

Did Securitization Lead to Lax Screening? Evidence from Subprime Loans

Benjamin Keys, University of Michigan
with
Tanmoy Mukherjee, Amit Seru and Vikrant Vig

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Motivation

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 - Involves converting illiquid assets to liquid securities
 - Changes model of financial intermediaries from “risk warehousing” to “originating and distributing”

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 - Illiquidity of loans provides incentives: Diamond and Rajan [2003]
 - Making loans more liquid can reduce incentives
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 - “...securitization contributed to bad lending”: Stiglitz [2007]
 - Proponents argue reputation concerns or regulatory oversight may prevent moral hazard

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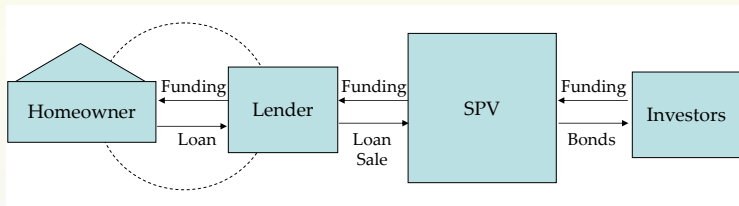
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- ▶ Does securitization lead to lax screening by lenders?

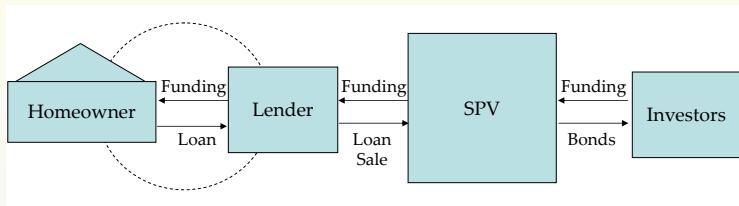
Motivation

- ▶ Does securitization lead to lax screening by lenders?
- ▶ Argue it did
 - “Loans” more likely to be securitized default 20% more than similar risk profile loans with lower likelihood of securitization

The Process



The Process



- ▶ Relate screening by a lender to securitization
 - Examine quality of loans originated after purging any hard information

Making Causal Inferences Is Difficult

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- ▶ Inferences based on time-series may be insufficient
 - Macroeconomic factors and policy initiatives may induce compositional differences in mortgage borrowers

Making Causal Inferences Is Difficult

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 - Use adhoc threshold in lending market to generate exogenous variation in securitization likelihood of a loan as compared to another loan with similar risk characteristics

Adhoc Threshold

Background On Credit Scores (FICO)

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- ▶ FICO score (350-800) reflects the credit quality of the borrowers
 - A scaled probability score with a higher FICO \Rightarrow borrower with better credit quality
 - Fair Isaac: “FICO gives ranking of potential borrowers by the probability of having some negative credit event in the next two years”
 - Generated via software licensed by Fair Isaac to three independent repositories (TransUnion, Experian, and Equifax)

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 - Generated via software licensed by Fair Isaac to three independent repositories (TransUnion, Experian, and Equifax)
- ▶ Most reliable measure used by the lender, rating agencies and investors: Gramlich [2007]
 - High predictability even for low income borrowers
 - Median score used by lenders
 - Tend to be sticky (anywhere from 3-6 months to move)

Adhoc Threshold

Threshold of 620 FICO

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- ▶ Threshold in mid 1990s by Fannie Mae and Freddie Mac in their guidelines on what loans would be purchased by them
 - Fair Isaac: "... those agencies [Fannie Mae and Freddie Mac], have indicated to lenders that **any consumer with a FICO score above 620 is good...**"
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- ▶ Since early 2000s, loans around FICO threshold of 620 are predominantly non-agency

Empirical Design

Using adhoc cutoff as a measure of ease of securitization

- ▶ Analogous to Fuzzy RD design
 - Make causal inferences on lender's behavior by comparing performance of loans to borrowers with scores of 619 (620-) vs. 621 (620+)
 - Unconditional probability of securitization higher at 621:
$$\left\{ \frac{N_s}{N_p} \right\}_{620+} > \left\{ \frac{N_s}{N_p} \right\}_{620-}$$
 - Assumption: Underlying demand for mortgage loans at a given price same for potential 620⁻ or 620⁺ borrowers
 - $\{N_p\}_{620+} \approx \{N_p\}_{620-}$

