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the Economics of Interfirm Networks  
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# What Do Cash Holdings Tell Us about Bank-Firm Relationship? The Case of Japanese Firms

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# 1.Motivation of the Study

➤ Firms' cash holdings are affected by bank-firm relationship, especially main bank relationship in Japan.

e.g. Jensen (1986), Dittmar et al. (2003),

Dittmar and Mahrt-Smith (2007),

Pinkowitz et al. (2006)

1. Firms affiliated with main banks can economize cash holdings.

Main banks mitigate asymmetric information between lenders and borrowers, relaxing external financial constraints of affiliated firms and decreasing firms' demand for cash.

2. Sensitivity of cash to its determinants is lower for affiliated firms.

Main banks may cushion external shocks to their affiliated firms by providing bank credit, so that firms do not have to adjust their cash holdings in response to shocks.

3. Affiliated firms are forced to increase cash holdings so that their main banks might exploit monopoly rents.

Main banks can extract monopoly rents from affiliated firms by requiring them to deposit back part of the loans (compensating balance).

e.g. Pinkowitz and Williamson (2001)

➤ The above discussions suggest that we can infer the reality of bank-firm relationship by analyzing the behavior of firms' cash holdings.

## 2. Purpose of the Study

- We uncover the true picture of the bank-firm relationship in Japan by estimating the demand equation of firms' cash holdings, based on a panel data of Japanese firms in the 2000s provided by the Teikoku Databank Data (TDD).

### 3. Features of the Study

➤ We take advantage of the rich information on the bank-firm relationship in the TDD.

In particular,

- 1) We can identify a firm's "main bank," defined as the financial institution with which the firm thinks has close relationship.



2) Financial transactions with main bank,  
such as loans outstanding and time  
deposits, are available.

## 4. Main Findings of the Study

- 1) The firms closely tied with their main banks hold *less* cash.
- 2) The sensitivity of cash to cash flow, net working capital and cash flow volatility is smaller for the firms closely tied with their main banks.

3) The firms closely tied with their main banks pay higher “effective” borrowing rates that reflect monopoly rents.

## 5. Empirical Strategy

- We estimate the standard cash holdings equation of firms by taking bank-firm relationship explicitly into consideration.

## ➤ Three motives for holding cash

### 1) Transaction motive

sign

growth rate of real sales (GSALES)

+

logarithm of real total assets ( $\log(\text{RTW})$ )

-

change in net working capital (NWC)

-

## 2) Precautionary motive

cash flow (CASHFLOW) +

volatility of cash flow (SDCASHFLOW) +

## 3) Agency motive

debt-asset ratio (DEBT) -

To avoid higher cost of external finance, the debt-ridden firm will use cash to redeem debt.

bank debt/total debt (BANK DEBT)

main bank debt/total bank debt (MAINDEP)

Main banks provide liquidity for rainy days.

Main banks may extract monopoly rent by forcing their affiliated firms to increase cash holdings.

- or +

## ➤ Effects of bank-firm relationship on cash holdings

1) When net working capital is scarce, short-term loans will be provided by main banks.

2) Closer bank-firm relationship will mitigate external financial constraints, so that sensitivity of cash to cash flow and its volatility will be lowered.



### 3) Higher debt-asset ratio does not necessarily raise the cost of external finance under close bank-firm relationship

