The Great American Debt Boom
1949-2016

Alina Bartscher   Moritz Kuhn   Moritz Schularick   Ulrike Steins

Housing, Credit and Heterogeneity

New Challenges for Stabilization Policies

September 13, 2018

Motivation

- Sixfold increase of U.S. household debt relative to GDP since WW2

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- Explore distribution of household debt, drivers of increase in indebtedness

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- Explore distribution of household debt, drivers of increase in indebtedness, and consequences for financial stability over the long run

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- Provide stylized facts on long-run distributional changes in household debt using newly compiled data

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- Explore debt increase as rational response to rising house prices

- Quantify effect of rising household debt on financial fragility (*stress testing*)

Results

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- Adjusting debt for rising house prices accounts for aggregate debt boom

- Debt boom led to more financial fragility of household sector

Data

- Historical Survey of Consumer Finances 1949 - 2016 (HSCF)

Column
Number

1-2   Study Number (59)

3   Card Number (5)

4-7   Interview Number

8-10   Income (of S.U.) from wages and salaries (for non self-employed onl

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11   Income of S.U. from roomers and boarders, excluding from re-
lated secondaries

1. $1 - 99
2. $100 - 499
3. $500 - 999
4. $1000 - 1999
5. $2000 - 2999
6. $3000 - 4999
7. $5000 - 9999
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Data
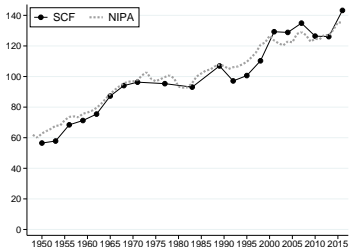
- Historical Survey of Consumer Finances 1949 - 2016 (HSCF)

- SCF most widely used data on U.S. income and wealth distribution
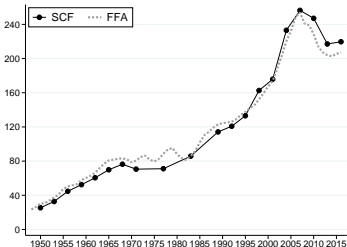
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- Combine *historical* (1949-1977) and *modern* (1983-2016) data

- Comprehensive data on household finances from 1949 to 2016

Aggregate trends from micro data

Income

Total debt

- Micro data matches macro trends: income and total debt

Aggregate trends from micro data

Housing debt
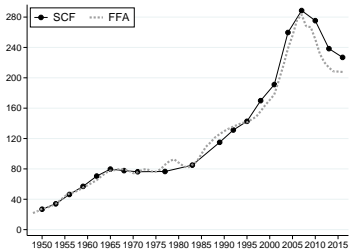
Non-housing debt
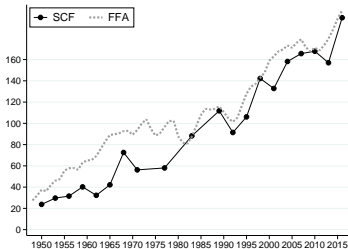
- Micro data matches trends for debt components: housing and non-housing debt

Variables

1. **Income:** wages and salaries, professional practice and self employment, rental income, interest, dividends, business and farm income, transfer payments

Variables

1. **Income**

2. **Debt:** housing debt (owner-occupied and other real estate), car loans, education loans, and loans for consumer durables, credit card debt, and other non-housing debt

Variables

1. ***Income***

2. ***Debt***

3. ***Housing debt:*** debt on owner-occupied housing

Variables

1. ***Income***

2. ***Debt***

3. ***Housing debt***

4. ***Nonhousing debt:*** debt net of housing debt

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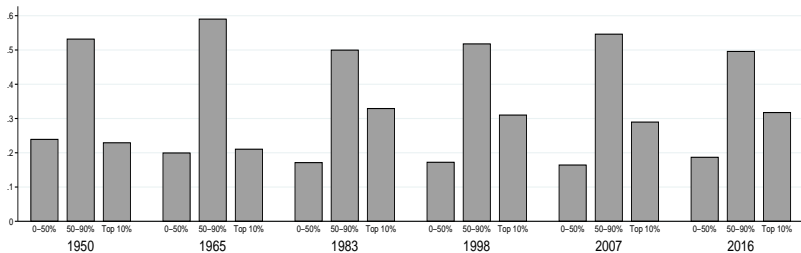
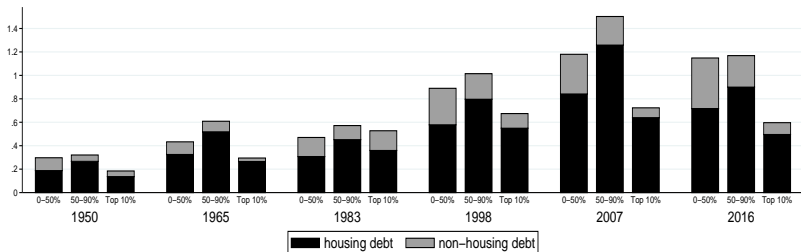- In 2016, richest 10% owe 1/3 of all household debt

