Branching Out Inequality:
The Impact of Credit Equality Policies

Jacelly Cespedes
University of Minnesota

Erica Jiang
USC Marshall

Carlos Parra
PUC-Chile

Jinyuan Zhang
UCLA

Policies to Promote Equal Credit Access

- Credit access is crucial for economic development but unequal across regions
  - e.g., Chodorow-Reich (2014), Beck et al. (2010), Chen et al. (2017)

- A major intervention in many countries to promote equal credit access:

  regulating private institutions to supply credit to poorer areas

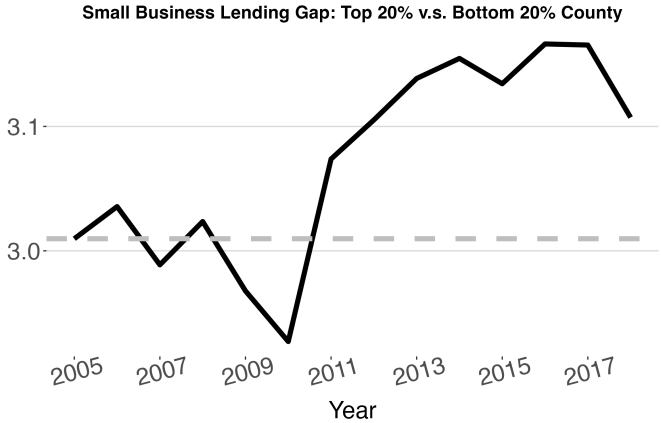
  - e.g., the Community Reinvestment Act (CRA) in the US, India's Priority Sector Lending, and South Africa's National Credit Act

The US Effort

- The CRA since 1977 mandates banks to lend to low-income neighborhoods in areas of their operation
- Designed to steer banks' behavior toward broader social and economic goals
- Banks' incentive and capacity to comply affect the effectiveness of the CRA
  - Rise of non-bank financial institutions, technological advancement, etc
- Ongoing debate/policy reform:

  How effective is the CRA in the current financial system?

Geographic Inequality in Credit Availability in the US



- The small business lending gap b/w rich and poor counties was widened
- Existing studies focus on within-region analysis and do not explain this trend

This Paper: CRA Widens Cross-Region Disparities

The CRA widens cross-region disparities by affecting banks' branching decisions

- Banks subsidize underserved neighborhoods within rich areas under the CRA
- CRA compliance is too costly in poor areas
  - → Banks close branches to sidestep the rule
  - → lending reduction due to CRA-induced branch closures

Rich Areas

Poor Areas

This Paper: Negative Net Effect of the CRA

Expansion of shadow banks makes CRA compliance costlier

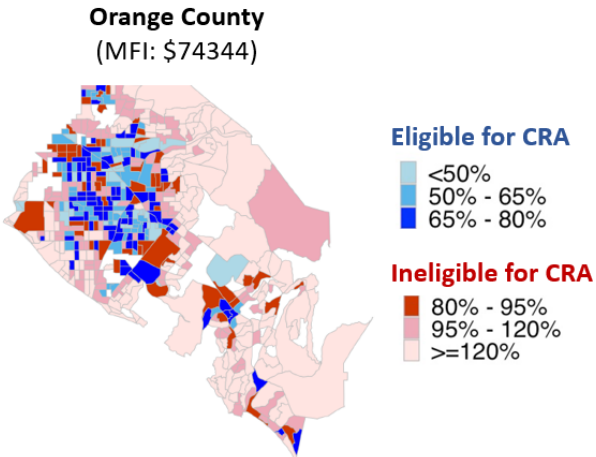
- More CRA-induced branch closures
  - Concentrated in poorer areas with more minority population
- Net effect of the CRA on lending shifts from positive 30% to negative 3.4%
- Widened cross-region disparities in lending, banking access, and real business establishments

Background: CRA Rules

CRA Rules

Sufficient lending and investment in CRA-eligible census tracts within a banking institution's CRA assessment areas

