Aggregate and Distributional Dynamics of Consumer Credit in the U.S.

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Purpose of Todays Talk

- Document the dynamics of consumer credit (unsecured credit, auto loans, and mortgage/heloc)
- Emphasis will be on unsecured credit, but other other liabilities cannot be ignored
- Look at the changes in the cross-section and the individual paths of debt holdings with emphasis on young individuals (25-34)
  - Separate pre and post Great Recession behavior
  - Identify changes in behavior from changes in participation
- Most of the talk will be about data

Why do we care?

- Evaluation of the performance of models with heterogeneous agents
- **Models of individual credit:** Why individuals borrow? What are they doing with the loans? smooth consumption, insure shocks, purchase durable/lumpy goods
- **Models of default:** What does borrowing look like before default? What default options are preferred?
- At the macro level, hoping to identify facts that may have predictive content for changes in the business cycle

Key Findings: Credit in General

- The distribution of unsecured debt holding is "hump-shaped" by age with a peak around age 48-55.
- The distribution of mortgage debt, auto debt, and student loans peak earlier.
- Individuals that also hold mortgage debt have much larger balances of unsecured credit.

Key Findings: Credit Boom and the Great Recession

- The credit boom expanded borrowing across all four classes.
- The Great Recession significantly reduced consumer debt balances for all age cohorts but increased holdings of student debt
- Default
  - For individuals of age 20 and 31, the Great Recession triggers an increase in foreclosure rates as a vehicle to discharge unsecured debt.
  - The bankruptcy option is not used as frequently as foreclosure because of the smaller size of unsecured debt relative to mortgage debt.
  - Unlike other periods, young individuals tried to decrease unsecured debt levels but fail and use the bankruptcy option.

I) Data and Aggregate Dynamics

Data Source: FRBNY's Consumer Credit Sample (CCP)

- Analysis based on FRBNY's Consumer Credit Sample (CCP)
- The CCP is a longitudinal quarterly database that tracks the liability side of consumers' balance sheets (1999-2013)
- Database is a 5% random sample of credit reports provided by Equifax.
- Individual data on
  - unsecured and secured balances,
  - payments,
  - delinquencies, bankruptcies, and foreclosures,
  - geographic markers.

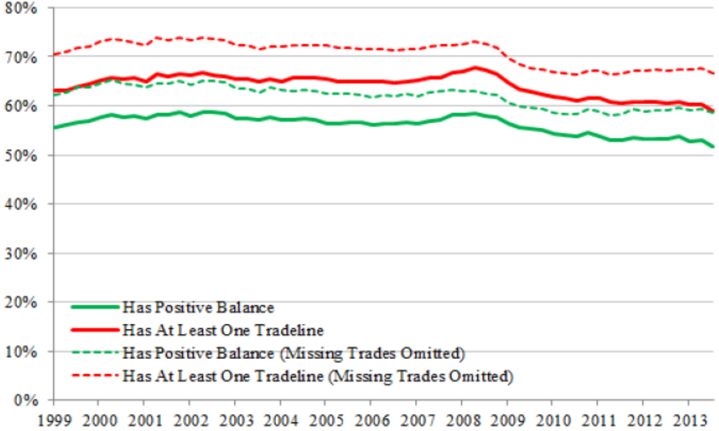
Analysis

- Allows us to study the behavior of individual with respect of unsecured and secured debt holding starting 1999-2013.
- Document the aggregate and distributional patterns (cross section) by age
- Special emphasis on the individuals between 25-34. Why?
  - The initial debt positions at age 25 are very similar
  - For this group, the exposure to large shocks (i.e.,health, kids, divorce, etc...) is very limited
  - Look at the top 10% and bottom 10% of the borrowers' distribution
- All data will be inflation adjusted

Limitations

- The data set (FRBNY Credit Panel/Equifax) is very detailed in documenting liabilities, but it has no information about assets or income.
- Currently matching the data with the SCF to gather more information about each individual (education, income, wealth,...)
- Very difficult to separate changes in credit supply (tightening of credit) from deleverage
- Models can be used to identify features that are important to understand the dynamics of liabilities, and then backout implied assets and income

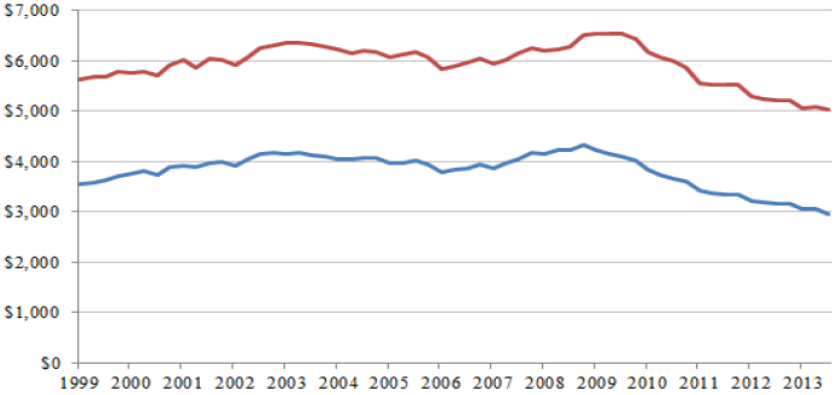
Percentage of Consumers with Positive Balances or Tradelines



Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Relatively stable participation until the Great Recession in 2008

Average Real Credit Card Balances

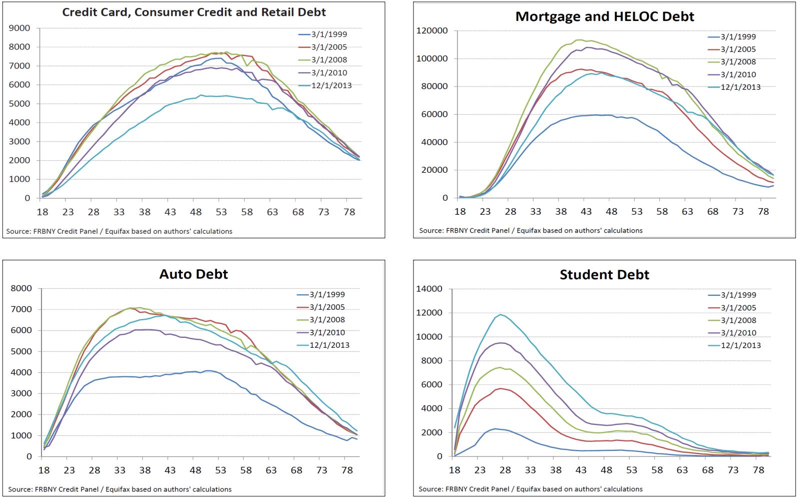


Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations
Notes: PCE adjusted to 2014. Joint accounts left as is

Participation decision is important (red line is conditional on positive balance, $\ell > 0$, blue line includes zeros, $\ell \geq 0$)