Time periods

Distribution of household debt
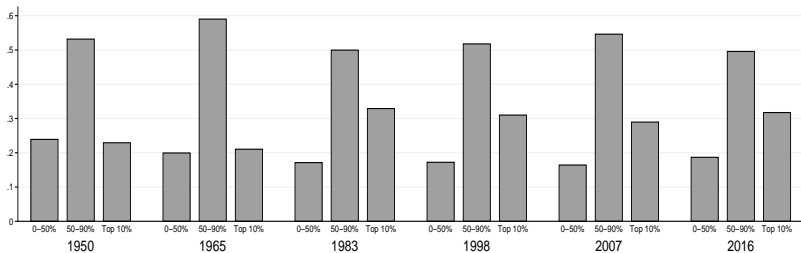
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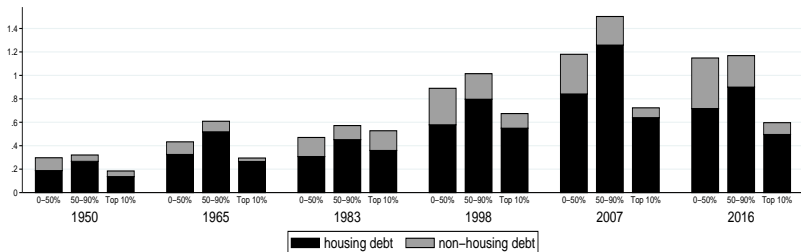
- Debt share of income-rich households increased
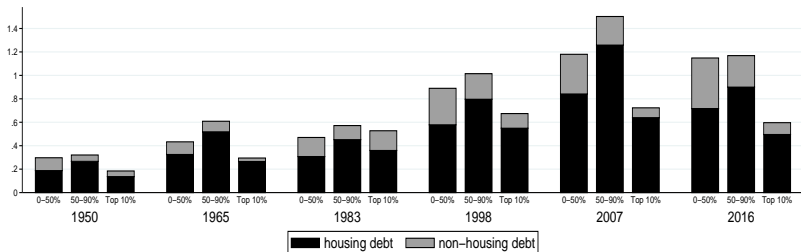
Debt-to-income and composition of debt

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- From 1990s rising education debt accelerated rising debt-to-income at bottom of the income distribution

Decomposing rising household debt

- Decompose increase in debt-to-income ratios

Detailed decomposition

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- Explore drivers of housing debt increase over time

Detailed decomposition

Changing life cycle of debt

- Construct life-cycle profiles of housing debt-to-income ratios for synthetic cohorts
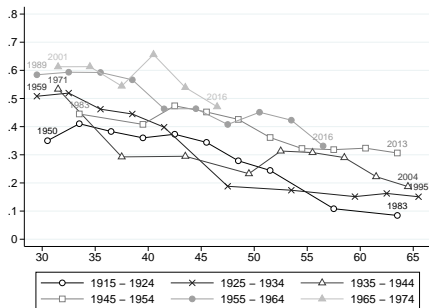
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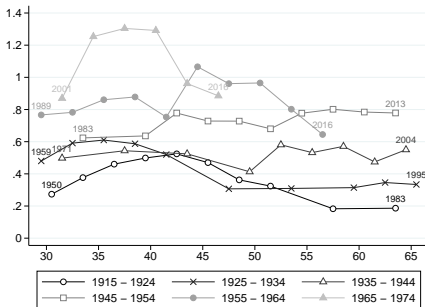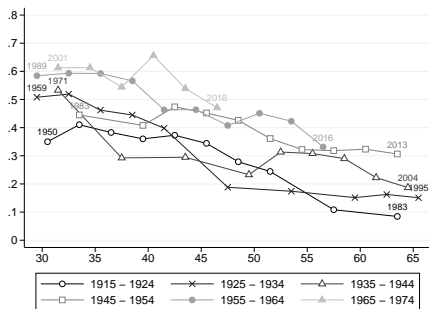

- Levels of debt-to-income profiles shifted up

Life cycle of loan-to-value ratios

- Trace out loan-to-value ratios across cohorts
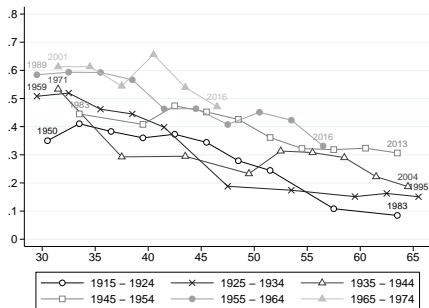
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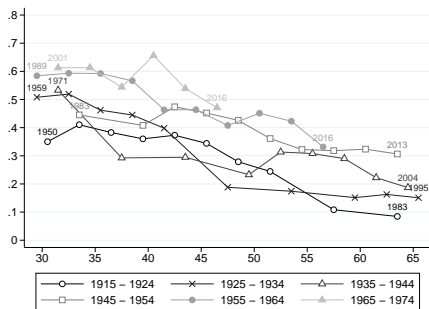
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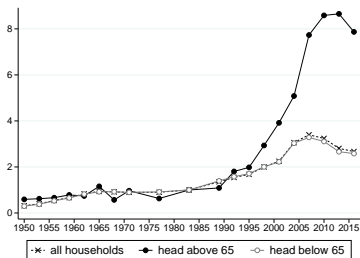- In 2013, a 65-year-old household owe 33% on house
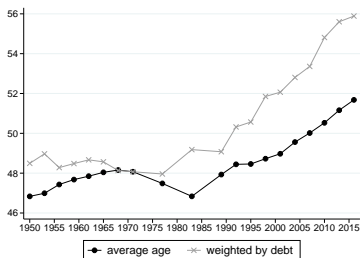
Old-age debt boom