- Assessment area: MSAs (or counties if outside an MSA) in which the bank has its branches and deposit-taking ATMs
- CRA-eligible LMI regions: census tracts with median-family-income (MFI) lower than 80% of assessment area MFI



CRA Rules

- Banks receive CRA ratings: Outstanding, Satisfactory, Needs to Improve, and Substantial Non-compliance
- Why do banks care about CRA ratings?
  - Affect banks' ability to participate in M&As or to open new branches
  - Subject to more frequent CRA exams if failing to comply
  - Reputation concern and hassles from community groups

Model

Objectives

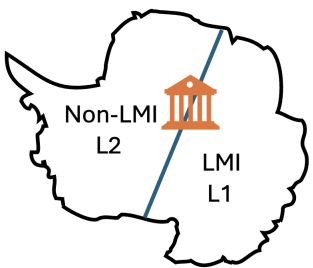
- Understand how banks respond to CRA
- Illustrate the trade-off of CRA and its distributional effect
- Motivate empirical measure, design, and quantification

Setup - Bank's Decision in an MSA

$$\max_{L_1,L_2,b} \quad \pi(L_1,L_2,b) = \underbrace{r_1(L_1,b)L_1 + r_2(L_2,b)L_2}_{\text{Lending Profit}} - \underbrace{\delta(\bar{L} - L_1) \times \mathbb{1}(b > 0)}_{\text{Regulatory Cost}}$$

- Downward-sloping lending demand curve for each sub-region $i \in \{1,2\}$

$$r_i(L_i,b) = \underbrace{\alpha + \alpha_i}_{\text{Demand}} - \underbrace{\beta}_{\text{Elasticity}} L_i + \underbrace{\gamma}_{\text{Branch preference}} b$$

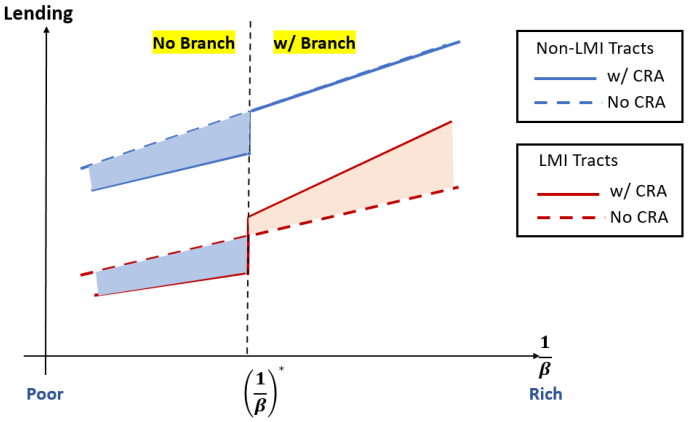


Model Solution

$$\Delta\pi = \underbrace{\frac{(2\alpha + \alpha_1 + \alpha_2 + \gamma)\gamma}{2\beta}}_{\text{Benefit of Branch}} \underbrace{-\delta(\bar{L} - \frac{\alpha + \alpha_1 + \gamma}{2\beta} - \frac{\delta}{4\beta})}_{\text{Regulatory Cost}}$$

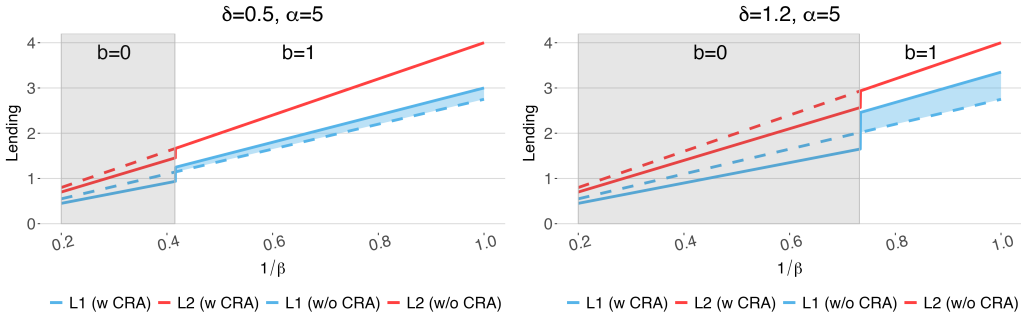
- No CRA benchmark: $\Delta\pi' =$ Benefit of Branch $> 0 \rightarrow b = 1$
- w/ CRA: $b = 0$ when Regulatory Cost is so high that $\Delta\pi < 0$