II) Life-Cycle Dynamics

Figure 7: An Overview of Debt Level Changes by Age



Sizeable changes in the cross-section between 1999 and 2013

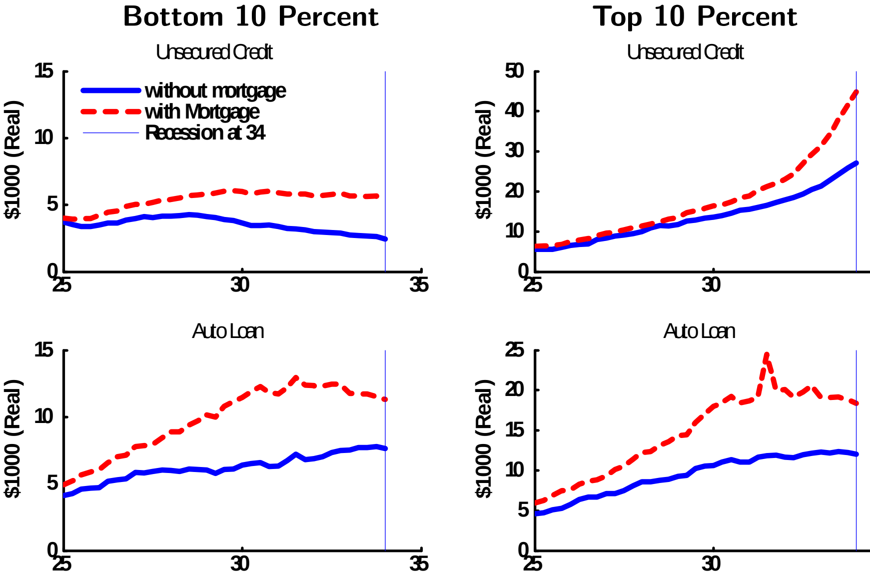
III) Distributional Facts for Consumer Debt

Distributional Facts Consumer Debt

- Differentiate the individual debt dynamics before and after the financial crisis.
- Focus on individuals 25-34 years old with unsecured credit, auto loans, and mortgage debt.
- Eliminate individuals with student loans and individuals with only credit card debt (very few)
- Data segmentation:
  - separate individuals by whether mortgage debt is present
  - Top and bottom 10% of the borrowers

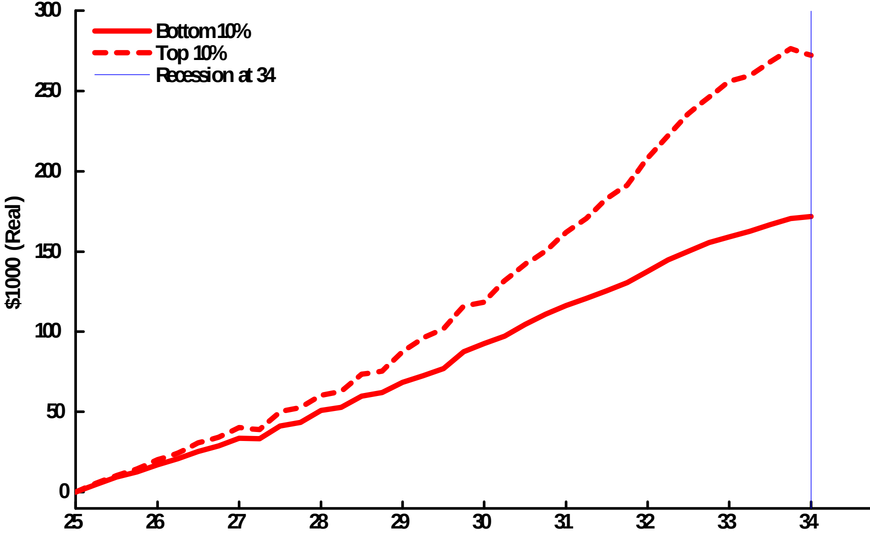
Individual Debt Dynamics, 25-34

Unsecured Credit and Auto Loans



Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Mortgage/Heloc



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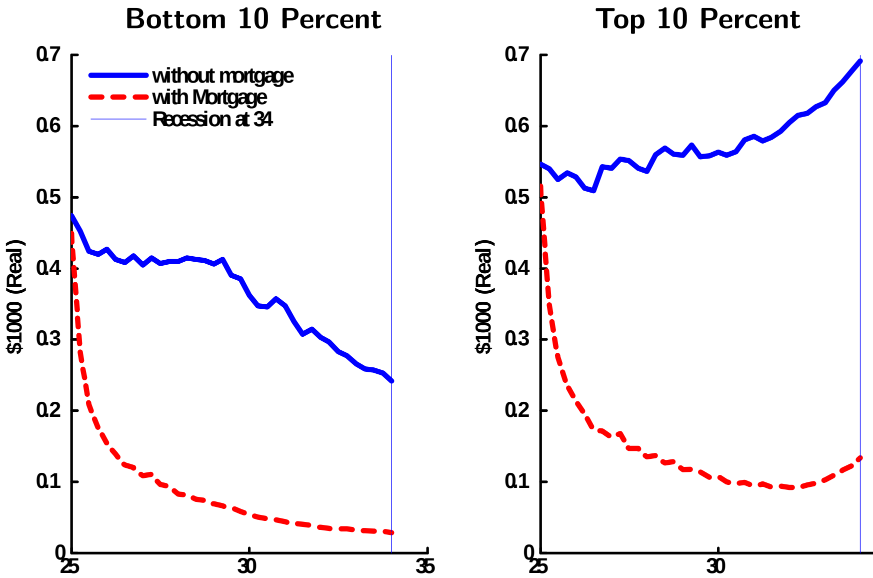
Share of Unsecured Debt on Total Debt



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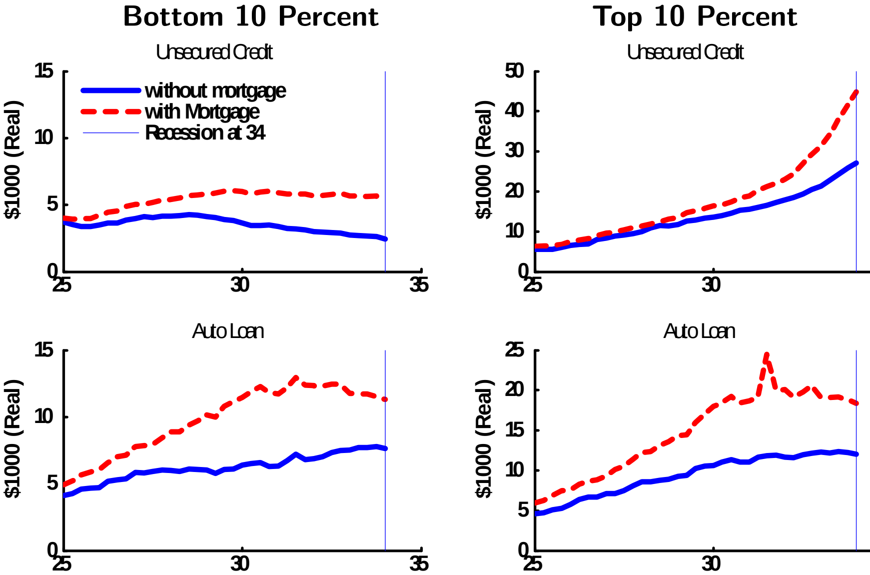
IV) Credit and the Great Recession