- Strongest effect on old households from changing lifecycle (*Graying of American debt*)

- Debt *aged* twice as fast as population

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- Old households' housing debt increased 8-fold since 1983

Housing debt, housing equity, and wealth accumulation

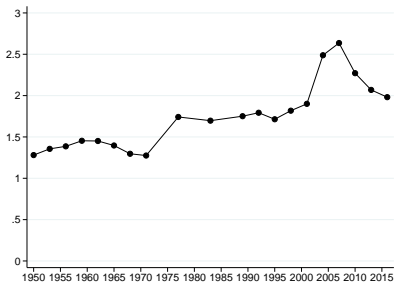- Households accumulated more debt over time

Housing debt, housing equity, and wealth accumulation

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- Changes in wealth depend on asset position of households

Housing debt, housing equity, and wealth accumulation

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- Debt increase happened in lockstep with rising house values

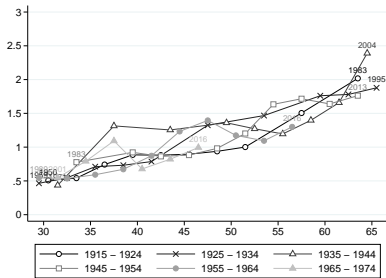housing debt-to-income
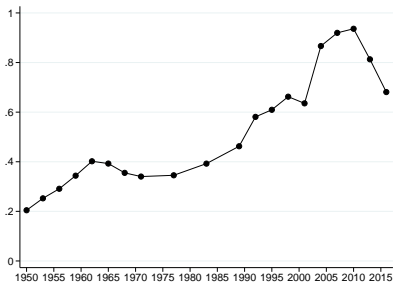
housing-to-income

Housing debt and home equity

housing, debt, and home equity
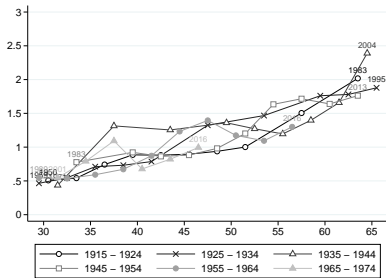

Life-cycle home equity profile

- Rising household debt balanced rising house values

age effect

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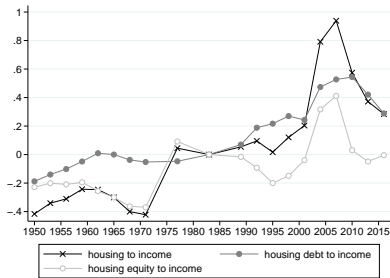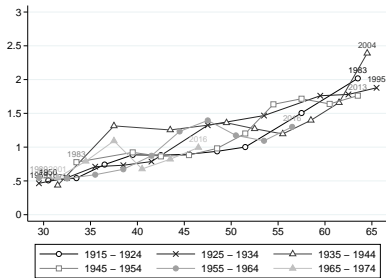Life-cycle home equity profile

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- Life-cycle home equity profiles roughly constant across cohorts

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- Reason for house price increase irrelevant for reaction

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- House price increase accounts for debt increase across cohorts

House prices and changing life-cycle profiles

- Adjust **housing-to-income** ratios across cohorts for house price growth
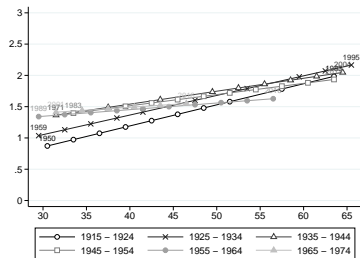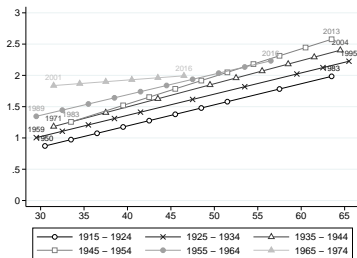
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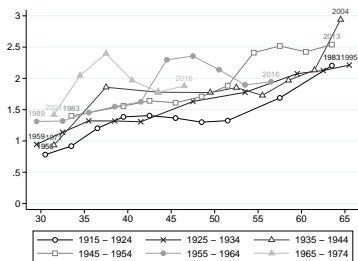
- Original life-cycle profiles
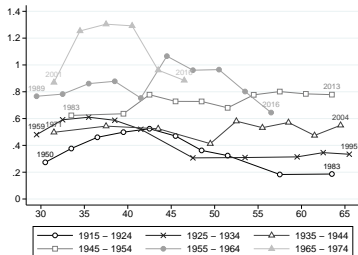
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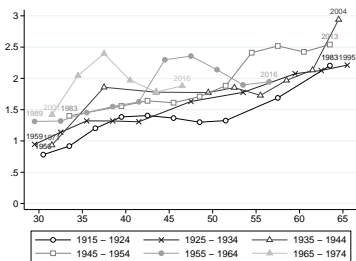
- Adjusted life-cycle profiles

