

Monetary Policy Shock, the Strength of Bank Relationship and Corporate Cash Policy

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Abstract

This paper investigates whether strength of the bank-firm relationship affects the level of cash holding, especially in the tighter period of monetary policy. We measure the strength of bank-firm relationship by holding bank ownership, bank-firm proximity (holding local bank ownership) and the number of holding local bank ownership. We argue that remote location between firm and bank increases the cost of financial external fund, if the headquarters of firms and holding ownership bank are the same province, it is easier for companies to obtain external funding. So the strength of the local bank-firm relationship can ease financial constraint. As expected, stronger evidence supports that firms with stronger bank-firm relationship tend to hold less cash. The firms without stronger bank-firm relationship adjust their level of cash holding more quickly toward target level than holding local bank ownership firms and stronger bank relationship reduces the investment-cash sensitivity. Our findings are in line with our expectations and support both the precautionary motive for holding cash and the pecking order theory.

Keywords: cash holding, speed of adjustment, holding local bank ownership, monetary policy, geography location, bank firm relationship

1. Introduction

The issue of cash holdings of firms has recently gained a lot of attention in literature. One stream of this literature examines the determinant of corporate cash holding. Kim et al. (1998) provide a theoretical and empirical investigation of the firm's decision to invest in liquid assets. Opler et al. (1999) examine the determinants and implications of holding cash by publicly U.S. firms in the 1971–1994. Ozkan et al. (2004) investigates the empirical determinants of corporate cash holdings for a sample of UK firms. The second stream of this literature consider the impact of corporate property on determinant of corporate cash holding, Harford et al. (2008) example the relationship of Corporate governance and firm cash holdings in the US. Bigelli et al. (2012) and Gao et al. (2013) consider the behavior of cash holding in private firms. The third stream of this literature consider the marginal value of cash holding (For example Dittmar et al., 2007; Denis et al., 2010). To the best of our knowledge, the relationship among strength of bank relationship, the determinants of cash holdings, speed of adjustment (SOA) of cash holding toward to its target level, especially in the tighten episode of monetary policy have been given to little attention.

In this study, we focus on a specific transmission mechanism: monetary policy, strength of bank firm relationship and cash holding. First, we use the combined variables of location and holding bank ownership to study the relationship between holding local bank ownership and cash holding, and investigate it whether affect corporate cash policy if a firm holds local bank ownership. we also examine the different determinant of cash holding, which is similar with Opler et al. (1999), and speed of adjustment of cash holding toward to its target level for holding local bank ownership (hereafter to *HLBO*) firms and non-holding local bank ownership (hereafter to non-*HLBO*) firms (Note 1).

Second, we investigate the impact of monetary policy on corporate cash policy, and wish to better understand how firms with stronger bank relationship change their cash holdings in response to the change in monetary policy. Furthermore, we test whether there are differences in cash holdings decisions by *HLBO* and non-*HLBO*

firms, in particular, with respect to the monetary policy.

This paper is related to existing literature on the relevance of geography. Distance inhibits information transmission among financial market participants, geographic proximity between firm and bank can reduce asymmetric information and build good relationship and easily access to bank loans and gain a lower cost of external funds. John, K., Knyazeva, A. et al. (2011) examines the impact of geography on firm dividend policies. Gaspar and Massa (2007) test the intuition that locally held firms should exhibit a higher quality of corporate governance using local ownership as a proxy for the amount of private information. Alessandrini et al. (2010) find that increased functional distance contributes to the tightening of financing constraints, higher investment cash flow sensitivity. Knyazeva et al. (2012) provides new evidence on the role of distance between banks and borrowers in bank lending.

This paper is also related to existing literature of bank firm relationship. A close bank-firm relationship can mitigate information asymmetries and corporate financial constraints. Firms that were connected with banks received preferential treatments in terms of easy access to bank loans and a lower cost of external funds. Berger and Udell (1995) show that firms with close banking relationships do enjoy preferential access to credit. Kutsuna et al. (2007) find that main bank relationships give small issuers increased access to equity capital markets. Espenlaub et al. (2012) investigate the evolution and determinants of connections between firms and banks, and the impact of bank connections on corporate investment.

Using a sample of holding local bank ownership's firms in china over the period 2006–2012, first, we show that, on average, there are weak evidence that holding local bank ownership (hereafter to *HBO*) companies hold less cash than non *HBO* companies, however, strong evidence that stronger bank relationship can reduce the level of cash holding and lower the speed of adjustment toward to the optimal level of cash holding. This is because holding local bank ownership (*HLBO*) firms can have more access to external financing from holding bank and have a weaker precautionary motive, thus they economize cash holdings.

We also consider endogeneity and sample selection bias issue. So, we use a variety of methods to solve this problem. First, we use difference in deference (DID) and the lagged variables to mitigate simultaneity issues, and conduct a natural experiment to study how (if at all) firms adjust their financial policies in response to an exogenous shock. Second, we employ a propensity score-matching approach to mitigating the sample selection bias issues. we apply propensity score-matching based on several firm variable, the result show that the level of cash holding for *HLBO* firms is lower than the one for non *HLBO* firms, and the speed of adjustment is difference between the *HLBO* and non *HLBO* firms.

By analyzing the impact of bank relationship strength on corporate cash policy, this study contributes to several literatures. First, although prior studies extensively document the determinant of firm cash policy (Kim et al. 1998, Opler et al. 1999), no study has examined the cash policy of holding local bank ownership firms in a transitional economy in china, The firms holding local bank ownership could get more external funds easily, then the existing cash holdings should be less important and have less need to hold cash. Second, previous study on corporate cash holdings is more interpretation from the micro company's level, this paper extends our understanding of corporate cash holdings from the perspective of macroeconomic policy. Moreover, after the outbreak of the financial crisis in 2007, the People's Bank of China adopted moderately loose monetary policy and Chinese Government declared that a stimulus package estimated at 4 trillion yuan will be spent over the next two years. However, excessive money supply lead to inflation, from then until 2012, the People's Bank of China adopted moderately tighter monetary policy in order to deal with inflation. For these reasons, the data in china provided an interesting setting for us and a natural environment to study the impact of monetary policy on micro-enterprises. Finally, we investigate the strength of bank relationship on corporate policy from the views of geography location and the number of holding local bank ownership. Our study also contributes to the growing literature on the increase in corporate cash holdings, bank relationship and geography locations.

The remainder of this paper is organized as follows. Section 2 describes literature review and derives the empirical hypotheses. Section 3 presents the data and basic statistics. Section 4 provides empirical result. Section 5 is robust test. Section 6 concludes.

2. Literature Review and Hypothesis Developing

2.1 Distance, Bank Relationship and Cash Holding

The trade-off theory postulates that firms determine an optimal level of cash holdings by weighing the marginal benefits and marginal costs of cash holdings. managers maximize the shareholders' wealth, and they set the optimal level of cash holding in a way that the marginal benefit equals the marginal cost of holding cash. The

trade-off theory mainly involves Keynes (1936) 's theory of money demand motive: The transactions motive and precautionary motive. Opler et al. (1999) examine the trade off and financing hierarchy theory of firm's cash holding over period 1952–1994 in US. Their results support the trade off theory.

The transaction motive, firms must hold a certain amount of cash for daily operations and transactions, firms hold more cash when the costs of the external financing and opportunity costs are high. In the real world, when the company's cash is shortage, the company must raise funds from the outside at higher interest rates, since the existence of transaction costs. Once firms can't raise funds from outside, firms must reduce investment and reduce dividends or raise funds by selling securities. So, shortages of cash will bring high costs to the company.

The precautionary motive, firms need to keep cash to protect themselves against adverse cash flow shocks that might force them to forgo valuable investment opportunities due to costly external financing (Duchin et al. 2010), firms keep cash to better deal with adverse shocks, therefore, firms with greater cash flow fluctuation hold more cash. The research of Opler et al. (1999) support for the precautionary motive, Han S et al. (2007) shows that the cash holdings of financially constrained firms are sensitive to cash flow volatility, because financial constraints create an intertemporal trade-off between current and future investments, financial constraints firms increase their cash holdings in response to increases in cash flow volatility.

A growing body of finance literature examines the relationship between geographic location and corporate finance. Geographical proximity is most often attributed to its bank or its customers on transaction costs. Wang et al. (2010) pointed out that asymmetric information could have a distinct effect on firm investment and financing decisions, distance inhibits information transmission among financial market participants, geographic proximity between firm and bank can reduce asymmetric information. Degryse et al. (2005) study the effect on loan conditions of geographical distance between firms, the lending bank, and all other banks in the vicinity. Chhaochharia et al. (2012) shows that local institutional investors are effective monitors of corporate behavior. Firms with high local ownership have better internal governance and are more profitable. In the bank–firm relationship, even the distance between the bank and the firm seems to influence credit availability. Distance affects the bank's ability to collect soft information from borrowers and to transfer this information inside the bank organization (Cotugno et al., 2013).

Geographic location between bank and firm can affect transaction costs, which can be decomposed into two components: transportation and information cost (Elliehausen & Wolken, 1990). Transportation costs may relate to the dollar and time costs incurred by banks or their customers. Information costs primarily include search costs to obtain information about alternative suppliers.