Unsecured Credit and Auto Loans: 1999



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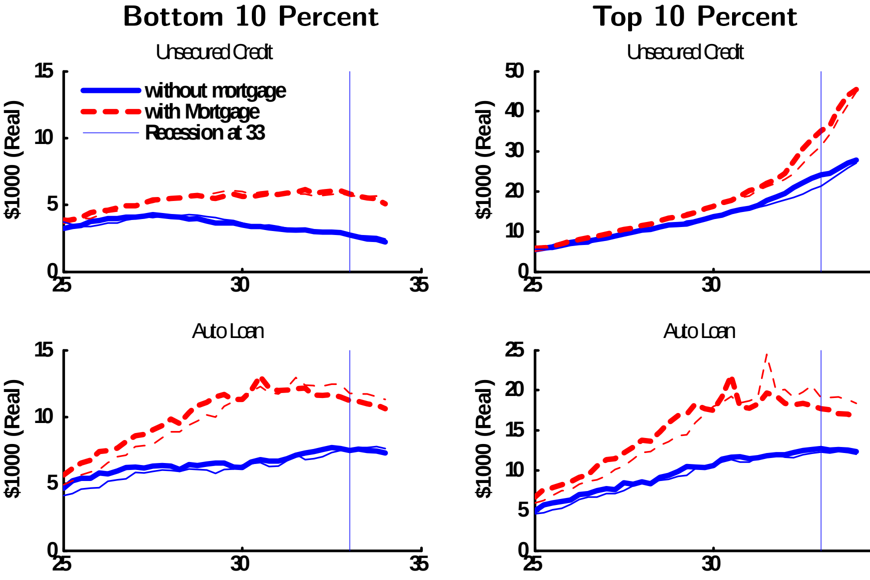

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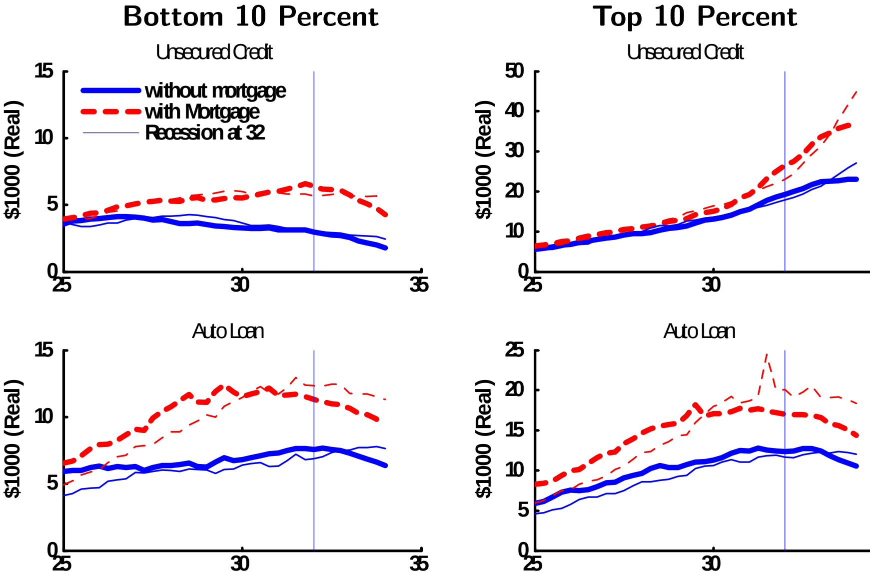

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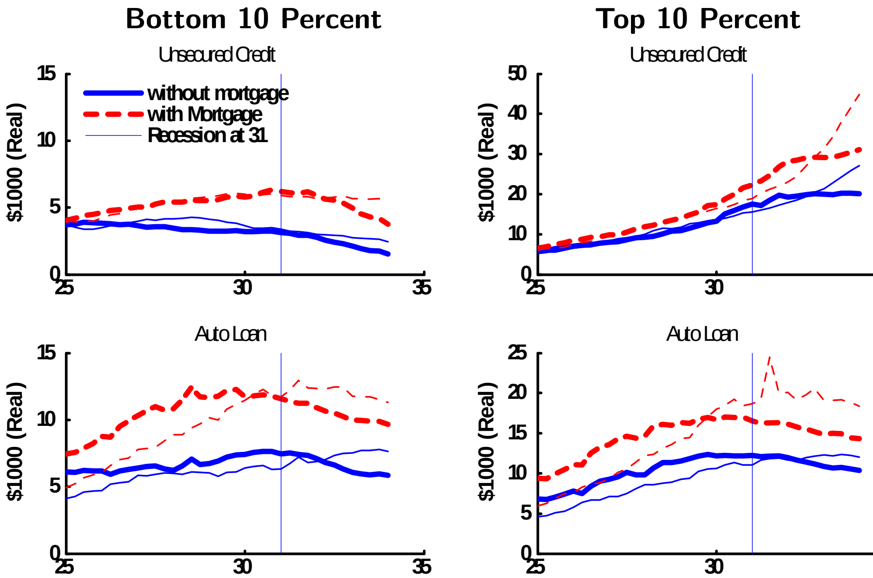

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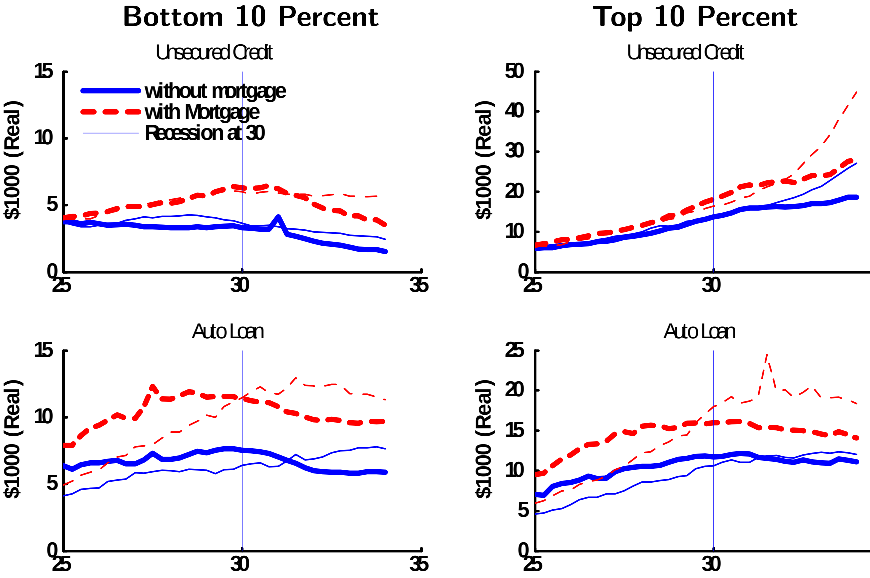

