Regulating Household Leverage

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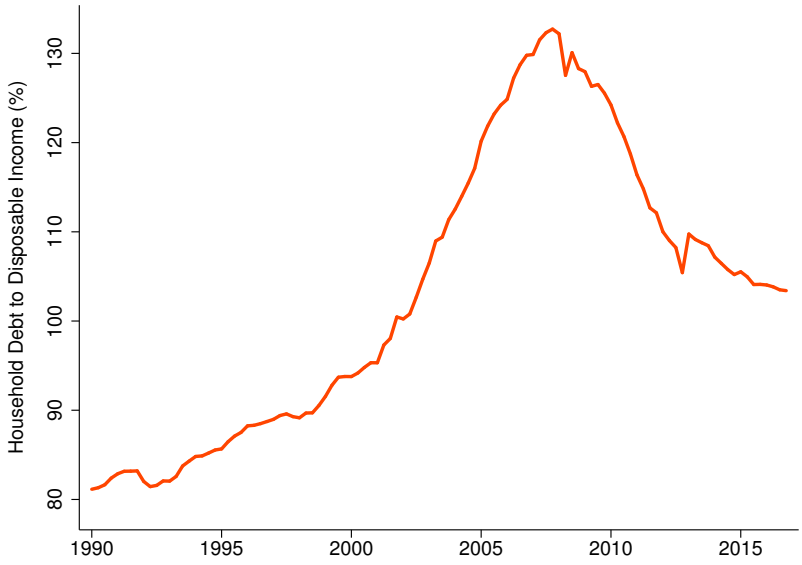
The views expressed here are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of San Francisco or the Federal Reserve System.

Household Leverage in the U.S. (1990–2016)



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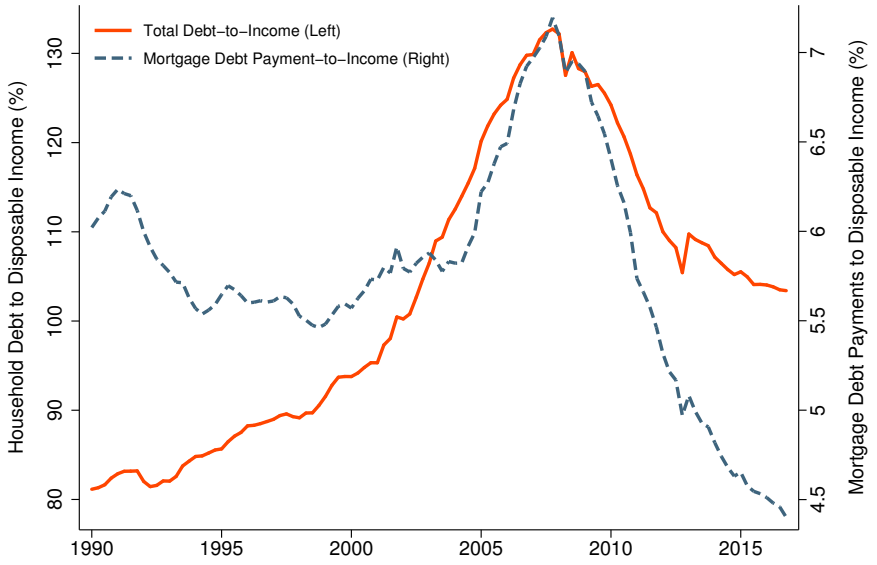

Household Leverage and the Great Recession

- **Empirics and theory suggest that this was not a sideshow**

  Mian & Sufi (2011, 2014), Mian et al. (2013)

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  1. Ex-post debt restructuring and payment relief

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  2. Ex-ante restrictions on leverage
     - Macroprudential regulation

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     - Consumer financial protection

       Campbell et al (2011), Agarwal et al (2015b), Campbell (2016)

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- **Relatively little empirical evidence on the impacts of #2**

This Paper

Studies a central U.S. policy intended to reduce household mortgage leverage

The Ability-to-Repay/Qualified Mortgage Rule

- Primary mortgage-related provision of Dodd-Frank Act
- Operates as an implicit tax on certain contract characteristics
- Intended to make high-leverage loans more costly to originate

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Research questions

- How did this affect the price of credit?
- How did this affect the quantity of credit?
  - *Extensive margin*: Did it result in the loss of loans?
  - *Intensive margin*: Did it reduce household leverage at the loan level?
- What are the implications for mortgage market performance?