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 - Use detailed data on subprime loans contracts to control for various loan characteristics

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 - Estimation relies on cross-sectional differences

Large Dataset on Subprime Mortgages

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- ▶ Loan Performance database: All securities issues in secondary non-agency market
 - Loans in more than 8000 non prime loan pools
 - Borrower characteristics: Credit score (FICO), debt to income ratio, documentation (full, limited, no)
 - Loan characteristics: LTV, loan amount, term and interest rate type (ARM vs. FRM), type of property (owner occupied, vacation, investor)

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- ▶ Restrict sample for reasonable comparison
 - New purchases of owner-occupied, single family residences
 - Not FHA or VA insured or Alt-A
 - Sample period 2001-2006

Overall Market Trends

Summary Statistics

Entire Sample

Year	Number of Loans	% Low Documentation	Mean Loan-To-Value	Mean FICO
2001	136,483	26.0%	84.6	611
2002	162,501	32.8%	85.6	624
2003	318,866	38.9%	87.0	637
2004	610,753	40.8%	86.6	639
2005	793,725	43.4%	86.3	639
2006	614,820	44.0%	87.0	636

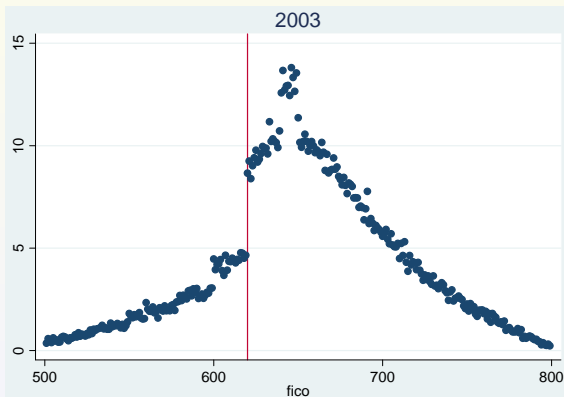
- ▶ Steady growth in number of loans securitized
- ▶ ↑ in % low documentation, LTV ratio
- ▶ Loans with higher credit score securitized

Adhoc Rule in Lending

Number of Loans (in'00) at each FICO score: Low Documentation

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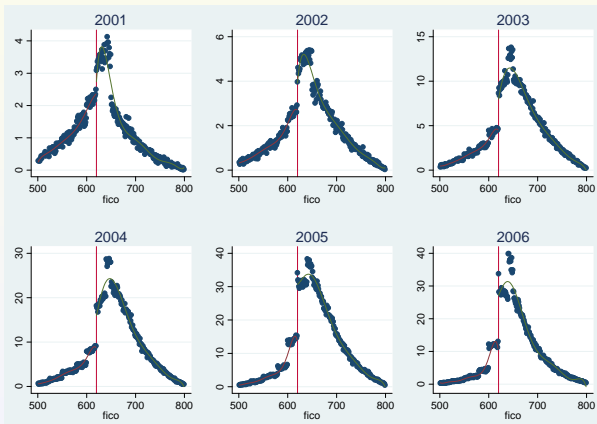


► Large jump in number of loans at 620

- $\left\{ \frac{N_s}{N_p} \right\}_{620+} > \left\{ \frac{N_s}{N_p} \right\}_{620-}$

Adhoc Rule in Lending

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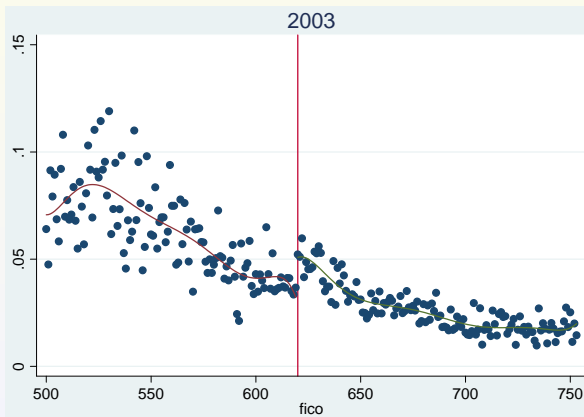
- ▶ Similar trend across years