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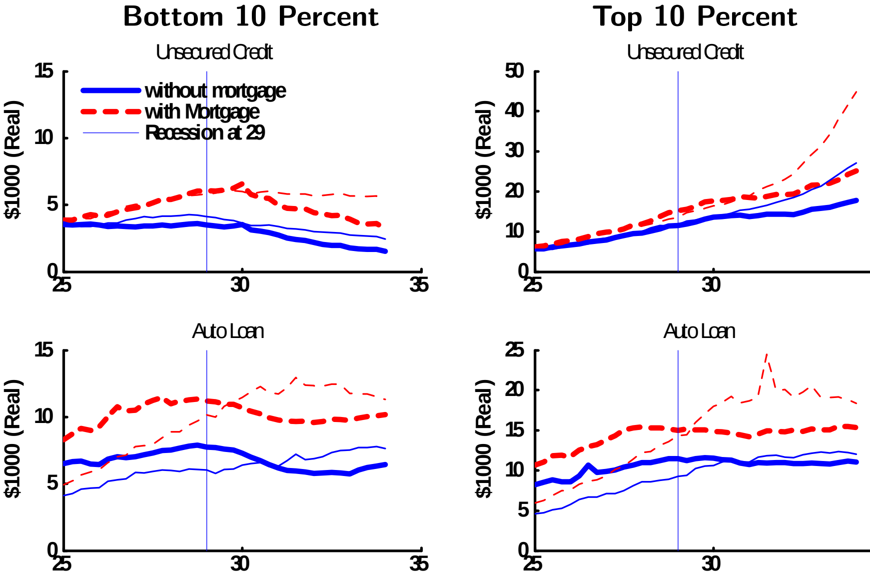

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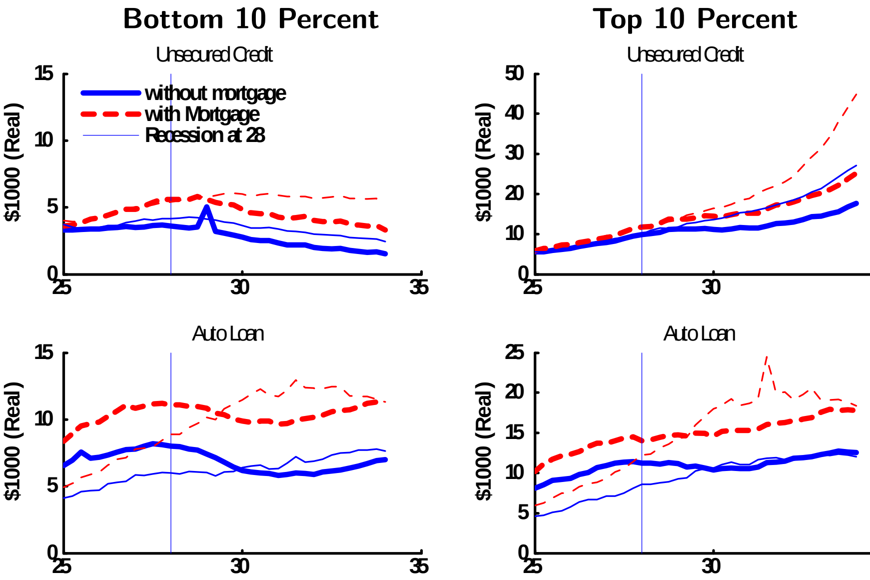

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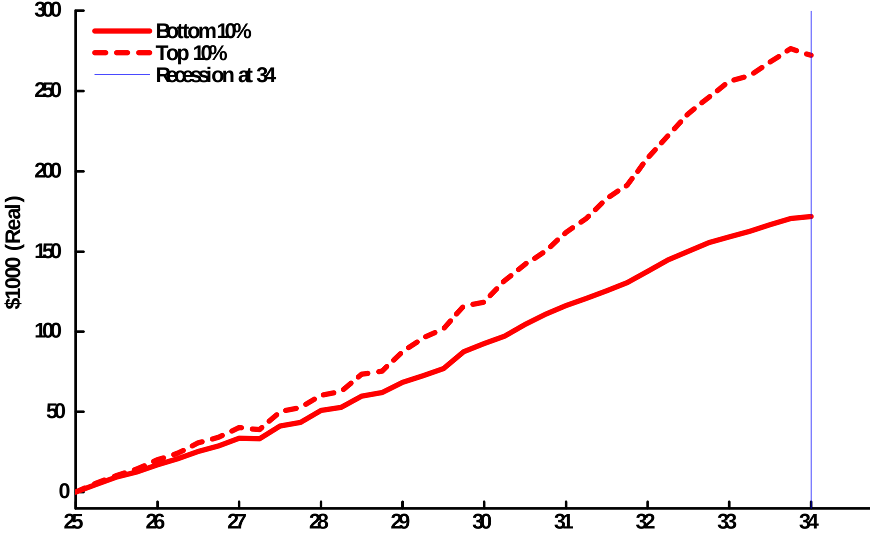
Mortgage Debt and the Great Recession

Mortgage/Heloc: 1999



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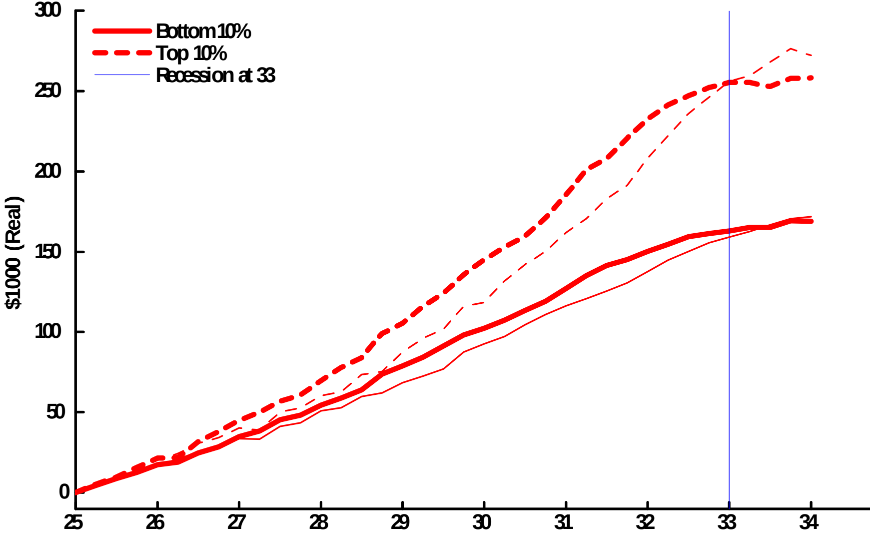

