Rise of Bank Competition: Evidence from Banking Deregulation in China

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Motivation

- Banking sector plays an important role in economic growth but are often heavily regulated in many countries (Barth et al. (2013))
- Opposing views on whether bank competition (e.g., deregulation) could help economic development
  - Benefits of competition; lower costs and higher efficiency (e.g., King and Levin (1993 a, b); Jayaratne and Strahan (1996); Rajan and Zingales (1998))
  - Costs of competition: reduce profit and risk seeking (e.g., Keeley (1990)), discourage relationship lending and screening/monitoring (e.g., Allen and Gale (2000); Petersen and Rajan (1995); Marquez (2002); Berger et al. (2005); Jiang, Levin, and Lin (2016))
- Empirical evidence on bank competition is inconclusive
  - Data limitation; use aggregate market structure indicators (e.g., HHI)
  - Hard to disentangle the benefits and costs of bank competition on borrowers

Contribution

- This paper use a unique loan-level data to explore the economic consequences of bank competition in China
- Trace each loan to document competition dynamics between incumbent and new entrant banks
- Disentangle bank competition's countervailing effects (costs and benefits) on borrowers
- Exploit the exogenous variation of bank deregulation in 2009 to establish causal effects of bank competition on firm activities

Main Findings

- Competition makes credit allocation worse at macro level
  - New entrant banks mainly target the old clients of incumbent banks (i.e., 88% of loans go to old borrowers instead of extensive expansion)
  - Increased competition leads to more bank credit to SOEs, low efficient firms, and relationship borrowers
- Competition has positive effects on individual firms at micro level
  - Loans from new entrant banks have lower interest rates, better internal ratings, more guarantees, and lower default
  - Competition led to greater added value of loans for private firms (e.g., higher investments in assets, employments, sales, and efficiency) but NOT for SOEs and relationship borrowers
- These countervailing effects shed lights on mixed empirical evidence

Data

- China Banking Regulatory Commission (CBRC) loan-level data
  - Record individual bank loans of 19 largest banks in China
  - Cover borrowers with an annual credit line over RMB 50 million (US$8 million) between 2007 and 2013; Represent 80% of the total bank credit in China
  - Comprehensive loan level information (e.g., loan amount, maturity, guarantee, ratings, delinquency) and borrower ID
- CBRC bank branch data
  - All bank branch information in China between 1949 and 2016; branch ID, addresses, and opening and closing dates
- Chinese Industry Census at firm level
  - All manufacturing firms in China with annual sales over $700K between 1998 and 2013
  - Balance sheet, income, and cash flow statements
  - Interest rate=interest payments/loans outstanding

