Economics 704a Lecture 13:
Housing, Household Finance,
and Monetary Policy

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## Housing, Household Finance, and Monetary Policy

- Theme of last two lectures: With heterogeneity and incomplete markets, household balance sheets matter.

- The 1,000 pound gorilla on most household balance sheets is *housing*.
    - Today: Focus on housing and monetary policy.

- Housing and the macroeconomy is one of my main areas of research. Happy to talk more!

Housing and Interest Rates
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Rate Resets
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Quantitative Easing
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Wong
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Housing, Household Finance, and Monetary Policy

1. How Much Do Interest Rates Affect the Housing Market?

2. How Do Interest Rates Affect Consumption?
   Evidence From Rate Resets
   - Di Maggio et al. (2017)
   - Fuster and Willen (2017)

3. How Effective Was Quantitative Easing?
   - Beraja et al. (2019)

4. How Will Aging Population Affect Monetary Transmission?
   - Wong (2018)

Housing Boom

- Large housing boom from 2001-2006.
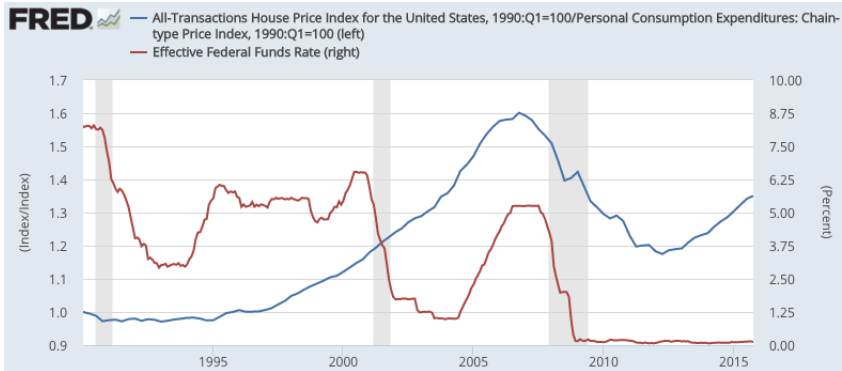
How Much Do Interest Rates Affect the Housing Market?

- What caused the boom?
  - Still a matter of debate. Leading theories:

1. Expectations.

2. Credit supply expansion.
   - Securitization, financial innovation, demand for safe assets.
   - Expectations of lenders / MBS investors.

3. Interest rates.
   - Some argue low rates 2002-2005 caused boom.
   - My view: Effect of interest rates on house prices is too weak to have caused boom (Glaeser et al., 2010; Adelino et al., 2012).
   - Not to say no effect of interest rates on prices or real economy.
     - Some find large effects in cities with inelastic housing supply (Aladangady, 2017).

- Move next to real effects working through housing market.

Housing and Interest Rates
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Rate Resets
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Quantitative Easing
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Wong
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Di Maggio et al. : Question

- How do households respond to declines in interest rates that affect their debt payments?
    - Ideally, exogenous changes in payments holding debt constant.
    - Tells us how monetary policy affects consumption through changing interest rates, to the extent debt is adjustable-rate.

- Paper has two parts
    - Micro data for individual response.
    - Regional variation to aggregate.

# Di Maggio et al.: Strategy Using Rate Resets

- Use resets on adjustable-rate mortgages from 2005-7.
  - Most ARMs have a fixed period and then adjust annually.
    - N/1 ARM fixed for N years and then adjusts annually.
  - 2005-7 mortgages reset to much lower rates in 2010-15.
    - Did not refinance because under water. Exactly who we want to give money to through policies like QE.

- Fuster and Willen (2017): large declines in default at reset.

- Di Maggio et al. (2017) link mortgages to credit reports, look at consumption and debt repayment.

- Empirical Strategies:
  - Event study on expected rate reset (within-borrower).
  - Diff-in-Diff: Compare 5/1 and 7/1 ARMs (across-borrowers).
  - Mian-Sufi-style analysis using monetary policy shocks $\times$ initial ARM share to show that more ARMS $\Rightarrow$ more responsive.
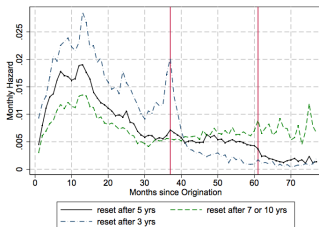
Fuster and Willen (2017): Decline in Default Hazard
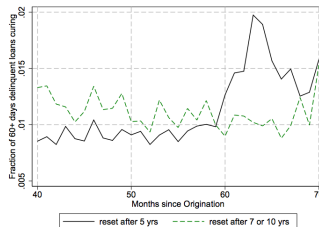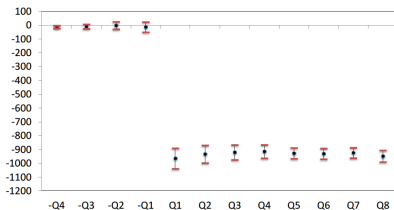

