

Internal Capital Markets in Business Groups and the Propagation of Credit Supply Shocks

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Motivation

- ▶ Active internal capital markets within business groups, e.g. Japan (Hoshi, Kashiyap, and Scharfstein, 1991), South Korea (Almeida, Kim, and Kim, 2015), (Santioni, Schiantarelli, and Strhan, 2017) , France (IMF, 2018)
- ▶ So far: Efficiency test or risk-sharing feature

This Paper

- ▶ First empirical evidence:
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- ▶ Macro implications: bank lending channel beyond direct bank-firm linkages

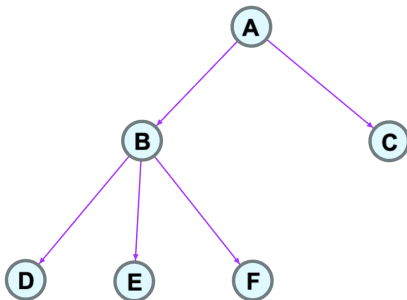
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- ▶ Macro implications: bank lending channel beyond direct bank-firm linkages
- ▶ Implications on China:
 - ▶ Less developed formal financial institutions, unprecedented growth (Allen et. al., 2005)
 - ▶ Limited number of firms direct accessible to formal finance

Motivation

Risk sharing vs intermediaries

- ▶ Consider a simple tree:
 - ▶ Risk sharing: D, E, F, cash-rich to cash poor
 - ▶ Intermediaries: banks $\rightarrow A \rightarrow B$, bank $\rightarrow B \rightarrow D,E,F$



RoadMap

- ▶ Main Results
- ▶ Data
- ▶ Baseline Results
- ▶ Challenges: Endogeneity and Overlays of Networks
- ▶ Mechanisms: Heterogeneity and Equity Transfer Channel

Overview - Main Results

Main Results

- ▶ Propagation of bank credit from corporate shareholders to subsidiaries:
 - ▶ When shareholders' cities experience an average of 16.7% of local bank credit growth, subsidiary investment increase by 1% of **fixed asset**, ...
 - ▶ accounts for **71%(7%)** of the median(average) investment rate
- ▶ This shareholder-subsidiary linkage becomes more significant when:
 - ▶ Subsidiary firms face **tighter financial constraint**
 - ▶ Subsidiary firms have **better investment opportunity**
 - ▶ Shareholders are **controlling**, but **do not apply** to SOEs
 - ▶ Results **do not apply** to SOEs or Foreign Subsidiaries
- ▶ **Mechanism**
 - ▶ Equity exchanges between shareholders and subsidiaries

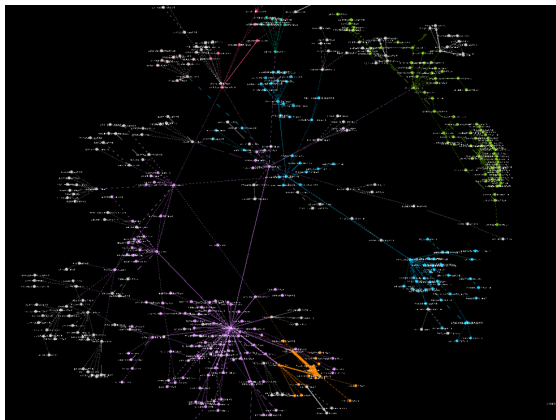
Why would ICM facilitate credit transfer?

- ▶ Key assumption (stein, 1997)
 - ▶ Firms within business groups face a binding credit constraint
 - ▶ Shareholders are willing and allowed to transfer credit to subsidiaries for more profits
 - ▶ Information advantage; debt holder + shareholder rights
- ▶ Testable hypotheses:
 - ▶ When shareholders' local credit growth \uparrow , subsidiary investment \uparrow .
 - ▶ ..., subsidiaries with better investment opportunities, Δ investment \uparrow .
 - ▶ ..., subsidiaries with tighter financial constraints, Δ investment \uparrow .

Data

- ▶ The ownership network
 - ▶ Business registry data from the State Administration for Industry and Commerce (SAIC)
 - ▶ Covers the entire universe of firms in China (40 million in 2017)
 - ▶ %16 in network, but contribute to more than 80% of registration capital, 70% of fixed capital ...
- ▶ Manufacturing firm balance sheet from Annual Survey of Chinese Industry Enterprises (ASCIE)
 - ▶ more than 90% can be matched to SAIC
- ▶ City(prefecture) level
 - ▶ Credit growth from city yearbooks
 - ▶ Bank branch information from Chinese Banking Regulatory Committee (CBRC)

- ▶ Haier Group: nested and pyramid structure (Allen, Cai, Gu, Qian, Zhao, and Zhu, 2019)