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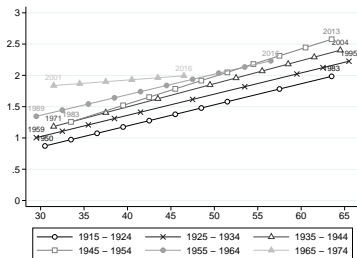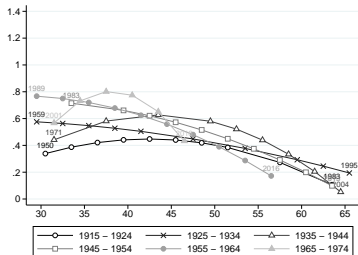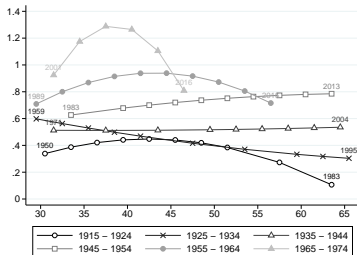

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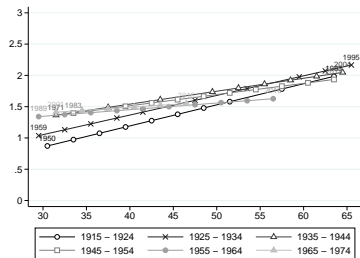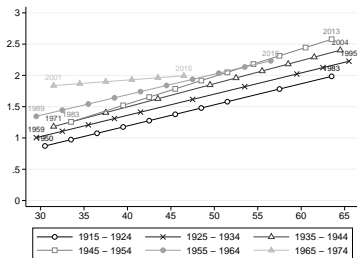
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- Adjust **housing-to-income** ratios across cohorts for house price growth

- Constant house prices across cohorts

- Changing life-cycle profiles largely accounted for by house price changes

House prices and changing life-cycle profiles

- Adjust **housing debt-to-income** ratios assuming constant home equity

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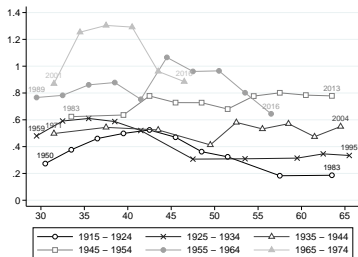
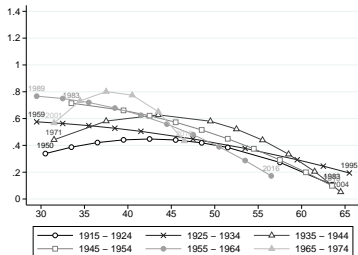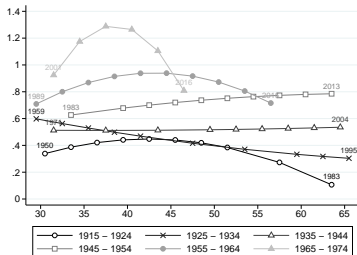- Original life-cycle profiles

House prices and changing life-cycle profiles

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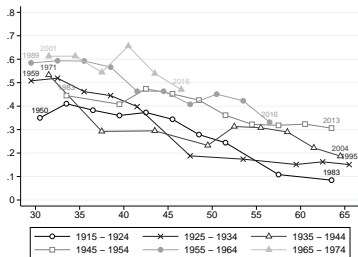$$\frac{\tilde{D}_t}{Y_t} = \frac{H_t P_0}{Y_t} - \frac{E_t}{Y_t}$$

- Adjusted life-cycle profiles

House prices and changing life-cycle profiles

- Adjust **housing debt-to-income** ratios assuming constant home equity

$$\frac{\tilde{D}_t}{Y_t} = \frac{H_t P_0}{Y_t} - \frac{E_t}{Y_t}$$

- Smoothed original life-cycle profiles

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- Adjust **housing debt-to-income** ratios assuming constant home equity

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House prices and changing life-cycle profiles

- Adjust **housing debt-to-income** ratios assuming constant home equity

$$\frac{\tilde{D}_t}{Y_t} = \frac{H_t P_0}{Y_t} - \frac{E_t}{Y_t}$$

- House prices largely account for changing debt-to-income ratios

House prices and changing life-cycle profiles

- Derive **loan-to-value** ratio life-cycle profiles after adjustment in house prices
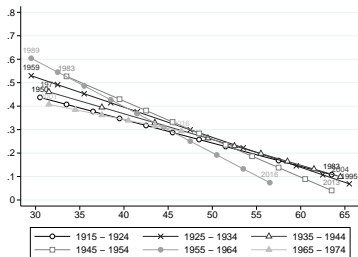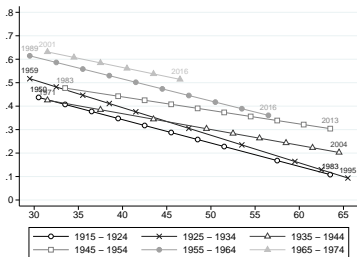
House prices and changing life-cycle profiles

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House prices and changing life-cycle profiles

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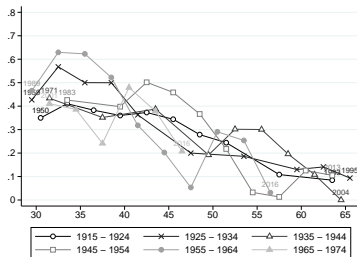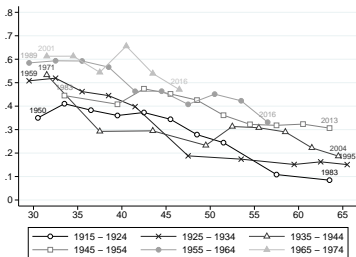
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House prices and changing life-cycle profiles