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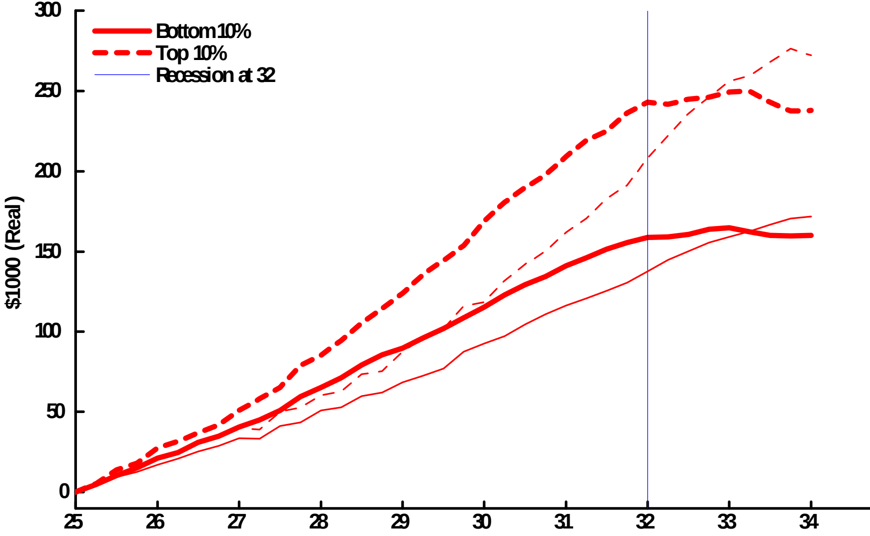

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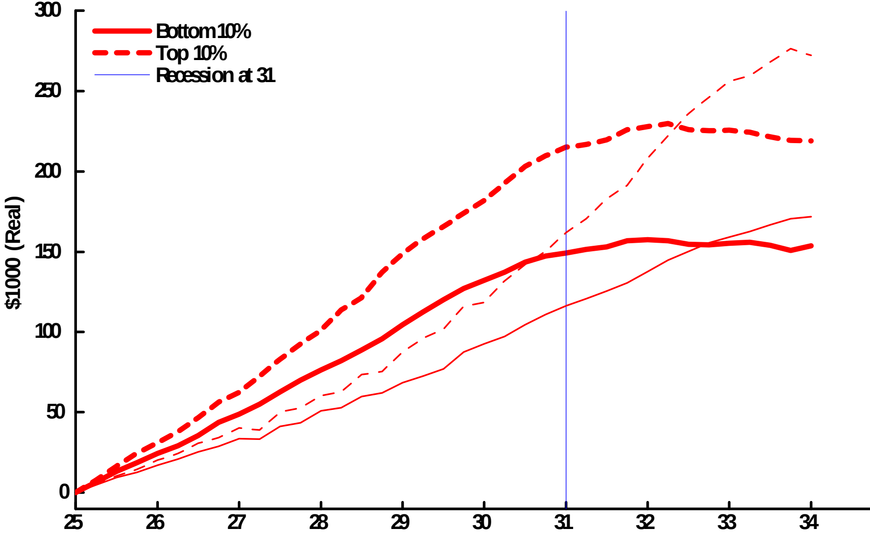

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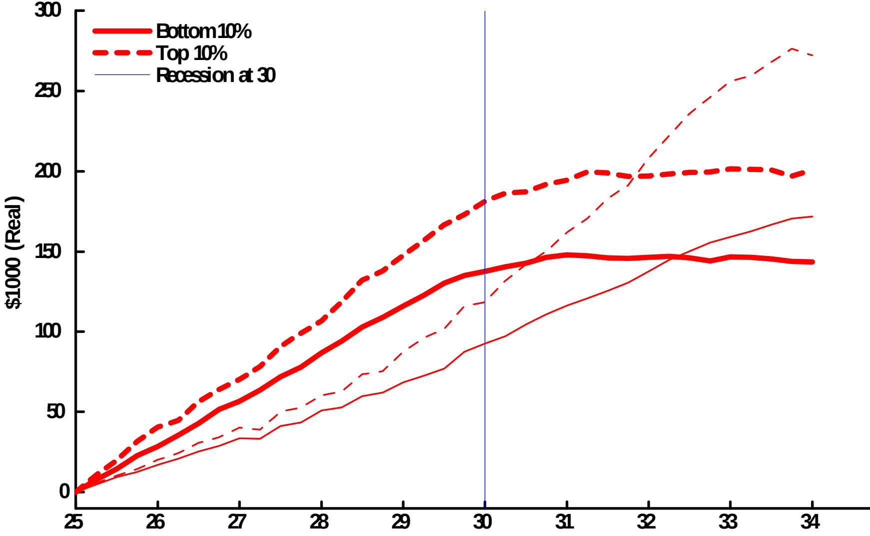

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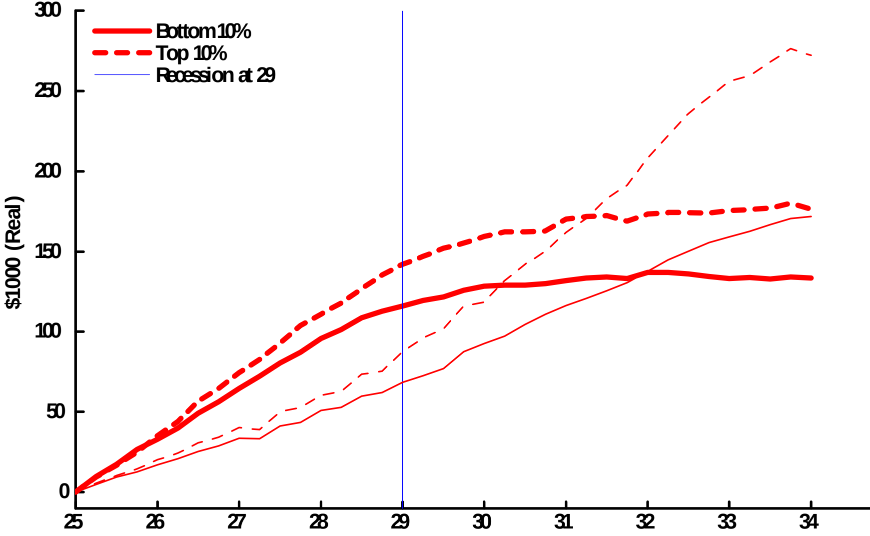