Main Results

- **Sharp but small increase in prices**
  - Borrowers pay a 10-15bps premium for newly regulated mortgages
    - $1,700–2,600 in extra interest for average affected loan

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  - In most extreme scenario, policy would only $\downarrow$ default rate by 0.2pp
- **Bottom line:** Careful targeting is important – quantity effects can be very large even when market-priced costs are small and effects on loan performance are limited.

Outline

1. Institutional Background on ATR/QM rule
2. Data and sample construction
3. Research design and results
   - Prices
   - Quantities
   - Performance
4. Conclude

Institutional Background and Data

Ability-to-Repay Rule (ATR)

- Issued: January 1, 2013; Effective: January 10, 2014
- Mandated by Dodd-Frank and implemented by CFPB

> *"**A creditor shall not make a loan** that is a covered transaction **unless the creditor makes a reasonable good faith determination** at or before consummation **that the consumer will have a reasonable ability to repay the loan** according to its terms."*

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- ATR exposes lender to legal liabilities
  - Borrowers can bring lawsuits for violations of ATR

ATR and Qualified Mortgages (QM)

Compliance with ATR requires lenders to *either*

- Make “reasonable good faith” evaluation of borrower’s ATR
  - Must consider and verify 8 specific underwriting criteria
  - No explicit guidance on what constitutes “consideration”
  - No explicit limits on product features

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Law imposes an implicit "tax" on non-QM loans

- If a loan is QM then the loan has ATR "safe harbor"

QM Standards

- QM product features and underwriting rules
  - **Debt-to-income (DTI) ratio $\leq$ 43%**
  - Verified income, assets, and debt
  - No interest-only, balloon, or negative amortization
  - Term $\leq$ 30 years
  - Points and fees $\leq$ 3%
- QM "Patch"
  - **GSE loans not required to meet DTI limit**
  - Implication: non-QM $\approx$ Jumbo loans with DTI > 43 + other stuff
  - Expires in 2021 or when GSEs exit conservatorship

Research Questions

Has ATR/QM affected credit **prices**, **quantities**, or **performance**?

- **Prices**
  - Do lenders charge a premium for non-QM loans?
- **Quantities**
  - How does the DTI limit affect the allocation of credit?

    Intensive margin: shifts from high- to low-DTIs
    Extensive margin: loss of high-DTI loans
- **Performance**
  - Given DTI effects, what are the implications for mortgage default?

Data

- CoreLogic Loan-Level Market Analytics (LLMA) Data
  - Loan-level data covering $\approx$ 60% of all active first mortgages
  - Provided by majority of top-20 loan servicers
  - Origination characteristics (FICO, LTV, DTI, property type)
  - Contract terms (rate, term, product type)
  - Monthly performance information over the life of the loan
- Sample restrictions
  - Originated January, 2010 – December, 2015
  - Purchase loan
  - Conventional (non-FHA)
  - 30-year, fixed-rate
  - Owner-occupied
  - Non-missing: FICO, LTV, DTI, rate, appraisal, geography

Research Design and Results

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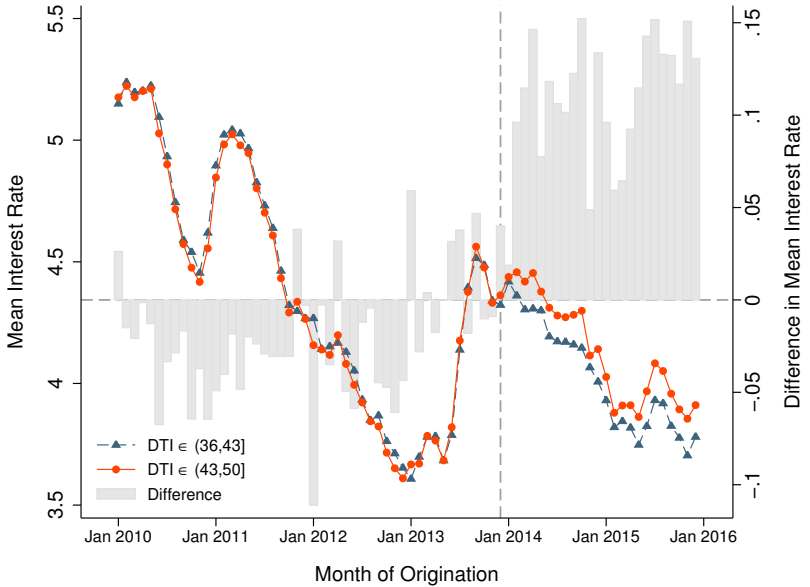
Mean Interest Rates by DTI and Month of Origination



