Mapping Fragility

A Study on US Household Finance

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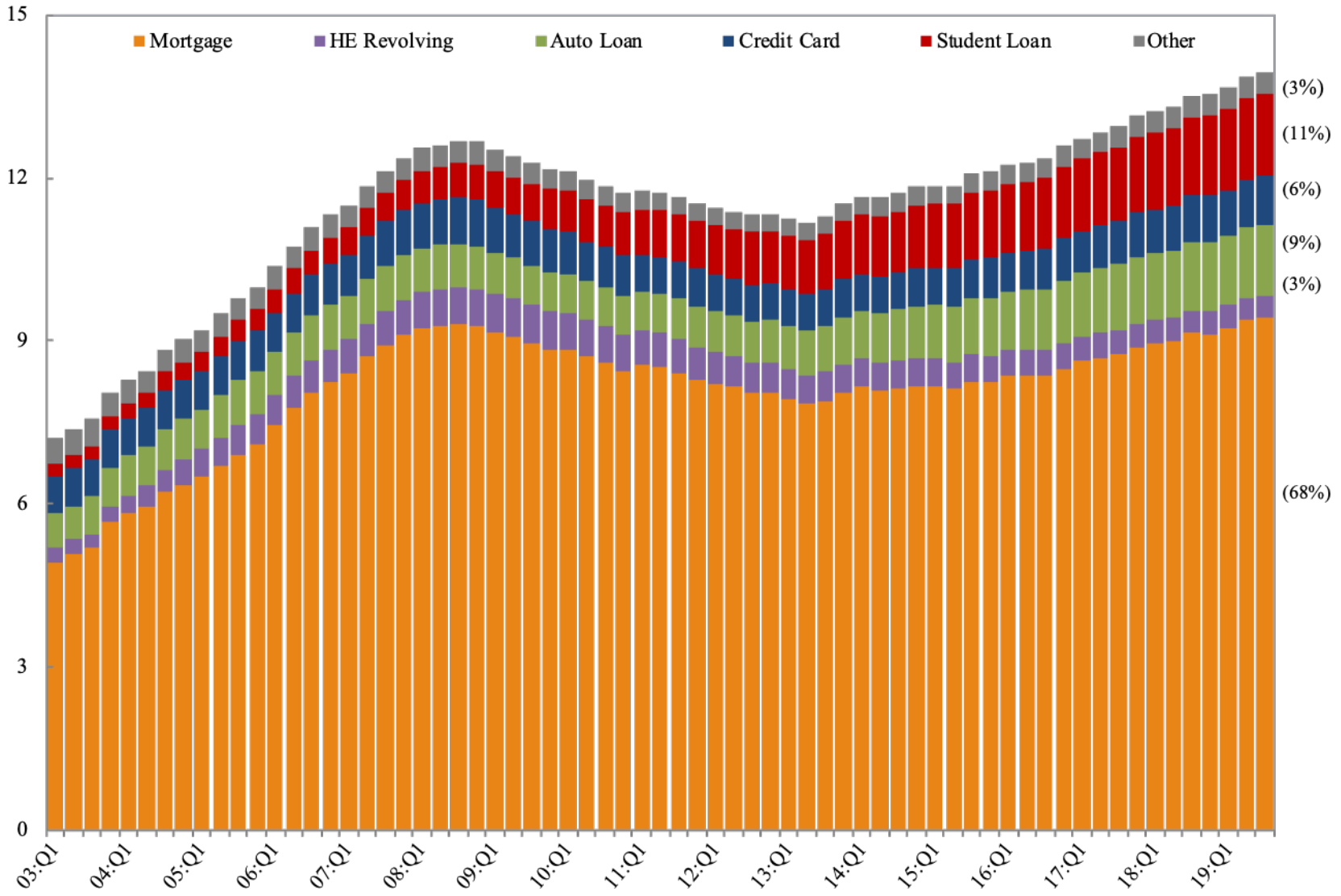
ASSA 2020, San Diego

Total Debt Balance and its Composition



Source: New York Fed Consumer Credit Panel/Equifax

Hypotheses in the literature

- Behavioral explanations:
  - Consumption smoothing
  - Keeping up with the Joneses
  - Equity extraction

