Branching Out Inequality:
The Impact of Credit Equality Policies

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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:

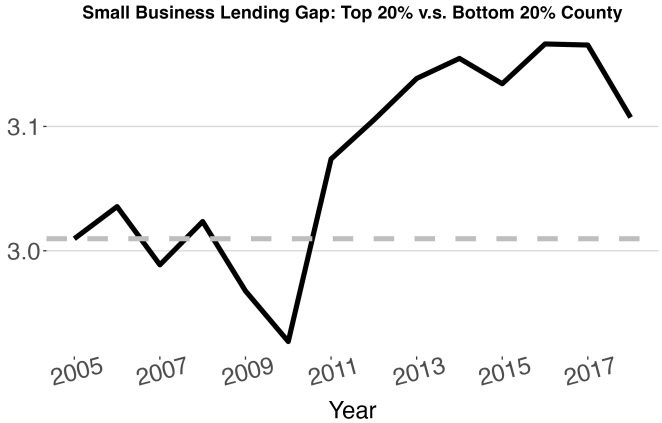
  regulating private institutions to supply credit to poorer areas
  - e.g., the Community Reinvestment Act (CRA) in the US, India's Priority Sector Lending, and South Africa's National Credit Act

The US Effort: the Community Reinvestment Act (CRA)

- The CRA since 1977 mandates banks to lend to low-income neighborhoods in areas of their operation
- Policy reform following the rise of non-banks, technological advancement, etc

What are the economic consequences of location-based fair lending regulations?

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

Conceptual Framework

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

- In rich areas, banks subsidize underserved neighborhoods under the CRA

Conceptual Framework

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

- In rich areas, banks subsidize underserved neighborhoods under the CRA
- In poor areas, banks close branches to sidestep the rule $\rightarrow$ information-intensive lending declines

This Paper

- Model:
  - illustrate the trade-off between compliance and exit
  - motivate a measure of "cost of CRA violation" (δ)
- Estimate δ for individual banks using a RD design
- Reduced-form analysis: Compare branching and lending decisions of banks w/ different δ following local expansion of non-bank lenders
  - more competition from non-banks increases the cost of compliance
  - banks w/ higher cost of CRA violation are the first to exit
- Quantification:
  - CRA-induced branch closure cutoff
  - Net effect of the CRA
  - Consequences as non-banks keep expanding

Preview of Findings

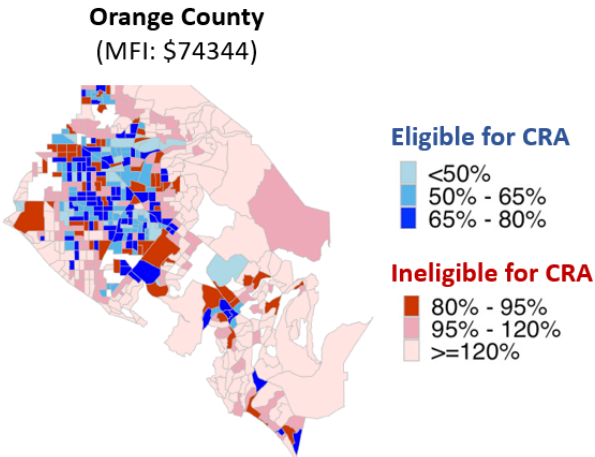
- Banks with higher cost of CRA violation are more likely to exit from an area as non-bank lenders expand locally
  - Branch closures and small business lending reduction
- Adverse effects concentrated in poorer areas with larger minority population
- Net effect of the CRA on lending shifted from positive 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

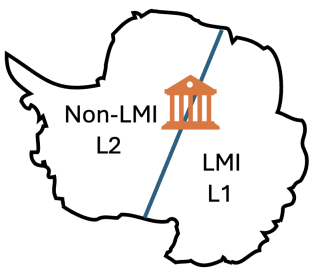
- Understand how banks respond to CRA
- Illustrate the trade-off of CRA and its distributional effect
- Motivate empirical measure, design, and quantification