- Derive **loan-to-value** ratio life-cycle profiles after adjustment in house prices
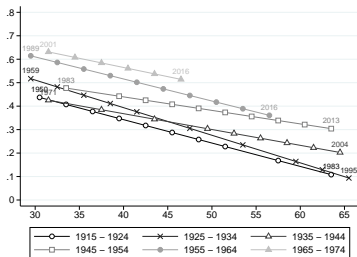
- Smoothed original life-cycle profiles

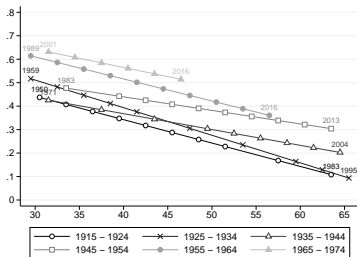# House prices and changing life-cycle profiles

- Derive **loan-to-value** ratio life-cycle profiles after
  adjustment in house prices

- Smoothed adjusted life-cycle profiles

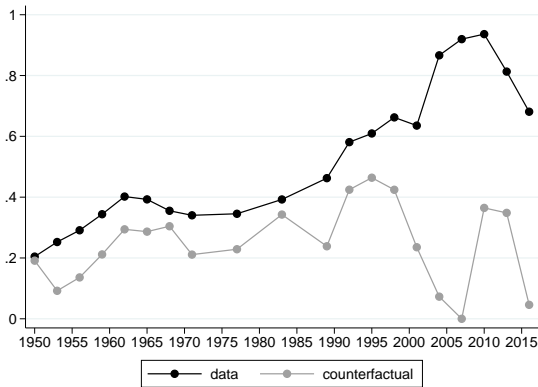# House prices and changing life-cycle profiles

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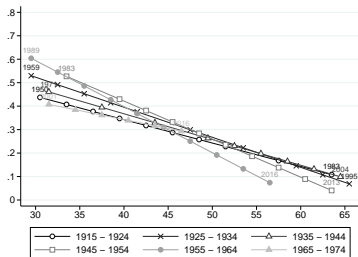
- House prices largely account for changes in loan-to-value profiles

House prices and aggregate debt increase

- Removing house price growth accounts for increase in debt-to-income

- Debt boom as reaction to rising house prices

Financial fragility

- Debt increase adjusts life-cycle wealth accumulation of household

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    1. Shock: 20% drop in house prices and 50% drop in income (unemployment)

Financial fragility

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  1. Shock: 20% drop in house prices and 50% drop in income (unemployment)

  2. *Double trigger*: negative home equity and mortgage payments-to-income more than 50%
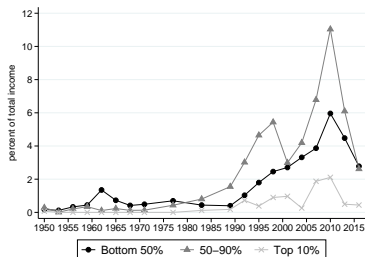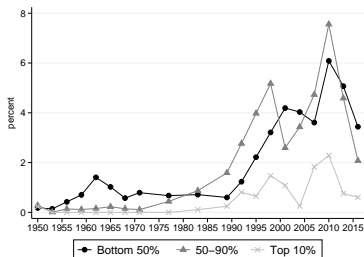
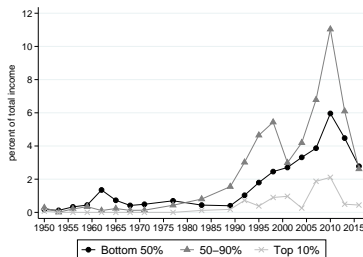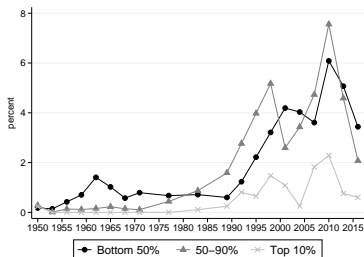# Household stress testing
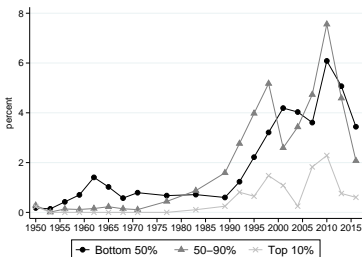
- Share of households failing stress test

Household stress testing

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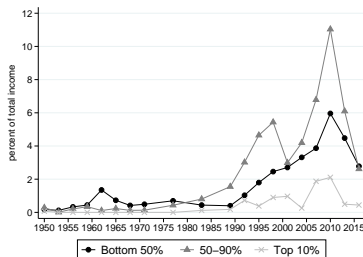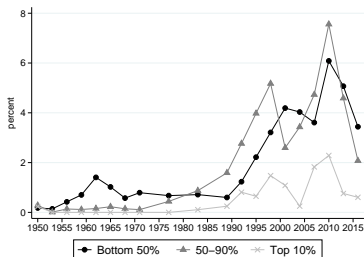
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Household stress testing

- Share of households failing stress test

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- Financial fragility stared to increase in the 1980s