2.2 The Monetary and Economic Environment in China

Monetary policy has a significant impact on corporate investment financing decisions. By reading the "China Monetary Policy Report" of central bank in China (Note 2), we can see that: The People's Bank of China (PBC) announced three increases in the required reserve ratio by 1.5 percentage point and made a decision to raise the benchmark lending rates of financial institutions twice in 2006. By the end of 2006, the growth of broad money (M2) fell to 16.9 percent from the yearly high of 19.2 percent. In 2007, the PBC raised the reserve requirement ratios on ten occasions by 5.5 percentage point and hiked the RMB benchmark deposit and lending rates on six occasions, at the end of 2007, broad money M2 down 0.2 percentage points from the previous year. In 2008, with the spreading and deepening of the U.S. sub-prime crisis, the PBC adopted moderately loose monetary policy, such as cutting the benchmark deposit and lending interest rates on five occasions, lowering required reserve ratios on four occasions, at the end of 2008, broad money M2 represent a year-on-year increase of 17.8 percent and an acceleration of 1.1 percentage points from the previous year. At the same time, a stimulus package estimated at 4 trillion yuan will be spent over the next two years, by the end of 2010. However, excessive money supply leads to inflation. In 2011, facing growing inflation pressures, the PBC raised the deposit reserve requirement ratio six times by a total of three percentage points, and the benchmark lending and deposit rates were raised three times by a total of 0.75 percentage points, M2 up 13.6 percent year on year, representing a deceleration of 6.1 percentage points from the previous year. In the late 2012, in view of the deceleration of economic growth and CPI growth, fine-tunings and preemptive adjustments were conducted in a forward-looking manner, including two cuts of reserve requirement ratio of 0.5 percentage points each. For these reasons, and reference Rao et al. (2011) 's research, we define it as tightening episode of monetary policy in 2006, 2007, 2011, 2012 and loosing episode of monetary policy in 2008, 2009, 2010. So, we split samples into 3 period: pre-crisis tighter(2006–2007), during-crisis loosing (2008–2010), post-crisis tighter (2011–2012).

2.3 The Institutional Background of Bank Relationship in China

Bank plays a crucial role in economic transition. Bank behavior determines the availability and the cost of credit.

However, in the specific context of China, bank credit discrimination on Non-SOEs (State owned enterprise) is more serious (lu et al., 2012). Most banks are state-owned so that they may have a purely ideological preference for lending to government-owned firms over private firms. The private firms, borrowing from China's state-owned commercial banking sector by private firms remains meager. Non-SOEs have less access to obtain fund from bank. Wei and Wang (1997) find that China's bank loans favored SOEs and argued that such discrimination diminished the effectiveness of other measures designed to promote the growth of non-state sectors. Ferri (2009), lu et al. (2012) points out that banks in China traditionally met government policy goals by financing the operations of SOEs, regardless of their profitability or risk. Brandt et al. (2003) pointed out that banks have been dealing almost exclusively with government-owned firms so that they have developed good channels for obtaining credit information about these firms in China.

To eliminate the effect of credit discrimination. Bank relationship may be one of the effective methods. One way of the bank relationships is crossing shares between bank and firm. That is bank ownership or holding bank ownership. However, according to the "the commercial bank law of the People's Republic of China", it is forbidden for commercial bank to invest to bank financial institutions and enterprises in China. So, under current law, regulation prohibits banks from holding shares in the enterprise. As a result, holding bank ownership becomes another way of bank relationship. Under current law, Domestic non-financial institutions may become a shareholders of commercial bank. Holding share in local city commercial bank can ease informational opaqueness problem. With the deepen financial reform by Chinese government, more and more Non-SOEs invest in bank.

2.4 Hypothesis

According bank firm relationship theory, firms with closer bank relation might obtain external funds cheaply and easily. In a sense, if these firms need to finance investment projects, they can directly receive financial support from banks. Moreover, bank firm relationship decrease the problems associated with agency conflicts and informational asymmetry (Ozkan et al., 2004). These firms would have less need to hold cash for precautionary motive. So HBO firms can economize cash holdings since banks are ready to provide them with liquidity for rainy days. Pinkowitz et al. (2001) examine the effect of bank power on cash holdings using industrial firms from the United States, German, and Japan. Luo et al. (2005) and lu et al. (2012) find that firms with closer bank relations hold less cash. Therefore, we expect non-HBO firms to maintain higher cash balances to avoid, for example, significant fixed costs involved in obtaining external funds and hypothesis the bellow:

H1: HBO firms hold less cash relative to non-HBO firms.

Monetary policy also affects cash holdings, if the monetary policy of the central bank becomes stricter, external financing costs begin to rise, the cash shortage in the near future will occur, then the company improve the level of cash holdings in response to financial constraints. hence, the changes of monetary policy have difference impact on HBO and non-HBO firms. For these HBO firms, they can directly receive financial support from banks during rainy day, non-HBO firms are more likely to avoid precautionary when the monetary policy becomes stricter, these firms must adjust the amount of cash holdings in response to the impact of external financing environmental deteriorating, in particular, when the level of cash holdings below the optimal level of cash holdings. Therefore, we hypothesis as bellow:

H2: The effect of HBO is more pronounced during period with tighter monetary policy.

Connections help reduce asymmetric information problems, Banks act as firms' external financing providers and bank financing plays an important role in developing a country's financial system. Firms that were connected with banks received preferential treatments in terms of easy access to bank loans and a lower cost of external funds. Denis and Sibilkov (2010) find greater cash holdings are associated with higher levels of investment for constrained firms with high hedging needs. Sheu and Lee (2012) find that excess cash is significantly correlated with capital expenditure, particularly for firms financially constrained and with severe managerial entrenchment.

Recent theoretical papers highlight the importance of distance in explaining the availability and pricing of bank loans. The severity of the asymmetric information problem itself may also increase with distance (Degryse et al., 2005). Hauswald and Marquez (2003) find the precision of the signal about a borrower's quality received by a bank decreases with distance.

Distance inhibits information transmission among financial market participants, geographic proximity between firm and bank can facilitates the collection of soft information (reduce asymmetric information), build good relationship and bank financing. Holding local bank ownership, due to their geographical proximity, are likely to have lower communication costs, lower information gathering costs, and may even have easier access to

firm-level information. Moreover, firms, using the shareholder status, interference bank loans. As a result, holding local bank ownership can alleviate firm's financial constraints. The rationale is that a shorter distance (or greater Proximity) increases the ability to collect "soft" information (Dass et al.2011). Wang et al. (2010) pointed out that the geographic proximity between the firm and its investors could alleviate these agency problems by facilitating better monitoring and relationship building. Holding local bank ownership can build stronger bank relationship, and facilitate access to external finance from bank, so, holding local bank ownership will alleviate firm's financial constraints. We posit that

H3: A closer bank firm relationship reduces the firm's level of cash holding.

H4: A firm with closer bank firm relationship adjusts its level of cash holding more slowly toward to target level.

H5:The effect of *HLBO* is more pronounced for non-state-owned firms

For firms, holding local bank ownership can improve their debt capacity and financial constrains, where the term financial constraints indicates that a lack of internal funds may negatively affect a firm's investments in a imperfect world. So, the investment expenditures are affected by the cash (cash flow), which is often referred to as "investment cash (cash-flow) sensitivity". Follow Fazzari et al. (1988), we take investment cash (cash-flow) sensitivity as a proxy for financial constraints. Our hypothesis is that the strength of bank relationship improves asymmetric information between firms and banks by alleviating the problem of financial constraints since banks are able to provide liquidity when needed. So, we posit that

H6: The sensitivity of corporate investment to cash is less for *HLBO* firms than for non-*HLBO* firms, during the tighter period of monetary policy, especially, during the tighter period of monetary policy.

3. Data and Basic Statistics

3.1 Sample Information

Our sample is drawn from listed A-share firms in China from 2006 to 2012. Our primary data source is China Stock Market Accounting Research (CSMAR) and Wind Financial Database. Financial data are collected from the CSMAR, and we obtain holding bank ownership data from Wind Financial Database and collect data on headquarters location by baidu search engine. Following Opler et al. (1999), we remove financial listed companies and exclude observations with missing value.

We split firms into the strong and weak of bank-firm relationship by the consistency of headquarter location for firms and holding ownership bank, Geographic location is important for corporate finance, the academic literature usually defines corporate location as the location of its headquarters. To test the geographic proximity effect, we use three related variable, *HLBO1*, *HLBO2*, *NLBO*. *HLBO1*=1 if holding local bank ownership (the headquarters for bank and firm are in the same province), otherwise, *HLBO1*=0. *HLBO2*, dummy variable, *HLBO2* =1 if holding local bank ownership (the headquarters for bank and firm are in the same province), *HLBO2*=0 if the firms hold other province's bank ownership. *NLBO* is the number of holding bank ownership in the same province.

0 presents the final sample distribution across industries. There are 11,574 firm-year observations, including 2,494 firm-year observations in which the firms hold bank ownership and 9,080 firm-year observations in which the firms don't hold bank ownership. Among the hold bank ownership samples, the highest number of holding bank ownership comes from the Manufacturers industries (1,322, 11.42%), followed by Wholesale and retail trade industries (334, 2.89%); the numbers in parentheses are the number of sample and proportion. The lowest number of holding bank ownership comes from Communication and cultural industries (37, 0.32%). These industrial classifications are defined by the China Securities Regulatory Commission (CSRC).

Table 1. Distribution by industry of the holding bank ownership sample

CSRC	Industrial classification	Holding Bank Ownership				Total	
		Non HBO		HBO		N	%
		N	%	N	%		
	Extractive	277	(2.39)	41	(0.35)	318	(2.75)
	Communication and cultural	110	(0.95)	37	(0.32)	147	(1.27)
	Electricity, gas and water	348	(3.01)	107	(0.92)	455	(3.93)
	Real estate	649	(5.61)	185	(1.60)	834	(7.21)
	Building	189	(1.63)	45	(0.39)	234	(2.02)
	Transportation, warehousing	339	(2.93)	101	(0.87)	440	(3.80)

Agriculture, forestry, animal husbandry and fishery	177	(1.53)	42	(0.36)	219	(1.89)
Wholesale and retail trade	408	(3.53)	334	(2.89)	742	(6.41)
Social Services	305	(2.64)	46	(0.40)	351	(3.03)
Information technology	640	(5.53)	90	(0.78)	730	(6.31)
Manufacturers	5,443	(47.03)	1,322	(11.42)	6,765	(58.45)
Comprehensive	195	(1.68)	144	(1.24)	339	(2.93)
Total	9,080	(78.45)	2,494	(21.55)	11,574	(100)

Note. *HBO* is the holding bank ownership, *Non HBO* is that the firms don't hold bank ownership. In parentheses is proportion of the corresponding sample accounted for the total sample, sample periods: 2006–2012.