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 $i \in \{1,2\}$

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

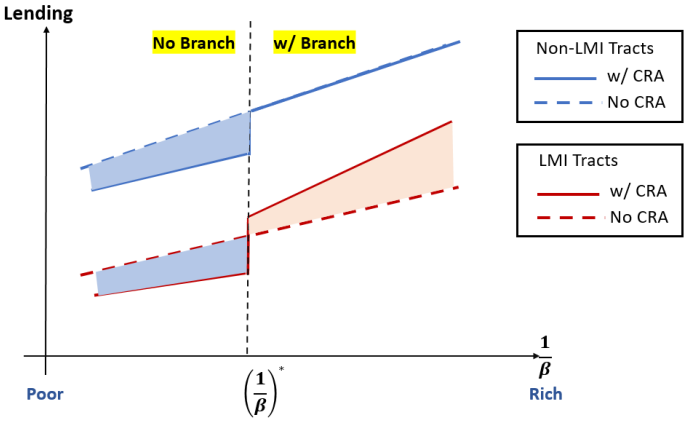


Model Solution

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

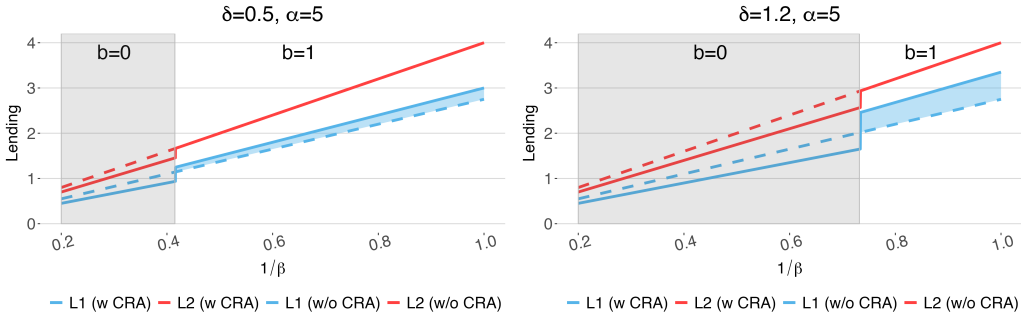
- No CRA benchmark: $\Delta\pi' =$ Benefit of Branch $> 0 \rightarrow b = 1$
- w/ CRA: $b = 0$ when Regulatory Cost is so high that $\Delta\pi < 0$

(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?

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

- Competition from non-bank lenders increases the lending gap
- Compare branching decisions of banks w/ different δ following local expansion of non-banks

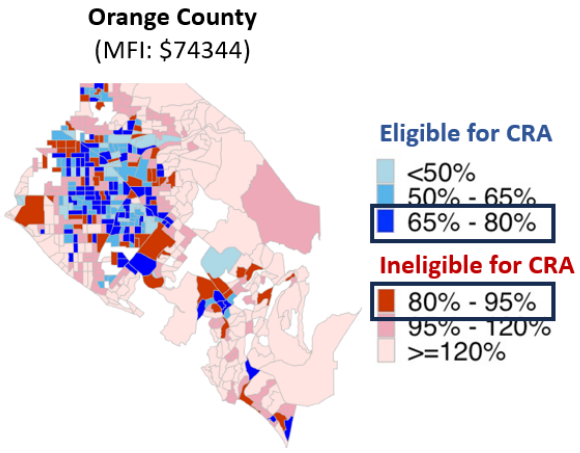
$$\Delta Y_{b,c,t} \sim \Delta \text{NonBank}_{c,t} \times \hat{\delta}_b + \mu_{b,t} + \nu_{c,t}$$

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%]

