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Shadow Banking and Corporate Finance

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Submitted in fulfilment of the requirements of the Degree of
Doctor of Philosophy

Adam Smith Business School
College of Social Science
University of Glasgow

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Hao Peng

May 2020

Authors Declaration

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

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Shadow Banking and Corporate Finance

Abstract

This thesis examines how shadow banking activities affect firms' behaviors. We focus on two important representatives of shadow banking activities: wealth management products issued by commercial banks and finance companies affiliated in business groups in China. By observing how corporates' cash holding policies, investment decisions and financing choices response to dynamic changes in the shadow banking activities through three empirical studies, we find that the wide spread of shadow banking activities in China plays an important role in explaining corporate behaviors.

Precisely, the first study in this thesis investigates the relationship between shadow banking activities (wealth management products) and firms' investment decision. Wealth management products are best described as asset-based investment products that derive returns based on the performance of designated pool of underlying assets, which contribute to a sizeable fraction of shadow banking activities in China while are subject to lightly regulation. In this study, we find that firms operating in cities with greater shadow banking presence are more responsive to their investment opportunities than those operating in cities with less shadow banking presence. This effect is stronger for financially constrained firms, suggesting that shadow banking activities to some extent reduce firms' financial

constraints. We find this result is valid and robust in the endogeneity tests using instrumental and natural experiment method. The results of this study suggest a more careful regulation on shadow banking industry taking both the benefit and risk sides into consideration.

The second study investigates the impact of the presence of finance companies on firms' cash policy. Finance company is essential a shadow bank involving credit and maturity transformation affiliated in a business group. We find a cash hoarding behavior after firms having access to finance companies. This result is consistent with tunneling theory for cash holdings that the hoarding cash is a result of controlling shareholders' incentives to siphon resources out of the firm to increase their own wealth using finance companies as a tunneling vehicle. This result survives in a battery of robust tests and endogeneity tests. To the best of our knowledge, this study is the first to provide systematic evidence that finance companies serve controlling shareholders' tunneling motives rather than firms' investment purposes.

The third study examines the relationship between the presence of finance companies and firms' reporting behaviors. We show that firms are more likely to be engaged in earnings management through increasing the use of discretionary accruals after having access to finance company. We also find that their earnings management behavior is in parallel with an extensive equity financing. We argue that controlling shareholders are incentivized to manage earnings to raise more capital from equity issuance and require firms to deposit the raised capital in finance company for their own interest, which is consistent with the tunneling view of finance companies in the second study. We highlight the earnings

management costs imposed by the presence of finance company in China. Both the second and third studies have important implications that policy makers need to pay close attention to the prevalence of finance companies in the evolution of business groups, especially on the cost side of such group-specific banks.

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Chapter 1

Introduction

China has been one of the fastest growing economies over last three decades. A widely recognized perception in the law, institutions, finance, and growth literature is that a country's overall economic growth is largely attributable to a well development of financial systems (King and Levine, 1993; Levine and Zervos, 1998; Levine, et al, 2000; Bekaert et al, 2005; Beck et al, 2005; Demirgüç-Kunt and Maksimovic, 1998; Love, 2003; Beck, et al2008; Rajan and Zingales, 1998; Wurgler, 2000; Guiso et al, 2004; Schoar, and Thesmar, 2007). However, China seems to be a counterexample to the findings in these existing literatures because its significant economic development is accompanied by poor legal systems and underdeveloped financial markets (Allen et al, 2005). On the other hand, a growing body of literature has turned to discuss the role of informal financial systems playing in developing economies. The dominant view is that the informal financial system fills the institutional void, serving as a complement of the formal financial system in a weak institutional context. At the same time, such informal financial system has become increasingly notable because it may also bring substantial risks to the economy. This thesis focuses on the role of the most important constitution of informal financial systems-shadow banking system and pays specific attention to the benefits and costs of this unique system, as well as how the shadow banking system serves the real economies. This thesis aims at providing a more comprehensive landscape of China's shadow banking and investigating its real economic influences by establishing a bridge linking shadow banking activities with firms' financial and investment decisions.

Shadow banking in China, or credit intermediation involving activities outside the traditional banking system, has evolved rapidly in terms of its size and dynamics since the globe financial crisis. It differs from shadow banking in the United State constituted by various securitization and market-based instruments which play only a limited role, shadow banking in China is now playing a crucial role to the ecosystem of China's economy which constructs connections among thousands of financial institutions with companies, local governments and hundreds of millions of households. According to Moody's report in June 2017, shadow banking assets accounted for 83 per cent of GDP, which is down from a peak of 87 percent recorded in 2016. The prevalence of shadow banking enriches firms' financing channels, however, raises concerns that it may increase the over fragility and risk of the financial system in China due to its opaqueness and complexity given that China is an emerging market where financial markets are relatively imperfect because of information asymmetry, weak corporate governance and poor investor protection.

To study the real impact of the shadow banking activities in China, in this thesis, we examine two major components of China's shadow banking sector-wealth management business conducted by commercial banks and business groups' finance company in China.

The thesis contains three thorough studies. The first study examines the real effect of shadow banking activities (commercial banks' wealth management products) on firm investment. The second study investigates the relationship between the presence of finance company and firms' cash holding policy. The third study focus on the relationship between the presence of finance company and firms' earnings management behavior.

Specifically, the first study investigates the effects of the shadow banking activities on firm investments in China. The study answers the research question that how shadow banking activities impact firm investments through banking lending channel. It has been long of concern to the literature that how bank lending behaviors influences firms' investments given the frictions in the economy. Most of literature on bank lending channel focus on the availability of external financing such as capital markets or banks' on-balance sheet credit, however, how shadow banking credit influences firms' investments has received little attention. Shadow banking in China evolves rapidly in response to changes in regulation. It is believed that those shadow banking activities may impose a key risk to the stability of China's financial system and economy. To tighten shadow banking activities and defusing the financial risks that threaten the economy, a recent regulation on shadow banking industry in 2018, namely the *New Asset Management Rules*, was introduced, which drives our motivation to conduct this study. The regulation largely stands on the risk side of the shadow banking activities, however, the real impact of such regulation on shadow banking is still unknown due to the lack of systematic evidence on how shadow banking affects the real economy. Regulators are still ambivalent about how and to what extent to regulate this sector (Allen, 2018).

The thesis aims to provide insights to the heated debate regarding the net benefits of shadow banking sector in China. The prevalence of shadow banking enriches firms' financing channels, however, raises concerns that it may increase the over fragility and risk of the financial system in China due to its opaqueness and complexity. To study the net impact of shadow banking in China, we focus on the largest component of shadow banking activities in China-wealth management products (WMPs) and how bank's involvement in

WMPs affects firms' investment behavior. We use 363,654 WMPs issuance information from WIND terminal from 2009 to 2016 and match WMPs data with firm-level data via the WMPs issuers' (commercial banks') geographical location of headquarter. We find that the scale of WMPs is positively related the level of firm investment, suggesting that firms operating in cities with greater shadow banking presence are more responsive to their investment opportunities than those operating in cities with less shadow banking presence. We also examine whether differences in firm characteristics affect the extent to which shadow banking reduces financial constraints. We find that small and private firms subject to more information asymmetries invest more if they operate in cities with more shadow banking activities presence. Moreover, a prevalence shadow banking environment would help firms to reduce the reliance of investment on cash flow. Further, firms with greater investment opportunities proxies by TobinQ depend more on shadow banking credit. These results suggest that shadow banking has become an important driving force of firm investment through financial constraint channel. We employ the *Regulation on Asset Management Business of Commercial Bank* issued by China Banking Regulatory Commission (CBRC) in 2013 as an exogenous supply-side shock to shadow credit and an instrument of WMPs to deal with the endogeneity problem in the relationship between the scale of shadow banking and firm investment.

Our results provide robust evidence suggesting that shadow banking plays a complementary role that meets the financial demands of firms in China. Precisely, shadow banking in China serves an important alternative financing channel for firms that have less privileged access to formal bank credit in the context of the presence of regulatory restriction of the 75% cap on banks' loan-to-deposit ratio. Any inappropriate regulation or overregulation could

have negative economic effects if firms facing the withdrawal of the shadow banking financing cannot frictionlessly switch to an alternative financing source. We recommended that when the regulators are focusing on systematic risks of shadow banking activities, they should also not lose sight of its impact on corporate investment of firms; which is the core of the long-term development of economies.

The second study shifts the focus to the prevalence of finance company in China's business groups. Finance company¹ is a non-banking financial institution affiliated with a business group, providing the member firms of the business groups with bank-like financial services such as deposit taking and loan originating. They are essentially shadow banks involving in maturity, credit, and liquidity transformation within groups.

Chinese reformers originally experimented with finance companies to enable firms to reduce financial constraints and to better manage investments within and outside the group (Keister, 1998). However, anecdotes show that the effectiveness and the functioning of finance companies may not be efficient as much as it could be. Precisely, the nearly 50% loan-to-deposit implies that a large portion of deposit generated from member firms are not re-allocated to firms

¹ Business Group Finance Company Act (FC Act) is one of the most critical regulations on FC, where terms and conditions with regard to entry, establishment and operations are clarified. According to the FC Act, Business group is defined as a business consortium that consists of a holding company and a group of subsidiaries and joint stock companies that are connected through capital linkage. Business groups applying for establishing finance company should meet the following requirements: 1) Registered capital of the holding company should not be lower than Renminbi 800 million one year before the application. 2) Consolidated assets of the holding company should not be lower than Renminbi 5 billion and net asset ratio should not be lower than 30% one year before application. 3) Two years in row before the applications, consolidated total revenue should not be lower than Renminbi 4 billion per year and earning before tax should not be lower than Renminbi 200 million per year. Besides, the establishment of a finance company is subject to a two-stage approval from the PBOC. Specifically, the first stage refers to the approval of preparation where the PBOC will make an announcement of approval for qualified Business group to prepare the establishment of a finance company. After a no more than 6 months preparation, the Business group is required to submit the application documents for opening. If the application is accepted, the PBOC will make a second stage of approval of opening announcement for qualified finance company.

within groups. On the other hand, firms increase cash holdings dramatically in the following years after having access to finance companies, which suggests that the level of financial constraints may not be alleviated given member firms tend to save more cash after the access to finance companies.

To better understand the role of finance company in business groups, we examine how cash holdings of Chinese firms have evolved in parallel with the development of business groups and whether this evolution can be explained by the emergence and functioning of finance companies. We use hand-collected data 196 finance companies' information with respect to the date of incorporation and the ownership structure from CBRC's official announcements from 1987 to 2014. We trace ownership of finance companies of any length and match the data with ultimate or direct shareholders of firms that list on Shanghai and Shenzhen stock exchanges to make sure that finance companies and listed firms belong to the same business group.

We find a stark difference between member firms in groups with and without finance companies in terms of their cash holdings. We find that a member firm which belongs to a business group with a finance company holds more cash than a member firm which belongs to a business group without a finance company. This result is inconsistent with the precautionary theory (Keynes, 1936), which predicts a reduced cash holding for member firms when they have access to finance company's funds and reduce their financial constraints. The four evidences suggest that the member firms' increase in cash holding after having access to finance companies within the business group is because of the incentives for the parent company to siphon resources out of the firm to increase their own

wealth. First, we find the increase in cash holdings is stronger when finance companies are allowed to enter the interbank market in year 2000 by the government since the finance companies find it even easier and more profitable to lend out through the interbank market in the presence of dual-track interest system, although interbank market focuses mainly on overnight lending between financial institutions. Second, consistent with the study proposed by Kalcheva and Lins (2007) who argued that firms with a more of diverged controlling shareholder's cash flow rights versus voting rights would hold more cash, we expect that this tunneling effect is stronger when the control right of the controlling shareholders is lower because the controlling shareholders wants to transfer benefits from firms where their cash flow right is low to firms where their cash flow right is high (Bertrand et al, 2002). Similarly, in the third analysis, we would expect the parent company to save more cash out of cash flow from equity issuance than other debt financing as their main financing choice for each member firm to accumulate cash holdings. By diluting the controlling right while remain full control, the controlling shareholders could reap more private benefits from depositing the accumulated cash from equity issuance in their wholly controlled finance companies. And fourth, to examine the interbank market is the plausible channel in explaining how private benefit is realized in the context of the presence of finance companies, we conduct a cash holdings sensitivity test and document that the cash holdings of firms with finance companies, in compared with firms without finance companies, are more sensitive to the variation of interbank rate, namely the SHIBOR rate while insensitive to the variation of governmental constrained rate.

To address the endogeneity problem, we take advantage of the Behavioral Guidance for controlling shareholders of listed small- and middle-sized enterprises issued by Shenzhen stock exchange in

2007 as an exogenous shock to the extent of tunneling effect of a parent company with an FC within the business group. The 2007 Anti-tunneling Guidance restricted possible harmful behaviors of controlling shareholders to minority shareholders that negatively affects the financial independence of firms, including restriction on any listed SME firms to deposit cash in their affiliated FCs. We find that the higher level of cash holdings for the treated firms is significantly reduced if they are SME firms post-2007 compared to control firms, which is in line with the tunneling hypothesis.

We also consider two alternative explanations. First, the higher level of cash holdings for the treated firms could be that it is the controlling shareholders' intention to improve the efficiency of resource allocation within groups by channeling cash from firms with lower capital efficiency to firms with good investment opportunity and hence large cash needs, using finance companies as an intermediary. We test the first alternative explanation by comparing responses in cash holdings after accessing finance companies across state-owned firms and non-state-owned firms. Empirical studies show that state-owned firms facing with soft budget constraints tend to be more profligate at capital efficiency in contrast to non-state-owned firms. However, we did not find state-owned firms increase more cash holdings after having access to finance companies, which is against the first alternative explanation. The second alternative explanation lies in that accessing finance company possible provides management an avoidance of external monitoring by creditors and hence increases the agency cost of managerial discretion. The result that the level of bank-dependence of firms in the pre-accessing finance company period (proxying the level of external monitoring) is irrelevant to firms' cash policy post-accessing finance company period rules out this alternative explanation.

The second study has important implications that policy makers need to pay close attention to the role of finance companies in the evolution of business groups, especially on the cost side of such group-specific bank

The third study continued to investigate the how firms' earnings management reacts their access to finance company. This study answers the question whether the firms' access to finance company enhances the corporate governance or brings unintended consequence to the firms. We test two contrary economic mechanisms through which finance company affects firms to engage in earnings management: corporate governance and agency conflict of tunneling. Precisely, if the corporate governance mechanism of finance company works, we expect less earnings management behavior after firms accessing the finance company. Because access to finance company help group members reduce agency cost and hence improve the productivity and performance (Keister 1998). However, if finance company facilitates controlling shareholder of firms with privilege to siphon resources out of firms to increase their own wealth, they have incentives to window dress true firm performance to obfuscate the market. This insight suggests that earnings management is inherently associated with finance company-induce tunneling especially in a weak institutional context because poor corporate governance prevents such earnings manipulation from easily being detected and the benefits of this misbehavior are higher (Leuz et al, 2003).

We find that firms are more likely to be engaged in earnings management through increasing the use of discretionary accruals after having access to finance company. We also find that their earnings management behavior is in parallel with an extensive

equity financing. We inferred that finance company can bring substantial private benefits to controlling shareholders (also the parent of business group and the wholly owner of finance company) if large amount of cash holdings is deposited in finance company, controlling shareholders are incentivized to manage earnings to raise more capital from equity issuance and require firms to deposit the raised capital in finance company. By doing so, the controlling shareholders can reap most, if not all, the profits from finance company. In short, finance company enhances the tunneling motives of controlling shareholders, which consequently result in more earning management behaviors. We also conduct two cross-sectional analysis to provide more direct evidence supportive of our tunneling explanation. We use the difference between Shibor rate (Interbank-market rate) and firms' last year profitability, and the controlling shareholders total share holdings to capture the tunneling incentive of firms with access to finance company behind their earnings management behavior. First, we find that larger difference indicating larger tunneling benefits that finance company could supply is associated with greater level of earnings management for firms with access to finance company. Second, the positive relationship between the presence of finance company and earnings management is stronger if controlling shareholders exercise full control while holding a relatively smaller portion of cash flow rights. Besides, we also use a direct measure of tunneling (related party transaction between subsidiary and parent company) to reflect the extent of entrenchment of the controlling shareholders and find that earnings management is more pronounced at firms controlled by more entrenched shareholders after they access the finance company.

Our evidences show that the presence of finance company has a strong positive effect on earnings management, which reduces the

quality of a firm's accounting information. These results also survive in the endogeneity test. We use *No.37 Memorandum Disclosure Regulation* on Related Transaction between Finance Companies and Listed Firms issued by Shenzhen stock exchange in 2011 as an exogenous shock on firms' earning management decision. This regulation indicating a more transparent accounting information on the transaction between finance companies and affiliated firms supposedly reduced the abuse of finance company in tunneling activities by controlling shareholders. As expected, we find that earnings management of firms with access to finance company significantly reduced in the aftermath of the regulation adoption, confirming that a firm's tunneling rationale to hide information on earnings management once they gain the helps from finance company. These results also imply that improving accounting quality may help to reduce earning managements, which is consistent with argument proposed by Biddle et al (2009).

Because firms may increase reported earnings to achieve various incentives other than tunneling incentives. We attempt to rule out three alternative explanations for our results. First, it is believed that managerial compensation could be the key driver to an increasing earnings management after having access to finance company (Cheng and Warfield, 2005). It is possible that compensation of CEO becomes more dependent on the performance of the firms after firms have access to finance company. Finance company might be endowed to have responsibility for managing the member firms' budget on behave of the parent company of the group. Therefore, a more marketized compensation scheme based on the performance could be adopted. Our results show that this alternation explanation does not hold since we find that variation of CEO compensation including salary and option has no significant influence on the relationship between the presence of finance company and the level

of earnings management. Second, accessing to finance company may bring stronger financing capacity and greater investment opportunities to affiliated member firms. Finance company's primary function of funds reallocation within groups may promote the liquidity of the member firms, which results in that firms are more sensitive to investment opportunities. Managers may use discretionary accruals to credibly signal positive prospects to the market, enabling it to raise more capital to support the optimal investment projects (Linck et al, 2013). In line with this view, we would expect that positive effect of finance company on earnings management is stronger at firms with great investment opportunities. However, we provide evidence against this hypothesis. Third, we consider that political issue may both affect firms' decision to access to finance company and earnings management decision. Liu et al (2018) find that political connections matter in deciding firms' earnings management. One may argue that firms manage earnings to meet objectives set by government agency for quick political promotion. Thus, we would expect that state-owned firms should responses differently from non-state-owned firms in terms of the engagement of earnings management after accessing to finance company. Our results fail to support this hypothesis.

Taken together, the third study highlights the earnings management costs imposed by the presence of finance company in China. It has an implication for policymakers as we suggest that improving transparency of the transactions between finance companies and listed firms could help increase the informativeness of firms' reporting.

The remainder of this thesis is organized as follows. We show all the related literature in chapter 2, followed by three chapters

presenting the three studies in the relation between shadow banking activities and corporate finance. We draw conclusion in Chapter 6.

Chapter 2

Literature review

2.1 Related literature in China's shadow banking

Different definitions for shadow banking have been proposed by researchers and regulators, Pozsar et al (2012) defined shadow banking as financial intermediaries that involves in maturity, credit, and liquidity transformation with no backstop of liquidity facilities from central bank. According to Financial Stability Board (FSB) definition, shadow banking is credit intermediation that conduct entities and activities fully or partially outside the regular banking system, or non-bank credit intermediation in short (Financial Stability Board, 2014).

It is widely believed that the rapid growth of shadow banking activities in China was driven by China's 4 trillion stimulus plan initiated by the Chinese government in response to the global financial crisis in 2008. There are several characteristics of shadow banking in China. First, commercial banks are the dominant players in the shadow banking market, it indeed is "the shadow of banks". Second, shadow banking attaches a close tie with the financial system, companies, local governments and hundreds of millions of households. Third, shadow banking is becoming more complex with more emergence of structured shadow credit intermediation based on sophisticated structures of existing shadow banking instruments.

The expansion of the literature on shadow banking started from the 2007-09 Financial Crisis. Researchers began to rethink the role of financial intermediaries in financial system. Recently, the literature on China's shadow banking has been growing. Chen et al (2016) and Hachem and Song (2016) contend that the stricter liquidity regulation was the trigger to the rapid development of shadow banking in China. Wang et al (2016) demonstrate that shadow banking essentially provides a pragmatic dual-track reform solution to interest rate liberalization in China, which led to efficiency gain in credit allocation and social surplus. Acharya et al (2016) find that small- and median-size banks in China significantly increase the participation of shadow banking activity in the form of issuing off-balance sheet wealth management products, which may induce a substantial rollover risk when they mature. Chen et al (2017) argue that small- and median-size banks engage more actively in shadow banking in the form of channeling risky entrusted loans as a response to the deposit shortfalls as well as regulatory prohibition on lending to risky industry, which brings the risk of shadow banking into their balance sheet. Chen et al (2017) report that the rollover pressure of local government from maturing debt financed by China's four-trillion-yuan stimulus package manifest the handover effect of the stimulus plan on fostering the rapid growth of shadow banking activities. Allen et al (2017) reveal that the pricing of affiliated entrusted loans and non-affiliated entrusted loans incorporates fundamental and informational risks.

2.2 Related literature in business group

Several attempts by academic practitioners have been made to the definition of a business group (Granovetter,1985; Keister,1998; He, Mao et al.,2013; Khanna and Rivkin, 2001; Khanna and Yafeh,

2007; Almeida, Kim et al., 2015), however, it still remains ambiguous due to the fact that the concept of ‘business group’ inclines to an intuition notion rather than a judicial organizational form (Khanna and Rivkin 2001). In order to better account for the China’s institutional context, we employ the official definition in the Registration of Business Groups Regulation (Registration Act, 1998) by State Administration for Industry & Commerce of the People’s Republic of China (SAIC). A business group is a federation of legally independent firms, which are bound together by ownership ties, operating under the control of a single parent, or core firm.

A large and growing body of literature has paid attention to intermediation functions played by business group as efficient response to the institutional voids (Leff, 1978). In particular, the kernel of institutional void theory is that the business groups can achieve internal replication of the functions provided by ambient intermediary as in advanced economies given the scale and scope of the groups (Gertner et al, 1994, Khanna and Palepu, 2000). Especially in emerging markets where financial markets are relatively imperfect because of information asymmetry, weak corporate governance and poor investor protection, the resultant transaction costs are particularly expensive. A business group acts as an internal capital market that can allocate resources among affiliated firms less costly and thereby can lead to economic benefits to affiliated firms. It is widely believed that groups can fill some institutional voids through the mechanism of internal capital market in less developed financial markets (Khanna and Palepu, 2000, Morck et al, 2005).

It seems always to be a recurring theme in the research to study the benefits and costs of internal capital markets for business groups. In general, the internal capital market can be controversially motivated by a finance advantage and a tunneling intention. In a financial constrained environment where not all positive NPV projects can be financed, firms can create value by actively engaging in “winner-picking” through internal capital markets. The economic rationale behind implies that well-informed management in a business group reallocate scarce funds from members with low profitability to those with high profitability, thereby benefit from firm’s most promising growth opportunities which stand-alone firms may not have financing capacity to capture (Stein, 1997). Gopalan et al (2007) document that Indian business groups transfer cash internally to prop up member firms that are close to bankruptcy. More recently, Almeida et al (2015) found evidence that chaebols in Korea alleviate the negative effects of the Asian crisis through intragroup capital reallocation in the circumstance that external finance became more expensive. The finding is consistent in the spirit of the work by Kuppuswamy and Villalonga (2015) who show that the U.S. conglomerates’ internal capital efficiency increases during the 2007–2009 financial crisis. Moreover, business group in a pyramidal structure appears to have finance advantages in setting up new firms, those with large investment requirements but low injectable cash flows, as the group is better able to access a pool of internal funds (Almeida and Wolfenzon 2006; Bena et al, 2013). Other studies on business group have contented another function of internal capital market in risk sharing by funds reallocation (Khanna and Yafeh 2005; Gopalan et al, 2007; He et al, 2013). All above evidence has sketched a positive picture of internal capital markets, suggesting that the presence of internal capital markets embed in business groups will improve firm performance. However, a growing number of longitudinal studies have paid attention to the cost of such affiliation. Business group can be associated with agency problems such as expropriation by managers or the

controlling shareholders. In such respects, the internal capital market acts no longer as efficient complement to the weak external markets, but rather as rent-seeking vehicles through which the controlling shareholders can exploit benefits from minority investors. More importantly, the problems can be exacerbated in emerging market where corporate governance and investor protection are weak (Johnson et al, 2000; Khanna and Palepu 2000). Bertrand et al (2002) discover a significant amount of tunneling activities via manipulating nonoperating components of profit in Indian business groups. Bae (2002) pointed out that acquisitions provide a way for controlling shareholders of Korean business groups (chaebols) to increase their wealth. Similar, tunneling benefits can be pursued by controlling shareholders of chaebols via the use of private securities offerings.

2.3 Related literature in cash holdings

Prior empirical literature has paid attention to either financial constraints channel or agency channel in explaining firms' cash holdings policies. With regard to the former, the precautionary demand of holding cash initially proposed by Keynes (1936) suggests that liquid cash prevents firms from underinvesting or even forgoing positive NPV projects if adverse cash flow shocks make alternative of funds unavailable or excessively costly. This conventional wisdom is supported by a number of papers. For example, Bates et al (2009) conclude the reason why U.S firms hold much more cash than they used to is protect themselves against adverse cash flow shocks. Duchin (2010) finds that diversified firms hold less cash than stand-alone firms do because diversification efficiently reduces firms' exposure to risk and allows them to hold less cash for precautionary reasons. McLean (2011) show that firms

with strong precautionary motive to hold cash are increasingly rely on share issuance as the source of the cash. In addition to the financial constraint channel, as argued by Jensen (1986), excess cash holdings may aggravate agency problems since firms' insiders may have incentives to pursue their private benefits through a pool of accumulated free cash flow. Based on Jensen's viewpoint, ample studies focus on agency conflicts between controlling shareholders and minority shareholders and study how the excess cash holding relates to the controlling shareholders' private interests of wealth maximization via expropriating resource out of firms, or in other words, the controlling shareholders' engagement in tunneling behaviors. Dittmar and Mahrt-Smith (2007) present that poorly governed firms lower increase in firm value corresponding to 1 dollar increase in cash holdings. In the international study of 45 countries by Dittmar et al (2003), firms in countries where investor protection is weak hold twice as much cash as firms in countries with good investor protection. Harford et al (2008) find that firms with entrenched managers choose to spend cash quickly on investments rather than hoard it. Kalcheva and Lins (2007) discover that firm value is lower in countries with weaker external shareholder protection, which is consistent with findings by Pinkowitz et al (2006).

2.4 Related literature in evidence of tunneling in China

A growing stream of empirical literature has shown tunneling evidence in China. Chen et al (2012) confirm the existence of tunneling in Chinese listed firms and argue that the non-tradeable reform can help to mitigate this agency conflicts between controlling shareholders and minority shareholders. A group of studies show evidence that controlling shareholders of Chinese

listed firms use related-party transaction to conduct tunneling activities. For example, Jiang et al (2010) find that controlling shareholders use intercorporate loans to siphon funds from publicly listed firms. Jian and Wong (2010) show evidence of propping up by controlling shareholders through related sales and the propping up effect is stronger for state-owned firms and firms operating in regions with weaker economic institutions. Peng et al (2011) confirm this finding by studying connected transaction data among firms. Jiang et al (2015) investigates the Non-Operational Fund Occupancy (or NOFO) behavior of controlling shareholders, providing evidence that such behavior comes from their tunneling motives.

2.5 Related literature in earnings management

Many studies have defined earnings management. For example, Schipper (1989) use "disclosure management" to define "earnings management" in the sense that management purposeful intervene the external financial reporting process for their personal benefits. A more widely used definition by Healy and Wahlen (1999:368) concludes the occurrence of earnings management as “when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting practices”. Under generally accepted accounting principle (GAAP), firms involve in earnings management through manipulating reported accounting numbers to obscure true economic performance (Dechow and Skinner, 2000).

Institutional factors such as weak corporate governance, investor protection and underdeveloped market are considered significant determinants of earnings management activity. Xie et al (2003) emphasized the importance of the board of directors, the audit committee, and the executive committee in preventing earnings management. In the multinational comparison across 31 countries, Leuz et al (2003) found that countries with developed equity markets, dispersed ownership structures, strong investor rights, and legal enforcement are less likely to have earnings management problem. The introduction of short selling can help improve the market efficiency and hence less earnings management (Fang, 2016).

A substantial body of empirical has focused on the motivation behind firms' earnings management behavior. For example, Gunny (2010) examine the relationship between earnings management and future performance and suggested that firms are motivated to opportunistically manage earnings to meet the earnings benchmark. Furthermore, managers manipulate earnings to avoid reporting earnings losses and decreases (Dichev, 1997), Du and Shen (2018) explored evidence suggests that managers manage earnings to match peer performance. Strong evidence is found in support of debt covenant hypothesis that managers opportunistically report earnings to avoid violations of accounting-based debt covenants (DeFond and Jiambalvo, 1994; Dichev and Skinner, 2002). Cheng and Warfield (2005) argued that compensation maximization is an important driving force shaping managers reporting outcomes. Earning overstatements are more frequently to exist in CEOs' early years of service because their attempts to favorably influence the market's perception of their ability (Ali and Zhang, 2005). Moreover, managers are engaged in earnings management prior to security issuance such as initial public offerings or seasoned equity offerings to boost share prices (Teoh et al, 1998a; Teoh et al, 1998b;

Rangan, 1998). Similar, Louis and Robinson (2005) that managers use discretionary accruals to favorably signal information to the market around stock splits announcement. Linck et al (2013) suggested that managers strategically use discretionary accruals to credibly signal positive prospects to the market, enabling it to raise more capital to support the optimal investment projects. Besides, matching expected credit rating is another motivation to earnings management (Alissa et al, 2013). Liu and Lu (2007) reveals a unique setting where Chinese firms are motivated by controlling shareholders' tunneling incentives to engage in earnings management activities.

Earnings management techniques also attract numerous attentions by a great volume of literature. A large number of studies focus on discretionary accruals management (e.g. Dechow et al, 1995; Dechow et al, 2003; Ayers et al, 2006; Cohen and Zarowin, 2010). However, accrual model received repeated criticism due to that it may produce bias and noisy in detecting earnings management (Bernard and Skinner, 1996). Stubben (2010) suggests that discretionary revenue as an alternative measure of earnings management provides more powerful estimation. In addition, research also interested in real earnings management. Prior studies pay attention to three types of real earnings management. Due to that research and development (R&D) must be recorded as incurred expense to reflect the uncertainty of future benefits associated with R&D expenditure, managers may choose to cut R&D expense to boost the earnings. Several studies have found evidence of cutting R&D expense to manipulate earnings (Baber et al, 1991; Dechow and Sloan, 1991; Bens et al, 2002; Cheng, 2004). The second type of real management activities refers to manager's discretion on the timing of asset sales. Examples of research focusing on timing of asset sales include Bartov (1993) and Herrmann et al (2003).

Alternative, sales manipulation such as overproduction to report lower cost of goods sold also provide a way to manage reported earnings. Example of research providing evidence consistent with managers overproducing to decrease reported include Gunny (2010), Thomas and Zhang (2002) and Roychowdhury (2006). Furthermore, Farrell et al (2014) document that the use of share repurchases offers a prevalent mechanism to manage earnings per share.

Chapter 3

Shadow Banking Financing and Firm Investment

3.1 Introduction

Given the fiction in banking industry in China where banks are forced to involve in shadow banking activities such as absorbing quasi-deposits to satisfy the loan growth, firms in China are financial constrained that they have to rely on informal financing such as shadow banking financing to support their investment demands. In this context, shadow banking seems to play an important role in capital intermediary. If the capital intermediary mechanism works in China, we would expect the more the quasi-deposits are absorbed by banks, the more investment that firms would have because they are less financially constrained. To test this hypothesis, we use novel data of the major component of China's Shadow banking activities-wealth management products (WMPs) issued by banks, we find that firms operating in cities with greater shadow banking presence are more responsive to their investment opportunities than those operating in cities with lesser shadow banking presence. This effect is stronger for small and more constrained firms. We deal with the endogeneity problem in the relationship between scale of shadow banking and firm investment by using the *Regulation on Asset Management Business of Commercial Bank* issued by China Banking Regulatory Commission (CBRC) in 2013 as an exogenous supply-side shock to shadow credit. We discovered an unintended consequence of the

regulation on firm investment, that is, firms with prevalent shadow banking environment reduced their investment in the aftermath of the regulation on shadow credit supply. Our findings are consistent with the hypothesis that the shadow banking activities in China serves as a complement for financial markets, helping firms to overcome financial constraints. We recommended that when the regulators are focusing on systematic risks of shadow banking activities, they should also not lose sight of its impact on corporate investment of firms; which is the core of the long-term development of economies.

Shadow banking in China, or credit intermediation involving activities outside the traditional banking system, has evolved rapidly in terms of its size and dynamics since the globe financial crisis. It differs from shadow banking in the United State constituted by various securitization and market-based instruments which play only a limited role, shadow banking in China is now playing a crucial role to the ecosystem of China's economy which constructs connections among thousands of financial institutions with companies, local governments and hundreds of millions of households. Moreover, another defining feature is that shadow banking in China is mainly driven by commercial banks who have been able to keep shadow banking assets beyond the balance sheet to sidestep regulatory constraints on lending. The prevalence of shadow banking enriches firms' financing channels, however, raises concerns that it may increase the over fragility and risk of the financial system in China due to its opaqueness and complexity. The burst of the stock market bubble during 2015 has been attributable to that shadow banking provides much leveraged capital to the stock market that fuels the vulnerability of the market. This led to the introduction of the recent regulation on shadow banking industry in 2018, namely the New Asset Management Rules, aimed at

tightening shadow banking activities and defusing the financial risks that threaten the economy. However, due to the lack of systematic evidence on how shadow banking affects the real economy, such regulation could have negative economic effects if firms facing the withdrawal of the shadow banking financing cannot frictionlessly switch to an alternative financing source.

On the other hand, it has been long of concern to the literature that how bank lending behaviors influences firms' investments given the frictions in the economy. Modigliani and Miller (1958) provide a theoretical foundation in corporate finance that firms' investment decision is irrelevant to its financing decisions in perfect capital and credit markets. However, firms in an institutional context where capital markets are insufficient to support their optional investment may face adverse selection and moral hazard frictions that restricts their ability to access external financing or substitution of private sources of capital, if their main capital providers experience shocks (Holmstrom and Tirole, 1997). As a result, firms that extensively rely on them may have to choose suboptimal investment that limits firms' growth and profitability. Recent studies that work on this bank lending channel focus on the availability of external financing such as capital markets or banks' on-balance sheet credit, however, how shadow banking credit influences firms' investments has received little attention. Most of the existing theoretical and empirical literature on shadow banking deals with the risk side, focusing on how much risk shadow banking adds to the real economy, while there is little evidence on the price or the importance of such shadow credit (Allen et al, 2019). If shadow banking does have complementary effect to the existing financial market or lending market, any over-regulation on shadow banking activities need to be re-evaluated since shocks to such markets could have negative impact on firms that dependent on shadow credit.

This study aims to contribute to the unresolved debate regarding the role of shadow banking in China.

China seems to be a natural candidate for investigating the real impact of shadow banking on the border economy for three reasons. First, China's capital markets are relatively underdeveloped with weak shareholder protection (Ljungqvist et al, 2015, Allen et al, 2005). In such context, firms subject to moral hazard and adverse selection friction due to information asymmetries are more likely to be financially constrained when they invest (Beck et al, 2005). Second, the enforcement of the 75% cap on banks' loan-to-deposit ratio may create distortions in bank lending market. Lenders will have incentives to seek regulatory arbitrage opportunities to avoid 75% loan-to deposit restriction. On the other hand, borrowers will have incentives to explore alternative financing channel outside the traditional banking system to fill the gap in loan supply. Third, the imperfection in capital market and lending market is in parallel with an exponentially booming shadow banking market², which creates a puzzling whether the growing shadow banking activities fill the gap in financing to the real economy. Therefore, it is important to develop a more comprehensive picture about shadow banking in China, with particular focus on the role of commercial banks and how it serves the real economy.