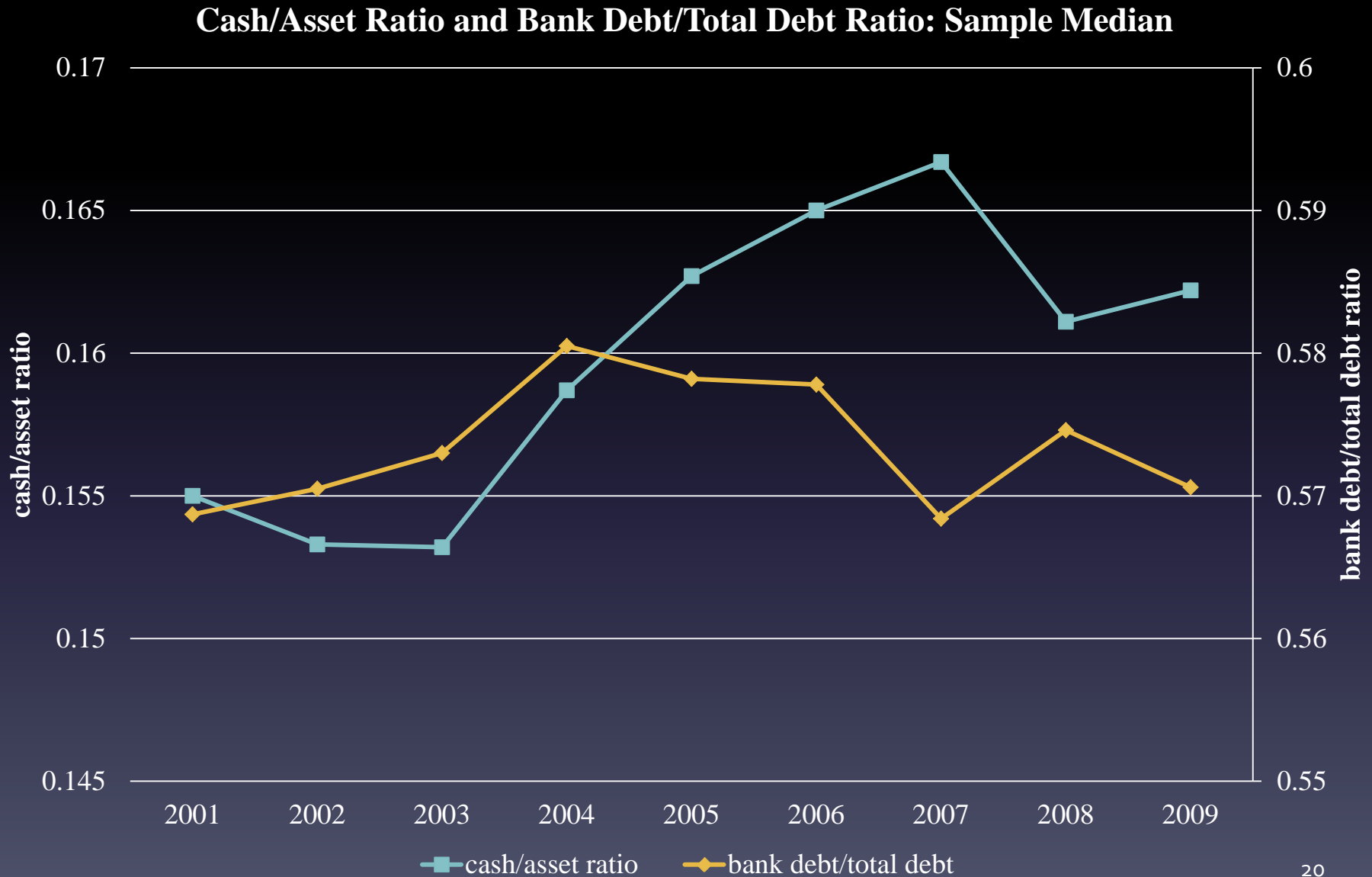
Cash determinants	Bank-firm relationship	
	weak	strong
	<u>sensitivity of cash</u>	
NWC	large	small
CASHFLOW	large	small
SDCASHFLOW	large	small
DEBT	large	small
	<u>level of cash holdings</u>	
BANK DEBT	negative or positive	
MAINDEP		