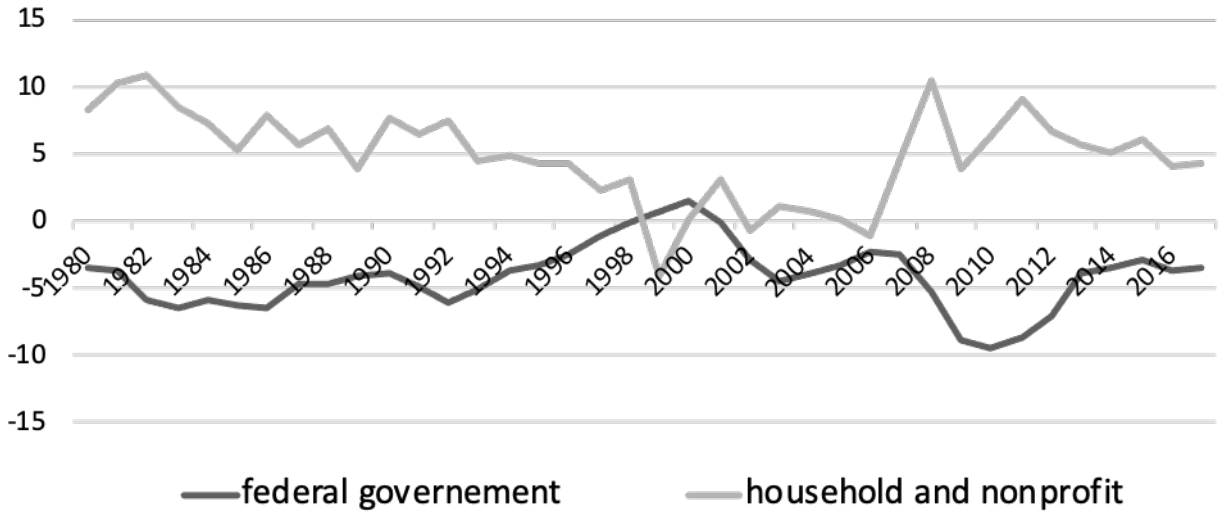
- "Involuntary" indebtedness:
  - Insufficient income and poverty
  - Fisher ("snowball") effect

Confusion

- Confusion regarding subject of inquiry:
  - Increase in debt and debt to income
  - Financial fragility
  - Macroeconomic consequences
- To study the macroeconomic implications of household debt, we need a theory of social classes
  - **Social classes** link **purposes** with **functions** of debt to map fragility and distress

Debt and Public Policy in the USA

- Net lending/borrowing of households has mirrored that of government



Definitions and accounting

- Defined on the basis of flows, at each time t saving (S_t) is the difference between receipts (Y_t) and outflows
- Let us define outflows as the sum of expenditures incurred for consumption (C_t) and for debt servicing ($i_t \cdot D_{t-1}$, where i represents both interest and principal repayment at time t, as a share of outstanding debt):

$$S_t = Y_t - C_t - i_t \cdot D_{t-1}$$

- Defined based on stocks, saving is the change in individual or family net worth (NW), assets (A) minus liabilities (D):

$$S_t = \Delta A_t - \Delta D_t = \Delta NW_t$$

- Hence, if income includes unrealized capital gains:

$$\Delta D_t = \Delta A_t - Y_t + C_t + i_t \cdot D_{t-1}$$

- Let us decompose income into a normal component (Y^P) and an income shock (Y_t^{ε}), which may be transitory or permanent:

$$\frac{\Delta D_t}{Y} = \frac{\Delta A_t}{Y} + \left(\frac{C_t - Y^P}{Y}\right) + \left(\frac{i_t \cdot D_{t-1}}{Y} - \frac{Y_t^{\varepsilon}}{Y}\right)$$

- from which:

$$\frac{D_t}{Y} = \frac{\Delta A_t}{Y} + \left(\frac{C_t - Y^P}{Y}\right) + \left[(1 + i_t) \cdot \frac{D_{t-1}}{Y} - \frac{Y_t^{\varepsilon}}{Y}\right]$$

Fisher effect

"The very effort of individuals to lessen their burden of debt increases it, because of the mass effect of the stampede to liquidate in swelling each dollar owed. *Then we have the great paradox which, I submit, is the chief secret of most, if not all, great depressions:* The more the debtors pay, the more they owe." (Fisher 1933, 344, emphasis in original)