A. Mean interest rates
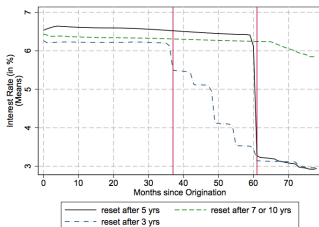
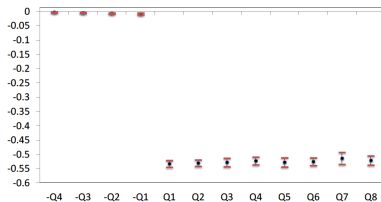B. Default hazard rates
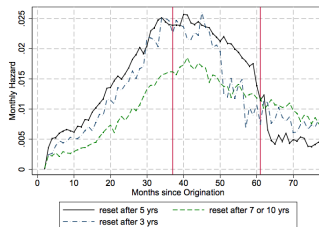
C. Prepayment hazard rates

D. Cure rates

Di Maggio et al.: Event Study For Non-Conforming Loans

(a) Mortgage Payments

(b) Mortgage Payments / Initial Mortgage Payment

(c) New Car Spending

(d) Voluntary Mortgage Repayment

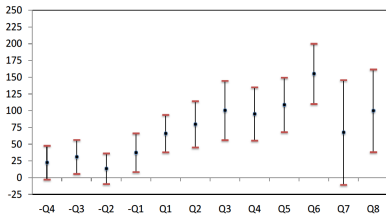# Di Maggio et al.: Event Study For Conforming Loans
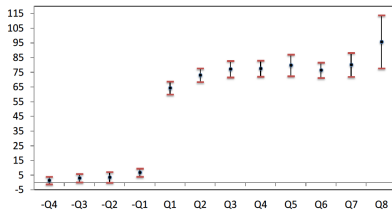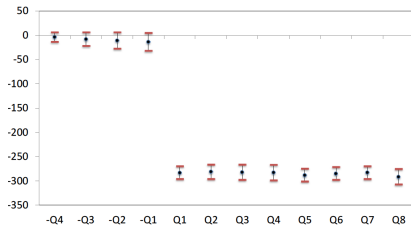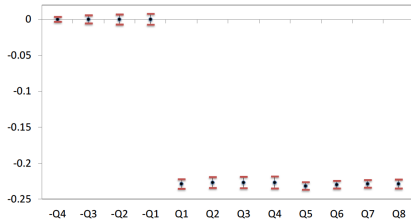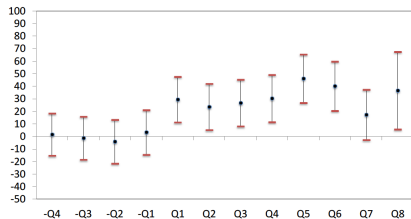

(a) Mortgage Payments

(b) Mortgage Payments / Initial Mortgage Payment

(c) New Car Spending
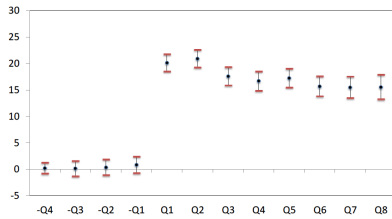
(d) Voluntary Mortgage Repayment

Di Maggio et al.: Findings

- Average monthly payment falls \$940/month (53%) at reset.
    - Auto purchases rise by 13.6% of payment reduction
    - Repay mortgage debt faster by 8% payment reduction.
    - Consistent with consumption models with credit constraints.

- Heterogeneity
    - High LTV $\Rightarrow$ twice as responsive auto spending, less deleveraging.
    - Same for low income households.

- Robustness
    - Conforming loans smaller in magnitude of payment reduction but similar in MPCs.
    - Similar results from Diff-in-Diff

Di Maggio et al.: Distribution of ARM Share

ARM Share
- 27.5% - 68.5%
- 19.6% - 27.5%
- 14.7% - 19.6%
- 2.1% - 14.7%
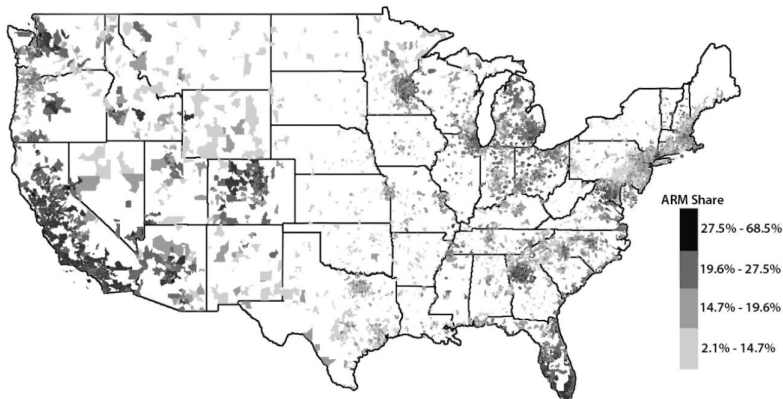
Di Maggio et al.: Cross Regions

- Identification challenge:
  - ARM share non-random; corr with debt, poverty, subprime. Try to address with observables, but would want instrument.