## 6. Data Set and Descriptive Statistics of Cash Holdings

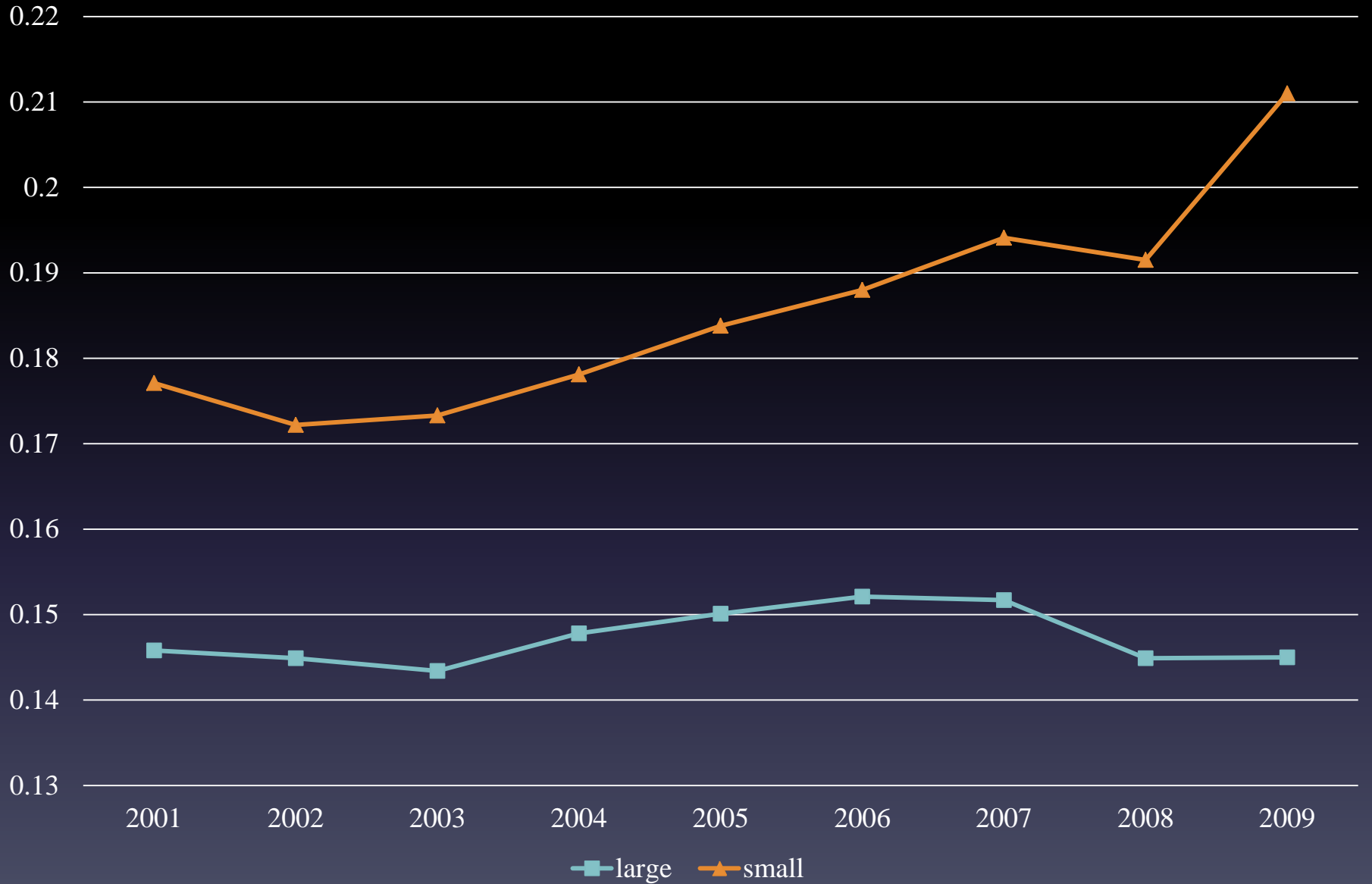
- The TDD is a huge data set of about 400,000 Japanese firms constructed in cooperation with the Teikoku Databank Ltd., the largest credit information provider in Japan.

- The TDD contains rich information of bank-firm relationship as well as firms' basic attributes and financial statements.
- The firms' financial statements are available from 2001-2009 but the detailed information of bank-firm relationship is available only from 2007-2010.

