Interest Rate Caps, Corporate Lending, and Bank Market Power: Evidence from Bangladesh

Yusuke Kuroishi
Hitotsubashi U

Cameron LaPoint
Yale SOM

Yuhei Miyauchi
Boston U

TSE Industrial Organization & Finance Conference

Toulouse School of Economics

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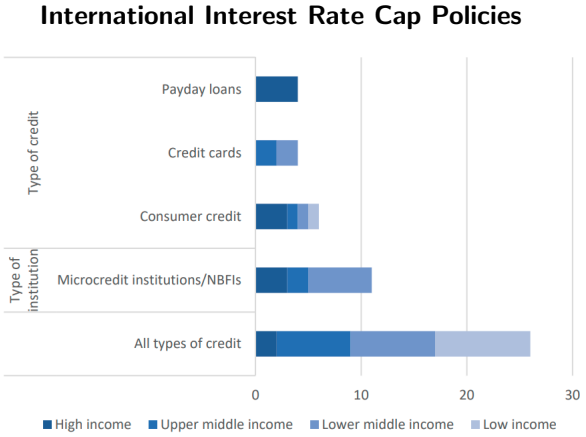
Motivation: high financing costs in developing countries

- A well-functioning financial market is crucial for economic growth
  - Jayaratne & Strahan 1996; Rajan & Zingales (1998); Levine (2005); Midrigan & Xu (2014)
- At the same time, firms' external financing costs in low-income countries are high
  - Demirgüç-Kunt et al. (2004); Beck et al. (2005); Cavalcanti et al. (2024)
- Why are external financing costs high in low-income countries?
  - Funding or monitoring costs (information asymmetries)
  - Heightened risks of providing credit due to collection losses, default
  - Market power: *ex ante* imperfect competition vs. *ex post* relationship lending
- What policies are effective in reducing external financing costs?
- **This paper:** study interest rate cap policy applied to corporate loans in Bangladesh
  - Traditional focus on SMEs in development literature excludes large share of the economy (SMEs only $\approx$ 22% of Bangladesh 2019 GDP)

Interest rate caps are common worldwide



Source: Ferrari et al. (2018), "Interest Rate Caps: The Theory and The Practice," World Bank Policy Research Working Paper

- In high-income countries, framed as anti-usury laws
  - Caps predominantly applied towards loans to individuals
- In low and middle-income countries...
  - Focus is on loans from microfinance institutions and loans to firms
  - Commonly used to stimulate industrial investment, esp. during crisis periods
  - Post-COVID examples: Bangladesh, Dominican Republic, Vietnam

This paper: interest rate cap on corporate loans

- **Policy experiment in Bangladesh:** central bank capped interest rates on corporate industrial loans at 13% between 2009 and 2011
  - Sudden, top-down change in interest rates for bank branches with high pre-cap interest rates
  - Consumer lending and branches charging corporate rates $< 13\%$ unaffected
  - Diff-in-diff using within-bank variation in pre-cap rates charged by branches
- Main findings from **credit registry data**:
  1. Cap successfully lowered branch-level interest rates but led to an **increase** in credit provision
     - ⋆ Lending semi-elasticity (IV): 100 basis point $\downarrow$ in rates $\implies$ 36% $\uparrow$ in equilibrium credit
     - ⋆ Real credit demand elasticity of 1.7: first estimate for corporate loans in a low-income country
  2. **No evidence of reallocation of credit away from riskier borrowers**
     - ⋆ No change in delinquency rates, collateral type, or sectoral composition of loans
- Mostly **opposite** effects relative to existing work on interest rate caps in middle to high-income countries for consumer/small-firm loans

Contributions & related literature

1. **Effects of interest rate caps on equilibrium credit outcomes**
   - Consumer credit: Alessie et al. (2005); Benmelech & Moskowitz (2010); Rigbi (2013); Melzer & Shroeder (2017); Madeira (2019); Fekrazad (2020); Cuesta & Sepulveda (2021); Cherry (2025)
   - SMEs/microfinance: Heng et al. (2021); Burga et al. (2022); Quirk (2023); Ornelas et al. (2024)
   - Our paper: causal evidence on rate caps applied to large firms in developing country context
2. **Nature of imperfect competition in the banking sector**
   - Relationship lending: Petersen & Rajan (1994,95); Berger & Udell (1995); Boot & Thakor (2000); Kysucky & Norden (2016); Gertler et al. (2024)
   - Deposit franchise: Drechsler et al. (2017,21,23) $\longrightarrow$ no evidence in our setting
   - Static markups: Schwert (2020); Saidi & Streitz (2021); Wang et al. (2022); Bordeu et al. (2025)
   - Our paper: direct evidence of importance of *ex ante* market power for price regulation
3. **Access to external finance in developing countries**: Rioja & Valev (2004); Burgess & Pande (2005); De Mel et al. (2008); Hsieh & Klenow (2009); Kaboski & Townsend (2011); Banerjee & Duflo (2014); Choudhary & Limodio (2021); Bau & Matray (2023); Ji et al. (2023); Fonseca & Matray (2024)

Policy Background

2009–11 corporate loan rate cap in Bangladesh

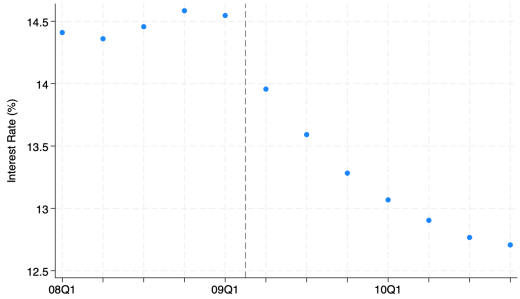
- Bangladesh Bank (central bank) imposed **13% limit** on annualized rates charged on working capital and term loans to businesses
  - Regulated categories: loans to large and medium-scale industrial, agriculture, housing sector, and trade financing sectors
  - Stated objective was to "boost investment" in wake of GFC
- Cap lifted gradually on March 2011 and January 2012 for most previously regulated loans
  - Concerns from IMF that "the regulation hinders transmission of monetary policy"
  - IMF threatened to revoke $1 billion credit line if cap not removed
- **No other financial regulation introduced around the same time**
  - Bank capital requirements (Basel II) and deposit rate floors came later
  - Bank $\times$ time FEs and conduct pre-trends tests to account for possible influence of GFC

Credit registry data from Bangladesh Bank

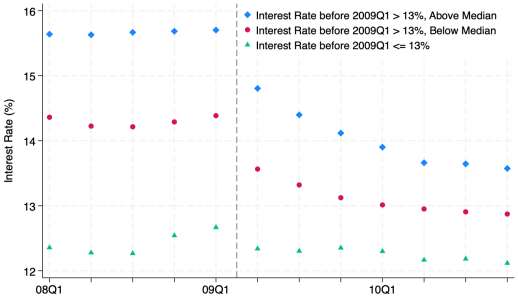
- Main datasets from **SBS-2 + SBS-3 (Scheduled Bank Statistics)** from central bank
  - Bank branch-level data on lending and deposit accounts broken down by account type
    - ⋆ Individual vs. corporate customers, by borrower's industry, loan type, economic use of funds, type of collateral (physical vs. cash vs. inventories) Primary sectors Heat maps
  - Key outcomes: annualized interest rates, outstanding loan amounts, # of loans, delinquency rates, deposit amounts and rates
  - Merge to bank balance sheets (SBS-1) to assess bank health or financing constraints
- Estimation sample consists of balanced panel of branches:
  - Focus on private commercial banks and foreign commercial banks
  - Omit sectors not subject to the regulation: commodities, public sector, individuals
- Supplementary data: World Bank Enterprise Survey, policy repo rate, census statistics

Evidence of drop in interest rates after cap imposed

(a) Average Branch-Level Interest Rates



(b) Average Rates by Cap Exposure



- Avg. rate 50 bps. ↓ right after the cap, driven by branches charging rates $>$ 13% cap
- Gradual response due to pre-cap loans maturing and new ones being signed

What Does Theory Predict about Rate Caps?