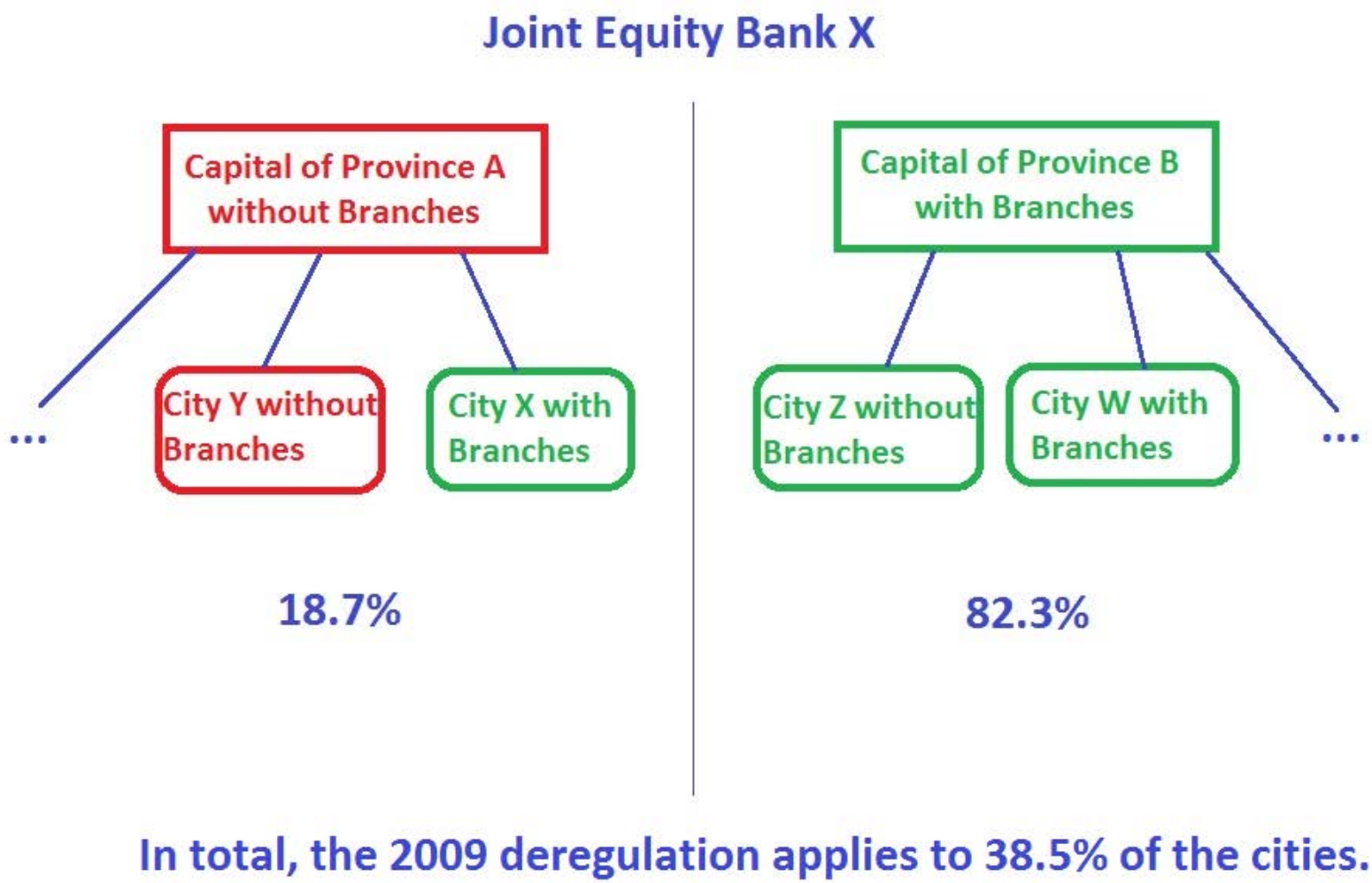
Background of Banking Sector in China

- Three types of banks in China
  - Big five commercial banks; state-owned, national banks, approximately 45% of the market share
  - Twelve joint equity banks; state-owned, national banks but focus local business, approximately 17% of the market share
  - Municipal commercial banks and others
- CBRC bank enter regulation in 2006
  - Each bank only allow to apply for one new branch in one city. One application at a time
  - Reviewed by CBRC local and central offices. On average, take about a year to reject or accept
  - Limited quota on total numbers of branches
  - Huge limitation on expansion of the joint equity banks which covered only 7% cities of China in 2006. Big five, 90%.