In this study, we attempt to answer this question empirically by focusing on the largest component of shadow banking activities in China-wealth management products (WMPs). We obtain 363,654 WMPs issuance information from WIND terminal from 2009 to 2016. We create a new proxy taking the maturity differences of

² According to Moody's report in June 2017, shadow banking assets accounted for 83 per cent of GDP, which is down from a peak of 87 percent recorded in 2016.

WMPs into account to make the scale of each bank's WMPs comparable. We match our WMPs proxy with firm-level data via the WMPs issuers' (commercial banks') geographical location of headquarter. We provide evidence that the rise of WMPs was a response to the regulatory restriction on banks' loan-to-deposit ratio as well as a slowdown in loan growth. Furthermore, we provide new evidence on the relationship between shadow banking activities and firms' investments. We find that the scale of WMPs is positively related the level of firm investment, suggesting that firms operating in cities with greater shadow banking presence are more responsive to their investment opportunities than those operating in cities with lesser shadow banking presence.

Our explanation lies on that shadow banking plays a complementary role that meets the financial demands of firms in China. We conclude that shadow banking in China serves an important alternative financing channel for firms that have less privileged access to formal bank credit in the context of the presence of regulatory restriction of the 75% cap on banks' loan-to-deposit ratio.

Next, we examine cross-sectional variation in the relation between shadow banking and firm investment sensitivities. We examine whether differences in firm characteristics affect the extent to which shadow banking reduces financial constraints. We find that small and private firms subject to more information asymmetries invest more if they operate in cities with more shadow banking activities presence. We also find that a prevalence shadow banking environment would help firms to reduce the reliance of investment on cash flow. Further, firms with greater investment opportunities proxies by TobinQ depend more on shadow banking credit. These results suggest that shadow banking has become an important

driving force of firm investment through financial constraint channel.

Due to that our shadow banking proxy is based on city-level, it is possible that shadow banking activities in a city might be correlated with city-wide factors that are not captured our firm-specific proxies for growth opportunities. We adopt two approaches to deal with this potential endogeneity problem. First, we use the income structure of banks as an instrument for our shadow banking proxy. Our results survive in this instrumental variable test. Second, we take advantage of *Regulation on Asset Management Business of Commercial Bank* issued by China Banking Regulatory Commission (CBRC) in 2013 as an exogenous supply-side shock to shadow credit. The regulation aimed at curbing the development of shadow banking the by setting the ceiling that WMPs money can be channeled to borrowers. Given this adverse shock to the supply of shadow credit, we find that firms operating in the cities with shadow banking presence significantly reduce their investment in the aftermath of the regulation compared to firms operating in the cities with absence of shadow banking throughout our sample period. Our results reinforce the complementary effect of the shadow banking on capital and credit markets.

Our study contributes to the line of research on bank lending channel. The bank lending channel literature has investigated the real effect of shocks to banks on investment. For example, Chava and Purnanandam (2011) use Russian crisis of Fall 1998 as the supply-side shock on bank credit to demonstrate that U.S bank-dependent borrowers' performance was negatively affected by the adverse shocks to banks. Paravisini (2008) argue that financial constraints by banks lead to underinvestment to profitable lending.

More recently, Gilje et al (2016) find that banks exposed to deposit windfalls increase their lending to segments subject to greater contracting frictions. Cingano et al (2016) find that the credit crunch in interbank during financial crisis have a series of negative economic consequences in the period of 2007 to 2010. Similar conclusion can also be found in a large literature that discuss the bank-borrower relationship and how bank healthy affects borrower's performance (Slovin et al, 1993; Peek and Rosengren, 1997; Peek and Rosengren, 2000; Khwaja and Mian, 2008; Kang and Stulz, 2000). Our study contributes to these literatures by raising a novel aspect of supply-side shadow credit and discuss the real effect of changes in shadow credit on the border economy.

Our study relates to a growing body of literature on shadow banking in China. It is believed that tightening monetary policy was the trigger of rapid rise of shadow banking in China, giving banks a stronger incentive to exploit regulatory arbitrage (Chen et al, 2016; Hachem and Song, 2016). Wang et al (2016) proposed that shadow banking provides an a dual-track reform mechanism to gradual interest rate liberalization in China where interest rate is controlled by means of binding deposit rate ceiling and bank loan quota. The closest to our study is Acharya et al (2016), who study off-balance sheet wealth management products, find that small- and median-size banks in China engage in more shadow banking activities in response to on-balance-sheet financial constraint and competition from big banks. They also argue that the booming WMPs market will induce a substantial rollover risk to banking systems. While existing studies focus on another important component of shadow banking activities in China-entrusted loans. By using the entrusted loan data, Allen et al (2019) presents evidence on the asset side of shadow banking activities, emphasizing on the fundamental and informational risks incorporated in pricing of affiliated entrusted

loans and non-affiliated entrusted loans. He et al (2016) measure the impact of the announcements of entrusted loans. They find that the lender firms of the entrusted loans experienced a negative abnormal return due to a lack of worthy projects, while the receipt firms of the entrusted loans generate a positive abnormal return that indicates a type of certification. Our study contributes to the emerging literature by providing a linkage between shadow banking and firm investment, aiming at study the real effect of shadow banking activities on the economy.

Finally, this study extends several strands in the literature on firm investment in china. Firth et al (2008) discover a negative relationship between leverage and investment in China where the banks and other debt-holders perform a beneficial monitoring and disciplinary role that reduce overinvestment problem induced by agency problem. He et al (2013) find that business group plays an important role in determining firm investment. Cull and Xu (2005) suggest that the extent of private ownership matters for Chinese firm investment decision. Chen et al (2011) attribute the distortion firms' investment behavior and investment inefficiency to government intervention. Wang et al (2009) argue that the stock market price is informative in reflecting firm investment efficiency. Our study indicates a novel dimension in the determinants of firm investment in China, the shadow banking environment surrounded by firms. We suggest that a more active shadow banking environment could help to fill the gaps in capital and traditional banking credit markets. Firms operating in such environment are less financially constrained and hence make more investments.

Our results also have implications for the effect of the recent regulation of the New Asset Management Rules on shadow banking

industry. Given the institutional context of China's capital and credit markets, firms that depend more on shadow credit would have been more adversely affected by potential over-regulation on shadow banking activities. Policy makers are suggested to be carefully in drawing conclusion about shadow banking to avoid unintended consequence in the implementation of the regulation since function and real impact of shadow banking can vary according different economic conditions.

The remainder of the study is organized as follows. Section 3.3 introduces an overview of institutional background in China including regulation on credit market and details of wealth management products. Section 3.4 describes the data and sample. Empirical results and endogenous tests are presented in Section 3.5. Section 3.6 presents conclusions.

3.2 Intuitional background

3.2.1 Fiction in banking industry in China

Financial sector in China is dominated by banks. Four types of banks constitute the banking system. This first type is policy banks³, whose main objective is to issue loans to sectors that conduct non-profit businesses in accordance with governmental economic policies. These banks are not commercial banks which is not the

³ They are China EXIM Bank, China Development Bank and Agriculture Development Bank of China.

interest of this study. The second type is the five state-owned banks⁴. They are the predominant players in China's commercial loan and deposit market. The third type is twelve joint-stock banks. The fourth type is urban and rural commercial banks. They are small banks whose controlling shareholders are local or province government. All banks are supervised by supervision of the People's Bank of China (PBOC) and China Banking Regulatory Commission (CBRC). Fictions in credit market stems from the different objectives and incentive structures of banks. State-owned banks are less market-originated banks which tend to allocate and price loans based on governmental preferences but not on commercial judgment (Bailey et al, 2011), while other non-state-owned banks are small and financially constrained banks that serve small and private firms which have limited credit histories and collateral. Generally speaking, bank credit most likely flows to state-owned or big private firm but are discriminative against small and private firms (Firth et al, 2008), which is partially responsible for the market fiction.

Moreover, China has been implementing tightly regulated interest rate system. Precisely, PBOC sets the benchmark interest rate with ceiling and floor bounds for different maturities over business cycles and has only began to liberalize since 2015. Further, banks must comply with the regulatory enforcement of the 75% loan-to-deposit ratio (LTR) restriction. In other words, banks can only allocate loans equal to less than 75% of the deposits they generated⁵. In 2015, the LTR regulation was formally removed by the CBRC, however, the LTD ratio is still one of the key ratios that banks are

⁴ They are Industrial and Commercial Bank of China, China Construction Bank, Agricultural Bank of China, Bank of China and Communications Bank of China.

⁵ In 1995, the regulation of the loan-to-deposit ratio was written into the law on commercial banking. It was not until 2008 that the LTR regulation was fully enforced. In the following three year after the enforcement, CBRC amend the frequency of LTR monitoring requirements. Recently, regulators began to allow non-traditional deposit such as inter-bank deposit to be counted as denominator and certain types of loans were included as the numerator in the LTR calculation.

required to report to CBRC. The rationale of the LTR regulation is to ensure the liquidity of the deposit funds not invested in loans. Under an environment with the presence of these regulations, banks are experiencing difficulties in raising cheap deposits to sustain their loan growth while meeting the 75% LTR cap. As a result of the joint forces of these regulation and government intervention, banks are seeking ways to circumvent regulation through absorb quasi-deposits to satisfy the loan growth. Depositors are attracted by quasi-deposit products such as WMPs because it offers higher yields. It is the complexity of the banking regulation that induce the rapid growth in the shadow banking activities.

3.2.2 Key characteristics of shadow banking in China

It is widely believed that the rapid growth of shadow banking activities in China was driven by China's 4 trillion stimulus plan initiated by the Chinese government in response to the global financial crisis in 2008. There are several characteristics of shadow banking in China. First, commercial banks are the dominant players in the shadow banking market, it indeed is "the shadow of banks". Second, shadow banking attaches a close tie with the financial system, companies, local governments and hundreds of millions of households. Third, shadow banking is becoming more complex with more emergence of structured shadow credit intermediation based on sophisticated structures of existing shadow banking instruments.

3.2.3 Wealth management products (WMPs)

WMPs are quasi-deposits products provided by banks. It differs with other deposit products in three aspects. First, unlike traditional bank product—deposits, WMPs are best described as asset-based investment products that derive returns based on the performance of designated pool of underlying assets. Second, WMPs are off-balance sheet activity which do not account for liabilities in banks' balance sheet. Third, it is banks who have the discretion to set the rate of return of WMPs for investors. However, banks have no discretion to set the interest rate of deposits for savers because saving rate of deposits can only be set by the central bank of China.

The first WMP emerged in 2005, when the deregulation of expanding commercial banks' range of financial business was introduced by the Chinese regulator. In principle, WMPs are issued by commercial banks and are sold at traditional banks counters. Although other non-banking financial institutions such as securities companies, mutual funds, trust companies and insurance companies with asset management license offer similar investment products under different names, WMPs have its unique feature that investors would consider them as a substitute for bank deposits due to banks are the issuers of WMPs. This led to a misunderstanding by the WMP investors that they strongly believe the target returns of WMPs is effectively guaranteed by the bank. In practice, although there is little evidence due to the lack of transparency, WMPs barely incur loss because the issuer banks often rescue the failed WMPs. Technically speaking, there are two types of WMPs. Principal-guaranteed WMPs (the yield could be either guaranteed or floating) are often recorded on the balance sheet asset as required by the CBRC. Because they are deposit-like on-balance-sheet liabilities, banks must pay deposit reserves which cause a lower yield than non-principal-guaranteed WMPs. Non-principal-guaranteed with floating yield WMPs are off-balance-sheet activities with no

disclose requirements, often providing higher yield than banks are allowed to offer on formal deposits or Principal-guaranteed WMPs. Unguaranteed WMPs constitute a majority share of the WMP market. Typically, the underlying assets consist of a single loan or a pool of loan, debt instruments, money market instruments and small portion of equity assets.

WMP seems to be a good candidate to study shadow banking in China. WMPs are quasi-deposits issued by commercial banks that contribute to the largest fraction of shadow banking activities while are subject to lightly regulation. It essentially constitutes a dual-track mechanism to the existing constrained banking credit system given the restricted interest rate. Due to that there is no regulatory ceiling on the interest rate that WMPs could offer, WMPs became appealing to the depositors especially when the regulated deposit rate is very much below the WMPs yield. On the other hand, banks want to benefit from the raise off-balance sheet funding via WMPs and channel these funds to borrowers to circumvent regulation of on-balance sheet lending by capital ratio and LDR.

3.2.4 Regulation on asset management business of commercial bank in 2013

Regulation on Asset Management Business of Commercial Bank issued by China Banking Regulatory (hereafter, WMPs regulation) Commission (CBRC) in 2013 is considered as a milestone in the history of shadow banking regulation. This regulation specifically applies to wealth management products issued by commercial banks. It was the first time that the assets that a WMP could invest was

clarified. According to the WMPs regulation, investible assets can be categorized in two types: non-standard debt assets and standard assets. Non-standard debt assets refer to assets not traded on the inter-bank bond market or stock exchanges, including credit assets, trust loans, entrusted loans, acceptance bills, letters of credit, and account receivables. Standard assets are those traded on the inter-bank bond market or stock exchanges. The key element of banking regulation this study focuses is the rule that WMPs invested in non-standard debt assets should not exceed 35% of a bank's total WMPs or 4% a bank's total assets. This regulation to a certain extent restricts banks' ability to channel credit to borrowers through issuance of WMPs, representing a supply-side shock to borrowers who are dependent on shadow banking credits.

3.3 Data and Sample

3.3.1 Firm-level data and bank-level data

Our sample consists of all non-financial firms listed on the Shanghai and Shenzhen stock exchanges from 2007 to 2016. We obtain accounting data and stock price data from China Securities Market and Accounting Research database (CSMAR). We retrieve accounting data of all banks in China from and WIND Financial Terminal. Due to that WMPs channels funds from investors to borrowers, funds generated from WMPs issuance are normally pooled in a specific bank headquarter and will be lend to firms operating in the same city as where the bank headquarter operates. Therefore, city could be the link to match the two datasets. We match firm-level data with WMPs data by geographical location of

firms and banks headquarter in city-level. Our final bank sample consists of 2,368 bank year observations and 390 unique banks including 5 State-own banks, 12 Joint-stock banks and 373 City/rural/foreign banks.

3.3.2 WMPs data

We obtain 363,654 WMPs data from WIND Financial Terminal⁶. WIND provides a comprehensive data of WMPs including name of issuers, valid date, maturity date, yield and estimated volume. To reflect the extent that banks involve in WMPs, we borrow ideas of measure used in mutual funds literature. To be more precise, we introduce the proxy of average daily assets under management (ADAUM) to take the maturity differences into account. For example, bank A issues a 1-year WMP from the beginning of the year to the end of the year, attracting 10 billion funds from investors. This gives bank A an ADAUM of 10 billion ($10 \times 365 / 365$). Bank B issues a 1-month WMP from 1/1/2016 to 1/31/2016 (30 days of maturity) with a volume of 80 billion, the ADAUM equals to 6.58 billion ($80 \times 30 / 365$). This proxy allows us to compare the extent that a bank has involved in WMPs in a calendar year.

We calculate the shadow banking proxy as follows:

⁶ WIND Financial Terminal is a computer software system that provides access to financial data, companies, securities, fundamentals, news, research and analytics in the Chinese markets. The recent study by Acharya et al (2016) also used this data source.

$$Shadow_X_{i,j} = \sum \frac{(Estimated\ volume_{i,k,j} * Maturity_{i,k,j})}{365}$$

Where $Shadow_X_{i,j}$ refers to aggregated average daily assets under management of Banks i in year j . X refers to all WMPs, non-principle guarantee WMPs and principle guarantee WMPs, respectively. $Estimated\ volume_{k,j}$ is the estimated volume of funds that the k th WMP issued by bank i would receive in year j . $Maturity_{k,j}$ is the effective days of maturity of the k th WMP issued by bank i in year j . We scale our shadow banking proxies by bank capital.

Table 3.1: Definition of variables

Variable	Definition
Penal A: Bank Characteristics (Bank-Year Variation)	
Shadow_ALL	The average daily asset under management of all WMPs as percentage of bank capital
Shadow_NG	The average daily asset under management of non-principle guarantee WMPs as percentage of bank capital
Shadow_G	The average daily asset under management of principle guarantee WMPs as percentage of bank capital
Deposit to asset	Ratio of total deposit to total assets
Loan to asset	Ratio of total loan to total assets
Log (total assets)	Logarithm of total asset
Capital to asset	Ratio of capital to total assets
Loan growth	The percentage change in loan from year t-1 to year t
Deposit growth	The percentage change in deposit from year t-1 to year t
Loan to deposit	Ratio of total loan to total deposit
Non-interest to interest	Ratio of non-interest income to interest income
Penal B: Firm Characteristics (Firm-Year Variation)	
CAPEX	Capital expenditures scaled by capital stock
Firm size	Logarithm of total asset
Leverage	Ratio of total liabilities to total assets
Cashflow	Ratio of operating cash flow to capital stock
Sale	Ratio of total operating revenue to capital stock
TobinQ	Market value of equity plus book value of total liabilities, scaled by book value of total assets
Ownership	Indicator variable that equals one if controlling shareholders is a government agency

Table 3.2: Summary statistics of bank-level variables

This table presents descriptive statistics for all bank-level variables used in this study during the period of 2007 to 2016. **Shadow_ALL**, **Shadow_NG** and **Shadow_G** are the variables of interest in this study. The rest of variables are control variables used in regressions in this study. Banks are categorized into three types. There are 5 State-own banks, 12 Joint-stock banks and 373 City/rural/foreign banks. All variables are calculated for each bank-year.

variable	All banks			State-own banks			Joint-stock banks			City/rural/foreign banks		
	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd
Shadow_ALL	2368	0.2335	0.6509	50	0.6563	0.8874	120	0.5869	0.9107	2198	0.2046	0.6183
Shadow_NG	2368	0.1789	0.5503	50	0.5338	0.7878	120	0.4488	0.7353	2198	0.1561	0.5251
Shadow_G	2368	0.0515	0.159	50	0.1174	0.1549	120	0.1311	0.2584	2198	0.0456	0.1503
Deposit to asset	2296	0.7352	0.1355	50	0.7648	0.0665	117	0.665	0.098	2129	0.7383	0.1373
Loan to asset	2298	0.4698	0.1095	50	0.5058	0.0339	117	0.4748	0.0859	2131	0.4687	0.1117
Log (total assets)	2368	22.3134	1.7628	50	27.5045	0.4298	120	25.5387	1.085	2198	22.0192	1.4184
Capital to asset	2368	0.0877	0.059	50	0.0652	0.0108	120	0.0541	0.0144	2198	0.09	0.0605
Loan growth	1901	0.2073	0.1718	45	0.152	0.0842	105	0.2259	0.145	1751	0.2076	0.1747
Deposit growth	1899	0.2336	0.2224	45	0.1255	0.0659	105	0.2259	0.1748	1749	0.2369	0.2268
Loan to deposit	2290	0.648	0.1729	50	0.6673	0.089	117	0.7121	0.0657	2123	0.644	0.1777
Non-interest to interest	2350	0.0449	0.0491	50	0.1443	0.0315	120	0.1073	0.0632	2180	0.0392	0.0434

3.3.3 Descriptive statistics

Table 3.1 provides the variable definition. Table 3.2 and Table 3.3 reports the summary statistics of our banking variables from 2007 to 2016. As can be seen from Table 2, the focus of our dataset, the variables (*shadow_ALL*, *shadow_NG* and *shadow_G*), indicates the extent that a bank has involved in all WMPs, non-principle guaranteed WMPs and principle guaranteed WMPs, respectively. The mean of the shadow ratio for all WMPs including principle guaranteed WMPs and non-principle guaranteed WMPs equals to 0.2335. Not surprisingly, non-principle guaranteed WMPs are far more popular with banks than principle guaranteed WMPs because non-principle guaranteed WMPs provides banks a promising mechanism to keep their business off balance sheet for circumventing on-balance-sheet regulation. Five state-owned banks engage in more shadow banking activities than joint-stock banks do. Chinese banks have an average deposit to asset ratio of 0.7352, which is much lower than that reported in American banks (e.g. 0.827, Gilje et al, 2016). However, banks in China have a higher speed of deposit growth rate (0.2336) than American banks do (0.085). On average, Chinese banks have a loan-to-deposit ratio of 0.648. Table 3 shows a description of our shadow banking proxies over the period of 2007–2016. Banks have become more involved in WMPs business given that the ADAUM of WMPs has reached to more than 35% of banks' capital in 2016. This number was only 1.22% in 2007. Table 3.4 provides summary statistics of the firm-level variables.

Table 3.3: The mean of shadow banking proxies by year

This table presents descriptive statistics for **Shadow_ALL**, **Shadow_NG** and **Shadow_G** used in this study across the sample years from 2007 to 2016. Banks are categorized into three types. There are 5 State-own banks, 12 Joint-stock banks and 373 City/rural/foreign banks. All variables are calculated for each bank-year.

year	ALL			State-own banks			Joint-stock banks			City/rural/foreign banks						
	obs	ALL	NG	G	obs	ALL	NG	G	obs	ALL	NG	G	obs	ALL	NG	G
2007	95	0.0122	0.0115	0.0007	5	0.045	0.0402	0.0048	12	0.053	0.0513	0.0017	78	0.0038	0.0036	0.0002
2008	119	0.0517	0.0351	0.0166	5	0.0921	0.0682	0.0239	12	0.1825	0.1728	0.0097	102	0.0343	0.0172	0.017
2009	154	0.0519	0.0378	0.0141	5	0.1751	0.151	0.0241	12	0.1096	0.0949	0.0147	137	0.0423	0.0287	0.0137
2010	179	0.0631	0.0486	0.0145	5	0.3142	0.2981	0.0161	12	0.1212	0.0941	0.0271	162	0.051	0.0376	0.0135
2011	208	0.1003	0.0766	0.0237	5	0.807	0.749	0.0579	12	0.2708	0.1798	0.091	191	0.0711	0.0525	0.0186
2012	258	0.1977	0.1354	0.0457	5	0.6902	0.5144	0.1758	12	0.5219	0.2994	0.1852	241	0.1713	0.1194	0.0361
2013	319	0.2406	0.1833	0.0544	5	0.8098	0.5173	0.2925	12	0.9566	0.6927	0.2393	302	0.2028	0.1575	0.0431
2014	333	0.3744	0.2864	0.0829	5	1.199	0.8574	0.3416	12	1.5118	1.2489	0.262	316	0.3182	0.2408	0.072
2015	357	0.3686	0.2863	0.0811	5	1.3069	1.1398	0.1586	12	1.3006	1.0794	0.2703	340	0.3219	0.2458	0.0733
2016	346	0.3509	0.2802	0.0707	5	1.1237	1.0028	0.0789	12	0.8408	0.5743	0.21	329	0.3213	0.2585	0.0655

Table 3.4: Summary statistics of firm-level variables

Panel A of this table presents the descriptive statistics for all firm-level variables used in this study during the period of 2007 to 2016. Panel B shows the descriptive statistics of firm expenditures across years. **CAPEX** is the dependent variable calculated as capital expenditures scaled by capital stock. **Firm size** is the logarithm of total asset. **Leverage** refers to the ratio of total liabilities to total assets. **Cashflow** is the ratio of operating cash flow to capital stock. **Sales** is the ratio of total operating revenue to capital stock. **TobinQ** is calculated as the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Ownership** is an indicator variable that equals one if controlling shareholders is a government agency. All variables are calculated for each firm-year.

Panel A: Summary statistics of firm-characteristics				
variable	N	mean	median	SD
CAPEX	23998	0.495	0.2852	0.6077
Firm size	24013	21.7268	21.6024	1.3503
Leverage	24013	0.4514	0.4447	0.2258
Cashflow	24009	0.3947	0.3009	0.8005
Sales	24009	6.0186	3.8724	6.8918
TobinQ	21915	2.7541	2.1406	1.9794

Panel B: Descriptive statistics of firm investment variables across years				
year	N	mean	median	SD
2007	1564	0.4975	0.2746	0.6186
2008	1719	0.5067	0.2798	0.6289
2009	2061	0.4754	0.2633	0.6223
2010	2297	0.5757	0.3494	0.6756
2011	2422	0.6362	0.3986	0.7034
2012	2466	0.5726	0.3585	0.6557
2013	2581	0.5141	0.3152	0.5905
2014	2776	0.4583	0.2739	0.5491
2015	3064	0.4011	0.2204	0.5247
2016	3048	0.3763	0.1965	0.4958

3.4 Empirical results

3.4.1 Bank level determinants of WMP issuance

The main hypothesis of this study is that the rise of WMP market is a response to regulatory constraints on interest rate and on-balance sheet lending in banking sector, as WMP provides banks a new model of off-balance sheet credit intermediary that fills the gaps in underdeveloped capital markets and insufficient credit market. Hence, we believe that the slowdown of loan supply and the 75% loan-to-deposit restrictions are the main forces driving the WMP issuance.

Hypothesis (1). Banks facing with a slowdown of loan supply are more likely to issue WMPs.

Hypothesis (2). Banks with higher loan-to-deposit ratio are more likely to issue WMPs.

To test these hypotheses, we rely on OLS regression to estimate the bank-level determinants of WMP issuance. We estimate the following model:

$$Shadow_{it} = \alpha + \beta Size_{i,t} + \theta Capital_{i,t} + \delta Loan\ growth_{i,t} + \gamma Deposit\ growth_{i,t} + \rho LTD_{i,t} + Bank\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (1)$$

Where dependent variable $Shadow_{it}$ is the average daily asset under management of all WMPs, non-principle guarantee WMPs and principle guarantee WMPs issued by bank i as percentage of capital in year t . $Log(total\ assets)_{i,t}$ is calculated as the logarithm of total asset of bank i in year t . $Loan\ growth$ ($Deposit\ growth$) is the growth rate of bank i 's loan (deposit) in year t . LTD is the loan-to-deposit ratio of bank i in year t . We include bank fixed effects and time fixed effects in our regression. All standard errors are clustered at bank-year level.

Table 3.5 reposts the results of OLS estimation and Table 3.6 presents the correlation matrix of the variables used in this OLS estimation. We find a positive relationship between loan-to-deposit ratio and all our three WMP proxies, which confirms our hypothesis (1) that banks with higher loan-to-deposit ratio are more likely to issue WMPs because these banks are facing more restriction given the 75% regulatory cap on loan-to-deposit ratio. It provides evidence that the regulatory restriction on loan-to-deposit ratio is one of the key determinants for banks to conduct shadow banking activities through WMP issuance. This result is consistent with Chen et al (2016) and Hachem and Song (2016) who contend that the stricter liquidity regulation was the trigger to the rapid development of shadow banking in China. In column (1) and (2), the estimates of coefficients on loan growth are significantly negative at 1% level for proxies of all WMPs and non-principle guarantee WMPs. However, the coefficient on loan growth is

insignificantly correlated with principle guarantee WMPs. The negative coefficients on loan growth provide evidence supporting our hypothesis (1) that Banks facing with a slowdown of loan supply are more likely to issue WMPs because these banks are more likely under pressure to expand their lending business. This result implies that off-balance sheet WMP issuance is the key battlefield for banks to fight against the slowdown in loan supply induced by regulatory constraints. Even though bank can issue principle guarantee WMPs to raise on-balance sheet funds, these funds are most likely invested in assets with good liquidity and low risk due to the principle guarantee commitment, and apparently, bank loans do not belong to this asset category. Therefore, we argue that principle guarantee WMPs may not be treated as a good substitution of deposit funds that enables banks to invest longer-term and illiquid assets such as loans. While due to the lack of regulation and transparency on off-balance sheet activities, non-principle guarantee WMPs may offer banks a suitable source of funding to conduct maturity mismatch in meeting riskier borrowers' long-term credit demand.

Table 3.5: The determinants of WMPs issuance

This table reports panel regression results of the determinants of shadow banking activities in the sample period of 2007 to 2016. The dependent variables **Shadow_ALL**, **Shadow_NG** and **Shadow_G** are bank-level proxies for shadow banking activities calculated by the average daily asset under management of all WMPs, non-principle guarantee WMPs and principle guarantee WMPs divided by bank's capital, respectively. **Log (total assets)** is logarithm of total bank asset. **Capital to asset** is the capital to asset ratio. **Loan growth** is the percentage change in deposit from year t-1 to year t. **Deposit growth** is the percentage change in deposit from year t-1 to year t. **Loan to deposit** refers to loan to total deposit ratio. All continuous variables are winsorized at the 1% and 99% level. In all columns, Bank-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	All WMPs	Non-Guarantee WMPs	Guarantee WMPs
Log (total assets)	0.1239 (1.27)	0.0979 (1.18)	0.0351 (1.50)
Capital to asset	-0.4308 (-0.53)	-0.5403 (-0.75)	0.0882 (0.56)
Loan growth	-0.2883*** (-2.86)	-0.2244*** (-2.68)	-0.0420 (-1.62)
Deposit growth	0.1035 (1.48)	0.0855 (1.41)	0.0149 (0.88)
Loan to deposit	0.7727*** (4.10)	0.5659*** (3.69)	0.1765*** (3.63)
Constant	-3.4310 (-1.61)	-2.6790 (-1.48)	-0.9323* (-1.81)
Year fixed effect	yes	yes	yes
Bank fixed effect	yes	yes	yes
N	1893	1893	1893
adj. R-sq	0.2174	0.1879	0.1497

Table 3.6: Correlation matrix

This table reports correlation matrix of the bank-level determinants of WMPs. The dependent variables **Shadow_ALL**, **Shadow_NG** and **Shadow_G** are bank-level proxies for shadow banking activities calculated by the average daily asset under management of all WMPs, non-principle guarantee WMPs and principle guarantee WMPs divided by bank's capital, respectively. **Log (total assets)** is logarithm of total bank asset. **Capital to asset** is the capital to asset ratio. **Loan growth** is the percentage change in deposit from year t-1 to year t. **Deposit growth** is the percentage change in deposit from year t-1 to year t. **Loan to deposit** refers to loan to total deposit ratio. All continuous variables are winsorized at the 1% and 99% level. In all columns, Bank-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	shadow_ALL	shadow_NG	shadow_G	Log (total assets)	Deposit to asset	Loan to asset	Capital to asset	Loan to deposit	Deposit growth	Loan to deposit
shadow_ALL	1									
shadow_NG	0.9635	1								
shadow_G	0.662	0.4701	1							
Log (total assets)	0.3701	0.3482	0.3068	1						
Deposit to asset	-0.1937	-0.1785	-0.1717	-0.1875	1					
Loan to asset	-0.1454	-0.1364	-0.1267	-0.2219	0.4598	1				
Capital to asset	-0.1356	-0.1276	-0.1063	-0.4446	-0.2967	0.0076	1			
Loan to deposit	-0.057	-0.0515	-0.0424	-0.0882	-0.0813	-0.093	0.0223	1		
Deposit growth	-0.1232	-0.109	-0.1129	-0.1704	-0.1131	-0.1516	0.1538	0.5029	1	
Loan to deposit	-0.0094	-0.011	-0.0063	-0.1013	-0.2207	0.6514	0.2334	-0.0191	-0.0266	1

3.4.2 The impact of WMP issuance on firm investment

We now consider the impact of banks engaging in WMP business on a border economy. We pay attention to investment behavior of firms operating in an environment with prevalent shadow banking activities. We hypothesize that the rising of WMPs essentially constitute a complementary mechanism to the regulated banking system. It provides an important alternative financing channel to firms that have limited opportunities for obtaining funds in the formal market due to the regulatory constraints in the banking sector.

Hypothesis 3. Firms operating in cities with more prevalent shadow banking activities are less likely to face financial constraints and hence conduct more investments.

To test this hypothesis, we examine whether greater WMPs presence in a city can increase the firms' investment. Following the literature by Aivazian et al (2005) and Firth et al (2008), we employ an investment equation to explore the impacts of WMPs presence on firm investment. Specifically, the model is shown as follows.

$$\begin{aligned} Investment_{it} = & \alpha + \beta Shadow_{j,t} + \theta Firm\ Size_{i,t} + \\ & \delta Cash\ flow_{i,t} + \gamma Sale_{i,t} + \rho TobinQ_{i,t} + \mu Ownership_{i,t} + \\ & City\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (2) \end{aligned}$$

Where the dependent variable $Investment_{it}$ is the capital expenditure of firm i to capital stock in year t . $Firm\ Size_{i,t}$ is the logarithm of the firm's total assets in year t . $Cash\ flow_{i,t}$ is the net cash flow generated from operating activities. $Sale_{i,t}$ is the total operating revenue scaled by capital stock. $TobinQ_{i,t}$ is calculated as the ratio of sum of market value of equity and book value of liabilities to book value of assets. $Ownership_{i,t}$ is a dummy variable that equals to 1 if firm i is owned by government agency and 0 for otherwise. We use non-principle guarantee WMPs as the only proxy of shadow banking activities because we only consider the economic impact of off-balance sheet source of funding. The key coefficient of interest is β which captures the responsiveness of firms' investment to the shadow banking environment.

Table 3.7: Main results

Column (1) and (2) in this table reports the results of the relationship between the prevalence of shadow banking and firm investment during the sample period of 2007 to 2016. Column (3) reports the results of the difference-in-differences analysis. **CAPEX** is the dependent variable calculated as capital expenditures scaled by capital stock. **Firm size** is the logarithm of total asset. **Leverage** refers to the ratio of total liabilities to total assets. **Cashflow** is the ratio of operating cash flow to capital stock. **Sales** is the ratio of total operating revenue to capital stock. **TobinQ** is calculated as the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Ownership** is an indicator variable that equals one if controlling shareholders is a government agency. **Shadow_NG** is the city aggregated average daily asset under management of non-principle guarantee WMPs as percentage of city aggregated bank capital. **Shadow_ID** is an indicator which equals to 1 if firm operates in a city where banks have issued WMPs and 0 for firm operating in a city where no banks has ever issued WMPs in the sample period of 2009 to 2016. **Post** is a time dummy equals to 1 for period between 2013 to 2016 and 0 for period between 2009 to 2012. All continuous variables are winsorized at the 1% and 99% level. In all columns, Bank-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(2)
	CAPEX	CAPEX	CAPEX
Shadow_NG	0.0363*** (3.28)	0.0329*** (3.39)	
Shadow_ID*Post			-0.0749*** (-2.76)
Firm size		0.0980*** (10.32)	0.0951*** (10.13)
Leverage		-0.0732* (-1.81)	-0.0587 (-1.51)
Cashflow		0.1511*** (10.55)	0.1504*** (9.89)
Sales		0.0157*** (8.66)	0.0154*** (8.54)
TobinQ		-0.0020 (-0.70)	-0.0038 (-1.29)
SOE		-0.0890*** (-6.11)	-0.0976*** (-6.21)
Constant	0.4701*** (83.37)	-1.7557*** (-8.25)	-1.6586*** (-7.91)
Year fixed effect	yes	yes	yes
City fixed effect	yes	yes	yes
N	20270	18382	18813
adj. R-sq	0.0566	0.2202	0.2432

The results of this estimation are presented in Table 3.7. In column (1), the coefficient for the *Shadow_NG* is 3.63% with a t-value of 3.28, indicating that firms operating in cities with more shadow banking activities taken place on average have more investments. This result is robust when city fixed effect is included. This positive relationship confirms our argument that shadow banking in China serves important economic functions in the form of providing alternative credit to firms, which provides evidence supporting our hypothesis (3). In summary, firms in an environment with more prevalent shadow banking activities are more easily to access alternative financing channel to obtain funds for their investments.

3.4.3 Cross-sectional variation in the impact of shadow banking on firm investment

In this section, we focus on how variation in firm-characteristics affects the impact of shadow banking on firm investment. As we discussed earlier, shadow banking can affect firm investment through a direct financial constraint channel, by intermediating credit to financially constrained borrowers who have less privileged access to formal bank credit. To further explore the validity of this channel, we use the following model with interaction terms to capture this effect.

$$\begin{aligned}
 Investment_{it} = & \alpha + \beta Shadow_NG_{j,t} + \theta Firm\ Size_{i,t} + \\
 & \delta Cash\ flow_{i,t} + \gamma Sale_{i,t} + \rho TobinQ_{i,t} + \mu Ownership_{i,t} + \\
 & \omega(Shadow_NG_{j,t} * Z_{i,t}) + City\ Fixed\ Effects + \\
 & Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (3)
 \end{aligned}$$

where $Z_{i,t}$ refers to a series of variables that capture financial constraints for firm i in a specific year. $Z_{i,t}$ includes *Firmsize*, *cash flow*, *TobinQ* and *Ownership*. Our emphasis is on the coefficient ω for the interaction variable.