Conceptual framework with two types of market power

- Two-period model ($t = 1, 2$) in the spirit of Petersen & Rajan (1995)
  - We add *ex ante* market power to the *ex post* relationship lending friction
- Unit measure of borrowers seeking financing:
  - $t = 1$: Invest 1 unit of consumption good, returns R_1 with probability p, zero otherwise
    - ⋆ To finance project, need to borrow from a bank with sunk cost $u \sim F(\cdot)$
  - $t = 2$: Can invest again if project successful in $t = 1$; in which case invest 1 unit which returns R_2 with probability 1
- Banks face a unit cost of funding c in both periods
  - $t = 1$: Set interest rate r_1 depending on demand elasticity and **competitiveness of market**, captured by $0 \leq \theta \leq 1$ (Weyl & Fabinger 2013)
  - $t = 2$: "Lock in" fraction γ of successful borrowers and charge $r_2 = R_2 \longrightarrow$ **rent extraction through relationship lending**

Theoretical effects of a rate cap on credit supply

- **Cap policy:** $\bar{r} = \delta \cdot r_1$ for dates 1 and 2, with $0 < \delta < 1$ and $R_2 > \bar{r}$ (binding)
- **Intuition:** to determine effects of cap on credit supply, need to compare banks' break even interest rate with and w/o the cap
  - break-even rate w/o cap: $c/p - \gamma \cdot (R_2 - c)$
  - With cap the break-even rate rises to: $c/p - \gamma \cdot (\bar{r} - c)$

Proposition: predicted effect of rate cap on credit supply

Under the cap policy, equilibrium credit supply in date 1 strictly increases if and only if

$$\delta > \frac{1 - \theta/\epsilon(r_1)}{c/p - \gamma \cdot (R_2 - c)} \Big(c/p - \gamma \cdot (\bar{r} - c) \Big)$$

- More likely to be satisfied as $\theta \to 1$ (strong *ex ante* market power)
- Less likely to be satisfied as $\gamma \to 1$ (strong *ex post* market power)

Main Results for Lending Outcomes

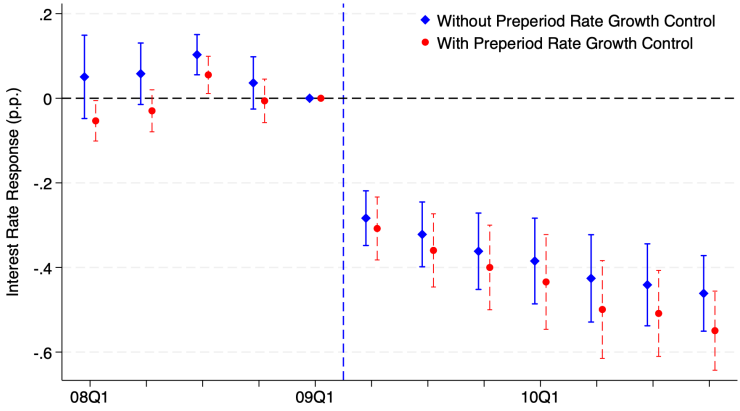
Empirical strategy: branch-level exposure to the cap

- Diff-in-diff using branch-level average rates charged on outstanding loans in year prior to reform relative to the 13% cap (in basis points):

$$Y_{i,t} = \sum_{s=-m, s\neq -1}^{s=n} \beta_s \cdot \underbrace{\text{TrtIntensity}_i \times \mathbb{1}\{t=s\}}_{\text{cap exposure}} + \underbrace{\nu_{Bank(i),t}}_{\text{bank-time FEs}} + \underbrace{\psi_{d(i),t}}_{\text{district-time FEs}}$$
$$+ \sum_{s=-m, s\neq -1}^{s=n} \gamma_s \cdot \underbrace{\text{PreRateGrowth}_i \times \mathbb{1}\{t=s\}}_{\text{time trend in rates}} + \underbrace{\eta_i}_{\text{branch FEs}} + \epsilon_{i,t}$$

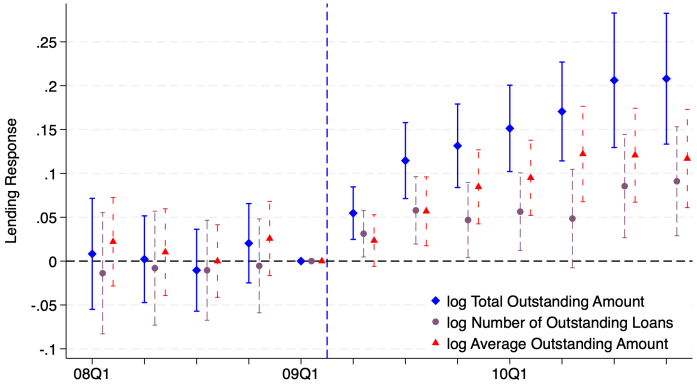
- Set $\text{TrtIntensity}_i = 0$ if pre-cap avg. rate $< 13\%$ (inframarginal branches)
  - $\Longrightarrow$ We have a proper control group for a continuous DiD (de Chaisemartin et al. 2024)
- $\text{PreRateGrowth}_i \times \mathbb{1}\{t=s\}$ accounts for time trend of pre-regulation growth in rates

Clear first stage effect on branch-level rates



- **Pass through:** 100 bps. ↑ in TrtIntensity_i $\implies$ 55 bps. ↓ in rates over cap period Bunching

Equilibrium credit supply increased on extensive and intensive margins



- Average dollar amount of loans also increases Pooled Lights
- Holds with or w/o inclusion of $\psi_{d,t}$ district $\times$ quarter FEs
- Uniform pricing within a bank is not at play in this setting
  - Within-bank stdev. of TrtIntensity_i is 59 bps.
- Loan product may differ across locations due to competition or risk Rates Deposits Risk

IV analysis to estimate lending semi-elasticities

	log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)
Interest Rate	-0.31***	-0.33***	-0.14**	-0.16***	-0.17***	-0.18***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)
Specification	IV	IV	IV	IV	IV	IV
MOP F-Stats	109.54	106.07	109.54	106.07	109.54	106.07
TSLS 5% Critical Value	37.42	37.42	37.42	37.42	37.42	37.42
Branch FE	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X
District X Quarter FE	X	X	X	X	X	X
Preperiod Rate Growth Control		X		X		X
Number of Banks	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260

- Semi-elasticity: 100 bps. $\downarrow$ in rates $\implies$ 36% $\uparrow$ in branch-level lending Heterogeneity
- Corresponds to elasticity of credit demand w.r.t. real interest rates of ≈ 1.7
  - Under monopoly ($\theta = 1$), markup ratio of 2.43 over expected cost of credit
  - Within Altavilla et al. (2022) range of estimates for EU firms during COVID

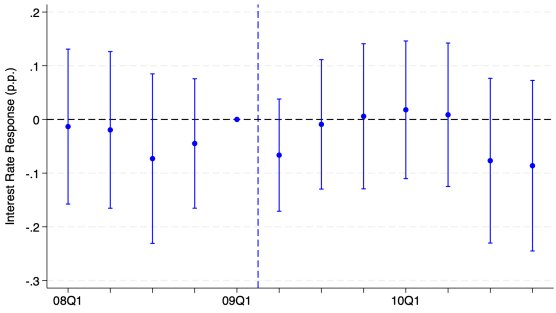
No evidence of changes in costs or borrower risk

	Delinquency Rate: ≥ 9 Months	Delinquency Rate: ≥ 3 Months	Proportion of Secured Loans	Predicted Delinquency Rate	Deposit Rate for Individual Accounts	log Total Deposit Amount for Individual Accounts
	(1)	(2)	(3)	(4)	(5)	(6)
Trt Intensity x 08Q1-Q4	0.001	-0.001	-0.000	-0.001	0.024	-0.036**
	(0.002)	(0.003)	(0.003)	(0.001)	(0.042)	(0.016)
Trt Intensity x 09Q2-Q4	0.000	-0.000	0.004*	-0.001	-0.052	0.014
	(0.002)	(0.004)	(0.002)	(0.001)	(0.036)	(0.013)
Trt Intensity x 10Q1-Q4	-0.001	-0.000	0.002	0.000	-0.004	0.015
	(0.003)	(0.004)	(0.002)	(0.001)	(0.048)	(0.019)
Specification	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X
District X Quarter FE	X	X	X	X	X	X
Baseline Mean	0.044	0.056	0.978	0.057	8.535	7.575
Number of Banks	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260
Adj. R-squared	0.757	0.735	0.929	0.957	0.801	0.893

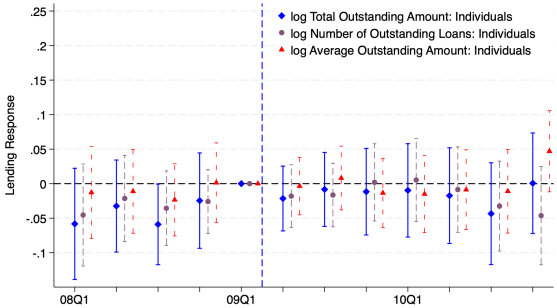
- Further, no shift in credit towards less risky sectors, as measured by *ex ante* delinquencies
- Tests using bank branch network version of TrtIntensity_j also show little evidence of spatial reallocation (Acharya et al. 2022) Network Event studies Sector shares IV