- Middle class epicenter of financial fragility

Debt regulation

- Introduce debt constraints to reduce financial fragility
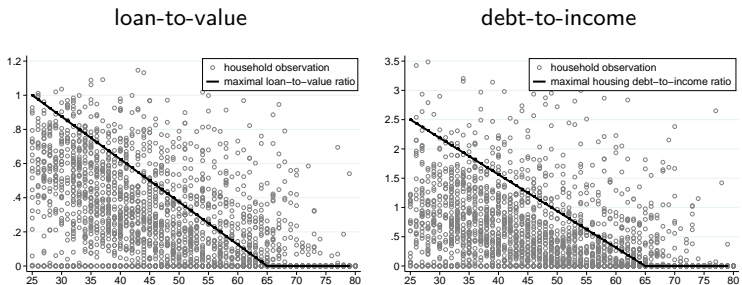
Debt regulation

- Introduce debt constraints to reduce financial fragility

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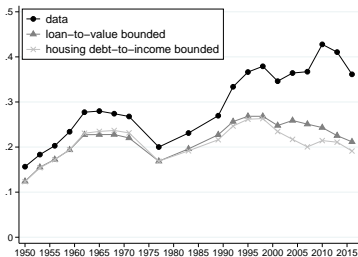
Debt regulation

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- Force households to repay housing debt at age 65
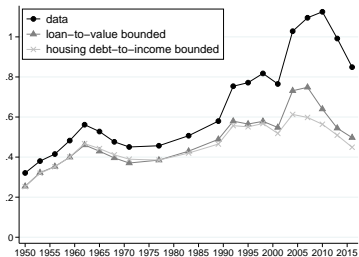
Debt regulation

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- Force households to repay housing debt at age 65

- In 1983: 17% of households above loan-to-value and
  15% above debt-to-income constraint

loan-to-value   debt-to-income

Debt regulation

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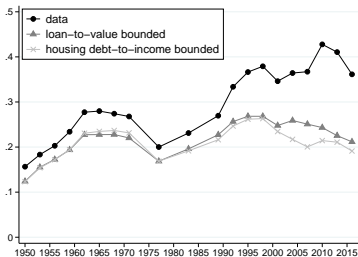- Force households to repay housing debt at age 65
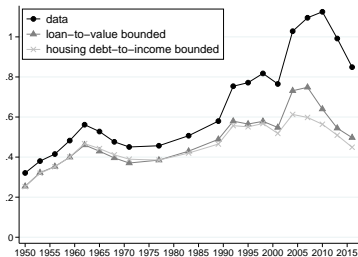

loan-to-value

housing debt-to-income

Debt regulation

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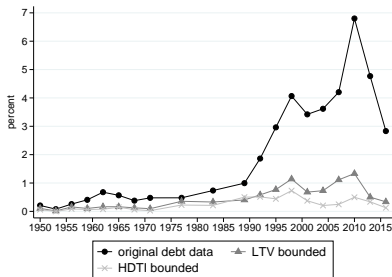- Force households to repay housing debt at age 65

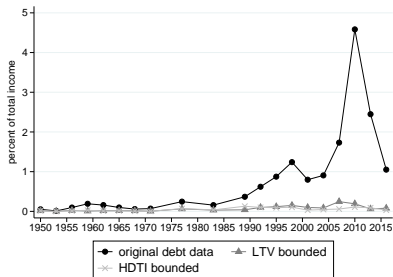loan-to-value   housing debt-to-income

- Households accumulate more wealth and less debt

Financial fragility under debt regulation

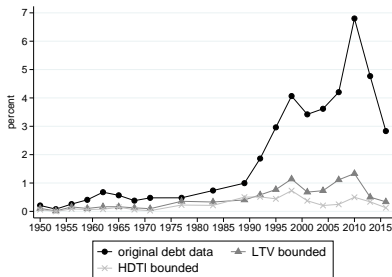Share of households   Home equity at risk
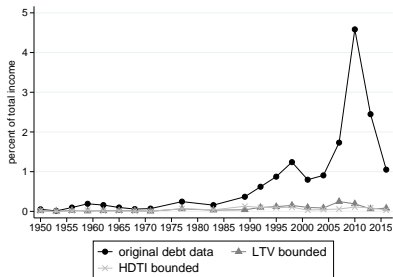

- Macroeconomy substantially stabilized under regulation

Financial fragility under debt regulation
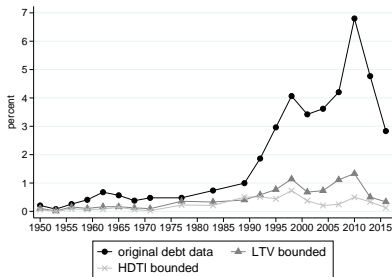
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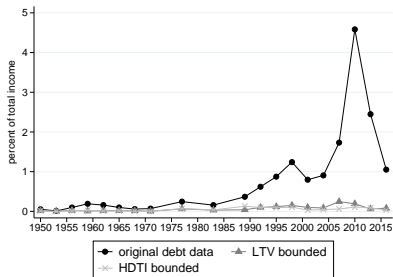- Macroeconomy substantially stabilized under regulation

- Households have more equity on their balance sheet

Financial fragility under debt regulation

Share of households   Home equity at risk

- Macroeconomy substantially stabilized under regulation

- Households have more equity on their balance sheet

- Trade-off between individual consumption smoothing and macroeconomic stability

Conclusions

- Income-rich households always owe most debt

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- Middle-class at epicenter of rising financial fragility