Table 3.8: Cross-sectional variation tests

This table reports the results of the impact Cross-sectional variation of firm characteristics on relationship between the prevalence of shadow banking and firm investment during the sample period of 2007 to 2016. **Shadow_NG** is the city aggregated average daily asset under management of non-principle guarantee WMPs as percentage of city aggregated bank capital stock. **CAPEX** is the dependent variable calculated as capital expenditures scaled by capital stock. **Firm size** is the logarithm of total asset. **Leverage** refers to the ratio of total liabilities to total assets. **Cashflow** is the ratio of operating cash flow to capital stock. **Sales** is the ratio of total operating revenue to capital stock. **TobinQ** is calculated as the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Ownership** is an indicator variable that equals one if controlling shareholders is a government agency. **Post** is a time dummy equals to 1 for period between 2003 to 2016 and 0 for period between 2009 to 2012. All continuous variables are winsorized at the 1% and 99% level. In all columns, Bank-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
	CAPEX	CAPEX	CAPEX	CAPEX
Shadow_NG	0.4794*** (4.51)	0.0414*** (4.74)	0.0029 (0.26)	0.0457*** (3.63)
Shadow_NG*Firm size	-0.0201*** (-4.08)			
Shadow_NG*Cashflow		-0.0206*** (-3.22)		
Shadow_NG*TobinQ			0.0097*** (4.80)	
Shadow_NG*SOE				-0.0351*** (-3.47)
Firm size	0.1084*** (10.52)	0.0977*** (10.33)	0.0974*** (10.21)	0.0978*** (10.29)
Leverage	-0.0700* (-1.75)	-0.0716* (-1.78)	-0.0714* (-1.78)	-0.0722* (-1.78)
Cashflow	0.1510*** (10.47)	0.1643*** (11.20)	0.1513*** (10.53)	0.1510*** (10.51)
Sales	0.0157*** (8.55)	0.0156*** (8.62)	0.0157*** (8.59)	0.0157*** (8.62)
TobinQ	-0.0029 (-1.03)	-0.0022 (-0.78)	-0.0086** (-2.58)	-0.0026 (-0.93)
SOE	-0.0888*** (-6.07)	-0.0892*** (-6.17)	-0.0879*** (-6.01)	-0.0711*** (-3.90)
Constant	-1.9820*** (-8.66)	-1.7540*** (-8.29)	-1.7248*** (-8.06)	-1.7564*** (-8.26)
Year fixed effect	yes	yes	yes	yes
City fixed effect	yes	yes	yes	yes
N	18382	18382	18382	18382
adj. R-sq	0.2214	0.2211	0.2210	0.2207

The results are presented in Column (1) to (4) in Table 3.8. In column (1), the coefficient of the interaction term between *Firmsize* and *Shadow_NG* is significantly negative at 1% level. This result is consistent a 2003 survey study on firm financing choice by Ayyagari et al (2010), we find that small firms operating in a city with more shadow banking credit have more investment than larger firms, which implies that small firms rely more on shadow financing due to their limited ability of accessing formal bank credit. Column (3) studies the investment-cash flow sensitivity following the model that was widely used in corporate finance literature (love, 2003; Almeida and Campello, 2007; Denis and Sibilkov, 2009). In the specification, the positive and statistically significant coefficient on $Cash\ flow_{i,t}$ suggest that firms are financially constrained because their investment is strongly sensitive to internal capital. Our attention is on the direction and significance of the coefficient of the interaction term $cash\ flow * Shadow_NG$. As expected, we find a significantly negative coefficient on the interaction term that indicates that greater availability of shadow banking credit reduces firms' financial constraints. Next, we examine whether greater prevalence of shadow banking activities in a city can increase the responsiveness of firms' investment to investment opportunities. To test this hypothesis, we rely on the interaction of $TobinQ * Shadow_NG$. The positive coefficient on the interaction term 1.17% with a t-statistic of 4.57 reveals that firms in cities with greater shadow banking prevalence are more responsive to their investment opportunities. We further consider the role of ownership structure of the firms in the relationship between the shadow banking environment and firm investment. The intuition is that China's banks are more likely to discriminate against private firms in their lending decisions (Firth et al, 2008). In contrast, state-owned firms are less financially constrained because banks treat them more favorably in their politically determined lending decisions. Therefore, we suggest that shadow banking alleviates private firms'

financial constraints induced by distortion in banking lending practice if the interaction term of *Ownership* * *Shadow_NG* is positive. We find exactly what we suggested.

Taken together, we find cross-sectional evidence suggesting that financially constrained firms can benefit from shadow banking activities as it has the potential to alleviate a legacy of government distortions in corporate financing.

3.5 Endogeneity

We find that firms operating in cities with more shadow banking activities tend to invest more than those operating in cities where shadow banking activities are less prevalent. Our explanation lies on that shadow banking plays a complementary role to formal financial system by providing an important alternative financing channel to firms. However, it is plausible that shadow banking prevalence is correlated with geographical growth opportunities, as changes in shadow banking prevalence may be determined by unobservable factors which also change local firms' ability in accessing capital in formal financial market to fund growth. It is possible that cities with greater growth opportunities may have more bank headquarters and hence more WMPs issuance while firms operating in cities with greater growth opportunities are prone to have more investments. Thus, greater shadow banking prevalence may be associated with greater investment opportunities and hence greater investment. To disentangle the potential endogeneity concern, we conduct two tests.

3.5.1 Instrumental variable

Given that our shadow banking proxies could be endogenous, we use instrumental variable approach as one of the identification strategies. We need to use an instrumental variable that is assumed not to have any direct effect on the firm investment but influence only the selection into the treatment condition. We adapt a two-stage-least-squares (2SLS) estimation and instrument for shadow banking prevalence using variable of bank's income structure. We use bank's income structure (non-interest income divided by interest income) as a proxy for their ability of and attitude towards diversification through creating additional profit opportunities. It is widely recognized that banks are shifting away from traditional sources of revenue like loan making and toward non-traditional activities that generate non-interest income such as fee income and revenue from trading activities (Stiroh, 2004). The increasing reliance on noninterest income protects banks from adverse shocks on traditional banking business led by overall business conditions. Engaging in shadow banking activities such as WMPs issuance can not only help banks to meet the need of regulation circumvention but also to bring in considerable non-interest income. Based on these reasons, we argue that banks with greater reliance on noninterest income are more likely to conduct shadow banking activities but the reliance on noninterest income does not directly affect the growth opportunities of firms, thus meeting the requirements for a valid instrument.

Equation for first stage:

$$\begin{aligned}
Shadow_NG_{it} = & \alpha + \beta Noninterest\ to\ interest_{i,t} + \\
& \theta Firm\ Size_{i,t} + \delta Leverage_{i,t} + \vartheta Cashflow_{i,t} + \gamma Sale_{i,t} + \\
& \rho TobinQ_{i,t} + \mu Ownership_{i,t} + City\ Fixed\ Effects + \\
& Year\ Fixed\ Effects + \varepsilon_{i,t} (4)
\end{aligned}$$

Equation for second stage:

$$\begin{aligned}
CAPEX_{it} = & \alpha + \beta Int_Shadow_NG_{i,t} + \theta Firm\ Size_{i,t} + \\
& \delta Leverage_{i,t} + \vartheta Cashflow_{i,t} + \gamma Sale_{i,t} + \rho TobinQ_{i,t} + \\
& \mu Ownership_{i,t} + City\ Fixed\ Effects + Year\ Fixed\ Effects + \\
& \varepsilon_{i,t} (5)
\end{aligned}$$

where $Int_Shadow_NG_{i,t}$ refers to the estimated $Shadow_NG$ using non-interest to interest as the instrument. Our emphasis is on the coefficient β for the $Int_Shadow_NG_{i,t}$.

Table 3.9: The results of instrumental variable regressions

This table reports the results of the instrumental analysis. Column (1)/(2) presents the results from estimating the first-stage (second-stage) regressions. **Shadow_NG** is the city aggregated average daily asset under management of non-principle guarantee WMPs as percentage of city aggregated bank capital. We instrument for **Shadow_NG** using non-interest income to interest income. **Non-interest to interest** is the city aggregated bank non-interest income divided by interest income. **Int_Shadow_NG** is the estimated Shadow_NG using non-interest to interest as the instrument. **CAPEX** is the dependent variable calculated as capital expenditures scaled by capital stock. **Firm size** is the logarithm of total asset. **Leverage** refers to the ratio of total liabilities to total assets. **Cashflow** is the ratio of operating cash flow to capital stock. **Sales** is the ratio of total operating revenue to capital stock. **TobinQ** is calculated as the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Ownership** is an indicator variable that equals one if controlling shareholders is a government agency. All continuous variables are winsorized at the 1% and 99% level. In all columns, Bank-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	First-stage	Second-stage
	(1)	(2)
	Shadow_NG	CAPEX
Non-interest to interest	2.6650** (2.08)	
Int_Shadow_NG		0.2679*** (3.57)
Firm size	0.0040 (0.88)	0.0971*** (10.17)
Leverage	-0.0018 (-0.10)	-0.0735* (-1.81)
Cashflow	0.0044 (0.58)	0.1498*** (10.48)
Sales	0.0001 (0.09)	0.0156*** (8.71)
TobinQ	0.0024 (0.67)	-0.0026 (-0.92)
SOE	-0.0117 (-1.09)	-0.0858*** (-5.90)
Constant	0.2316 (1.44)	-1.8562*** (-8.67)
Year fixed effect	yes	yes
City fixed effect	yes	yes
N	18373	18367
adj. R-sq	0.5617	0.2203

Table 3.9 reports our results of 2SLS regressions. Column (1) shows the results from the first-stage regression, where the dependent variable is the endogenous variable of *Shadow_NG*. We believe banks that have a large portion of non-interest income are more proactive to issue WMPs, because expanding product lines through involving in WMPs issuance associated with growing noninterest income may offer these banks traditional diversification benefits. Consistent with these arguments, we find *non-interest to interest* is positively related to *Shadow_NG*, which suggests that income structure is an important determinant of WMPs issuance. The result of second-stage regression is in Column (2), we find that the coefficient for *Int_Shadow_NG* is positively and statistically significant at the 1% level. Consistent with the results documented in earlier table, this result indicates that an environment with more prevalent shadow banking activities drive firms' increase in investment.

3.5.2 Difference-in-differences approach

The second approach that this study uses to address the endogeneity concern is the difference-in-differences approach. In 2013, China Banking Regulatory Commission (CBRC) released the *Regulation on Asset Management Business of Commercial Bank*. As we have mentioned in background section, the regulation aimed at limiting the shadow banking lending where credit is channeled off-balance sheet to borrowers through issuance of WMPs.

We consider the regulation is a natural experiment that allows us to investigate the effect of adverse shocks to shadow banking credit

supply on their borrowers' performance in a setting that is not contaminated by the borrowers' demand-side considerations. To estimate this effect, we proceed with a difference-in-difference analysis, where the two differences are: firms operating in cities with shadow banking prevalence vs. firms operating in cities with no shadow banking prevalence at all throughout the whole sample period; years before the adaption of the regulation and years after the adaption of the regulation. In general, we estimate the following model.

$$\begin{aligned}
 Investment_{it} = & \alpha + \beta Shadow_ID * Post + \theta Firm\ Size_{i,t} + \\
 & \delta Cash\ flow_{i,t} + \gamma Sale_{i,t} + \rho TobinQ_{i,t} + \mu Ownership_{i,t} + \\
 & City\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (4)
 \end{aligned}$$

Where *Shadow_ID* is an indicator which equals to 1 if firm *i* operates in a city where banks have issued WMPs and 0 for firm *i* operating in a city where no banks has ever issued WMPs in the sample period of 2009 to 2016. *Post* is a time dummy equals to 1 for period between 2013 to 2016 and 0 for period between 2009 to 2012. A negative coefficient on the interaction term of *Shadow_ID*Post* suggests evidence that restriction on shadow banking activities may have unintended consequence on real economy.

The results are provided in Column (3) of Table 3.7. We obtain a negative and significant coefficient on the interaction term of *Shadow_ID*Post*. After the adaption of the WMPs regulation, firms exposed to an environment where shadow banking activities are more prevalent in local banks decreased their investment by 7.49%. We attribute this decrease to that the regulatory intention to cap

risks associated with the growing WMPs market unintendedly create disturbance to firm financing because the reliance of firm investment on shadow credit was underestimated. We argue that shadow financing dominated by banks is an important constituent of bank lending.

3.6 Discussion and Conclusion

China has undergone a significant economic growth over the past three decades, enabling it to achieve the second largest economy in the world. However, such rapid growth in economy is associated with financial markets dominated by a large but underdeveloped banking system and capital markets with weak investor protection, which challenges the traditional beliefs that a country's overall economic growth is a result of the development of a financial system that includes a stock market and intermediation. China seems to be a counterexample to the existing literature on formal financial and law systems⁷ since the Chinese firms may rely on alternative financing channels such as relationships and reputation rather than formal external finance (Allen et al, 2005).

Existing literature on firm financing patterns are based on conventional definition of external financing such as bank loan, equity and debt, and they do not consider the possibility that firms could rely on other substitute forms of financing, such as shadow banking financing. Our study stands on the wide use of financing channels other than formal bank lending, equity or debt financing

⁷ See literature by La Porta et al (1997), La Porta et al (1998); Demirgüç-Kunt and Maksimovic (1998); Rajan and Zingales (1998); Wurgler (2000); Love (2003); King and Levine (1993); Levine and Zervos (1998); Beck et a (2000)

and fills the void in literature by looking at the relation between shadow banking prevalence and firm investment among China's listed firms.

We focus on WMPs provided by commercial banks in China. The WMPs are a pool of asset-back investments that produce return based on the performance of the underlying assets. Such product is essentially shadow banking activity that has no regulatory requirement of transparency. Banks offer WMPs as an alternative saving instruments to keep money within banking system off-balance sheet and intermediate money to borrowers to evade banking regulation of on-balance sheet lending by capital ratio and 75% loan to deposit restriction. To test the economic function of such activity, we proxied the level of shadow banking based on the issuance information of 363,654 bank WMPs. We match our shadow banking proxy with firm-level financial data via their geographical location of headquarter, aiming to examine whether firm investment is conditional on their shadow banking environment.

Our results suggest a positive relationship between shadow banking prevalence and firm investment. Moreover, this positive relationship is stronger for firms with small size, high-growth, more reliance on cash flow and no state ownership. We argue that shadow banking serves a complementary role to the formal financial system where financially constrained firms have less privileged credit access, which shed light on the importance of shadow banking in sustaining economic growth.

Understanding the economic functions and dynamics of shadow banking activities is particularly important for regulators. Any efforts made on controlling the risks of shadow banking should be based on a thorough understanding of whether shadow banking has made the Chinese economy more or less efficient. Further research on the net impact of shadow banking activities would provide more insight on how such activities should be encouraged under a more efficient monitoring and regulation system.

Chapter 4

Finance Company and Cash Holding

4.1 Abstract

In China, firms within a business group may be able to access funds provided by a parent-owned finance company within the business group. Finance companies essentially are intra-group banks that collect and redistribute funds within the group. However, anecdotes show that the effectiveness and the functioning of finance companies to a business group is questionable. The average cash holdings of Chinese group member firms increased significantly after they gain access to finance companies. We provide direct evidence of ‘tunneling’: where the parent of the business group requires member firms to increase their cash holdings through deposits in the group’s finance company and invest the collected deposits in the interbank market or other financial institutions, instead of lending to business group members. The parent of the business group reaps most, if not all, the profits from the finance company, at the expense of member firms’ increased holding in cash. We use the Shenzhen 2007 Anti-tunneling Guidance as the exogenous shock to identify the main results. Our results cannot be explained by the alternative hypotheses that member firms hold more cash holdings as a result of reduced bank monitoring or the parent’s incentive to reallocate capital more efficiently

4.1 Introduction

In the late 1980s, China's government has experimented a series of reforms aimed at improving financial performance and productivity of firms. It started from encouraging the alliance of firms in the form of business group, followed by giving access to some business groups with additional financing through finance companies (hereafter, FCs), a specialized financial institution that collected and redistributed funds within the group⁸. These FCs share some similarities with banks but differ in a way where FCs are not allowed to collect deposits from or originate loans to non-group-member firms. Chinese reformers originally experimented with FCs in attempt to enable firms to reduce financial constraints and to better manage investments within and outside the group (Keister 1998).

However, this group-specific bank may not be costless. Business group with a finance company in China is akin to Japanese *Keiretsu* where corporations in multiple industries are tied under a "main bank" system. Researchers have revealed the cost of bank-centered financial system in Japan that firms with the main bank relations were expropriated by the main bank through the mechanisms of providing financial services to those firms (Weinstein and Yafeh 1998).

⁸ See the definition proposed by People's Bank of China (PBOC) on July 13, 2000 in the *Business Group Finance Company Act*. In December of 2006, China Banking Regulatory Commission (CBRC) issued the *Amendment of Business Group Finance Company Regulation*.

Anecdotes show that the effectiveness and the functioning of FCs to a business group is questionable. From 2014 to 2016, more than half of the asset of finance companies are composed of deposits due from central or other financial institutions or investments rather than loans to member firms. Such low loan to deposit ratio suggests that finance companies may not be efficient as much as it could be. On the other hand, firms increase cash holdings dramatically in the following years after having access to finance companies, which suggests that the level of financial constraints may not be alleviated given firms tend to save more cash after the access to finance companies is available.

Moreover, China has a different institutional context, an institutional context where capital markets are relatively inadequate at allocating funds and the investor protection is weak (Allen et al, 2005), Chinese firms are prone to rely heavily on internal financing. In this study, we ask whether FCs can help to fill the institutional void of inefficient capital markets as Chinese reformers expected, or, produce an unintended market fiction such as the lesson learned from main banks in Japan.

To answer this empirical question, we examine that how cash holdings of Chinese firms have evolved in parallel with the development of business groups and whether this evolution can be explained by the emergence and functioning of finance companies. We hand-collected data 196 finance companies' information with respect to the date of incorporation and the ownership structure from CBRC's official announcements from 1987 to 2014⁹. We trace

⁹ The incorporation of a finance company is subject to a two-stage approval from the PBOC. Specifically, the first stage refers to the approval of preparation where the PBOC will make an announcement of approval for qualified business group to

ownership of finance companies of any length and match the data with ultimate or direct shareholders of firms that list on Shanghai and Shenzhen stock exchanges to make sure that finance companies and listed firms belong to the same business group. We collect firm-level data from CSMAR and WIND.

We focus on firm's cash policy because cash holdings provide a mechanism to identify whether finance companies devote to a reduction in financial constraints or a market fiction of rent extraction by controlling shareholders that have the largest voting right of these firms because of their dominated shareholdings. Precisely, finance companies, of which lending practice is supervised by banking regulators, represent a visible internal capital market which may alleviate the level of financial constraints of fellow group members. A reduction in financial constraints protect firms from holding cash as a buffer to cope with the adverse shocks especially when external financing is expensive (Bates et al, 2009). Therefore, we would expect a lower cash ratio for firms with finance companies compared to those without finance companies. In contrast, cash holdings also represent a promising proxy to investigate the agency conflicts between controlling shareholders and minority shareholders because cash holdings attach a cheaper private benefit option than other assets (Opler et al, 1999). Additionally, finance companies offered an ideal setting to study this agency problem where the primary function of finance companies is to manage cash on behave of the business group with a pyramidal ownership structure. Hence, we would expect that firms

prepare for the establishment of a finance company. After a no more than 6 months' preparation, the business group is required to submit the application documents for opening. If the application is accepted, the PBOC will make a second stage of approval of opening announcement for qualified finance company. In this paper, we obtain information of finance companies according to the approval of opening announcement.

with finance companies would overinvest cash holdings for tunneling incentives by controlling shareholders.

Surprisingly, we find a stark difference between member firms in groups with and without finance companies in terms of their cash holdings. We find that a member firm which belongs to a business group with an FC (treated firms) holds 2.49% more cash than a member firm which belongs to a business group without an FC (control firms). This result is inconsistent with the precautionary theory (Keynes, 1936), which predicts a reduced cash holding for member firms when they have access to FC's funds and reduce their financial constraints. This result is consistent with the tunneling theory that parent company direct recourses from member firms to the FC, which is solely owned by the parent company of the business group and consequently reap all the FC's profits of lending to the member firms.

To the best of our knowledge, our study is the first to provide systematically consistent evidence that the member firms' increase in cash holding after having access to FC within the business group. It can be at least partially explained by the tunneling effect where the controlling parent company of the business group extract benefits from minority shareholders of member firms. Once FCs receive the cash deposit from member firms, they can either lend it to other member firms within the business group, or lend it to other financial institutions, e.g., commercial banks, in the form of deposits. By encouraging and requiring member firms to increase cash holdings in the form of deposit in the FC, the parent company of the business group, who is the sole owner of the FC, can reap most of, if not all, the profits from the FC's lending.

Four pieces of evidence suggest that the member firms' increase in cash holding after having access to FCs within the business group is because of the incentives for the parent company to siphon resources out of the firm to increase their own wealth. First, we find the increase in cash holdings is stronger when FCs are allowed to enter the interbank market in year 2000¹⁰ by the government since the FCs find it even easier and more profitable to lend out through the interbank market in the presence of dual-track interest system¹¹, although interbank market focuses mainly on overnight lending between financial institutions. Second, consistent with the study proposed by Kalcheva and Lins (2007) who argued that firms with a more of diverged controlling shareholder's cash flow rights versus voting rights would hold more cash, we expect that this tunneling effect is stronger when the control right of the controlling shareholders is lower because the controlling shareholders wants to transfer benefits from firms where their cash flow right is low to firms where their cash flow right is high (Bertrand et al, 2002). Similarly, in the third analysis, we would expect the parent company to save more cash out of cash flow from equity issuance than other debt financing as their main financing choice for each member firm to accumulate cash holdings. By diluting the controlling right while remain full control, the controlling shareholders could reap more private benefits from depositing the accumulated cash from equity issuance in their wholly controlled finance companies. Similar pattern was found in the work by McLean (2011) while our inference stands for the tunneling view

¹⁰ The *interbank bond market* and *lending market* (Interbank Markets) are the most important money markets in China established in 1996. It was not until the *Finance Company Entry Regulation of the Interbank Bond Market and Lending Market Act (FC Entry Act 2000)* released by PBOC that a FC, as an independent legal treasure entity affiliated with a business group, were eligible to apply for the membership of the Interbank Markets after making three consecutive years of positive profits

¹¹ China has been implementing a co-existed interest rate system, that is, a constrained interest rate system for non-financial institutions with floors and ceilings based on the PBOC benchmark rate and a liberalized interest rate system that is negotiable among financial institutions benchmarked by Shanghai Interbank Offered Rate (hereafter, the SHIBOR rate). The entry to the interbank market implies a realizable arbitrage from the imparity of the two interest systems.

instead of his precautionary view for the increase in share issuance-cash savings given our China setting. And fourth, to examine the interbank market is the plausible channel in explaining how private benefit is realized in the context of the presence of finance companies, we conduct a cash holdings sensitivity test and document that the cash holdings of firms with finance companies, in compared with firms without finance companies, are more sensitive to the variation of interbank rate, namely the *SHIBOR* rate while insensitive to the variation of governmental constrained rate.

We attempt to rule out two alternative explanations. First, due to that our sample is not randomly assigned, it is possible that our treated firms in our sample have lower capital efficiency before they have access to finance companies. Therefore, the higher level of cash holdings for the treated firms could be that it is the controlling shareholders' intention to improve the efficiency of resource allocation within groups by channeling cash from firms with lower capital efficiency to firms with good investment opportunity and hence large cash needs, using finance companies as an intermediary. If this alternative explanation holds, we would expect that that the member firms' cash holding increase is more prevalent for firms with poorer capital efficiency. Our empirical evidences fail to support this hypothesis, which suggests that the member firms' cash holding increase is most likely driven by the tunneling incentives of parent company. Specifically, we do not find that the cash holding increase effect is stronger for state-owned firms compared to non-state-owned firms, despite the fact that state-owned firms face soft budget constraints and hence use capital less efficiently in contrast to non-state-owned firms (Chen et al, 2017, Kornai et al, 2003). Second, firm's cash holdings may be less affected by controlling shareholders' tunneling motive but more affected by managerial entrenchment due to the weaker external monitoring from banks

after firms accessing FC credit as a replacement of bank credit. In other words, the switch from bank-dependence to FC-dependence enables entrenched managers to avoid the discipline of external debtholders (e.g. bank credit, in this case) and therefore management may hold more cash to pursue their own objectives. However, our test shows no significant differences in proxies of bank-dependence across treatment and control firms. This is against the hypothesis that an increased managerial agency problem induced by the laxer external monitoring may explain the firms' cash hoarding after they gain access to FCs.

To shed light on the impact of the presence of finance companies, we track member firms' financial outcomes, investors' valuation on corporate cash holdings and dividend policy between treated and control firms. According to our tunneling explanation, the treated firms' (firms with accessing to finance companies) financial performance should be poorer than the control firms (firms without accessing to finance companies). A different result would invalidate our tunneling explanation. Our results confirm this explanation. We find that treated firms have poor financial profitability, as measured as ROA and ROE, than control firms. We further find that treated firms reduce their financing investment, as measured by cash paid for equity and debt investments, and do not increase their fixed investments, as measured by cash paid to acquire and construct fixed assets, intangible assets and other long-term assets, compared to control firms. We find no reliable evidence of differences in dividend payout between two groups of firms, suggesting that richer cash holdings do not drive an increase in a higher dividend payout. In consequence, minority shareholders are harmed given that an incremental increase in cash holdings would have a lower increase in firm value, as measured by Tobin Q ratio. This pattern is consistent with the tunneling view from literature on both financing

choice, investment decision and dividend policy (Baek et al, 2006; Johnson et al, 2000; Kalcheva and Lins 2007; Pinkowitz et al, 2006).

Our evidence suggests that the informational and financial advantage of the group-specific bank does not result in a more efficient internal capital market therefore a reduced financial constraint and an increase in firm investment. Instead, we find that the existence of finance companies in business groups yields a severe agency problem between controlling shareholders and minority shareholders as well as a significant market friction that reduces the efficiency of capital markets. We find limited consistent evidence supportive of the claim proposed by Keister (1998) that firms in groups with finance companies should be superior to firms without finance companies.

Selection and unobserved heterogeneity in observational data is inevitable owing to the lack of randomization process in allocating the treatment. Although the decision to establish a FC for a parent company within the business group is a plausible exogenous decision to each member firm since the formation of the finance company in parent's level does not require approvals from general meeting of all shareholders in subsidiary's level, we take steps to address the potential endogeneity issue where whether a member firm belongs to a business group with or without an FC is determined by a confounding factor that also determines member firms' cash holdings. We take advantage of the *Behavioral Guidance for controlling shareholders of listed small- and middle-sized enterprises* issued by Shenzhen stock exchange in 2007 (hereafter, *the 2007 Anti-tunneling Guidance*) as an exogenous shock to the extent of tunneling effect of a parent company with an FC within the business group. *The 2007 Anti-tunneling Guidance*

restricted possible harmful behaviors of controlling shareholders to minority shareholders that negatively affects the financial independence of firms, including restriction on any listed SME firms to deposit cash in their affiliated FCs¹². We find that the higher level of cash holdings for the treated firms is significantly reduced if they are SME firms post-2007 compared to control firms.

Our results highlight that government needs to pay close attention to the request to establish an FC by a business group. In general, an FC within the business group will have positive impact on improving the efficiency of the internal capital market and reduce member firms' financial constraints. However, if the regulation and supervision of FCs are not adequate, tunnelling incentives may arise from the parent company, which is the sole owner of the FCs, which, in turn, can have detrimental effects on member firms' financial performance and investment. These effects can further have negative impact on the real economy in general.

Our study provides the first evidence of the role of FCs within a business group in China. Our findings contrast to the previous belief that these FCs may facilitate the internal capital market within the business group, and instead find strong tunnelling effects where controlling shareholders of the parent company direct resources from minority shareholders of member firms for the parent's private benefits. These results are consistent to the empirical evidence from the main bank model in Japan, where Japanese firms' high level of cash holdings are found to be consistent with rent extraction by main banks (Pinkowitz and Williamson,2001).

¹² The *Behavioral Guidance for controlling shareholders of listed small- and middle-sized enterprises, Rule No.20* restricts firms listed in SME board to deposit cash in the controlling shareholders owned finance companies.

Our study belongs to the board literature on business groups and contributes specifically to literature on internal capital markets. In general, the internal capital market can be controversially motivated by a financing advantage and a tunneling intention. In a financial constrained environment where not all positive NPV projects can be financed, firms can create value by actively engaging in “winner-picking” through internal capital markets. The economic rationale behind implies that well-informed management in a business group reallocate scarce funds from members with low profitability to those with high profitability, thereby benefit from firm’s most promising growth opportunities which stand-alone firms may not have financing capacity to capture (Stein,1997). Several studies have shown evidence supportive of this hypothesis in different institutional and economic context such as India (Gopalan et al, 2007), Korea (Almeida et al, 2015), China (Chen et al, 2017) and the U.S. (Kuppuswamy and Villalonga 2016). Moreover, business groups in a pyramidal ownership structure appear to have financing advantages for firms with large investment requirements but low injectable cash flows, as business group is better able to access a pool of internal funds (Almeida and Wolfenzon 2006, Bena and Ortiz-Molina 2013). He et al (2013) show evidence that Chinese business groups act as internal capital market mitigate financial constraints confronted by group-affiliated firms. Other studies on business groups have contented the function of internal capital market in risk sharing by funds reallocation (Gopalan et al, 2007; He et al, 2013; Hoshi et al, 1991; Khanna & Yafeh 2005). All above evidence has sketched a positive picture of internal capital markets, suggesting that the presence of internal capital markets embed in business groups will improve firm performance. However, a growing number of longitudinal studies have paid attention to the cost of such affiliation. Business groups can be associated with agency problems such as expropriation by managers or the controlling shareholders. In such respect, the internal capital market acts no longer as efficient complement to the weak external markets,

but rather as rent-seeking vehicles through which the controlling shareholders can exploit benefits from minority investors. More importantly, the problems can be exacerbated in emerging market where corporate governance and investor protection are weak (Johnson et al, 2000, Khanna and Palepu 2000). Our study complements these literature by providing the first empirical comparison of an explicit and visible internal capital market (group member firms with finance companies) and an implicit and invisible internal capital market (group member firms without finance companies), attempting to examine the extent to which firm behaviors can be explained by the organizational and functional difference of two internal capital markets and the underlying motives of the controlling shareholder in a pyramidal structure.

Our study also belongs to a voluminous literature on cash holdings and contributes by highlighting a novel facet of cash holding determinants for China's group affiliates, namely the presence of finance companies, which goes beyond the existing literature. Prior empirical literature has paid attention to either financial constraints channel or agency channel in explaining firms' cash holdings policies. With regard to the former, the precautionary demand of holding cash initially proposed by Keynes (1936) suggests that liquid cash prevents firms from underinvesting or even forgoing positive NPV projects if adverse cash flow shocks make alternative of funds unavailable or excessively costly. This conventional wisdom is supported by a number of papers (Bates et al, 2009; Duchin, 2010; Gao et al, 2013). In addition to the financial constraint channel, as argued by Jensen (1986), excess cash holdings may aggravate agency problems since firms' insiders may have incentives to pursue their private benefits through a pool of accumulated free cash flow. Based on Jensen's viewpoint, ample studies focus on agency conflicts between controlling shareholders

and minority shareholders and study how the excess cash holding relates to the controlling shareholders' private interests of wealth maximization via expropriating resource out of firms, or in other words, the controlling shareholders' engagement in tunneling behaviors (Dittmar and Mahrt-Smith 2007; Dittmar et al, 2003, Harford et al, 2008; Johnson et al, 2000; Kalcheva and Lins 2007; Pinkowitz et al, 2006).

Besides, our study extends the literature on the raising concerns of tunnelling effects found in Chinese listed firms. Previous evidence of tunnelling by the controlling shareholders has relied on different types of related-party transaction including inter-corporate loans (Jiang et al, 2010), abnormal related sales (Jian and Wong, 2010) and other related-party transaction (Peng et al, 2011). Chen et al, (2012) study the impact of the non-tradeable reform as an exogenous shock to Chinese listed firms' cash policies and conclude that the reform significantly reduces firms' cash holdings, suggesting the existence of cash tunnelling prior to the reform. Our study takes a further step on these literatures and discover a new type of cash tunnelling, that is, through group affiliated FCs. Moreover, by investigating how controlling shareholders react to the deregulation and regulation on the ease of cash tunnelling, our setting can reflect a time dependent feature of controlling shareholders' tunnelling motivations in response to a changing institutional context, whereas existing works primarily focus at one point in time.

Our study is the first to explore a plausible setting in which cash holdings represent a contemporary proxy instead of a future option that benefit controlling shareholders personally, however, at the expense of minority shareholders. This contributes to existing

literature on tunnelling via cash holdings (Chen et al, 2012; Dittmar and Mahrt-Smith 2007; Kalcheva and Lins, 2007).

Finally, our study contributes to the growing literature on shadow banking in China by providing a unique aspect to examine how controlling shareholders in business groups make use of group shadow banks as a vehicle of cash tunnelling¹³. Chen et al (2016) and Hachem and Song (2016) contend that the stricter liquidity regulation was the trigger to the rapid development of shadow banking in China. Wang et al (2016) demonstrate that shadow banking essentially provides a pragmatic dual-track reform solution to interest rate liberalization in China, which led to efficiency gain in credit allocation and social surplus. Acharya et al (2016) find that small- and median-size banks in China significantly increase the participation of shadow banking activity in the form of issuing off-balance sheet wealth management products, which may induce a substantial rollover risk when they mature. Chen et al (2017) argue that small- and median-size banks engage more actively in shadow banking in the form of channelling risky entrusted loans as a response to the deposit shortfalls as well as regulatory prohibition on lending to risky industry, which brings the risk of shadow banking into their balance sheet. Chen et al (2017) report that the rollover pressure of local government from maturing debt financed by China's four-trillion-yuan stimulus package manifest the handover effect of the stimulus plan on fostering the rapid growth of shadow banking activities. Allen et al (2017) reveal that the pricing of affiliated entrusted loans and non-affiliated entrusted loans incorporates fundamental and informational risks.

¹³ We adopt the definition of shadow banks proposed by Pozsar et al, (2010) Shadow banking. *Federal Reserve Bank of New York*. that shadow banks are financial intermediaries that conduct maturity, credit, and liquidity transformation not backstopped by central bank liquidity facilities. The focus of this paper, finance company, is one of the examples of shadow banks listed in their work.

The remainder of this study proceeds as follows. In section 4.3, we briefly overview the institutional details that constitute the setting for our analysis and develop our hypotheses. We describe our data and sample in Section 4.4. In section 4.5, we report our main empirical results, our identification strategies. In 4.6, we present robust checks. We conclude in section 4.7.

4.3 Institutional background

4.3.1 Finance companies in business group

We employ the official definition in the Registration of Business Groups Regulation (Registration Act, 1998) by State Administration for Industry & Commerce of the People's Republic of China (SAIC). A business group is a federation of legally independent firms, or namely member firms, which are bound together by ownership ties, operating under the control of a single parent, or core firm.

Generally, there are two types of finance companies in China. The first type of finance companies includes a diverse group of non-depository financial institutions such as leasing companies and automobile finance companies involved primarily in extending credit to businesses and consumer. In principle, these non-depository finance companies are funded through commercial paper and medium-term notes because they do not collect deposits

although subject to by bank regulations¹⁴. Moreover, they are not necessary to be affiliated within a business group. The second type of finance companies are captive financing subsidiaries of business groups providing financial services only to group-affiliates. Unlike the first type of finance companies, they are depository financial institutional of which prime funds consist of group-affiliates' deposits and are supervised by bank regulations. In this study, we focus on the second type of finance companies.