The Effect of Non-QM Status on Interest Rates

	(1)	(2)	(3)	(4)
DTI $>$ 43	-0.018***	-0.017***	-0.004	-0.004
	(0.005)	(0.004)	(0.004)	(0.004)
DTI $>$ 43 $\times$ Post	0.131***	0.141***	0.119***	0.113***
	(0.007)	(0.008)	(0.007)	(0.007)
Month FEs	X	X	X	X
County FEs		X	X	X
FICO $\times$ LTV Bin FEs			X	X
Property Type FEs				X
Implied %Δ	2.9%	3.2%	2.7%	2.5%
R-Squared	0.70	0.72	0.75	0.75
Number of Observations	62,748	62,748	62,748	62,748

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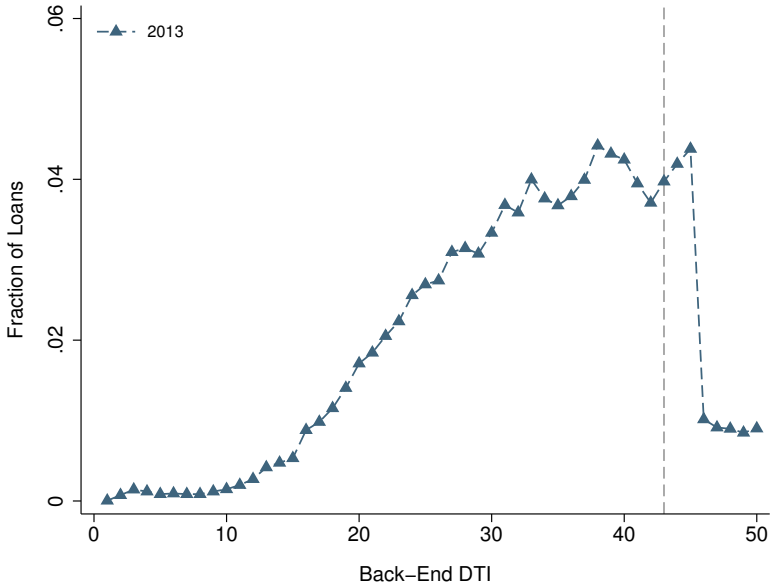
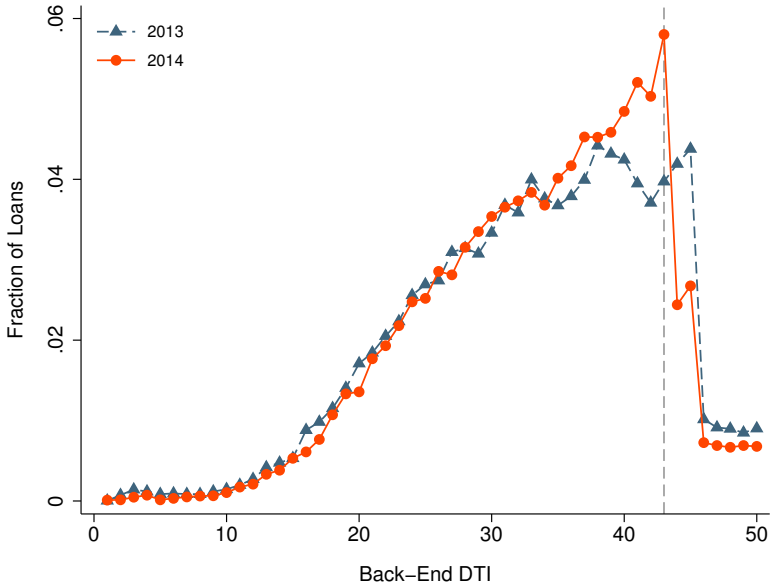
Fraction of Loans by DTI (2013)



Fraction of Loans by DTI (2013–2014)



Constructing the Counterfactual DTI Distribution

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- **Our approach**: Proxy for jumbo market changes using unaffected conforming market