The 2009 Bank Entry Deregulation

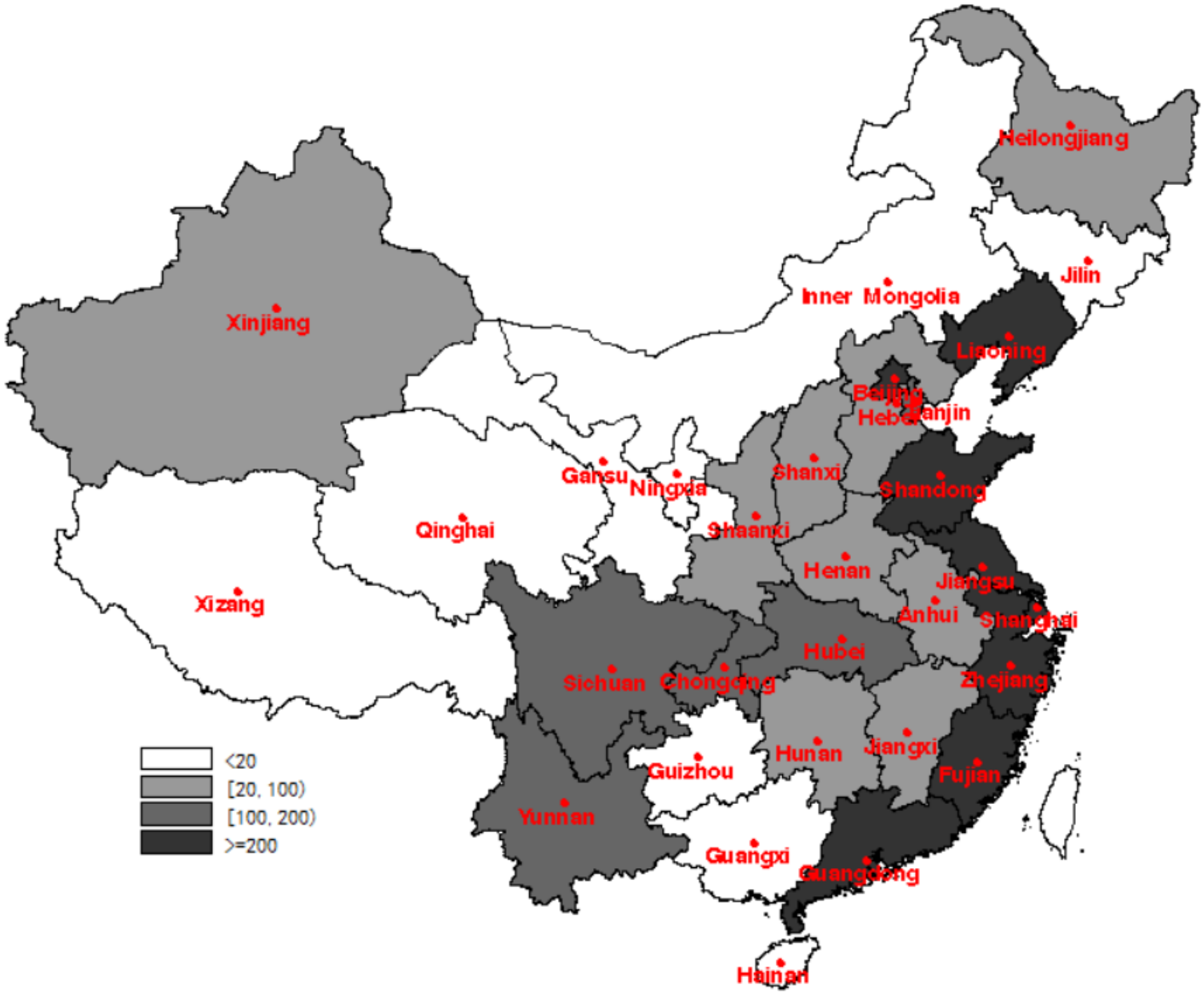
- In April 2009, CBRC partially removed the restriction on bank entry
- Specifically, a joint equity bank can freely open unlimited number of new branches in a city
  - If this joint equity bank has already had branches in this city
  - Or, has branches in the provincial capital of this city
  - Otherwise, still under restriction by 2006 rules
- In the deregulated cities
  - Joint equity banks can apply multiple branch openings at once
  - Application needs to be reviewed only by local CBRC offices; Usually within 4 months
  - Remove the quota on total number of branches allowed
- Exploit the exogenous variation from this shock across banks and across regions in China