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



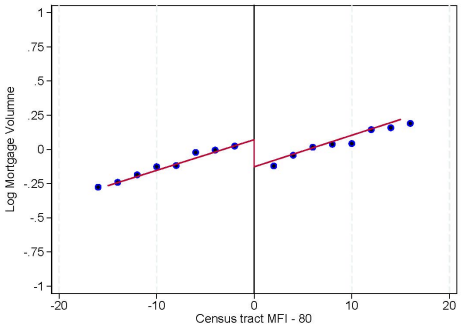
Estimating δ of banks: Regression Discontinuity Design

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

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

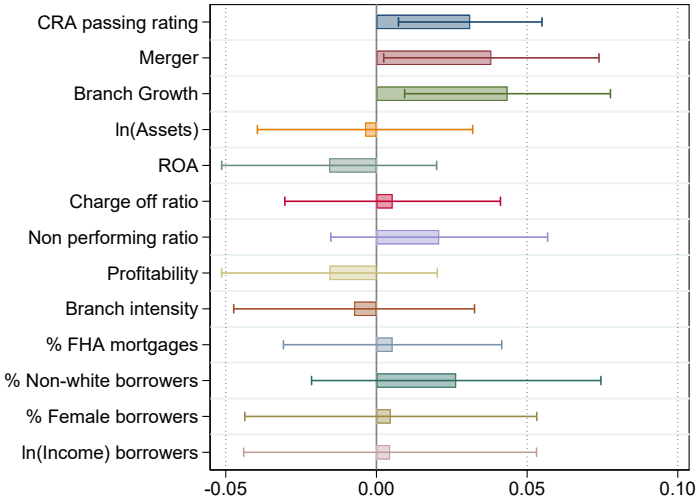
- Restrict to MSAs/counties where bank b has branches
- Pre-crisis data: 2005-2008

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



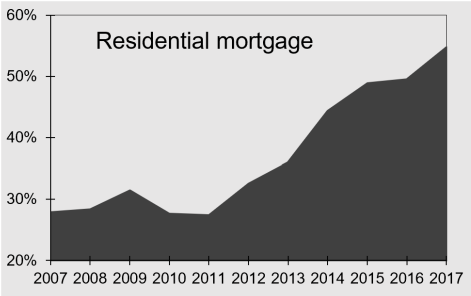
High $\hat{\delta}$ banks

- 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

Rise of Non-Bank Lenders in Mortgage Lending

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

- Expansion of non-bank lenders 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)

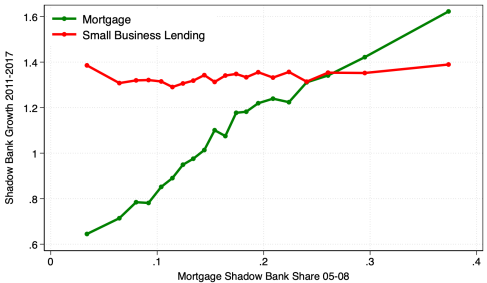
Local Exposure to the Rise of Non-Bank Lenders: Bartik Shock

- **Concern** of using local non-bank lending growth:

  bank exits $\rightarrow$ expansion of non-bank lenders

- **Solution:** Bartik shock

$$\Delta \text{NonBank}_{m,t} = \text{NB Share}_{m,0508} \times \text{Leave-one-out National NB Growth}$$



Validity: NB 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)
Δ NonBank × High $\hat{\delta}_b$	-0.134***	-0.077**
	(0.03)	(0.03)
Bank × Year FE	✓	✓
County × Year FE	✓	✓

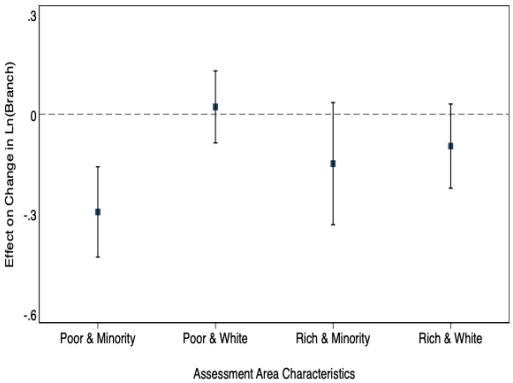
- High δ banks are more likely to close branches
- 30% increase in non-bank market share
  $\rightarrow$ 3.9% higher likelihood of complete branch-withdrawal
  $\rightarrow$ 2.2% more branch closure