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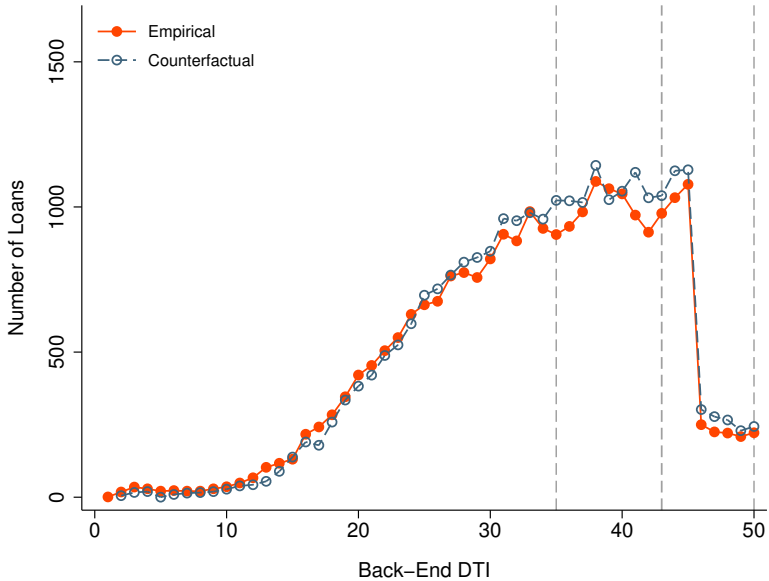
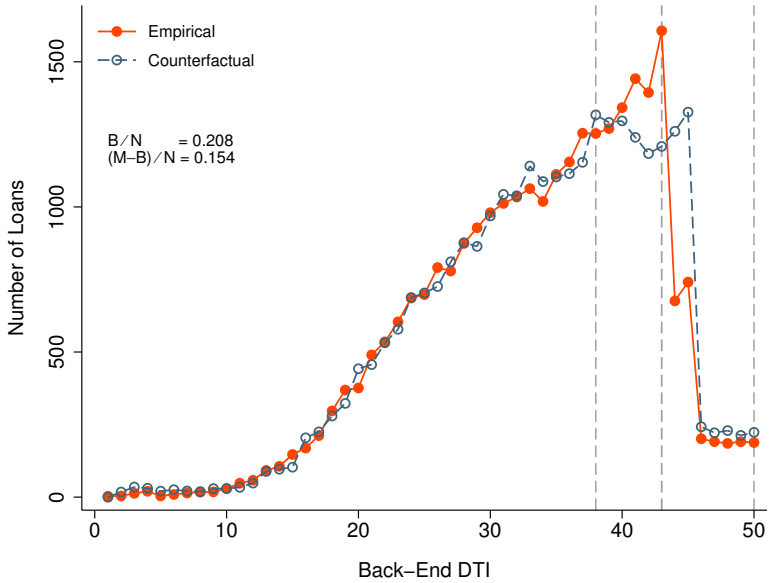
- **Counterfactual**: $\hat{n}_{jd}^{post} = \hat{\pi}_{jd}^{post} \times N_{j\underline{d}}^{post}$

Assumption 3 Validation Assumption 1 Validation

Proof of Concept: Placebo Policy Year 2013



The Effect of QM on Quantity of Credit: Actual Policy Year 2014



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- In the first draft we submitted, this was all we had to say about quantities
- The result is interesting, but somewhat unsatisfying
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Referee #1

*In my mind, **the most interesting result of the paper is that quantities decline by so much**, in particular on the extensive margin. I agree with your statement that this has important implications for the implementation of macro-prudential policies like the one that is studied directly. As such, **the reasons for this decline in quantity need to be explored much more systematically**."*

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Referee #2

*"The quantification of the **negative effect of the reform on quantities** in the first part of the paper **might be interesting** for the legislator - **but without additional discussion - it is not clear what we learn from an academic point of view**."*

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Referee #3

Gave us a free pass on this (sort of)

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Referee #4

"It would be very interesting if the authors could explore also heterogeneity across banks: ***which banks pulled out from the market the most?****...This will be* ***important in shaping the policy implications of the paper****."*

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Editor's Letter

*"**You need to investigate reasons for the large quantity effect**...It is not enough to say that the reduction in the number of loans reflects credit rationing. You **need to outline a mechanism**, because the same mechanism may be helpful in thinking about the impact of other forms of regulation. I am not necessarily asking you to write down a model. But you **need to find the economic mechanism generating the quantity effect**."*

What Explains the Large Quantity Effect?