Delinquencies of Loans

Delinquencies: Low Documentation

Delinquencies of Loans

Delinquencies: Low Documentation



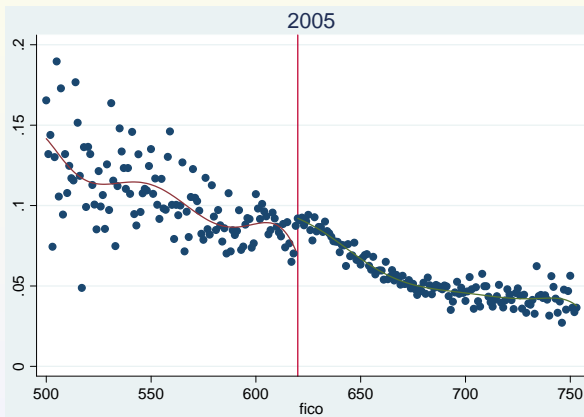
- ▶ Default rates jump around the 620 threshold

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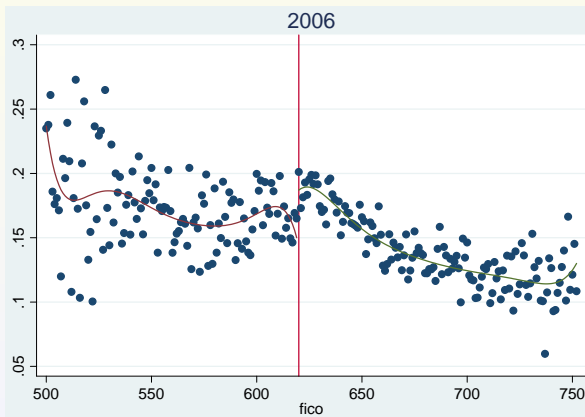
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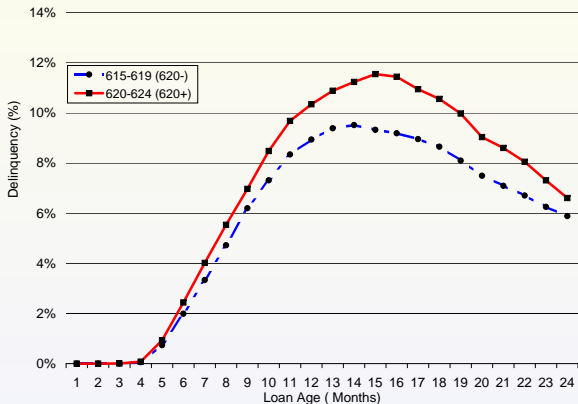
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Performance of Loans Around Thresholds

60+ Delinquency: Low Documentation

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60+ Delinquency: Low Documentation



- ▶ Loans at 620⁺ default more relative to loans at 620⁻
- ▶ Large magnitudes relative to mean default rates – around 20% more

Performance of Loans Around Thresholds

60+ Delinquencies

$$Y_i = \Phi \left(\alpha + \beta T_i + \gamma_1 X_i + \delta_1 T_i * X_i + \mu_t + \epsilon_i \right).$$

Low Documentation Loans				
	Pr(Delinquency)=1			
	(1)	(2)	(3)	(4)
FICO \geq 620	0.12 (3.42)	0.12 (3.68)	0.08 (2.17)	0.08 (2.40)
Observations	1,393,655	1,638,823	1,393,655	1,638,823
Pseudo R ²	0.088	0.089	0.110	0.111
Other Controls	Yes	Yes	Yes	Yes
FICO \geq 620 bin	5 point	10 point	5 point	10 point
Time Fixed Effects	No	No	Yes	Yes
Mean Delinquency (%)	4.45			

- Higher delinquency at 620+ relative to 620- (20%)