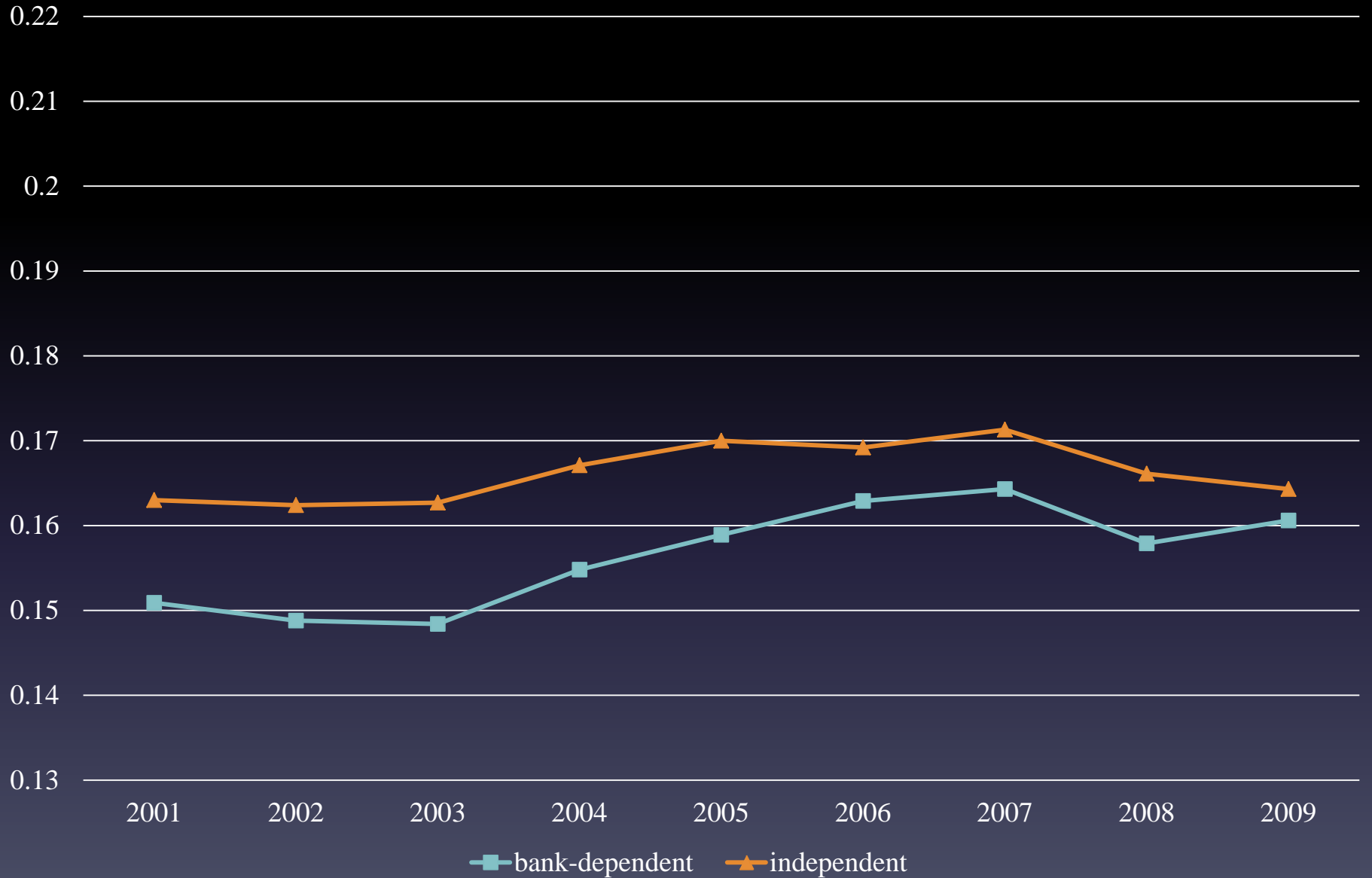
# ➤ Descriptive statistics of cash holdings