Table 2. Distribution by year of holding bank ownership sample

Panel A.

year	Holding Bank Ownership				Total
	Non HBO	HBO		Subtotal	
		Non HLBO1	HLBO1		
2006	987	112	189	301	1,288
2007	1,041	122	181	303	1,344
2008	1,122	130	200	330	1,452
2009	1,194	123	213	336	1,530
2010	1,302	129	233	362	1,664
2011	1,622	137	254	391	2,013
2012	1,812	150	321	471	2,283
Total	9,080	903	1,591	2,494	11,574

Panel B.

year	SOE		Non-SOE		Total
	Non HLBO1	HLBO1	Non HLBO1	HLBO1	
2006	79	133	33	56	301
2007	83	131	39	50	303
2008	91	145	39	55	330
2009	81	151	42	62	336
2010	80	146	49	87	362
2011	93	144	44	110	391
2012	95	163	55	158	471
Total	602	1013	301	578	2494

0 provided the sample distribution of holding bank ownership across years. In panel A, among the hold bank ownership samples, we split the sample into *HLBO1* (if the firms hold bank ownership and the headquarters for bank and firm are the same province) and *Non-HLBO1* sample (the firm holds the bank ownership, however, the headquarters for bank and firm aren't the same province). Panel B provided the distribution of holding bank ownership cross year and property rights. There is a time trend for *HLBO1*, and the time trend of *HLBO1* for Non-SOE grow faster than that for SOE. In 2006, there are 133 and 56 *HLBO1* firms for SOE, Non-SOE respectively. However, it becomes 163 and 158 *HLBO1* firms for SOE, Non-SOE respectively.

3.2 Basic Statistics

To avoid the influence of outliers, each continuous variable are winsorized at the 2.5% and 97.5% percentiles of their distributions. Follow Opler et al (1999), we report the cash(*Cash*), sale growth rate(*SaleGr*), real size(*Size*), net working capital(*NetWC*), cash flow(*Cflow*) and so on. 0 presents the descriptive statistics of the main variables for the sample periods (pre- crisis, during crisis, post-crisis).

Table 3. Descriptive statistics of the variables

Panel A: mean values t-statistics are used to access the significance of the difference in the means								
	Full		Pre-crisis(tighter) 2006–2007		during-crisis(Loosing) 2008–2010		Post-crisis(tighter) 2011–2012	
	HLBO1=0	HLBO1=1	HLBO1=0	HLBO1=1	HLBO1=0	HLBO1=1	HLBO1=0	HLBO1=1
(N)	(9080)	(1591)	(2028)	(370)	(3618)	(646)	(3434)	(575)
Cash	0.286	0.230***	0.210	0.185**	0.267	0.235**	0.366	0.237***
Size	15.237	15.665***	15.131	15.481***	15.237	15.632***	15.299	15.82***
SaleGr	0.194	0.159***	0.227	0.203	0.186	0.154*	0.183	0.135***
NetWC	-0.038	-0.101***	-0.102	-0.136**	-0.070	-0.120***	0.033	-0.057***
CF	0.062	0.061	0.067	0.072	0.069	0.067	0.051	0.046
CFVol	0.090	0.073***	0.079	0.068***	0.089	0.072***	0.098	0.078***
Lev	0.481	0.525***	0.529	0.540	0.503	0.533***	0.43	0.505***
CapExp	0.080	0.067***	0.068	0.061*	0.075	0.065***	0.091	0.072***
Payout	0.014	0.01***	0.012	0.014	0.015	0.011***	0.014	0.008***

Panel B: median values Mann-Whitney tests are used to access the significance								
	HLBO1=0	HLBO1=1	HLBO1=0	HLBO1=1	HLBO1=0	HLBO1=1	HLBO1=0	HLBO1=1
Cash	0.169	0.167**	0.153	0.128***	0.163	0.185	0.209	0.169***
Size	15.104	15.539***	15.029	15.433***	15.097	15.512***	15.156	15.684***
SaleGr	0.140	0.124***	0.169	0.148	0.136	0.119	0.127	0.108*
NetWC	-0.024	-0.097***	-0.081	-0.143***	-0.056	-0.110***	0.052	-0.052***
CF	0.054	0.054	0.059	0.061	0.059	0.061	0.045	0.041
CFVol	0.060	0.052***	0.053	0.051***	0.060	0.052***	0.065	0.053***
Lev	0.485	0.535***	0.533	0.548	0.502	0.539***	0.426	0.511***
CapExp	0.058	0.051***	0.045	0.045	0.054	0.050**	0.071	0.057***
Payout	0	0**	0	0.002	0.003	0.005	0	0***

Note. *** p<0.01; ** p<0.05; * p<0.1.

The Cash is the ratio of cash to net total asset (total asset subtract cash), in full sample, the mean (median) cash is 0.286 (0.169) for HLBO1=0 sample, the mean (median) cash is 0.230 (0.167) for HLBO1=1 sample. The two sample t test reject null hypothesis at 5% level for different sample period. Indicating that the holding local bank ownership firms hold significantly lower mean cash than the non holding local bank ownership ones. In fact, non-HLBO1 being more risky and more financially constrained, tend to hold significantly more total cash than HLBO1 firms as expected under the trade-off model and hypothesis 3. The size is the logarithm of real assets (real assets is are deflated using CPI), the two sample t test and Wilcoxon rank test both reject null hypothesis that firms holding bank ownership are the same as the one don't hold bank ownership at 1% level. The t test and Wilcoxon rank test indicate that the net working capital (*NetWC*) in the non-holding local bank ownership firm are significantly higher than the one in the holding local bank ownership firm. The two sample t test and Wilcoxon rank test show that the cash flow volatility (*CFVol*: the cash flow volatility using the standard deviation of cash flow over the previous two year) in the non-HLBO1 firm significantly higher than the one in the holding local bank ownership firm at 1% level. These indicate cash flow volatility is the important determinant of cash holding for non-HBO1 firm, which is consistent with the precautionary motivation of cash holding.

To test the effects of change in monetary policy on cash holding, we conduct analysis of simple DID, and the result shows in 0. When monetary policy changed from Tighter to loosing ((2006, 2007)→(2008, 2010)). The cash ratio for non-HLBO1 firms (HLBO1=0) was significantly increased by 5.7% from 21% in the tighter episode to 26.7% in the loosing episode of monetary policy at 1% level. For HLBO1 group (HLBO1=1), the cash ratio significantly decreased by 5% from 18.5% in the tighter episode to 23.5% in the loosing episode of monetary policy at 5% level. When monetary policy changed from loosing to Tighter ((2008, 2010)→(2011, 2012)). The change of cash holding for HLBO1=1 isn't significant at 10% level. However, The change of cash holding for HLBO1=0 is significant at 1% level. These indicate that for non-HLBO1 firms, the costs of being short in cash are extremely high during the tighter episode. So, non-HLBO1 firms hold more cash during these periods. These findings support H1-H3, and are consistent with the precautionary motive for holding cash, also with trade off theory. However, for HLBO1 firms, they can easily obtain fund from the bank of their holding

ownership, as a result, they decrease the level of cash holding, yet the decrease is insignificant.

Table 4. Simple difference in difference

		CASH					
		Pre-crisis	during-crisis	Difference	during-crisis	Post-crisis	Difference
		Tighter=0	Loosing =1		Loosing =0	Tighter=1	
	HLBO1=1	0.185	0.235	0.05*	0.235	0.237	0.002
HLBO1	HLBO1=0	0.210	0.267	0.057***	0.267	0.366	0.099***
	Difference	-0.025*	-0.032***	-0.007**	-0.032***	-0.129***	-0.097***

Note. *** p<0.01; ** p<0.05; * p<0.1

4. Empirical Results

4.1 The Relationship among the Strength of Bank Relationship, Monetary Policy and Cash Holding

To investigate the relationship between the strength of bank relationship and cash holding. Following previous literature (see, Oper et al.1999, Venkiteswaran. 2011), we choose the relevant factors that affect cash holding level as bellow:

$$Cash_{i,t} = \beta_0 + \beta_1 HBO(HLBOs) + \beta_2 Size + \beta_3 SaleGr + \beta_4 NetWC + \beta_5 CF + \beta_6 CF vol + \beta_7 Lev + \beta_8 CapExp + \beta_9 Payout + Dual + Outin + SOE + industry, year + \varepsilon_{i,t} \quad (1)$$

The dependent variable is cash ratio, the *HBO* is dummy variable, *HBO* equal 1 if holding bank ownership, otherwise *HBO* equal 0, the *Size* is the natural logarithm of total asset, the sales growth rate expressed as *SaleGr*, *NetWC* is net working capital, scaled by net total asset, *CF* denotes the cash flow, scaled by net total asset, *CFVol* is the cash flow volatility in the previous two years, *Lev* denotes the total debt, scaled by net total asset, *CapExp* is the investment expenditures, scaled by net total asset, *Payout* is the Cash dividends, scaled by net total asset, *Dual* =1 when a firm's CEO also in the position of chairman of the board, otherwise, *Dual* =0, *Outin* is proportion of independent directors on the board. *SOE* is indicate variable for state owned enterprises, *Industry* and *Year* are the dummy variables for the industry and year variables, respectively.

