The Cost of Consumer Collateral: Evidence from Bunching

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What Does Collateral Do?

- Lending contracts rely on collateral to align incentives of lender and borrower
  - Increases borrowers' skin in the game; may reduce default rates
  - 80% of household debt in the U.S. is collateralized (NY Fed 2020)
- Effectiveness of incentive alignment depends on both:
  - **Consumers value of the collateral**
    - May have both financial value (equity) and non-financial value (attachment to home, moving is a hassle, etc.).
  - **Consumers having discretion in repayment (i.e. moral hazard)**

Identifying the Effect of Collateral is Challenging

- Usually collateral is part of a bundle of contract terms that vary together in equilibrium
- Consumer credit markets are highly segmented
  - Mortgages and auto loans $\longrightarrow$ collateralized
  - Credit cards and student loans $\longrightarrow$ uncollateralized
- We have a unique setting where households have the option of taking a larger collateralized loan or a smaller uncollateralized loan.
  - Nothing else about the loan changes.

In This Paper

1) **How much are consumers willing to give up to avoid pledging collateral?**
   - Use a series of bunching estimators to find out what households would have borrowed if they choose the larger collateralized loan.
   - $\longrightarrow$ Consumers are willing to give up 40% of their ideal (highly subsidized) loan to avoid posting their houses
     - This equates to $25,000 per borrower in net present value of subsidies for our sample.
     - Could be much higher for credit-constrained borrowers.

In This Paper

2) **Do collateral requirements causally induce fewer defaults (moral hazard)?**
   - Use time variation in the collateral threshold to estimate the effect of collateral on loan default
   - $\longrightarrow$ Collateral reduces default risk by 35%

Outline

- **Institutional Details**
- Estimating Collateral Aversion
- Loan Default and Moral Hazard
- Concluding Thoughts

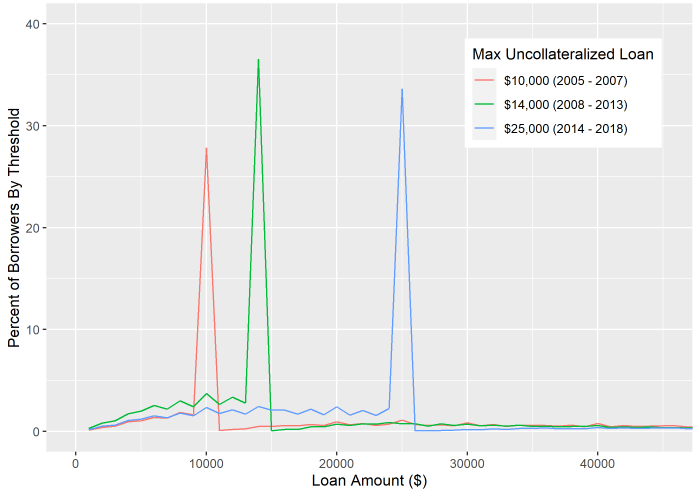
Setting - U.S. Federal Disaster Loans

- U.S. Federal Disaster Loan program run by Small Business Administration (SBA)
- Provides low interest loans to HHs and small businesses affected by natural disasters (we only use data on HHs here)
- Loan amounts capped at uninsured portion of documented loss (up to $240k)

Collateral Rules

- Approval decisions are *not* made based on the availability of collateral
- But, if available, collateral is required if the loan amount is greater than:
  - $\$10,000$ from 2005 - 2007
  - $\$14,000$ from 2008 - 2013
  - $\$25,000$ from 2014 - 2018
- Collection process on collateral is extremely lax: SBA holds a junior lien that they collect if the property sells or if another lien holder initiates a foreclosure
  - We don't think borrowers (or loan officers) know this though.
- **Do people base their loan amounts on these cutoffs?**

Final Loan Distributions for Three Collateral Rules



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Estimating the Cost of Collateral - Conceptual

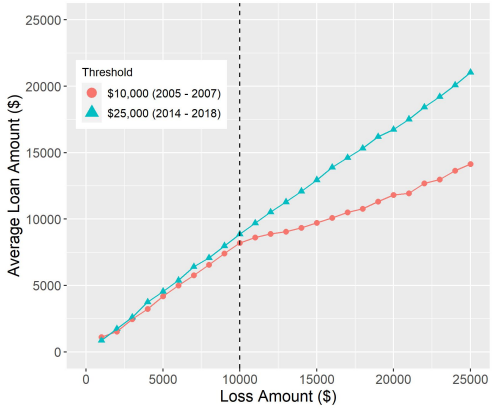
- HH's 'ideal' loan amount – amount it would borrow absent collateral requirement
- We can quantify how much collateral costs by estimating how much consumers are willing to give up to avoid collateralizing
  - If the household values avoiding collateral more than the subsidies they give up from borrowing below their "ideal" loan amount, they bunch. Otherwise, they don't bunch

Empirically Estimating the Cost of Collateral

- Three approaches to estimate the counterfactual:
  1. **Difference-in-bunching estimator**: Use changes in bunching threshold over time
  2. **Traditional bunching estimator**: Use the density prior to the bunch point to project the counterfactual density after the bunch point
  3. **Original request**: Use borrower's initially requested loan amount as a proxy.
- Due to time constraints, I'm only going to show the first one.