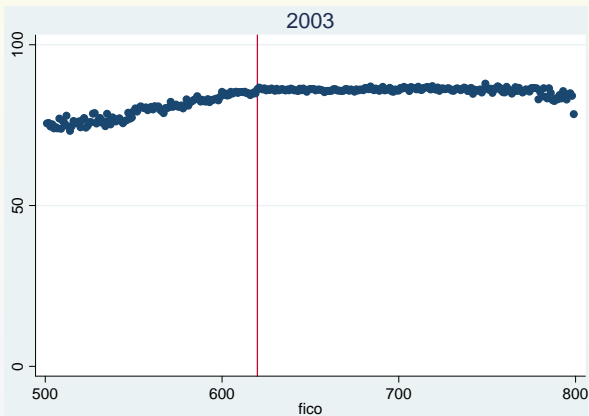
Alternative Explanation

What about...

- ▶ Selection on Observables
 - Borrowers
 - Investors/Issuer

Loan Characteristics Around Thresholds

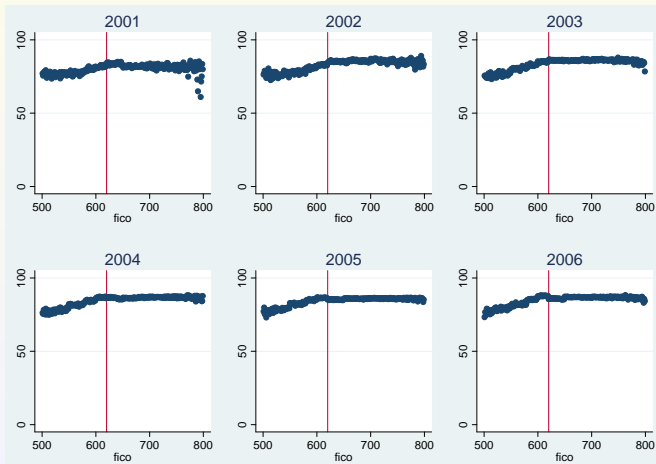
Loan To Value Ratio: Low Documentation



- ▶ No jump in loan to value at 620

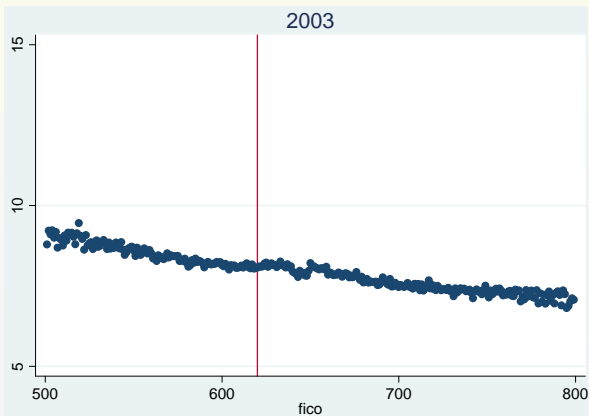
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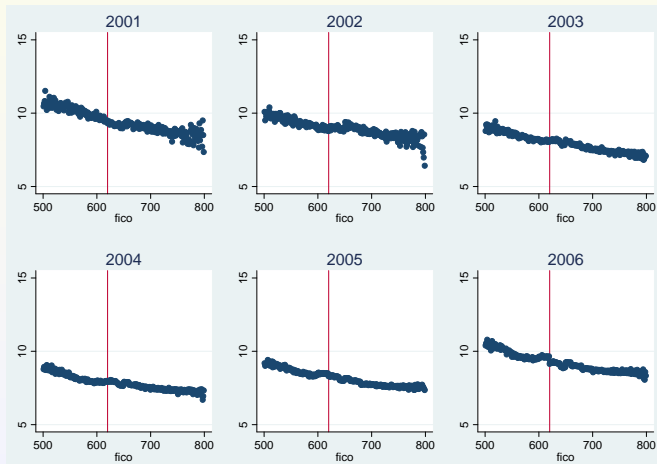
Interest Rates: Low Documentation



- ▶ No jump in interest rates at 620.