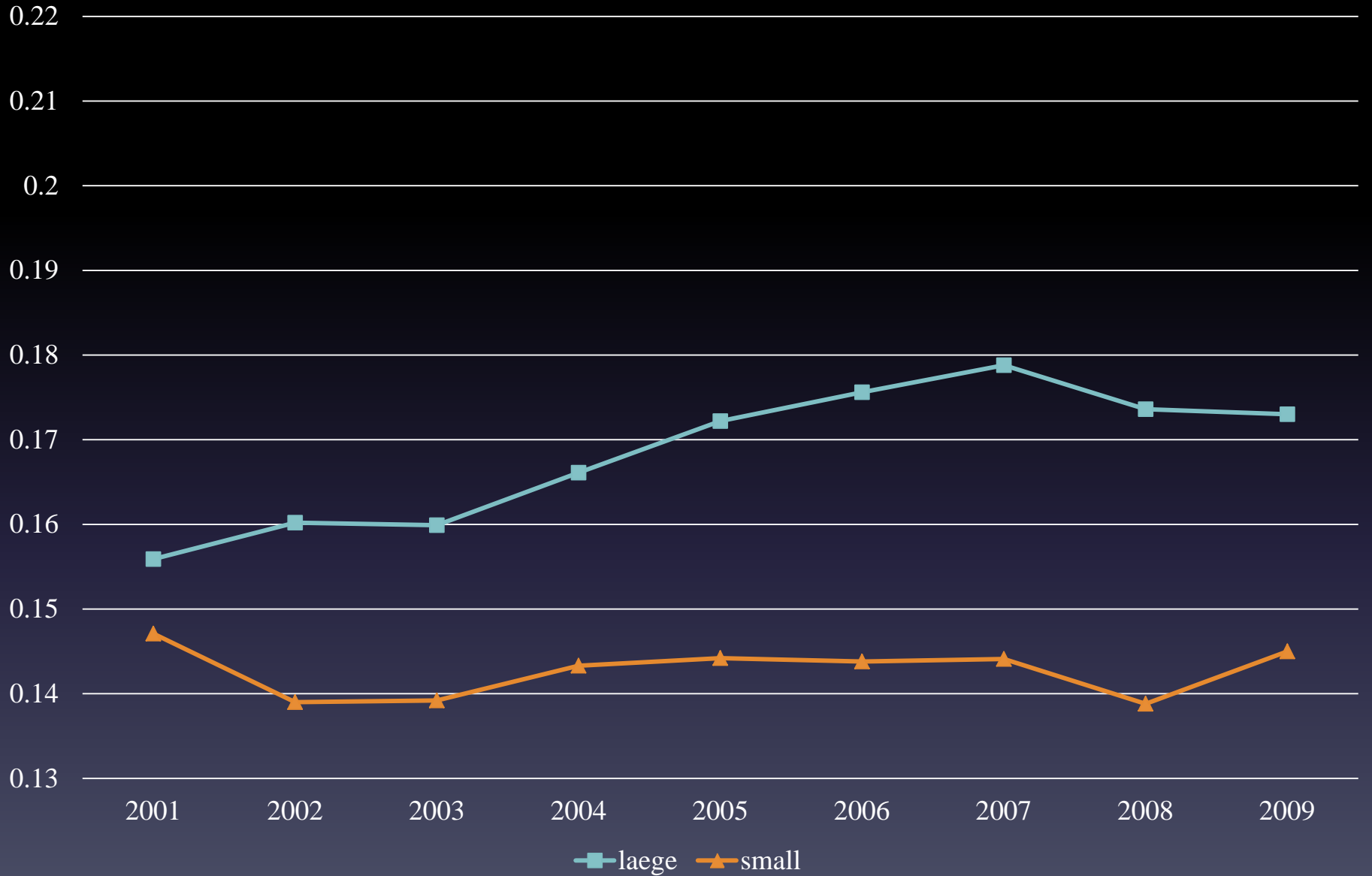
## Cash/Asset Ratio by Firm Size



## Cash/Asset Ratio by Bank Dependence

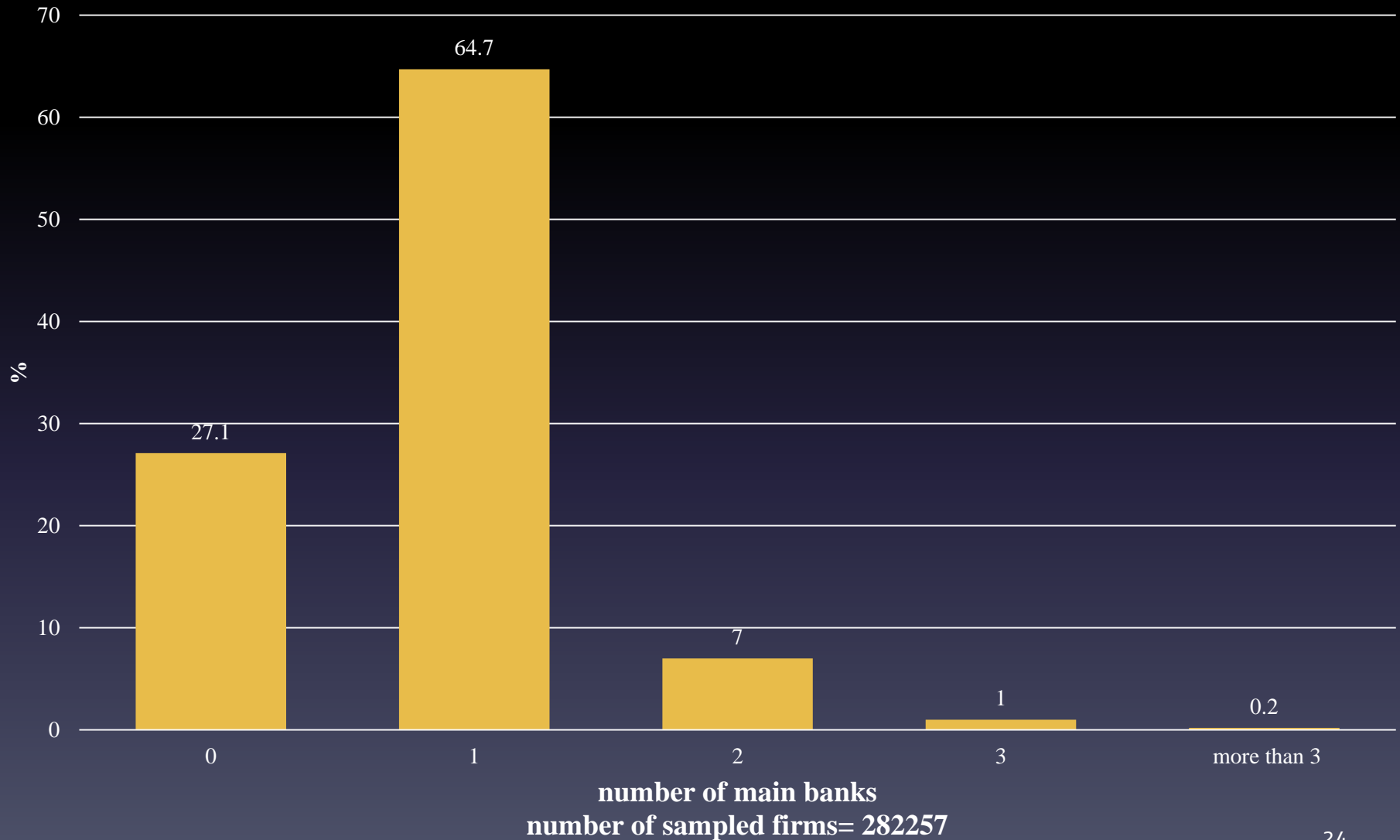


## Cash/Asset Ratio by Cash Flow Volatility



# ➤ Descriptive statistics of main bank relationship

## Histogram of Number of Main Banks: 2008





## ➤ Cash/asset ratio and main bank relationship

Bank-dependence	Number of main banks		
	0	1	more than one
Bank-dependent	0.1725	0.1364	0.1697
Independent	0.1770	0.1578	0.1754

## 7. Estimation Results and Implications

- Dependent variable: A change in cash holdings divided by total assets
- Panel estimation for the whole sample period (2001 – 2009; Table 5)

All the explanatory variables have the coefficient estimates consistent with the theory and they are statistically significant at the 1% level.

## ➤ Sample separation by bank debt/total debt

	Bank-dependent	Independent
NWC	-0.1704***	-0.3734***
CASHFLOW	0.1952***	0.3602***
SDCASHFLOW	0.0394***	0.1088***
DEBT	-0.0990***	-0.1020***
BANK DEBT	-0.0625***	-0.0360***
Adjusted R <sup>2</sup>	0.0791	0.1782
# of observations	47981	48929
Model	fixed	fixed

Cash holdings are less sensitive to net working capital, cash flow and cash flow volatility for bank-dependent firms.

Bank-dependent firms hold less cash.

➤ The above evidence remains essentially intact even if IV estimation is applied to the first-differenced model (Table 6).

➤ Panel estimation for the sub-sample period (2007 – 2009; Table 9 )

Sample separation into six firm groups classified by the number of main banks and the bank debt/total debt ratio

	No main bank		One main bank