Baseline

- ▶ Subsidiaries respond to parent company credit supply shocks:

$$Y_{it} = \alpha_{ct} + \eta_{ind,t} + \theta_i + \gamma CreditGrowth_{i,pt} + \kappa' X_{it} + \epsilon_{it}$$

1. Y_{it} : investment, R&D, profit margin, leverage growth, debt growth
2. $CreditGrowth_{i,pt}$: the average bank credit growth where **non-local** shareholders experience (**fix network at 2001**):

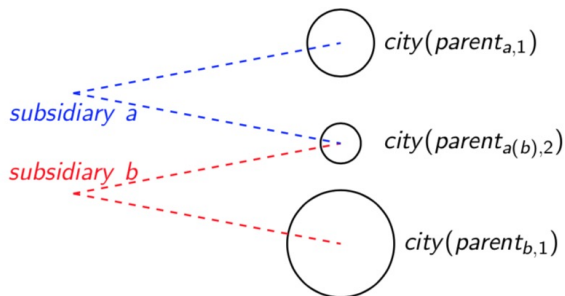
$$CreditGrowth_{i,pt} = \log\left(\sum_{j \in H_{i0,c(j) \neq c}} Loan_{c(j),t}\right) - \log\left(\sum_{j \in H_{i0,c(j) \neq c}} Loan_{c(j),t-1}\right)$$

3. Controls: Firm fixed effect, city-cross-year, industry-cross-year fixed effect

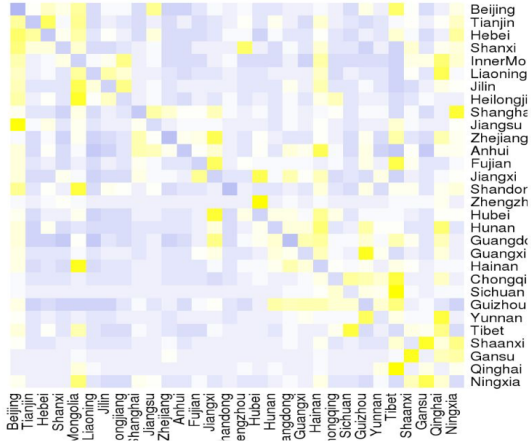
Key Identification

Large geographical diversification of the corporate shareholders

Consider: two similar subsidiaries a and b in the same city, but exposure to shareholders in **various** cities, various exposure to **non-local** credit growth



Geographical diversification of corporate shareholders



The Baseline Results

Table: The Baseline Results

	(1)	(2)	(3)
	Investment	R&D	Profit Margin
$CreditGrowth_{ipt}$	0.0619*** (0.014)	0.0144 (0.012)	-0.0061 (0.003)
# of Obs.	1,379,261	1,015,249	1,535,540
City \times Year FE	Yes	Yes	Yes
2-digit CIC \times Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes

Identification Challenges

Challenge 1: Local credit demand correlated across cities

- ▶ Local bank credit growth depends on both demand and supply shocks
- ▶ Credit demand across cities might be correlated, although we control for industry-year or city-year fixed effect
- ▶ **Solution:** Bartik-IV using the bank branch information:
 - ▶ Projected growth of # of local bank branches proxies for credit growth
 - ▶ \sum_b (country-wide bank b branch growth \times the initial market share of b) - not driven by local, but global demand, also filtered trend.
 - ▶ Banks expanded fast were more ambitiously giving new credits to firms
 - ▶ Cities with a large presence of such ambitious banks, banking sector expands more rapidly.

The IV Results

Table: The Instrumental Variables Approach

	(1)	(2)	(3)
	First Stage	Second Stage	
	$CreditGrowth_{pt}$	Investment	Leverage
Branch Bartik IV	1.643***		
Z_{pt}	(0.019)		
F-Value	1.2×10^4		
$CreditGrowth_{pt}$		0.258**	-0.017
		(0.102)	(0.015)
# of Obs.	249,785	249,785	285,555
City \times Year FE	Yes	Yes	Yes
2-digit CIC \times FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes

Challenge 2: Other business networks

- ▶ Overlays with other business networks
 - ▶ Supply chain: proxies for upstream supply shocks and downstream demand shocks
 - ▶ Trade credit: account payables and receivables
 - ▶ Geographical overlays of industries: ind. \times ind. FE; city \times city FE
- ▶ On the interpretation:
 - ▶ Tunnelling effect: common shareholder dummy - common shareholder move the resources from one with low cash-flow rights to the other with high cash-flow rights