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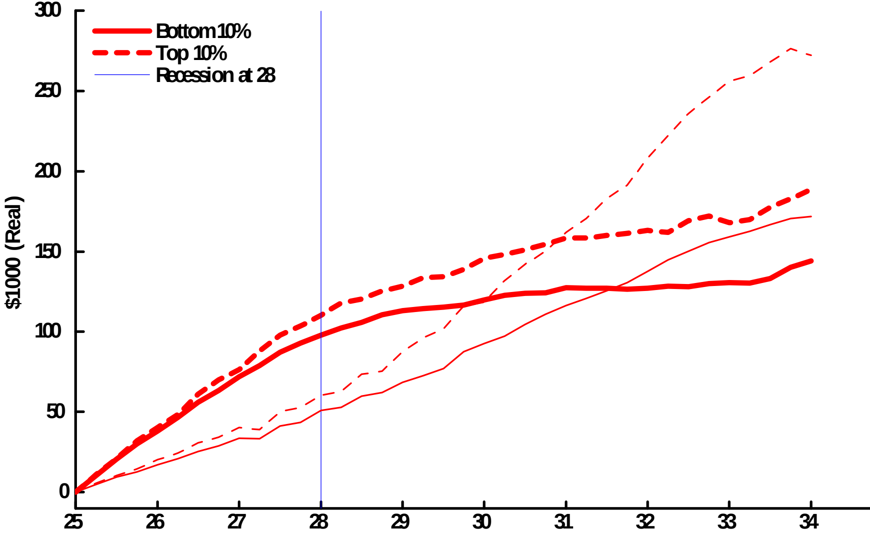

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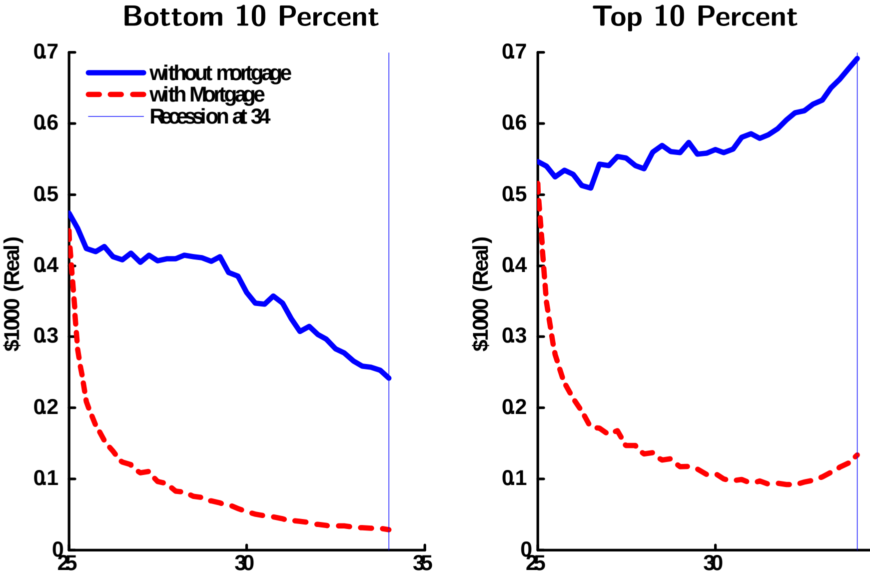
Share Unsecured Credit and the Great Recession

Share of Unsecured Debt on Total Debt: 1999



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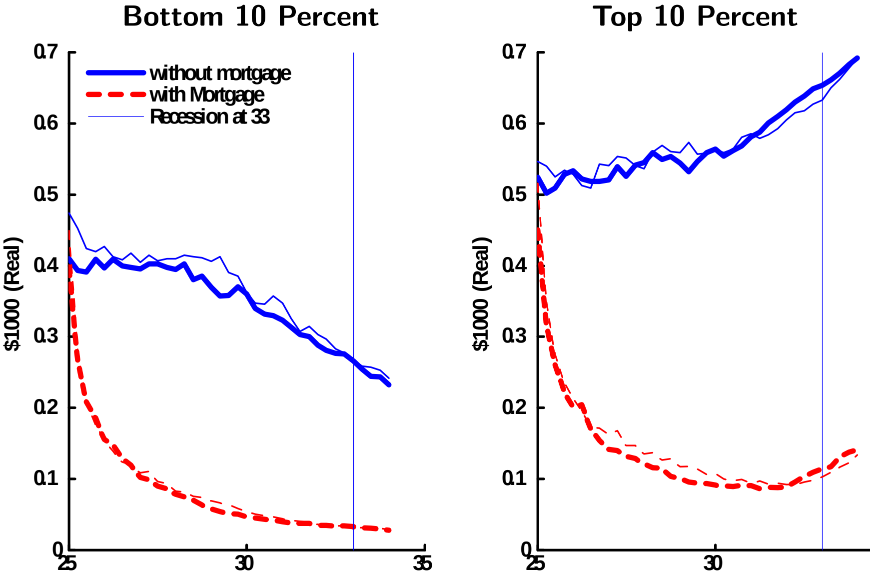

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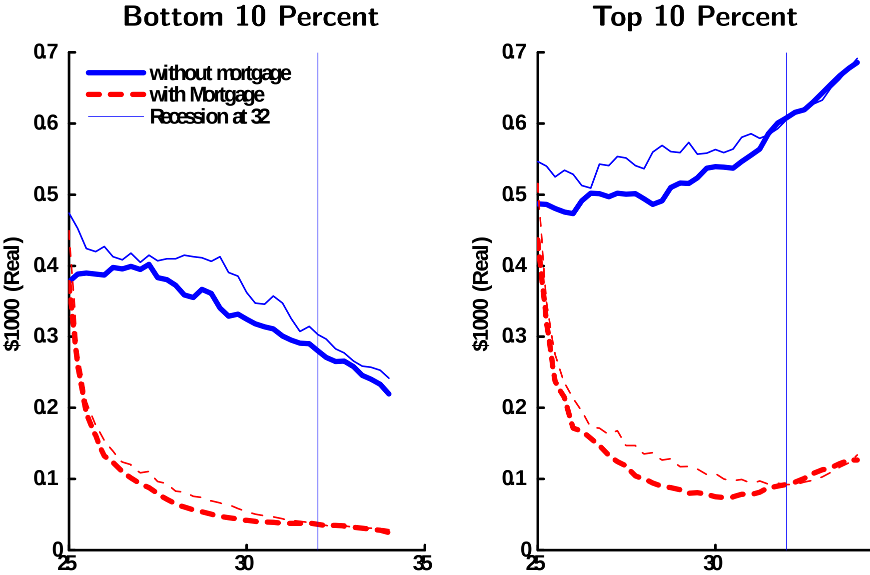