Placebo: no effect on loans to individual borrowers

(a) Interest Rate



(b) Credit Supply



- Reassuring because loans to individuals never subject to this rate cap policy
- Given null results for deposits, no evidence of cross-product spillovers (Ornelas et al. 2024)

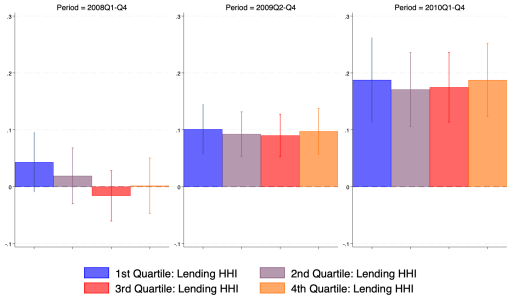
Additional results & robustness checks

1. Honest DiD robust pre-trends test of Rambachan & Roth (2023) ✓ Go to
   - Lending responses remain significant even at more stringent bounds $M > 2$ on post-reform deviations from parallel trends
2. Including finer fixed effects at subdistrict-time (*upazila*) level ✓ Go to
3. Similar results for tradable vs. non-tradable sector firms ✓ Go to
4. Alternative samples with public banks or w/o Islamic finance institutions ✓ Go to
5. Monotonic results using discretized version of TrtIntensity_i ✓ Go to
6. Using arithmetic average interest rates to construct TrtIntensity_i ✓ Go to
7. Results including extended period after cap removal ✓ Go to
   - Rates do not recover due to gap between now lower repo rate and 13% cap Go to
   - Similar dynamic pattern with night-time lights Lights

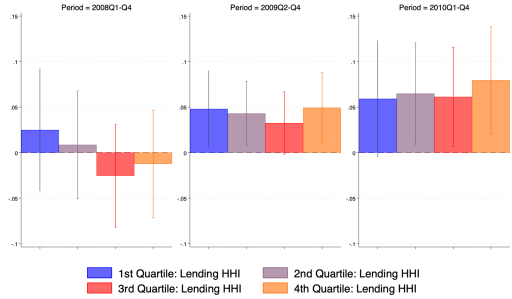
Further Evidence of Ex Ante Market Power

No heterogeneous responses to the cap depending on HHI

(a) Log Outstanding Loan Amount



(b) Log Number of Loans



- HHI may not proxy well for market power in contexts where competition occurs on both quantity and price dimensions (De Loecker, Eeckhout, Unger 2020) Deposit HHI Scatter
- Motivates three more direct tests of *ex ante* market power using margins of competition

Test #1: (Non-)Role of close competitors' price setting

$$Y_{i,d,t} = \alpha_1 \cdot \text{InterestRate}_{i,t} + \alpha_2 \cdot \text{CompetingRate}_{i,t} + \eta_i + \nu_{Bank(i),t} + \psi_{d,t} + \epsilon_{i,d,t}$$

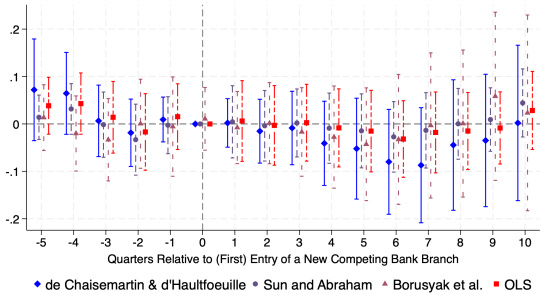
	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)
Interest Rate	-0.34***	-0.13*	-0.22***
	(0.08)	(0.07)	(0.06)
Competing Branch's Interest Rate	-0.12	-0.11	-0.01
	(0.07)	(0.06)	(0.06)
Specification	IV	IV	IV
Lewis and Mertens F-Statistics	41.22	41.22	41.22
Branch FE	X	X	X
Bank X Quarter FE	X	X	X
District X Quarter FE	X	X	X
Number of Banks	39	39	39
Number of Branches	1084	1084	1084
Observations	13008	13008	13008

- Match each parent bank to its **closest competitor** bank based on balance sheet size and sectoral specialization in the pre-cap period
- No effect of (cap-instrumented) competing bank's average branch rates on lending

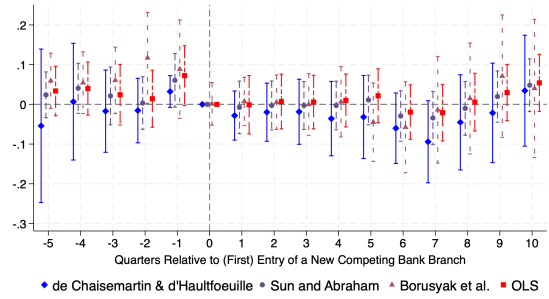
Test #2: Branch-level null effects of competitors' entry

$$Y_{i,d,t} = \sum_{t=-m, t\neq -1}^{t=n} \xi_t \cdot Entry_{i,Bank(i,j),t} + \eta_i + \nu_{Bank(i),t} + \psi_{d,t} + \varepsilon_{i,d,t}$$

(a) Log Outstanding Loan Amount



(b) Log Number of Loans



- $Entry = 1 \implies$ branch of closest competitor enters the same subdistrict as branch i
- Incumbents do not alter their lending or loan pricing in response to entrants Rates Test #3

Conclusions and policy implications

- Effects of an interest rate cap on credit supply are theoretically ambiguous when banks wield both *ex ante* and *ex post* (i.e. relationship lending) market power

- We study a 2009 interest rate cap on corporate loans in Bangladesh in which both forms of market power are likely present
  - Extensive + intensive margin credit supply **increase** $\longrightarrow$ real credit demand elasticity of 1.7
  - No evidence of reallocation away from riskier borrowers, in contrast to previous studies
  - Direct evidence that bank branches faced imperfect competition for **new contracts** based on null effects of competitors' local entry on loan pricing and credit supply

- **Policy implications:** interest rate markups are an important parameter for gauging desirability of caps from a market efficiency perspective
  - Credit rationing may be more of a concern for caps on loans to SMEs
  - Macro/GE tradeoffs may reduce desirability of caps: distortion of monetary policy transmission and reduced long-run incentives of banks to enter

THANK YOU!

SSRN paper downloadable here

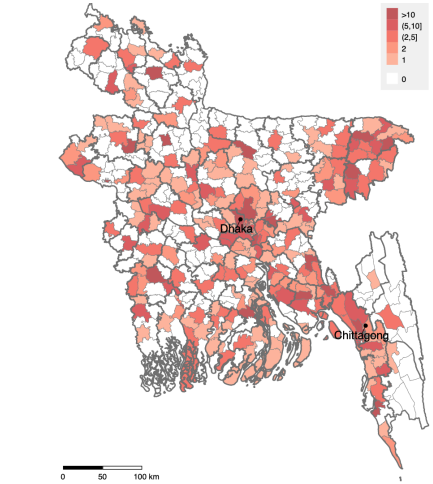
↓↓

Appendix

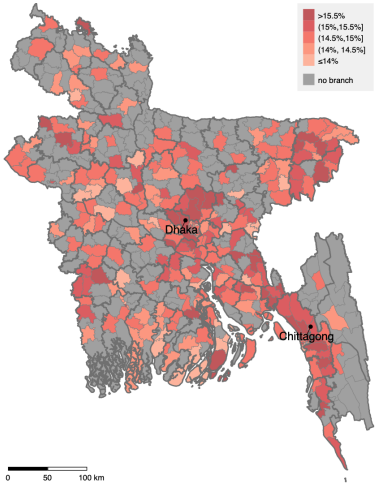
Spatial Patterns of Bank Branches and Rates

Go back

(a) Number of Branches

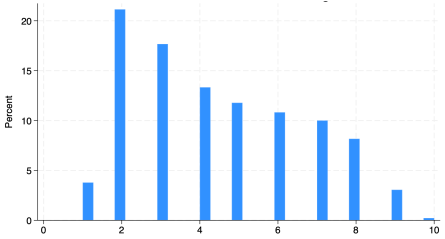


(b) Average Interest Rates



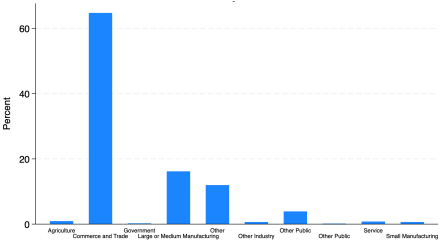
Bank branch lending patterns by major industrial sector