(Net) Effects of the CRA



- Cross-subsidization between LMI and non-LMI within rich areas (high $\frac{1}{\beta}$)
  $\rightarrow$ more lending in LMI within rich areas
- CRA-induced branch closures in poor areas (low $\frac{1}{\beta}$)
  $\rightarrow$ less lending in the poorest areas

(Net) Effects of the CRA



- Higher shadow cost of CRA violation, i.e., higher δ:
  - More lending to LMI within rich areas
  - ... but, a larger set of poor areas suffer from CRA-induced branch closure

Empirical Analysis

Does CRA compliance lead to branch closures?

$$\text{Regulatory cost} = \underbrace{\delta}_{\substack{\text{Cost of} \\ \text{CRA violation}}} \times \underbrace{(\bar{L} - \frac{\alpha + \alpha_1 + \gamma}{2\beta} - \frac{\delta}{4\beta})}_{\text{Lending gap}}$$

- A local profitability shock increasing the lending gap
- Compare branching decisions of banks w/ different δ in response to a local profitability shock

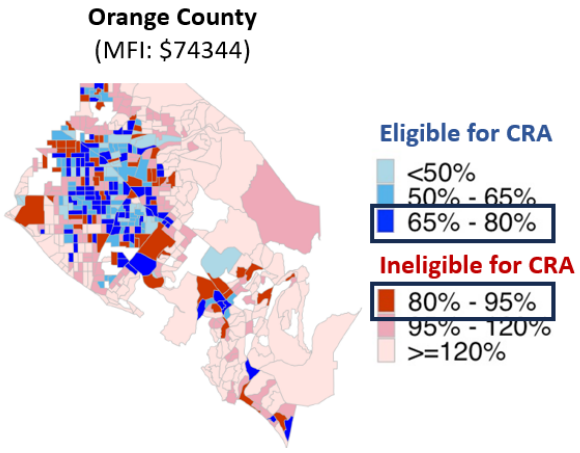
$$\Delta Y_{b,c,t} \sim \text{Profitability-Shock}_{c,t} \times \hat{\delta}_b + \mu_{b,t} + \nu_{c,t}$$

Estimating δ of banks: Regression Discontinuity Design

Model: $(L_1^* - L_2^*)|_{b=1} = \frac{\alpha_1 - \alpha_2 + \delta}{2\beta}$

- Census tracts with MFI just around the 80% threshold have $\alpha_1 = \alpha_2$
- L_1^*: lending to tracts [65%, 80%)
- L_2^*: lending to tracts [80%, 95%]

$\Rightarrow (L_1^* - L_2^*)|_{b=1} = \frac{\delta}{2\beta}$



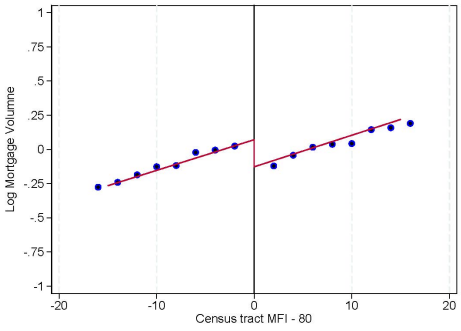
Estimating δ of banks: Regression Discontinuity Design

