Rise of Bank Competition:
Evidence from Banking Deregulation in China

Haoyu Gao (Central University of Finance and Economics)
Hong Ru (Nanyang Technological University)
Robert M. Townsend (MIT)
Xiaoguang Yang (Chinese Academy of Sciences)

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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 across firms
  - 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 lending to SOEs, especially for inefficient ones; 0.12% loss of GDP

- Competition has positive effects on individual firms
  - Loans from new entrant banks have lower interest rates, better internal ratings, more guarantees, and lower default, primarily for private firms
  - Competition led to greater added value of loans for private firms (e.g., higher growth in assets, employments, and profitability) but NOT for SOEs; 0.67% gain of GDP

- These countervailing effects shed lights on mixed empirical evidence
  - Novel unintended consequences of financial reform (i.e., worse resource allocation)

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
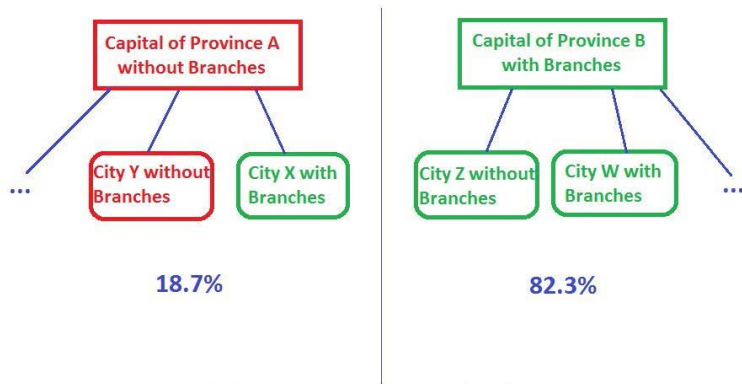
Background of Banking Sector in China

- Three types of banks in China
  - Big four 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 four, 97%.

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
- 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
- Differences in difference regressions
  - Treatment group: joint equity banks in deregulated cities
  - Control group: joint equity banks in regulated cities and big four banks

The 2009 Bank Entry Deregulation

Joint Equity Bank X

Capital of Province A without Branches

Capital of Province B with Branches

... **City Y without Branches** **City X with Branches**

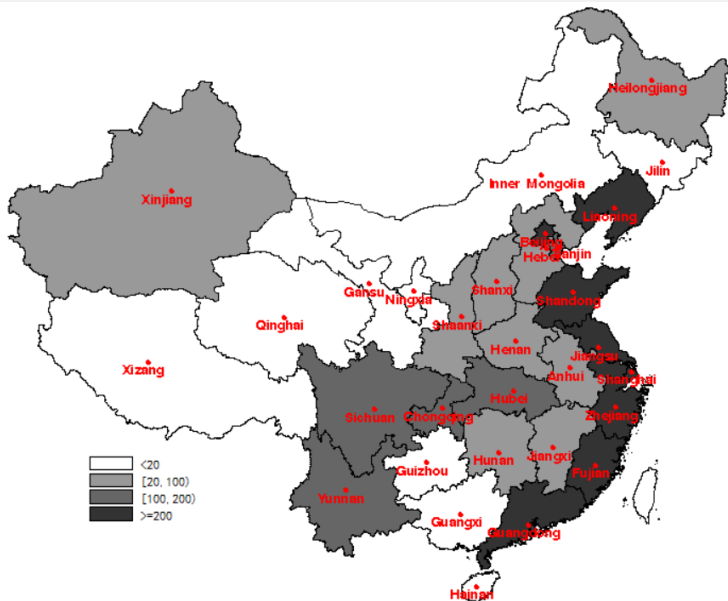**City Z without Branches** **City W with Branches** ...