Loan Characteristics Around Thresholds

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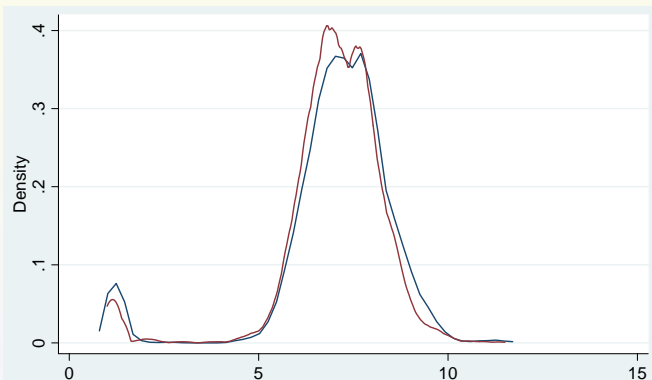


Distribution of Loan Contracts around 620

Interest Rates: Low Documentation

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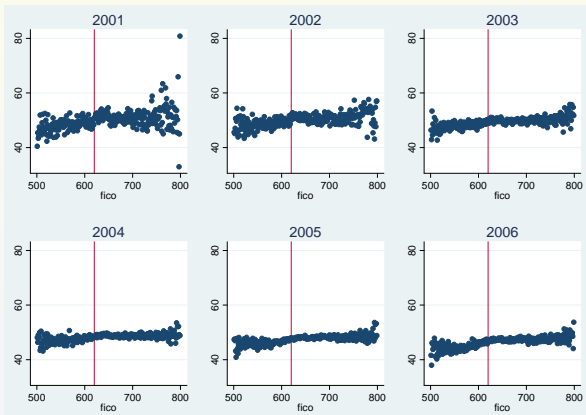
Interest Rates: Low Documentation



- ▶ No difference in the distributions of interest rates offered at 620^+ and 620^-
- ▶ KS test rejects that the two distributions are not equal at 1%

Borrower Demographics Around Thresholds

Household Income: Low Documentation



- ▶ No jump in borrower demographic variables at 620 across years

Alternative Explanation

What about...

- ▶ Lender Strategic Adverse Selection

Alternative Explanation

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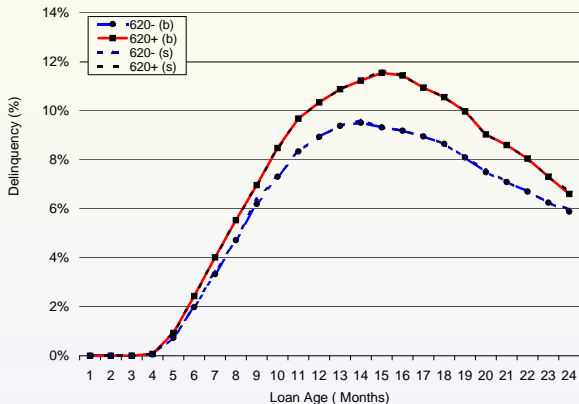
- ▶ Lender Strategic Adverse Selection
 - Biases against finding effects

Performance of Loans Around Thresholds

60+ Delinquency: Low Documentation

Performance of Loans Around Thresholds

60+ Delinquency: Low Documentation



- ▶ Loans on balance sheet at 620⁺ and 620⁻ perform similarly
- ▶ 620⁺ loans default more than 620⁻

Additional Tests

What about...

- ▶ Optimal lender rule of thumb unrelated to securitization

A Natural Experiment

Perturbing ease of securitization

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Perturbing ease of securitization

- ▶ Use a natural experiment to perturb ease of securitization around the threshold

A Natural Experiment

Perturbing ease of securitization

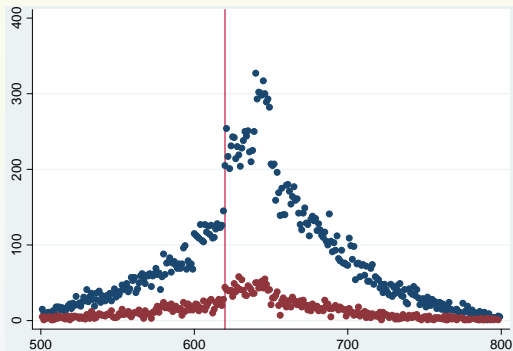
- ▶ Use a natural experiment to perturb ease of securitization around the threshold
 - Predatory laws passed in Georgia and New Jersey
 - Subsequently reversed