In China, the first finance company was established in 1987. Initially, the finance companies were not regulated. As the activities of the finance companies expanded, the first regulation on finance companies, namely the *Business Group Finance Company Regulation* (hereafter, the FC act) was implemented in 1996, where the definition of finance company was officially clarified, and its terms and conditions with respect to entry, establishment and operation were firstly justified¹⁵. By the end of year 2014, there were 196 finance companies with an aggregated on- and off-balance sheet total asset of 5.53 trillion RMB that provided financial services to more than 45000 group-affiliates¹⁶.

¹⁴ Unlike the finance companies discussed by Carey et al, (1998), finance companies such as leasing companies and automobile finance companies are subject to the banking regulations in China.

¹⁵ The *Business Group Finance Company Regulation* clarified the terms and conditions of entry, establishment and operations for finance companies. The FC act was initially issued in 1996 and was amended in 2000 and 2006. The FC act also provide a definition for business group. According to the FC act, a business group is defined as business group as a business consortium that consists of one holding company as the business group parent and a group of subsidiaries and joint stock companies that are connected through equity ties. Finance companies could only provide limit financial services authorized by PBOC (before 2006) and CBRC (after 2006) to business group member firms.

¹⁶ See China Banking Regulatory Commission 2014 Annual Report on <http://www.cbrc.gov.cn/>

Figure 4.1: An overview of finance company industry

	2014	2015	2016
Asset billions			
Total Asset	3170.34	4072.63	4760.39
Including :			
Cash and Due from Central Bank	305.46	223.66	306.78
Due from Banks and Other Financial Institutions	1185.18	1753.45	1967.70
Loans	1325.18	1688.15	2078.79
Investments	208.47	291.14	289.76
Liabilities billions			
Total Liabilities	2717.37	3501.73	4086.96
Including :			
Inter-bank borrowings	90.62	98.52	91.66
Deposits	2423.12	3234.02	3743.39
Equity billions			
Total shareholders' Equity	452.97	570.90	673.43
Profitability billions, %			
Total Profit	69.65	75.78	79.56
Net Profit	53.62	58.41	61.99
ROA	1.69%	1.58%	1.39%
ROE	11.84%	10.96%	9.83%
Other ratio billions, %			
NPL	0.11%	0.05%	0.03%
capital adequacy ratio	21.22%	21.19%	21.25%
LLP	1215.88%	2763.30%	3303.79%
Liquidity ratio	62.34%	71.87%	64.79%
Inter-bank borrowings to equity	21.79%	22.04%	28.40%
Investment to total asset	6.58%	49.82%	30.24%

Figure 4.1 provides an overview of finance company industry from 2014 to 2016. By the end of 2016, the on-balance-sheet total asset of finance companies had reached to 4760.39 billion with a dramatic increase of 50.15% since 2014. Strikingly, nearly half of the total assets is made up of investments and interbank assets. On the liabilities side, deposits from group-affiliates constitutes over 90% of the total liabilities, while interbank borrowing only weights a small portion. Not surprisingly, as an insider lender, the lower risk level reflected by the extremely low non-performing loans ratio and high capital adequacy ratio implies that finance companies may have informational advantages in financial contracting within business groups.

4.3.2 Dual-track interest system and Inter-bank market

During the past two decades, China has made substantial efforts on interest rate liberalization. More precisely, China embarked on its long-expected steps toward interest rate liberalization since 1996, beginning with the establishment of the National Interbank Funding Centre (NIFC) as well as the abolishment of the ceilings on interbank lending and borrowing rates. The remainder of 1990s had witnessed a series of interest rate liberalization in terms of interbank repo rates and bond rates, which implies the full liberalization of interbank rates. In 2005, the deposit rates due from financial institutions has achieved fully liberalized, followed by the foundation of *SHIBOR* (Shanghai Interbank Offered Rate)¹⁷ in 2006

¹⁷ The price quotation group of SHIBOR comprises 18 commercial banks: Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Bank of Communications, China Merchants Bank, China CITIC Bank, China Everbright Bank, Industrial Bank Co. Ltd., Shanghai Pudong Development Bank, Bank of Beijing, Bank of Shanghai, HSBC, Huxia Bank, Guangdong Development Bank, Postal Savings Bank of China, China Development Bank, China Minsheng Banking Co Ltd. All above banks are

as an interbank benchmark reference rate gauging the liquidity and cost of funds for financial institutions. Similar to *LIBOR* (London Interbank Offered Rate) except that the market is based on the National Interbank Funding Centre (NIFC) in Shanghai. On the other hand, China has been implementing a controlled loans and deposits interest rate system for non-financial firms, where the rates are capped by ceilings and floors on deposit and loan rates.

Due to a battery of financial reforms in liberating interest rate, two interest rate systems of deposits and loans have co-existed prospectively: a restricted interest rate system for non-financial institutions with floors and ceilings based on the PBOC benchmark rate and a liberalized interest rate system that is negotiable among financial institutions benchmarked by interbank rate.

On the other hand, *the 2000 FC Entry Act* allows the business group owned finance company to enter the *interbank bond market* and *lending market* where surplus fund is invested and short-term fund is raised, aiming to improve the efficiency of cash management conducive to member firms via finance companies. Given the context that China has been implementing a co-existed interest rate system, the *2000 FC Entry Act* specified an increased return on cash holdings achieved by which finance companies could lend the cash collected from member firms to the interbank market with higher negotiable interest return than otherwise member firms deposit their cash in other banks with constrained interest return. Therefore, we

primary dealers of open market operation or market makers in the foreign exchange market, actively participating in money market with sound information disclosure. The rate is arithmetically averaged after eliminating the top 2 and bottom 2 quotes. Currently, the SHIBOR is composed of eight maturities: overnight, 1-week, 2-week, 1-month, 3-month, 6-month, 9-month and 1-year, quoted in annualized rate using 360 days per year. Retrieved from: www.shibor.org

would expect an unintended consequence of *the 2000 FC Entry Act* that cash holdings for firms with finance company would increase after the *2000 FC Entry Act* as the tunnelling incentive increased driven by the arbitrage opportunity between two interest rate systems. We provide evidence supportive of this prediction. To the best of our knowledge, our study is the first to discuss the impact of dual-track interest rate system on corporate finance.

Consequently, from a perspective of stand-alone non-financial affiliated subsidiaries, it makes no substantial difference in terms of the interest return generated from depositing in either non-affiliated depository institutions or affiliated finance company given the fact that any depository institutions could only offer constrained interest return on non-financial firms' cash deposit according to the laws¹⁸. This indifference makes the cash tunneling undetectable for minority shareholders of these stand-alone firms. However, from a perspective of business groups' parent, through depositing their non-financial subsidiaries' cash in their wholly controlled finance companies and lending it in the interbank market, group parents could achieve a higher interest return on cash as long as the interbank rate on cash is higher than the constrained interest rate which seems always the case. Besides, the interest rate return finance companies generate from lending to the interbank market constitutes the profits that mainly belong to the group parent only. In sum, this contextual setting intuitively makes it possible for controlling shareholders to control the listed company's cash and, to divert the cash to their own interest by channeling the cash in the form of deposit in finance companies.

¹⁸ According to *the Law of Penalties for Illegal Financial Activities No.260* issued by China State Council in 1999, it is illegal for financial intuitions to solicit deposit with interest rates higher than the statutory deposit rates.

4.3.3 The 2007 anti-tunneling shock

The Shenzhen stock exchange issued the *Anti-tunneling Guidance* in 2007. The *Anti-tunneling Guidance* emphasizes on the prohibition of any possible tunneling behaviors by the ultimate controlling shareholders of firms listed on Small- and Medium size Enterprise Board (SME board) that harm the minority shareholders. Prior among the anti-tunneling rules mentioned in the *Guidance*, it is worth noting that the *Anti-tunneling Guidance* restricted firms of business groups listed on SME board to deposit their cash holdings in group affiliated finance companies because of the suspicion that such behavior may affect the financial independence of firms and correspondingly may induce tunneling. This exogenous shock allows us to study the differential cash policies between firms with and without finance companies and to what extent this difference can be explained by the specialization of finance companies.

4.4 Data and sample

Our sample consists of all non-financial firms publicly listed on either the Shanghai or the Shenzhen Stock Exchange in China from 1998 to 2014. We confine our sample period to start from 1998, the first year that comprehensive cash flow information of Chinese listed firms was available, because our analysis relies on cash flow information. We retrieve accounting and ownership data from the CSMAR and the WIND Financial Terminal, two standard databases on Chinese capital markets, to formulate controls variables for firm characteristics in the regression.

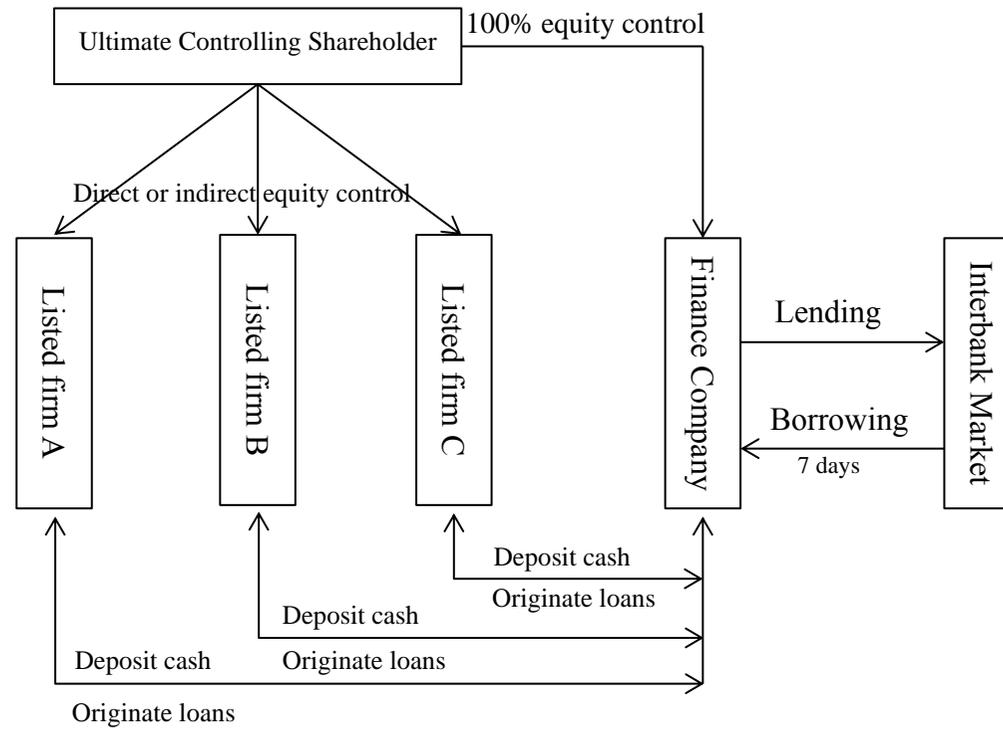
4.4.1 Finance company data

We manually obtain finance company ownership data by reviewing the CBRC's official announcements. Whenever the application for the incorporation of finance company is approved, the CBRC will post an announcement for approval on its official website which discloses the information in terms of ownership, management committee, the amount of capital stock and authorized line of business.

4.4.2 Group identification

Because firms associated with finance companies simultaneously belong to business groups given the fact that finance company must be affiliated with business groups according to finance company regulations, we only consider listed firms that belong to business groups to avoid confounding explanation that it is the organizational difference between group affiliation and non-group affiliation rather than the presence of finance companies that contributes to the difference motives behind the cash policies.

Figure 4.2: The classic structure of a business group affiliated with a finance company after 2000



A typical Chinese business group is characterized as an unlisted parent controlling group member firms through direct equity ties or via a pyramidal structure (Chen et al, 2017, Fan et al, 2013). Based on the ownership dataset from CSMAR, we identify all listed firms that have the same ultimate controlling shareholder and so belong to the same business group. Particularly, we manually trace ownership of pyramids of any length via the National Enterprise Credit Information Publicity System¹⁹. We label that the firm is controlled by a business group in accordance with the procedure employed by Faccio and Lang (2002) and Faccio et al (2011), that is, whenever the direct shareholder of a firm is another firm, we identify its owners, the owners of its owners, and so on until we find an owner whose legal registered name contains “Group”, “Holding” or “State Asset Management” alone the chain²⁰. Next, we match ownership dataset of finance company with that of listed firm to make sure that finance companies and listed firms belong to the same business group. For the remainder of the study, we refer to “listed group-affiliated firms” as “firms”.

Our final sample covers 21,584 firm-year observations representing 1830 unique firms. Of these, 468 unique firms were associated with 180 finance companies during 1998 to 2014. The rest 16 finance companies were either affiliated with business groups that do not have listed subsidiaries or owned by foreign business groups such as Hitachi, Panasonic and GE.

¹⁹ See <http://www.gsxt.gov.cn/index.html>.

²⁰ We identify State Asset Management Agencies as business groups due to that State Asset Management Agencies sits at the top of the pyramidal structure as the ultimate owner in China. This is consistent with Fan, J. P. H., Wong, T. J. and Zhang, T. Y. (2013) Institutions and organizational structure: The case of state-owned corporate pyramids. *Journal of Law Economics & Organization*, **29**, 1217-1252. who discussed the state asset management system in detail. Moreover, State Asset Management Agencies are officially recognized as parents of business groups since many of finance companies are directly owned by State Asset Management Agencies.

Table 4.1: The importance of finance companies in China

Panel A in this table presents the number of FCs and the size and number of public firms that are affiliated with FCs from 1998 to 2014. Panel B shows the size and number of all public firms listed in Shanghai and Shenzhen stock exchanges. Our sample consists of 21,584 firm-year observations representing 1,830 unique firms, among which 468 firms were associated with 180 FCs during 1998 to 2014. There are 196 FCs by the year of 2014, among which 16 FCs were either affiliated with business groups that do not have listed subsidiaries or owned by foreign business groups such as Hitachi, Panasonic and GE. These 16 FCs are not included in our sample.

year	Panel A: Number of firms					Panel B: Total asset			
	No. of FC	No. of listed firms with FC	No. of listed firms without FC	No. of all listed firms	% of No. of listed firms with FC as total No. of all listed firms	Total asset of listed firm with FC (in billions)	Total asset of listed firms without FC (in billions)	Total asset of listed firms (in billions)	% of total asset of listed firms with FC as total asset of all listed firms
	(1)	(2)	(3)	(4)	(6) = (2) / (4)	(7)	(8)	(9)	(10) = (7) / (9)
1998	40	48	647	695	6.91%	168.76	812.53	981.28	17.20%
1999	40	63	813	876	7.19%	251.35	1132.23	1383.58	18.17%
2000	43	80	941	1021	7.84%	320.47	1506.21	1826.68	17.54%
2001	45	90	976	1066	8.44%	770.73	1724.15	2494.88	30.89%
2002	50	98	1019	1117	8.77%	826.94	2146.65	2973.59	27.81%
2003	51	108	1052	1160	9.31%	991.82	2488.94	3480.77	28.49%
2004	57	130	1094	1224	10.62%	1291.34	2822.15	4113.48	31.39%
2005	59	132	1091	1223	10.79%	1586.80	3003.01	4589.81	34.57%
2006	64	148	1119	1267	11.68%	2174.53	3546.22	5720.76	38.01%
2007	73	182	1132	1314	13.85%	4268.90	5002.84	9271.73	46.04%
2008	81	208	1137	1345	15.46%	5115.37	6002.64	11118.01	46.01%
2009	90	234	1149	1383	16.92%	6778.61	7421.62	14200.23	47.74%
2010	104	259	1239	1498	17.29%	8734.09	8922.04	17656.13	49.47%
2011	125	297	1262	1559	19.05%	11071.33	10573.01	21644.35	51.15%
2012	149	349	1242	1591	21.94%	13673.15	10987.25	24660.40	55.45%
2013	175	399	1204	1603	24.89%	16554.14	11141.87	27696.01	59.77%
2014	196	429	1213	1642	26.13%	19647.71	11494.11	31141.82	63.09%

Table 4.1 illustrates the distribution of the finance companies and their affiliated listed firms in the same group over time. Column 1 in panel A shows the total number of finance companies increased from 40 in 1998 to 196 in 2014. Column 2, 3 and 4 shows that only small portion (6.91%) of all firms in 1998 received financial services from finance companies. However, this ratio increased by almost 20% over 16 years, indicating that more than a quarter of all firms had access to finance company's services by the end of 2014. Likewise, as shown in panel B column 10, finance companies dealt with 17.20% (168.76 billions) of all firms' total assets in 1998 and this ratio raised remarkably to 63.09% (19,647.71 billions) in 2014. The tremendous increases in these numbers shed light on the fact that finance companies have been playing an increasingly important role in China's economy, however, barely received attentions from scholars.

Table 4.2: Definition of variables

This table provides definition for all variables used in this study during the period of 1998 to 2014. Cash, Δ cash, Excash and Equity financing are dependent variables which are the interest of this study. The rest of variables are control variables used in regressions in this study.

Variable	Definition
Cash	Cash and cash equivalents scaled by noncash total assets
Δcash	Net change in cash and cash equivalents, scaled by noncash total assets
Excash	Industry-adjust cash. Difference between individual firm's cash level and average cash in the same industry, scaled by noncash total assets
Equity financing	Cash proceeds from equity issuance, scaled by noncash total assets
ROA	Net profit scaled by noncash total assets
ROE	Net profit scaled by total shareholders' equity
Tobin Q	Market value of equity plus book value of total liabilities, scaled by book value of total assets
Market to book	Market value of equity to book value of equity
Leverage	Ratio of total liabilities to total noncash assets
Finance expense	Ratio of finance expense to total noncash assets
CAPEX on fixed assets	Capital expenditures scaled by noncash total assets
CAPEX on investment	Equity investments and debt investments, scaled by noncash total assets
Log (total assets)	Logarithm of total asset
AGE	The number of years since the firm's incorporation
IPO	The number of years since the firm was listed on the exchange
Net working capital	Difference between current noncash assets and current liabilities, scaled by noncash total assets
Ownership	Indicator variable that equals one if controlling shareholders is a government agency
Control right	Total shares as a percentage of total shares outstanding held by controlling shareholders
Payout ratio	Dividend payments scaled by earnings
Dividend	Indicator variable that equals one if firm i paid cash dividends in year t

Table 4.3: Summary statistics of all variables

This table presents descriptive statistics for all variables used in this study during the period of 1998 to 2014. **Cash**, **Δcash**, **Excash** and **Equity financing** are dependent variables. The rest of variables are control variables used in regressions in this study. All variables are calculated for each firm-year. **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. **Equity financing** refers to the cash flow from equity financing. **Log (total assets)** is Logarithm of total asset. **Market to book** is market value of equity to book value of equity. **Leverage** is total liabilities divided by total noncash assets. **Operating cashflow** refers to the cash flow from operating activities. **CAPEX on fixed assets** is the capital expenditures scaled by noncash total assets. **CAPEX on investment** is equity investments and debt investments, scaled by noncash total assets. **AGE** is the number of years since the firm's incorporation. **Net working capital** is the difference between current noncash assets and current liabilities, scaled by noncash total assets. **Finance expense** is the ratio of finance expense to total noncash assets. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. **Payout ratio** is the dividend payments scaled by earnings. **Dividend** is the indicator variable that equals one if firm *i* paid cash dividends in year *t*.

Panel A: All variables summary statistics from 1998 to 2014

variable	N	mean	sd	5%	25%	50%	74%	95%
Cash	21581	0.2293	0.252	0.0221	0.0809	0.1497	0.2748	0.7405
Δcash	21547	0.0319	0.1576	0.1464	-0.031	0.0065	0.0568	0.2836
Excash	21581	0.0114	0.2471	0.2453	0.1509	0.0784	0.0399	0.4809
Equity financing	16205	0.0672	0.1847	0	0	0.0008	0.0152	0.4352
ROA	21581	0.0409	0.0846	0.0963	0.0131	0.0395	0.075	0.1624
ROE	21582	0.0529	0.2047	0.1822	0.0267	0.0692	0.1156	0.2332
Tobin Q	21386	2.3202	1.4014	1.0132	1.3859	1.8957	2.7705	5.0723
Market to book	21384	3.5971	3.315	0.9297	1.8118	2.7744	4.3231	8.8975
Log (total assets)	21584	21.5862	1.2467	19.8184	20.7163	21.4427	22.2758	23.9466
Leverage	21581	0.598	0.2614	0.2105	0.4226	0.5842	0.7441	1.0018
Finance expense	21579	0.0129	0.0146	0.0077	0.0033	0.0115	0.0207	0.0377
CAPEX on fixed assets	21495	0.0711	0.0713	0.0015	0.0179	0.0491	0.1006	0.2208
CAPEX on investment	18576	0.0504	0.1183	0	0	0.007	0.0428	0.2431
AGE	20934	12.1322	5.7847	3	8	12	16	22
IPO	20934	8.1153	5.3612	0	4	8	12	18
Net working capital	21581	-0.0513	0.2703	0.4925	0.1955	0.0366	0.1237	0.358
Ownership	21584	0.7182	0.4499	0	0	1	1	1
Control right	21584	0.407	0.1646	0.1637	0.2752	0.3952	0.5309	0.697
Payout ratio	20901	0.2398	0.3235	0	0	0.1316	0.3726	0.8329
Dividend	20901	0.5721	0.4948	0	0	1	1	1

(Continued)

Table 4.3 – Summary statistics (Continued)

Penal B: Summary Statistics of cash holdings by year								
year	N	mean	sd	5%	25%	50%	75%	95%
1998	695	0.1418	0.1571	0.0118	0.0485	0.0955	0.1843	0.4281
1999	876	0.1694	0.1788	0.0127	0.059	0.1177	0.2149	0.5084
2000	1021	0.2386	0.2719	0.0143	0.0762	0.1478	0.2797	0.8268
2001	1066	0.2507	0.2503	0.0204	0.0932	0.1684	0.3166	0.7812
2002	1117	0.2309	0.2377	0.0213	0.086	0.1583	0.2942	0.6897
2003	1160	0.2218	0.2248	0.0251	0.0856	0.151	0.2743	0.6648
2004	1224	0.213	0.2284	0.0204	0.0776	0.144	0.2658	0.6393
2005	1223	0.19	0.207	0.0173	0.0657	0.1295	0.2338	0.586
2006	1267	0.19	0.2113	0.0124	0.0669	0.13	0.2329	0.5741
2007	1314	0.2054	0.2181	0.0164	0.0739	0.1387	0.2537	0.6242
2008	1344	0.2076	0.2218	0.0199	0.078	0.1429	0.2578	0.6043
2009	1383	0.2614	0.2837	0.027	0.0924	0.1719	0.3082	0.9022
2010	1496	0.31	0.3453	0.032	0.1	0.187	0.3624	1.2198
2011	1559	0.2838	0.3091	0.0327	0.097	0.1764	0.3284	0.9977
2012	1591	0.2632	0.2811	0.0331	0.0924	0.166	0.3109	0.9086
2013	1603	0.2235	0.2283	0.0312	0.0882	0.151	0.2712	0.6577
2014	1642	0.2119	0.2209	0.0324	0.083	0.1412	0.2511	0.6571

Table 4.2 provides variable definitions and Table 4.3 presents summary statistic for our sample. All continuous variables are winsorized at 1% and 99%. Following the previous literature on cash holdings, we scaled all continuous variables by total assets minus cash. We use three proxies to capture the level of firms' cash holdings in observation years. $Cash_{i,t}$ is measured as the amount of cash and cash equivalents as a percentage of firm i 's total noncash assets in year t . $\Delta cash_{i,t}$, reflects the net increase in cash holdings of firm i in year t . To mitigate the concern that the difference in cash holdings is driven by the different industry factor across firms in our sample, we also included $Excash_{i,t}$ which is the industry-adjust cash holdings computed as the difference between individual firm cash holdings and its industry mean. In addition, we decomposed the components of cash holdings and paid specific attention to net cash proceeding from equity issuance, as proxied by $Equity\ financing_{i,t}$. In table 3 panel A, we show that the mean (median) sample cash to noncash ratio is 22.93% (14.97%). Panel B tabulates the calendar time evolution in cash holdings during our sample period. At the beginning of the sample period, the mean (median) cash to noncash asset ratio is 14.15% (9.55%). The year of 2000 witnessed a dramatically increase by 6.92% (3.01%) in the cash ratio to reach 23.86% (14.78%) in 2000. Starting from 2001, the ratio falls steadily from 25.07% (16.84%) in 2001 to reach 19.00% (13.00%) in 2007, before increase afterward. It peaks in 2010 at 31.00% (18.70%), which is more than double that of in the beginning of the sample period.

4.5 Main results

4.5.1 The average effect of having access to finance companies on cash holdings

Basically, firms can be affiliated with a finance company either in the form of establishment of a new finance company by their affiliated business parent, or, through being acquired by a business group that has already owned a finance company. Because in both cases, firms had access to finance companies at different calendar years, we are able to adapt a continuous difference-in-differences method to investigate the effect of having access to finance companies on cash holdings. Particularly, in a given year, some sample firms have been affiliated with finance companies and other sample firms have not. By observing the differences in cash holdings between two sample groups, we could estimate the average effect of having access to finance companies on cash holdings.

Hypothesis (1). Member firms in business groups are more likely to increase their cash holdings after they have access to finance companies.

Moreover, we suspect that the controlling shareholders will dilute the controlling right while remain full control to raise more cash via equity financing. By doing so, the controlling shareholders could reap more private benefits from depositing the more raised cash from equity issuance in their wholly controlled finance companies.

Hypothesis (2). Member firms in business groups are more likely to issue more equity to raise cash after they have access to finance companies.

We also included these firms that have no access to finance companies during the entire sample period to increase the precision of the estimates of the normal level of cash holdings but excluded the firm-year observations representing the afterward period that firms were disaffiliated from a business group that had owned a finance company to reduce the sample noises. We estimate the following regression for each measure of cash holdings.

$$\text{Dependent}_{i,t} = \alpha + \beta FC_{i,t} + \gamma X_{i,t} + \text{Firm Fixed Effects} + \text{Year Fixed Effect} + \varepsilon_{i,t} \quad (1)$$

Where dependent variables consist of the level of cash holdings proxied as $Cash_{i,t}$, net increase in cash holdings from time t-1 to t proxied as $\Delta cash_{i,t}$, the industry-adjust cash holdings proxied as $Excash_{i,t}$ and, the cash that proceeds from equity issuance proxied as $Equity\ financing_{i,t}$. $FC_{i,t}$ is an indicator variable which equals to one if firm i has affiliated with a finance company by year t. $X_{i,t}$ control for a set of firm-specific characteristics that determine the level of cash holdings, including $Log\ (total\ assets)_{i,t}$ (logarithm of total asset), $Market\ to\ book_{i,t}$ (market value to book value of equity), $Leverage_{i,t}$ (ratio of total liabilities to total noncash assets), $Operating\ cashflow_{i,t}$ (net cash flow from operating activities scaled by noncash assets), $CAPEX\ on\ fixed\ assets_{i,t}$ (capital expenditures scaled by noncash total assets), $CAPEX\ on\ investment_{i,t}$ (equity investments and debt investments, scaled by noncash total assets), $AGE_{i,t}$ (number of years since the firm's incorporation), $Net\ working\ capital_{i,t}$ (net working capital defined as the difference between current noncash assets and current liabilities, scaled by noncash total assets), $SOE_{i,t}$ (an indicator variable that equals one if controlling shareholders is a government agency), $Finance\ expense_{i,t}$ (ratio of

finance expense to total noncash assets), *Control right*_{*i,t*} (shares held by controlling shareholders as a percentage of total shares outstanding) and, *Dividend*_{*i,t*} (indicator variable that equals one if firm *i* pays cash dividends in year *t*). In addition, to control for variables that are constant across firms but vary over time and are time-invariant but vary from firm to firm, year fixed effects and firm fixed effects are included in the regression. We cluster all standard errors at firm level.

Table 4.4: Correlation matrix

This table reports correlation matrix of all variables. The dependent variable **Cash** is the cash and cash equivalents scaled by noncash total assets. The dependent variable Δ **cash** is the net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is the difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	FC	Cash	Δ cash	Excash	Equity financing	ROA	ROE	Tobin Q	Market to book	Leverage	Finance expense	CAPEX on fixed assets	CAPEX on investment	Log (total assets)	AGE	Net working capital	SOE	Control right	Payout ratio
FC	1.00																		
Cash	-0.02	1.00																	
Δ cash	-0.03	0.57	1.00																
Excash	-0.03	0.97	0.56	1.00															
Equity financing	-0.06	0.48	0.74	0.48	1.00														
ROA	-0.03	0.41	0.27	0.39	0.22	1.00													
ROE	-0.01	0.10	0.09	0.09	0.04	0.37	1.00												
Tobin Q	-0.11	0.20	0.13	0.18	0.14	0.18	0.06	1.00											
Market to book	-0.07	0.06	0.05	0.05	0.02	0.02	-0.18	0.37	1.00										
Leverage	0.10	0.01	0.06	0.01	-0.14	-0.30	-0.07	-0.16	0.05	1.00									
Finance expense	0.00	-0.41	-0.09	-0.40	-0.12	-0.43	-0.21	-0.12	0.03	0.34	1.00								
CAPEX on fixed assets	0.00	0.10	0.04	0.09	0.19	0.19	0.10	0.02	-0.04	-0.16	-0.10	1.00							
CAPEX on investment	-0.07	0.12	-0.01	0.13	0.06	0.15	0.06	0.08	0.00	-0.17	-0.19	-0.03	1.00						
Log (total assets)	0.30	-0.13	-0.07	-0.14	-0.13	0.05	0.11	-0.34	-0.38	0.25	0.02	0.02	-0.06	1.00					
AGE	0.06	-0.11	-0.14	-0.16	-0.23	-0.10	-0.02	-0.08	-0.01	0.15	0.08	-0.21	-0.03	0.14	1.00				
Net working capital	-0.08	0.01	-0.02	0.04	0.15	0.25	0.12	0.06	-0.06	-0.41	-0.43	-0.09	0.14	-0.08	-0.08	1.00			
SOE	0.22	-0.09	-0.03	-0.09	-0.07	-0.07	-0.04	-0.14	-0.08	0.06	0.00	-0.02	-0.06	0.18	-0.11	-0.12	1.00		
Control right	0.09	0.05	0.04	0.06	0.06	0.15	0.09	-0.06	-0.06	-0.06	-0.15	0.06	0.01	0.21	-0.31	0.08	0.15	1.00	
Payout ratio	0.00	0.14	0.07	0.15	0.12	0.18	0.10	-0.05	-0.12	-0.17	-0.19	0.10	0.07	0.06	-0.14	0.10	0.02	0.16	1.00

Table 4.5: The results of the baseline regressions

This table reports panel regression results of the impact of the presence of FC on firm cash holdings in the sample period 1998 to 2014. The dependent variable **Cash** is the cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is the net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is the difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. **Before^k (after^k)** indicates the k years before (after) the year when the firm has access to FCs. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cash holding		Δcash		Excash		Equity financing	
FC	0.0249** (2.35)		0.0170*** (3.31)		0.0281*** (2.66)		0.0375*** (5.01)	
Log (total assets)	-0.0411*** (-6.80)	-0.0413*** (-6.31)	-0.0129*** (-4.15)	-0.0117*** (-3.30)	-0.0391*** (-6.55)	-0.0394*** (-6.09)	-0.0180*** (-4.91)	-0.0158*** (-4.02)
Market to book	-0.0025** (-2.42)	-0.0022** (-2.10)	-0.0008 (-1.38)	-0.0005 (-0.87)	-0.0023** (-2.33)	-0.0022** (-2.12)	-0.0028*** (-4.81)	-0.0026*** (-4.07)
Leverage	0.3978*** (15.97)	0.3799*** (14.53)	0.2334*** (16.86)	0.2375*** (15.47)	0.3936*** (15.86)	0.3765*** (14.40)	0.0514*** (3.04)	0.0378** (2.05)
Operating cashflow	0.4507*** (17.93)	0.4315*** (16.47)	0.4645*** (23.26)	0.4609*** (22.02)	0.4484*** (18.06)	0.4276*** (16.43)	0.0376* (1.68)	0.0368 (1.58)
CAPEX on fixed assets	0.0526 (1.58)	0.0607* (1.73)	-0.1535*** (-5.88)	-0.1468*** (-5.19)	0.0397 (1.20)	0.0492 (1.41)	0.3349*** (9.25)	0.3391*** (8.57)
CAPEX on investment	0.0872*** (3.24)	0.0779*** (2.74)	-0.0875*** (-5.11)	-0.0927*** (-5.07)	0.0821*** (3.14)	0.0731*** (2.66)	0.0267 (1.27)	0.0207 (0.92)
AGE	-0.0003 (-0.35)	0.0001 (0.13)	-0.0039*** (-6.74)	-0.0037*** (-5.80)	-0.0074*** (-8.25)	-0.0070*** (-7.31)	-0.0107*** (-11.43)	-0.0110*** (-10.85)
Net working capital	-0.0210 (-1.01)	-0.0018 (-0.08)	0.0604*** (5.27)	0.0709*** (5.58)	-0.0208 (-1.00)	-0.0018 (-0.08)	0.0967*** (6.11)	0.0965*** (5.59)
SOE	-0.0214* (-1.68)	-0.0134 (-1.06)	-0.0094 (-1.49)	-0.0091 (-1.43)	-0.0244** (-2.00)	-0.0174 (-1.42)	-0.0141 (-1.52)	-0.0152 (-1.56)
Finance expense	-5.9800*** (-18.09)	-5.6262*** (-16.31)	-0.8697*** (-4.98)	-0.7127*** (-3.69)	-5.9735*** (-18.22)	-5.6076*** (-16.46)	0.6260*** (2.80)	0.8703*** (3.42)
Control right	-0.0001 (-0.24)	-0.0001 (-0.28)	-0.0001 (-0.99)	-0.0001 (-0.63)	-0.0002 (-0.56)	-0.0002 (-0.52)	-0.0002 (-0.73)	-0.0000 (-0.19)
Dividend	0.0346*** (8.94)	0.0343*** (8.10)	0.0269*** (9.12)	0.0304*** (9.23)	0.0332*** (8.50)	0.0333*** (7.79)	0.0315*** (8.39)	0.0340*** (8.31)
before5		0.0181		0.0030		0.0163		0.0131

		(1.16)		(0.23)		(1.05)		(0.83)
before4		0.0258		0.0186		0.0253		0.0117
		(1.64)		(1.40)		(1.63)		(0.81)
before3		0.0128		0.0088		0.0135		0.0145
		(0.99)		(0.73)		(1.04)		(1.00)
before2		0.0108		-0.0018		0.0111		0.0026
		(0.87)		(-0.15)		(0.88)		(0.21)
before1		-0.0005		-0.0083		0.0001		-0.0068
		(-0.05)		(-0.77)		(0.01)		(-0.71)
after1		0.0454***		0.0525***		0.0471***		0.0724***
		(4.23)		(4.03)		(4.40)		(5.24)
after2		0.0288***		0.0019		0.0313***		0.0235**
		(2.72)		(0.19)		(2.92)		(2.21)
after3		0.0130		-0.0016		0.0140		0.0203*
		(1.13)		(-0.16)		(1.21)		(1.84)
after4		0.0050		-0.0028		0.0072		0.0112
		(0.39)		(-0.26)		(0.56)		(0.97)
after5		0.0180		0.0152		0.0206		0.0326**
		(1.26)		(1.38)		(1.45)		(2.24)
Constant	0.9040***	0.8986***	0.2142***	0.1769**	0.7548***	0.7521***	0.5514***	0.5069***
	(7.47)	(6.84)	(3.50)	(2.55)	(6.33)	(5.81)	(7.55)	(6.48)
Year fixed effect	yes							
Firm fixed effect	yes							
N	17805	15679	17803	15677	17805	15679	14673	13023
adj. R-sq	0.2368	0.2159	0.1482	0.1464	0.2357	0.2110	0.1298	0.1271

Table 4.5 column (1), (3), (5) and (7) tabulate the main results. The coefficient for the FC indicator is 0.0249 with a t-value of 2.35, suggesting that having access to finance companies results in greater difference in cash holdings between our treatment group and control group, after controlling for a host of cash holding determinants. In simple words, firms tend to hold more cash after they have access to finance companies. In terms of the economic magnitude of this effect, the coefficient of 0.0249 indicates an economically significant increase of 10.90% ($=2.49/22.85$) from the average cash holdings before having access to finance companies. Besides, we also find that the correlation coefficients between the FC indicator and other measures of cash holdings, in Column (3) and (5), are indeed significantly positive at better than 1% level, suggesting that, relative to the controlled firms that have no access to finance companies, the treated firms increase not only the level of cash holdings but also the net change in cash holdings in a specific year (with the coefficient of 0.0170), as well as the amount of cash that exceeds the industry average (with the coefficient of 0.0281) after they have access to finance companies. Moreover, the coefficient between cash generating from equity issuance and the FC indicator provides a statistically reliable (at better than 1% level) and economically significant evidence that the effect of having access to finance companies increases cash proceeding from equity issuance by 47.77% ($=3.75/7.85$) for treated firms. The controlling shareholders may consider raising more cash to achieve more private benefit, one way to fulfill this ambition is to issue more equity to collect cash. Although equity issuance may cause controlling right dilution, as long as the controlling shareholders remain control those listed subsidiaries, they have incentive to issue more equity to raise cash because they can request those subsidiaries to deposit more cash in the finance companies to extract more rents. Collectively, these results confirm our tunneling prediction that firms are more likely to hoard cash accumulated from equity issuance after they have access to finance companies because

finance companies facilitate group business parents with convenience for rent extraction through cash holdings.