The 2009 Bank Entry Deregulation

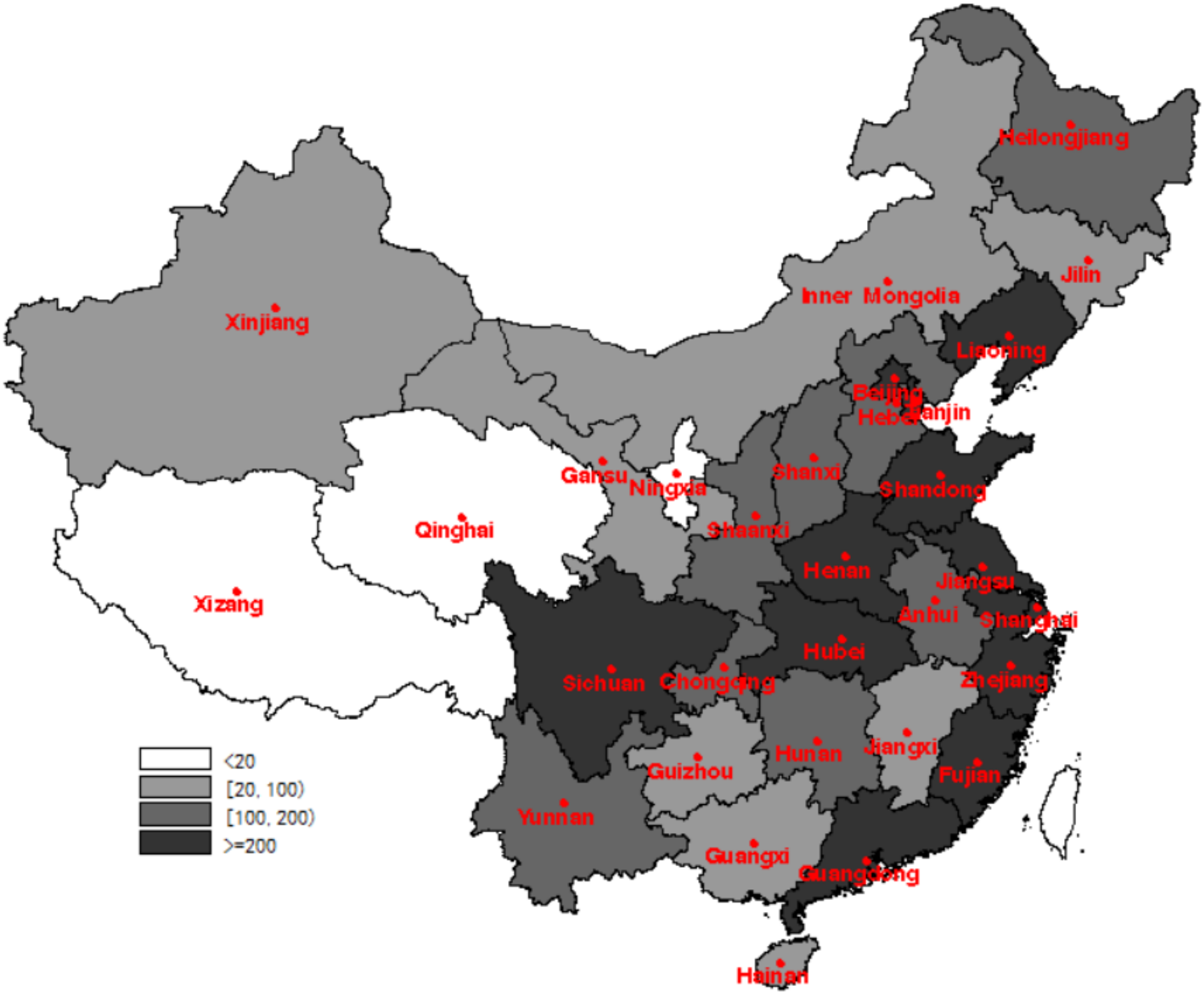


In total, the 2009 deregulation applies to 38.5% of the cities.

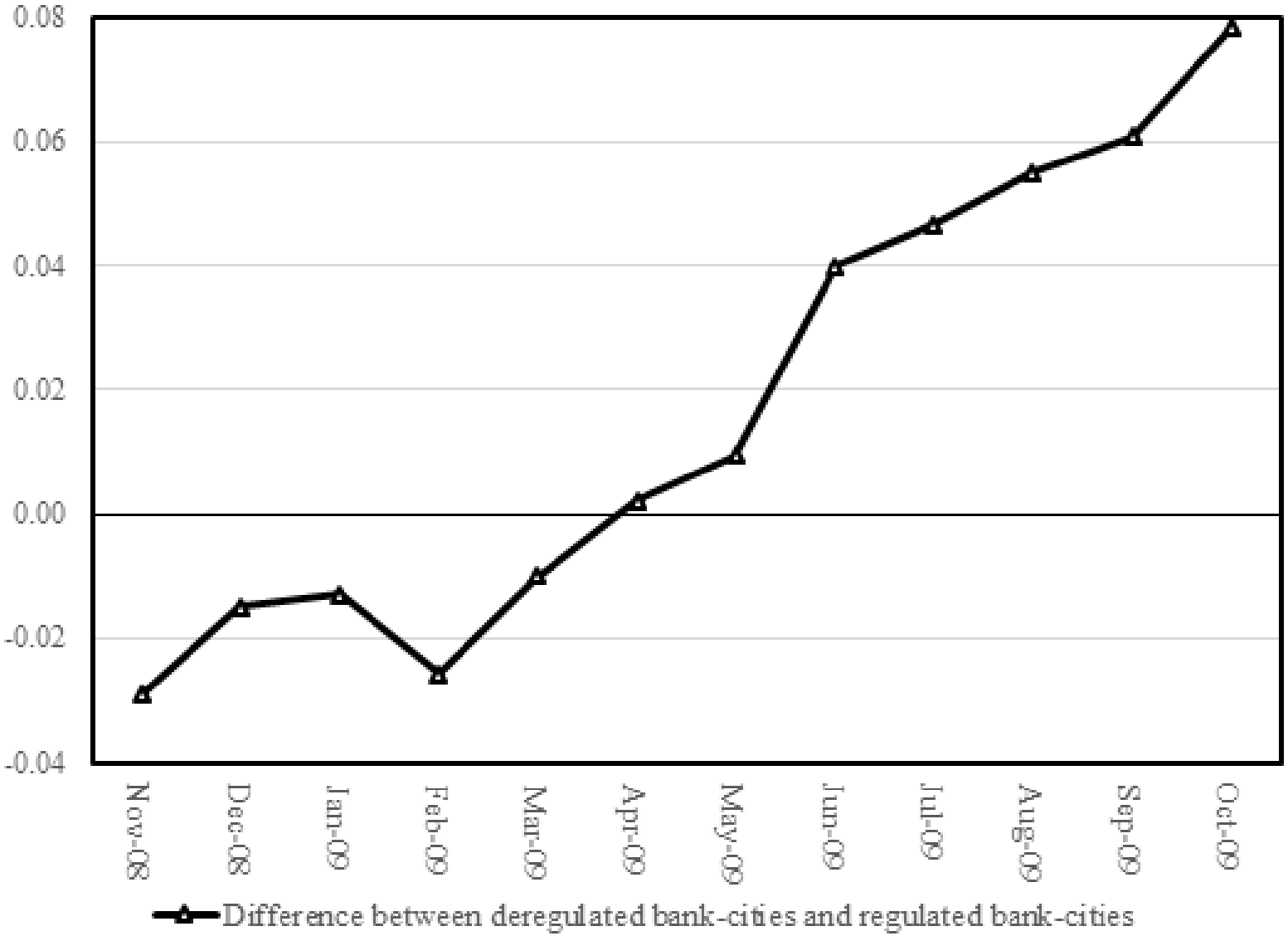
Distribution of Joint Equity Bank Branches in 2008