18.7%

82.3%

In total, the 2009 deregulation applies to 38.5% of the city-bank pairs
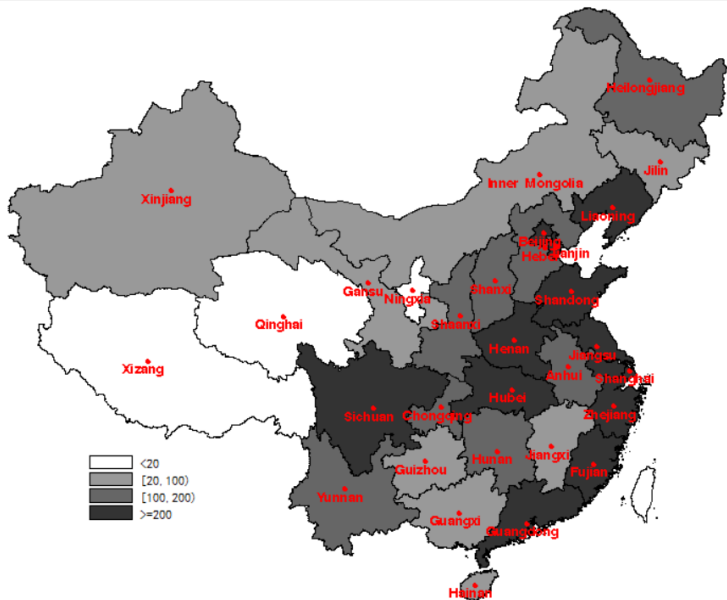
Treatment group: joint equity banks in the deregulated cities (i.e., 38.5%)

Control group: joint equity banks in still regulated cities (61.5%) and the big four banks
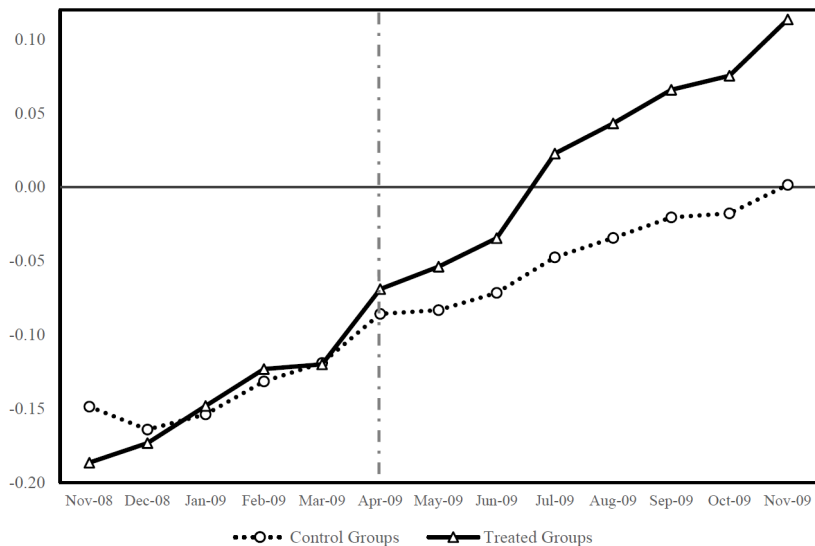
Distribution of Joint Equity Bank Branches in 2008

Distribution of Joint Equity Bank Branches in 2013

Trend of Outstanding Loan Amounts (Treatment vs. Control)

4-Trillion (Treatment vs. Control)

Growth Rate of Loans Outstanding From Nov 2008 to Mar 2009

	All-Banks			
	Without winsorization		With winsorization	
	Mean	Std. Dev.	Mean	Std. Dev.
Regulated Bank-Cities	32.14%	125.26%	27.22 %	72.05%
Deregulated Bank-Cities	34.42%	236.86%	27.09%	89.56%
Mean Difference	2.28 %		-0.13%	
t-statistics	(0.38)		(-0.04)	