(a) Number of Sectors

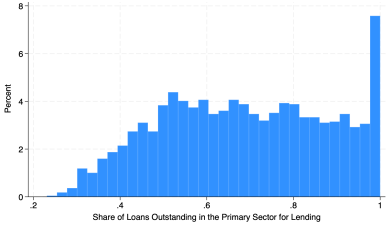


(b) Primary Sector

Go back

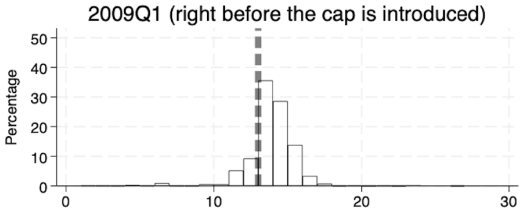


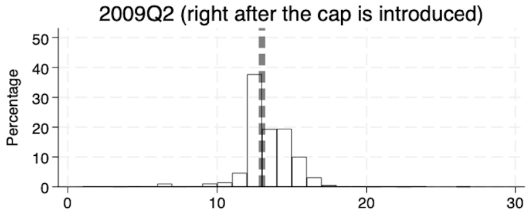
(c) Share of Primary Sector Outstanding Loans

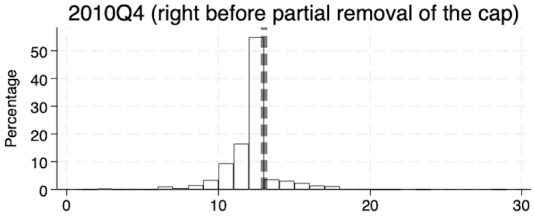


Bunching below the threshold right after reform

Go back







- Persistence of loans above the cap in the post-reform period stems from reform not applying retroactively to current contracts

Pooled event study effects of the rate cap

Go back

	Interest Rate		log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TrtIntensity x 2008Q1-Q4	0.06*	-0.01	0.00	0.01	-0.01	-0.01	0.01	0.01
	(0.03)	(0.01)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)
TrtIntensity x 2009Q2-Q4	-0.33***	-0.36***	0.09***	0.10***	0.04**	0.05***	0.05***	0.05***
	(0.04)	(0.04)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
TrtIntensity x 2010Q1-Q4	-0.46***	-0.50***	0.18***	0.18***	0.07**	0.07***	0.11***	0.11***
	(0.05)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X
District X Quarter FE	X	X	X	X	X	X	X	X
Preperiod Rate Growth Control		X		X		X		X
Baseline Mean	14.90	14.90	6.91	6.91	4.33	4.33	2.58	2.58
Number of Banks	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260
Adj. R-squared	0.87	0.88	0.95	0.95	0.91	0.91	0.92	0.92

What predicts pre-cap branch-level interest rates?

Go back

	Interest Rate				
	(1)	(2)	(3)	(4)	(5)
Deposit Rate	0.164***	-0.010	-0.030***	-0.029***	-0.015
	(0.006)	(0.010)	(0.010)	(0.010)	(0.012)
Delinquency Rate: $\geq$ 9 Months	-0.289***	-0.037	0.146*	0.181**	0.152*
	(0.108)	(0.081)	(0.080)	(0.080)	(0.083)
Proportion of Secured Loans	-3.132***	-0.599*	-0.531	-0.513	-0.505
	(0.090)	(0.349)	(0.350)	(0.350)	(0.359)
ln(Population Density)			-0.118***	-0.105***	
			(0.005)	(0.005)	
Subdistrict-Bank HHI				0.239***	
				(0.031)	
Specification	OLS	OLS	OLS	OLS	OLS
Bank FE		X	X	X	X
Subdistrict FE					X
Mean	14.938	14.938	14.938	14.938	14.938
Number of Banks	39	39	39	39	39
Observations	9959	9959	9959	9959	9959
Adj. R-squared	0.281	0.528	0.558	0.560	0.599

What predicts pre-cap branch-level deposit rates?

Go back

	Deposit Rate				
	(1)	(2)	(3)	(4)	(5)
Interest Rate	0.661***	-0.069	-0.109**	-0.106*	-0.066
	(0.072)	(0.050)	(0.055)	(0.055)	(0.063)
Delinquency Rate: 9 Months or More Overdue	-2.481***	-0.056	0.058	0.031	-0.444
	(0.515)	(0.378)	(0.366)	(0.368)	(0.434)
Proportion of Secured Loans	2.741***	4.495***	4.498***	4.493***	4.580***
	(0.349)	(1.147)	(1.157)	(1.156)	(1.150)
ln(Population Density)			-0.061***	-0.068***	
			(0.019)	(0.020)	
Subdistrict-Bank HHI				-0.147	
				(0.101)	
Specification	OLS	OLS	OLS	OLS	OLS
Bank FE		X	X	X	X
Subdistrict FE					X
Mean	7.720	7.720	7.720	7.720	7.720
Number of Banks	39	39	39	39	39
Observations	2124	2124	2124	2124	2124
Adj. R-squared	0.113	0.661	0.663	0.663	0.699

What predicts pre-cap branch-level delinquency rates?

Go back

	Delinquency Rate: 9 Months or More Overdue				
	(1)	(2)	(3)	(4)	(5)
Interest Rate	-0.005**	-0.002	0.001	0.001	0.000
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Deposit Rate	-0.005***	-0.000	0.000	0.000	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Proportion of Secured Loans	0.024***	0.039**	0.036**	0.036**	0.043**
	(0.007)	(0.018)	(0.018)	(0.018)	(0.021)
ln(Population Density)			0.005***	0.003**	
			(0.001)	(0.001)	
Subdistrict-Bank HHI				-0.024***	
				(0.008)	
Specification	OLS	OLS	OLS	OLS	OLS
Bank FE		X	X	X	X
Subdistrict FE					X
Mean	0.040	0.040	0.040	0.040	0.040
Number of Banks	39	39	39	39	39
Observations	2124	2124	2124	2124	2124
Adj. R-squared	0.025	0.069	0.076	0.080	0.125

Heterogeneous responses by branch characteristics

Go back

	log Total Outstanding Amount				
	(1)	(2)	(3)	(4)	(5)
Interest Rate	-0.31***	-0.20***	-0.33***	-0.39***	-0.34**
	(0.06)	(0.06)	(0.09)	(0.09)	(0.14)
Interest Rate X Above Median Dummy (Subdistrict-Bank HHI)	0.09				0.04
	(0.08)				(0.09)
Interest Rate X Above Median Dummy (Population Density)		-0.21**			-0.15
		(0.08)			(0.10)
Interest Rate X Above Median Dummy (Delinquency Rate: $\geq$ 9 Months)			0.10		0.13*
			(0.08)		(0.07)
Interest Rate X Above Median Dummy (Proportion of Secured Loans)			0.02		0.04
			(0.07)		(0.08)
Interest Rate X Above Median Dummy (Deposit Rate: Total Accounts)			-0.03		-0.09
			(0.11)		(0.13)
Interest Rate X Above Median Dummy (Leverage Ratio)				0.01	0.10
				(0.12)	(0.12)
Interest Rate X Above Median Dummy (Bank Delinquency Rate: $\geq$ 9 Months)				0.13	0.12
				(0.11)	(0.14)
Specification	IV	IV	IV	IV	IV
Lewis and Mertens F-Statistics	74.50	71.04	32.22	26.18	9.01
Branch FE	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X
District X Quarter FE	X	X	X	X	X
Baseline Mean	6.91	6.91	6.91	6.91	6.91
Number of Banks	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260