The Great American Debt Boom
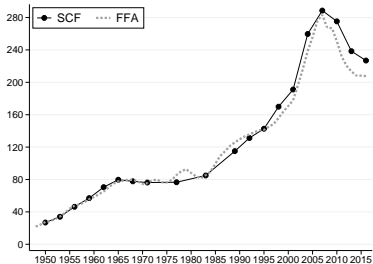## 1949 - 2016

Housing, Credit and Heterogeneity

New Challenges for Stabilization Policies

September 13, 2018

Aggregate debt trends

- Split data in five periods based on housing debt trend

- Different drivers of debt increase over time

1. 1950-1965: Post-war housing boom

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2. 1965-1983: Debt stagnation

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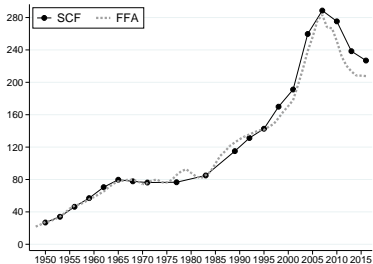
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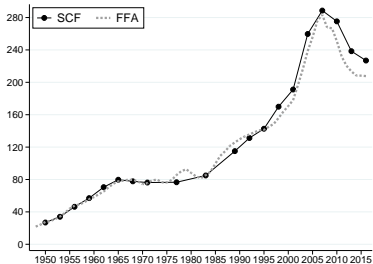1. 1950-1965: Post-war housing boom

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4. 1998-2007: Housing and debt boom

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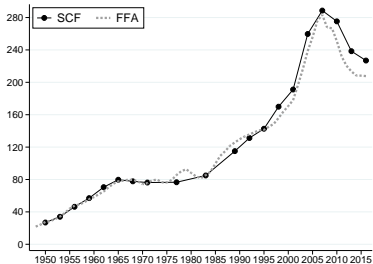3. 1983-1998: Rising house prices and begin of debt boom
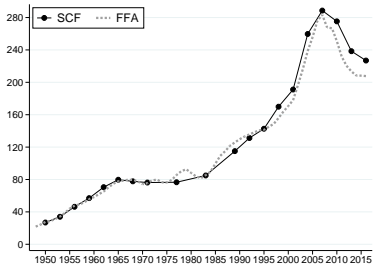4. 1998-2007: Housing and debt boom
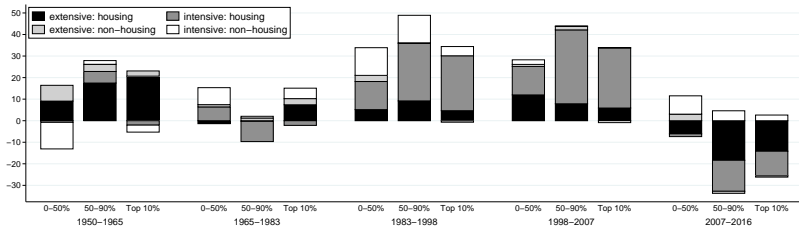5. 2007-2016: Financial crisis and its aftermath

Back

Decomposing rising household debt

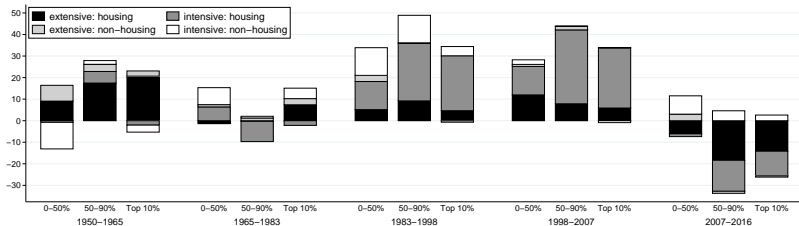- Decomposing debt increase along the income distribution

  1. Extensive margin during post-war housing boom (1950-1965)

Decomposing rising household debt

- Decomposing debt increase along the income distribution

  1. Extensive margin during post-war housing boom (1950-1965)
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  1. Extensive margin during post-war housing boom (1950-1965)
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  3. Extensive margin at the bottom strongest during debt and housing boom (1998-2007)
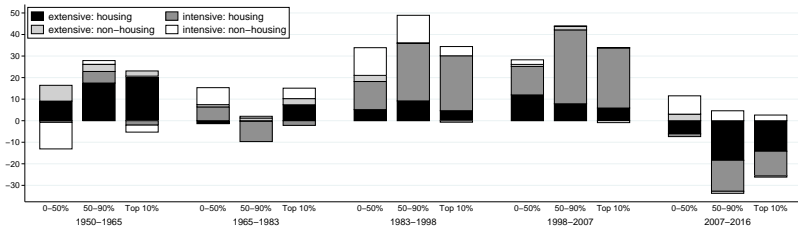
Decomposition of housing debt

- Change in housing debt-to-income ratio

$$d_{i,t}^H - d_{i,t-1}^H = \underbrace{(s_{i,t}^{H^+} - s_{i,t-1}^{H^+})d_{i,t-1}^{H^+}}_{\Delta \text{ extensive housing debt}} + \underbrace{s_{i,t}^{H^+}(d_{i,t}^{H^+} - d_{i,t-1}^{H^+})}_{\Delta \text{ intensive housing debt}}$$