Estimate $\hat{\delta}_b$ for each bank b across MSAs (counties if outside an MSA)

$$\log(\text{Loans})_{b,i,t} = \hat{\delta}_b \mathbb{1}(\text{LMI}_{i,t}) + \kappa_1(\text{MFI}_{i,t} - 80\%) + \kappa_2 \mathbb{1}(\text{LMI}_{i,t}) \times (\text{MFI}_{i,t} - 80\%) + \gamma_{m,t}$$

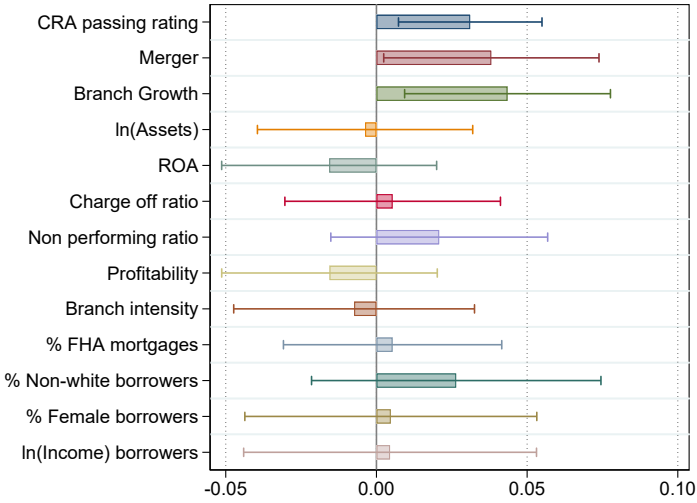
- Restrict to MSAs/counties where bank b has branches
- Pre-crisis data: 2005-2008

Average Shadow Cost of CRA Voliation (δ)



- Average δ: Banks' mortgage supply is 2% higher in neighborhoods with median income right below 80% of the assessment area's median income
- High $\hat{\delta_b}$: banks with $\hat{\delta_b}$ above median Mortgage Price Lending Standard

What Drives $\hat{\delta}_b$ Variations across Banks



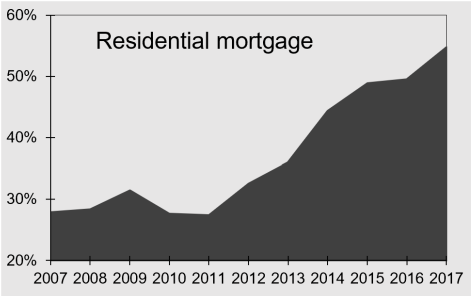
High $\hat{\delta}$ banks

- higher CRA rating
- higher need for structural changes
- not correlated with bank profitability or risk taking
- do not appear to have different technology (branch intensity), customer base, or product market segments

Profitability-Shock: Rise of Shadow Banks in Mortgage Lending

$$\Delta Y_{b,c,t} \sim \text{Profitability-Shock}_{c,t} \times \hat{\delta}_b + \mu_{b,t} + \nu_{c,t}$$

- Expansion of shadow banks starting in 2011
  - technological advancement
  - regulatory arbitrage
- Shock to local demand for bank credit
  $\rightarrow$ Lower profitability



Source: Buchak, Matvos, Piskorski, and Seru (2018, JFE)

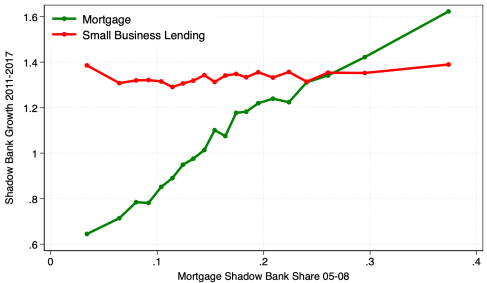
Local Exposure to the Rise of Shadow Banks: Bartik Shock

- **Concern** of using local shadow bank growth:

  bank exits $\rightarrow$ expansion of shadow banks

- **Solution:** Bartik shock

$$\text{SBank Shock}_{m,t} = \text{SB Share}_{m,0508} \times \text{Leave-one-out National SB Growth}$$



Validity: SB Share$_{m,0508}$ is correlated with local population but uncorrelated with age, education level, poverty level, race share, per capita income, housing price and CRA-exposure etc.