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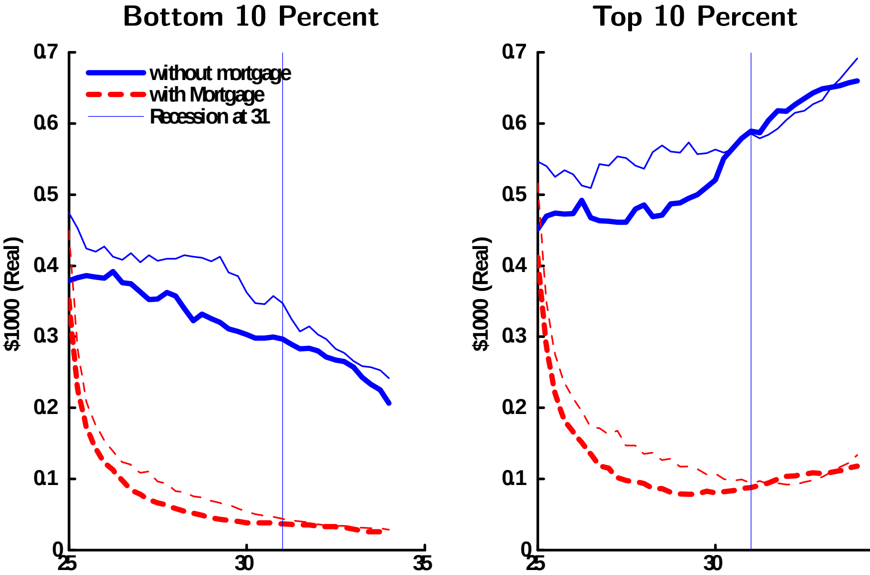

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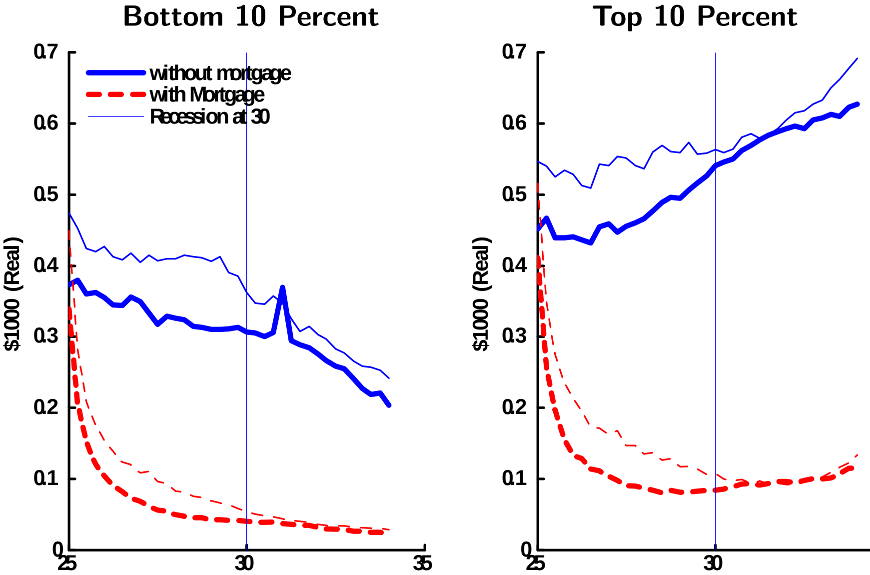

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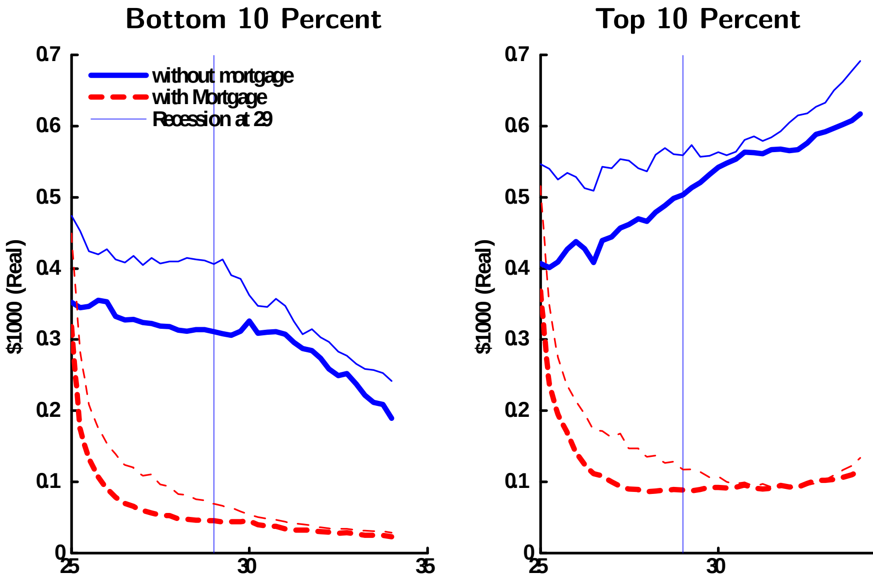

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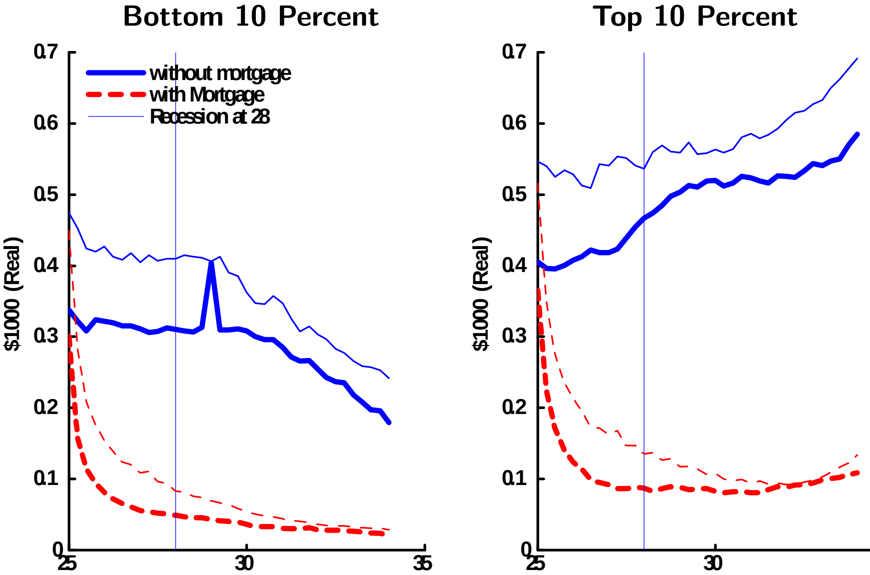