Table 5 reports the corresponding results. The column 1 presents the results for base-line model without considering the bank's influence. The coefficients on the variables are consistent with previous findings: large companies have lower cash reserves, because of larger companies are expected to get financing in an easier and cheaper way (Bigelli et al., 2012). While firms with higher *SaleGr*, *CF* and *CFvol* have higher cash reserves, if a company has a good investment opportunities in the near future, it will maintain a high cash reserves for it, for these reasons, holdings of liquid assets could be more valuable for firms with more investment opportunities, especially if they are financially constrained (Denis & Sibilkov, 2010; Bigelli et al., 2012), higher levels of uncertainty and risk are typically associated with higher levels of cash reserves (Han & Qiu, 2007). *NetWC* is significantly negative correlation with cash holding, because of the substitution effect between them. *Lev* has significantly negative effect on the cash holding, *CapExp* and *Payout* have significantly positive effect on the cash holding, *Dual* has significantly positive effect on the cash holding, *SOE* is indicator variable for state owned enterprises, the result shows that state owned enterprises hold less cash. The 2-5 columns provide the result of holding bank ownership. In column 2, the coefficient of *HBO* is -0.004, however the t = -0.71, this indicates that *HBO* can decrease the level of cash holding, but it isn't significant. To test the geographical proximity effect of holding bank ownership, we use three holding local bank ownership variables, the *HLBO1*, *HLBO2* and *NLBO*. These coefficients of holding local bank ownership are negative and significant at 10% level. Compare with the result in column 2, the geographical proximity effect is significant at 10% level. Especially in column 4, the coefficient of *HLBO2* is -0.015 (t=-1.97), the result shows that compare with holding other province bank ownership, holding local province bank ownership can significantly decrease the level of cash holding. In column 5, the coefficient of *NLBO* is -0.006 and t equal -1.66, indicating that the greater the number of holding bank ownership in the same province, the less cash holdings. In column 6-12, we split samples into SEOs and Non-SEOs group. In SEOs group, the coefficients of *HBO* and *HLBOs* aren't significant, indicating that the holding bank ownership and holding local bank ownership haven't significant influence on cash holding of corporate in SEOs group. However, in Non-SEOs group, there are significant relationship between *HBO*, *HLBOs* and cash at 5% level, the coefficient of *HBO* and *HLBO1* are -0.029 (t=-2.84) and -0.037 (t=-3.03) respectively. Indicating the geographical proximity effect is significant at 5% level. The coefficient of *NLBO* is

significantly negative in column 13, the result shows that compare with holding other province bank ownership, holding local province bank ownership can significantly decrease the level of cash holding. In a word, the strength of bank relationship can significantly decrease the level of cash holding for Non-SEOs, but it's unimportant for SOEs. These results support H5.

Table 6 reports the results for bank relationship's effect on cash holding during different periods of monetary policies. In column 1–4, it is the tighter episode in pre-crisis, the coefficients of *HBO* and *HLBOs* are significant at 5% level, this indicates that bank relationship and strength of bank relationship can decrease the level of cash holding when monetary policy is tightening in pre-crisis. However, during the loosing episode (column 5–8), the coefficients of *HBO* and *HLBOs* become insignificant and the signal is inconsistent. It indicates that strength of bank relationship hasn't important impact on cash holding during the loosing episode of monetary policy. When monetary policy turns into tightening (2011–2012), the relationship between the strength of bank relationship and cash become significant negative correlation at 5% level. The results is consistent with analysis of DID and support the H1-H3.

4.2 Costly Adjustment and the Speed of Adjustment

In a frictionless world, firms would hold the optimal level of cash. However, in real word, firms often adjust their level of cash holding owing to financial friction. To test the difference of SOA in different bank relationship group, following Ozkan and Ozkan (2004), we assume that the company at different times has the optimal level of cash holdings as:

$$Cash_{i,t}^* = \beta X_{i,t} = f(Size, SaleGr, NetWC, CF, CFVol, TD, CapExp, Payout, Dual, Outin, Industry, Year) \quad (2)$$

where, Cash* is the optimal level of cash holding, firm other specific variables that affect the cost and benefits of cash holding are the same as the previous definition.

However, due to the presence of adjustment costs, making the company can't immediately adjust to the optimal target level, the firm trades off its adjustment costs and benefits. A standard partial adjustment model for cash holding as bellow:

$$Cash_{i,t} - Cash_{i,t-1} = \lambda(Cash_{i,t}^* - Cash_{i,t-1}) + \varepsilon_{i,t} \quad (3)$$

Where λ is the proportion of the gap between the actual and its target level of cash holding each year, which measures the speed of adjustment to optimal level of cash holding, ranging between 0 and 1. λ equal 1 indicates that the firms adjust immediately adjust, and there aren't the costs of adjustment, while λ equal 0 denote that it is difficulty for company to change its cash level as a result of the higher costs of adjustment.

Owing to the market imperfections, both *HBO* (*HLBOs*) and non-*HBO* (*HLBOs*) firms have different agency costs or transaction cost on cash holding level. These factors prevent firms from quickly adjusting to optimal level of cash holding. For these reasons, we examine the speed of adjustment across these groups during different episode by bellow regression equation.

$$\Delta Cash_{i,t} = \alpha + \beta_1 HBO(HLBOs) + \beta_2 HBO(HLBOs) * (Cash_{i,t}^* - Cash_{i,t-1}) + \beta_3 (Cash_{i,t}^* - Cash_{i,t-1}) + \varepsilon_{i,t} \quad (4)$$

Where *HBO* is dummy variable, *HBO* equal 1 when firms hold bank ownership, otherwise, *HBO* equal 0. The coefficient on β_1 measures the difference of the adjustment speed between the groups.

Table 5. The strength of bank relationship and cash holding

	base		Pool			SEOs				Non-SEOs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
HBO		-0.004 (-0.71)				0.008 (1.47)				-0.029*** (-2.84)			
HLBO1			-0.010* (-1.68)				0.003 (0.51)				-0.037*** (-3.03)		
HLBO2				-0.015** (-1.97)				-0.014 (-1.53)				-0.014** (-2.09)	
NLBO					-0.006* (-1.66)				0.004 (0.80)				-0.026*** (-2.72)
Size	-0.009*** (-4.35)	-0.009*** (-4.13)	-0.010*** (-4.27)	0.005 (1.29)	-0.009*** (-4.16)	-0.002 (-0.92)	-0.004 (-1.63)	0.010** (2.26)	-0.002 (-0.77)	-0.015*** (-3.69)	-0.014*** (-3.43)	0.000 (0.04)	-0.015*** (-3.93)
SaleGr	0.010* (1.68)	0.010* (1.68)	0.009 (1.53)	0.018* (2.84)	0.010* (1.68)	0.017** (2.26)	0.015* (1.63)	0.029** (2.26)	0.017** (2.26)	0.002 (0.51)	0.004 (1.04)	-0.002 (-0.51)	0.003 (0.71)

	(1.70)	(1.67)	(1.41)	(1.67)	(1.67)	(2.37)	(1.94)	(2.19)	(2.35)	(0.24)	(0.43)	(-0.12)	(0.30)
NetWC	-0.220***	-0.221***	-0.228***	-0.230***	-0.221***	-0.256***	-0.263***	-0.268***	-0.256***	-0.208***	-0.216***	-0.146***	-0.208***
	(-18.56)	(-18.57)	(-18.04)	(-12.03)	(-18.60)	(-18.66)	(-17.83)	(-11.37)	(-18.63)	(-10.73)	(-10.66)	(-4.49)	(-10.75)
CF	0.334***	0.334***	0.327***	0.425***	0.334***	0.394***	0.384***	0.440***	0.393***	0.329***	0.322***	0.421***	0.328***
	(13.76)	(13.75)	(12.78)	(10.17)	(13.75)	(13.44)	(12.31)	(8.31)	(13.40)	(8.64)	(8.13)	(6.22)	(8.63)
CFVol	0.515***	0.514***	0.511***	0.446***	0.513***	0.555***	0.555***	0.590***	0.553***	0.443***	0.445***	0.212***	0.441***
	(19.52)	(19.47)	(18.39)	(8.81)	(19.43)	(16.62)	(15.49)	(8.66)	(16.57)	(11.18)	(10.87)	(2.77)	(11.13)
Lev	-0.533***	-0.534***	-0.551***	-0.368***	-0.534***	-0.426***	-0.440***	-0.359***	-0.426***	-0.635***	-0.651***	-0.372***	-0.634***
	(-33.04)	(-33.04)	(-32.27)	(-13.45)	(-33.06)	(-23.24)	(-22.53)	(-10.72)	(-23.25)	(-23.51)	(-23.07)	(-7.79)	(-23.47)
CapExp	0.168***	0.166***	0.170***	-0.202***	0.166***	-0.072*	-0.030	-0.390***	-0.075*	0.216***	0.193***	0.064	0.220***
	(4.96)	(4.90)	(4.78)	(-3.28)	(4.90)	(-1.77)	(-0.69)	(-4.95)	(-1.84)	(4.00)	(3.43)	(0.62)	(4.08)
Payout	3.529***	3.526***	3.557***	2.531***	3.526***	2.640***	2.619***	1.834***	2.637***	3.979***	4.051***	3.295***	3.987***
	(31.41)	(31.37)	(30.26)	(11.71)	(31.38)	(18.15)	(17.12)	(6.38)	(18.13)	(23.79)	(23.37)	(10.09)	(23.85)
Dual	0.035***	0.035***	0.035***	-0.016	0.035***	-0.004	-0.005	-0.003	-0.004	0.037***	0.039***	-0.031**	0.037***
	(5.96)	(5.96)	(5.80)	(-1.52)	(5.96)	(-0.47)	(-0.62)	(-0.21)	(-0.45)	(4.53)	(4.56)	(-2.03)	(4.56)
Outin	0.044	0.044	0.056	-0.228***	0.043	0.017	0.032	-0.317***	0.020	-0.014	-0.001	-0.066	-0.012
	(0.92)	(0.92)	(1.09)	(-2.99)	(0.90)	(0.32)	(0.53)	(-3.42)	(0.36)	(-0.18)	(-0.02)	(-0.48)	(-0.15)
SOE	-0.018***	-0.018***	-0.019***	-0.004	-0.018***								
	(-3.60)	(-3.58)	(-3.61)	(-0.50)	(-3.58)								
Cons	0.432***	0.429***	0.464***	0.285***	0.429***	0.328***	0.358***	0.225***	0.323***	0.547***	0.532***	0.240**	0.557***
	(11.47)	(11.31)	(11.36)	(4.52)	(11.39)	(8.02)	(8.13)	(2.91)	(7.93)	(7.83)	(7.25)	(2.09)	(8.02)
N	11574	11574	10671	2494	11574	6198	5596	1615	6198	5376	5376	879	5376
R ² _a	0.430	0.430	0.436	0.334	0.430	0.360	0.362	0.315	0.360	0.471	0.471	0.395	0.471