Summary Statistics

	N	Mean	Median	Std. Dev.	P25	P75
			Panel A: City-Bank-Month Level			
Outstanding Branches	430,560	10.074	0.000	28.529	0.000	9.000
—Big Four commercial banks	107,640	36.766	23.000	47.135	13.000	41.000
—Joint-equity commercial banks	322,920	1.177	0.000	5.291	0.000	0.000
Outstanding Loans	430,560	29.196	1.190	123.291	0.000	14.546
—Big Four commercial banks	107,640	86.534	24.700	226.056	9.100	61.385
—Joint-equity commercial banks	322,920	10.084	0.000	42.106	0.000	3.620
SOE-Share	249,253	0.190	0.086	0.253	0.000	0.292
			Panel B: Loan Characteristics			
Loan Amount (Million RMB)	6,470,267	15.161	4.000	31.405	0.585	13.411
Maturity (in Months)	6,470,267	0.992	0.500	1.876	0.333	1.000
Rating Dummy	6,470,267	0.979	1.000	0.143	1.000	1.000
Guaranteed	6,470,267	0.208	0.000	0.406	0.000	1.000
Default	5,276,910	0.011	0.000	0.103	0.000	0.000
Existing Borrower	6,470,267	0.763	1.000	0.425	1.000	1.000
			Panel C: Firm Characteristics			
Fixed Assets (Million RMB)	2,078,597	30.131	6.051	87.737	2.051	18.889
Liabilities (Million RMB)	2,084,805	48.364	9.500	138.277	3.320	29.424
Employee	2,055,139	216.265	120.000	321.487	55.000	240.000
ROA	2,079,673	0.133	0.054	0.218	0.010	0.166
SOE	2,086,333	0.059	0.000	0.236	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:

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

- 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)

	DV: Log (1 + No. Branches)			
	Shorter Window			Longer Window
	(1)	(2)	(3)	(4)
	[200901,200906]	[200810,2009009]	[200804,201003]	[200704,201103]
After2009.4*Treatment	0.004**	0.010***	0.031***	0.070***
	(2.13)	(3.69)	(8.13)	(12.60)
Treatment	0.193***	0.189***	0.178***	0.160***
	(7.28)	(7.15)	(6.75)	(6.08)
After2009.4	0.005***	0.005***	0.000	-0.017***
	(2.83)	(2.74)	(0.01)	(-6.01)
Control & FEs	YES	YES	YES	YES
Observations	27,456	54,912	109,776	219,456
Adjusted R-squared	0.905	0.904	0.904	0.903
	DV: Log (1 + Outstanding Loan)			
	Shorter Window			Longer Window
	(1)	(2)	(3)	(4)
	[200901,200906]	[200810,2009009]	[200804,201003]	[200704,201103]
After2009.4*Treatment	0.039***	0.070***	0.125***	0.175***
	(5.37)	(7.14)	(9.79)	(10.95)
Treatment	0.536***	0.520***	0.503***	0.460***
	(14.08)	(14.01)	(13.98)	(13.25)
After2009.4	0.052***	0.071***	0.075***	0.053***
	(13.04)	(13.89)	(11.34)	(6.67)
Control & FEs	YES	YES	YES	YES
Observations	27,456	54,912	109,776	219,456
Adjusted R-squared	0.814	0.814	0.815	0.814

Targeting of Joint Equity Banks

Year	(1) New borrowers in new-entry Branch	(2) Loans by SOEs from Joint-equity Banks	(3) Loans by SOEs from Big-four Banks
2007	.	29.92%	23.86%
2008	9.56%	28.97%	24.37%
2009	13.63%	30.92%	25.78%
2010	13.05%	24.69%	21.57%
2011	13.06%	17.78%	17.75%
2012	11.04%	16.32%	16.19%
2013	10.48%	14.86%	16.27%

Joint Equity Banks' Preference on SOEs (DID)

Panel A: Lending to SOEs

	Dependent Variable: Percentage of Loans to SOEs			
	6M	1Y	2Y	4Y
Treatment*After2009.4	0.012***	0.019***	0.026***	0.013*
	(2.60)	(3.65)	(4.13)	(1.67)
Treatment	0.007	0.000	-0.006	0.007
	(0.30)	(0.00)	(-0.34)	(0.42)
After2009.4	0.001	-0.003	-0.008**	0.004
	(0.17)	(-0.94)	(-2.08)	(0.80)
Pretrend_1				0.010
				(1.39)
Pretrend_2				0.007
				(1.09)
Pretrend_3				0.002
				(0.41)
PreDummy	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	18,003	32,868	69,204	142,312
R-squared	0.323	0.322	0.315	0.297

Joint Equity Banks' Preference on SOEs (Pre-trend)