Decomposition of housing debt

- Change in housing debt-to-income ratio $d_{i,t}^H - d_{i,t-1}^H$

- Decomposing extensive margin

$$s_{i,t}^{H^+} - s_{i,t-1}^{H^+} = \underbrace{(s_{i,t}^{HO} - s_{i,t-1}^{HO})s_{i,t-1}^{H^+|HO}}_{\Delta \text{ extensive home owners}} + \underbrace{s_{i,t}^{HO}(s_{i,t}^{H^+|HO} - s_{i,t-1}^{H^+|HO})}_{\Delta \text{ extensive housing debt}}$$

$s_{i,t}^{HO}$: share of homeowners

$s_{i,t}^{H^+|HO}$: share of homeowners with housing debt

Decomposition of housing debt

- Change in housing debt-to-income ratio $d_{i,t}^H - d_{i,t-1}^H$

- Decomposing extensive margin $s_{i,t}^{H^+} - s_{i,t-1}^{H^+}$

- Decomposing intensive margin

$$d_{i,t}^{H^+} - d_{i,t-1}^{H^+} = \underbrace{\left(\frac{D_{i,t}^{H^+}}{H_{i,t}^+} - \frac{D_{i,t-1}^{H^+}}{H_{i,t-1}^+} \right) \frac{H_{i,t-1}^+}{I_{i,t-1}}}_{\Delta\text{intensive housing debt}} + \underbrace{\frac{D_{i,t}^{H^+}}{H_{i,t}^+} \left(\frac{H_{i,t}^+}{I_{i,t}} - \frac{H_{i,t-1}^+}{I_{i,t-1}} \right)}_{\Delta\text{housing-to-income}}$$

$D_{i,t}^{H^+}$: intensive margin of housing debt

$H_{i,t}^+$: intensive margin of housing

$I_{i,t}$: mean income

# Decomposition of housing debt

- Change in housing debt-to-income ratio $d_{i,t}^H - d_{i,t-1}^H$

- Decomposing extensive margin $s_{i,t}^{H^+} - s_{i,t-1}^{H^+}$

- Decomposing intensive margin $d_{i,t}^{H^+} - d_{i,t-1}^{H^+}$

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- Debt   : changing LTV + constant housing-to-income
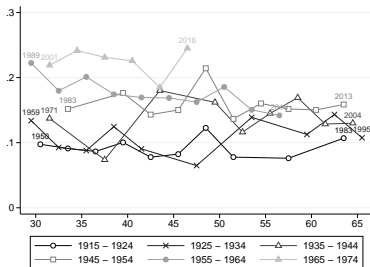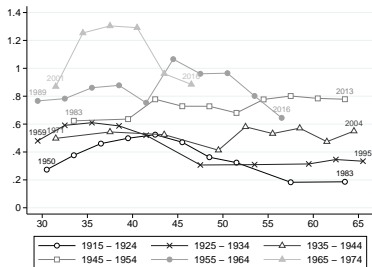
- Housing : changing housing-to-income + constant LTV

Changing life cycle of debt

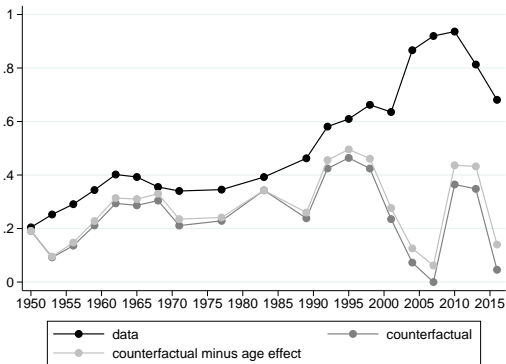- **Housing debt** shapes changing life-cycle pattern
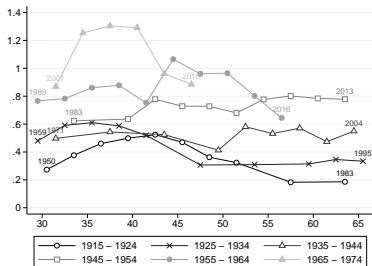
Changing life cycle of debt

- Housing debt shapes changing life-cycle pattern

- Change in **non-housing debt** quantitatively small

Housing debt to income

- Demographic change led to an increase in average household age

- Removing age effects leads to smaller change in housing debt-to-income ratios over time

Home equity-to-income

- Demographic change led to an increase in household age

- Removing age effects leads to smaller change in home
  equity-to-income ratios over time
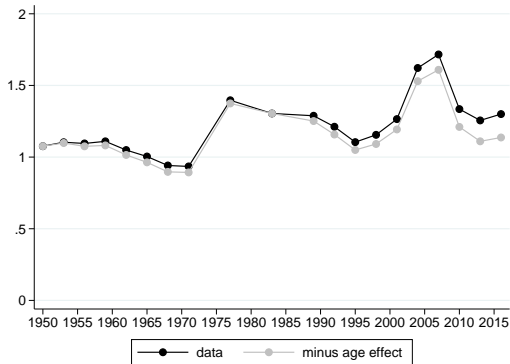
SCF 1983 - 2016

- Publicly available triennial survey representative of the U.S. population

- Provides detailed information on

  - Household balance sheets
    (financial, non-financial asset and debt positions)

  - Various sources of income

  - Demographic characteristics

  - Employment situation

- Oversamples rich households to match the highly skewed distribution of wealth and income at the top