Note. *HBO*=1 if holding bank ownership, otherwise, *HBO*=0, *HLBO1*=1 if holding local bank ownership (the headquarters for bank and firm are in the same province), otherwise, *HLBO1*=0, *HLBO2*=1 if holding local bank ownership (the headquarters for bank and firm are in the same province), *HLBO2*=0 if the firms hold other province's bank ownership, *NLBO* is the number of holding local province bank ownership. *Cash* is the ratio of cash to net total asset (total asset subtract cash), *Size* is the natural logarithm of real total asset deflated by CPI, *SaleGr* is the sale growth rate, *NetWC* is the net working capital without cash scaled by net total asset, *CF* is the measured cash flow arising from the operation, *CFVol* is the cash flow volatility using the standard deviation of cash flow over the previous two year, *Lev* is the represents the financial leverage, *CapExp* is capital expenditure scaled by net total asset, *Payout* is cash dividends scaled by net total asset. *Dual* =1 when a firm's CEO also in the position of chairman of the board, otherwise, *Dual* =0. *Outin* is proportion of independent directors on the board. *SOE* is indicate variable for state owned enterprises. T statistics in parentheses, * p<0.1, ** p<0.05, *** p<0.01.

Table 6. Monetary policy, the strength of bank relationship and cash holding

	Pre-crisis (tighter)				During-crisis(Loosing)				Post-crisis(tighter)			
	2006–2007				2008–2010				2011–2012			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
HBO	-0.007**				0.005				-0.027**			
	(2.02)				(0.62)				(-2.52)			
HLBO1		-0.018***				-0.004				-0.035***		
		(2.82)				(-0.43)				(-2.77)		
HLBO2			-0.017**				-0.015				-0.015**	
			(-2.23)				(-1.31)				(-2.05)	
NHLBO				-0.012**				0.001				-0.021**
				(2.37)				(0.14)				(-2.28)
Size	-0.001	0.000	0.000	-0.000	-0.008**	-0.007**	0.010*	-0.007**	-0.006	-0.008*	0.009	-0.007*
	(-0.20)	(0.14)	(0.03)	(-0.04)	(-2.40)	(-2.28)	(1.71)	(-2.32)	(-1.48)	(-1.76)	(1.36)	(-1.73)
SaleGr	0.015*	0.014	0.025	0.014	0.001	0.000	0.012	0.000	0.015	0.015	0.005	0.016
	(1.66)	(1.63)	(1.28)	(1.63)	(0.07)	(0.03)	(0.73)	(0.05)	(1.32)	(1.20)	(0.24)	(1.37)
NetWC	-0.153***	-0.154***	-0.223***	-0.152***	-0.266***	-0.267***	-0.270***	-0.267***	-0.231***	-0.243***	-0.200***	-0.231***
	(-8.34)	(-8.37)	(-5.66)	(-8.27)	(-15.09)	(-15.13)	(-9.33)	(-15.09)	(-10.15)	(-10.13)	(-5.93)	(-10.17)
CF	0.388***	0.385***	0.502***	0.384***	0.230***	0.230***	0.361***	0.230***	0.420***	0.421***	0.426***	0.420***
	(9.71)	(9.62)	(6.22)	(9.61)	(6.51)	(6.51)	(5.95)	(6.51)	(9.17)	(8.84)	(5.31)	(9.18)
CFVol	0.728***	0.725***	0.786***	0.729***	0.623***	0.621***	0.581***	0.622***	0.350***	0.351***	0.250***	0.349***
	(13.36)	(13.27)	(6.17)	(13.36)	(15.10)	(15.04)	(7.35)	(15.06)	(7.89)	(7.61)	(3.03)	(7.87)

Lev	-0.382*** (-15.47)	-0.384*** (-15.54)	-0.337*** (-6.60)	-0.383*** (-15.47)	-0.474*** (-19.57)	-0.475*** (-19.64)	-0.338*** (-7.75)	-0.475*** (-19.60)	-0.687*** (-22.11)	-0.708*** (-21.79)	-0.447*** (-9.16)	-0.687*** (-22.09)
CapExp	-0.000 (-0.00)	-0.010 (-0.19)	-0.317** (-2.55)	-0.007 (-0.13)	0.198*** (3.82)	0.195*** (3.77)	-0.065 (-0.70)	0.196*** (3.79)	0.127** (2.07)	0.133** (2.08)	-0.302*** (-2.74)	0.131** (2.14)
Payout	1.810*** (10.09)	1.814*** (10.09)	1.875*** (5.47)	1.813*** (10.10)	3.822*** (22.35)	3.814*** (22.33)	3.171*** (8.85)	3.817*** (22.35)	4.133*** (20.10)	4.176*** (19.66)	2.353*** (5.51)	4.140*** (20.14)
Dual	0.002 (0.22)	0.002 (0.21)	-0.016 (-0.78)	0.002 (0.24)	0.031*** (3.44)	0.031*** (3.44)	-0.023 (-1.40)	0.031*** (3.44)	0.043*** (4.21)	0.045*** (4.26)	-0.014 (-0.78)	0.043*** (4.22)
Outin	-0.093 (-1.13)	-0.087 (-1.06)	-0.332** (-2.00)	-0.088 (-1.07)	0.024 (0.34)	0.021 (0.30)	-0.297** (-2.44)	0.024 (0.33)	0.095 (1.12)	0.108 (1.20)	-0.092 (-0.74)	0.094 (1.11)
State	-0.005 (-0.63)	-0.004 (-0.60)	0.003 (0.21)	-0.004 (-0.59)	-0.007 (-0.97)	-0.007 (-0.92)	0.000 (0.03)	-0.007 (-0.95)	-0.018* (-1.91)	-0.019* (-1.86)	-0.018 (-1.26)	-0.019* (-1.95)
Cons	0.362*** (5.73)	0.345*** (5.49)	0.302** (2.19)	0.353*** (5.61)	0.376*** (6.70)	0.372*** (6.66)	0.228** (2.32)	0.372*** (6.67)	0.546*** (7.62)	0.576*** (7.52)	0.309*** (2.80)	0.561*** (7.87)
N	2632	2398	604	2632	4646	4264	1028	4646	4296	4009	862	4296
R ² _a	0.324	0.309	0.387	0.323	0.409	0.414	0.360	0.409	0.465	0.471	0.305	0.464

Note. $HBO=1$ if holding bank ownership, otherwise, $HBO=0$, $HLBO1=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), otherwise, $HLBO1=0$, $HLBO2=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), $HLBO2=0$ if the firms hold other province's bank ownership, $NLBO$ is the number of holding local province bank ownership. $Cash$ is the ratio of cash to net total asset (total asset subtract cash), $Size$ is the natural logarithm of real total asset deflated by CPI, $SaleGr$ is the sale growth rate, $NetWC$ is the net working capital without cash scaled by net total asset, CF is the measured cash flow arising from the operation, $CFVol$ is the cash flow volatility using the standard deviation of cash flow over the previous two year, Lev is the represents the financial leverage, $CapExp$ is capital expenditure scaled by net total asset, $Payout$ is cash dividends scaled by net total asset. $Dual=1$ when a firm's CEO also in the position of chairman of the board, otherwise, $Dual=0$. $Outin$ is proportion of independent directors on the board. SOE is indicate variable for state owned enterprises

Table 7. The estimating results for the speed of adjustment

	Base line	HBO	HLBO1	HLBO2	NLBO
	(1)	(2)	(3)	(4)	(5)
Cash _{it} *-Cash _{it-1}	0.387*** (58.21)	0.397*** (54.99)	0.397*** (56.70)	0.404*** (17.36)	0.397*** (56.66)
HBO*(Cash _{it} *-Cash _{it-1})		-0.065*** (-3.48)			
HBO		0.007* (1.80)			
HLBO1*(Cash _{it} *-Cash _{it-1})			-0.099*** (-4.40)		
HLBO1			0.005 (1.03)		
HLBO2*(Cash _{it} *-Cash _{it-1})				-0.101*** (-3.53)	
HLBO2				-0.009* (-1.65)	
NLBO*(Cash _{it} *-Cash _{it-1})					-0.079*** (-4.27)
NLBO					0.004 (1.05)
Cons	0.008 (0.68)	0.007 (0.58)	0.017 (1.32)	0.016 (0.75)	0.008 (0.63)
N	9096	9096	8346	2082	9096
R ² _a	0.294	0.295	0.297	0.247	0.296

Note. $HBO=1$ if holding bank ownership, otherwise, $HBO=0$, $HLBO1=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), otherwise, $HLBO1=0$, $HLBO2=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), $HLBO2=0$ if the firms hold other province's bank ownership, $NLBO$ is the number of holding local province bank ownership.