"*Imagine the distress which would occur if debtors who have borrowed in the 1970s in anticipation of continued inflation were suddenly to find themselves confronted by price stability*" (Tobin 1980, II)

- From 1997 to 2007, household net new borrowing excluding interests has contributed to increase in debt-income. Overall, from 1980, interest rate and deflation more important (Mason and Jayadev 2014)
- **Snowball effect**: the difference between the cost of debt and income growth as a motive to go into debt at the household level: Pasinetti (2008a, 2008b) and Sylos Labini (2009)

Consumption Smoothing

- Higher temporary income volatility and necessity to smooth consumption
  - Life-cycle reasons (Ando and Modigliani 1963)
  - Rational expectations: more borrowing anticipates economic expansion
- Avoid credit crunch and debt deflation (Greenspan 1996, 1998)
- **Income shock**: variable of interest is the difference(or the ratio) between current income and “normal income”

Equity Extraction

- Relation between spending and wealth
- "house as ATM" thesis

- **Capital gains on house > average**: difference between unrealized capital gains on house and average house prices inflation

- **Liquidity risk**: ratio of unrealized capital gains/losses to income

Keeping up with the Joneses

- Clear step away from rational expectations. Households placed in social, cultural context
  - Households did not save enough to stabilize the debt-income ratio
  - Emulation and relative income hypothesis
- Income inequality, uncertainty

- **Overspent on house**: residual from a regression of house value as a function of income, other assets, age (squared), gender, and education
- **Overspent on car**: residual from a regression of car value as a function of income, other assets, age (squared), gender, and education

Insufficient Income and (Relative) Poverty

- Difficulty to make ends meet, pay for health care or education, save for adverse events.
  - Privatization of essential services
  - Health care coverage
  - Unemployment insurance
  - Debt payments

- Exposure to policy measures is asymmetric (interest rates)

- Wage stagnation + debt reduce bargaining strength of workers

- **Available equivalent income**: household total gross income at 2016 prices, subtracting the necessary expenses for debt service and rent payments, divided by an equivalence scale
- **Poor** (in terms of av. eq. income): dummy variable taking on value 1 if av. eq. income is lower than 60% of the median in the relevant year

An asset-based definition of classes

- **Capitalists**: receive rent from property, and/or have an active or non active property role in a business (excluding family firms). Owning a pension fund does not qualify
  - Three functions of wealth

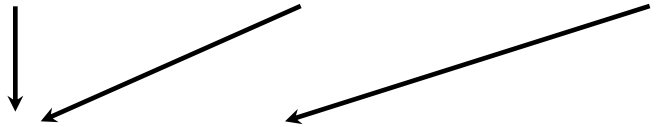
- **Homeowners**: own their dwelling, do not receive rent incomes and do not own non-family business
  - Two functions of wealth

- **Propertyless**: all others
  - One function of wealth

[definitions adapted from Fessler and Schürz (2017)]

Purposes and Functions of Debt

	Earn	Cost-Save	Consume
Capitalists	X	X	X
Homeowners		X	X
Propertyless			X



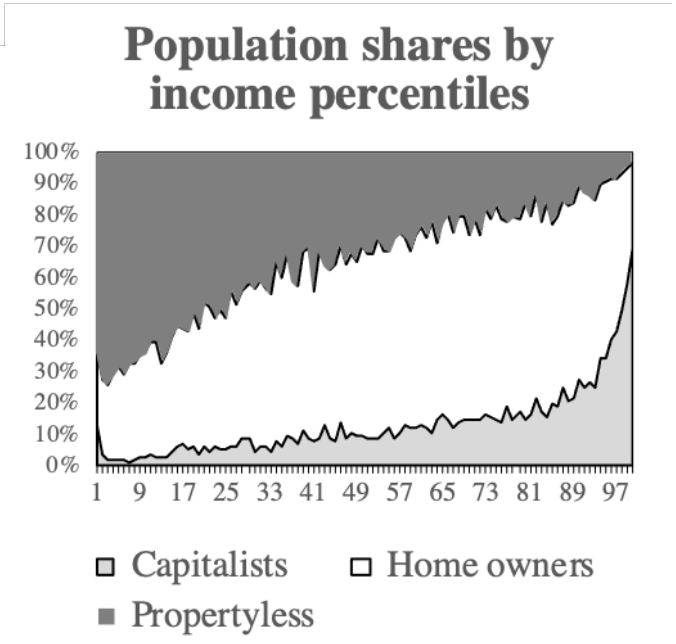
$$\frac{D_t}{Y} = \frac{\Delta A_t}{Y} + \left(\frac{C_t - Y^P}{Y}\right) + \left[(1 + i_t) \cdot \frac{D_{t-1}}{Y} - \frac{Y_t^{\varepsilon}}{Y}\right]$$