IV RESPONSES BY BRANCH CHARACTERISTICS – MARGINS

GO BACK

	log Number of Outstanding Loans					log Average Outstanding Amount				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interest Rate	-0.11*	-0.11*	-0.14*	-0.09	-0.09	-0.20***	-0.09*	-0.19**	-0.23***	-0.19*
	(0.06)	(0.06)	(0.08)	(0.07)	(0.10)	(0.05)	(0.05)	(0.07)	(0.07)	(0.10)
Interest Rate X Above Median Dummy (Subdistrict-Bank HHI)	0.00				0.02	0.09				0.02
	(0.08)				(0.08)	(0.06)				(0.06)
Interest Rate X Above Median Dummy (Population Density)		-0.07			-0.01		-0.14***			-0.17***
		(0.08)			(0.08)		(0.05)			(0.07)
Interest Rate X Above Median Dummy (Delinquency Rate: $\geq$ 9 Months)			0.09		0.10			0.01		0.02
			(0.07)		(0.08)			(0.06)		(0.06)
Interest Rate X Above Median Dummy (Proportion of Secured Loans)			-0.03		-0.04			0.05		0.06
			(0.06)		(0.07)			(0.06)		(0.06)
Interest Rate X Above Median Dummy (Deposit Rate: Total Accounts)			0.01		0.01			-0.04		-0.05
			(0.11)		(0.12)			(0.10)		(0.10)
Interest Rate X Above Median Dummy (Leverage Ratio)				-0.13	-0.11				0.17*	0.22**
				(0.12)	(0.12)				(0.10)	(0.11)
Specification	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
Lewis and Mertens F-Statistics	74.50	71.04	32.22	55.68	17.63	74.50	71.04	32.22	55.68	17.63
Branch FE	X	X	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X	X	X
District X Quarter FE	X	X	X	X	X	X	X	X	X	X
Baseline Mean	4.33	4.33	4.33	4.33	4.33	2.58	2.58	2.58	2.58	2.58
Number of Banks	39	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260

Limited evidence of credit reallocation *within* bank

Go back

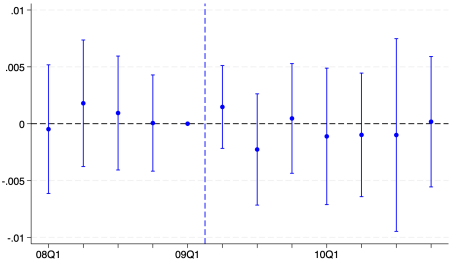
	Interest Rate	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)	(4)
TrtIntensity x 2008Q1-Q4	0.08	0.00	-0.01	0.01
	(0.06)	(0.04)	(0.03)	(0.02)
TrtIntensity x 2009Q2-Q4	-0.33***	0.09***	0.03*	0.05**
	(0.08)	(0.03)	(0.02)	(0.03)
TrtIntensity x 2010Q1-Q4	-0.45***	0.18***	0.06**	0.11***
	(0.07)	(0.05)	(0.02)	(0.03)
Network TrtIntensity x 2008Q1-Q4	-0.00	0.05**	0.03	0.02
	(0.03)	(0.02)	(0.03)	(0.02)
Network TrtIntensity x 2009Q2-Q4	-0.09**	-0.00	-0.04	0.03*
	(0.04)	(0.02)	(0.03)	(0.02)
Network TrtIntensity x 2010Q1-Q4	-0.09	0.01	-0.04	0.05*
	(0.05)	(0.03)	(0.03)	(0.03)
Specification	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
District X Quarter FE	X	X	X	X
Baseline Mean	14.86	6.96	4.32	2.64
Number of Banks	38	38	38	38
Number of Branches	1596	1596	1596	1596
Observations	19152	19152	19152	19152
Adj. R-squared	0.87	0.96	0.91	0.93

- Network TrtIntensity$_i$ = share-weighted average of all other branches' cap exposure
- Similar approach to internal capital network regressions of Giroud & Mueller (2015,19)
- Sign is also opposite of what theory would predict
- Branches should increase lending by less if more exposed to cap via parent bank

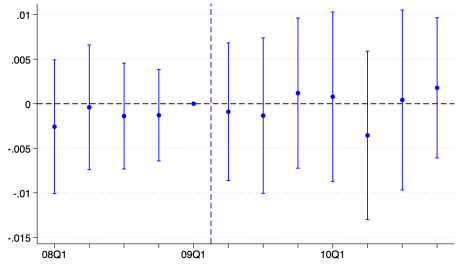
No dynamic effect on delinquencies

Go back

(a) Delinquency Rate: $\geq$ 9 Months Overdue



(b) Delinquency Rate: $\geq$ 3 Months Overdue

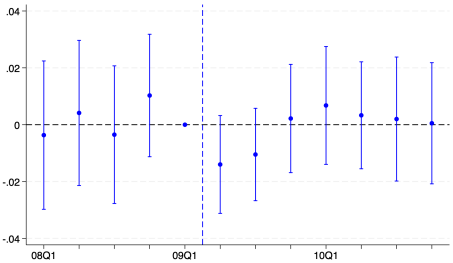


- Pre-cap mean 9+ months delinquency rate of $\approx 4\%$
  - About the same as delinquency rate on consumer loans in U.S. around GFC

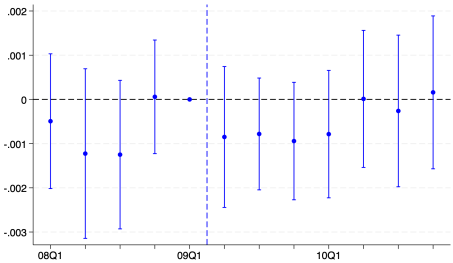
No dynamic effect on secured loans or predicted delinquency based on sectoral risk

Go back

(a) Proportion of Secured Loans



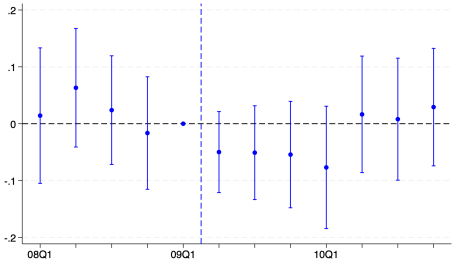
(b) Predicted Delinquency Rate



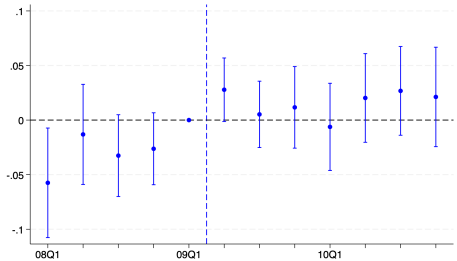
- Predicted delinquency constructed in two steps:
  - Avg. pre-cap delinquency rate for each of 46 detailed sectors at the bank level
  - Compute branch-quarter-level predicted delinquency rate as the weighted avg. of these bank-sector delinquency rates, with outstanding loan amounts by sector as weights

No dynamic effect on funding costs (deposits) Go back

(a) Deposit Rate for Individual Accounts



(b) Log Total Deposit Amount



- Pre-cap mean deposit rate for individual accounts of 8.6%
  - Deposit franchise plays less of a role in how banks respond to loan rate cap due to moral suasion of central bank to keep deposit rates high

No shift in credit away from *ex ante* riskier sectors

Go back

	Deposit Rate: Total Accounts	log Deposit Amount: Total Accounts	Deposit Rate: Corporate Accounts	log Deposit Amount: Corporate Accounts
	(1)	(2)	(3)	(4)
Interest Rate	0.01	-0.04	0.01	0.19
	(0.01)	(0.03)	(0.04)	(0.16)
Specification	IV	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	107.25	107.25	46.96	46.96
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
District X Quarter FE	X	X	X	X
Baseline Mean	5.910	6.491	5.934	4.660
Number of Banks	39	39	39	39
Number of Branches	1855	1855	1712	1712
Observations	22260	22260	13035	13035

- No change in lending shares to broad sectors despite potential differential exposure to recession or trade patterns

IV estimates of (null) changes in borrower risk

Go back

	Delinquency Rate: $\geq$ 9 Months	Delinquency Rate: $\geq$ 3 Months	Proportion of Secured Loans	Predicted Delinquency Rate
	(1)	(2)	(3)	(4)
Interest Rate	0.002	-0.002	0.006	-0.000
	(0.004)	(0.008)	(0.020)	(0.001)
Specification	IV	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	109.538	109.538	109.538	109.538
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
District X Quarter FE	X	X	X	X
Baseline Mean	0.044	0.056	0.641	0.057
Number of Banks	39	39	39	39
Number of Branches	1855	1855	1855	1855
Observations	22260	22260	22260	22260

IV estimates of (null) changes in deposit rates

Go back

	Deposit Rate: Total Accounts	log Deposit Amount: Total Accounts	Deposit Rate: Corporate Accounts	log Deposit Amount: Corporate Accounts
	(1)	(2)	(3)	(4)
Interest Rate	0.01	-0.04	0.01	0.19
	(0.01)	(0.03)	(0.04)	(0.16)
Specification	IV	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	107.25	107.25	46.96	46.96
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
District X Quarter FE	X	X	X	X
Baseline Mean	5.910	6.491	5.934	4.660
Number of Banks	39	39	39	39
Number of Branches	1855	1855	1712	1712
Observations	22260	22260	13035	13035

