
Alina Bartscher†
Moritz Schularick¶
Moritz Kuhn‡
Ulrike Steins★

† University of Bonn
‡ University of Bonn, CEPR
¶ University of Bonn and New York University
★ University of Bonn
How and why did U.S. household debt rise from 15% of income in 1946 to more than 100% in 2007?
Historical SCF files so far not systematically coded

Major harmonization exercise: extract detailed data on income, assets, and debt

Result: comprehensive annual dataset 1949-2016

Particularly good picture of the “bottom 90%”

### Codebook of 1950

<table>
<thead>
<tr>
<th>Column Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Study Number (59)</td>
</tr>
<tr>
<td>3</td>
<td>Card Number (5)</td>
</tr>
<tr>
<td>4-7</td>
<td>Interview Number</td>
</tr>
<tr>
<td>8-10</td>
<td>Income (of S.U.) from wages and salaries (for non self-employed)</td>
</tr>
</tbody>
</table>

- **000.** No income from wages and salaries \$1,997 to 9,949
- **X00.** Wage and salary income exceeds \$9,949 (record in Y book)
- **X0X.** Wage and salary income not ascertained
- **00X.** Not ascertained whether had wage and salary income in 1949
- **00Y.** Income from wage and salary less than \$100

#### Income of S.U. from roomers and boarders, excluding from related secondaries

1. \$1 - 99
2. \$100 - 499
3. \$500 - 999
4. \$1,000 - 1,999
5. \$2,000 - 2,999
6. \$3,000 - 4,999
7. \$5,000 - 9,999
8. \$10,000 and over

- **O.** No income from this source
- **Y.** N.A. whether income from this source
- **X.** Income from this source, N.A. amount

#### Income of S.U. from other rent

1. \$1 - 99
2. \$100 - 499
3. \$500 - 999
4. \$1,000 - 1,999
Aggregate trends: income
Aggregate trends: debt
It’s all about housing debt
Mortgages account for 2/3 of total debt increase

**Table:** Decomposition of the increase in aggregate debt-to-income ratios between 1950 and 2013

<table>
<thead>
<tr>
<th>Margin</th>
<th>Housing Debt (%)</th>
<th>Non-Housing Debt (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive</td>
<td>21.7</td>
<td>9.6</td>
</tr>
<tr>
<td>Intensive</td>
<td>33.3</td>
<td>17.8</td>
</tr>
<tr>
<td><strong>Total Increase</strong></td>
<td><strong>82.4</strong></td>
<td></td>
</tr>
</tbody>
</table>

Percentage point change in aggregate debt-to-income between 1950 and 2016.
The four phases
Housing debt to income ratios
Loan to value ratios
Home equity to income
Summary

- Sharply higher debt-to-income ratios, increasingly concentrated among households in 50 to 80th percentile of the income distribution
- Substantial increases in aggregate loan-to-value ratios, with somewhat faster increases for households in the middle and lower part of the income distribution
- Stable home equity positions over time and across the distribution
A framework to think about household debt dynamics
Real house prices

[Graph showing real house prices from 1975 to 2015 with different datasets: FHFA, Census: Median, Census: Mean, Census: Index, MHDB, assetprices.dta, SCF: Median, SCF: Mean.]

MHDB assetprices.dta
## House prices and debt dynamics

<table>
<thead>
<tr>
<th>Year</th>
<th>Housing</th>
<th>Equity</th>
<th>Debt</th>
<th>Loan to value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>100</td>
<td>80</td>
<td>20</td>
<td>0.2</td>
</tr>
<tr>
<td>2007</td>
<td>150</td>
<td>80</td>
<td>70</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Debt/income rises by 3.5x and LTVs by 2x
Faced with an unexpected and permanent increase in wealth, life-cycle households will smooth consumption;

As housing is indivisible, the adjustment margin is debt (home equity withdrawal, cash-outs)

Even relatively modest increase in house prices will lead to considerable debt increases and rising LTVs

The postwar household debt boom is a reaction to higher house prices

Over time, this makes the economy more fragile and sensitive to asset price fluctuations (Minsky)
The mechanism

\[ P \uparrow \rightarrow \text{home equity } E \text{ (wealth) increases} \]

\[ D \uparrow \rightarrow E \rightarrow \text{extract equity by increasing debt} \]

- Consumption
- Home improvements
- Repaying other debt
- Start business
- ...

\[ H \uparrow \rightarrow D \uparrow \rightarrow \text{more expansive house} \]

\[ E \uparrow \rightarrow \text{more home equity} \]

\[ \text{constant home equity} \]

\[ E \rightarrow D \uparrow \rightarrow \text{more debt} \]
Evidence from birth-cohorts

(a) housing debt-to-income

(b) housing debt-to-income (smoothed)

(c) counterfactual housing debt

(d) counterfactual housing debt (smoothed)
Ageing of debt

- - all households
- head above 65
- head below 65
Evidence for HEW

Figure 1: HEW from FFA, following Klyuev and Mills (2007)

(a) Levels

(b) Relative to Income

- rel. to disp. income
- rel. to GDP
Evidence for HEW
From Modigliani to Minsky
Financial fragility

- Track growing sensitivity of economy to asset price changes
- We stress-test household balance sheets with a 20% exogenous house price decline
- Households are assumed to be “at risk” if they have negative home equity and a debt-service-to-income ratio exceeding 50%
- Key result: owing to higher LTVs and debt, the sensitivity to asset price fluctuations has grown strongly
Notional mortgage value at risk
Home equity at risk

(f) Home equity at risk (income)
Conclusions

- When real house prices rise, home-owning households become richer
- Without a change in savings behavior, households want to increase consumption
- Owing to indivisibility of housing, they will increase debt
- This mechanism accounts for a large part of the post-WW2 debt increase
- Increasing leverage makes the entire economy endogenously more vulnerable