	Bank-dependent	Independent	Bank-dependent
NWC	-0.0931	<b>-0.4079***</b>	<b>-0.0848***</b>
CASHFLOW	0.2682	<b>0.5382***</b>	<b>0.1045***</b>
SDCASHFLOW	-0.4211	-0.2217	<b>-0.0696</b>
DEBT	0.1154	<b>-0.3861***</b>	-0.1667***
BANK DEBT	-0.0550	0.0715	-0.0903***
MAINDEP	-----	-----	<b>-0.0284***</b>
Adjusted R <sup>2</sup>	0.0189	0.0850	0.0397
# of observations	1208	1178	9290
Model	fixed effect	fixed effect	fixed effect
	One main bank	More than one main bank	
	Independent	Bank-dependent	Independent
NWC	-0.3355***	-0.1341***	<b>-0.3714***</b>
CASHFLOW	0.3159***	0.2805***	<b>0.4941***</b>
SDCASHFLOW	0.3287***	-0.4632**	<b>0.4078***</b>
DEBT	-0.1418***	-0.0526	-0.1272
BANK DEBT	-0.0062***	<b>-0.2024***</b>	-0.0292
MAINDEP	-0.0092	0.0041	-0.0044
Adjusted R <sup>2</sup>	0.0827	0.0231	0.0941
# of observations	8641	1837	1833
Model	fixed effect	fixed effect	fixed effect

- When main bank relationship is the closest, sensitivity of cash to net working capital, cash flow and cash flow volatility is least among the six firm groups.
- Main bank's loan share decreases cash/asset ratio only for the firm group with the closest main bank relationship.

- Sensitivity of cash holdings to net working capital and cash flow is largest for the independent firms with no main bank and second largest for the independent firms with more than one main bank.
- Sensitivity of cash to debt-asset ratio is largest for the independent firms with no main bank.

➤ Do main banks extract monopoly rents from their affiliated firms?

Difference between “effective” borrowing rate

$r_L^*$  and nominal rate  $r_L$  is a proxy of monopoly rents.