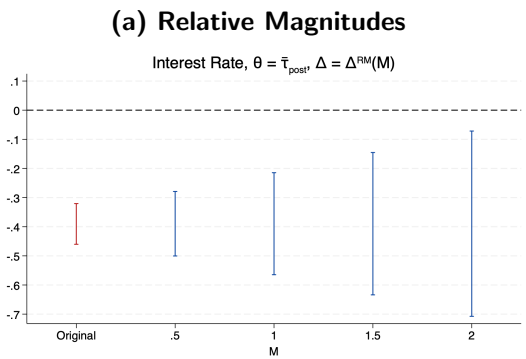
IV estimates of (null) changes in sector composition

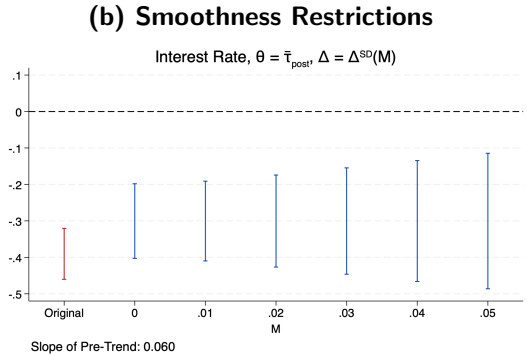
Go back

	Share of Outstanding Loans: Manufacturing	Share of Outstanding Loans: Import or Export	Share of Outstanding Loans: Others
	(1)	(2)	(3)
Interest Rate	-0.01	-0.00	0.02
	(0.01)	(0.01)	(0.01)
Specification	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	109.54	109.54	109.54
Branch FE	X	X	X
Bank X Quarter FE	X	X	X
District X Quarter FE	X	X	X
Baseline Mean	0.16	0.09	0.75
Number of Banks	39	39	39
Number of Branches	1855	1855	1855
Observations	22260	22260	22260

Rambachan & Roth (2023) pre-trends tests for interest rates

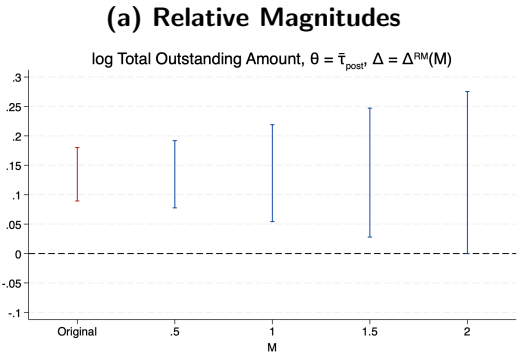
Go back

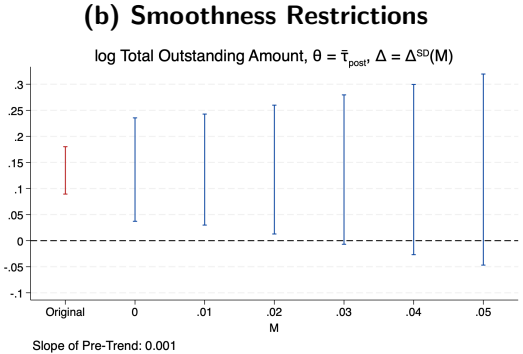




Rambachan & Roth (2023) pre-trends tests for total lending

Go back

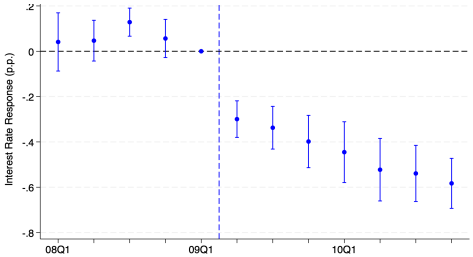




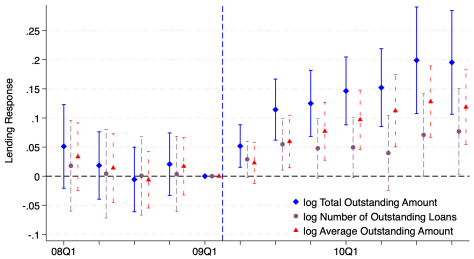
Robustness to inclusion of subdistrict × quarter FEs

Go back

(a) Interest Rates



(b) Lending Responses

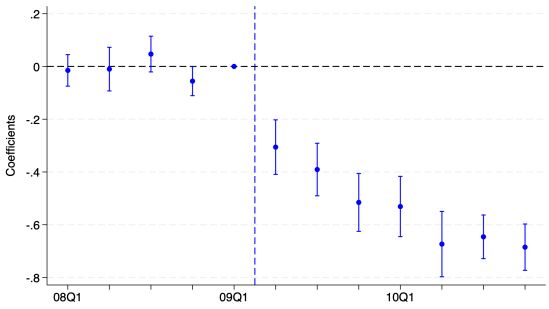


- Note: the average subdistrict (*upazila*) is roughly one-sixth the size of the average U.S. county in acreage
- The average district (*zila*) is roughly equivalent to the typical U.S. county in area

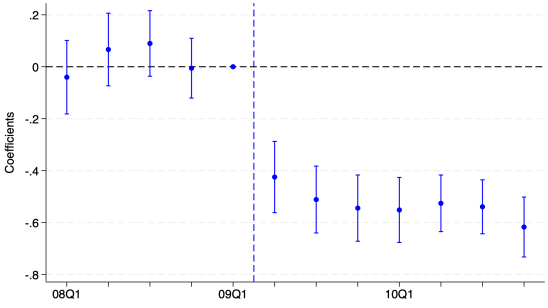
Results for interest rates charged to tradables vs. non-tradables firms

Go back

(a) Loan Rates for Commerce/Trade Sector



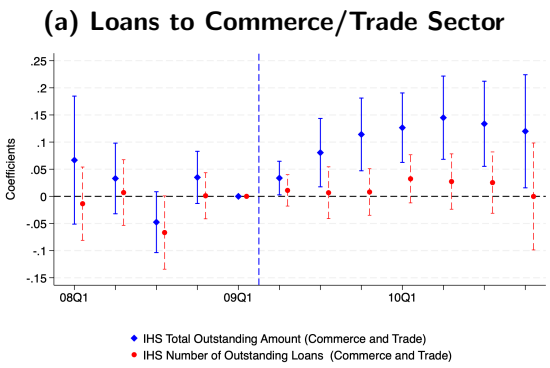
(b) Loan Rates for Other Sectors

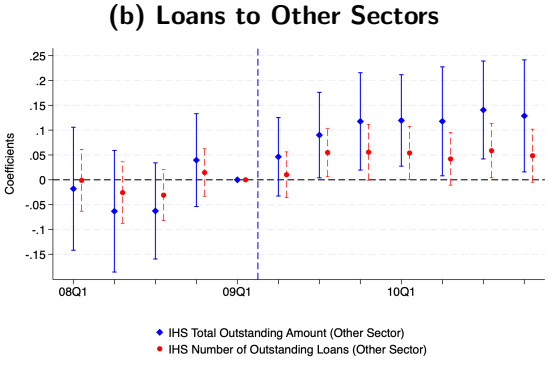


- Pass through of cap to branch-level interest rates nearly identical for loans to tradable vs. non-tradable firms

Results for lending to tradables vs. non-tradables

Go back





- Slightly larger extensive margin response for loans to non-export firms
- Note: use IHS transform to account for fact that some branches do not make loans to particular sectors (but similar if we use logs)

Results hold if include public banks in the sample

Go back

	Interest Rate		log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trt Intensity x 08Q1-Q4	-0.005	-0.004	0.005	0.003	0.007	0.008	-0.001	-0.005
	(0.005)	(0.005)	(0.016)	(0.017)	(0.021)	(0.022)	(0.016)	(0.017)
Trt Intensity x 09Q2-Q4	-0.536***	-0.532***	0.082***	0.077***	0.058***	0.052***	0.024	0.025
	(0.029)	(0.031)	(0.015)	(0.016)	(0.018)	(0.019)	(0.017)	(0.018)
Trt Intensity x 10Q1-Q4	-0.709***	-0.716***	0.137***	0.137***	0.120***	0.122***	0.017	0.015
	(0.033)	(0.034)	(0.022)	(0.023)	(0.024)	(0.025)	(0.021)	(0.022)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X
District X Quarter FE		X		X		X		X
Baseline Mean	13.823	13.823	5.371	5.371	4.062	4.062	1.309	1.309
Number of Banks	46	46	46	46	46	46	46	46
Number of Branches	4852	4852	4852	4852	4852	4852	4852	4852
Observations	58224	58224	58224	58224	58224	58224	58224	58224
Adj. R-squared	0.828	0.829	0.943	0.943	0.777	0.778	0.895	0.895