Overlays with other business relationships

Table: Overlays with other networks

	(1)	(2)	(3)	(4)	(5)
	Investment				
<i>CreditGrowth_{ipt}</i>	0.0571**	0.0624***	0.0413**	0.0480***	0.0625***
	(0.0143)	(0.0143)	(0.0157)	(0.0144)	(0.0144)
Log(Demand from downstream)	0.00213				
	(0.00212)				
Log(Supply from upstream)	0.00213				
	(0.00211)				
Account Payable		-0.0992***			
		(0.00679)			
Account Receivable		-0.986***			
		(0.0135)			
Shareholder Ind. × Subsidiary Ind.FE	NO	NO	YES	NO	NO
Shareholder city × Subsidiary city FE	NO	NO	NO	YES	NO
Common Shareholder Dummy	NO	NO	NO	NO	YES
City × Year FE	YES	YES	YES	YES	YES
2-digit CIC × Year FE	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES
Firm-level Controls	YES	YES	YES	YES	YES

Heterogeneity and Mechanism

Heterogenous effects and mechanism

- ▶ More significant when ...
 - ▶ subsidiaries face **tighter financial constraint**
 - ▶ external finance dependence (***)
 - ▶ subsidiaries have **better investment opportunity**
 - ▶ lagged ROA (***), ROC(***), TFP(***), sale growth(***)
 - ▶ the shareholders are **controlling...**
- ▶ Results **do not apply** to SOEs
 - ▶ SOE shareholders do not pass credit to subsidiaries
 - ▶ SOE subsidiaries do not respond to shareholders' credit supply
- ▶ Mechanism: **equity transfers** from subsidiaries to shareholders in exchange for cash.

Subsidiary firm financial vulnerabilities

Table: Financial Vulnerabilities and the Pass-through of Credit Shocks

	(1)	(2)	(3)	(4)
	Investment			
<i>CreditGrowth_{ipt}</i>	0.0463 (0.0371)	0.110*** (0.0316)	0.0994*** (0.0351)	0.107*** (0.0310)
<i>CreditGrowth_{ipt}</i> × High ext. fin. dep.	0.116*** (0.0493)			
High inventory ratio		-0.0149 (0.0542)		
High Tangible Asset Ratio			0.0141 (0.0523)	
High Trade Credit Ratio				-0.00737 (0.0567)

Subsidiary firm investment opportunities

Table: Investment Opportunities and the Pass-through of Credit Supply Shocks

	(1)	(2)	(3)	(4)
Investment (High external financial dependence firms)				
$CreditGrowth_{ipt}$	0.111** (0.0466)	0.110*** (0.0428)	0.123** (0.0480)	0.0777* (0.0451)
$CreditGrowth_{ipt} \times$ High ROA(t-1)	0.097*** (0.00470)			
High ROC(t-1)		0.089*** (0.00506)		
High TFP(t-1)			0.071*** (0.00466)	
High Sales Growth(t-1)				0.064*** (0.00467)

SOE shareholders not affecting subsidiary investment

Table: SOE versus Non-SOE Shareholders

	(1)	(2)	(3)	(4)
	Baseline	Size-adjusted	Share-adjusted	Simple-average
<i>CreditGrowth_{ipt}</i> (SOE holders)	-0.0638 (0.0532)	-0.0119 (0.0741)	-0.0870 (0.0768)	-0.0602 (0.0650)
<i>CreditGrowth_{ipt}</i> (non-SOE holders)	0.0664*** (0.0191)	0.108*** (0.0238)	0.918*** (0.0255)	0.739*** (0.020)
Number of Observations	1,314,458	1,314,458	1,314,458	1,314,458
City × Year FE	Yes	Yes	Yes	Yes
2-digit CIC × Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes

SOE subsidiaries not responding

Table: Heterogeneous Response of Subsidiaries

	(1)	(2)	(3)
	Domestic Private	SOEs	Foreign-invested
$CreditGrowth_{i,pt}$	0.0946*** (0.0217)	0.00945 (0.0329)	0.00724 (0.0229)
Number of Observations	970,214	115,653	209,310
City \times Year FE	Yes	Yes	Yes
2-digit Industry \times Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes

The equity transfer channel

Table: Equity Transfer in Response to Credit Supply Shocks

	OLS	IV
	Equity Share in Corporate Shareholders (%)	
<i>CreditGrowth_{i,pt}</i>	3.38*** (0.084)	10.070*** (0.127)
Number of Observations	748,829	379,261
City × Year FE	Yes	Yes
2-digit Industry × Year FE	Yes	Yes
Firm FE	Yes	Yes
Firm-level Controls	Yes	Yes

The equity transfer channel

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	OLS	IV
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$CreditGrowth_{i,pt}$	3.38*** (0.084)	10.070*** (0.127)

- ▶ 0.5% additional equity shares are sold by the subsidiaries to their shareholders following an average 16.7% credit growth in shareholders' cities, which is worth of 2.5 millions RMB on average.

Conclusion

- ▶ A large ownership network, contribute to more than 80% Chinese Economy.
- ▶ Internal capital markets within business groups can propagate credit shocks from shareholders to subsidiaries in a credit boom
- ▶ Equity transfers between shareholders and subsidiaries is one channel
- ▶ Important implications on the bank lending channel and misallocation