A Natural Experiment

Number of Loans: Low Documentation

A Natural Experiment

Number of Loans: Low Documentation



- ▶ Predatory laws passed in Georgia and New Jersey (Oct 2002)
- ▶ Subsequently reversed Georgia (April 2003) and New Jersey (May 2004)

A Natural Experiment

60+ Delinquencies

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60+ Delinquencies

	Pr(Delinquency)=1			
	Entire Period 2001-2006		During Law and Six months After	
	(1)	(2)	(3)	(4)
FICO \geq 620	-.94 (2.08)	-.91 (2.00)	-1.04 (2.23)	-1.02 (2.12)
FICO \geq 620*NoLaw	.91 (1.98)	.88 (1.94)	1.14 (1.97)	1.13 (1.93)
Observations	109,536	109,536	14,883	14,883
Other Controls	Yes	Yes	Yes	Yes
Time Fixed Effects	No	Yes	No	Yes
Pseudo R ²	0.05	0.06	0.04	0.05
Mean Delinquency (%)	6.1		4.2	

- ▶ Effects confined to periods when law not passed or retracted
 - Delinquency patterns **reverse** during the period when law in effect
- ▶ Confirms not just a lender rule of thumb unrelated with securitization

Additional Tests

What about...

- ▶ Manipulation of FICO Scores
 - Why manipulate?

A Natural Experiment

Manipulation of FICO score

- ▶ Sticky and tough to game (especially upwards)

A Natural Experiment

Manipulation of FICO score

- ▶ Sticky and tough to game (especially upwards)
- ▶ Use the same natural experiment to examine how quickly effects show up
 - Manipulation should take time

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- Results show up quickly (within 3 to 6 months) after the law reversed

Additional Tests

What about...

- ▶ Soft Information
 - Do effects attenuate with more hard information?

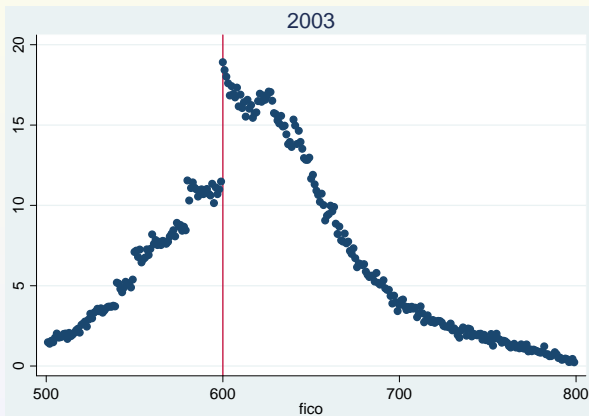
Another Adhoc Rule Of Lending

Threshold of 600 FICO

- ▶ Threshold appears in advice by Fair Isaac
 - Fair Isaac: “...anything below 600 is considered someone who probably has credit problems that need to be addressed...”
 - Einav, Jenkins and Levin [2007]: “...a FICO score above 600, a typical cut-off for obtaining a standard bank loan”
- ▶ Value of soft information lower for loans that provide full documentation

Another Adhoc Rule

Number of Loans at each FICO score: Full Documentation



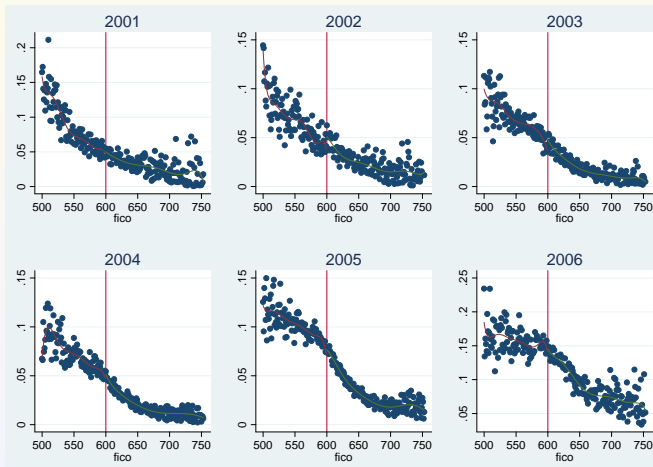
- ▶ Large jump in number of loans at 600