The Data

- We use ten waves of the *US Survey of Consumer Finances*, a triennial survey run by the Federal Reserve: from 1989 to 2016.

- Microdata is subject to multiple imputation to overcome misreporting and nonresponse, and comes with a set of bootstrap weights to allow inference to the US population.

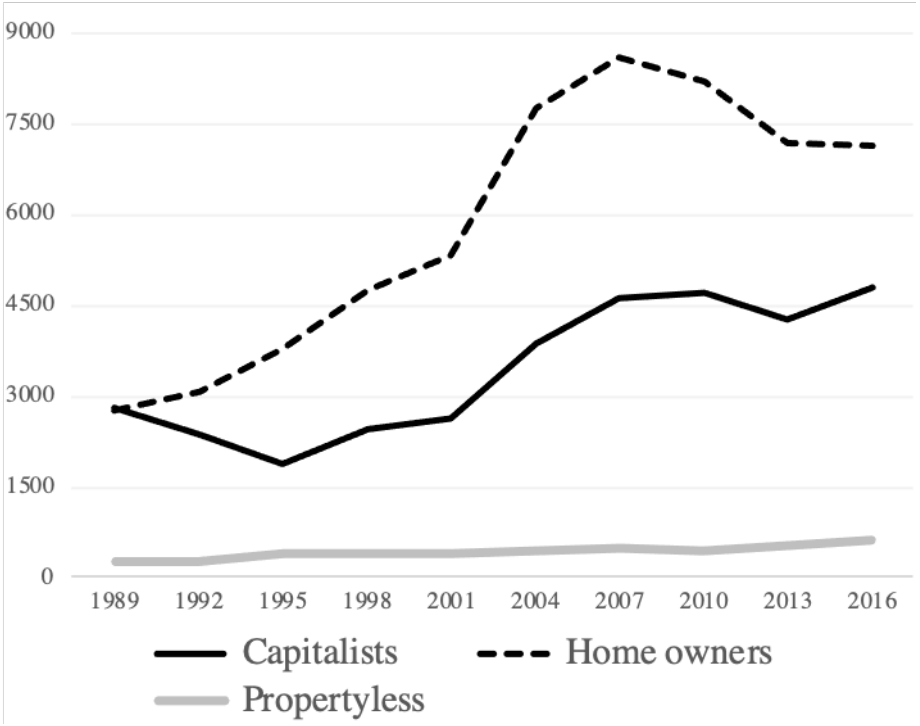
Population shares



- Homeownership boom
- Capitalists in upper income strata. Own a share of debt much larger than share of population
- Homeowners in middle income strata. Own a share of debt slightly larger than share of population
- Propertyless in low income stata. Own share of debt lower than share of population