Difference-in-Bunching, Individual Borrower Design

- Absent collateral requirements, loss amount strongly predicts loan amount
- For loans $\in (\$10K, \$25K]$:
  - Control group: Borrowers during \$25K threshold
  - Treatment group: Borrowers during \$10K threshold



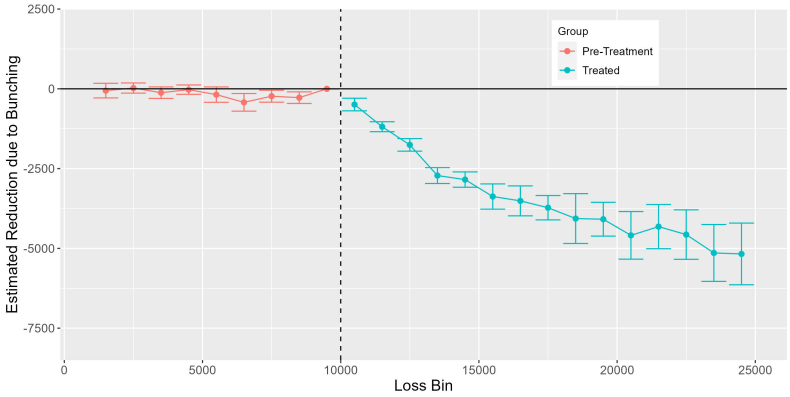
Difference-in-Bunching Estimation

$$LoanAmount_i = \sum_j^J \alpha_j * LossBin_j + \sum_j^J \beta_j * LossBin_j * 1(Threshold = \$10,000) + \gamma * X_i + \varepsilon_i$$

- β_j capture treatment effects
- X_i = controls

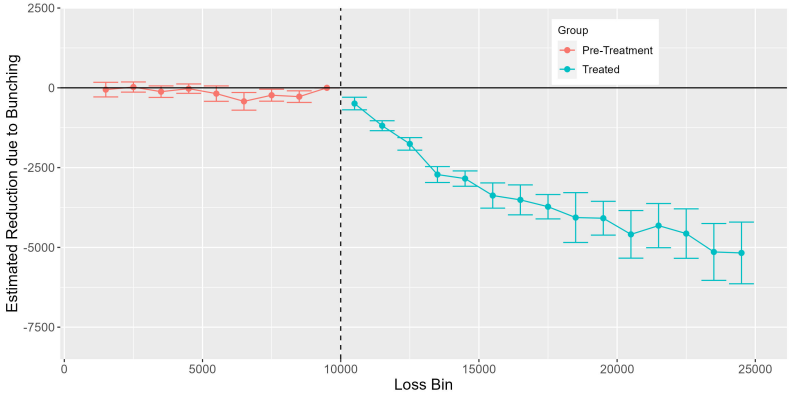
Difference-in-Bunching Results

- Left half = parallel trends; Right half = impact of collateral
- Average HH with $25K in losses borrows $5K less due to collateral requirement



Difference-in-Bunching Results

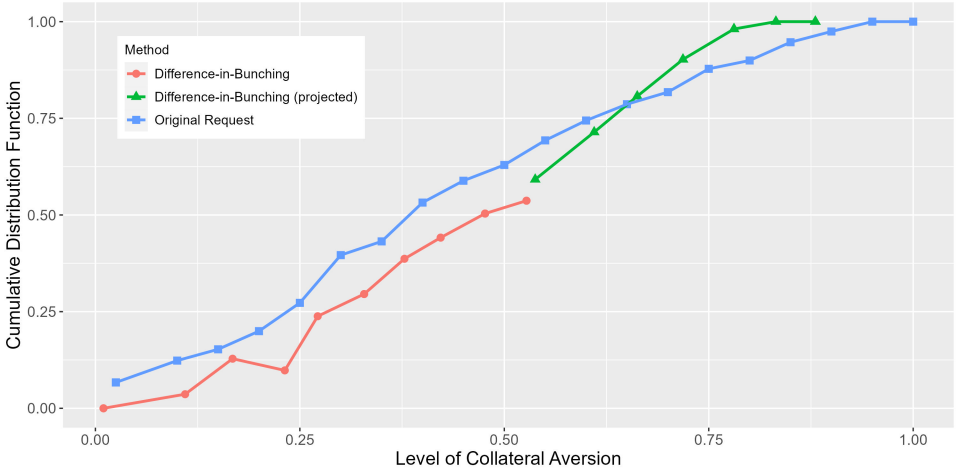
- Can use average loan for “untreated” group and binary nature of bunching to translate into collateral aversion.
- Median collateral aversion of 47%
- Does not change with covariates!