Effect on Bank Lending

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

- 30% increase in non-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



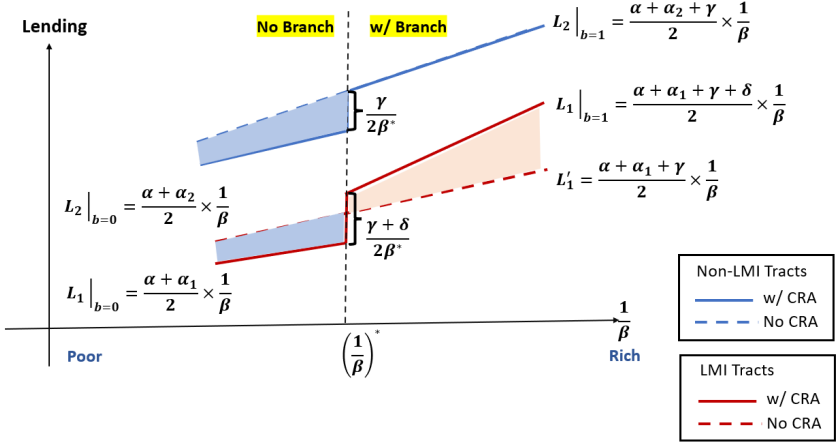
- The adverse effects of the CRA concentrate in low-income areas with more minorities
- Similar patterns across various branch- and lending-related outcomes Other Outcomes

Economically disadvantaged counties are the marginal areas shifting from benefiting to suffering from the CRA as non-bank lenders 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

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

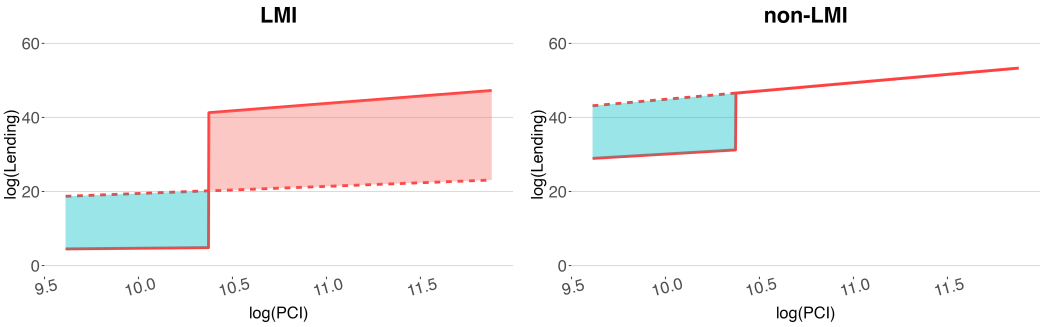
$$\text{Lending in LMI} = \frac{\alpha + \alpha_2}{2} Log(PCI) + \frac{\gamma + \delta}{2} \text{Branch} \times log(PCI) + \text{Branch}$$