While estimates in Column (1), (3), (5) and (7) only provide an average effect of having access to finance companies on cash holdings, to investigate the dynamics pattern of firms' cash holdings around their first access to finance companies, we adapt a regression of the following specification:

$$\begin{aligned}
 & \text{Dependent}_{i,t} = \alpha + \\
 & \sum_{k=1}^5 \delta_k \text{Before}_{i,t}^k + \sum_{k=1}^5 \theta_k \text{After}_{i,t}^k + \gamma X_{i,t} + \\
 & \text{Firm Fixed Effects} + \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (2)
 \end{aligned}$$

Where $\text{Dependent}_{i,t}$ is the focus of interest ($\text{Cash}_{i,t}$, $\Delta \text{cash}_{i,t}$, $\text{Excash}_{i,t}$ and $\text{Equity financing}_{i,t}$). $X_{i,t}$ is a set of control variables. $\text{Before}_{i,t}^k$ ($\text{After}_{i,t}^k$) indicates the k years before (after) the year when the firm has access to FCs. We use the controlled firms that remained no connection with FCs throughout our sample period as a benchmark and thus the $\text{Before}_{i,t}^k$ and $\text{After}_{i,t}^k$ for those firms are always zero. We omit the year prior to the first year that firms were affiliated with FCs as the reference category, or, base year. This specification allows us to analyze the dynamic patterns of cash policies of treated firms that have access to FCs, which is captured by the coefficient δ_k and θ_k . Because our sample of the first year that firms have access to FCs vary over time, one may argue that the variations over time associated with market factors may influence the establishment of FCs or the decision of business groups with FCs on acquisition, such as the clustering of establishing FCs or

M&A waves, we therefore include year fixed effects to account for such variations in this specification.

Table 4.5 Column (2), (4), (6) and (8) report the results of regressions. The coefficients reflect the change in the differences between firms with FC access and firms without FC access over the five years before and the five years after the base year which is one year prior to firms being tied with finance companies. Compared with base year, the coefficients for all four dependent variables of interest on all the $Before_{i,t}^k$ dummies are statistically insignificant, whereas the coefficients on $After_{i,t}^k$ exhibit some variation with regard to their level of statistical significance. Specifically, the cash ratio of firms having access to finance companies significantly increase 4.54% (2.88%) more than firms having no such access from year -1 to 0 (year -1 to 1) at the 1% level. As for the net cash ratio and excess cash ratio, we can also observe a similar short-term increasing trend, with the coefficients of net cash ratio on $After^1$ (5.25%) being significantly positive, and the coefficients of excess cash ratio on $After^1$ (4.71%) and $After^2$ (3.13%) being significantly positive. Similarly, the coefficients of cash proceeds from equity issuance on $After^1$, $After^2$, $After^3$ and $After^5$ are positive and significant at the 1% level, implying that the increase in cash proceeds from equity issuance is greater compared with those for firms remaining no access to finance companies throughout.

4.5.2 Sensitivity to endogeneity: *Difference-in-difference-in-differences results*

A key assumption behind our difference-in-differences baseline regression is that having access to FCs is exogenous to each member firm. While this assumption may be plausible because the establishment of FCs at parent level does not require approval at a general meeting of all shareholders at the subsidiary's level, we may still face an endogeneity challenge where whether a member firm belongs to a business group with or without an FC is determined by confounding factors that also determine member firms' cash holdings. For example, the business group parent might prefer to acquire firms with higher levels of cash or to spin off member firms with lower levels of cash. To address this concern, we tested the impact of the 2007 Anti-tunneling Guidance as an exogenous shock to the parent firm's incentive to tunnel. The Guidance emphasized the prohibition of any possible tunnelling behaviors by the ultimate controlling shareholders of firms listed on the SME Board that might harm the minority shareholders²¹. It does not allow firms in business groups listed on the SME Board to deposit their cash in group-affiliated FCs because of the suspicion that such behavior might affect the financial independence of firms and, correspondingly, might induce tunnelling²². This exogenous shock allowed us to study the difference in cash policies between firms with and without FCs and the extent to which this difference could be explained by the specialization of FCs. We hypothesize that the shock should reduce parent firms' tunnelling behaviours induced by FCs.

To test this hypothesis, we employed a difference-in-difference-in-differences approach. The three differences are SME firms vs. non-

²¹ There are two main stock exchanges and three listed boards in the Chinese stock market. The Main Board is in both Shanghai Stock Exchange and Shenzhen Stock Exchange. The Small- and Medium size Enterprise Board (SME board) in Shenzhen Stock Exchange exists to help SMEs that otherwise find it difficult to get listed on the Main Board; the Growth Enterprises Market Board (GEM board) is a NASDAQ-like board that supports start-up and high-tech enterprise.

²² 2007 Anti-tunneling Guidance, Rule No. 20.

SME firms, pre-2007 period vs. post-2007 period and firms with FCs vs. firms without FCs. In the presence of the firm- and year-fixed effects, the interaction of the FC dummy variable with the other two terms in the specification yields a regression framework of difference-in-difference-in-differences, which allowed us to identify a causal relation between the presence of FCs and cash tunnelling. If the premise that firms having access to FCs are more likely to adopt tunnelling behaviours is plausible, we should expect the coefficient on the three-way interaction term to be negative, which would imply that the tunnelling effect for firms listed on the SME Board gaining access to FCs should be smaller after the 2007 Anti-tunneling Regulation than for those that are not listed on the SME Board. These correspond to estimation of the following specifications:

$$\begin{aligned}
 \text{Dependent}_{i,t} = & \alpha + \beta \text{SME}_{i,t} + \delta \text{Post2007}_{i,t} + \mu \text{FC}_{i,t} + \\
 & \vartheta \text{SME}_{i,t} * \text{Post2007}_{i,t} + \theta \text{FC}_{i,t} * \text{Post2007}_{i,t} + \rho \text{SME}_{i,t} * \text{FC}_{i,t} + \\
 & \sigma \text{SME}_{i,t} * \text{Post2007}_{i,t} * \text{FC}_{i,t} + \gamma X_{i,t} + \text{Firm Fixed Effects} + \\
 & \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (3)
 \end{aligned}$$

where $\text{Dependent}_{i,t}$ and $\text{FC}_{i,t}$ are defined as in specification (2). $\text{Post2007}_{i,t}$ is the time dummy which is equal to 1 for the period between 2008 and 2011 and 0 for the period between 2004 and 2007. $\text{SME}_{i,t}$ is an indicator which equals 1 for firms listed on the SME Board and 0 for other firms. In the first regression, the key coefficient of interest is ϑ , whereas the key coefficient of interest in the second regression is σ .

Table 4.6: The impact of 2007 anti-tunneling shock on cash holdings

This table reports panel regression results of the impact of 2007 Anti-tunneling Guidance as an exogenous shock on firms' cash holdings by using a difference-in-difference-in-differences approach. Column (1), (2) and (3) report the results of difference-in-difference-in-differences. The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable Δcash is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. We only considered firms with constant access to FCs throughout the whole sample period, or no access at all throughout. **Post2007** is the time dummy which is equal to 1 for period between 2008 to 2011 and 0 for period between 2004 to 2007. **SME** is an indicator which equals to 1 for firms listed in SME board and 0 for otherwise. **Controls** include all variables controlled in the baseline regression. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	Cash holding	Δcash	Excash
FC*post2007	-0.0065 (-0.66)	-0.0114 (-1.35)	-0.0084 (-0.83)
SME*post2007	-0.0993*** (-3.74)	-0.0429** (-1.99)	-0.1050*** (-3.91)
FC*SME*post2007	-0.1664** (-2.17)	-0.2201** (-2.23)	-0.1585** (-2.13)
Log (total asset)	-0.0097 (-1.08)	0.0134* -1.86	-0.0069 (-0.78)
Market to book	-0.0013 (-1.24)	0.0002 -0.29	-0.0013 (-1.25)
Leverage	0.3428*** -10.09	0.2274*** -9.31	0.3396*** -10.02
Operating cashflow	0.3458*** -10.99	0.4249*** -11.74	0.3309*** -10.95
CAPEX on fixed assets	-0.0852* (-1.91)	-0.2311*** (-5.35)	-0.0974** (-2.18)
CAPEX on investment	0.0854** -2.23	-0.1230*** (-3.78)	0.0741** -1.96
AGE	-0.0035** (-2.10)	-0.0088*** (-5.76)	-0.0146*** (-8.67)
Net working capital	-0.0526* (-1.91)	0.0429** -2.13	-0.0488* (-1.77)
SOE	-0.0239* (-1.94)	-0.0086 (-0.93)	-0.0280** (-2.25)
Finance expense	-4.3638*** (-10.79)	0.3721 -1.12	-4.2813*** (-10.57)
Control right	-0.0003 (-0.73)	-0.0001 (-0.49)	-0.0002 (-0.55)
Dividend	0.0263*** -5.17	0.0260*** -4.91	0.0265*** -5.2
Constant	0.3500** -2.04	-0.3040** (-2.24)	0.1768 -1.04
Year-fixed effect	yes	yes	yes
Firm-fixed effect	yes	yes	yes
N	7,722	7,722	7,722
adj. R-sq	0.2329	0.1875	0.2744

In Table 4.6 we found significant and negative three-way interaction, strong evidence corroborating the hypothesis that, for firms listed on the SME Board with access to FCs, the tunnelling effect should be smaller after the 2007 Anti-tunneling Regulation than the effect found for firms that are not listed on the SME Board. Having access to FCs resulted in SME firms' cash holdings reducing by 16.64% percentage points more than the cash holdings of non-SME firms. This effect is consistent and robust to all other ways we tested for measuring cash holdings, with a statistical significance level of 5%.

4.5.3 The effect of FCs' entering to inter-bank market on firms' cash holdings

In this section, we study the effect of allowing finance companies to participate in interbank activities on firms' cash holdings. Specifically, we investigate changes in cash holdings among firms that had access to finance companies relative to firms that had no such access before and after the privilege of finance companies change. As we have introduced in the institutional background section, the 2000 entry shock provided not only the liquidity injection but also the opportunity to arbitrage from the disparity of the two interest rate systems. If firms with finance companies essentially were more likely to engage in cash tunneling, then the arbitrage opportunity attached by the 2000 entry shock would induce greater tunneling incentives because the tunneling benefits were enlarged. As a result, we would expect that firms with finance companies should hold more cash relative to the pre-shock period

and relative to those firms without access to finance companies as their controlling shareholders had incentives to divert cash for their own interest in the form of deposit in parent-wholly-owned finance companies. To test this conjecture, we employ a difference-in-differences design with the controls for determinants that could influence firms' cash holdings. To do so, we regress the following model

$$\begin{aligned}
 \text{Dependent}_{it} = & \alpha + \beta FC_{i,t} + \delta \text{Post2000}_{i,t} + \theta FC_{i,t} * \\
 & \text{Post2000}_{i,t} + \gamma X_{i,t} + \text{Firm Fixed Effects} + \\
 & \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (5)
 \end{aligned}$$

Where $\text{Dependent}_{i,t}$ is the focus of interest ($\text{Cash}_{i,t}$, $\Delta \text{cash}_{i,t}$, $\text{Excash}_{i,t}$ and $\text{Equity financing}_{i,t}$). $FC_{i,t}$ equals to 1 if a firm is affiliated with a finance companies and 0 otherwise. Note that the FC indicator in this specification is different from the one in specification (1) since we only include the year-firm observation within the period that firms have access to finance companies. In other words, the treatment effect of having access to finance companies is consistent throughout our sample period. We conduct a balanced sample pre- and post-period from 1998 to 2003 given the shock year is 2000. $\text{Post2000}_{i,t}$ is the time dummy which is equal to 1 in the time period after 2000 and 0 otherwise. A positive coefficient on the interaction term suggests evidence in support of tunneling behavior. All other control variables are defined as above.

Table 4.7: The impact of entering interbank market on cash holdings

This table reports the effect of allowing FCs to participate in interbank activities in 2000 on firms' cash holdings during the sample period of 1998 to 2014. The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. We only considered firms with constant access to FCs throughout the whole sample period, or no access at all throughout. **Post2000** is the time dummy which is equal to 1 in the period after 2000 and 0 otherwise. **Year^k** is an indicator that equals to 1 if the year equals to k and 0 otherwise. **Controls** include all control variables in baseline regression. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cash holding		Δcash		Excash		Equity financing	
FC*post2000	0.0441*** (2.84)		0.0671*** (3.81)		0.0440*** (2.80)		0.1384*** (4.16)	
FC*year¹⁹⁹⁸		-0.0008 (-0.04)		0.0320 (0.97)		-0.0006 (-0.03)		0.0097 (0.22)
FC*year¹⁹⁹⁹		0.0230 (1.30)		0.0396 (1.48)		0.0224 (1.24)		0.0062 (0.09)
FC*year²⁰⁰¹		0.0191 (1.12)		0.0772*** (3.07)		0.0192 (1.12)		0.1064** (2.54)
FC*year²⁰⁰²		0.0573** (2.46)		0.1006*** (3.52)		0.0575** (2.47)		0.1982*** (3.96)
FC*year²⁰⁰³		0.0832*** (2.94)		0.0802*** (2.77)		0.0817*** (2.86)		0.1372** (2.53)
Constant	1.3752*** (3.00)	1.3998*** (3.05)	0.7724** (2.29)	0.7717** (2.29)	1.3198*** (2.92)	1.3437*** (2.97)	1.7548*** (3.01)	1.7555*** (3.00)
Controls	yes	yes						
Year fixed effect	yes	yes						
Firm fixed effect	yes	yes						
N	3141	3141	3139	3139	3141	3141	1647	1647
adj. R-sq	0.2186	0.2197	0.2054	0.2051	0.2117	0.2128	0.2601	0.2601

The results are reported in Table 4.7. As tabulated in Column (1), (3), (5) and (7), the coefficients on the interaction between *Post2000* and *FC* are positive and statistically significant (at a level of 1%) for cash holding, net cash, excess cash and cash proceeds from equity issuance. These evidences suggest that the difference between average cash holdings of firms with finance companies and without finance companies was substantially expanded after 2000, which was likely due to that the permission to access the interbank market enhance the tunneling incentive of business parents because the interbank market would provide higher interest return on each ¥1 deposit in finance company and so the tunneling benefit was diluted. Consequently, it is possible that firms are under greater pressure from their group parent to accumulate more cash even through expensive equity financing as long as the parent can keep the controlling stake of the firms.

We next examine the dynamic pattern of cash holdings, Δ cash, excess cash and cash proceeds from equity issuance around the 2000 entry regulation in Column (2), (4), (6) and (8) by using a similar specification as equation (3). The results again depict that the coefficients in all years after the 2000 entry shock for net cash and cash proceeds from equity issuance are positive and significant. This confirms our previous findings that the increase in cash were partially attributable to the excessive engagement in equity issuance, especially in the post-2000 period, the period in which group parents were able to generate higher private benefits. For cash holdings and excess cash holdings, we can observe a gradually increasing pattern throughout the years around the 2000 entry shock, with all coefficients on *After* dummies other than the year immediately after the 2000 entry shock are positive and significant. This growing pattern in cash holdings is not surprisingly as we argued that firms with finance companies are prone to hold more

cash for tunneling motive which seemed to be magnified once finance companies were allowed to access interbank activates.

4.5.4 Cross-sectional variation of control right in the effects of the presence of finance companies on cash holdings

As discussed earlier, the increase in cash holdings by firms with finance companies is suggestive of potential expropriation by their controlling shareholder. However, the incentives of controlling shareholders to expropriate minority investors may vary with corporate governance quality. To test whether corporate governance quality can affect cash holdings through an agency conflict channel, we conduct regressions in which the level of cash is a function of a proxy measure for governance quality, and an interaction between this governance measure and the FC indicator dummy. We expect the net effect of the interaction between the governance measure and the presence of finance companies to be negative with respect to cash. In this study, we focus on the equity ownership as a proxy of governance quality. The reason is that in a weak institutional context, ownership concentration in publicly traded firms can be recognized as the substitution of legal investor protections in providing the function of corporate governance (La Porta et al, 1998). In other words, ownership concentration by the controlling shareholders would shape corporate governance and hence reduce the power as well as the incentives of the controlling shareholders to expropriate minority shareholders (La Porta et al, 2002). These arguments are consistent with the spirit of the work developed by Jensen and Meckling (1976) who focused on the agency problem that arises from the separation of ownership and control. Build on their agency framework, a number of empirical studies link tunneling incentives attached to cash with equity ownership by

controlling shareholders and find a negative relationship between the level of cash and ownership concentration (Chen et al, 2012, Kalcheva and Lins, 2007).

On the other hand, in the presence of finance companies, controlling shareholders' endeavor to dilute control of the firm while retain relative control, which consequently reduce ownership concentration, would still bring them considerable private benefits if the cash accumulating from control dilution through extensive equity issuance comprise a major source of firms' savings and the cash is deposited in their wholly owned finance companies. In such context, it creates another type of equity tunneling which differs from the prior tunneling models in a way that the extractions are not merely achieved through discriminative equity offering price in financial transactions (Baek et al, 2006), instead, the cash that proceeds from equity issuance essentially represents a promising expropriation rent for controlling shareholders who own finance companies.

Taken together, we hypothesize that the presence of finance companies exacerbates controlling shareholders incentives to extract private benefits from minority shareholders when their ownership concentration ratio is lower. We modified our baseline model to include ownership variable that captures agency problem.

$$\begin{aligned}
 \text{Dependent}_{it} = & \alpha + \beta FC_{i,t} + \theta \text{Control right}_{i,t} + \delta(FC_{i,t} * \\
 & \text{Control right}_{i,t}) + \gamma X_{i,t} + \text{Firm Fixed Effects} + \\
 & \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (6)
 \end{aligned}$$

Where *Control right*_{*i,t*} refers to shares held by controlling shareholders as a percentage of total shares outstanding. Our emphasis is on the coefficient δ for the interaction variable ($FC_{i,t} * \textit{Control right}_{i,t}$). A significantly negative coefficient would provide evidence in support of our hypothesis.

Table 4.8: Cross-sectional analysis: Control right

This table reports the variation of control right in the effects of the presence of finance companies on cash holdings during the sample period of 1998 to 2014. The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. **Control Right** refers to shares held by controlling shareholders as a percentage of total shares outstanding. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Cash holding	Δcash	Excash	Equity financing
FC	0.0612** (2.56)	0.0218** (2.06)	0.0653*** (2.77)	0.0506*** (3.24)
FC*Control right	-0.0012** (-2.34)	-0.0003 (-1.40)	-0.0012** (-2.41)	-0.0007** (-2.06)
Log (total assets)	-0.0405*** (-6.74)	-0.0126*** (-4.05)	-0.0386*** (-6.49)	-0.0176*** (-4.81)
Market to book	-0.0025** (-2.42)	-0.0008 (-1.36)	-0.0023** (-2.32)	-0.0028*** (-4.81)
Leverage	0.3970*** (16.00)	0.2332*** (16.82)	0.3928*** (15.88)	0.0512*** (3.03)
Operating cashflow	0.4495*** (17.92)	0.4639*** (23.22)	0.4472*** (18.05)	0.0364 (1.63)
CAPEX on fixed assets	0.0517 (1.54)	-0.1534*** (-5.87)	0.0388 (1.17)	0.3355*** (9.24)
CAPEX on investment	0.0867*** (3.23)	-0.0879*** (-5.14)	0.0816*** (3.12)	0.0261 (1.23)
AGE	-0.0001 (-0.15)	-0.0038*** (-6.58)	-0.0072*** (-8.04)	-0.0105*** (-11.27)
Net working capital	-0.0214 (-1.03)	0.0602*** (5.26)	-0.0211 (-1.02)	0.0963*** (6.08)
SOE	-0.0207 (-1.64)	-0.0090 (-1.42)	-0.0238* (-1.96)	-0.0132 (-1.42)
Finance expense	-5.9575*** (-18.08)	-0.8610*** (-4.93)	-5.9509*** (-18.21)	0.6434*** (2.87)
Control right	0.0001 (0.31)	-0.0001 (-0.66)	0.0000 (0.01)	-0.0000 (-0.21)
Dividend	0.0344*** (8.89)	0.0268*** (9.11)	0.0331*** (8.46)	0.0315*** (8.40)
Constant	0.8853*** (7.40)	0.2056*** (3.36)	0.7361*** (6.24)	0.5367*** (7.37)
Year fixed effect	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes
N	17805	17803	17805	14673
adj. R-sq	0.2368	0.1479	0.2357	0.1289

The results are presented in Column (1) to (4) in Table 4.8. The coefficients on $FC_{i,t} * Control\ right_{i,t}$ are significantly negative in regressions on *Cash*, $\Delta cash$, *Excash* and *Equity Financing* as dependent variables at the level of 5%, suggesting that poorly governed firms with a dispersed ownership structure exhibit a greater increase in cash holdings than control firms after they have access to finance companies.

4.5.5 The effects of the presence of finance companies on cash-to-cash-flow sensitivity

We further explore the impact of having access to finance companies on firm behavior with regard to the manner in which firms perform cash management. Specifically, we decompose cash flows into three components: net cash generated from operational activities, net cash generated from investment activities and net cash generated from financing activities and implement a cash-to-cash-flow sensitivity analysis developed by Almeida et al (2004) to examine the firms' propensity to accumulate cash generated by each component of cash flows. The purpose of this test is to validate the channel through which cash holdings can be affected by having access to finance companies. If finance companies indeed mitigate financial constraints of treat firms by providing additional source of financing as well as a more efficient cash management, we expect that firms that have access to finance companies should rely less on operational cash flows but more on financing cash flows. Meanwhile, these firms should increase their investment cash outflows and hence a negative cash flow sensitivity of cash generated from investment activities is expected. To test this, we estimate the following regression.

$$\Delta Cash_{it} = \alpha + \beta FC_{i,t} + \delta Z_{i,t} + \theta FC_{i,t} * Z_{i,t} + TobinQ_{i,t-1} + SIZE_{i,t} + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (7)$$

Our tests concern the change in cash holdings as the dependent variable in response to the change in each components of cash flows. Z refers to the three components of cash flows including operating cash flows ($OPCF_{i,t}$), financing cash flows ($FICF_{i,t}$) and investment cash flows ($IVCF_{i,t}$). Size is the natural log of total assets. $TobinQ_{i,t-1}$ is calculated as sum of market value of equity plus book value of liabilities divided by book value of assets. We include Size and Tobin Q to control for economies of scale in cash management and growth opportunity, respectively.

Alternatively, consistent with Almeida, Campello and Weisbach (2004), we also employ an advance model in which we control for not only the sources but also the uses of funds, which is shown as follows.

$$\Delta Cash_{it} = \alpha + \beta FC_{i,t} + \delta Z_{i,t} + \theta FC_{i,t} * Z_{i,t} + TobinQ_{i,t-1} + SIZE_{i,t} + CAPEX_fix_{i,t} + CAPEX_fin_{i,t} + \Delta NWC_{i,t} + \Delta SHORT\ DEBT_{i,t} + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (8)$$

Where $CAPEX_fix_{i,t}$ and $CAPEX_fin_{i,t}$ are the capital expenditures on fixed assets and financial investment, respectively. We add the change in working capital proxied by $\Delta NWC_{i,t}$ and change in short-term debt proxied by $\Delta SHORT\ DEBT_{i,t}$ because these two variables

can be substitutes for cash. In both specifications, $\theta > 0$ ($\theta < 0$) would indicate that having access to FCs increases (reduces) the propensity to save cash out of each specific components of cash flows.

Table 4.9: Cash-cashflow sensitivity: Components of cash flows

This table reports the results of the effects of the presence of finance companies on cash-to-cash-flow sensitivity during the sample period of 1998 to 2014. We decompose cash flows into three components: net cash generated from operational activities, net cash generated from investment activities and net cash generated from financing activities, in order to investigate the attribution of the net change in cash. Penal A reports the results of cash-cashflow sensitivity-components of cash flows. In Penal B, we conduct a subsample analysis where we partition firms by whether the controlling shareholders hold above sample-mean shares. The dependent variable Δcash is net change in cash ratio scaled by noncash total assets. **Financing cash flow** refers to the cash flow from financing activities. **Operating cash flow** refers to the cash flow from operating activities. **Investing cash flow** refers to the cash flow from investment activities. **Controls** include all control variables mentioned in specification (6). All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	Penal A			Penal B					
	(1)	(2)	(3)	Control right above mean			Control right below mean		
	Δcash	Δcash	Δcash	(4)	(5)	(6)	(7)	(8)	(9)
	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash
FC	-0.0069 (-1.55)	-0.0026 (-0.49)	-0.0073 (-1.29)	-0.0195*** (-2.97)	-0.0128 (-1.57)	-0.0150 (-1.60)	-0.0000 (-0.00)	-0.0073 (-1.00)	-0.0125 (-1.62)
Financing cash flow	0.4655*** (25.20)			0.5767*** (23.61)			0.5501*** (23.89)		
FC*Financing cash flow	0.0095*** (11.49)			-0.0393 (-0.85)			0.0088*** (11.81)		
Operating cash flow		0.4670*** (25.66)			0.5008*** (14.12)			0.4847*** (17.28)	
FC*Operating cash flow		0.0837 (1.34)			0.1046 (1.10)			0.1321 (1.42)	
Investing cash flow			0.5477*** (25.94)			0.5096*** (12.80)			0.5158*** (17.47)
FC*Investing cash flow			-0.0290 (-0.62)			0.0168 (0.20)			-0.0737 (-1.43)
Constant	0.3999*** (7.45)	0.2193*** (4.26)	0.1325** (2.56)	0.1761** (2.41)	-0.2909*** (-4.40)	-0.3096*** (-4.16)	0.4037*** (4.63)	-0.0046 (-0.05)	-0.2214** (-2.50)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year fixed effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	16855	16881	16881	7599	7609	7609	9239	9255	9255
adj. R-sq	0.2520	0.2025	0.1823	0.3231	0.2309	0.1659	0.2836	0.1532	0.1280

The results from specification (5) and (6) are presented in Table 4.9. Surprisingly, we find the change in cash holdings is only positively sensitive to net cash generated from financing activities. This result is robust in both specification at a significant level of 1%. While no systematic distinction between treated firms and control firms in terms of the propensity to save cash out of operating activities and investment activities was found after the treated firms access the finance companies. Our results show that having access to finance companies has no significant effect on loosening financial constraints and stimulating investments, while such access did increase the firms' propensity to save cash out of financing activities, which is inconsistent with our financial constraint hypothesis. Our inference is that the attractiveness of having finance companies for controlling shareholders lies in that it facilitates the benefit of self-serving actions rather than its advantageous function on loosening member firms' financial constraints, as our primary agency hypothesis suggested. To test the validity of this inference, we further spilt our sample based on the controlling shareholders' percentage ownership. We partition firms by whether the controlling shareholders hold above sample-mean shares. Results are shown In Column (7) to (12) of Penal B. The coefficient estimates for the interaction term of $FC*FICF$ is significant and positive for firms in which controlling shareholders own above sample average shares, suggesting that the increasing propensity to save cash out of financing activities is mostly driven by firms with more agency conflicts after they have access to finance companies. Again, no mitigation effect of finance companies on financial constraints was found in both sub-groups since the coefficients on $FC*OPCF$ and $FC*IVCF$ are statistically indistinguishable from zero.

Table 4.10: Cash-cashflow sensitivity: Components of financing cash flows

This table reports the results of the effects of the presence of finance companies on cash-to-cash-flow sensitivity during the sample period of 1998 to 2014. We further decompose financing cash flows into three components: net cash generated from equity financing, net cash generated from debt financing and net cash borrowed from banks, in order to investigate the attribution of the net change in cash. Penal A reports the results of cash-cashflow sensitivity-components of financing cash flows. In Penal B, we conduct a subsample analysis where we partition firms by whether the controlling shareholders hold above sample-mean shares. The dependent variable Δcash is net change in cash ratio scaled by noncash total assets. **Equity financing** refers to the cash flow from equity financing. **Debt financing** refers to the cash flow from debt financing. **Borrowing** refers to the cash borrowed from banks. **Controls** include all control variables mentioned in specification (6). All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	Penal A			Penal B					
	(1)	(2)	(3)	Control right above mean			Control right below mean		
	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash	Δcash
FC	0.0012 (0.27)	-0.0018 (-0.29)	-0.0060 (-0.94)	-0.0117* (-1.68)	-0.0086 (-0.95)	-0.0111 (-1.22)	-0.0019 (-0.33)	0.0007 (0.08)	-0.0176* (-1.65)
Equity financing	0.6719*** (32.53)			0.6761*** (19.18)			0.6693*** (26.67)		
FC*Equity financing	0.0024*** (2.77)			-0.0353 (-0.58)			0.0050*** (6.10)		
Debt financing		0.2347*** (5.05)			0.3128*** (4.35)			0.3219*** (4.52)	
FC*Debt financing		-0.0448 (-0.58)			-0.0066 (-0.07)			-0.1083 (-0.70)	
Borrowing			0.0341*** (4.66)			0.0407*** (3.69)			0.0551*** (5.02)
FC*Borrowing			0.0033 (0.24)			-0.0146 (-0.96)			0.0265 (0.86)
Constant	0.5547*** (8.96)	0.3406*** (3.08)	0.2933*** (5.40)	-0.0540 (-0.61)	-0.4211*** (-2.58)	-0.1492** (-2.08)	0.3011*** (3.03)	0.0596 (0.31)	0.0359 (0.38)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year fixed effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	13856	9769	16468	6000	4018	7381	7847	5750	9081
adj. R-sq	0.3198	0.0632	0.0759	0.2847	0.0744	0.0845	0.2907	0.0322	0.0358

Given that the change in net cash holdings is only sensitive to cash generated from financing activities, we further decomposed the financing cash flows into three components: cash received from equity issuance, cash received from debt issuance and cash borrowed from banks or other financial institutions. We re-estimate the model by using the components of financing cash flows. The results from re-estimating (4) are presented in Table 4.10. We note that among all three financing alternatives, the change in net cash is only sensitive to the cash generated from equity issuance. In our split sample analysis in Penal B, we obtain qualitatively similar result that such sensitivity is significant only for firms in which controlling shareholders own above sample average shares.

Overall, these results confirm our previous findings that firms facing more agency conflicts tend to hoard cash through extensively issuing equity after they have access to finance companies.

4.5.6 Interbank market rate and firm cash policies

A key assumption of our agency conflicts expatiation is that firms with finance company receive pressure from their controlling shareholders to deposit majority of their cash holdings in finance companies rather than other depository institutions. However, we do not have direct evidence for this assumption due to the lack of data availability in terms of the exact amount of deposit in finance

companies placed by firms. In fact, it is not mandatory for firms to disclose the amount of deposit they put in finance companies. To somehow testify the validity of this assumption, we turn to consider the relationship between interbank market rate and firms cash policies. Because we believe that the controlling shareholders were incentivized by the regulatory arbitrage opportunity from the disparity of the two interest systems, which in turn constitute the largest portion of finance companies' profits that belong to the controlling shareholders. If the assumption is not valid, which indicates that firms only deposit a small fraction of their cash holdings in finance companies, we would expect that the cash holdings of firms with finance companies should not react positively to the regulatory arbitrage opportunity in interbank market. To capture this arbitrage opportunity, we introduce a measure of the Shanghai interbank offered rate (SHIBOR), which also measures the overall availability of liquidity and credit in the economy. This measure is increasingly prevalent in recent studies on shadow banking in China (Acharya et al, 2016; Allen et al, 2017). We include all SHIBOR rates of eight maturities as well as the interest rate spread defined as difference between overnight SHIBOR rate and PBOC demand deposit interest rate. Notably, SHIBOR changes over time but remains way above the PBOC deposit rate during our sample period, implying that a positive arbitrage profit is always available to finance companies, or in other words, the higher SHIBOR measures are, the greater arbitrage profits that a finance company could enjoy.

Accordingly, if firms only deposit a small portion of their cash holdings in finance companies, we hypothesize that the level of firms' cash holdings should be negative related to SHIBOR rates because a higher SHIBOR rate represents a tight liquidity market driven by deposit shortfalls and hence a reduction in firms' cash holdings. A parallel hypothesis is that the level of firms' cash holdings should be insensitive to SHIBOR rates. To test these hypotheses, we estimate the following model.

$$Dependent_{it} = \alpha + \beta FC_{i,t} + \theta RATES_{i,t} + \delta(FC_{i,t} * RATES_{i,t}) + \gamma X_{i,t} + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (9)$$

Where $Dependent_{i,t}$ is the four variables of interest ($Cash_{i,t}$, $\Delta cash_{i,t}$, $Excash_{i,t}$ and $Equity\ financing_{i,t}$). $RATES_{i,t}$ include interest rate spread defined as difference between overnight SHIBOR rate and PBOC demand deposit interest rate, as well as all SHIBOR rates with eight maturities: overnight, 1-week, 2-week, 1-month, 3-month, 6-month, 9-month and 1-year. Our focus is the coefficient of δ , which capture the differential cash holding response of treated firms versus control firms to the arbitrage opportunity in interbank markets.

Table 4.11: Rate-sensitivity analysis: Coefficients Matrix for interaction terms

This table reports the results of the relationship between interbank market rate and firms cash policies during the sample period of 1998 to 2014. We only report the coefficients matrix for interaction terms to save space. Panel A reports the coefficients of interest rate spread on all three cash proxies. **Spread** is calculated as Shibor rate minus demand risk-free rate. Panel B reports the coefficients of Shibor rates on all three cash proxies. We consider all **Shibor rates** with eight maturities: overnight (O/N), 1-week(1W), 2-week(2W), 1-month(1M), 3-month (3M), 6-month(6M), 9-month(9M) and 1-year(1Y). Panel C reports the coefficients of risk-free rate on all three cash proxies. We consider **Risk-free rates** with three maturities: 3-month (3M), 6-month(6M) and 1-year(1Y). The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. We control the same variables as in baseline regression. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Dependents	Penal A: Spread	Penal B: Shibor rate								Penal C: Risk-free rate		
	FC*spread	FC*O/N	FC*1W	FC*2W	FC*1M	FC*3M	FC*6M	FC*9M	FC*1Y	FC*3M	FC*6M	FC*1Y
Cash	0.0162*** (2.74)	0.0151*** (2.66)	0.0134*** (2.84)	0.0124*** (2.96)	0.0105*** (2.92)	0.0102*** (2.95)	0.0105*** (2.83)	0.0111*** (2.88)	0.0118*** (2.90)	0.0122* (1.79)	0.0083 (1.32)	0.0051 (0.85)
Δcash	0.0094** (2.18)	0.0092** (2.02)	0.0075** (2.01)	0.0062* (1.87)	0.0046 (1.61)	0.0039 (1.35)	0.0046 (1.44)	0.0051 (1.56)	0.0056 (1.64)	0.0107 (1.46)	0.0089 (1.27)	0.0073 (1.09)
Excash	0.0173*** (2.95)	0.0162*** (2.88)	0.0145*** (3.11)	0.0135*** (3.26)	0.0115*** (3.19)	0.0115*** (3.33)	0.0119*** (3.23)	0.0126*** (3.29)	0.0134*** (3.32)	0.0145** (2.15)	0.0105* (1.69)	0.0072 (1.21)
Equity financing	0.0168*** (3.70)	0.0148*** (3.08)	0.0123*** (3.13)	0.0106*** (2.98)	0.0083*** (2.75)	0.0068** (2.22)	0.0081** (2.38)	0.0090** (2.55)	0.0097*** (2.63)	0.0107 (1.41)	0.0052 (0.73)	0.0012 (0.18)

The results of these estimations are presented in Panels A to C in Table 4.11. For parsimony of presentation we only present the key interaction in the format of matrix while noting all the control variables in Equation (1) are included. In Panel A, with $Cash_{i,t}$ as dependent variable, the coefficient estimates for $FC*spread$ in Row 1 is 0.0163 (t-statistic = 2.74, significant at the 1% level), suggesting that firms with finance companies increase their cash holdings when arbitrage profits are higher proxied by $spread$. Similar results are obtained from Row 2 and 4 in Panel A when we use $\Delta cash_{i,t}$, $Excash_{i,t}$ and $Equity\ financing_{i,t}$ as alternative dependent variables of cash holdings. Moving to the coefficient estimates for $FC*spread$ presented in Panel B, coefficient estimates on the interaction between FC and all eight SHIBOR rates are statistically significant for cash, industry-adjusted cash, and cash generated from equity issuance. An interesting finding is that the change in cash of firms with finance companies is only sensitive to short-term SHIBOR rates with maturities shorter than two-week and this sensitivity is decreasing as the maturity increases. This is probably because that the short-term SHIBOR rates are more of a concern for finance companies in cash management. In principle, finance company, as an internal bank in a business group, not only deals with the member firms' demands of daily settlement but also relies on the profits generated from lending or investment activities to compensate the depositors. Therefore, short-term liquidity management should be the primary focus for finance companies.