Alternative Bunching Estimators – Median Collateral Aversion

	Median Collateral Aversion (%)			
	(1)	(2)	(3)	(4)
Collateral Threshold	10,000	14,000	25,000	All
Traditional Bunching Estimator	47.37	39.39	45.65	–
	(0.98)	(2.48)	(0.74)	–
Original Request Approach:				
- No Covariates	39.40	37.00	37.10	37.90
	(0.76)	(0.86)	(3.23)	(0.77)
- Covariates	38.80	36.70	38.30	37.80
	(0.72)	(0.87)	(3.49)	(0.79)
Difference-in-Bunching Approach:				
- No Covariates	47.64	–	–	–
	(2.89)	–	–	–
- Covariates	46.81	–	–	–
	(3.16)	–	–	–

Implied CDF of Collateral Aversion



Takeaways from the Three Approaches: Ex Ante Collateral Aversion

- Across methods and thresholds, consumers will give up around **40%** of their "ideal" loan to avoid collateral.
  - Similar overall demand response from doubling of interest rate.
  - Equivalent to $\approx$ \$25,000 in NPV for our sample.
  - Total amount forgone $>$ \$1.1 billion.

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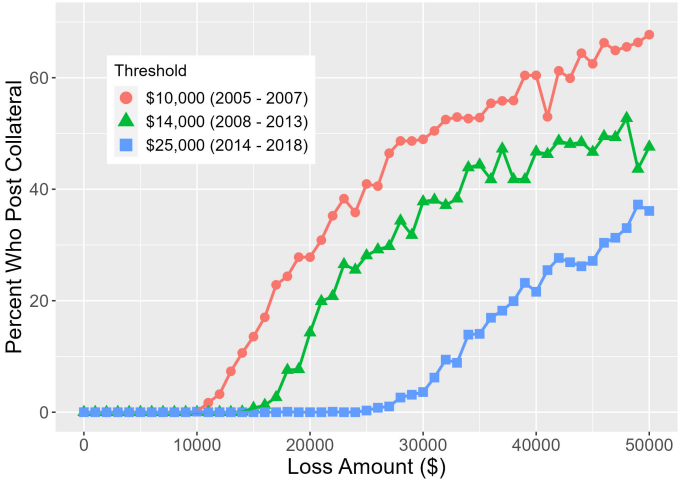
Does Collateral Reduce Defaults?

- Variation in posting collateral across thresholds provides identification of the impact of collateral on defaults.
- Instrument for posting collateral: Same Difference-in-Bunching estimator.



2SLS Framework

First Stage:

$$P(Collateral_i) = Z_i\gamma' + v_i \tag{1}$$

$$Z_i = (LossBin_i \times Threshold_i; \tau_t, LossBin_i, log(LoanAmount_i), Disaster_i)$$

Second Stage:

$$P(Default_{i,t}) = \widehat{X}_i\beta' + e_{i,t} \tag{2}$$

$$\widehat{X_{i,t}} = (\widehat{\textbf{Collateral}_\textbf{i}}; \tau_t, LossBin_i, log(LoanAmount_i), Disaster_i).$$

Second Stage Results: Collateral Causally Reduces Default

- Large causal impact of collateral on default: 34% decline
- Similar in magnitude to 100 point increase in credit scores
- Adding controls doesn't impact estimate

	Dependent variable:		
	Default Hazard		Default Rate
	(1)	(2)	(3)
Collateral (fit)	-0.031^{*}	-0.033^{**}	-0.057^{**}
	(0.017)	(0.015)	(0.025)
ln(Loan Amount)	0.070^{***}	0.061^{***}	0.131^{***}
	(0.018)	(0.016)	(0.026)
Credit Score (00s)		-0.035^{***}	
		(0.002)	
ln(Monthly Debt)		-0.004^{***}	
		(0.001)	
ln(Monthly Income)		0.017^{***}	
		(0.006)	
Implied Percentage Change:	−0.34	−0.38	−0.39
Disaster Fixed Effects?	Yes	Yes	Yes
Time Since Origination Fixed Effects?	Yes	Yes	No
Loss Size Fixed Effects?	Yes	Yes	Yes
Data Level?	Loan Year	Loan Year	Loan
Observations	606,443	606,443	55,087
Residual Std. Error	0.263	0.261	19.283

Concluding Thoughts

- We have a unique setting to estimate the costs of collateral requirements
  - Holds direct financial consequences or moral costs of default equal, exclusively varies (perceived) cost of losing one's home
- Borrowers **really** don't like posting their homes as collateral
- Ex ante, the median borrower gives up 40% to avoid collateral, total low-cost credit forgone is over $1.1 billion, and is giving up subsidies worth $25,000 in NPV.

Concluding Thoughts

- Ex post, fear of losing one's home causally and substantially reduces default rates
- Magnitude is comparable to 100 points in credit score
- Suggests substantial degree of consumer control over default in this program
- And power of collateral to align incentives and mitigate moral hazard

Concluding Thoughts

- In sum, collateral is a key factor in the actions of consumers
- Even in a time of acute need!
- Consumers value their home *more* than just the accumulated equity.
- Helps to explain mortgage market behaviors like high default costs and reluctance to borrow against home equity