Empirical Analysis

Branch Closure and Lending

Branch Closure

	Δ Branch Presence	Δ log(1+# Branch)
SBank Shock × High $\hat{\delta}_b$	-0.134***	-0.077**
	(0.03)	(0.03)
Bank × Year FE	✓	✓
County × Year FE	✓	✓

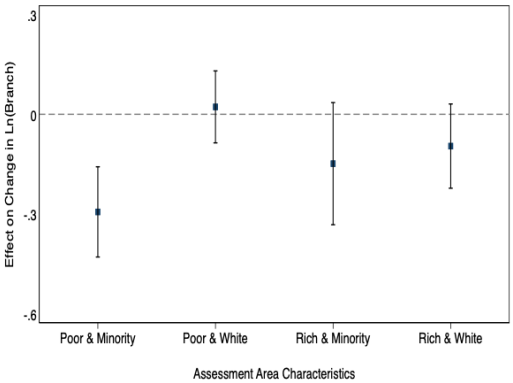
- High δ banks are more likely to close branches
- 30% increase in shadow bank market share
  → 3.9% higher likelihood of complete branch-withdrawal
  → 2.2% more branch closure

Effect on Bank Lending

	log(Mortgage)	log(SML)
SBank Share$\times$ High $\hat{\zeta}_b$	-0.661***	-0.569***
	(0.10)	(0.10)
County$\times$ Year FE	✓	✓
Bank $\times$ FE	✓	✓

- 30% increase in shadow bank market share
  $\rightarrow$ 14.5% $\downarrow$ mortgage lending & 13.0% $\downarrow$ small business lending
- SML reduction at market level Market-Level Results
  $\rightarrow$ Market adjustments fail to pick up bank-level lending slack

Adverse Effects Concentrate in Economically Disadvantaged Areas



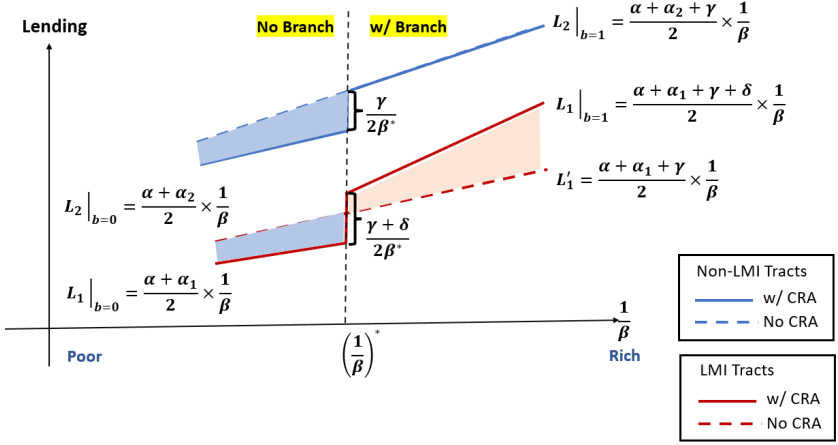
- The adverse effects of the CRA concentrate in low-income areas with more minorities
- Similar patterns across various branch- and lending-related outcomes Other Outcomes

Economically disadvantaged counties are the marginal areas shifting from benefiting to suffering from the CRA as shadow banks expand

Net Effect on Bank Lending

Should we be concerned about the adverse impact of the CRA?