To summarize, these findings are inconsistent with the hypothesis based on the assumption that firms deposit majority of their cash holdings not in finance companies but in other depository institutions. In fact, the positive responses of firms with finance companies to interbank market rates yields evidence in support of

our tunneling inference with regard to the effect of the presence of finance companies on firms' cash policies.

4.5.7 Sensitivity to alternative explanations

We consider two alternative explanations for our main results that attribute the increase in cash holdings to controlling shareholders' intention on improving efficiency of capital allocation and weaker external monitoring by banks after access finance companies. The first alternative explanation posits that the incentives for the parent company to give member firms access to finance companies is to improve the efficiency of capital allocation. The parent firms will want to reallocate cash across firms, requiring firms with lower capital efficiency to deposit more cash generated from inefficient capital expenditure (e.g. overinvestment in negative NPV projects or outright stealing by entrenched managers) in finance companies and lend it out to firms with good investment opportunity and hence large cash needs.

Table 4.12: Alternative explanation: FC encourages capital efficiency

This table reports the variation of ownership in the effects of the presence of finance companies on cash holdings during the sample period of 1998 to 2014. The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. The dependent variable **Equity financing** refers to the cash flow from equity financing. **Ownership** is the indicator variable that equals 1 if controlling shareholders is a government agency and 0 for otherwise. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Cash holding	Δcash	Excash	Equity financing
FC	0.0481* (1.74)	0.0071 (0.57)	0.0486* (1.81)	0.0371*** (2.91)
FC*ownership	-0.0421 (-1.48)	0.0008 (0.06)	-0.0390 (-1.41)	-0.0181 (-1.32)
Log (total assets)	-0.0434*** (-6.87)	-0.0124*** (-3.74)	-0.0413*** (-6.60)	-0.0170*** (-4.69)
Market to book	-0.0028*** (-2.65)	-0.0008 (-1.30)	-0.0026** (-2.53)	-0.0028*** (-4.65)
Leverage	0.3981*** (15.90)	0.2319*** (16.68)	0.3939*** (15.78)	0.0490*** (2.91)
Operating cashflow	0.4451*** (17.65)	0.4614*** (23.16)	0.4430*** (17.78)	0.0330 (1.48)
CAPEX on fixed assets	0.0520 (1.56)	-0.1522*** (-5.83)	0.0393 (1.18)	0.3375*** (9.31)
CAPEX on investment	0.0844*** (3.14)	-0.0879*** (-5.13)	0.0795*** (3.04)	0.0257 (1.21)
AGE	-0.0001 (-0.06)	-0.0038*** (-6.58)	-0.0071*** (-7.95)	-0.0105*** (-11.30)
Net working capital	-0.0211 (-1.02)	0.0595*** (5.20)	-0.0209 (-1.01)	0.0955*** (6.04)
SOE	-0.0170 (-1.35)	-0.0088 (-1.39)	-0.0202* (-1.67)	-0.0113 (-1.20)
Finance expense	-5.9684*** (-18.13)	-0.8745*** (-5.02)	-5.9626*** (-18.26)	0.6106*** (2.74)
Control right	-0.0001 (-0.27)	-0.0001 (-1.04)	-0.0002 (-0.59)	-0.0002 (-0.77)
Dividend	0.0341*** (8.83)	0.0268*** (9.06)	0.0328*** (8.40)	0.0314*** (8.32)
MVSD	0.0000** (2.03)	-0.0000 (-0.10)	0.0000* (1.89)	-0.0000 (-0.41)
Constant	0.9497*** (7.50)	0.2039*** (3.11)	0.7968*** (6.37)	0.5303*** (7.27)
Year fixed effect	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes
N	17800	17798	17800	14668
adj. R-sq	0.2364	0.1463	0.2353	0.1276

We test the first alternative explanation by comparing responses in cash holdings after accessing FCs across state-owned firms and non-state-owned firms. Empirical study shows that state-owned firms facing with soft budget constraints tend to be more profligate at capital efficiency in contrast to non-state-owned firms. The intention on improving capital efficiency would contaminate our tunneling explanation if we find state-owned firms increase more cash holdings after having access to FCs. Table 4.12 shows that when the controlling shareholders are state-owned enterprises, the reduction in cash holdings associated with the FC access is modest and insignificant at conventional levels. This result is inconsistent with alternative explanation since state-owned firms adopt cash policy indifferently from non-state-owned firms after FC is accessible, which rules out the capital efficiency hypothesis.

Table 4.13: Alternative explanation: FC addresses managerial agency problem

This table reports the variation of bank-dependence in the effects of the presence of finance companies on cash holdings during the sample period of 1998 to 2014. The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. **Dependence** is average borrowings from banks in pre-access to FC years scaled by noncash total assets. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Cash holding	Δcash	Excash	Equity financing
FC	0.0150 (0.55)	0.0007 (0.07)	0.0134 (0.50)	-0.0006 (-0.05)
FC*dependence	-0.0183 (-0.20)	0.0251 (0.80)	-0.0010 (-0.01)	0.0815** (2.21)
Log (total assets)	-0.0402*** (-6.47)	-0.0123*** (-3.81)	-0.0381*** (-6.22)	-0.0166*** (-4.44)
Market to book	-0.0025** (-2.38)	-0.0008 (-1.39)	-0.0024** (-2.31)	-0.0029*** (-4.82)
Leverage	0.3853*** (15.19)	0.2301*** (16.07)	0.3805*** (15.03)	0.0498*** (2.88)
Operating cashflow	0.4461*** (16.96)	0.4531*** (22.13)	0.4435*** (17.08)	0.0331 (1.44)
CAPEX on fixed assets	0.0471 (1.36)	-0.1606*** (-5.97)	0.0344 (1.00)	0.3290*** (8.83)
CAPEX on investment	0.0792*** (2.84)	-0.0913*** (-5.24)	0.0741*** (2.73)	0.0236 (1.09)
AGE	0.0001 (0.08)	-0.0038*** (-6.36)	-0.0070*** (-7.46)	-0.0109*** (-11.12)
Net working capital	-0.0171 (-0.80)	0.0616*** (5.29)	-0.0175 (-0.82)	0.0987*** (6.18)
SOE	-0.0207 (-1.59)	-0.0106* (-1.68)	-0.0230* (-1.85)	-0.0141 (-1.49)
Finance expense	-5.8757*** (-17.60)	-0.8788*** (-4.79)	-5.8737*** (-17.72)	0.6610*** (2.82)
Control right	-0.0000 (-0.08)	-0.0001 (-0.85)	-0.0001 (-0.44)	-0.0001 (-0.41)
Dividend	0.0332*** (8.21)	0.0269*** (8.79)	0.0323*** (7.92)	0.0307*** (7.95)
Constant	0.8848*** (7.15)	0.2053*** (3.26)	0.7344*** (6.03)	0.5276*** (7.13)
Year fixed effect	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes
N	16580	16578	16580	13676
adj. R-sq	0.2243	0.1439	0.2229	0.1309

The second alternative explanation lies in that accessing FC possible provides management an avoidance of external monitoring by creditors and hence increases the agency cost of managerial discretion. With firms' dependence on external banks reduces given that FC acts as a substitution of financing, the monitoring stress from external banks reduces. Accordingly, the increase in cash holdings in the aftermath of accessing FC may be the result of management having more flexibility to serve their own interests. In this respect, one would expect that management in more bank-dependent firms would hold more cash because they are less disciplined by external creditors after they gain access to FC credit. To test this hypothesis, we examine whether more bank-dependent firms pre-accessing FCs period would hold more cash after they get access to FCs. We determine the dependence on external bank credit by using average borrowings from banks pre-FC years scaled by total non-cash asset because we assume that firms' dependence on banks before accessing FC credits is time invariant. Column 1 to 3 in Table 4.13 show that there is no statistical change in cash holdings for bank-dependent firms after they get access to FC credit (the t-statistic for $FC*dependence$ on cash holdings is -0.20) although we find some substitution effect between bank financing and equity financing after they access FCs (the t-statistic for $FC*dependence$ on equity issuance is 2.21). This substitution cannot undermine our tunneling explanation because it can only represent the change in financing choice in the absence of significant increase in cash holdings. This evidence does not suggest that the increase in cash holdings after firm gain access to FCs is due to managerial agency problem induced by weaker monitoring from external banks associated with FC being a replacement of external bank creditors.

4.5.8 The effects of the presence of finance companies on performance, investment decisions, dividend policy and market reaction

Our evidence that firms increase their cash holdings after they have access to finance companies are consistent with the view that the presence of finance companies enhance the tunneling incentives of controlling shareholders through the channel of agency conflicts. We have not, however, investigated the effect the presence of finance companies on firms' performance, investment decisions and market value of their cash holdings. In this section, we conduct two formal tests to evaluate whether agency channel provides a systematic explanation for the increasing cash holdings of firms with access to the finance companies.

First, we pay attention to the effect of the presence of finance companies on firms' performance and investment decisions. The agency conflict channel implies that having access to finance companies increases tunneling incentives of controlling shareholders, we would expect a decrease in profitability and little or no change in investments. We estimate the following model.

$$Y_{i,t} = \alpha + \beta FC_{i,t} + \gamma X_{i,t} + \text{Firm Fixed Effects} + \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (10)$$

Where $Y_{i,t}$ refers to either profitability as measured by return on asset ($ROA_{i,t}$) and return on equity ($ROE_{i,t}$), investment decision as measured by capital expenditure on fixed assets ($CAPEX$ on fixed

$assets_{i,t}$) or capital expenditure on financial investment ($CAPEX$ on $investment_{i,t}$). $X_{i,t}$ is the vector of control variables including a proxy for logarithm of total assets ($Log (total\ assets)_{i,t}$), market value to book value of equity ($Market\ to\ book_{i,t}$), ratio of total liabilities to total noncash assets ($Leverage_{i,t}$) and net change in cash holdings ($\Delta cash_{i,t}$). Both firm and year fixed effects are included. All standard errors are clustered at the firm level.

Table 4.14: Accounting performance, investments and dividends

This table reports the accounting profitability and investments after firms gain access to FCs during the sample period of 1998 to 2014. The dependent variables are **ROA** (Net profit scaled by noncash total assets) in Colum (1), **ROE** (Net profit scaled by total shareholders' equity) in Colum (2). **CAPEX on fixed assets** (Capital expenditures scaled by noncash total assets) in Colum (3) and **CAPEX on investment** (Equity investments and debt investments, scaled by noncash total assets) in Colum (4). **Payout ratio** (Dividend payments scaled by earnings) in Colum (5). **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	ROA	ROE	CAPEX on fixed assets	CAPEX on investment	Payout ratio
FC	-0.0102*** (-2.98)	-0.0221*** (-2.81)	-0.0000 (-0.01)	-0.0119* (-1.80)	-0.0223 (-0.98)
Log (total assets)	0.0126*** (6.93)	-0.0168*** (-3.43)	0.0035*** (2.65)	-0.0108*** (-3.92)	0.1237*** (14.25)
Market to book	0.0008* (1.89)	-0.0230*** (-14.59)	0.0004** (1.96)	-0.0002 (-0.43)	-0.0047*** (-4.38)
Leverage	-0.1356*** (-21.24)	-0.0455*** (-3.26)	-0.0213*** (-5.72)	-0.0572*** (-6.85)	-0.2921*** (-11.59)
Net cash	0.1230*** (30.01)	0.0964*** (12.62)	-0.0033 (-0.93)	-0.0290*** (-3.95)	0.2341*** (13.85)
Constant	-0.1414*** (-3.80)	0.5254*** (5.24)	0.0237 (0.85)	0.3300*** (5.75)	-1.9944*** (-11.00)
Year fixed effect	yes	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes	yes
N	21250	21250	21199	18291	20575
adj. R-sq	0.1822	0.1082	0.0507	0.0578	0.0805

Table 4.14 reports the results from estimating (10). In Column (1) and (2), the coefficients on FC dummy for *ROA (ROE)* is -0.0102 (-0.0221) and statistically significant at 1%, suggesting that firms experienced a significant profitability decline after they have access to the finance companies. In Column (3) reports the coefficients for *CAPEX_fix*. As we predicted, we find no statistically reliable difference in capital expenditure on fixed assets after treated firms access finance companies. Column (4) reveals that treat firms reduced investment on financial assets significantly in post-access period. Column (5) shows that the dividend ratio weakly reduced; the coefficient estimate for FC is -0.0223, significant at over 10% level, suggesting the indifference on dividend payout. These findings imply that firms are more likely to hoard cash after they have access to finance companies for agency incentives other than for operational or investing purpose, which partially explains the significant decline in firm performance.

Second, we examine the market value of cash holdings over time. We borrow insights from a number of papers focusing on how firm value is related to the changes in cash holdings (Bates et al, 2009; Dittmar and Mahrt-Smith 2007; Kalcheva and Lins, 2007; Pinkowitz et al, 2006). To test the degree to which agency cost of cash can explain the impact of the presence of finance companies on firm value, we follow the approach akin to Pinkowitz, Stulz and Williamson (2006), who designed a regression to evaluate the cash holdings based on the model in Fama and French (1998). Consistent with our agency explanation on cash holdings, we expect that firms with finance companies are more likely to experience agency conflicts, which thus leads to lower increase in firm value corresponding to an incremental increase in cash holdings compared to firms with no access to finance companies. We employ the following regression specification.

$$\begin{aligned}
TobinQ_{i,t} = & \alpha + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \\
& \beta_5 dNA_{i,t+1} + \beta_6 R\&D_{i,t} + \beta_7 dR\&D_{i,t} + \beta_8 dR\&D_{i,t+1} + \\
& \beta_9 I\&D_{i,t} + \beta_{10} dI\&D_{i,t} + \beta_{11} dI\&D_{i,t+1} + \beta_{12} dTobinQ_{i,t+1} + \\
& \beta_{13} FC_{i,t+1} + \beta_{14} dCash_{i,t} + \beta_{15} (FC_{i,t} * dCash_{i,t}) + \\
& \beta_{16} dCash_{i,t+1} + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \\
& \varepsilon_{i,t} \quad (11)
\end{aligned}$$

Where $X_{i,t}$ is the level of variable X in year t scaled by total assets minus cash holdings. $dX_{i,t}$ indicates a change in variable X from time t-1 to t ($X_t - X_{t-1}$) and, $dX_{i,t+1}$ refers to a change in variable X from time t to t+1 ($X_{t+1} - X_t$). *TobinQ* is the proxy for market value of firm calculated as sum of market value of equity plus book value of liabilities. *E* refers to net income. NA is the total assets minus cash holdings. *R&D* is the R&D expenses and we set it equal to zero if missing. *I&D* is the sum of interest expenses and dividends. We also replace the lead and lag of cash changes with the level of cash to address the concern in equation (11) that increase in cash may change expectations about future growth as suggested in Pinkowitz, Stulz and Williamson (2006). We also use the following robust model.

$$\begin{aligned}
TobinQ_{i,t} = & \alpha + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \\
& \beta_5 dNA_{i,t+1} + \beta_6 R\&D_{i,t} + \beta_7 dR\&D_{i,t} + \beta_8 dR\&D_{i,t+1} + \\
& \beta_9 I\&D_{i,t} + \beta_{10} dI\&D_{i,t} + \beta_{11} dI\&D_{i,t+1} + \beta_{12} dTobinQ_{i,t+1} + \\
& \beta_{13} FC_{i,t+1} + \beta_{14} dL_{i,t} + \beta_{15} (FC_{i,t} * dL_{i,t}) + \\
& Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t} \quad (12)
\end{aligned}$$

Where L proxies for two cash measures including the level of cash holdings and industry-adjust cash.

We focus on firms with finance companies because our hypotheses concern the impact of the presence of finance companies on the value of cash holdings. The coefficient of β_{15} captures the difference in sensitivity of firm value to an incremental increase in cash holdings between firms with and without finance companies.

Table 4.15: Cross-sectional analysis: Cash-firm value

This table shows the panel regression results of the market value of cash holdings using Fama and MacBeth (1973) approach. The dependent variable **TobinQ** is the proxy for market value of firm calculated as sum of market value of equity plus book value of liabilities. **ROA** refers to net profit scaled by noncash total assets. **NA** is the total assets mins cash holdings. **R&D** is the R&D expenses and we set it equal to zero if missing. **I&D** is the sum of interest expenses and dividends. The suffix **lag** represents a change in variable X from time t-1 to t ($X_t - X_{t-1}$). The suffix **lead** represents a change in variable X from time t to t+1 ($X_{t+1} - X_t$). All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Tobin Q					
FC		-0.0788 (-0.90)		0.0809 (0.97)		-0.1383 (-1.58)
Cash_lag	1.8028*** (18.37)	1.8740*** (17.89)				
FC*Cash_lag		0.6466*** (-3.00)				
Cash			2.6032*** (21.34)	2.7121*** (21.80)		
FC*Cash				0.8673*** (-2.92)		
Excash					2.5738*** (21.49)	2.6673*** (21.83)
FC* Excash						-0.7230** (-2.54)
Cash_lead	0.1653 (1.64)	0.1748* (1.73)				
ROA	5.3581*** (10.88)	5.3485*** (10.84)	4.1929*** (8.93)	4.2111*** (8.96)	4.2522*** (9.05)	4.2702*** (9.07)
ROA_lag	0.4274*** (-2.82)	0.4220*** (-2.79)	-0.2618* (-1.72)	-0.2569* (-1.70)	-0.2610* (-1.71)	-0.2572* (-1.69)
ROA_lead	3.5416*** (14.21)	3.5403*** (14.17)	3.3449*** (13.98)	3.3553*** (14.01)	3.3600*** (14.00)	3.3695*** (14.01)
NA_lag	-0.0331** (-2.56)	-0.0327** (-2.53)	0.0396*** (-3.34)	0.0384*** (-3.26)	0.0415*** (-3.47)	0.0404*** (-3.40)
NA_lead	0.7608*** (18.20)	0.7602*** (18.21)	0.6311*** (15.55)	0.6306*** (15.69)	0.6394*** (15.69)	0.6391*** (15.82)
R&D	6.3564 (0.78)	6.3594 (0.78)	11.2810 (1.33)	11.5183 (1.36)	10.2873 (1.22)	10.3823 (1.24)
R&D_lag	-12.9705* (-1.74)	-13.0565* (-1.74)	17.8610** (-2.38)	17.8025** (-2.35)	18.2295** (-2.43)	18.0695** (-2.40)
R&D_lead	8.3275 (1.20)	9.0783 (1.31)	7.8988 (1.20)	8.7590 (1.37)	7.5559 (1.16)	8.3074 (1.30)
Interest&dividend	7.2967*** (4.83)	7.2871*** (4.82)	1.8478 (1.27)	1.8147 (1.25)	1.7132 (1.17)	1.6872 (1.16)
Interest&dividend_lag	0.2332 (0.41)	0.2355 (0.42)	0.6917 (1.31)	0.6894 (1.32)	0.7205 (1.36)	0.7155 (1.35)
Interest&dividend_lead	2.4368*** (3.18)	2.4328*** (3.18)	1.2434 (1.64)	1.2131 (1.61)	1.2331 (1.62)	1.2091 (1.60)
Tobin Q_lead	0.2891*** (-15.24)	0.2898*** (-15.33)	0.2560*** (-14.73)	0.2566*** (-14.85)	0.2587*** (-14.85)	0.2593*** (-14.96)
Constant	2.5162*** (13.55)	2.5192*** (13.58)	2.4833*** (14.09)	2.4715*** (14.10)	2.8584*** (16.40)	2.8664*** (16.51)
Year fixed effect	yes	yes	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yse	yse	yse
N	19504	19504	19506	19506	19506	19506
adj. R-sq	0.4452	0.4457	0.4905	0.4919	0.4891	0.4901

Table 4.15 shows the results of estimating (11) and (12). In Column (2), (4) and (6), we find that firms with finance companies significantly decrease the value of cash holdings given that the coefficient on the interaction variable between all measures of cash and FC indicator is consistently negative and significant. Take result in Column (4) for example, 1 dollar increase in cash is valued at 2.71 by outside investors of firms, unless firms are controlled by shareholders who own finance companies, in which case that an incremental increase in cash is discounted to 1.84.

Taken together, we find that firms are more likely to hoard cash for controlling shareholders' needs and wishes other than for operational and investment purposes after they have access to finance companies. The outside investors realized the potential agency conflicts led by the presence of finance companies and hence decrease their valuation of cash holdings for compensation. These results provide strong evidence supporting our tunneling explanation.

4.6 Robustness check

4.6.1 Cash holdings and changes in controlling shareholders

As we discuss above, affiliated firms gain access to a finance company through either their business parent establishing a new finance company or being acquired by a business group that already has a finance company. Our evidence shows that firms on average increase the level of cash holdings after they gain access to finance

companies. We infer that the increasing cash holdings of firms with finance companies serve their controlling shareholders' interest on expropriation rather than operational and investment purposes. To test the plausibility of our inference, we provide an alternative control sample analysis by looking at firms that gain access through acquisition only. The idea is to compare the cash holdings of treated firms acquired into business groups with existing finance companies with the average cash holdings of controlled firms acquired by business groups that has no connection with finance companies during our sample period. We assume that whether the business group that acquirers belong to owning finance companies has a dominant impact on firms' cash policies.

We retrieve all acquisition deals information from Thomson ONE database. We double check this database with the ownership database to ensure that the acquirers are the new controlling shareholders with no less than 20% of the ownership of the firms after the acquisition completed. Moreover, we only consider firms that changed their controlling shareholders only once during our sample period. Our final MA sample consists of 373 acquisitions. Of these, the targets firms of 63 acquisitions were consolidated into business groups with existing finance companies.

The assumption under which the econometrician can attribute the increase in cash holdings of target firms after the acquisition to the presence of finance companies is that the target firms less likely self-select the acquirers according to whether the acquirers are associated with finance companies. Therefore, we assume that the presence of finance companies in acquirers' group is relatively exogenous to targets firms' cash policies. To test this assumption by estimating the following equation.

$$\begin{aligned}
\text{Dependent}_{it} = & \alpha + \beta \text{FCMA}_{i,t} + \theta \text{PostMA}_{i,t} + \delta (\text{FCMA}_{i,t} * \\
& \text{PostMA}_{i,t}) + \gamma X_{i,t} + \text{Firm Fixed Effects} + \\
& \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (13)
\end{aligned}$$

Where $\text{Dependent}_{i,t}$ is the four variables of interest ($\text{Cash}_{i,t}$, $\Delta \text{cash}_{i,t}$, $\text{Excash}_{i,t}$ and $\text{Equity financing}_{i,t}$). $\text{FCMA}_{i,t}$ equals to 1 if the target firms were acquired into business groups with existing finance companies, otherwise it equals to 0. $\text{Post MA}_{i,t}$ represents the after acquisition period. We would expect the estimate of the interaction term of δ to be significantly positive.

Table 4.16: Cash holdings and M&A

This table reports the results of changes in controlling shareholders in the effect the presence of finance companies on cash holdings during the sample period of 1998 to 2014. We consider firms that gain access to FCs through acquisition only due to changes of their controlling shareholders. We employ an alternative M&A sample that consists of 373 acquisitions. Of these, the targets firms of 63 acquisitions were consolidated into business groups with existing FCs. The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FCMA** equals 1 if the target firms were acquired by business groups with FCs, and otherwise 0. **Post MA** represents the period after acquisition. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Cash holding	Δcash	Excash	Equity financing
Treat*post MA	0.0582* (1.77)	0.0208** (2.05)	0.0686** (2.04)	0.0623*** (4.43)
Log (total assets)	-0.0258* (-1.95)	-0.0047 (-0.71)	-0.0288* (-1.89)	-0.0040 (-0.65)
Market to book	-0.0000 (-0.03)	-0.0003 (-0.52)	-0.0001 (-0.05)	-0.0011** (-2.20)
Leverage	0.1972*** (3.99)	0.1239*** (4.27)	0.2174*** (3.60)	-0.0057 (-0.23)
Operating cashflow	0.3754*** (7.81)	0.4422*** (10.50)	0.3864*** (6.81)	-0.0100 (-0.22)
CAPEX on fixed assets	0.1037 (1.44)	-0.1791*** (-3.17)	0.0367 (0.47)	0.3840*** (5.69)
CAPEX on investment	0.0599 (1.21)	-0.0716** (-2.26)	0.0638 (1.48)	0.0433 (1.56)
AGE	0.0036* (1.92)	-0.0021* (-1.71)	-0.0125*** (-5.17)	-0.0103*** (-5.21)
Net working capital	-0.0904** (-2.27)	0.0139 (0.77)	-0.0983** (-2.12)	0.0207 (0.98)
SOE	-0.0291 (-1.46)	-0.0106 (-1.34)	-0.0480** (-2.31)	-0.0006 (-0.05)
Finance expense	-5.1972*** (-8.67)	-1.2947*** (-4.54)	-5.7145*** (-8.31)	0.0060 (0.02)
Control right	0.0002 (0.38)	0.0001 (0.51)	-0.0001 (-0.11)	0.0003 (0.82)
Dividend	0.0325*** (3.77)	0.0227*** (3.63)	0.0254** (2.57)	0.0244*** (3.37)
Constant	0.6106** (2.36)	0.0747 (0.61)	0.6574** (2.17)	0.2658** (2.28)
Year fixed effect	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes
N	3364	3364	3364	2628
adj. R-sq	0.2414	0.1690	0.2083	0.1350

Table 4.16 shows the results from estimating (13). Constituent with our prediction, the coefficient estimates of the interaction terms for all dependent variables of our interest are statistically significant and positive, suggesting that firms that gained access to finance companies through the controlling shareholders change increase their cash holdings. This result adds value to our interference that the presence of finance companies matters in explaining firms' cash hoarding behaviors.

4.6.2 Cash holdings of FC firms versus matched non-FC firms

As another robustness check, we also employ a propensity score matching technique to estimate the differences in the level of cash holdings between FC-related firms and non-FC-related firms. We match our treatment firms (that have relation with finance companies by the end of our sample period) with control firms (that have never been associated with finance companies during our sample period) based on the same set of explanatory variables in our baseline regression. The matching procedure adopts a one-to-one nearest-neighbor matching with replacement (Heckman et al, 1997). For each FC-related firm-year observation, we select a non-FC-related firm observation with the closest propensity score in the same year. The matching estimation yields a sample of 10398 firm-year observation including 458 unique FC-related firms and 944 unique non-FC-related firms for the period 1998-2014.

Table 4.17: Summary statistics of propensity score matching analysis

This table presents the summary statistics of the sample before and after propensity score matching estimation. We match our treatment firms with control firms based on the same set of explanatory variables in our baseline regression. Penal A shows the summary statistics of the pre-match the sample. Penal B shows the summary statistics of the post-match the sample. **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. **Equity financing** refers to the cash flow from equity financing. **Log (total assets)** is Logarithm of total asset. **Market to book** is market value of equity to book value of equity. **Leverage** is total liabilities divided by total noncash assets. **Operating cashflow** refers to the cash flow from operating activities. **CAPEX on fixed assets** is the capital expenditures scaled by noncash total assets. **CAPEX on investment** is equity investments and debt investments, scaled by noncash total assets. **AGE** is the number of years since the firm's incorporation. **Net working capital** is the difference between current noncash assets and current liabilities, scaled by noncash total assets. **Finance expense** is the ratio of finance expense to total noncash assets. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. **Dividend** is the indicator variable that equals one if firm *i* paid cash dividends in year *t*.

Variable	Penal A: Pre-match					Penal B: Post-match				
	FC-firms		non-FC-firms		MeanDiff	FC-firms		non-FC-firms(matched)		MeanDiff
	N	mean	N	mean		N	mean	N	mean	
Cash	6324	0.2467	15131	0.3512	-0.1045	5199	0.2517	5199	0.226	0.0257**
Δcash	6315	0.0446	15106	-0.0222	0.0668	5199	0.0431	5198	0.0356	0.0075
Excash	6324	-0.0292	15131	0.0122	-0.0414	5199	0.0083	5199	-0.0193	0.0275**
Equity financing	4680	0.0722	11416	0.0782	-0.006	4204	0.0671	4239	0.0608	0.0063
Log (total assets)	6324	22.0906	15134	21.3736	0.7171***	5199	22.1831	5199	22.1739	0.0092
Market to book	6287	3.3546	14971	3.964	-0.6094	5199	3.24	5199	3.2601	-0.0201
Leverage	6324	0.6791	15131	0.8539	-0.1748	5199	0.6599	5199	0.636	0.0239
Operating cashflow	6315	0.0752	15108	-0.1	0.1752	5199	0.0709	5199	0.0694	0.0015
CAPEX on fixed assets	6304	0.0773	15065	0.0701	0.0072***	5199	0.0755	5199	0.0733	0.0022
CAPEX on investment	5408	0.0434	13052	0.0643	0.0209***	5128	0.0439	5132	0.0489	-0.005
AGE	6104	11.5937	14706	12.334	0.7403***	5199	12.156	5199	12.0727	0.0833
Net working capital	6324	-0.1185	15131	-0.2762	0.1577	5199	-0.1028	5199	-0.0947	-0.0081
SOE	6324	0.9009	15134	0.6421	0.2588***	5199	0.9002	5199	0.904	-0.0038
Finance expense	6323	0.0131	15130	0.0237	-0.0107	5199	0.0128	5199	0.0124	0.0004
Control right	6324	44.5388	15134	39.1591	5.3796***	5199	43.4801	5199	43.3593	0.1209
Dividend	6088	0.6199	14689	0.5532	0.0667***	5199	0.6422	5199	0.6565	-0.0142

Table 4.17 provides summary statistics for our match estimation. The matching estimation seems to be efficient since the two-sample t-test indicates no significant difference in a set of firms' characteristics between treatment group and new control group, however, with an exception that cash ratio and industry-adjusted cash ratio of treatment firm are higher than their identical sample at 5% significance level.

Table 4.18: Propensity score matching analysis: FC firms vs. non-FC firms

This table reports panel regression results of re-estimation of the baseline regression using propensity score match sample. The dependent variable **Cash** is cash and cash equivalents scaled by noncash total assets. The dependent variable **Δcash** is net change in cash ratio scaled by noncash total assets. The dependent variable **Excash** is difference between individual firm's cash level and average cash in the same industry scaled by noncash total assets. The dependent variable **Equity financing** refers to the cash flow from equity financing. **FC** is an indicator variable which equals to one if a firm has affiliated with a FC. All other variables are defined in Table 2. All continuous variables are winsorized at the 1% and 99% level. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Cash holding	Δcash	Excash	Equity financing
FC	0.0183* (1.68)	0.0133*** (2.65)	0.0229** (2.10)	0.0264*** (3.62)
Log (total assets)	-0.0453*** (-5.19)	-0.0150*** (-4.09)	-0.0428*** (-4.91)	-0.0150*** (-2.83)
Market to book	-0.0060*** (-3.89)	-0.0033*** (-3.32)	-0.0052*** (-3.42)	-0.0027** (-2.17)
Leverage	0.4260*** (12.07)	0.2367*** (13.46)	0.4226*** (11.96)	0.0508** (2.23)
Operating cashflow	0.5284*** (14.32)	0.5008*** (17.28)	0.5247*** (14.50)	0.0681** (2.07)
CAPEX on fixed assets	-0.0209 (-0.45)	-0.1654*** (-4.72)	-0.0206 (-0.44)	0.2555*** (5.11)
CAPEX on investment	0.1433*** (3.51)	-0.0581** (-1.98)	0.1452*** (3.56)	0.1709*** (3.90)
AGE	-0.0007 (-0.52)	-0.0046*** (-5.55)	-0.0079*** (-6.28)	-0.0117*** (-7.83)
Net working capital	-0.0360 (-1.25)	0.0444*** (3.03)	-0.0436 (-1.51)	0.0631*** (3.39)
SOE	-0.0210 (-0.80)	0.0091 (0.80)	-0.0207 (-0.84)	0.0142 (0.86)
Finance expense	-6.4630*** (-13.70)	-1.4599*** (-6.38)	-6.5543*** (-13.80)	-0.2092 (-0.72)
Control right	-0.0005 (-1.21)	-0.0004** (-2.22)	-0.0005 (-1.20)	-0.0008** (-2.56)
Dividend	0.0263*** (4.97)	0.0189*** (5.08)	0.0247*** (4.54)	0.0174*** (3.50)
Constant	1.0392*** (5.52)	0.2793*** (3.70)	0.8631*** (4.63)	0.5297*** (4.87)
Year fixed effect	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes
N	10260	10259	10260	8407
adj. R-sq	0.2835	0.1948	0.3055	0.1712

We then revisit our baseline regression by using our matched sample. The results presented in table 4.18 again confirm the univariate findings from table 4.17 as well as the robustness of our prior findings. The coefficient estimates on FC indicators for all cash-related proxies are significant positive, which indicates that firms increase their cash holdings in conjunction with the access to finance companies.

4.7 Conclusion

In this study, we examine the role that finance companies play in determining group member firms' cash policies. Surprisingly, we find that firms hold high levels of cash after they gain access to finance companies and the increasing cash holdings of firms with finance companies serves no operational and investment purposes. We show that this effect is more pronounced for firms with more agency conflicts. These findings are contrary to Chinese reformers' intention of designing such a group-specific bank from which one could expect an improvement in the efficiency of cash management and hence a reduction in financial constraints of group member firms. We interpret these results as consistent with controlling shareholders extracting rents from firms by encouraging firms to accumulate large cash holdings and to deposit these cash holdings in their wholly owned finance companies. Because by doing so, the controlling shareholders could reap all the benefits from lending these cash in interbank markets through their finance companies. Our finding that firms that had access to finance companies rebalancing their cash holdings sensitively to the arbitrage benefits available in interbank market confirms this prediction.

These results are robust to several specifications that address concerns about endogeneity and concomitant effects. Precisely, by introducing two exogenous regulations to firms' cash policies as natural experiments, we first find that firms with finance companies substantially increased more cash holdings after finance companies were allowed to access interbank activities where arbitrage opportunity were available. In addition, we find greater reduction in cash holdings in firms after regulator placed restriction on depositing their cash in finance companies. These results provide strong evidence in support of finance companies being the mechanism by which controlling shareholders extract rents from firms.

We also investigate how this rent exaction behavior by controlling shareholders via finance companies affects firm profitability, dividend policy and firms' valuation. Our analyses show that firms experience a reduction in profitability after they access finance companies. Moreover, outsider investor value one dollar of cash substantially less if a firm belongs to a business group with a finance company. Again, these results imply that although the close ties between finance and industry within a business group may have helped firms to gain access to financial advantages, such access may not be costless. What is even worse, the cost of such access may outweigh its benefits. In the absence of efficient capital markets, it is possible that the controlling shareholders of business groups would take advantage of the existence of such finance-industry ties to siphon resources for their own interests. Overall, our findings provide the first evidence that the presence of finance companies inhibit rather than encourage the growth of Chinese firms. Our study has important implications that policy makers need to pay close attention to the role of finance companies in the evolution of

business groups, especially on the cost side of such group-specific bank.