Table 7 presents the result for the speed of adjustment(SOA) cross groups. In column 1, we report the results of SOA using full sample. The SOA is significantly positive 0.387(t statistics 58.21). Column 2 shows the result of holding bank ownership's impact on SOA, the coefficient on $(Cash_{i,t}-Cash_{i,t-1})$ is significant positive at 1% level, the coefficient on $(HBO*(Cash_{i,t}-Cash_{i,t-1}))$ is significant negative at 1% level(the coefficient is -0.065, t statistics=-3.48). These results indicate that Non-*HBO* firms adjust the level of cash holding more rapidly toward the target level of cash holding than *HBO* firms. The similar results are showed in column 3–5. In column 4, the result indicates that compare with holding other province bank ownership, the firms with holding local province bank ownership adjust their level of cash holding slowly. The column 5 indicates that the more numbers if local province bank held by firms, the slower speed of adjustment. In a word, stronger bank relationship, slower SOA.

To further study the impact of monetary policy on the speed of adjustment for *HBO* (*HLBOs*) companies and Non-*HBO* (*HLBOs*) companies, if the cost of external financing changes, what's the different effect on SOA for *HBO* companies and non-*HBO* companies? Column 1 and 13 provide these results in Table 8. From column 1-4, we can see that the coefficients on $(HBO*(Cash_{i,t}-Cash_{i,t-1}))$ and $(HLBOs*(Cash_{i,t}-Cash_{i,t-1}))$ are significant and negative at 1% level, the result indicates that the SOA for *HBO* (*HLBO*) companies and Non-*HBO* (Non-*HLBO*) companies is difference when monetary policy is tighter during 2006–2007, While the coefficients become smaller from -0.145 to -0.238 in column 1-3, which indicate that the *HLBOs* firms adjust their cash holding more slowly than the one for *HBO* firms, when the cost of external financing rise. In column 5-8, the similar results can be seen during the loosing episode of monetary policy (2008–2010). When the monetary policy becomes tighter again, the results show that the coefficient on $(HBOs*(Cash_{i,t}-Cash_{i,t-1}))$ are all negative and significant at 5% level in column 10–13. So, the strength of bank relationship can influence the SOA. These results are consistent with H2 and H4.

4.3 The Sensitivity Analysis of Investment on Cash

Why do the non-*HLBO* firms adjust their cash holding more quickly than the one for *HLBO* firms? Is it debt capacity and financial constrain? In classic investment theory, corporate investments have nothing about the financing of the investment, but based on the availability of investment opportunities. However, in real world, corporate face tighter financing constraints to depend more on internal cash flows and thus be more investment–cash flow sensitive than less constrained firms. Following the seminal paper by Fazzari et al. (1988), We test our third hypothesis on the investment-cash sensitivity with division of our sample into *HBOs* and non-*HBOs* firms, the basic regression equation as bellow:

$$Inv_{i,t} = \beta_0 + \beta_1 Cash_{i,t-1} + \beta_2 SaleGr_{i,t-1} + \beta_3 CF_{i,t-1} + \text{Year Dummies} + \text{Industry Dummies} + \varepsilon_{i,t-1} \quad (5)$$

Here, *Inv* is the investment expenditures, the sales growth rate expressed as *SaleGr*, *CF* denotes the cash flow, *Cash* is the ratio of cash to net total asset (total asset subtract cash). To test costly external finance hypothesis, we expect that the coefficient on *Cash* is smaller for *HBOs* firms than for non-*HBOs* firms. According to Stein (2003) and Sheu et al. (2012), We take the costly external finance (holding bank ownership) into account, the equation become bellow:

$$Inv_{i,t} = \beta_0 + \beta_1 Cash_{i,t-1} + \beta_2 SaleGr_{i,t-1} + \beta_3 CF_{i,t-1} + \beta_4 HBOs + \beta_5 HBOs * Cash_{i,t-1} + \text{Year Dummies} + \text{Industry Dummies} + \varepsilon_{i,t-1} \quad (6)$$

Here, *HBOs* are these variables, *HBO*, *HLBO1*, *BLBO2*, *NLBO*. We include the interaction of *HBOs* and *Cash*, in the model. If the coefficient on *HBOs*Cash* is significantly less than zero, then it indicates that cash could be used to increase investment for non-*HBO* firms (underinvestment).

Table 10 provides the result for the sensitivity analysis of investment on cash. Column 1 is the baseline model, the results show that investment expenditures are significantly positive correlation with *SaleGr*, *CF*, *Cash*. In column 2–13, we include the *HBO* and the interaction *HBO*Cash* into model for different monetary policy episode. From the results, we can see that the coefficient on *HLBOs* are significantly positive at 10% level when monetary policy is tighter, and the coefficient (absolute value) on *HLBOs* during tighter episode are bigger than that in loosing episode, indicate that holding local bank ownership can increase corporate investment, especially in tighter episode. In line with our expectation, the *HLBOs*Cash* is significantly negative at 5% level (in addition to the coefficient on *NLBO*Cash*). Further more, the absolute coefficient on *HLBOs* in tighter episode are bigger than that in loosing episode. The sensitivity analysis of investment on cash for *HLBO* firms is significantly less than that for non *HLBO* firms. These results are largely in agreement with the first hypothesis, in that the dependence of cash on capital expenditure is stronger for Non-*HLBO* than for *HLBO* firms. During the tighter episode of monetary, owing to the external financial cost rise, the sensitivity analysis of investment on cash will significantly increase.

5. Robust Test

In this section, we conduct robust analysis of our results on the impact of bank relationship on cash holding. Until now, our analysis has used pooled OLS regression controlling year and industry effects, so, the firms-specific fixed effects may affect the robust of our result. Therefore, first, we re-estimate cash model using panel fixed effect regression in Table 11. The results in Table 11 are similar with Table 5 for 3 sample periods (pre-crisis, during-crisis, post-crisis). These results confirm the robustness of our earlier results. The strength of bank relationship can significantly affect the level of cash holding during tighter episode of monetary policy, however, haven't insignificantly effect during loosing episode of monetary policy.

Second, we also adopt the matching method to examine whether the *HBO* (*HLBO*) firms tend to hold less cash.

Table 8. Monetary policy and the speed of adjustment

	Pre-crisis (tighter)				During-crisis(Loosing)				Post-crisis(tighter)			
	2006-2007				2008-2010				2011-2012			
	HBO	HLBO1	HLBO2	NLBO	HBO	HLBO1	HLBO2	NLBO	HBO	HLBO1	HLBO2	NLBO
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(10)	(11)	(12)	(13)
Cash _{it} *-Cash _{it-1}	0.399*** (16.14)	0.400*** (15.81)	0.407*** (6.71)	0.395*** (16.93)	0.337*** (27.95)	0.337*** (27.64)	0.445*** (12.06)	0.342*** (29.55)	0.428*** (42.57)	0.428*** (41.99)	0.361*** (10.29)	0.426*** (43.35)
HBO*(Cash _{it} *-Cash _{it-1})					-0.011 (-0.41)				-0.072** (-2.49)			
HBO					0.007 (1.21)				0.009 (1.36)			
HLBO1*(Cash _{it} *-Cash _{it-1})		-0.221*** (-3.45)				-0.066** (-2.01)				-0.075** (-2.11)		
HLBO1		-0.011 (-0.89)				0.008 (1.17)				0.003 (0.36)		
HLBO2*(Cash _{it} *-Cash _{it-1})			-0.238*** (-3.15)				-0.162*** (-3.62)				-0.002** (-2.05)	
HLBO2			-0.008 (-0.64)				-0.002 (-0.22)				-0.021 (-1.22)	
NLBO*(Cash _{it} *-Cash _{it-1})				-0.167*** (-3.17)				-0.055* (-1.94)				-0.065** (-2.31)
NLBO				0.000 (0.03)				0.004 (0.79)				0.003 (0.48)
Cons	0.077*** (2.68)	0.078*** (2.65)	-0.002 (-0.04)	0.076*** (2.63)	0.015 (0.88)	0.014 (0.84)	0.009 (0.27)	0.015 (0.91)	-0.038* (-1.94)	-0.030 (-1.46)	-0.002 (-0.06)	-0.037* (-1.87)
N	1241	1120	298	1241	4214	3855	981	4214	3641	3371	803	3641
R ² _a	0.215	0.212	0.169	0.217	0.190	0.184	0.214	0.190	0.362	0.365	0.286	0.361

Table 9. The regression of investment on cash sensitivity

	Base-line		Pre-crisis (tighter)		During-crisis(Loosing)				Post-crisis(tighter)				
			2006-2007		2008-2010				2011-2012				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
SaleGr _{it-1}	0.040*** (16.72)	0.035*** (3.48)	0.038*** (3.57)	-0.012 (-0.58)	0.028*** (2.96)	0.024*** (5.50)	0.024*** (5.33)	0.005 (0.37)	0.024*** (5.46)	0.053*** (16.27)	0.054*** (16.11)	0.019 (1.58)	0.052*** (16.04)
CF _{it-1}	0.013*** (7.67)	0.010** (2.27)	0.010** (2.07)	-0.002 (-0.23)	0.010** (2.24)	0.013*** (5.29)	0.012*** (4.92)	0.017*** (2.96)	0.013*** (5.31)	0.014*** (4.87)	0.015*** (4.91)	0.009 (1.46)	0.014*** (4.88)
Cash _{it-1}	0.096*** (14.46)	0.139*** (7.00)	0.148*** (7.03)	0.143*** (3.26)	0.139*** (7.00)	0.111*** (11.46)	0.115*** (11.36)	0.125*** (6.12)	0.111*** (11.46)	0.085*** (8.13)	0.080*** (7.35)	0.121*** (5.52)	0.084*** (8.03)
HBO		0.009 (1.64)				0.002 (0.55)			0.007* (1.92)				
HBO *Cash		-0.058*** (-3.12)				-0.022** (-2.15)			-0.066*** (-5.91)				
HLBO1			0.015**				0.004				0.007*		