Total debt by class

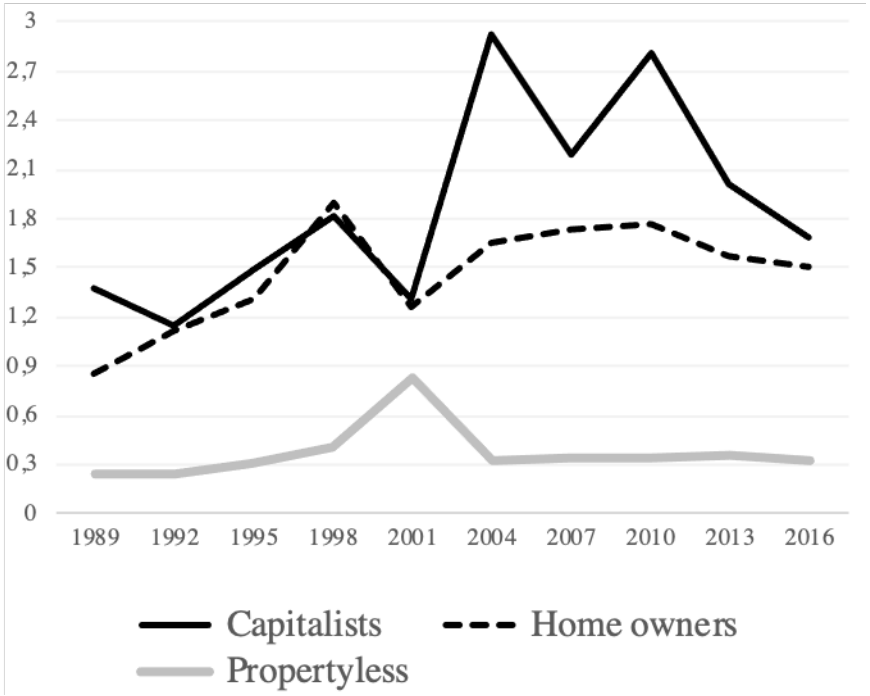
(2016 USD bn)



- Crisis and recession of the early 1990s
- Debt boom early 2000s
- Post-2007 deleveraging

Notes: "inactive" education loans not included, mortgages for non-residential real estate included

Debt-to-Income Ratio by Class



- Crisis and recession of the early 1990s
- Crisis and debt boom early 2000s
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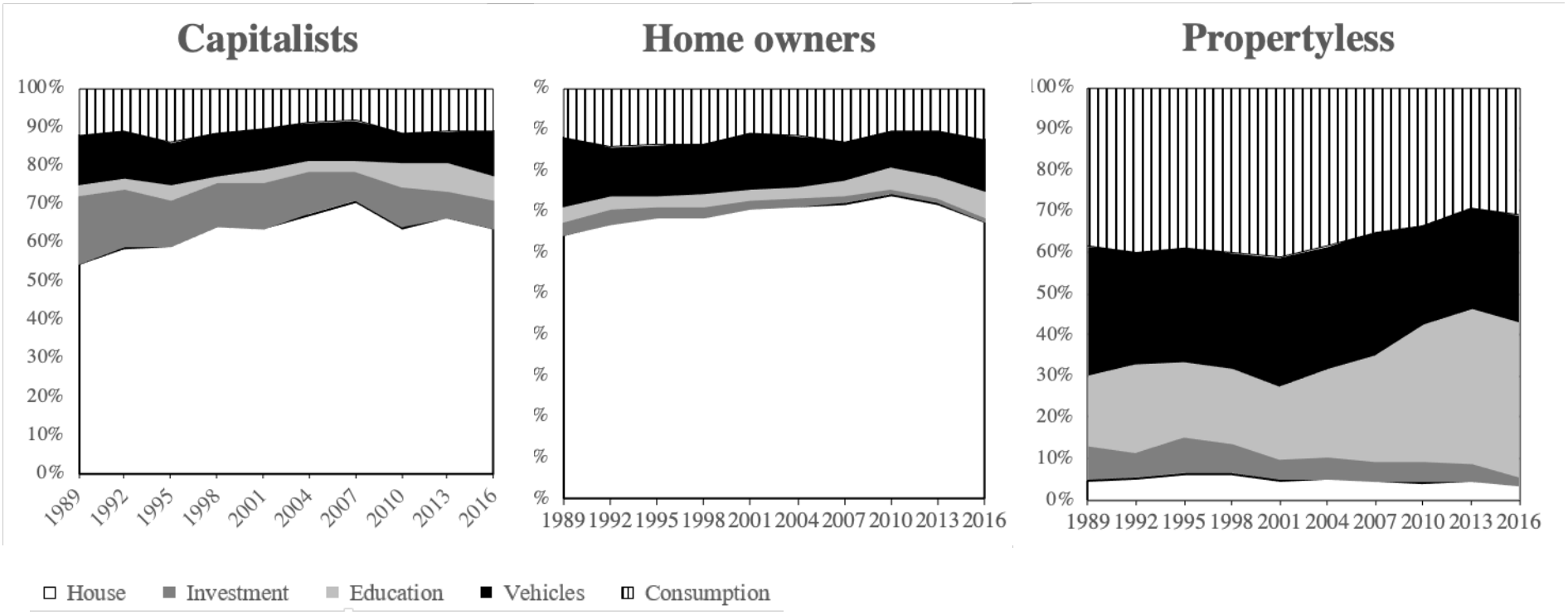
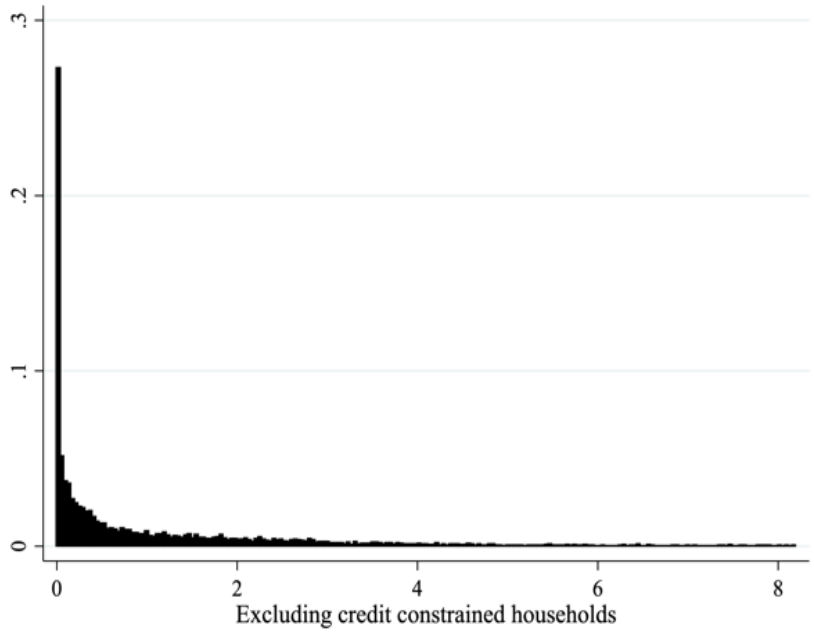
Notes: SCF, “inactive” education loans not included, mortgages for non residential real estate included