- Unintended by the regulator

> *"the Bureau believes that the ability to repay requirements and the accompanying potential litigation costs will create, at most,* ***relatively small price increases*** *for mortgage loans. These small price increases, in turn, are* ***not likely to result in the denial of credit to more than a relatively small number of borrowers*** *[...]" (CFPB, 2013)*

- Difficult to reconcile with a frictionless view of credit markets
- Why do some lenders exit the market entirely instead of pricing the added legal risk?

Agency Conflicts as a Potentially Important Market Friction

Recall: Compliance with ATR requires lenders to *either*

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- Fragmented lenders
  - Perform documentation and underwriting through brokers/correspondents
  - Buy non-QM loans from third-party originators
  - Exposed to ATR liability, but outsource compliance to third-parties

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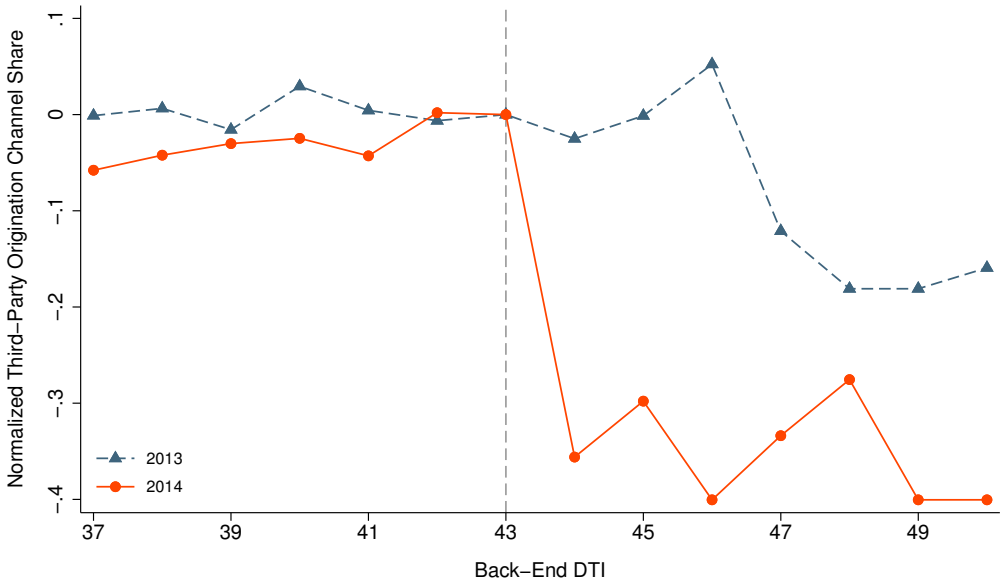
Hypothesis

- Agency costs $\rightarrow$ non-QM lending unprofitable at fragmented lenders

Share of Third-Party Originations by DTI



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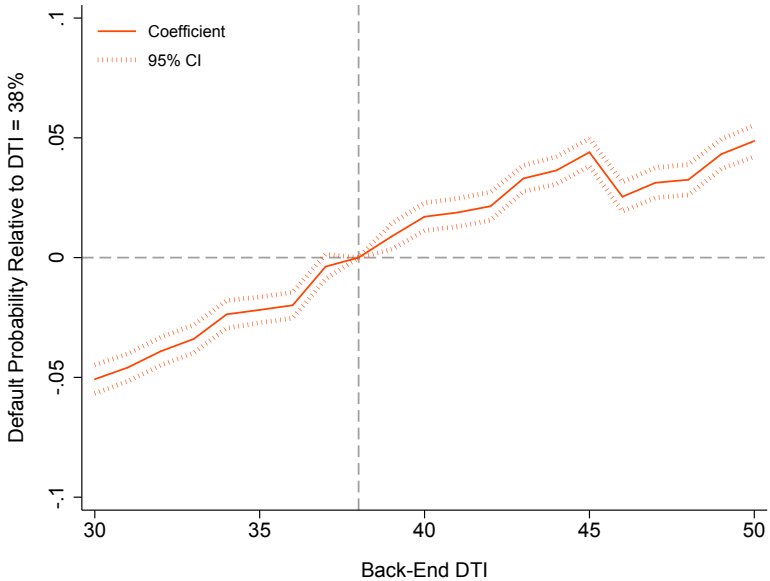
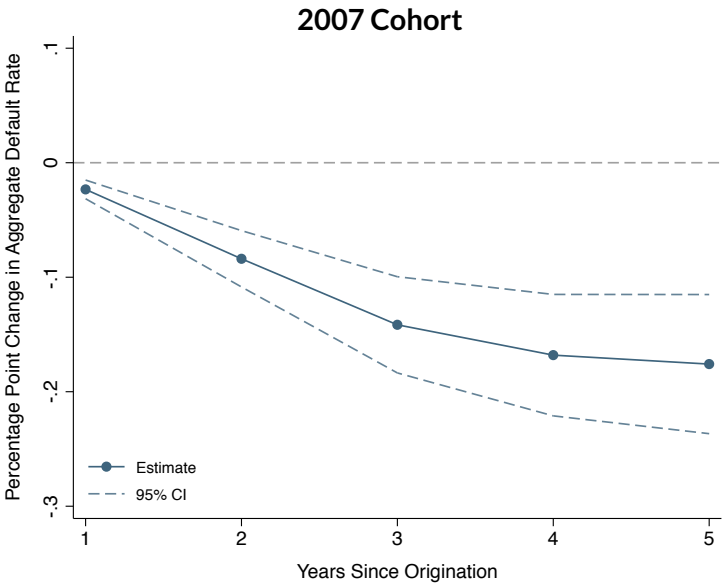
Would QM Have Helped to Avoid the Mortgage Crisis?