Chapter 5

Finance Company and Earnings Management

5.1 Abstract

The abuse of finance companies may result in rent exaction behavior by controlling shareholders given fewer effective corporate governance mechanisms are in place to protect minority shareholders. If controlling shareholders intend to tunnel the firm value, they have incentives to mask true firm performance and conceal their private control benefits from outside investors. This insight suggests that earnings management is inherently associated with tunneling after firms access the finance companies in the context of poor corporate governance practice, where private control benefits are higher and the likelihood of these benefits being detected is lower. This study investigates the impact of firms' accessing finance companies (group-specific bank-like firms) on earnings management decision in Chinese business groups. Based on Chinese firm-level data from 2007 to 2014, we find systematic differences in earnings management after firms gain access to finance companies. We empirically document that firms with access to finance companies are more likely to be engaged in earnings management through increasing the use of discretionary accruals. We also find that their earnings management behavior is in parallel with an extensive equity financing. These evidences support the hypothesis that firms with access to finance companies opportunistically manage earnings in an effort to serve the tunneling

motives of their controlling shareholders. We identify evidences that exclude the other explanations that firms with finance companies opportunistically manage earnings to credibly signal positive investment opportunities to the market, to maximize managerial compensation or to pursue political promotion. Moreover, we take advantage of *No.37 Memorandum of Disclosure Regulation on Related Transaction between Finance Companies and Listed Firms* issued by Shenzhen stock exchange in 2011 as an exogenous shock on firms' earning management decision to alleviate endogeneity problem, and document that a more transparent transaction information between financial companies and affiliated firms can reduce finance companies-induce tunneling problem, and consequently reduces the incentives to manage earnings.

5.2 Introduction

Chinese business groups have been involved in an experiment with the formation of finance company-a specialized bank-like financial institution that collected and redistributed funds. Due to the underdevelopment of the formal financial system, finance company has becoming an important constituent of informal financial system providing substitutions for the existing formal system. Hence, finance company may provide member firms of business groups with predominance in reducing financial constraints and improving efficiency of capital management because finance company represents an effective corporate governance mechanism (Keister, 1998).

However, such specialized firm is fully controlled by the parent company of the business group with a pyramidal structure. A rising concern regarding this pyramidal organization form in literature is the possibilities that the controlling shareholders may expropriate private benefits from the minority shareholders due to the divergence between ownership and control (e.g. La Porta et al, 1999; La Porta et al, 2000). This agency conflict between controlling shareholders and minority shareholders is described as “tunneling” by Johnson et al (2000). Studies show that tunneling is particularly serious in emerging markets, where poorer corporate governance and weak investor protection leaves firms vulnerable to controlling shareholders tunneling activities (Claessens et al, 2000; Bertrand et al, 2002; Bae et al, 2002; Firedman et al, 2003; Liu and Lu, 2007). In this respect, finance companies can be abused by controlling shareholders as a mechanism facilitating their tunneling activities. Yet, no systematic research has provided evidence examining the

real impact of having a finance company on member firms' behaviors in a business group.

In this study, we aim to set up a link between the presence of finance companies and their affiliated firms' earnings management decision. Studying the difference in the magnitude of earnings management before and after firms accessing the finance companies and to what extent the difference is attributable to the emergence and functioning of finance company allows us to achieve a better understanding to the role of finance companies plays in the business groups. To do so, we use hand-collected data of all 196 finance companies' information with respect to the date of incorporation and the ownership structure from CBRC's official announcements by 2014. We match the finance company data with Chinese firm-level data derived from CSMAR in the period between 2007 and 2014 if they share the same ultimate controlling shareholder.

We propose two contrary economic mechanisms through which finance company affects firm to engage in earnings management: corporate governance and agency conflict of tunneling. Precisely, if the corporate governance mechanism of finance company works, we would expect less earnings management behavior after firms accessing the finance company. However, if finance company facilitates controlling shareholder of firms with privilege to siphon resources out of firms to increase their own wealth, they have incentives to window dress true firm performance to obfuscate the market. This insight suggests that earnings management is inherently associated with finance company-induce tunneling especially in a weak institutional context because poor corporate governance prevents such earnings manipulation from easily being

detected and the benefits of this misbehavior are higher (Leuz et al, 2003).

Our empirical findings are in support of the tunneling mechanism of finance company. We find that firms are more likely to be engaged in earnings management through increasing the use of discretionary accruals after having access to finance company. We also find that their earnings management behavior is in parallel with an extensive equity financing. Our tunneling explanation lies on that due to that finance company can bring substantial private benefits to controlling shareholders (also the parent of business group and the wholly owner of finance company) if large amount of cash holdings is deposited in finance company, controlling shareholders are incentivized to manage earnings to raise more capital from equity issuance and require firms to deposit the raised capital in finance company. By doing so, the controlling shareholders can reap most, if not all, the profits from finance company. In short, finance company enhances the tunneling motives of controlling shareholders, which consequently result in more earning management behaviors. We also conduct two cross-sectional analysis to provide more direct evidence supportive of our tunneling explanation. We use the difference between Shibor rate (Interbank-market rate) and firms' last year profitability, and the controlling shareholders total share holdings to capture the tunneling incentive of firms with access to finance company behind their earnings management behavior. First, we find that larger difference indicating larger tunneling benefits that finance company could supply is associated with greater level of earnings management for firms with access to finance company. Second, the positive relationship between the presence of finance company and earnings management is stronger if controlling shareholders exercise full control while holding a relatively smaller portion of cash flow rights. Besides, we also use a direct measure of

tunneling (related party transaction between subsidiary and parent company) to reflect the extent of entrenchment of the controlling shareholders and find that earnings management is more pronounced at firms controlled by more entrenched shareholders after they access the finance company.

Because firms may increase reported earnings to achieve various incentives other than tunneling incentives. We attempt to rule out three alternative explanations for our results. First, it is believed that managerial compensation could be the key driver to an increasing earnings management after having access to finance company (Cheng and Warfield, 2005). It is possible that compensation of CEO becomes more dependent on the performance of the firms after firms access to finance company. Finance company might be endowed to have responsibility for managing the member firms' budget on behave of the parent company of the group. Therefore, a more marketized compensation scheme based on the performance could be adopted. Our results show that this alternation explanation does not hold since we find that variation of CEO compensation including salary and option has no significant influence on the relationship between the presence of finance company and the level of earnings management. Second, accessing to finance company may bring stronger financing capacity and greater investment opportunities to affiliated member firms. Finance company's primary function of funds reallocation within groups may promote the liquidity of the member firms, which results in that firms are more sensitive to investment opportunities. Managers may use discretionary accruals to credibly signal positive prospects to the market, enabling it to raise more capital to support the optimal investment projects (Linck et al, 2013). In line with this view, we would expect that positive effect of finance company on earnings management is stronger at firms with great investment opportunities.

However, we provide evidence against this hypothesis. Third, we consider that political issue may both affect firms' decision to access to finance company and earnings management decision. Liu et al (2018) find that political connections matter in deciding firms' earnings management. One may argue that firms manage earnings to meet objectives set by government agency for quick political promotion. Thus, we would expect that state-owned firms should responses differently from non-state-owned firms in terms of the engagement of earnings management after accessing to finance company. Our results fail to support this hypothesis.

Our evidences show that the presence of finance company has a strong positive effect on earnings management, which reduces the quality of a firm's accounting information. Other unobservable factors other than tunneling incentives of controlling shareholders that determine whether to access to finance company may also be the key drivers of earnings management, which leaves our empirical findings vulnerable to concerns about endogeneity. To mitigate the endogeneity concerns, we use *No.37 Memorandum Disclosure Regulation on Related Transaction between Finance Companies and Listed Firms* issued by Shenzhen stock exchange in 2011 as an exogenous shock on firms' earning management decision. This regulation indicating a more transparent accounting information on the transaction between finance companies and affiliated firms supposedly reduced the abuse of finance company in tunneling activities by controlling shareholders. As expected, we find that earnings management of firms with access to finance company significantly reduced in the aftermath of the regulation adoption, confirming that a firm's tunneling rationale to hide information on earnings management once they gain the helps from finance company. Our results also imply that improving accounting quality

may help to reduce earning managements, which is consistent with argument proposed by Biddle et al (2009).

Our study makes important contributions literature and policy. First, to the best knowledge of us, we are the first empirical research linking the presence of finance company to earnings management and provide systematic evidence of tunneling motive behind earnings management behavior of firms with finance company in China. Our study offers a more comprehensive understanding of the role of finance company in business groups. Although that it is undeniable that allowing business groups to have finance companies may bring some economic benefits to firms, more attention should be put on how controlling abuse finance company as a tunneling vehicle to satisfy their own interest at the expense of the minority shareholders especially when accounting information and existing regulation is too poor to detect the tunneling activities. As a result, the cost of capital is expected to increase due to information asymmetry led by greater agency conflicts between the controlling shareholders and the minority shareholders. We argue that not only the minority shareholders, but also entire market will suffer if no further action is taken.

Our study belongs to a substantial body of research that has studied the motivation behind earnings manipulation by the management. According to previous literatures, firms are motivated to use earnings management to influence the contractual outcomes for the purpose of avoiding earnings losses and decreases (Burgstahler and Dichev, 1997), meeting analyst expectations (Gunny, 2010), helping firms move toward their expected credit ratings (Alissa et al, 2013), maximizing managerial compensation (Cheng and Warfield, 2005, Bergstresser and Philippon, 2006), boosting stock price prior to

equity issuance (Teoh et al, 1998a, Teoh et al, 1998b), matching peer performance (Du and Shen, 2018), meeting certain regulatory requirements (Chen and Yuan, 2004), signaling favorable private information to the market around stock splits (Louis and Robinson, 2005), signaling investment opportunities (Linck et al, 2013). The closest to our study is Liu and lu (2007), who argue that tunneling, although not being able to completely exclude other incentives, may be the key driver of the earnings management in the Chinese listed firms. Our study contributes to the literature by highlighting that it might be the privilege offered by finance company that drives Chinese listed firms to manage reported earnings to serve their own interests.

This study is related to a voluminous literature on tunneling in business group. Our study adds to these literatures by discovering a new vehicle of tunneling: finance company. Bertrand et al (2002) argue that the ultimate shareholders of the pyramids have strong incentives to siphon resources from firms low down to the ones high up in the Indian pyramid. Bae et al (2002) show that the controlling shareholders of Korean chaebol firms benefit from making acquisitions, but minority shareholders of these firms suffer acquisitions, which is consistent with the tunneling hypothesis. Similarly, Baek et al (2006) claim that private securities offerings are used as a tunneling mechanism by controlling shareholders of Korean chaebol. A growing stream of empirical literature has shown tunneling evidence in China. Chen et al (2012) confirm the existence of tunneling in Chinese listed firms and argue that the non-tradeable reform can help to mitigate this agency conflicts between controlling shareholders and minority shareholders. A group of studies show evidence that controlling shareholders of Chinese listed firms use related-party transaction to conduct tunneling activities (Jiang et al, 2010, Jian and Wong 2010, Peng et

al, 2011). Jiang et al (2015) investigates the Non-Operational Fund Occupancy (or NOFO) behavior of controlling shareholders, providing evidence that such behavior comes from their tunneling motives. Our study extends the literature and discovers an on-going phenomenon that the owners of business groups with finance company use income-increasing discretionary accruals to raise capital through equity issuance. The raised capital serves no investment purposes but was required to be deposited in finance companies which offers substantial private benefits to meet the tunneling motives of controlling shareholders.

The remainder of the study proceeds as follows: Section 5.3 briefly introduce the institutional background. In Section 5.4 is our data, sample and measure description. Section 5.5 provides the main results and our endogeneity analysis. We conclude in Section 5.6.

5.3 Institutional background

5.3.1 Definition of business group

Several attempts by academic practitioners have been made to the definition of a business group²³, however, it remains ambiguous since the concept of ‘business group’ inclines to an intuition notion rather than a judicial organizational form (Khanna and Rivkin 2001). To better account for the China’s institutional context, we employ the official definition in the Registration of Business Groups

²³ See Granovetter (1985); Keister (1998); He et al (2013); Khanna and Rivkin (2001); Khanna and Yafeh (2007); Almeida et al (2015)

Regulation by State Administration for Industry & Commerce of the People's Republic of China (SAIC) in 1988²⁴. A business group is a federation of legally independent firms, which are bound together by ownership ties, operating under the control of a single parent, or core firm.

Despite the ubiquity of business group in emerging markets and in many developed countries, the heterogeneity in the organizational forms of business group differs considerably from country to country, which could be attributable to different institutional and economic context. For example, American conglomerates are commonly referred as multi-segment firms that diverse in a set of distinct industries. Similarly, South Korean chaebols are broadly conceived as diversified firms dominated by wealth family, which are pyramidal in nature (Bae et al, 2002; Chang, 2003; Ferris et al, 2003). Japanese *keiretsus* tie corporations in multiple industries, which enable affiliates to enjoy the privileged access to capital under a “main bank” system (Morck and Nakamura, 1999, Gedajlovic and Shapiro, 2002). Not surprisingly, business groups in China are also relatively large and well-diversified but have maintained a unique structural characteristic, namely, a state-dominated rather than family-dominated structure (Keister, 1998). Hence, to fully capture the contextual difference across countries, it is arguably believed that research on the role of business group should be confined within a country-specific economic context (Greif, 2006). Further, the effect of business group may be time dependent as institutional context changes on an ongoing basis (Khanna and Palepu, 2000).

²⁴ The Registration of Business Groups Regulation specifies the quantitative requirements for registration of business group: 1) the aggregated registered capital of the core and other affiliated companies should be over 100 million yuan; 2) All members of group are legally independent; 3) The parent, or core company should have the registered capital of over 50 million yuan and at least 5 affiliated companies. Moreover, business group is not recognized as a juridical person with legal rights and obligations.

5.3.2 Finance company in China

Finance company in china is a legally independent non-banking financial institution supervised by China Banking Regulatory Commission (CBRC). According to *the Amendment Business Group Financial Company Regulation*²⁵, Finance company is defined as a non-banking financial institution that is affiliated with a business group which operates domestically, facilitating the members of the business group with financial management services with an attempt to strengthen the centralized management of business group funds and therefore enhance the utilization efficiency of funds. Unlike a bank, FCs are generally not allowed to take deposits from or originate loans for the public. Instead, Finance company can only collect deposits from and provide credits to the members of the business group for commercial use. Besides, a finance company may be competent to enter the *interbank bond market* and *lending market* where surplus fund is invested and short-term fund is raised²⁶.

5.3.3 No.37 Memorandum of Disclosure Regulation in 2011

²⁵ The Business Group Financial Company Regulation was initially issued by People's Bank of China (PBOC) on July 13, 2000. In December of 2006, China Banking Regulatory Commission (CBRC) issued the Amendment of Business Group Financial Company Regulation.

²⁶ The *Interbank Bond Market and Lending Market* are the most important money markets in China established in 1996. It was not until the *Finance Company Entry Regulation of the Interbank Bond Market and Lending Market Regulation* released by PBOC in 2000 that a finance company, as an independent legal treasure entity affiliated with a business group, were eligible to apply for the membership of the Interbank Markets three years after its incorporation. The *Finance Company Entry Regulation 2000* enables a qualified finance company to access interbank borrowing with the maximum maturity of 7 days. Meanwhile, The *Finance Company Entry Regulation 2000* also allows a finance company to engage in bond trading in the interbank bond market.

In 2011, the Shenzhen stock exchange issued *No.37 Memorandum of Disclosure Regulation on Related Transaction between Finance Companies and Listed Firms* (hereafter, *No.37 Memorandum*). The *No.37 Memorandum* specifically applies to firms: 1) Listed in Shenzhen stock exchange. 2) Belong to a business group that has access to finance company. The *No.37 Memorandum* specifies the disclosure requirements for related transactions between listed firms and finance companies. Firms are required to disclose detailed transactions information if the maximum daily monetary funds they deposit in the affiliated finance company exceeds RMB 3 million or 0.5% of the latest audited net assets in the latest period. Moreover, approvals from general meeting of all shareholders of the firm and timely disclosure is required if the maximum daily monetary funds they deposit in the affiliated finance company exceeds 30 million or 5% of the latest audited net assets in the latest period. More importantly, the *No.37 Memorandum* prohibit the raised funds through security issuance to be deposited in the affiliated finance company.

5.4 Data and sample

5.4.1 Sample construction

We construct our sample by selecting all non-financial firms listed in the Shanghai or the Shenzhen Stock Exchange. We obtain stock price, ownership and accounting data from CSMAR. Our sample covers the period from 2007 to 2014. We hand-collect the 196 finance company ownership data from the CBRC's official

announcements²⁷ by 2014. Following the study by Faccio and Lang (2002), we trace the ownership of listed firms and finance companies of any length via the *National Enterprise Credit Information Publicity System*²⁸ until we find an owner whose legal registered name contains “Group”, “Holding” or “State Asset Management” along the chain. Next, we identify whether a firm is affiliated with a finance company based on whether they share the same owner. Our final sample consists of 11,836 firm-year observations representing 1721 unique firms. Of these, 449 unique firms were associated with 180 finance companies²⁹ during 2007 to 2014.

5.4.2 Earnings management measures

This study focuses on discretionary accruals management. We follow the literature by Dechow et al (1995) and adopt the modified Jones model to estimate abnormal discretionary accruals as our earnings management measures. We also adjust for past performance based on the method employed by Kothari et al (2005) and Linck et al (2013). Specifically, we compute the following regression for all firms in our sample.

²⁷ Business groups need to submit application of intention to incorporate a finance company to CBRC. If the application for the incorporation of finance company is approved, the CBRC will post an announcement for approval on its official website which discloses the information in terms of ownership, management committee, the amount of capital stock and authorized line of business.

²⁸ See <http://www.gsxt.gov.cn/index.html>

²⁹ The rest 16 finance companies were either affiliated with business groups that do not have listed subsidiaries or owned by foreign business groups such as Hitachi, Panasonic and GE etc.

$$Accruals_{i,t} = \alpha(\Delta Sales_{i,t} - \Delta Account\ receivable_{i,t}) + \beta PPE_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where $Accruals_{i,t}$ indicates total accrual of firm i in year t , which is calculated using the following equation.

$$Accruals_{i,t} = (\Delta Current\ asset_{i,t} - \Delta Cash_{i,t}) - (\Delta Current\ Liabilities_{i,t} - \Delta Debt_{i,t}) - depreciation \quad (2)$$

$$Discretionary\ Accruals_{i,t}(DA_{i,t}) = Accruals_{i,t} - \hat{\alpha}(\Delta Sales_{i,t} - \Delta Account\ receivable_{i,t}) - \hat{\beta} PPE_{i,t} \quad (3)$$

In equation (2), $Accruals_{i,t}$ equals to change in current assets minus change in cash and cash equivalents minus the change in current liabilities excluding change in debt minus depreciation. Thus, we calculate the discretionary accruals (DA) based on equation (3), which is the $\varepsilon_{i,t}$ in equation (1). All variables in equation (1), (2) and (3) are scaled by total assets at the beginning of the year. We winsorize all variables at the 1st and 99th percentiles to control for outliers.

Following Linck et al (2013), we adjust discretionary accruals for past accounting performance. Precisely, in each year we divided firms within the same industry into ROA quartiles. We calculated the average discretionary accruals of firms excluding firm i in each

ROA quartile as the industry-benchmark discretionary accruals. We then calculated the abnormal discretionary accruals (AD_DA) as the firm's discretionary accruals minus the industry_benchmark discretionary accruals as described in the following equation:

$$\begin{aligned} \text{Abnormal Discretionary Accruals}_{i,t}(AD_DA_{i,t}) = \\ \text{Discretionary Accruals}_{i,t} - \\ \text{industry_benchmark discretionary accruals}_{i,t} \quad (4) \end{aligned}$$

Finally, we take the absolute value of our discretionary accruals (AB_DA) to evaluate the magnitude of firm's earnings management.

$$\begin{aligned} \text{Earnings management}_{i,t}(AB_DA_{i,t}) = \\ | \text{Discretionary Accruals}_{i,t} | \quad (5) \end{aligned}$$

5.4.3 Descriptive statistics of sample

Table 5.1 presents all the variables used in this study. Table 5.2 reports descriptive statistics of the variables used in this study. AB_DA , DA and AD_DA are the three earnings management variables of interest. The mean (median) for AB_DA , DA and AD_DA are 11.66% (7.27%), 0.84% (-0.72%) and 0% (-1.20%), respectively. Table 5.3 presents the evolution of AB_DA , DA and AD_DA across years from 2007 to 2014. The mean (median) of AB_DA shows a decreasing trend during the sample period, suggesting that the overall magnitude of earnings management

declines over years. However, there are some fluctuations in the mean (median) of DA , which indicates the use of discretionary accruals may differ over time.

Table 5.1: Definition of variables

Variable	Definition
Penal A: Earnings management measures	
AB_DA	Absolute value of modified Jones discretionary accruals
DA	Modified Jones discretionary accruals
AD_DA	Performance-adjusted abnormal discretionary accruals
Penal B: Firm Characteristics (Firm-Year Variation)	
Log (total assets)	Logarithm of beginning of year total assets
TobinQ	Market value of equity plus book value of total liabilities, scaled by book value of total assets
Leverage	Ratio of total liabilities to total assets
Cashflow	Ratio of operating cash flow scaled by beginning of year total assets
Cash	Cash and cash equivalents scaled by beginning of year total assets
Dividend	Dividend payments scaled by beginning of year earnings
Salegrowth	The percentage change in sales from year t-1 to year t
SOE	Indicator variable that equals one if controlling shareholders is a government agency
Control right	Total shares as a percentage of total shares outstanding held by controlling shareholders
CAPEX	Capital expenditures on fixed assets scaled by beginning of year total assets
ROA	Net profit scaled by beginning of year total assets
SHIBOR	Shanghai Interbank Offered Rate with maturity of 1 year
Equity issuance	Cash flow proceeds from equity issuance scaled by beginning of year earnings

Table 5.2: Summary statistics of all variables

This table presents descriptive statistics for all firm-level variables used in this study during the period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the earnings management proxies of interest in this study. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. The rest of variables are control variables used in regressions in this study. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. All variables are calculated for each firm-year. All continuous variables are winsorized at the 1% and 99% level.

Variable	N	mean	5%	25%	50%	75%	90%	sd
AB_DA	11187	0.1166	0.0066	0.032	0.0727	0.1433	0.2546	0.149
DA	11187	0.0084	-0.2305	-0.0758	-0.0072	0.0695	0.1744	0.189
AD_DA	11187	0	-0.2413	-0.0844	-0.012	0.0641	0.1666	0.1864
Log (total assets)	11332	21.8705	20.0096	20.9815	21.745	22.6393	23.6048	1.2811
TobinQ	11690	2.2669	1.0016	1.3665	1.8282	2.6373	3.9042	1.4143
Leverage	11835	0.5126	0.1484	0.3524	0.515	0.6662	0.7763	0.2196
Cashflow	11328	0.0521	-0.1057	0.0015	0.048	0.102	0.1644	0.1367
Cash	11332	0.1977	0.0271	0.0867	0.1512	0.2587	0.4105	0.1631
Salegrowth	11327	0.1077	-0.2046	-0.0142	0.0575	0.1678	0.3504	0.2751
Dividend	11676	0.2204	0	0	0.1425	0.3235	0.536	0.2926
SOE	11835	0.6619	0	0	1	1	1	0.4731
Control right	11835	38.2875	15.11	25.54	36.98	50.03	60.1	15.7138

Table 5.3: Summary statistics of earnings management measures by year

This table presents descriptive statistics for **AB_DA**, **DA** and **AD_DA** used in this study across sample years from 2007 to 2014. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. All variables are calculated for each firm-year.

year	N	AB_DA			DA			AD_DA		
		mean	median	sd	mean	median	sd	mean	median	sd
2007	1185	0.1335	0.086	0.1632	0.0032	-0.0135	0.2108	0	-0.0125	0.2069
2008	1268	0.1289	0.0806	0.1668	-0.0006	-0.023	0.2108	0	-0.0164	0.2015
2009	1296	0.1294	0.0796	0.1632	0.0085	-0.0079	0.2081	0	-0.0123	0.2045
2010	1345	0.1254	0.0763	0.1612	0.0166	-0.0078	0.2036	0	-0.0161	0.2009
2011	1450	0.1184	0.0753	0.15	0.0138	0.0074	0.1906	0	-0.0031	0.1928
2012	1516	0.0992	0.0614	0.1295	0.0009	-0.0121	0.1632	0	-0.0119	0.1666
2013	1560	0.1032	0.0622	0.1378	0.0233	0.0031	0.1706	0	-0.016	0.1685
2014	1567	0.1044	0.0707	0.1202	-0.0001	-0.0087	0.1593	0	-0.0069	0.156

5.5 Empirical results

5.5.1 Baseline regression

In this section, we investigate the overall effect of accessing finance company on firms' earnings management decision.

Hypothesis (1). Firms are more likely to engage in earnings management through increasing discretionary accruals after they access to finance company.

We suggest a tunneling story that accessing finance company facilities controlling shareholders' tunnelling incentives by requiring their member firms to raise funds and deposit the raised funds in finance company where controlling shareholders can reap all the profits. To reduce the misspecification problem, we follow literature by Campello and Graham (2013) and Linck et al (2013) and control for other possible determinants of earnings management including firm size, Tobin's Q, leverage, dividend ratio, cash flows, cash holdings, and sales growth. Previous studies suggest growth firms (high Tobin's Q sales growth) have stronger incentives to manage earnings (McNichols, 2002; Skinner and Sloan, 2002). Dechow (1994) discovered a negative relationship between operating cash flow and earnings management. Leveraged firms may be more conservative in financial reporting because they maybe confront with more scrutiny from debtholders (Khan and Watts, 2009). We also control for firm size due to that larger firms relative to smaller firms are less likely to managing earnings because earnings

management behaviour of larger firms is more likely to be detected due to their higher political sensitivity (Zmijewski and Hagerman, 1981). In addition, we also control for ownership structure to take the differences in state ownership V.S. private ownership and concentrated V.S. dispersed ownership in account, which may affect earnings management as suggested by Jo and Kim (2007) and Liu and lu (2007). We estimate the following regression:

$$\text{Dependent}_{i,t} = \alpha + \beta FC_{i,t} + \gamma X_{i,t} + \text{Firm Fixed Effects} + \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (6)$$

Where dependent variables are absolute value of discretionary accruals ($AB_DA_{i,t}$), discretionary accruals ($DA_{i,t}$) and performance-adjusted abnormal discretionary accruals ($AD_DA_{i,t}$). $FC_{i,t}$ is an indicator variable which equals to one if firm i has affiliated with a finance company by year t . $X_{i,t}$ control for a number of firm-specific characteristics that presumably affect the level of earnings management, including $Firm\ size_{i,t}$ (logarithm of beginning of year total asset), $TobinQ_{i,t}$ (Market value of equity plus book value of total liabilities, scaled by book value of total assets), $Leverage_{i,t}$ (ratio of total liabilities to beginning of year total assets), $Cash\ Flow_{i,t}$ (net cash flow from operating activities scaled by beginning of year total asset), $Cash_{i,t}$ (cash and cash equivalents divided by beginning of year total asset), $SOE_{i,t}$ (an indicator variable that equals one if controlling shareholders is a government agency), $Dividend_{i,t}$ (dividend payments scaled by earnings), $Control\ right_{i,t}$ (shares held by controlling shareholders as a percentage of total shares outstanding). In addition, year fixed effects and firm fixed effects are included in the regression. We cluster all standard errors at firm level. Our tunnelling story expects

a positive coefficient of β for $AB_DA_{i,t}$. Because earnings manipulation involves both positive and negative values of accruals, we expect a positive coefficient of β for $DA_{i,t}$ and $AD_DA_{i,t}$ because we believe that an increasing discretionary accrual helps firms attract more funds from the market.

Table 5.4: Correlation matrix

This table presents correlation matrix for all firm-level variables used in this study during the period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the earnings management proxies of interest in this paper. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. The rest of variables are control variables used in regressions in this paper. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. All variables are calculated for each firm-year. All continuous variables are winsorized at the 1% and 99% level.

	AB_DA	DA	AD_DA	Log(total asset)	TobinQ	Leverage	Cashflow	Cash	Salegrowth	Dividend	SOE	Control right
AB_DA	1											
DA	0.4185	1										
AD_DA	0.3943	0.971	1									
Log(total asset)	-0.1222	-0.0315	-0.0547	1								
TobinQ	0.057	-0.0133	-0.0092	-0.5413	1							
Leverage	0.1967	-0.0244	-0.01	0.2621	-0.1866	1						
Cashflow	-0.0439	-0.3222	-0.3239	0.0102	0.0425	-0.1304	1					
Cash	0.1759	0.0843	0.0527	-0.1445	0.0979	-0.2692	0.2044	1				
Salegrowth	0.2764	0.0991	0.0778	-0.0369	0.0024	0.0462	0.1913	0.303	1			
Dividend	-0.0887	0.0039	-0.0082	0.1119	-0.0852	-0.1948	0.0727	0.0973	-0.005	1		
SOE	-0.0542	-0.0599	-0.0475	0.231	-0.1524	0.1164	0.038	-0.0728	-0.006	-0.0057	1	
Control right	0.0274	0.0427	0.0215	0.2553	-0.1113	-0.0209	0.0827	0.0655	0.0961	0.1399	0.1159	1

Table 5.5: The results of baseline regressions

This table reports panel regression results of the overall impact of the presence of finance company on firm earnings management in the sample period 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **FC** is an indicator variable which equals to one if a firm has affiliated with a finance company. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. Column (2), (5) and (7) controls for firm-fixed effects. In other columns except column (2), (5) and (7), firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	AB_DA			DA			AD_DA		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FC	0.0381*** (4.25)	0.0442*** (5.93)	0.0305*** (4.08)	0.0348*** (3.03)	0.0448*** (4.02)	0.0296*** (2.65)	0.0335*** (2.88)	0.0440*** (3.88)	0.0302*** (2.69)
Log (total assets)	-0.1024*** (-16.07)	-0.0608*** (-13.36)	-0.0776*** (-13.58)	-0.0770*** (-8.56)	-0.0554*** (-8.26)	-0.0762*** (-8.36)	-0.0684*** (-7.66)	-0.0590*** (-8.83)	-0.0768*** (-8.41)
TobinQ		-0.0126*** (-4.16)	-0.0116*** (-3.68)		-0.0155*** (-3.78)	-0.0147*** (-3.44)		-0.0185*** (-4.60)	-0.0170*** (-4.06)
Leverage		0.1764*** (10.07)	0.1829*** (10.49)		-0.1269*** (-5.05)	-0.1239*** (-4.79)		-0.0867*** (-3.45)	-0.0823*** (-3.19)
Cashflow		-0.1007*** (-3.36)	-0.1044*** (-3.54)		-0.5816*** (-13.26)	-0.5851*** (-13.41)		-0.5803*** (-13.28)	-0.5865*** (-13.49)
Cash		0.2635*** (13.00)	0.2571*** (12.46)		0.1610*** (5.89)	0.1417*** (5.11)		0.1363*** (5.02)	0.1245*** (4.51)
Salegrowth		0.1063*** (12.19)	0.1084*** (12.33)		0.0764*** (5.71)	0.0783*** (5.79)		0.0616*** (4.60)	0.0653*** (4.82)
Dividend		-0.0020 (-0.40)	-0.0026 (-0.51)		0.0028 (0.40)	0.0021 (0.30)		0.0034 (0.47)	0.0024 (0.33)
SOE		-0.0239 (-1.38)	-0.0128 (-0.73)		-0.0394* (-1.68)	-0.0270 (-1.13)		-0.0337 (-1.44)	-0.0220 (-0.93)
Control right		0.0014*** (3.75)	0.0017*** (4.36)		0.0026*** (4.36)	0.0028*** (4.70)		0.0022*** (3.70)	0.0025*** (4.03)
Constant	2.3135*** (16.99)	1.2776*** (12.45)	1.6008*** (12.99)	1.6480*** (8.56)	1.2310*** (8.24)	1.6370*** (8.42)	1.4597*** (7.64)	1.3058*** (8.74)	1.6465*** (8.44)
Year fixed effect	yes	no	yes	yes	yes	no	yes	no	yes

Firm fixed effect	yes								
N	11187	10975	10975	11187	10975	10975	11187	10975	10975
adj. R-sq	0.0975	0.2242	0.2333	0.0298	0.1767	0.1844	0.0214	0.1660	0.1712

Table 5.5 tabulates results from estimating (6). We find strong evidence that firms increase the involvement of earnings management after they access to finance company given the coefficients on FC indicators for all earnings management measures are positive and significant in all specifications. For example, in Column (3), the coefficient for the reform indicator variable is 3.05% (t-statistic=4.08, significant at better than the 1% level), suggesting the prevalence of earnings management in the aftermath of accessing finance company. Column (6) and (9) show that the coefficients on FC are 2.96% (t-statistic=2.65) and 3.02% (t-statistic=2.69), which show evidence that finance company affiliated firms manipulate earnings upward. These results are consistent with our tunnelling conjunction of impact of the presence of finance company on firms' earnings management. Our evidence is consistent with the work conducted by Liu and Lu (2007).

5.5.2 Endogeneity tests: difference-in-differences approach

Our research design suffers the concerns that both the decision to access finance company and to frequently manage earnings using increasing accruals can be endogenous responses to forces in firms' operating environments that are unobservable to us. To alleviate this endogeneity concern caused by reverse causality or omitted variables, we use the experiment introduced by the *No.37 Memorandum of Disclosure Regulation* to examine effect of improving transparency in the transaction between finance company and affiliated firms on firms' earnings management decision. In general, increased transparency reduces information asymmetry and help investors recognize tunnelling by controlling shareholders, which results in less earnings management led by tunnelling incentives (Jo and Kim, 2007). Therefore, the experiment is well

suiting for our research question, as it facilitates difference-in-differences comparisons of treated firms (firms with access to finance company and listed in Shenzhen stock exchange) V.S. control firms (all firms except treated firms in our sample) before and after the adoption of the *No.37 Memorandum of Disclosure Regulation*. If finance company represents a tunnelling mechanism through which firms opportunistically manage earnings, we would expect a weakened effect of the presence of finance company on earnings management for treated firms. Our difference-in-differences model is specified as follows:

$$\begin{aligned}
 \text{Dependent}_{it} = & \alpha + \theta FC_modified_{i,t} * Post2011_{i,t} + \gamma X_{i,t} + \\
 & \text{Firm Fixed Effects} + \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (7)
 \end{aligned}$$

Where $Dependent_{it}$ is the three earnings management proxies of this study's interest. We only consider firms with constant status of having access to finance company or no access at all throughout the whole sample period. We modified our FC indicator by cleaning all pre-access firm observations to make it time-invariant across our sample period, as proxied by $FC_modified_{i,t}$. $Post2011_{i,t}$ is the time dummy which is equal to 1 in the years after 2011 and 0 otherwise. $X_{i,t}$ represents a set of firm-specific earnings management determinants as controlled in our baseline regression. A significantly negative coefficient on the interaction term of $FC_modified_{i,t} * Post2011_{i,t}$ would provide evidence in support of our tunneling prediction.