- Put empirical estimates back to our conceptual framework



Estimation in Two Steps

- Step 1: lending as a function of local log(PCI) and bank branch presence

$$\text{Lending in Non-LMI} = \frac{\alpha + \alpha_1}{2} log(PCI) + \frac{\gamma}{2} \text{Branch} \times log(PCI) + \text{Branch}$$

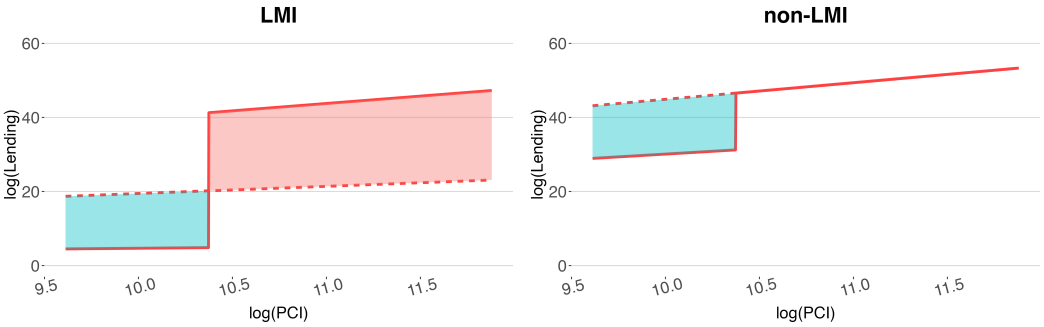
$$\text{Lending in LMI} = \frac{\alpha + \alpha_2}{2} Log(PCI) + \frac{\gamma + \delta}{2} \text{Branch} \times log(PCI) + \text{Branch}$$

- Step 2: Estimate CRA-induced lending cut

$$\Delta \log(\text{SBL + Mortgage})_{b,c,t} = \kappa \Big(\log \text{PCI}_{c,2010} \times \overline{\Delta \text{Branch Presence}}_{b,c,t} \Big) + \nu_{b,t} + \mu_{c,t}$$

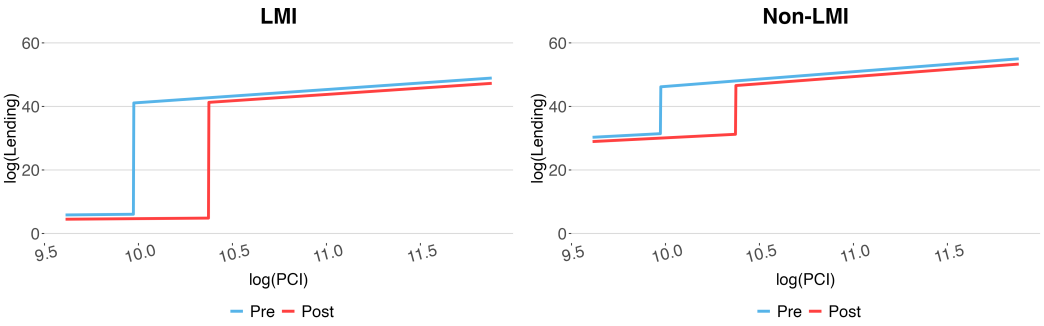
$$\Rightarrow \left(\frac{1}{\beta}\right)^* = \frac{2(\kappa^{\text{lmi}} + \kappa^{\text{non-lmi}})}{2\gamma + \beta}$$

Quantification: Net Effect and Decomposition



- 44% counties: 76% ↓ in LMI and 33% ↓ in non-LMI under the CRA
- 56% counties: 104% ↑ in LMI under the CRA
- Net effect: 3.4% reduction in overall lending

Quantification: Rise of Shadow Banks



Shadow banks: 25% in 2011 $\rightarrow$ 55% in 2017

- Net effect before the rise of shadow banks: 29.5%
- 43% counties shift from benefiting to suffering from the CRA

Widened Geographic Disparities

Widened Geographic Disparities

- CRA rules are more binding in less economically developed areas
- Widened gaps in economic outcomes between CRA binding and non-binding areas after the rise of shadow banks
  - Population living in bank desert
  - Unbanked rate among low-income households
  - Small business lending
  - Number of business establishments