			(2.15)			(1.01)			(1.70)				
HLBO1 *Cash			-0.061***			-0.027**			-0.061***				
			(-2.59)			(-2.22)			(-4.40)				
HLBO2			0.022**			0.005			0.014**				
			(2.40)			(1.07)			(2.47)				
HLBO2 *Cash			-0.031			-0.011			-0.029*				
			(-1.11)			(-0.71)			(-1.73)				
NLBO			0.013**			0.003			0.006*				
			(2.38)			(1.04)			(1.73)				
NLBO *Cash			-0.046***			-0.021**			-0.047***				
			(-2.71)			(-2.07)			(-4.44)				
Cons	0.057***	0.037***	0.035***	0.011	0.037***	0.053***	0.054***	0.069***	0.053***	0.062***	0.061***	0.069***	0.062***
	(11.58)	(3.06)	(2.89)	(0.36)	(3.08)	(7.74)	(7.66)	(4.30)	(7.70)	(8.07)	(7.76)	(4.95)	(8.02)
N	9096	1241	1120	298	1241	4214	3855	981	4214	3641	3371	803	3641
R ² _a	0.167	0.155	0.160	0.101	0.154	0.151	0.149	0.128	0.151	0.197	0.194	0.130	0.192

Note. $HBO=1$ if holding bank ownership, otherwise, $HBO=0$, $HLBO1=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), otherwise, $HLBO1=0$, $HLBO2=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), $HLBO2=0$ if the firms hold other province's bank ownership, $NLBO$ is the number of holding local province bank ownership, $Cash$ is the ratio of cash to net total asset (total asset subtract cash), $SaleGr$ is the sale growth rate, CF is the measured cash flow arising from the operation.

Table 10. Panel fixed-effects regression

	Pre-crisis (tighter)				during-crisis(Loosing)				Post-crisis(tighter)			
	2006-2007				2008-2010				2011-2012			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
HBO	-0.016*				-0.009				-0.037***			
	(-1.82)				(-0.86)				(-3.14)			
HBO1		-0.007**				-0.010				-0.046***		
		(-2.01)				(-0.75)				(-3.26)		
HBO2			-0.021*			0.003					-0.016**	
			(-1.82)			(0.26)					(-2.12)	
NLBO				-0.016**			-0.004					-0.032***
				(-2.43)			(-0.36)					(-2.90)
Size	0.008**	0.009**	0.005	0.008**	0.002	0.001	0.027***	0.001	0.001	-0.001	0.010	-0.000
	(1.96)	(2.15)	(0.64)	(2.01)	(0.42)	(0.33)	(3.65)	(0.33)	(0.16)	(-0.22)	(1.29)	(-0.07)
SaleGr	0.004	0.004	0.021	0.004	-0.003	-0.003	0.001	-0.003	0.001	0.000	0.016	0.001
	(0.58)	(0.55)	(1.55)	(0.55)	(-0.52)	(-0.50)	(0.07)	(-0.50)	(0.14)	(0.02)	(1.29)	(0.17)
NetWC	-0.228***	-0.229***	-0.224***	-0.227***	-0.312***	-0.312***	-0.348***	-0.312***	-0.284***	-0.283***	-0.284***	-0.286***
	(-11.65)	(-11.68)	(-5.32)	(-11.61)	(-16.34)	(-16.33)	(-10.61)	(-16.33)	(-11.74)	(-11.10)	(-7.91)	(-11.79)
CF	0.356***	0.354***	0.360***	0.354***	0.247***	0.247***	0.327***	0.247***	0.328***	0.322***	0.379***	0.328***
	(11.00)	(10.95)	(5.95)	(10.96)	(9.18)	(9.19)	(7.26)	(9.19)	(9.50)	(8.89)	(6.38)	(9.48)
CFVol	0.526***	0.524***	0.645***	0.526***	0.380***	0.380***	0.269***	0.380***	0.237***	0.234***	0.187**	0.236***
	(10.24)	(10.20)	(5.62)	(10.24)	(10.71)	(10.72)	(4.14)	(10.72)	(5.05)	(4.78)	(2.29)	(5.01)
Lev	-0.469***	-0.470***	-0.369***	-0.469***	-0.578***	-0.577***	-0.432***	-0.577***	-0.802***	-0.808***	-0.498***	-0.802***
	(-17.76)	(-17.80)	(-6.89)	(-17.75)	(-20.79)	(-20.78)	(-8.94)	(-20.78)	(-23.78)	(-23.01)	(-9.27)	(-23.77)
CapExp	-0.038	-0.042	-0.158	-0.039	0.276***	0.277***	-0.027	0.277***	0.009	0.004	-0.125	0.012
	(-0.76)	(-0.84)	(-1.54)	(-0.79)	(6.05)	(6.06)	(-0.34)	(6.07)	(0.16)	(0.08)	(-1.24)	(0.22)
Payout	1.441***	1.441***	1.477***	1.439***	2.884***	2.889***	2.609***	2.889***	2.599***	2.700***	0.927***	2.604***
	(8.23)	(8.23)	(4.56)	(8.22)	(17.27)	(17.32)	(7.33)	(17.31)	(17.09)	(17.00)	(3.16)	(17.13)
Dual	0.008	0.008	-0.039*	0.008	0.041***	0.041***	0.009	0.041***	0.053***	0.055***	0.004	0.053***
	(0.76)	(0.76)	(-1.89)	(0.78)	(4.36)	(4.36)	(0.51)	(4.37)	(4.93)	(4.86)	(0.21)	(4.94)
Outin	-0.018	-0.017	-0.173	-0.015	-0.009	-0.009	-0.103	-0.008	-0.011	-0.002	-0.182	-0.011
	(-0.22)	(-0.21)	(-1.11)	(-0.19)	(-0.12)	(-0.12)	(-0.82)	(-0.11)	(-0.12)	(-0.02)	(-1.47)	(-0.12)
State	-0.020**	-0.020**	-0.004	-0.020**	-0.014	-0.014	-0.012	-0.014	-0.031***	-0.031**	-0.022	-0.032***
	(-2.29)	(-2.27)	(-0.23)	(-2.28)	(-1.61)	(-1.61)	(-0.83)	(-1.63)	(-2.71)	(-2.56)	(-1.36)	(-2.75)

cons	0.275*** (3.72)	0.265*** (3.59)	0.186 (1.20)	0.272*** (3.67)	0.384*** (4.81)	0.390*** (4.90)	0.001 (1.35)	0.390*** (4.89)	0.569*** (6.39)	0.604*** (6.40)	0.327** (2.44)	0.588*** (6.63)
N	2632	2398	604	2632	4646	4264	1028	4646	4296	4009	862	4296
R ² _a	0.220	0.234	0.161	0.221	0.181	0.162	0.302	0.181	0.207	0.203	0.247	0.207

Note. $HBO=1$ if holding bank ownership, otherwise, $HBO=0$, $HLBO1=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), otherwise, $HLBO1=0$, $HLBO2=1$ if holding local bank ownership (the headquarters for bank and firm are in the same province), $HLBO2=0$ if the firms hold other province's bank ownership, $NLBO$ is the number of holding local province bank ownership.

Firms that hold (local) bank ownership serve as the treated samples, whereas firms without holding (local) bank ownership are the control samples. *Size*, *SaleGr*, *NetWC*, *Cflow*, *CFVol*, *LEV*, *CapExp*, *Payout* are the matching characteristic variables for the same industries and operation years. The propensity score-matching model is used to select the controlled variable. See Dehejia et al. (2002) for further details concerning the matching method and for its applications. The nearest matching method is also used. 0 presents the estimated results based on the matched pairs. We find that the results are basically consistent with the one in Table 5.

Table 11. Propensity score matching and cash holding

	(1)	(2)	(3)	(4)
HBO	-0.006 (-1.14)			
HLBO1		-0.017** (-2.38)		
HLBO2			-0.015* (-1.96)	
NLBO				-0.007 (-1.23)
Size	-0.001 (-0.44)	-0.005 (-1.23)	-0.005 (-1.12)	-0.005 (-1.17)
SaleGr	0.024*** (2.92)	0.041*** (3.75)	0.041*** (3.52)	0.042*** (3.79)
NetWC	-0.238*** (-15.31)	-0.232*** (-11.65)	-0.234*** (-11.01)	-0.230*** (-11.55)
CF	0.390*** (11.66)	0.418*** (9.95)	0.401*** (8.98)	0.418*** (9.94)
CFVol	0.504*** (12.98)	0.422*** (8.43)	0.414*** (7.82)	0.424*** (8.46)
Lev	-0.417*** (-19.36)	-0.426*** (-15.58)	-0.438*** (-15.09)	-0.425*** (-15.53)
CapExp	-0.136*** (-2.86)	-0.162*** (-2.74)	-0.161*** (-2.59)	-0.159*** (-2.68)
Payout	3.217*** (20.14)	3.275*** (16.62)	3.311*** (16.03)	3.288*** (16.68)
Dual	0.032*** (3.90)	0.032*** (3.13)	0.026** (2.42)	0.032*** (3.11)
Outin	0.002 (0.04)	-0.078 (-0.95)	-0.072 (-0.82)	-0.072 (-0.88)
State	-0.006 (-0.99)	0.000 (0.03)	-0.001 (-0.13)	-0.000 (-0.04)
Cons	0.353*** (6.94)	0.441*** (6.61)	0.442*** (6.25)	0.431*** (6.47)
N	4999	3180	2968	3180
R ² _a	0.363	0.368	0.364	0.367

Note. *Size*, *SaleGr*, *NetWC*, *Cflow*, *CFVol*, *LEV*, *CapExp*, *Payout* are the matching characteristic variables for the same industries and operation years.