- $\approx$ 50% larger pass through to interest rates but smaller lending response if include public banks (more inframarginal public sector branches)

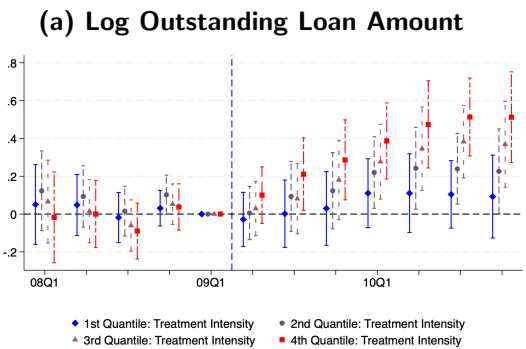
Results also hold if exclude Islamic finance institutions

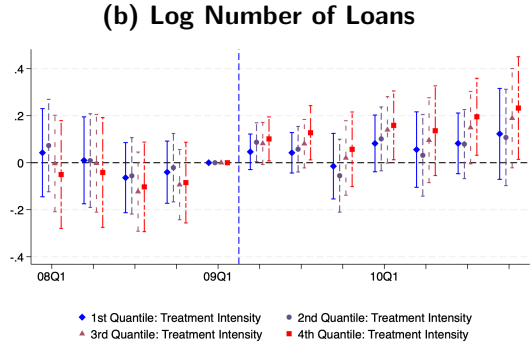
Go back

	Interest Rate		log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trt Intensity x 08Q1-Q4	-0.013**	-0.014**	0.008	0.018	-0.005	0.002	0.013	0.016
	(0.005)	(0.006)	(0.023)	(0.025)	(0.029)	(0.031)	(0.020)	(0.021)
Trt Intensity x 09Q2-Q4	-0.352***	-0.349***	0.091***	0.100***	0.034**	0.048***	0.057***	0.053***
	(0.042)	(0.044)	(0.019)	(0.020)	(0.017)	(0.018)	(0.017)	(0.018)
Trt Intensity x 10Q1-Q4	-0.431***	-0.457***	0.160***	0.173***	0.055**	0.065**	0.106***	0.108***
	(0.044)	(0.048)	(0.031)	(0.034)	(0.027)	(0.029)	(0.024)	(0.026)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X
District X Quarter FE		X		X		X		X
Baseline Mean	14.884	14.884	6.768	6.768	4.092	4.092	2.676	2.676
Number of Banks	31	31	31	31	31	31	31	31
Number of Branches	1468	1468	1468	1468	1468	1468	1468	1468
Observations	17616	17616	17616	17616	17616	17616	17616	17616
Adj. R-squared	0.881	0.881	0.954	0.954	0.888	0.887	0.907	0.907

- Nearly identical point estimates relative to our full estimation sample of branches

Monotonic effects if discretize TrtIntensity$_i$ Go back





- 1st quartile here includes branches inframarginal to the loan rate cap for whom TrtIntensity$_i = 0$

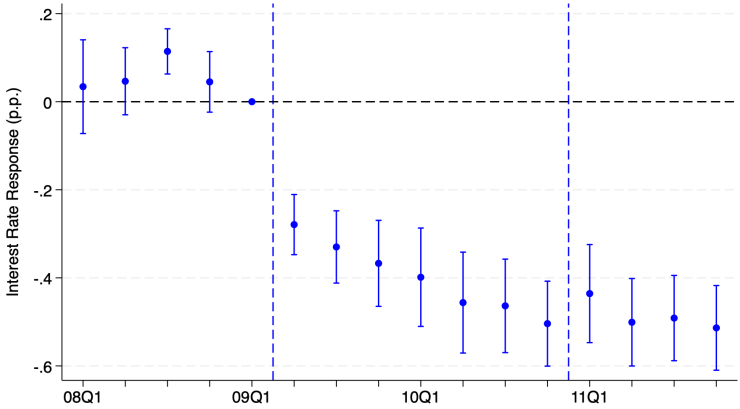
Robustness to using arithmetic average rates to construct TrtIntensity$_i$

Go back

	Interest Rate		log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trt Intensity x 08Q1-Q4	0.001	0.002	-0.002	0.002	-0.018	-0.016	0.016	0.018
	(0.015)	(0.016)	(0.015)	(0.015)	(0.020)	(0.021)	(0.015)	(0.016)
Trt Intensity x 09Q2-Q4	-0.212***	-0.210***	0.040***	0.043***	0.027*	0.035**	0.013	0.007
	(0.060)	(0.065)	(0.014)	(0.015)	(0.015)	(0.015)	(0.021)	(0.021)
Trt Intensity x 10Q1-Q4	-0.306***	-0.318***	0.085***	0.091***	0.048*	0.056**	0.037	0.035
	(0.072)	(0.081)	(0.026)	(0.029)	(0.026)	(0.027)	(0.040)	(0.044)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X
District X Quarter FE		X		X		X		X
Baseline Mean	15.003	15.003	6.905	6.905	4.326	4.326	2.579	2.579
Number of Banks	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260
Adj. R-squared	0.891	0.892	0.955	0.955	0.906	0.906	0.921	0.921

- Similarly, we still find null effects on risk profile and cost outcomes if redefine TrtIntensity$_i$ using arithmetic averages

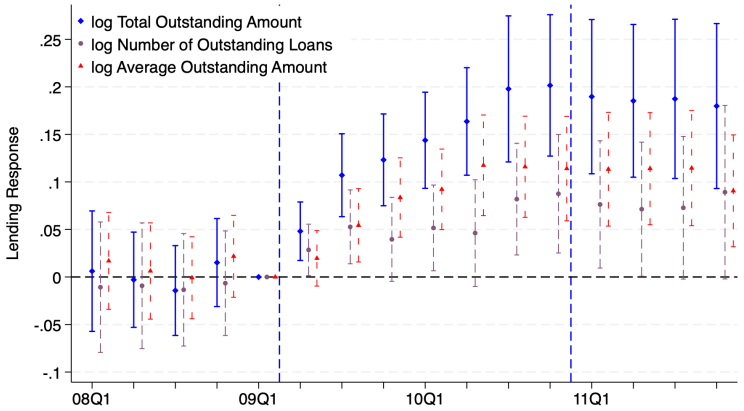
Rates do not immediately bounce back after cap removal



- 13% cap became more non-binding over the policy period due to lower policy repo rates (fell by $>$ 200 bps over the two years) Go back

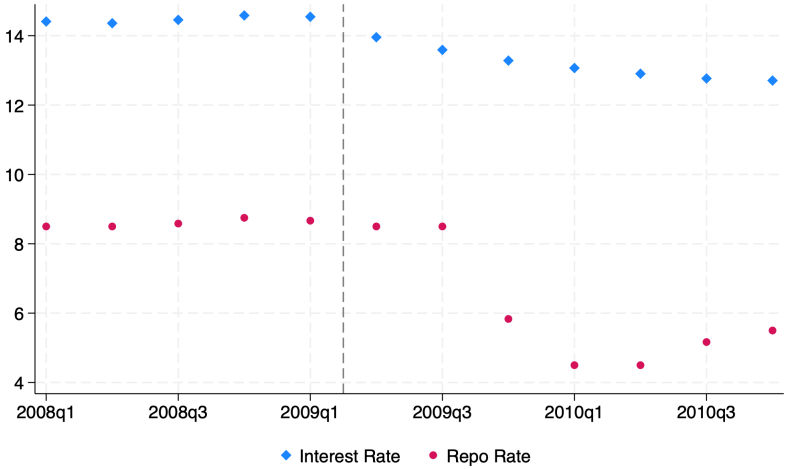
Lending does not decline after cap removal

Go back



- Continuation of bank-borrower relationships that formed during the preceding cap regime
- Cap became less binding over time due to dovish monetary policy