Real Outcomes

Conclusion

Conclusion

Two types of policies to promote equal credit access

- Public Scheme: e.g., direct transfers
- Private Scheme: regulating banks

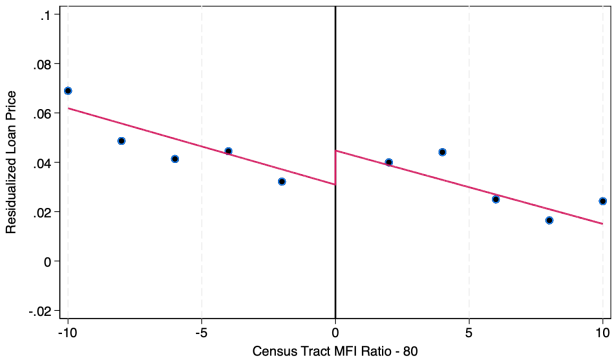
Importance of considering supply-side adjustment for assessing such policies

- The CRA improves credit equality in the rich areas at the cost of the poorer areas losing banking access
- The expansion of shadow banks compresses the set of areas benefiting from the CRA, further widening cross-region disparities in credit access

Appendix

Risk-Adjusted Return

Is CRA Compliance Costly?



- Risk-adjusted prices in the under-served census tracts are 2.2bps lower.

Back to Main

Lending Standard

	[-15,+15]			
	(1) Balloon	(2) Full Doc	(3) FICO	(4) LTV
$\mathbb{1}$(LMI)	0.001	-0.004	-1.098	0.105
	(0.00)	(0.00)	(0.83)	(0.12)
MFI-80	-0.000	-0.001***	0.387***	-0.043***
	(0.00)	(0.00)	(0.05)	(0.01)
$\mathbb{1}$(LMI)$\times$(MFI-80)	-0.000**	-0.000	0.088	-0.008
	(0.00)	(0.00)	(0.11)	(0.02)
Assessment Area$\times$Year FE	✓	✓	✓	✓

Back to Main

Effect on Mortgage

	Δlog(Orig. &Pur.) (1)	Δlog(Orig.) (2)	Δlog(Pur.) (3)	ΔRejection Rate (4)	ΔWithdrawal Rate (5)	ΔOrigination Rate (6)
SBank Shock × High $\hat{\delta}_b$	-0.661***	-1.478***	-0.746***	0.034*	0.042***	-0.054**
	(0.10)	(0.13)	(0.11)	(0.02)	(0.01)	(0.02)
Bank×Year FE	✓	✓	✓	✓	✓	✓
County×Year FE	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.270	0.216	0.638	0.086	0.092	0.089
Observations	210,048	210,048	210,048	179,926	162,914	179,926

Back to Main

Effect on Local Small Business Lending

	Δlog(Small Business Lending) Total		Δlog(Small Business Lending) Revenue <1 Million	
	(1)	(2)	(3)	(4)
SBank Shock × High $\sum_b w_b \hat{\delta}_b$	-0.551***	-0.262*	-1.172***	-0.444**
	(0.21)	(0.15)	(0.33)	(0.22)
SBank Shock	2.954***	-0.891	4.528***	-22.481***
	(0.35)	(3.85)	(0.47)	(6.39)
County FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Dynamic Controls		✓		✓
Adjusted R^2	0.764	0.802	0.796	0.826
Observations	17,880	12,765	17,765	12,737

Back to Main

Widened Geographic Disparities

	Δlog(1+Branch)	ΔBank Desert	ΔFinancial Inclusion	Δlog(Small Business Loans)	Δlog(SBA 7(a) Revolving Credit)	Δlog Business Estab.
	(1)	(2)	(3)	(4)	(5)	(6)
SBank Shock ×CRA Binding Area	-0.075**	0.064*	0.381**	-0.211*	-0.715**	-0.035**
	(0.04)	(0.04)	(0.15)	(0.11)	(0.33)	(0.02)
State FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓

- Widened gaps in economic outcomes between CRA binding and non-binding areas

Back to Main