Distribution of Joint Equity Bank Branches in 2013



Trend of Outstanding Loan Amounts (Treatment miuns Control)



Summary Statistics

Variables	N	Mean	Median	S.D.	P25	P75
			Panel A: The Number of Branches			
Outstanding Branches	46,512	10.073	0.000	28.379	0.000	9.000
—Big Five commercial banks	13,680	31.250	20.000	45.075	7.000	37.000
—Joint-equity commercial banks	32,832	1.249	0.000	5.445	0.000	0.000
Treatment	46,512	0.625	1.000	0.484	0.000	1.000
Exposure	46,512	0.385	0.000	0.487	0.000	1.000
New Branches overall sample	46,512	0.293	0.000	1.541	0.000	0.000
—Big Five commercial banks	13,680	0.672	0.000	2.659	0.000	0.000
—Joint-equity commercial banks	32,832	0.135	0.000	0.578	0.000	0.000
New Branches sub-sample	5687	2.394	1.000	3.795	1.000	2.000
—Big Five commercial banks	2847	3.229	1.000	5.073	1.000	3.000
—Joint-equity commercial banks	2840	1.557	1.000	1.284	1.000	2.000
			Panel B: The Loan Contract Characteristics			
Loan Amount (Million RMB)	6,089,830	15.036	4.009	31.012	0.620	13.654
Maturity (in Months)	6,089,830	11.998	6.000	22.249	4.000	12.000
Internal Rating	6,089,830	1.026	1.000	0.181	1.000	1.000
Guarantee Requirement	6,089,830	0.218	0.000	0.413	0.000	0.000
Relationship	6,089,830	0.859	1.000	0.349	1.000	1.000
Default	4,955,168	0.011	0.000	0.106	0.000	0.000

Diff-in-Diff Regression Specifications

In our first Diff-in-Diff analysis, we perform the regressions of loan contract terms on the Diff-in-Diff dummies:

$$\begin{aligned} Y_k &= \alpha + \beta_1 \times After2009.4_t \times Treatment_{i,j} + \beta_2 \times After2009.4_t \\ &\quad + \beta_3 \times Treatment_{i,j} + Control_{i,t} + FE + \epsilon, \end{aligned}$$

- Y_k is the loan level contract terms, such as loan amount, maturity, internal ratings, dummy for third party guarantee, and default (over 90 days delinquency)
- $After2009.4_t$ is the time dummy for the period after April 2009, $Treatment_{i,j}$ is the dummy for whether joint equity bank j can freely open branches in city i after the 2009 shock
- Control for city fixed effects, bank fixed effects, and year fixed effects.