- Step 2: Estimate CRA-induced lending cut

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

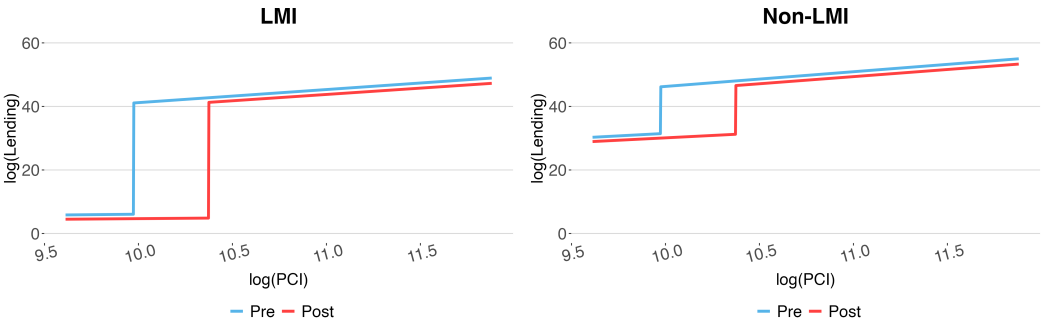
$$\Rightarrow \left(\frac{1}{\beta}\right)^* = \frac{2(\kappa^{\text{lmi}} + \kappa^{\text{non-lmi}})}{2\gamma + \delta}$$

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 non-bank lenders



non-bank lenders: 25% in 2011 $\rightarrow$ 55% in 2017

- Net effect before the rise of non-bank lenders: 29.5%
- 43% counties shift from benefiting to suffering from the CRA

Widened Geographic Disparities

Which Markets are More CRA Binding?

A more concerning unintended consequence:

widening cross-region disparities in credit access

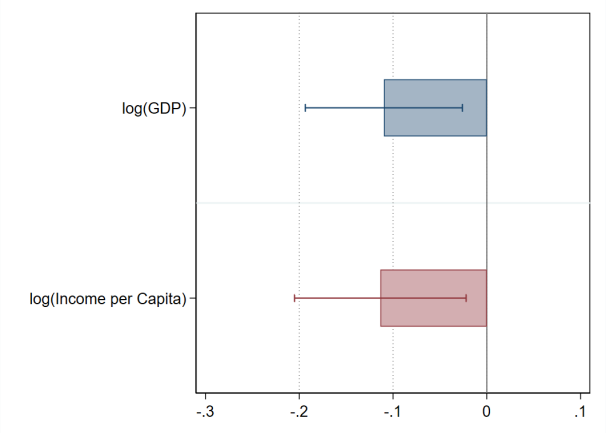
- Estimating how CRA-binding an MSA is, η_m, using a similar RD design

$$\log(\text{Loans})_{i,t} = \eta_m \mathbb{1}(\text{LMI}_{i,t}) + \beta_{b1}(\text{MFI}_{i,t} - 80\%) + \beta_{b2}\mathbb{1}(\text{LMI}_{i,t}) \times (\text{MFI}_{i,t} - 80\%) + \nu_t + \epsilon_{i,t}$$

- $\hat{\eta}_m$: CRA required excess lending (how much $\bar{L}$ deviates from no-CRA lending) AND bank δ

- CRA Binding regions: above-median $\hat{\eta}_m$

CRA Binding Regions



- CRA rules are more binding in less economically developed areas

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)
Δ NonBank ×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

Conclusion

Conclusion

Two types of policies to promote equal credit access

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

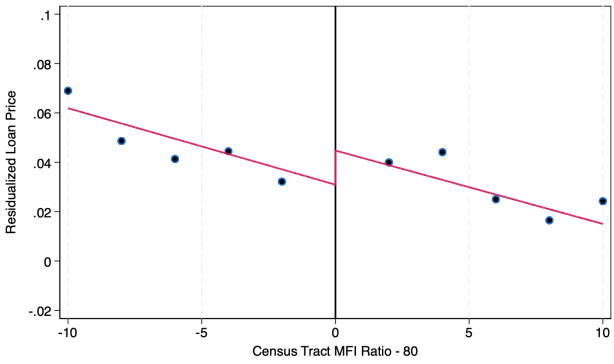
Importance of considering supply-side adjustment for assessing such policies

- The CRA improves credit equality in the rich areas at the cost of the poorer areas losing banking access
- The expansion of non-bank lenders 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.

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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	✓	✓	✓	✓

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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

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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

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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

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