Debt composition by class



Our dependent variable

Distribution of debt-to-income



Excluding discouraged borrowers and those turned down

	All sample	Capitalists	Homeowners	Propertyless
1989	11,63	8,82	7,7	17,92
1992	14,78	11,79	9,44	23,18
1995	17,57	12,77	10,7	28,89
1998	17,37	10,51	10,14	30,67
2001	17	9,09	9,75	31,71
2004	17,22	8,89	10,68	31,68
2007	15,84	7,34	9,49	29,94
2010	20,34	14,23	15	31,19
2013	19,33	14,91	12,25	31,02
2016	9,63	7,67	7,44	13,35

Notes: we define as having been "refused credit" those households who were refused credit (application turned down or not given as much as applied for) in the past 12 months, and who were unable to obtain the full amount elsewhere; "discouraged" are those households who did not apply for credit in the past 12 months but thought about it and then changed their minds for fear of being turned down. The info on discouraged is not available for 1989 and 1992

Explanatory variables: recap

- **House cap. gain. > av**: difference between unrealized capital gains on house and average house prices inflation
- **Liquidity risk:** ratio of unrealized capital gains (absolute value) to income.
- **Avail. eq. income**: average available equivalent income at 2016 prices (excluding rent and debt payments)
- **Poor** (av. eq. Income): dummy variable taking on value 1 if avail. eq. income is lower than 60% of the median
- **Overspent on house**: residual from a regression of house value as a function of income, other assets, age (squared), gender, and education.
- **Overspent on car**: residual from a regression of car value as a function of income, other assets, age (squared), gender, and education.
- **Income shock**: percent difference between current and self-described "normal" income
- **Snowball effect**: difference between "extra income" (previous variable) and average interest rate paid on total debt