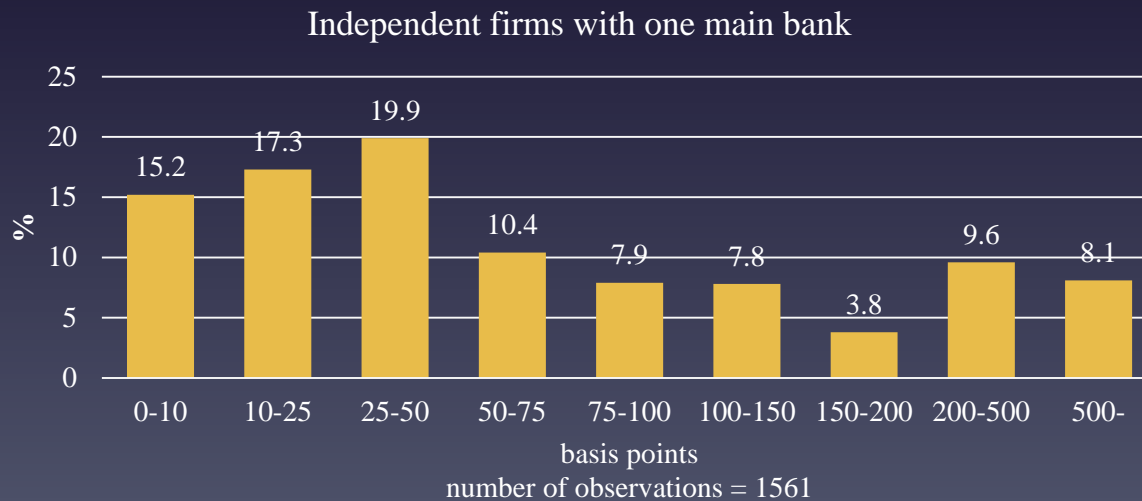
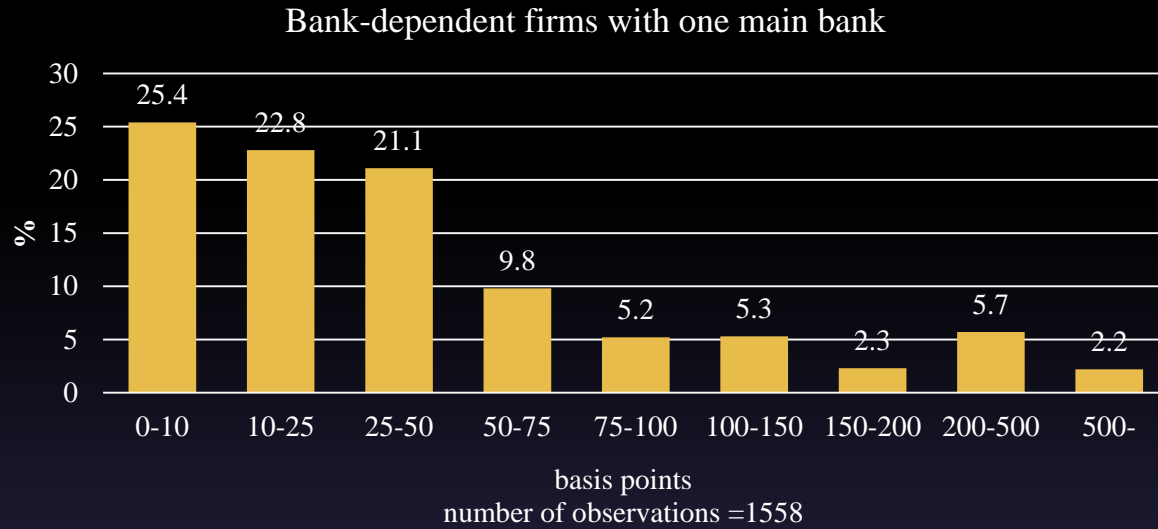
$$r_L^* = \frac{r_L B_L - r_D D}{B_L - D}$$