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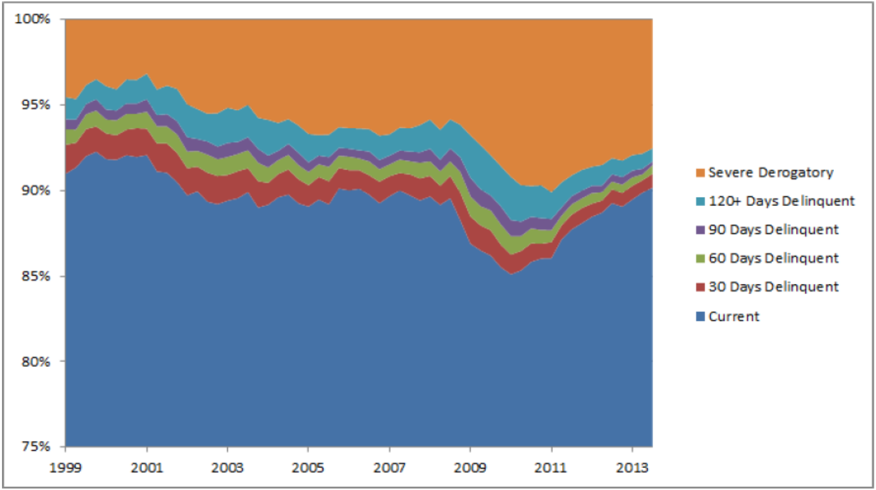
V) Dynamics Deleverage, Delinquencies, and Bankruptcy

Percent of Credit Card Balances in Delinquency



Participation: Individuals without Mortgage Debt in 1999

				Percent Choosing			
Debt	**Mortg.**	**Fore**	**Bank.**	**99-05**	**05-08**	**08-10**	**10-13**
↓	↑	No	No	57.2	59.6	**64.1**	60.1
↓	↑	No	Yes	4.5	1.8	1.0	**1.9**
↓	↑	Yes	No	1.1	0.8	0.5	0.5
↓	↑	Yes	Yes	0.4	0.2	0.1	0.2
↑	↑	No	No	35.2	36.9	34.1	37.1
↑	↑	No	Yes	1.2	0.5	0.2	0.3
↑	↑	Yes	No	0.3	0.3	0.1	0.1
↑	↑	Yes	Yes	0.9	0.1	0.1	0.1

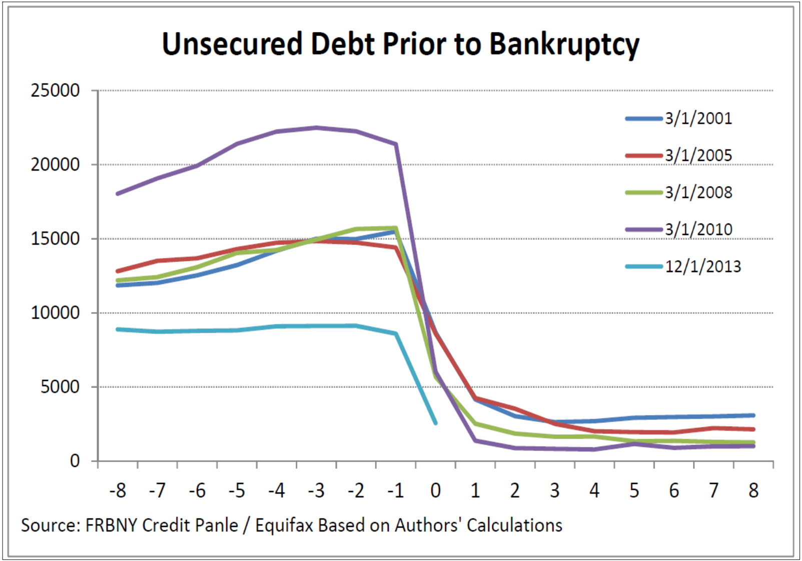
Source: FRBNY Credit Panel/ Equifax based on authors' calculations

Participation: Individuals with Mortgage/Heloc in 1999

				Percent Choosing			
Debt	**Mortg.**	**Fore**	**Bank.**	**99-05**	**05-08**	**08-10**	**10-13**
↓	↓	No	No	31.7	36.7	**42.8**	38.6
↓	↓	No	Yes	4.1	1.2	1.2	2.5
↓	↓	Yes	No	3.3	2.0	**5.2**	4.8
↓	↓	Yes	Yes	1.7	0.5	0.7	1.2
↓	↑	No	No	15.5	11.8	7.3	5.9
↓	↑	No	Yes	0.5	0.1	0.1	0.1
↓	↑	Yes	No	0.2	0.4	0.6	0.4
↓	↑	Yes	Yes	0.1	0.1	0.1	0.1
↑	↓	No	No	22.5	32.1	33.2	37.7
↑	↑	No	No	18.2	13.5	6.1	7.0

Source: FRBNY Credit Panel/ Equifax based on authors' calculations

Figure 8: Unsecured Debt Adjustments Prior to Bankruptcy



VI) Model of Credit Decisions

Model of Unsecured and Secured Credit

- Period is one quarter
- Life-cycle 20-34 and exogenous continuation value
- Exogenous prices and income
- Four assets; Savings, unsecured credit, car loans, and mortgages
- Three consumption goods: goods, housing, and auto
- Car and houses are financed with long-term contracts
- Do not model the purchase decision of houses and autos
- Shocks: Income, auto and house maintenance, and consumption opportunities

Decision Problem: Non Homeowner

$$v(a, d, l, z, y) = \max_{c, a', l' \in R_+} \{ U(c, \underbrace{z}_{auto}) + \beta E_{y', z'} v(a', d', l', z', y') \},$$

$$\begin{array}{lrcl} s.t. & c + \underbrace{a'}_{assets} + \underbrace{d(z)}_{auto} + R^l l & = & y + \underbrace{p\gamma z}_{shock} + \underbrace{l'}_{debt} + R^a a + \underbrace{\Psi(a', a)}_{adjustment}, \\ & d' & = & g_d(d, z) \\ & \Psi(a', a) & = & \begin{cases} >0 & \text{if a'<a} \\ \\ =0 & \text{if a'>a} \end{cases} \\ & a', l' & \geq & 0, R^a < R^l \end{array}$$

Decision Problem: Homeowner

$$v(a,d,l,m,h,z,y) = \max_{c,a',l' \in R_+} \{U(c,z,h) + \beta E v(a',d',l',m',h',z',y')\},$$

$$\begin{array}{rcl} s.t. \qquad c + a' + d' + m' + R^l l & = & y + p\gamma z + q\delta h + l' + R^a a + \Psi(\cdot), \\ d' & = & g_d(d) \\ m' & = & g_m(m) \\ h' & = & h, \\ \Psi(a',a) & = & \begin{cases} >0 & \text{if a'<a} \\ \\ =0 & \text{if a'>a} \end{cases} \\ R^a & < & R^l \end{array}$$

Conclusions: Great Recession

- The distribution of unsecured debt holding is "hump-shaped" by age with a peak around age 48-55.
- The distribution of mortgage debt, auto debt, and student loans peak earlier.
- Individuals that also hold mortgage debt have much larger balances of unsecured credit.
- The credit boom expanded borrowing across all four classes.
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