Table 5.6: The results of difference-in-differences analysis

This table reports panel regression results of the impact of 2011 *No.37 Memorandum of Disclosure Regulation* as an exogenous shock on firms' earnings management by using a difference-in-differences approach. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **FC_modified** is a time-invariant indicator variable which equals to one if a firm has affiliated with a finance company. **Post2011** is the time dummy which is equal to 1 in the years after 2011 and 0 otherwise. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	AB_DA	DA	AD_DA
FC_modified*Post2011	-0.0249** (-2.40)	-0.0286** (-2.22)	-0.0338*** (-2.66)
Log (total assets)	-0.0658*** (-12.94)	-0.0740*** (-8.51)	-0.0726*** (-8.50)
TobinQ	-0.0099*** (-3.49)	-0.0122*** (-3.12)	-0.0138*** (-3.70)
Leverage	0.1692*** (10.17)	-0.1122*** (-4.76)	-0.0734*** (-3.13)
Cashflow	-0.0897*** (-3.76)	-0.5426*** (-14.87)	-0.5419*** (-15.11)
Cash	0.2206*** (12.58)	0.1041*** (4.34)	0.0850*** (3.65)
Salegrowth	0.0943*** (12.05)	0.0775*** (6.33)	0.0621*** (5.20)
Dividend	-0.0042 (-0.93)	-0.0012 (-0.18)	-0.0013 (-0.19)
SOE	-0.0050 (-0.32)	-0.0173 (-0.92)	-0.0086 (-0.48)
Control right	0.0013*** (3.69)	0.0028*** (5.40)	0.0024*** (4.59)
Constant	1.3766*** (12.50)	1.5821*** (8.46)	1.5512*** (8.41)
Year fixed effect	yes	yes	yes
Firm fixed effect	yes	yes	yes
N	10003	10003	10003
adj. R-sq	0.2147	0.1933	0.1787

We present the results of our difference-in-differences in columns (1) to (3) of Table 5.6. In all columns, the coefficients of interaction term are negative and significant at the 5% level or above, suggesting that the impact of the presence of finance company on earnings management is decreased and implying the disclosure requirement specific to firms with access to finance company reduced tunnelling induced earnings management behaviours by their controlling shareholders.

5.6 Direct evidence of tunnelling mechanism

5.6.1 Does higher profitability of finance company motivate firms to manage earnings?

We perform analyses to provide direct evidence on the mechanisms through which the presence of finance company affects firms' earnings management. In this section, we consider whether higher profitability of finance company could enhance controlling shareholders' tunnelling incentives and thus increase the earnings management behaviours. Because almost half of total assets of finance companies is interbank deposit (the amount of funds placed by finance companies on other banks or financial institutions)³⁰, the interbank deposits provide a substantial amount of profits for finance companies. Our intuition lies on that if the interbank deposits can produce a higher profit margin than firms' operational investments, controlling shareholders would have higher incentives

³⁰ According to statistics from China National Association of Finance Companies (CNAFC) The amount of interbank deposit as a percentage of total assets for the all finance companies in China accounts for 37.38% (2014), 43.05% (2015), 44.33% (2016), 39.44% (2017) and 38.40% (2018), respectively. Data source: <http://www.cnafc.org/>

to divert firms' funds to finance company and lend the funds to interbank market instead of investing these funds to projects with lower returns. In line with this view, we hypothesize that higher rate of return on interbank deposits than firms' investments is associated with higher tunnelling incentives and hence more earnings management behaviours. We estimate the following equation to test this hypothesis.

$$\begin{aligned}
 \text{Dependent}_{it} = & \alpha + \beta FC_{i,t} + \theta \text{Excess return}_{i,t} + \delta (FC_{i,t} * \\
 & \text{Excess profit}_{i,t}) + \gamma X_{i,t} + \text{Firm Fixed Effects} + \\
 & \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (8)
 \end{aligned}$$

Where Dependent_{it} is the three variables of interest. $\text{Excess return}_{i,t}$ is proxied as the difference between 1-year interbank Shibor rate and firm i's ROA in n-1 year. Our focus is the coefficient of δ , which captures that to what extent the impact of the presence of finance company is dependent on the excess return. We expect a positive coefficient on the interaction term.

Table 5.7: Direct evidence: Relative profitability of finance company

This table reports the variation of relative profitability of finance company in the effects of the presence of finance company on earnings management during the sample period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **Excess return** is proxied as the difference between 1-year interbank Shibor rate and firm i's ROA in n-1 year, which captures the relative profitability of finance company. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	AB_DA	DA	AD_DA
FC	0.0081 (1.50)	-0.0091 (-1.15)	-0.0078 (-0.97)
Excess return	-0.0459* (-1.70)	-0.2403*** (-4.59)	-0.2277*** (-4.46)
FC*Excess return	0.0890** (2.11)	0.2094** (2.31)	0.1947** (2.12)
Log (total assets)	-0.0497*** (-17.11)	-0.0374*** (-6.58)	-0.0360*** (-6.29)
TobinQ	-0.0077*** (-4.36)	-0.0066* (-1.95)	-0.0081** (-2.43)
Leverage	0.1232*** (9.80)	-0.1385*** (-6.68)	-0.1055*** (-5.09)
Cashflow	-0.0354** (-2.14)	-0.7191*** (-17.18)	-0.7329*** (-17.02)
Cash	0.0678*** (4.29)	-0.1055*** (-4.06)	-0.1301*** (-4.97)
Salegrowth	0.0000*** (6.77)	0.0001*** (5.89)	0.0001*** (5.26)
Dividend	-0.0012 (-0.33)	0.0050 (0.84)	0.0042 (0.73)
SOE	0.0009 (0.07)	-0.0208 (-1.48)	-0.0140 (-1.02)
Control right	0.0010*** (4.16)	0.0018*** (4.98)	0.0013*** (3.61)
Constant	1.0888*** (17.09)	0.8875*** (7.15)	0.8582*** (6.87)
Year fixed effect	yes	yes	yes
Firm fixed effect	yes	yes	yes
N	10975	10975	10975
adj. R-sq	0.0687	0.1819	0.1811

Table 5.7 presents the regression results. We find that the coefficients of the interaction term are significantly positive for all of our earnings management measures. In general, the results support our hypothesis that the larger excess return on interbank deposit over firm last year's ROA representing higher tunnelling benefits would result in an increase in the level of earnings management.

5.6.2 The effect of widen divergence of cash-flow right and control on the relationship between the presence of finance company and earnings management?

Fan and Wong (2002) found that the informativeness of accounting earnings is positively associated with controlling shareholders' divergence of cash-flow right and control right in a pyramidal structure. They inferred that a pyramid structure or cross-shareholding allows the controlling shareholders to obtain control rights with lower equity investments, which causes a separation in control (voting rights) and ownership (cash flow rights). In this situation, controlling shareholders are more inclined to extract wealth from the firms using earnings management but only bear a fraction of the cost. We incorporate their inference into our finance company setting and argue that finance company exacerbates the entrenchment problem of controlling shareholders if finance company does offer supports to their tunneling activities. Based on the above, we hypothesize that controlling shareholders' divergence of cash-flow right and control right would increase their participation in earnings management after having access to finance company. We test this hypothesis using the following estimation.

$$\begin{aligned} \text{Dependent}_{it} = & \alpha + \beta FC_{i,t} + \theta \text{Control right}_{i,t} + \delta(FC_{i,t} * \\ & \text{Control right}_{i,t}) + \gamma X_{i,t} + \text{Firm Fixed Effects} + \\ & \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (9) \end{aligned}$$

We use shares held by controlling shareholders as a percentage of total shares outstanding (*Control right_{i,t}*) to reflect the level of divergence between control and cash flow right. A significantly negative coefficient of *FC_{i,t} * Control right_{i,t}* would lend support to our hypothesis.

Table 5.8: Direct evidence: Divergence of cash-flow right and control right

This table reports the variation of divergence of cash-flow right and control of controlling shareholders in the effects of the presence of finance company on earnings management during the sample period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders, which captures the divergence of cash-flow right and control of controlling shareholders. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	AB_DA	DA	AD_DA
FC	0.0682*** (3.45)	0.0679*** (2.65)	0.0381** (2.25)
FC*Control right	-0.0010** (-2.25)	-0.0012* (-1.94)	-0.0007* (-1.83)
Log (total assets)	-0.1026*** (-19.46)	-0.0686*** (-8.59)	-0.0239*** (-5.58)
TobinQ	-0.0193*** (-6.11)	-0.0145*** (-3.31)	-0.0055** (-2.24)
Leverage	0.1654*** (9.07)	-0.1556*** (-6.31)	-0.1186*** (-7.65)
Cashflow	-0.1038*** (-3.61)	-0.8113*** (-16.42)	-0.6408*** (-17.47)
Cash	0.1116*** (4.83)	-0.0968*** (-3.14)	-0.1094*** (-5.20)
Salegrowth	0.0002*** (6.38)	0.0002*** (6.98)	0.0001*** (8.11)
Dividend	0.0005 (0.12)	0.0076 (1.18)	0.0059 (1.19)
SOE	-0.0099 (-0.53)	-0.0365* (-1.77)	-0.0115 (-1.02)
Control right	0.0025*** (6.17)	0.0029*** (5.36)	0.0012*** (4.14)
Constant	2.1833*** (19.06)	1.5587*** (8.99)	0.5871*** (6.29)
Year fixed effect	yes	yes	yes
Firm fixed effect	yes	yes	yes
N	10975	10975	10975
adj. R-sq	0.1345	0.1963	0.1872

Table 5.8 presents regression results. The coefficients for *FC*Control right* on the three earnings management measures are 6.82% (t-value 3.45), 6.79% (t-value 3.65) and 3.81% (t-value 2.25) respectively. This indicates that finance company to inhibit earnings management is enhanced when control is evidently separate from cash-flow right. Henceforth, our hypothesis is supported.

5.6.3 Do more entrenched controlling shareholders conduct more earnings management after accessing finance company?

In this section, following Khanna and Yafeh (2005) and Jian and Wong (2010), we use related transactions between subsidiaries and parents to capture the magnitude of the controlling shareholders' entrenchment. We argue that controlling shareholders using related transactions to prop up resources are essentially more entrenched. This entrenchment effect reflected in their earnings management decision will be stronger once they access to finance company. We rely on the following estimation to test this hypothesis.

$$\begin{aligned}
 \text{Dependent}_{it} = & \alpha + \beta FC_{i,t} + \theta \text{Related transaction}_{i,t} + \\
 & \delta(FC_{i,t} * \text{Related transaction}_{i,t}) + \gamma X_{i,t} + \\
 & \text{Firm Fixed Effects} + \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (10)
 \end{aligned}$$

Where *Dependent_{it}*, *FC_{i,t}* and *X_{i,t}* remain the same as in our baseline regression. We obtain related party transaction from CSMAR database. We only consider transactions between listed firm and the parent firm (or its affiliates) and scaled the amount of

the transactions by beginning of the year total assets. δ captures how the differential earnings management response to the presence of finance company is dependent on the severity of controlling shareholders' entrenchment.

Table 5.9: Direct evidence: Entrenchment of controlling shareholders

This table reports the variation of entrenchment of controlling shareholders in the effects of the presence of finance company on earnings management during the sample period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **Related transaction** is the aggregated amount of transactions between listed firm and the parent firm (or its affiliates) scaled by beginning of the year total assets, which proxies the magnitude of entrenchment of controlling shareholders' propping. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	AB_DA	DA	AD_DA
FC	0.0242*** (3.28)	0.0170* (1.83)	0.0168* (1.84)
Related transaction	0.0009** (2.53)	0.0007** (2.03)	0.0007** (2.02)
FC*Related transaction	0.0720*** (5.48)	0.1146*** (3.55)	0.1142*** (3.44)
Log (total assets)	-0.1010*** (-19.18)	-0.0670*** (-8.63)	-0.0594*** (-7.95)
TobinQ	-0.0187*** (-5.81)	-0.0105** (-2.45)	-0.0104** (-2.56)
Leverage	0.1651*** (8.98)	-0.1528*** (-6.10)	-0.1191*** (-4.90)
Cashflow	-0.1079*** (-3.87)	-0.9866*** (-30.83)	-0.9988*** (-32.46)
Cash	0.1132*** (4.89)	-0.0668** (-2.24)	-0.0920*** (-3.20)
Salegrowth	0.0002*** (7.20)	0.0002*** (8.65)	0.0002*** (8.21)
Dividend	0.0008 (0.17)	0.0080 (1.25)	0.0077 (1.24)
SOE	-0.0093 (-0.50)	-0.0335* (-1.65)	-0.0259 (-1.38)
Control right	0.0023*** (5.75)	0.0026*** (4.97)	0.0020*** (3.98)
Constant	2.1570*** (18.77)	1.5221*** (9.00)	1.3599*** (8.36)
Year fixed effect	yes	yes	yes
Firm fixed effect	yes	yes	yes
N	10975	10975	10975
adj. R-sq	0.1338	0.2078	0.2036

Results are shown in Table 5.9 in Column (1) to (3). As expected, for all earnings management measures, we generate a positive coefficient for *FC*Related transaction* with a significance level of 1%. We interpret the results supporting our prediction that accessing finance company results in less creditability of accounting information reported by firms controlled more entrenched controlling shareholders.

5.6.4 The impact of finance company on external financing and investment

Our evidences so far suggest that the presence of finance company inhibit firms' earnings management behaviors. Our inference lies on that controlling shareholders have strong incentives to require their subsidiaries to raise external financing through equity issuance and to deposit the raised funds in finance company for tunneling purpose instead of investment purpose. The use of discretionary accruals can raise the stock price and reduce the cost of equity for firms, enabling firms to generate more funds from equity issuance. To test the validity of this argument, we examine firms' financing behaviors and investment decision after having access to finance company. We re-visit our baseline model using cash flow generated from equity issuance and capital expenditure as dependent variables.

Table 5.10: Finance company, external financing and investments

This table reports panel regression results of the impact of accessing finance company on external financing and investment. The dependent variable in Column (1) is **Equity issuance**, which is the cash flow proceeds from equity issuance scaled by beginning of year earnings. The dependent variable in Column (2) is **CAPEX**, which is Capital expenditures on fixed assets scaled by beginning of year total assets. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)
	Equity issuance	CAPEX
FC	0.0115** (2.32)	0.0010 (0.20)
Log (total assets)	-0.0415*** (-9.14)	-0.0311*** (-10.77)
TobinQ	-0.0172*** (-9.73)	-0.0085*** (-6.16)
Leverage	-0.1759*** (-12.56)	-0.0087 (-0.97)
Cashflow	-0.0495*** (-2.88)	0.0485*** (4.75)
Cash	0.0003*** (10.88)	0.0002*** (5.05)
Salegrowth	0.0330*** (5.74)	0.0411*** (10.30)
Dividend	0.0097** (2.43)	0.0030 (1.16)
SOE	-0.0001 (-0.01)	-0.0034 (-0.41)
Control right	-0.0009*** (-3.14)	0.0008*** (3.94)
Constant	1.0893*** (10.62)	0.7328*** (11.75)
Year fixed effect	yes	yes
Firm fixed effect	yes	yes
N	11107	11107
adj. R-sq	0.1070	0.1411

Table 5.10 Column (1) and (2) report the results of regressions. The coefficient for the FC indicator in Column (1) is 1.15 with a t-value of 2.32, suggesting that having access to finance companies results in greater external financing via equity issuance. In Column (2) reports the coefficients for CAPEX. We find no statistically reliable difference in capital expenditure before and after firms access finance company, indicating that the raised funds serve no investment purpose as we predicted.

5.7 Sensitivity to alternation explanations

5.7.1 Are our results driven by changes in managerial compensation?

It is believed that managerial compensation could be the key driver to an increasing earnings management (Cheng and Warfield, 2005). Managers could use discretionary accrual to manipulate reported earnings upward if their compensation is stickily tied to firms' performance (Bergstresser and Philippon, 2006). Finance company could be not only an intra-group bank but also an independent financial department of the group. Therefore, it could be case that compensation of CEO becomes more dependent on the performance of the firms after firms access to finance company because finance company might be endowed to have responsibility for managing the member firms' budget (including managerial compensation) on behave of the parent company. The adoption of a more marketized compensation scheme based on the performance after accessing finance company could invalid our tunnelling explanation. We test this hypothesis by incorporating proxies (CEOs' remuneration and

option holdings) that capture the cross-sectional variation in managerial compensation.

Table 5.11 show that managerial compensation including CEOs' remuneration and option holdings has no significant influence on changes in earnings management after firms access to finance company, thus providing evidence against the hypothesis that the increasing earning managements after access to finance companies stems from managerial compensation maximization motivation.

Table 5.11: Alternative explanation: Managerial compensation maximization

This table reports the variation of CEOs' compensation in the effects of the presence of finance company on earnings management during the sample period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **Salary** in Penal A is the reported CEOs' annual salary scaled by the beginning of year earnings. **Option** in Penal B refers to the option holdings held by CEOs as a percentage of firm's total share outstanding. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	Penal A: Remuneration			Penal B: Option holdings		
	(1) AB_DA	(2) DA	(3) AD_DA	(4) AB_DA	(5) DA	(6) AD_DA
FC	0.0279* (1.75)	0.0379** (2.22)	0.0436** (2.54)	0.0258 (1.53)	0.0364** (2.10)	0.0437** (2.48)
Salary	-0.0371*** (-2.69)	-0.0146 (-0.66)	-0.0101 (-0.50)			
FC*salary	-0.0280 (-0.51)	-0.0536 (-0.49)	-0.0063 (-0.06)			
Option				0.0035* (1.83)	0.0004 (0.18)	-0.0012 (-0.56)
FC*Option				0.4858 (1.09)	0.0920 (0.21)	-0.0842 (-0.17)
Log (total assets)	-0.1209*** (-9.08)	-0.0908*** (-4.78)	-0.0795*** (-4.30)	-0.1208*** (-9.07)	-0.0905*** (-4.75)	-0.0792*** (-4.27)
TobinQ	-0.0167*** (-3.03)	0.0004 (0.06)	-0.0009 (-0.15)	-0.0166*** (-2.98)	0.0004 (0.07)	-0.0009 (-0.15)
Leverage	0.1569*** (3.75)	-0.1545*** (-3.52)	-0.1144*** (-2.59)	0.1563*** (3.72)	-0.1561*** (-3.55)	-0.1157*** (-2.60)
Cashflow	-0.1647** (-2.40)	-1.0713*** (-12.93)	-1.0824*** (-12.65)	-0.1599** (-2.35)	-1.0691*** (-12.83)	-1.0828*** (-12.60)
Cash	0.0298 (0.58)	-0.2232*** (-3.04)	-0.2350*** (-3.26)	0.0249 (0.48)	-0.2246*** (-3.05)	-0.2344*** (-3.24)
Salegrowth	0.0063*** (3.03)	0.0098*** (5.64)	0.0089*** (4.82)	0.0064*** (3.06)	0.0098*** (5.59)	0.0089*** (4.80)
Dividend	0.0026 (0.24)	-0.0045 (-0.27)	-0.0105 (-0.66)	-0.0016 (-0.15)	-0.0070 (-0.44)	-0.0116 (-0.74)
SOE	0.0504* (1.83)	0.0333 (1.26)	0.0287 (1.13)	0.0506* (1.82)	0.0332 (1.26)	0.0287 (1.13)
Control right	0.0018* (1.76)	0.0012 (1.12)	0.0011 (0.92)	0.0018* (1.75)	0.0012 (1.10)	0.0011 (0.91)
Constant	2.6245*** (8.85)	2.0852*** (4.98)	1.8232*** (4.47)	2.6213*** (8.83)	2.0809*** (4.96)	1.8194*** (4.45)
Year fixed effect	yes	yes	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes	yes	yes
N	1908	1908	1908	1908	1908	1908
adj. R-sq	0.2282	0.2846	0.2803	0.2279	0.2844	0.2804

5.7.2 Are our results driven by greater sensitivity to investment opportunities?

Finance company is initially designed to promote the liquidity of the member firms through funds reallocation within groups, enabling firms to be more sensitive to investment opportunities. The greater sensitivity to investment opportunities resulted from accessing finance company may induce firm's strategic accrual reporting. Linck et al (2013) argue that managers may use discretionary accruals to credibly signal positive prospects to the market, enabling it to raise more capital to support the optimal investment projects. In this respect, one would expect that the use of discretionary accruals is strategic response to firm's growth opportunities after having access to finance company, which challenges our tunnelling speculation on the relationship between the presence of finance company and firms' earnings management.

However, our results in Table 5.12 fail to support this alternative explanation. The coefficients of interaction terms between the FC indicator and proxies of investment opportunities (*TobinQ* and *Salegrowth*) are insignificantly different from zero, suggesting no evidence of strategic accrual reporting due to greater sensitivity to investment opportunities after they access to finance company.

Table 5.12: Alternative explanation: Signaling investment opportunities

This table reports the variation of investment opportunities in the effects of the presence of finance company on earnings management during the sample period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. We use **TobinQ** and **Salegrowth** to capture the investment opportunities. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Dividend** is the dividend payments scaled by beginning of year earnings. **SOE** is a dummy that equals one if controlling shareholders is a government agency. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	Penal A: TobinQ			Penal B: Salegrowth		
	(1) AB_DA	(2) DA	(3) AD_DA	(4) AB_DA	(5) DA	(6) AD_DA
FC	0.0156 (1.41)	0.0259* (1.87)	0.0236* (1.75)	0.0259*** (3.77)	0.0167* (1.86)	0.0163* (1.84)
FC*TobinQ	0.0068 (1.43)	-0.0027 (-0.47)	-0.0017 (-0.30)			
FC*Salegrowth				0.0147 (0.85)	0.0343 (1.20)	0.0336 (1.23)
Log (total assets)	-0.0783*** (-16.29)	-0.0579*** (-7.94)	-0.0543*** (-7.72)	-0.0782*** (-16.27)	-0.0581*** (-7.96)	-0.0545*** (-7.74)
TobinQ	-0.0137*** (-4.65)	-0.0074* (-1.71)	-0.0084** (-2.04)	-0.0126*** (-4.38)	-0.0077* (-1.92)	-0.0086** (-2.25)
Leverage	0.1499*** (9.11)	-0.1623*** (-6.68)	-0.1261*** (-5.28)	0.1489*** (9.05)	-0.1627*** (-6.70)	-0.1265*** (-5.30)
Cashflow	-0.1433*** (-5.19)	-1.0033*** (-31.54)	-1.0102*** (-32.89)	-0.1424*** (-5.16)	-1.0040*** (-31.60)	-1.0107*** (-32.94)
Cash	0.1114*** (5.02)	-0.0686** (-2.32)	-0.0932*** (-3.27)	0.1102*** (4.97)	-0.0689** (-2.33)	-0.0937*** (-3.27)
Salegrowth	0.1166*** (14.59)	0.0604*** (4.92)	0.0418*** (3.53)	0.1132*** (12.22)	0.0520*** (3.69)	0.0337** (2.47)
Dividend	0.0002 (0.04)	0.0078 (1.22)	0.0075 (1.21)	0.0003 (0.06)	0.0074 (1.15)	0.0072 (1.14)
SOE	-0.0076 (-0.47)	-0.0302 (-1.56)	-0.0227 (-1.24)	-0.0075 (-0.46)	-0.0307 (-1.58)	-0.0232 (-1.27)
Control right	0.0017*** (4.87)	0.0023*** (4.72)	0.0018*** (3.81)	0.0017*** (4.89)	0.0024*** (4.77)	0.0019*** (3.86)
Constant	1.6650*** (15.98)	1.3212*** (8.34)	1.2466*** (8.13)	1.6627*** (15.95)	1.3270*** (8.39)	1.2517*** (8.18)
Year fixed effect	yes	yes	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes	yes	yes
N	10975	10975	10975	10975	10975	10975
adj. R-sq	0.1828	0.2111	0.2033	0.1826	0.2115	0.2038

5.7.3 Are our results driven by political reasons?

Political reasons could be another confounding factor. Liu et al (2018) find that political connection matters in deciding firms' earnings management. It is also plausible that political connection plays a crucial role in determining whether a business group is eligible to establish a finance company since the formation of the finance company needs approval from the government (CBRC). An alternative explanation based on this view is that managers of firms with access to finance company are those have close ties with the government whose incentives to manage earnings is to meet objectives set by government agency for quick political promotion. If this alternative explanation holds, we would expect a differential earnings management response of state-owned firms to the access to finance company compared to non-state-owned firms.

Our results in Table 5.13 provide evidence against this alternative explanation that state-owned firms are indistinguishable from non-state-owned firms in terms of the level of earnings management after accessing the finance company.

Table 5.13: Alternative explanation: Political context

This table reports the how political concerns influence the effects of the presence of finance company on earnings management during the sample period of 2007 to 2014. **AB_DA**, **DA** and **AD_DA** are the dependent variables. **AB_DA** is the absolute value of modified Jones discretionary accruals. **DA** is the modified Jones discretionary accruals. **AD_DA** is the Performance-adjusted abnormal discretionary accruals. **SOE** is a dummy that equals one if controlling shareholders is a government agency. We assume that SOEs have difference political environment from non-SOEs. **Log (total assets)** is calculated as the logarithm of beginning of year total asset. We use **TobinQ** and **Salegrowth** to capture the investment opportunities. **TobinQ** is the market value of equity plus book value of total liabilities, scaled by book value of total assets. **Leverage** is computed as total liabilities divided by total assets. **Cashflow** is the operating cash flow scaled by beginning of year total assets. **Cash** refers to cash and cash equivalents scaled by beginning of year total assets. **Salegrowth** is the percentage change in sales from year t-1 to year t. **Dividend** is the dividend payments scaled by beginning of year earnings. **Control right** is the total shares as a percentage of total shares outstanding held by controlling shareholders. In all columns, firm-fixed and year-fixed effects are further controlled. The standard errors are clustered at the firm level and are shown in parentheses, *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	AB_DA	DA	AD_DA
FC	0.0522 (1.29)	0.0069 (0.11)	-0.0066 (-0.09)
FC*SOE	-0.0229 (-0.55)	0.0114 (0.18)	0.0414 (0.58)
Log (total assets)	-0.1314*** (-11.85)	-0.1544*** (-10.69)	-0.1442*** (-8.64)
TobinQ	-0.0207*** (-3.98)	-0.0413*** (-6.17)	-0.0336*** (-4.52)
Leverage	0.1633*** (4.38)	-0.1392*** (-3.34)	-0.1714*** (-3.66)
Cashflow	0.1463*** (3.14)	-0.9799*** (-19.86)	-0.9366*** (-15.74)
Cash	0.2084*** (4.96)	-0.4011*** (-9.27)	-0.4293*** (-8.30)
Salegrowth	0.4119*** (19.83)	-0.4699*** (-19.37)	-0.4685*** (-16.13)
Dividend	-0.0012 (-0.14)	0.0018 (0.19)	0.0034 (0.29)
SOE	0.0067 (0.24)	-0.0484 (-1.27)	-0.0690 (-1.58)
Control right	0.0031*** (4.75)	0.0037*** (4.00)	0.0034*** (3.38)
Constant	2.8333*** (11.97)	3.5192*** (11.32)	3.3659*** (9.43)
Year fixed effect	yes	yes	yes
Firm fixed effect	yes	yes	yes
N	10975	10975	10975
adj. R-sq	0.2933	0.2998	0.2117

5.8 Conclusion

This study investigates the relationship between the presence of finance company and firm's earnings management behaviour across China's listed companies in business groups from 2007 to 2014. Given the importance of finance company in China's economy, little attention has been drawn by empirical research to the role of finance company in corporates decision. This study fills this gap by providing empirical evidence on the impact of finance company on firms' earnings management decision from a tunnelling perspective. Specifically, we show that accessing finance company leads to higher earnings management using increasing discretionary accruals. We also find that their earnings management behavior is in parallel with an extensive equity financing. Our results are consistent with the view that the presence of finance company facilitates controlling shareholders' tunneling incentives, which consequently results in more earning management behaviors. Additionally, we find that after the adoption of *No.37 Memorandum of Disclosure Regulation*, the difficulty of tunnelling by controlling shareholders of treated firms increased because a more transparent transaction information between firms and finance company is required, leading a significantly weaker effect of finance company on earnings management. This result further adds value to our tunnelling prediction to the relation between the presence of finance company and earnings management.

Our analyses also show higher profitability of finance company, more divergence of cash-flow right and control, and more entrenchment controlling shareholders are associated with more earnings management in the aftermath of accessing finance company. Moreover, we find evidence against alternative

explanations of our results driven by managerial compensation maximization, strategic signals of greater investment opportunities to the market and managers' political pursuing.

Taken together, our study highlights the earnings management costs imposed by the presence of finance company in China. Our study has an implication for policymakers as we suggest that improving transparency of the transactions between finance companies and listed firms could help increase the informativeness of firms' reporting. More efforts can be made by future research on a better understanding of the role of finance company in shaping group member firms' investment and financial decisions.

Chapter 6

Conclusion

China's being one of the fastest growing economies in the world leaves many puzzles as it is against the traditional wisdom in the finance and growth literature that growth of economies is based on well-developed legal and financial systems (Allen, 2005). One possible explanation for this phenomenon is that informal financial system has been playing an important role in supporting the growth of economy as it serves a good substitute for the formal systems. This thesis focuses on one of the key representatives of the informal system-shadow banking system. We aim at providing a more comprehensive picture of the importance and role of shadow banking by examining its economic influences on firms' operational and financial decisions.

Chapter 2 studies several related strands of literature to this thesis including business groups, cash holdings, earnings management, shadow banking and tunneling. This thesis tries to reconcile these strands of literature by adding the influences of shadow banking activities into the rationale behind firms' behaviors.

Chapter 3 examines the effects of the shadow banking activities on firm investments in China. We use a mountain of WMPs issuance data and Chinese listed firms' financial data spanning from 2009 to 2014. We document that the prevalence of shadow banking activities has a significant positive impact on firms' investment. We provide robust evidence suggesting financial constraints mechanism

through which shadow banking affects firms' investment. We find that small and private firms subject to more information asymmetries benefit the most from shadow banking prevalence. Moreover, we find firms with more dependence on internal capital market and with better investment opportunities are more responsive to the prevalence of shadow banking. These findings suggest that shadow banking help mitigate firms' financial constraints. Our research design successfully addressed the causal relationship between shadow banking prevalence and investment since our results survive in instrumental and difference-in-differences analysis.

Our study contributes to bank lending, investment and shadow banking literature in two ways: First, we point out the shadow credit has become an important complement for formal bank lending markets. We argue that bank lending literature should take shadow credit into consideration before drawing any conclusions. Shocks to the shadow banking system may have equivalent consequence as what bank lending channel literature has suggested. Second, due to the existence of regulatory restriction of the 75% cap on banks' loan-to-deposit ratio and tightly regulated interest rate system, shadow banking, as an alternative financing channel to firms, is influential in determining firms' investment. Third, our study contributes to the shadow banking literature by introducing more bright sides rather than focusing merely on the risk side.

Our results also add value to the implications of regulation on shadow banking industry. Specifically, we provide insights for the potential impact of the recent regulation of the New Asset Management Rules on real economy. Given the institutional context of China's capital and credit markets, firms that depend more on shadow credit would have been more adversely affected by

protectional over-regulation on shadow banking activities. Any inappropriate regulation or overregulation could have negative economic effects if firms facing the withdrawal of the shadow banking financing cannot frictionlessly switch to an alternative financing source. Policy makers are suggested to be carefully in drawing conclusion about shadow banking to avoid unintended consequence in the implementation of the regulation since function and real impact of shadow banking can vary according different economic conditions.

Chapter 4 turns the interest to the role that finance companies plays business groups. Finance company is a non-banking financial institution affiliated with a business group, providing the member firms of the business groups with bank-like financial services such as deposit taking and loan originating. They are essentially shadow banks involving in maturity, credit, and liquidity transformation within groups. We are interested in the role of finance companies in shaping group member firms' cash policy. We hand-collected 196 finance companies' information by 2014 and match this data with firm-level data through ownership. We find that firms hold higher levels of cash after they gain access to finance companies and the increasing cash holdings of firms with finance companies serves no operational and investment purposes. In addition, we show that this effect is more pronounced for firms with more agency conflicts. These findings are contrary to Chinese reformers' intention of designing such a group-specific bank from which one could expect an improvement in the efficiency of cash management and hence a reduction in financial constraints of group member firms. We interpret these results as consistent with the tunneling hypothesis that controlling shareholders extracts rents from firms by encouraging firms to accumulate large cash holdings and to deposit these cash holdings in their wholly owned finance companies.

Because by doing so, the controlling shareholders could reap all the benefits from lending these cash in interbank markets through their finance companies. Our finding that firms that had access to finance companies rebalancing their cash holdings sensitively to the arbitrage benefits available in interbank market confirms this prediction.

By introducing an exogenous regulation to firms' cash policies as natural experiments, our design has successfully addressed the endogeneity problem in the relation between the presence of finance companies and firms' cash holding. We find greater reduction in cash holdings in firms after regulator placed restriction on depositing their cash in finance companies.

Four pieces of evidence provide robust support to our tunneling prediction. First, we find the increase in cash holdings is stronger when tunneling benefits are larger led larger profitability a finance company could earn. Second, a more of diverged controlling shareholder's cash flow rights versus voting rights is associated with larger increase in cash holdings. Third, we find that firms save more cash out of cash flow from equity issuance than other debt financing as their main financing choice for each member firm to accumulate cash holdings. By diluting the controlling right while remain full control, the controlling shareholders could reap more private benefits from depositing the accumulated cash from equity issuance in their wholly controlled finance companies. And fourth, we find that cash holdings are more sensitive to the variation of interbank rate, namely the *SHIBOR* rate while insensitive to the variation of governmental constrained rate, suggesting that cash holdings flow from member firms to controlling shareholder owned finance companies to satisfy their tunneling motives. Further, we find a

larger discount in the value of cash for firms with finance companies, which again confirms our tunneling explanation. Our results cannot be explained by the alternative hypotheses that member firms hold more cash holdings as a result of reduced bank monitoring or the parent's incentive to reallocate capital more efficiently

Our study contributes to cash holdings literature by highlighting a novel facet of cash holding determinants for China's group affiliates, namely the presence of finance companies, which goes beyond the existing literature. Our study extends the literature on the raising concerns of tunnelling effects found in Chinese listed firms. Besides, our study has important implications that policy makers need to pay close attention to the role of finance companies in the evolution of business groups, especially on the cost side of such group-specific bank. In general, a finance company within the business group will have positive impact on improving the efficiency of the internal capital market and reduce member firms' financial constraints. However, if the regulation and supervision of finance companies are not adequate, tunnelling incentives may arise from the parent company, which is the sole owner of the finance companies, which, in turn, can have detrimental effects on member firms' financial performance and investment. These effects can further have negative impact on the real economy in general.

Chapter 5 investigates how firms reporting preferences evolve in parallel with the development of business groups and whether this evolution can be explained by the emergence and functioning of finance companies. Based on our finance company data and firm-level data from 2007 to 2014, we document that firms are more likely to be engaged in earnings management through increasing the use of discretionary accruals after having access to finance company.

We also find that their earnings management behavior is in parallel with an extensive equity financing. We inferred this evidence standing on the tunneling mechanism of finance companies we demonstrate in the previous chapter that controlling shareholders are incentivized to manage earnings to raise more capital from equity issuance and require firms to deposit the raised capital in finance company for their own interest.

Two cross-sectional analysis add value to the plausibility of our inference. First, we find that larger difference indicating larger tunneling benefits that finance company can provide is associated with greater level of earnings management for firms with access to finance company. Second, the positive relationship between the presence of finance company and earnings management is stronger if controlling shareholders exercise full control while holding a relatively smaller portion of cash flow rights. Besides, we also use a direct measure of tunneling (related party transaction between subsidiary and parent company) to reflect the extent of entrenchment of the controlling shareholders and find that earnings management is more pronounced at firms controlled by more entrenched shareholders after they access the finance company.

To address the endogeneity concern, we conduct a difference-in-differences test using exogenous disclosure shock on firms' earning management decision. A weaker earnings management of firms with access to finance company is found, implying that improving accounting quality may help to reduce earning managements, which is consistent with argument proposed by Biddle et al (2009).

We attempt to rule out three alternative explanations for our results. First, our results are not driven by managerial compensation maximization after having access to finance company (Cheng and Warfield, 2005). Second, accessing to finance company may bring stronger financing capacity and greater investment opportunities to affiliated member firms. However, we find evidence against the hypothesis that managers may use discretionary accruals to credibly signal positive prospects to the market, enabling it to raise more capital to support the optimal investment projects (Linck et al, 2013). Further, we find no systematic difference in earnings management between state-owned firms and non-state-owned firms, which rules out that our results are driven by political reasons.

Our study highlights the earnings management costs imposed by the presence of finance company in China. It contributes to the earnings management literature by identifying a possible key driver of Chinese listed firms' earnings management behavior. The implication for policymakers lies in the calls for actions to improve the transparency of the transactions between finance companies and listed firms, which may help increase the informativeness of firms' reporting.

Taken together, this thesis enriches the shadow banking literature by providing empirical evidence of how and to what extent shadow banking activities impact firms' behavior. Going forward, more efforts can be made by future research on a better understanding of the role of shadow banking in shaping Chinese economy.

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