$B_L$  : borrowing from main bank

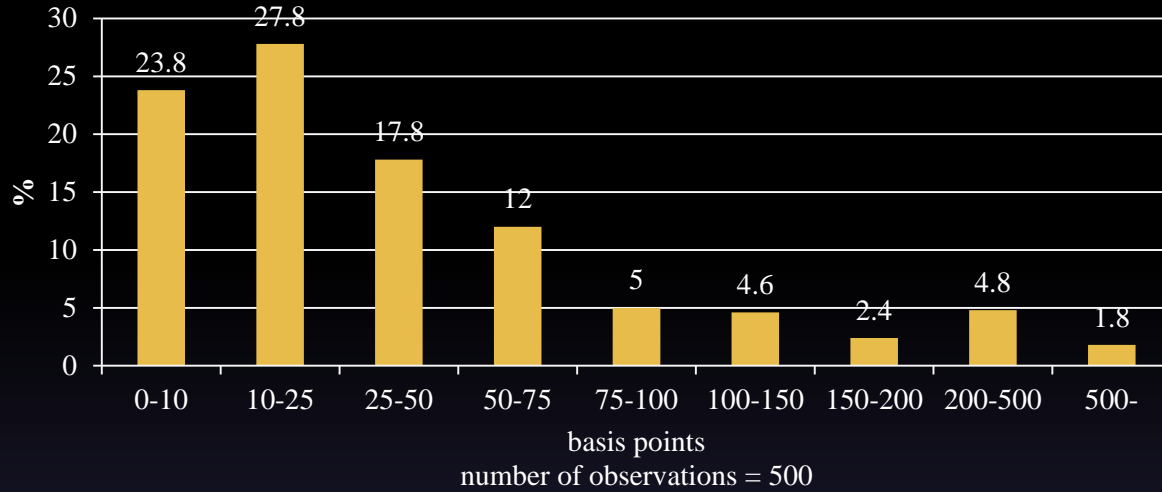
$D$  : deposit in main bank



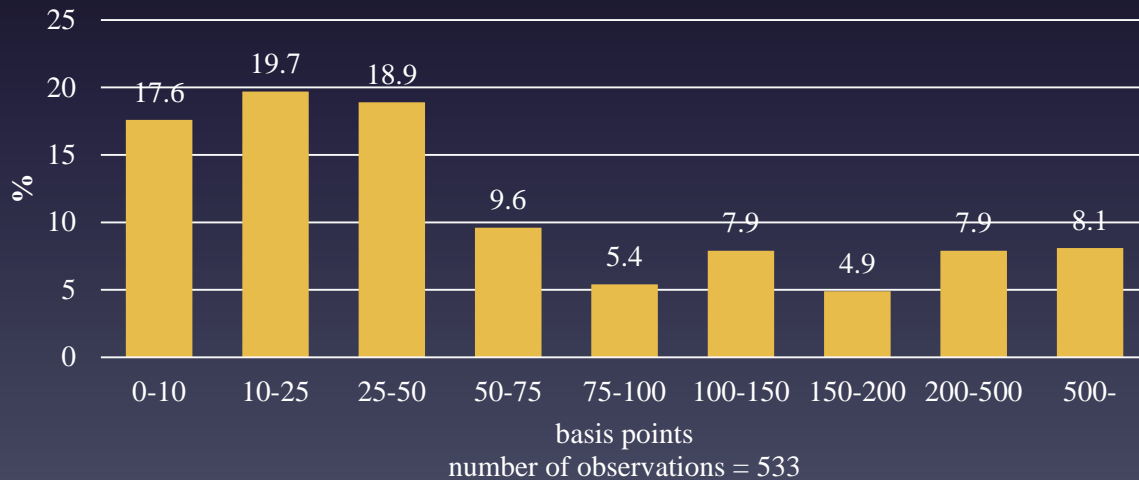
# ➤ Histogram of monopoly rent



Bank-dependent firms with more than one main bank



Independent firms with more than one main bank



# ➤ Regression of effective borrowing rate on MAINDEP

	Constant	MAINDEP	adjusted R <sup>2</sup> # of observations	model
Bank-dependent one main bank	0.0076***	-0.0024*	0.0032 1420	random effect
Independent one main bank	0.0127***	-0.0021	0.0014 1401	random effect
Bank-dependent more than one main bank	-0.0070	0.0193**	0.0006 407	fixed effect
Independent more than one main bank	0.0139***	-0.0050	0.0051 454	random effect

➤ We detect monopoly rents for four firm groups with main bank relationship.

Furthermore, main banks' share of loans is significantly positive for the bank-dependent firm group with more than one main bank.

## 8. Concluding Remarks

### Summary of our findings

1. Affiliated firms can economize cash holdings since main banks are ready to provide them with liquidity for rainy days.

2. Main banks may cushion external shocks to affiliated firms, so that sensitivity of cash to shocks is smaller for the affiliated firms.

3. Affiliated firms have to pay the price for maintaining the stable bank-firm relationship as monopoly rent.

### Agenda for future research

The benefit of maintaining long-term bank-firm relationship relative to the cost should be evaluated quantitatively.