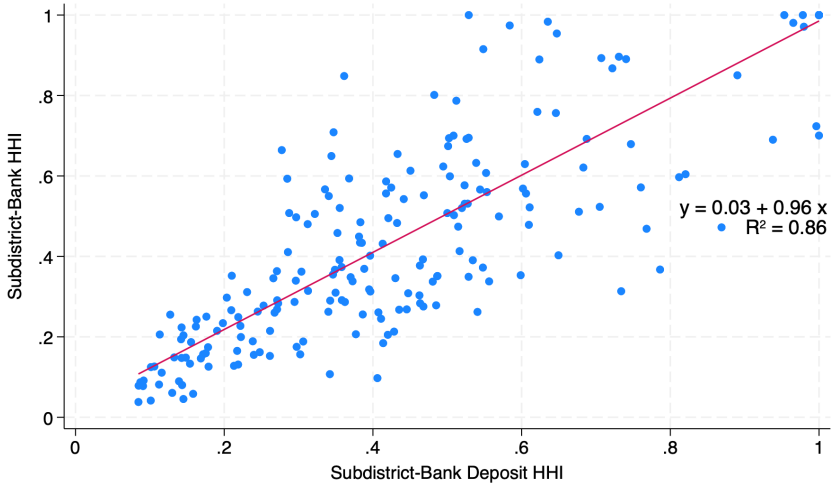
Gap between 13% cap and repo rate widens over regime



- Stimulative monetary policy would have made the 13% cap less binding over time Go back

Very high correlation between lending and deposit HHIs at subdistrict level

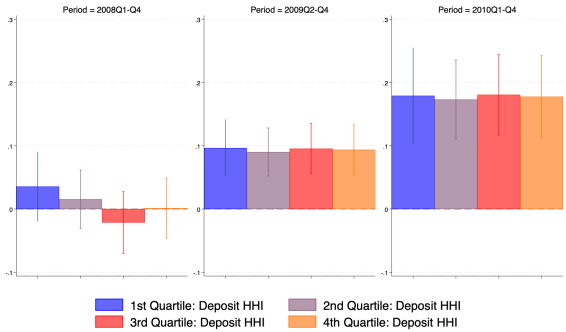
Go back



No heterogeneous responses to the cap depending on deposit HHI

Go back

(a) Log Outstanding Loan Amount

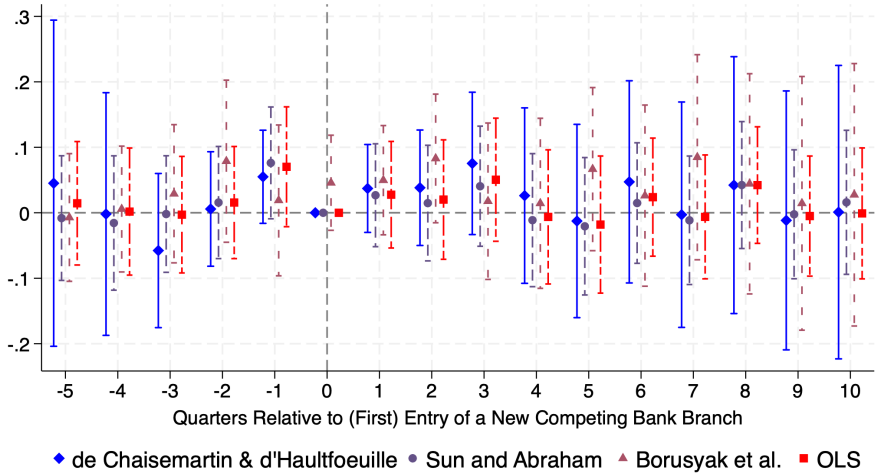


(b) Log Number of Loans

- Mirrors lack of heterogeneity in reduced form effects of the cap by lending HHIs

Test #2: null effect of entry on interest rates

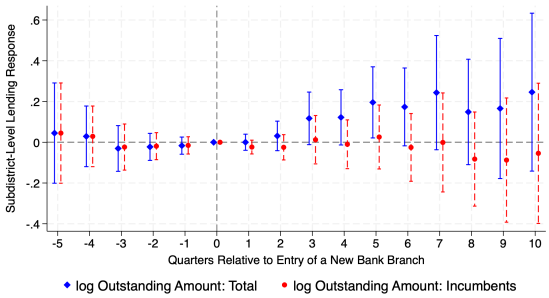
Go back



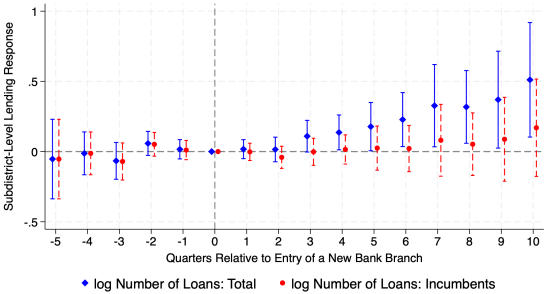
Test #3: local lending changes due to new branch entry

$$Y_{s,d,t} = \sum_{t=-m, t\neq -1}^{t=n} \xi_t \cdot Entry_{s,t} + \eta_s + \psi_{d,t} + \varepsilon_{s,d,t}$$

(a) Log Outstanding Loan Amount



(b) Log Number of Loans

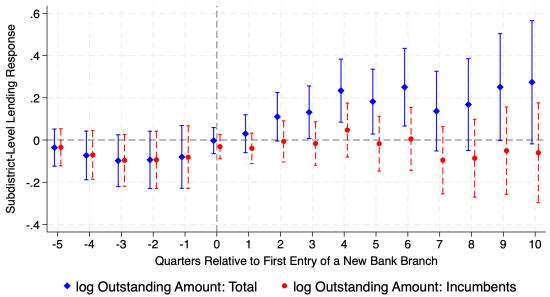


- Credit supply changes at the subdistrict level only due to new branches entering Go back

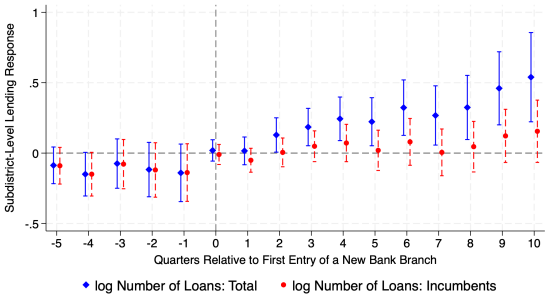
Test #3: local lending changes due to new branch entry: Borusyak et al. (2024) estimator

$$Y_{s,d,t} = \sum_{t=-m, t\neq -1}^{t=n} \xi_t \cdot Entry_{s,t} + \eta_s + \psi_{d,t} + \varepsilon_{s,d,t}$$

(a) Log Outstanding Loan Amount



(b) Log Number of Loans



- Borusyak et al. (2024) estimator includes more rural districts in control group who are less likely to experience new branch openings Go back

Suggestive evidence of investment response from night-time lights

Go back

	Nighttime Light Digital Number				IHS(Nighttime Light Digital Number)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TrtIntensity x 2005	-0.00	-0.00			-0.00	-0.00		
	(0.01)	(0.01)			(0.02)	(0.01)		
TrtIntensity x 2006	0.00	0.00			-0.02	-0.01		
	(0.01)	(0.01)			(0.02)	(0.02)		
TrtIntensity x 2007	0.01	0.00			0.01	-0.01		
	(0.01)	(0.01)			(0.01)	(0.01)		
TrtIntensity x 2009	0.01	0.01			0.04**	0.03*		
	(0.01)	(0.01)			(0.02)	(0.02)		
TrtIntensity x 2010	0.02	0.03**			0.02	0.02		
	(0.02)	(0.01)			(0.03)	(0.02)		
TrtIntensity x 2011	0.01	0.01			0.03	0.02		
	(0.02)	(0.01)			(0.02)	(0.02)		
TrtIntensity x 2012	0.02	0.02**			0.04*	0.03		
	(0.02)	(0.01)			(0.02)	(0.02)		
TrtIntensity x 2013	0.02	0.03**			0.07***	0.05*		
	(0.02)	(0.01)			(0.02)	(0.02)		
TrtIntensity x 2009-2013			0.01	0.02			0.05**	0.03**
			(0.02)	(0.01)			(0.02)	(0.02)
Specification	PPML	PPML	PPML	PPML	OLS	OLS	OLS	OLS
Subdistrict FE	X	X	X	X	X	X	X	X
Year FE	X		X		X		X	
District X Year FE		X		X		X		X
Baseline Mean	12.352	12.352	12.352	12.352	2.060	2.060	2.060	2.060
Number of Subdistricts	292	292	292	292	292	292	292	292
Observations	2628	2628	2628	2628	2628	2628	2628	2628
Adj. R-squared	0.87	0.88	0.87	0.88	0.98	0.99	0.98	0.99

- Satellite data report intensity of lights as a six-bit digital index between 0 (no light) and 63
- 10 out of 292 subdistricts report no night-time lights
  - Outcome is ordinal but not a "count"
  - Try both Poisson regression (Cohn et al. 2022) and OLS with IHS