Bank Expansion after 2009 Deregulation (at City Level)

Panel A: Joint Equity Bank Expansion

	DV: Log (1 + Outstanding Loans)			
	(1)	(2)	(3)	(4)
Variables	[2008, 2009]	[2007, 2010]	[2006, 2011]	Overall
After2009.4*Treatment	0.211***	0.318***	0.385***	0.448***
	(11.72)	(15.14)	(16.60)	(21.60)
Local Controls	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES
Observations	8,208	16,416	24,624	46,512
R-squared	0.691	0.688	0.687	0.793
Adjusted R-squared	0.682	0.682	0.682	0.792

Panel B: Big Five Bank Scale Back

	DV: Log (1 + Outstanding Loans)			
	(1)	(2)	(3)	(4)
Variables	[2008, 2009]	[2007, 2010]	[2006, 2011]	Overall
After2009.4*Treatment	-0.079***	-0.135***	-0.158***	-0.189***
	[-4.574]	[-9.042]	[-11.122]	[-13.502]
Local Controls	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES
Observations	8,208	16,416	24,624	46,512
R-squared	0.691	0.688	0.687	0.793
Adjusted R-squared	0.682	0.682	0.682	0.792

4-Trillion (Treatment vs. Control)

Growth Rate of Loans Outstanding from Nov 2008 to Mar 2009

	All Banks		Joint Equity Banks	
	Mean	Std. Dev.	Mean	Std. Dev.
Regulated BankCities	31.12	1.71%	32.76%	7.91%
Deregulated BankCities	33.60	2.32%	33.61%	2.32%
Mean Difference	2.48%		0.85%	
t-statistics	(-0.88)		(0.12)	

Targeting of Joint Equity Banks

Year	(1) New borrowers in new-entry Branch	(2) Loans to SOEs from Joint-equity Banks	(3) Loans to SOEs from Big-five Banks
2007	10.00%	28.89%	22.34%
2008	11.73%	28.24%	21.47%
2009	15.92%	27.84%	20.71%
2010	11.20%	25.05%	17.86%
2011	12.12%	20.43%	16.66%
2012	11.72%	18.58%	15.52%

Targeting of Joint Equity Banks (DID)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample Period			3 Months Before and After		
Variables	Loan_SOE	Higher ATR	Relationship	Loan_SOE	Higher ATR	Relationship
After2009.4*Treatment	0.002*	-0.027**	0.007**	0.012*	-0.018	0.102***
	(1.75)	(-1.99)	(2.35)	(1.89)	(-1.36)	(7.14)
Treatment	0.059*	-0.120*	0.041	0.157***	0.064	0.432***
	(1.86)	(-1.69)	(0.90)	(3.53)	(0.93)	(4.68)
Log(Assets)	0.033***	-0.055***	-0.051***	0.039***	-0.052***	-0.107***
	(6.03)	(-5.55)	(-14.30)	(6.82)	(-3.99)	(-16.82)
Leverage	0.222***	0.388***	0.111***	0.283***	0.378***	-0.043
	(6.02)	(6.43)	(4.00)	(5.89)	(3.48)	(-0.34)
Pre-Trendt-1	0.009	0.018	-0.015	-	-	-
	(0.79)	(0.88)	(-0.89)	-	-	-
Pre-Trendt-2	-0.005	0.021	-0.003	-	-	-
	(-0.67)	(1.25)	(-0.29)	-	-	-
Firm FE	No	No	Yes	Yes	Yes	Yes
City FE	Yes	Yes	No	No	No	No
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,261,775	1,261,775	1,563,576	156,295	156,295	185,402
R-squared	0.045	0.067	0.392	0.053	0.074	0.057

Targeting of Big Five Banks (DID)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample Period			3 Month Before and After		
Variables	Loan_SOE	Higher ATR	Relationship	Loan_SOE	Higher ATR	Relationship
After2009.4*Treatment	0.062	0.012	0.015	0.033	0.005	0.052**
	(1.43)	(0.33)	(1.20)	(1.10)	(0.27)	(1.96)
Log(Assets)	0.035***	-0.054***	-0.017***	0.031***	-0.047***	-0.105***
	(8.10)	(-9.72)	(-8.09)	(4.849)	(-5.892)	(-14.562)
Leverage	0.235***	0.327***	0.104***	0.244***	0.289***	0.171
	(6.99)	(8.14)	(8.20)	(5.508)	(4.954)	(1.349)
Firm FE	No	No	Yes	Yes	Yes	Yes
City FE	Yes	Yes	No	No	No	No
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,489,419	3,489,419	4,519,041	534,280	534,280	662,988
R-squared	0.051	0.045	0.553	0.044	0.035	0.045