	Dependent Variable: Percentage of Loans to SOEs
	4Y
Treatment*M2008.11	-0.000
	(-0.05)
Treatment*M2008.12	0.004
	(0.49)
Treatment*M2009.01	0.006
	(0.70)
Treatment*M2009.02	0.011
	(1.28)
Treatment*M2009.03	0.012
	(1.33)
Treatment*M2009.04	0.018**
	(1.97)
Treatment*M2009.05	0.013
	(1.35)
Treatment*M2009.06	0.017*
	(1.78)
Treatment*M2009.07	0.023**
	(2.40)
Treatment*M2009.08	0.025**
	(2.49)
Treatment*M2009.09	0.024**
	(2.36)
Treatment*M2009.10	0.029***
	(2.82)
Control & FEs	Yes
Observations	142.312
R-squared	0.297

Targeting Inefficient SOEs

Dependent Variable: Shares of Loans to High Efficient Firms

	For SOEs		For Non-SOEs	
	2Y	4Y	2Y	4Y
Treatment*After2009.4	-0.036***	-0.031**	-0.002	0.010
	(-3.15)	(-2.25)	(-0.28)	(0.95)
Treatment	0.106***	0.074**	-0.072***	-0.055**
	(2.79)	(2.27)	(-2.61)	(-2.41)
After2009.4	0.009	0.006	0.013***	0.002
	(1.35)	(0.83)	(2.70)	(0.36)
Pretrend_1		0.002		-0.014
		(0.15)		(-1.37)
Pretrend_2		0.002		-0.009
		(0.20)		(-0.93)
Pretrend_3		-0.009		-0.018**
		(-0.81)		(-2.03)
Control & FEs	Yes	Yes	Yes	Yes
Observations	35,740	73,171	60,563	124,655
R-squared	0.468	0.436	0.257	0.232

Competition Dynamics from Deregulation

- After April 2009, joint equity banks expand a lot faster than big four 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 with higher political hierarchy or bigger size are much less efficient; softer budget constraint

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 (Million RMB)	6,279,220	15.031	4.000	52,098	22.060	9.798	7.029	50.96
Maturity	6,279,220	0.997	0.500	52,098	0.950	0.583	-0.047	-5.65
Rating Dummy	6,279,220	0.979	1.000	52,098	0.995	1.000	0.016	26.33
Guaranteed	6,279,220	0.206	0.000	52,098	0.294	0.000	0.088	49.06
Default	5,111,093	0.011	0.000	41,780	0.006	0.000	-0.005	-9.31
Assets (100 Million RMB)	6,279,220	40.057	8.030	52,098	52.199	10.554	12.142	30.05
Leverage	6,279,220	0.611	0.609	52,098	0.602	0.610	-0.009	-10.81

Effects of Deregulation on Loan Contracts (DID)

Panel A: Firm-Bank-Month Sample

	Overall			SOEs			Non-SOEs		
	(1)	(2)	(3)	(5)	(6)	(7)	(9)	(10)	(11)
	Default	Rating	Guaranteed	Default	Rating	Guaranteed	Default	Rating	Guaranteed
Treatment*	-0.003***	0.005***	0.021***	-0.001	0.004	0.007**	-0.004***	0.005***	0.024***
After2009.04	(-3.90)	(3.53)	(11.90)	(-0.41)	(1.27)	(2.29)	(-3.97)	(3.11)	(11.50)
Treatment	0.009***	-0.019***	0.015***	0.01***	-0.002	-0.005	0.008***	-0.02***	0.019***
	(3.76)	(-5.39)	(3.16)	(2.70)	(-0.21)	(-0.66)	(2.93)	(-5.70)	(3.51)
After2009.04	0.003**	-0.001	-0.006***	0.01***	-0.001	-0.003	0.002	-0.000	-0.006***
	(2.31)	(-0.38)	(-4.14)	(4.95)	(-0.17)	(-1.34)	(1.62)	(-0.14)	(-4.20)
PreTrend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	801,542	859,486	859,486	99,514	113,27	113,275	702,028	746,211	746,211
R-squared	0.012	0.009	0.013	0.013	0.012	0.006	0.012	0.009	0.014