- **Answering this requires knowing**
  1. How QM would have affected the pre-crisis DTI distribution
     - Extrapolate our estimates to pre-crisis loan cohorts
  2. The relationship between DTI and mortgage performance
     - Estimate historical relationship using performance data
     - Origination cohorts 2005–2008
- **Given 1 & 2, how much lower would default rates have been?**

DTI and Five-year Default Rate (Pre-Policy Loan Cohorts)



Counterfactual Effect of QM on Default Rate



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    $\downarrow$ **default rate on worst-performing cohort by only 0.2pp**

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- Prices respond moderately, quantities move by a lot
  - Identifying credit market frictions and understanding how they interact with policy choices is crucial input into the design of *ex ante* restrictions on household leverage
- Only moderate performance improvements in extreme scenarios
  - Important to target the "right" measure of leverage

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Bottom Line

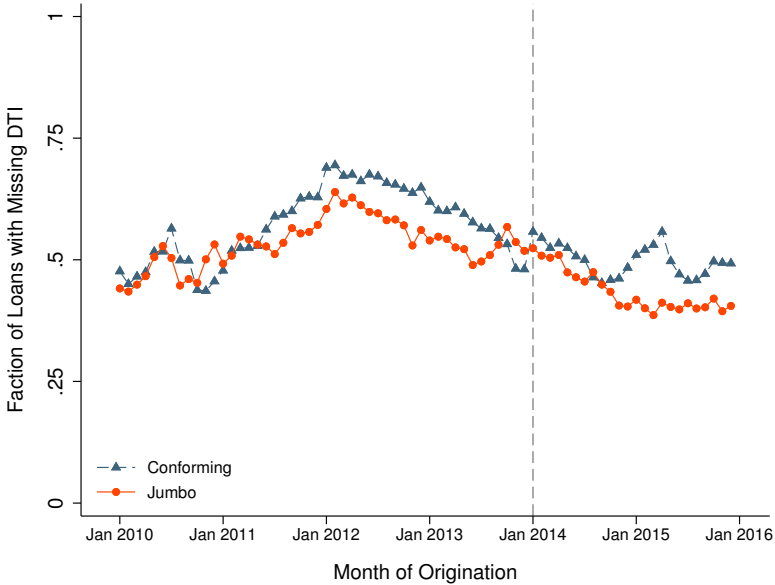
- New evidence on credit market responses to DTI restrictions
- Prices respond moderately, quantities move by a lot
  - Identifying credit market frictions and understanding how they interact with policy choices is crucial input into the design of *ex ante* restrictions on household leverage
- Only moderate performance improvements in extreme scenarios
  - Important to target the "right" measure of leverage

Limitations/Opportunities for Future Research

- Aggregate implications of DTI restrictions for house prices, consumption etc.
- Distributional/welfare effects of ex-ante restrictions on leverage
- Unintended/spillover effects in other credit markets

Thanks!