Competition Dynamics from Deregulation

- After April 2009, joint equity banks expand a lot faster than big five in deregulated cities
  - Does not seem to be confounded with 4T
- Increased interbank competition leads to more credit for SOEs from new entrant equity banks
  - Soft budget constraint of SOEs (e.g., Kornai (1988, 1993); Qian and Roland (1998); Song and Xiong (2017))
  - SOEs are typically inefficient and are relationship borrowers

Differences between Incumbent vs. New Entrant Banks

	Incumbent Banks			New-entry Banks				
	N	Mean	Median	N	Mean	Median	Diff	*t*-statistics
	Overall Sample							
Loan Amount (100 Million RMB)	6,063,386	15.000	4.000	26,444	23.294	10.000	-8.294***	-43.40
Maturity	6,063,386	11.996	6.000	26,444	12.669	7.000	-0.673***	-5.77
Internal Rating	6,063,386	1.027	1.000	26,444	1.007	1.000	0.020***	32.40
Guarantee Requirement	6,063,386	0.218	0.000	26,444	0.325	0.000	-0.107***	-42.03
Delinquent	6,063,386	0.014	0.000	26,444	0.007	0.000	0.006***	12.04
Default	4,933,421	0.011	0.000	21,747	0.006	0.000	0.006***	11.30
Assets (100 Million RMB)	6,017,234	69.313	8.120	26,358	44.414	9.141	24.899***	12.06
Leverage	6,017,234	0.605	0.604	26,358	0.587	0.587	0.019***	3.19

How do New Entrant Banks Compete (Joint Equity)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample Period			3 Month Before and After		
Variables	Guaranteed	Rating	Default	Guaranteed	Rating	Default
After2009.4*Treatment	0.002**	-0.001*	-0.001*	0.001	-0.001**	-0.001*
	(2.20)	(-1.69)	(-1.92)	(0.23)	(-2.24)	(-1.76)
Treatment	0.012	0.004	0.005**	0.070	-0.049	0.000
	(0.46)	(1.16)	(2.50)	(0.89)	(-1.06)	(0.23)
Log(Assets)	0.003	-0.002***	0.000	0.005*	-0.001	0.000
	(1.53)	(-3.72)	(0.41)	(1.76)	(-0.92)	(0.36)
Leverage	-0.017	0.007	0.000	-0.039	-0.008	0.011
	(-0.83)	(1.33)	(0.16)	(-0.97)	(-0.57)	(1.14)
Pre-Trendt-1	-0.000	0.004***	-0.002	-	-	-
	(-0.01)	(3.01)	(-1.60)	-	-	-
Pre-Trendt-2	-0.010**	-0.000	-0.002**	-	-	-
	(-2.12)	(-0.06)	(-2.05)	-	-	-
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	No	No	No	No	No	No
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,563,576	1,563,576	1,277,571	185,402	185,402	181,844
R-squared	0.025	0.002	0.002	0.026	0.002	0.006

How do Incumbent Banks Respond (Big Five)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample Period			3 Month Before and After		
Variables	Guaranteed	Rating	Default	Guaranteed	Rating	Default
After2009.4*Treatment	-0.008**	-0.004**	0.001**	-0.001	-0.013*	0.001
	(-2.04)	(-2.03)	(1.98)	(-0.15)	(-1.73)	(1.55)
Log(Assets)	-0.009	-0.013***	-0.002	0.002	-0.002**	0.000
	(-0.76)	(-7.92)	(-0.93)	(0.713)	(-2.075)	(0.087)
Leverage	0.010	0.048***	0.005	0.013	0.020	0.001
	(0.54)	(7.19)	(1.13)	(0.629)	(1.535)	(0.294)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	No	No	No	No	No	No
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,519,041	4,519,041	3,634,230	662,988	662,988	633,534
R-squared	0.010	0.003	0.006	0.005	0.005	0.007