- Strategies:
  1. OLS with "matched sample" of ZIP codes similar on observables but with different ARM share.
  2. IV for all ZIP codes with share of homes with price within 1.25× conforming loan limit as instrument.

	Mortgage Interest Rate		Mortgage Delinquency Growth Rate	House Price Growth Rate	Auto Sales Growth Rate	Employment Growth Rate
	(1)	(2)	(3)	(4)	(5)	(6)
ARM Share	-0.0198	-0.0176	-0.264	0.025	0.037	0.029
	(0.0005)	(0.0008)	(0.035)	(0.008)	(0.018)	(0.013)
Zip Code Controls	No	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	Yes	Yes	Yes	Yes
Number of Zip Codes	1000	902	902	902	902	902
R-Squared	0.56	0.75	0.69	0.49	0.28	0.11

- Downsides:
  - Partial-equilibrium borrower response. Does not pick up potentially-important credit supply response.

Di Maggio et al.: Evaluation

- The ARM reset design is clever and clean, and outcome variables show value of linking together admin datasets.
    - Outcome variables suggestive but not full picture.
        - Di Maggio et al.: Payments fall \$940, spend 13.6% on autos and 8% on paying down debt
        - MPC anywhere from 13.6% to 92%!
        - With strong assumptions, extrapolate to get MPC of 80%, but very tentative.
    - Sample attrition and selection issues (see paper).
    - Good example of interesting discontinuities and sources of variation in housing.

- Cross-regional exercise less convincing (authors downplay).
    - Instrument is related to level of local house prices, which may be correlated with error term.
    - Matching is good strategy, but still only does so much.
    - Long and variable monetary policy lags muddy things.
   - Tough to aggregate.

The Effect of LSAP on Refinancing and Consumption

- November 2008: Fed announce large scale asset purchases of mortgage-backed securities (QE1).
    - Goal: Push down mortgage rates, stimulate housing market and real economy through housing market.
    - How effective was policy?

- Beraja et al. (2019) argue policy was less effective than might have been because mis-targeted.
    - Want to stimulate places like Las Vegas, which had biggest housing bust and biggest recession.
    - But instead stimulate places with smallest bust and recession.

- Mechanism
    - Fixed rate mortgages: Only get benefit of new rate if refinance.
    - To refinance, must be "above water" (owe less than value).
    - In hardest-hit places, vast numbers are "under water" or at LTV constraint and cannot take advantage of QE.
    - Paper has model that I will not cover here.
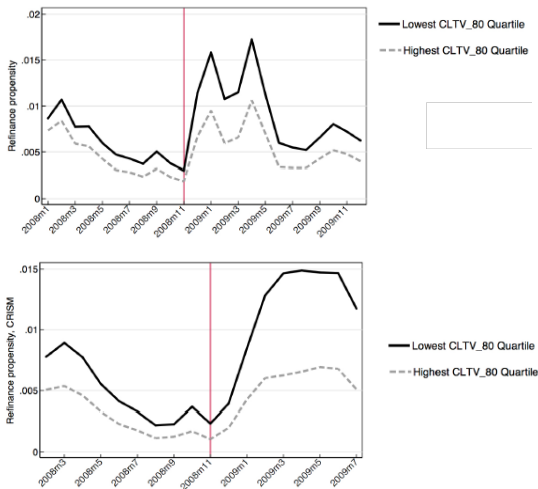
Large Heterogeneity in Loan-To-Value Ratios Across Cities
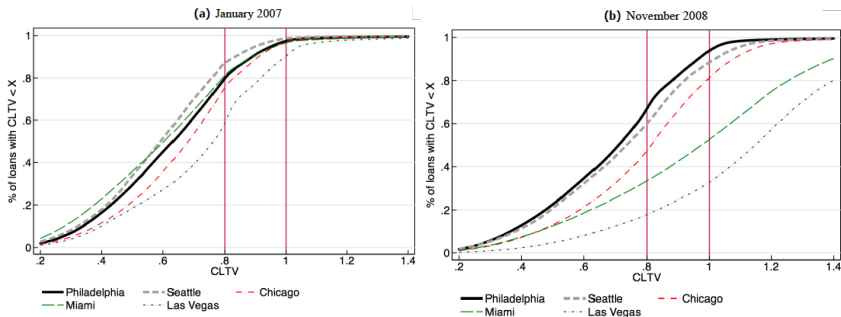
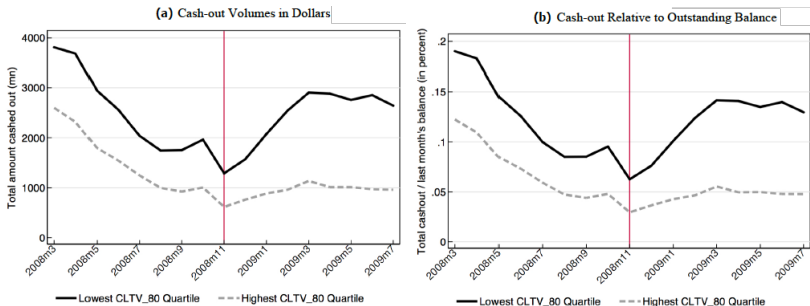# Low Equity (High LTV) Most Common in Hardest-Hit Areas
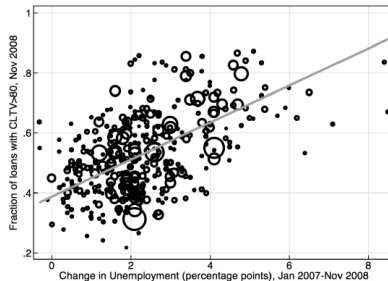
Refinance Propensities: Take Off in QE in Low-LTV Areas