Delinquencies of Loans

Delinquencies: Full Documentation

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Robustness Checks

Additional Tests

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- ▶ GSE selection
 - Very small proportion of loans originated around threshold are prime loans
 - Similar contract terms and performance for these loans

Robustness Checks

Additional Tests

- ▶ GSE selection
 - Very small proportion of loans originated around threshold are prime loans
 - Similar contract terms and performance for these loans
- ▶ Variation within:
 - Pool
 - Lenders
 - States
- ▶ Other counterfactual checks
- ▶ Other cutoff rules
- ▶ Other performance measures (delinquency definitions)

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- ▶ What should and should not be securitized?
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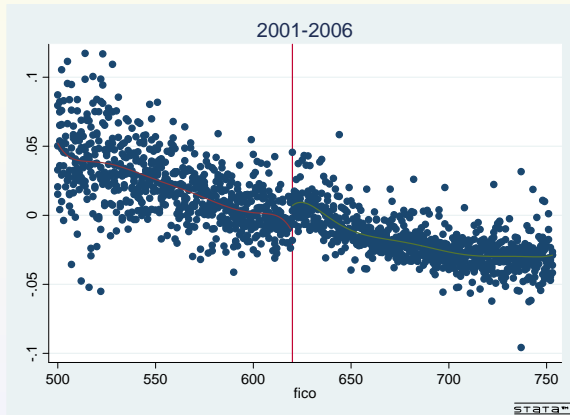
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- ▶ Cautious on welfare implications of securitization
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- ▶ Implications in general for defaults models and regulation through models
 - Default models not invariant to strategic behavior of participants: Lucas [1976]

Delinquencies of Loans (Pooled)

Delinquencies: Low Documentation

Delinquencies of Loans (Pooled)

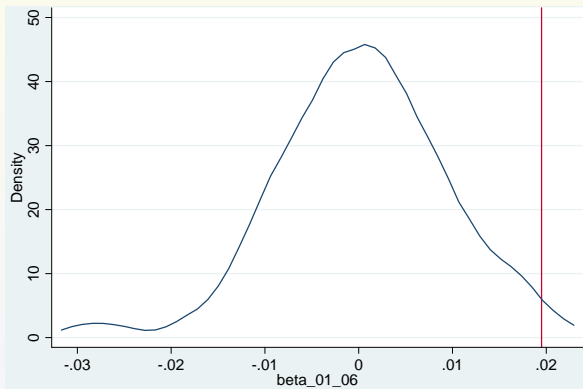
Delinquencies: Low Documentation



- ▶ Default rates jump around the 620 threshold

Permutation Tests

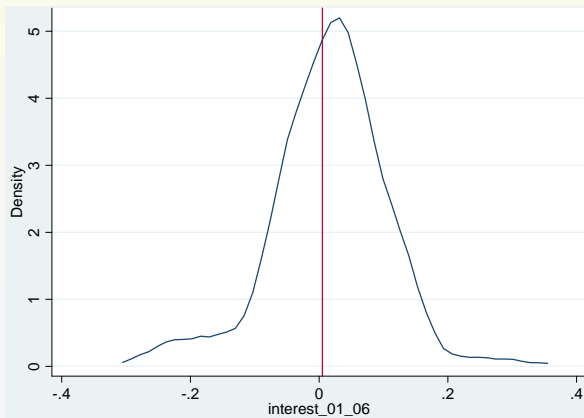
Delinquencies



- ▶ Same pattern for all years

Permutation Tests

Interest Rate



- ▶ Same pattern for all years