Effects of Competition on Firms

Variables	(1) Log(Assets)	(2) Log(Liabilities)	(3) Log(Sales)	(4) Log(Employee)	(5) ROA	(6) TFP	(7) Interest Rate
After2009.4*Treatment	0.072*	0.177**	-0.089	0.153**	0.022***	0.142**	-0.053***
	(1.70)	(2.32)	(-1.40)	(2.49)	(4.02)	(2.04)	(-3.93)
Pre-Trendt-1	-0.088	-0.127*	-0.116*	0.080	0.004	0.074	0.002
	(-1.48)	(-1.74)	(-1.94)	(1.60)	(0.62)	(0.50)	(0.77)
Pre-Trendt-2	-0.046	-0.083	0.007	0.033	0.000	0.182	0.005
	(-0.88)	(-1.33)	(0.13)	(0.67)	(0.03)	(1.54)	(1.01)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	226,533	226,504	226,503	224,728	226,039	224,698	99,185
Number of firms	50,182	50,181	50,173	49,839	50,102	49,830	25,470
Adjusted R-squared	0.237	0.163	0.200	0.035	0.006	0.002	0.426

Effects of Competition on Firms (SOE vs. Private)

Variables	(1) Log(Assets)	(2) Log(Liabilities)	(3) Log(Sales)	(4) Log(Employee)	(5) ROA	(6) TFP	(7) Interest Rate
After2009.4*Treatment*Private	0.178***	0.157***	0.123***	0.288***	0.006***	0.275***	-0.028***
	(12.02)	(8.69)	(8.12)	(14.34)	(3.02)	(2.67)	(-4.30)
After2009.4*Treatment	-0.064***	0.119***	-0.201***	-0.109*	0.016***	-0.108	-0.027*
	(-4.03)	(4.09)	(-3.07)	(-1.70)	(2.89)	(-0.26)	(-1.83)
Pre-Trendt-1	-0.087	-0.126*	-0.115*	0.082	0.004	0.076	0.004
	(-1.45)	(-1.72)	(-1.92)	(1.64)	(0.63)	(0.51)	(0.93)
Pre-Trendt-2	-0.045	-0.082	0.008	0.035	0.000	0.183	0.006
	(-0.85)	(-1.31)	(0.15)	(0.71)	(0.04)	(1.15)	(1.11)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	226,533	226,504	226,503	224,728	226,039	224,698	99,185
Number of firms	50,182	50,181	50,173	49,839	50,102	49,830	25,470
Adjusted R-squared	0.237	0.163	0.200	0.035	0.006	0.237	0.426

Effects of Competition on Firms (Relationship vs. Transaction)

Variables	(1) Log(Assets)	(2) Log(Liabilities)	(3) Log(Sales)	(4) Log(Employee)	(5) ROA	(6) TFP	(7) Interest Rate
After2009.4*Treatment	0.450***	0.104***	0.442***	0.341***	0.006***	0.124***	-0.017***
*Transaction Share	(53.50)	(51.45)	(46.86)	(31.72)	(4.89)	(2.79)	(-3.19)
After2009.4*Treatment	-0.313***	0.141***	-0.386***	-0.078	0.016***	0.076	-0.031**
	(-6.55)	(7.24)	(-6.20)	(-1.26)	(3.04)	(0.55)	(-2.06)
Pre-Trendt-1	-0.083	-0.117*	-0.113*	0.085*	0.003	0.006	0.003
	(-1.45)	(-1.69)	(-1.95)	(1.70)	(0.47)	(0.05)	(0.15)
Pre-Trendt-2	-0.034	-0.063	-0.003	0.031	-0.000	0.090	(0.008)
	(-0.68)	(-1.04)	(-0.05)	(0.63)	(-0.09)	(0.94)	(1.09)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	226,533	226,504	226,503	224,728	226,039	224,698	99,185
Number of firms	50,182	50,181	50,173	49,839	50,102	49,830	25,470
Adjusted R-squared	0.284	0.205	0.234	0.044	0.006	0.005	0.425

Conclusion

- Using loan level data in China, this paper studies the detailed interbank competition dynamics and the economic consequences
- Disentangle the costs and benefits of interbank competition
  - At macro level, higher competition makes new banks issue more loans for SOEs
  - At micro level, higher competition leads to higher value added on firms, especially for private firms and for transaction lending
- Policy implication; in China (or other countries), deregulation on bank entry might have adverse side effects (e.g., worse credit allocation) and should be paired with other policy changes (e.g., harden budget constraint for SOEs)
  - Add to the literature on "Ownership vs Competition" debate (e.g., Yarrow (1986); Bishop and Key (1989); Allen and Gale (1999); Boycko, Shleifer, and Vishny (1994, 1996a, 1996b); Nellis (1994); Shleifer (1998); Shirley and Walsh (2000))