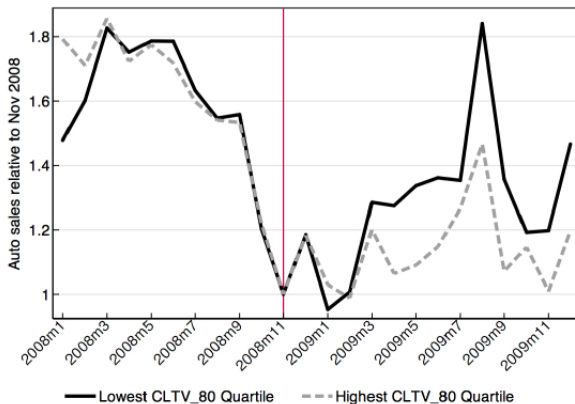Top: HMDA data. Bottom: Equifax-McDash Data

Increase in Cash-Out Refis in Low-LTV Areas

- Cash-out: Increase balance of mortgage when refinance, turning some home equity into cash.

(a) Cash-out Volumes in Dollars   (b) Cash-out Relative to Outstanding Balance

Cash-Out in Low-LTV Areas Translates Into Auto Sales

Legend: ——— Lowest CLTV_80 Quartile   - - - Highest CLTV_80 Quartile

Wong (2018): Refinance Channel and Population Aging

- Wong (2018)[1] also focuses on transmission of monetary shocks through refinancing.
    - Interaction with age and changing demographic structure.

1. Empirical analysis of monetary shocks.
    - Monetary policy passed through to mortgage rates and has large and persistent effects on consumption.
    - Young respond 2x more, drive 2/3 of aggregate response.
    - Refinancing is key channel: consumption response driven by homeowners and particularly those who adjust mortgage.
    - Young adjust mortgage more in response to change in rates, explaining for age differential in consumption response.

2. Partial equilibrium model.
    - Life cycle model with long-term debt and transactions costs.
    - Monetary transmission 50% weaker with older population.

[1]Arlene Wong's excellent slides are gratefully acknowledged.

Wong: Your Criticisms

- You wrote mini-referee reports on Wong's JMP.

- What were your comments on the empirics and theory?

- What did the AER do?

Housing and Macro

- Big field with lots of exciting work to be done.
    - My main research area.
    - Lots of great data to apply micro data and methods to macro models and questions.
    - Today we only scratched the surface.

- Happy to discuss more with you.

Retrospective: That's All Folks!

- We have covered a lot of ground in the last seven weeks!
    1. Real Business Cycles
    2. The New Keynesian Model
        2.1 Empirical Motivation for Nominal Rigidity
        2.2 Money, Money Demand, and Output
        2.3 Monopolistic Competition and Markups
        2.4 Full New Keynesian Model
    3. Optimal Policy in a New Keynesian Framework
    4. The Liquidity Trap and Policy in a Liquidity Trap
    5. New Perspectives on the Monetary Transmission Mechanism

- Hope you found class interesting and relevant for understanding business cycles and economic policy!
    - Will see you around building, if not in class.
    - Good luck on quals and enjoy the rest of first year!