6. Conclusion

In this paper, we focus on the link among strength of the bank firm relationship, monetary policy shock and corporate cash holding. We argue that holding local bank ownership can reduce asymmetric information, build good relationship and received preferential treatments in terms of easy access to bank loans and a lower cost of external funds. A stronger bank-firm relationship has a favorable effect on the corporate cash holding and financial constrain. Using a panel data of Chinese non-financial firms over 2006–2012 periods. We test whether the cash holding has distinct implications for holding local bank relationship and distance bank relationship firms. Moreover, how firms with stronger bank relationship change their cash holdings in response to the change in monetary policy. Furthermore, we also examine the difference of SOA and the investment sensitivity on cash between *HLBO* and non-*HLBO* firms due to costly adjustment.

We consider two facets of the strength for bank-firm relationship: proximity of firm and bank (holding local bank ownership) and the bank number of holding local bank ownership. Our results support that firms with stronger bank relationship hold less cash, make slower adjustments for their cash holding and Small investment sensitivity of cash than will firms with weak bank relationship, especially in response to monetary policy shocks and cash shortage. However, there are weak evidence that *HBO* companies hold less cash than non *HBO* companies. These findings are consistent with expectations and trade off theory, namely by the precautionary motive for cash holding. Our findings also provide insights into our understanding of cash holding decisions in an emerging market.

References

- Alessandrini, P., Presbitero, A. F., & Zazzaro, A. (2010). Bank size or distance: what hampers innovation adoption by SMEs? *Journal of Economic Geography*, 10(6), 845–881. <http://dx.doi.org/10.1093/jeg/lbp055>
- Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of Business*, 68(3), 351.
- Bigelli, M., & Sánchez-Vidal, J. (2012). Cash holdings in private firms. *Journal of Banking & Finance*, 36(1), 26–35. <http://dx.doi.org/10.1016/j.jbankfin.2011.06.004>
- Brandt, L., & Li, H. (2003). Bank discrimination in transition economies: ideology, information, or incentives? *Journal of Comparative Economics*, 31(3), 387–413. [http://dx.doi.org/10.1016/S0147-5967\(03\)00080-5](http://dx.doi.org/10.1016/S0147-5967(03)00080-5)
- Chhaochharia, V., Kumar, A., & Niessen-Ruenzi, A. (2012). Local investors and corporate governance. *Journal of Accounting and Economics*, 54(1), 42–67. <http://dx.doi.org/10.1016/j.jacceco.2012.03.002>
- Cotugno, M., Monferrà, S., & Sampagnaro, G. (2013). Relationship lending, hierarchical distance and credit tightening: Evidence from the financial crisis. *Journal of Banking & Finance*, 37(5), 1372–1385. <http://dx.doi.org/10.1016/j.jbankfin.2012.07.026>
- Dass, N., & Massa, M. (2011). The impact of a strong bank-firm relationship on the borrowing firm. *Review of Financial Studies*, 24(4), 1204–1260. <http://dx.doi.org/10.1093/rfs/hhp074>
- Degryse, H., & Ongena, S. (2005). Distance, lending relationships, and competition. *The Journal of Finance*, 60(1), 231–266. <http://dx.doi.org/10.1111/j.1540-6261.2005.00729.x>
- Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics*, 84(1), 151–161. <http://dx.doi.org/10.1162/003465302317331982>
- Denis, D. J., & Sibilkov, V. (2010). Financial constraints, investment, and the value of cash holdings. *Review of Financial Studies*, 23(1), 247–269. <http://dx.doi.org/10.1093/rfs/hhp031>
- Dittmar, A., & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. *Journal of Financial Economics*, 83(3), 599–634. <http://dx.doi.org/10.1016/j.jfineco.2005.12.006>
- Duchin, R. (2010). Cash holdings and corporate diversification. *The Journal of Finance*, 65(3), 955–992. <http://dx.doi.org/10.1111/j.1540-6261.2010.01558.x>
- Elliehausen, G. E., & Wolken, J. D. (1990). Banking markets and the use of financial services by small and medium-sized businesses. *Fed. Res. Bull.*, 76, 801.
- Espenlaub, S., Khurshed, A., & Sitthipongpanich, T. (2012). Bank connections, corporate investment and crisis. *Journal of Banking & Finance*, 36(5), 1336–1353. <http://dx.doi.org/10.1016/j.jbankfin.2011.11.024>
- Fazzari, S., Hubbard, R. G., & Petersen, B. C. (1988). Financing constraints and corporate investment.
- Ferri, G. (2009). Are new tigers supplanting old mammoths in China's banking system? Evidence from a sample

- of city commercial banks. *Journal of Banking & Finance*, 33(1), 131–140. <http://dx.doi.org/10.1016/j.jbankfin.2007.06.013>
- Gao, H., Harford, J., & Li, K. (2013). Determinants of corporate cash policy: Insights from private firms. *Journal of Financial Economics*, 109(3), 623–639. <http://dx.doi.org/10.1016/j.jfineco.2013.04.008>
- Gaspar, J. M., & Massa, M. (2007). Local ownership as private information: Evidence on the monitoring-liquidity trade-off. *Journal of Financial Economics*, 83(3), 751–792. <http://dx.doi.org/10.1016/j.jfineco.2005.10.010>
- Han, S., & Qiu, J. (2007). Corporate precautionary cash holdings. *Journal of Corporate Finance*, 13(1), 43–57. <http://dx.doi.org/10.1016/j.jcorpfin.2006.05.002>
- Harford, J., Mansi, S. A., & Maxwell, W. F. (2008). Corporate governance and firm cash holdings in the US. *Journal of Financial Economics*, 87(3), 535–555. <http://dx.doi.org/10.1016/j.jfineco.2007.04.002>
- Hauswald, R., & Marquez, R. (2003). Information technology and financial services competition. *Review of Financial Studies*, 16(3), 921–948. <http://dx.doi.org/10.1093/rfs/hhg017>
- John, K., Knyazeva, A., & Knyazeva, D. (2011). Does geography matter? Firm location and corporate payout policy. *Journal of Financial Economics*, 101(3), 533–551. <http://dx.doi.org/10.1016/j.jfineco.2011.03.014>
- Knyazeva, A., & Knyazeva, D. (2012). Does being your bank's neighbor matter? *Journal of Banking & Finance*, 36(4), 1194–1209. <http://dx.doi.org/10.1016/j.jbankfin.2011.11.011>
- Keynes, J. M. (2006). *General theory of employment, interest and money*. Atlantic Publishers & Dist.
- Kim, C. S., Mauer, D. C., & Sherman, A. E. (1998). The determinants of corporate liquidity: Theory and evidence. *Journal of Financial and Quantitative Analysis*, 33(3), 335–359.
- Kutsuna, K., Smith, J. K., & Smith, R. L. (2007). Banking relationships and access to equity capital markets: Evidence from Japan's main bank system. *Journal of Banking & Finance*, 31(2), 335–360. <http://dx.doi.org/10.1016/j.jbankfin.2006.04.007>
- Luo, Q., & Hachiya, T. (2005). Bank relations, cash holdings, and firm value: evidence from Japan. *Management Research News*, 28(4), 61–73. <http://dx.doi.org/10.1108/01409170510784805>
- Lu, Z., Zhu, J., & Zhang, W. (2012). Bank discrimination, holding bank ownership, and economic consequences: Evidence from China. *Journal of Banking & Finance*, 36(2), 341–354. <http://dx.doi.org/10.1016/j.jbankfin.2011.07.012>
- Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52(1), 3–46. [http://dx.doi.org/10.1016/S0304-405X\(99\)00003-3](http://dx.doi.org/10.1016/S0304-405X(99)00003-3)
- Ozkan, A., & Ozkan, N. (2004). Corporate cash holdings: An empirical investigation of UK companies. *Journal of Banking & Finance*, 28(9), 2103–2134. <http://dx.doi.org/10.1016/j.jbankfin.2003.08.003>
- Pinkowitz, L., & Williamson, R. (2001). Bank Power and Cash Holdings: Evidence from Japan. *Review of Financial Studies*, 14(4). <http://dx.doi.org/10.1093/rfs/14.4.1059>
- Rao, B. B., & Kumar, S. (2011). Is the US demand for money unstable? *Applied Financial Economics*, 21(17), 1263–1272. <http://dx.doi.org/10.1080/09603107.2011.568395>
- Sheu, H. J., & Lee, S. Y. (2012). Excess cash holdings and investment: the moderating roles of financial constraints and managerial entrenchment. *Accounting & Finance*, 52(s1), 287–310. <http://dx.doi.org/10.1111/j.1467-629X.2012.00500.x>
- Stein, J. C. (2003). Agency, information and corporate investment. *Handbook of the Economics of Finance*, 1, 111–165.
- Venkiteswaran, V. (2011). Partial adjustment toward optimal cash holding levels. *Review of Financial Economics*, 20(3), 113–121. <http://dx.doi.org/10.1016/j.rfe.2011.06.002>
- Wang, Q., & Pirinsky, C. A. (2010). *Geographic location and corporate finance: a review*. Handbook of Emerging Issues in Corporate Governance.
- Wei, S. J., & Wang, T. (1997). The siamese twins: Do state-owned banks favor state-owned enterprises in China? *China Economic Review*, 8(1), 19–29. [http://dx.doi.org/10.1016/S1043-951X\(97\)90010-9](http://dx.doi.org/10.1016/S1043-951X(97)90010-9)

Notes

Note 1. HLBO: if a non-financial listed company hold the share of listed or unlisted bank and the headquarters for firm and bank are the same province.

Note 2. See website of the People's Bank of China: <http://www.pbc.gov.cn/publish/english/957/index.html>.

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