Missing Debt-to-Income Ratios by Month of Origination



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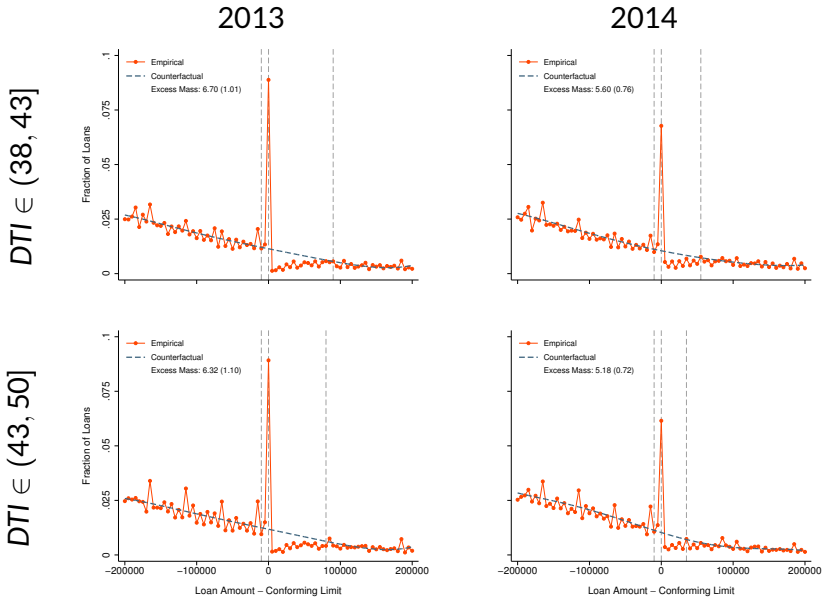
Substitution Into the Conforming Market



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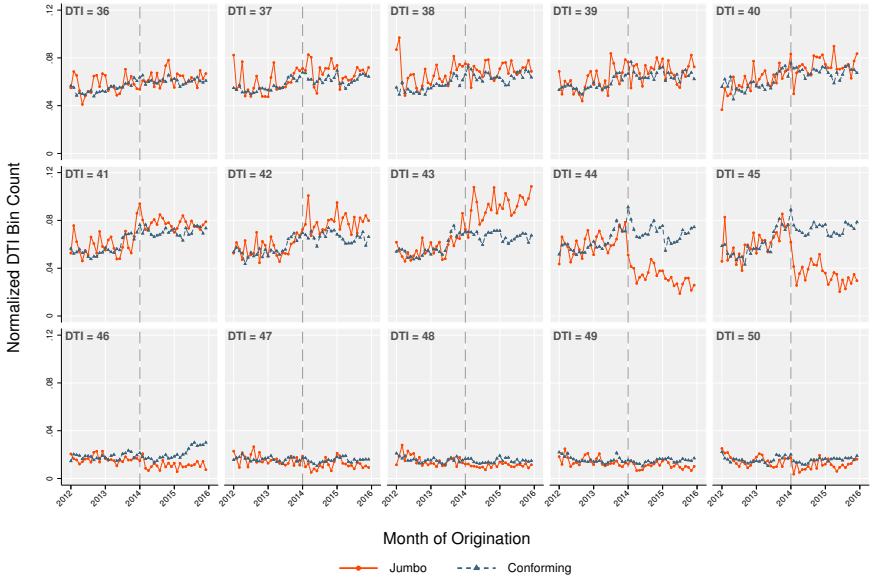
Parallel Trends test for Quantity Analysis



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Substitution to Adjustable-Rate Mortgages

	FRMs Only	FRMs and ARMs Combined	ARMs Only
	(1)	(2)	(3)
$\hat{B}/\hat{N}^{post}_{44^+}$	0.208***	0.333***	0.665***
	(0.033)	(0.032)	(0.123)
$(\hat{M}-\hat{B})/\hat{N}^{post}_{44^+}$	0.154***	0.101**	-0.056
	(0.041)	(0.039)	(0.146)
Bootstrap Replications	100	100	100
Number of Observations	418,105	454,360	36,255

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Performance Results by Documentation Status

	All Loans	Full Documentation	Low Documentation
	(1)	(2)	(3)
DTI ≤ 38	-0.0706***	-0.0709***	-0.0695***
	(0.0038)	(0.0052)	(0.0061)
DTI > 43	0.0320***	0.0384***	0.0227***
	(0.0044)	(0.0056)	(0.0069)
Implied Aggregate Effect	-0.0022***	-0.0025***	-0.0018***
	(0.0004)	(0.0004)	(0.0004)
Number of Observations	91,493	58,748	30,415

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