Effects of Deregulation on Interest Rates (DID)

	Nominal Interest Rate (%)	
	(1)	(2)
Private*After2009.4*Treatment	-0.603***	-0.603***
	(-2.91)	(-2.92)
After2009.4*Treatment	-0.460	-0.610
	(-1.19)	(-1.30)
Treatment	0.219	0.369
	(0.59)	(0.75)
Log(Assets)	1.109***	1.109***
	(18.89)	(18.89)
Leverage	2.669***	2.669***
	(9.62)	(9.62)
Private	0.687***	0.687***
	(2.92)	(2.93)
Pre-Trend$_{t-1}$		-0.167
		(-0.28)
Pre-Trend$_{t-2}$		-0.221
		(-0.33)
Firm FE	YES	YES
Year FE	YES	YES
Observations	108,580	108,580
R-squared	0.621	0.621

Effects of Deregulation on Firms

	(1)	(2)	(3)	(4)	(5)
	Asset Growth	Employment Growth	Leverage	Net Income Growth	ROA
After2009*Treatment	0.213***	0.081***	-0.018**	0.440***	0.018***
	(5.65)	(4.43)	(-2.19)	(3.48)	(7.24)
Treatment	2.625***	0.449***	-0.023	-1.194***	0.020*
	(5.16)	(2.65)	(-0.60)	(-3.12)	(1.68)
After2009	0.095**	0.498***	0.028***	0.171	0.004*
	(2.27)	(24.11)	(3.27)	(1.33)	(1.65)
Pre-Trendt-1	-0.071	0.007	-0.003	-0.073	-0.005
	(-1.58)	(0.31)	(-0.34)	(-0.48)	(-1.43)
Pre-Trendt-2	0.015	0.018	0.002	-0.256	-0.006*
	(0.37)	(0.80)	(0.24)	(-1.53)	(-1.75)
Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	293,125	292,545	317,731	188,434	342,096
Adjusted R-squared	0.05	0.051	0.001	0.008	0.015

Effects of Deregulation on Firms (SOE vs. Private)

	(1)	(2)	(3)	(4)	(5)
	Asset Growth	Employment Growth	Leverage	Net Income Growth	ROA
After2009*Treatment*Private	0.336***	0.112***	-0.030**	0.918***	0.918***
	(4.05)	(2.91)	(-2.05)	(2.85)	(2.85)
After2009*Treatment	-0.117	0.002	0.005	-0.435	-0.435
	(-1.58)	(0.05)	(0.35)	(-1.45)	(-1.45)
Treatment	2.280***	0.436***	-0.040	-1.071**	-1.071**
	(4.57)	(2.65)	(-0.94)	(-2.08)	(-2.08)
After2009	0.319***	0.502***	0.023*	0.421	0.421
	(4.29)	(13.76)	(1.78)	(1.41)	(1.41)
Pre-Trendt-1	-0.072	0.000	-0.003	-0.072	-0.072
	(-1.61)	(0.00)	(-0.31)	(-0.48)	(-0.48)
Pre-Trendt-2	0.005	0.016	0.003	-0.254	-0.254
	(0.13)	(0.83)	(0.31)	(-1.53)	(-1.53)
Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	292,764	292,180	317,290	188,185	341,654
Adjusted R-squared	0.051	0.053	0.002	0.008	0.015

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
    - Dark Side: Entry deregulation makes new banks issue more loans to SOEs; 0.12% loss of GDP
    - Bright Side: Entry deregulation leads to higher value added on firms, especially for private firms; 0.67% gain of GDP
- Policy implication; in China (or other countries), deregulation on bank entry might have adverse side effects and should be paired with other policy changes (e.g., harden budget constraint for SOEs)
    - Echos to the recent studies arguing that reforms in China could have unintended adverse consequences (e.g., Hachem and Song (2016, 2017); Chen, Petukhov, and Wang (2017); Wang et al. (2017)).
    - Liu, Wang, and Xu (2017) raise a similar point as this paper and argue that interest-rate liberalization in China improves capital allocations within each sector but could exacerbates misallocations across sectors which is due to SOEs' distorted incentives.