Poisson Pseudo Maximum Likelihood: IRRs

Owners

Av. Eq. income	**0.988****	**0.982****	**0.986****	**0.986****	**0.983****	**0.981****	**0.978****							
	[0.00154]	[0.00354]	[0.000819]	[0.00101]	[0.00324]	[0.00299]	[0.00399]							
Poor								**2.498****	**2.983****	**2.440****	**2.462****	**2.890****	**2.974****	**2.606****
								[0.135]	[0.476]	[0.0779]	[0.0838]	[0.415]	[0.424]	[0.216]
Liquidity risk	**1.018****							**1.018****						
	[0.00422]							[0.00386]						
Income shock		0.999							0.999					
		[0.00121]							[0.00227]					
Snowball effect			**1.028****							**1.027****				
			[0.000515]							[0.000497]				
Extra Unr. KG on house				**0.957****							**0.955****			
				[0.0115]							[0.0121]			
Overspent on vehicles					**1.002****							**1.002****		
					[0.000519]							[0.000311]		
Overspent on house						**1.006****							**1.004****	
						[0.000998]							[0.000314]	
Income gap							0.996							1.002
							[0.00295]							[0.000990]
Observations	*17757*	*15155*	*15155*	*10259*	*17757*	*17757*	*17757*	*17757*	*15155*	*15155*	*10259*	*17757*	*17757*	*17757*

Propertyless

Av. Eq. income	**0.977****	**0.976****	**0.978****	**0.971****	**0.966****									
	[0.00269]	[0.00260]	[0.00245]	[0.00304]	[0.00457]									
Poor						**1.953****	**1.831****	**1.824****	**1.866****	**1.959****				
						[0.133]	[0.124]	[0.121]	[0.127]	[0.132]				
Liquidity risk	1.013					**1.034****								
	[0.00983]					[0.0105]								
Income shock		0.718					**0.650***							
		[0.138]					[0.140]							
Snowball effect			**1.044****					**1.047****						
			[0.0161]					[0.0164]						
Overspent on vehicles				**1.086****					**1.002****					
				[0.00922]					[0.000273]					
Income gap					**0.989****					1.000				
					[0.00187]					[0.000287]				
Observations	*9997*	*8536*	*8541*	*9997*	*9997*	*9997*	*8536*	*8541*	*9997*	*9997*				

Poisson Pseudo Maximum Likelihood: IRRs

All

Av. Eq. income	0.999	0.999	0.999	0.996	0.998	0.999	0.998							
	[0.000716]	[0.000858]	[0.000873]	[0.00216]	[0.00116]	[0.000808]	[0.00159]							
Poor								**3.063****	**3.249****	**2.781****	**3.036****	**3.153****	**3.174****	**2.937****
								[0.350]	[0.439]	[0.189]	[0.296]	[0.360]	[0.363]	[0.281]
Liquidity risk	**1.002***							**1.002***						
	[0.00121]							[0.00123]						
Income shock		0.704							0.966					
		[0.381]							[0.153]					
Snowball effect			**1.027****							**1.024****				
			[0.00203]							[0.00166]				
Extra Unr. KG on house				0.982							0.985			
				[0.00918]							[0.00860]			
Overspent on vehicles					0.996							0.998		
					[0.00874]							[0.00687]		
Overspent on house						**1.002****							**1.001****	
						[0.000793]							[0.000106]	
Income gap							**1.002****							**1.001****
							[0.000897]							[0.000243]
Observations	*40676*	*34430*	*34436*	*17481*	*40676*	*40676*	*40676*	*40676*	*34430*	*34436*	*17481*	*40676*	*40676*	*40676*

Capitalists

Av. Eq. income	0.999	0.999	0.999	0.996	0.999	0.999	0.998							
	[0.000653]	[0.00101]	[0.000652]	[0.00211]	[0.00106]	[0.000723]	[0.00113]							
Poor								**4.965****	**5.116****	**5.140****	**6.342****	**5.240****	**5.284****	**4.785****
								[1.106]	[1.547]	[1.281]	[2.108]	[1.228]	[1.236]	[1.056]
Liquidity risk	1.002							1.002						
	[0.00119]							[0.00119]						
Income shock		**0.356****							0.702					
		[0.122]							[0.178]					
Snowball effect			**1.021****							**1.018****				
			[0.00270]							[0.00229]				
Extra Unr. KG on house				1.015							1.019			
				[0.0146]							[0.0104]			
Overspent on vehicles					**0.991***							**0.993****		
					[0.00391]							[0.00194]		
Overspent on house						**1.002****							**1.001****	
						[0.000677]							[0.000102]	
Income gap							**1.001***							**1.001****
							[0.000659]							[9.93e-05]
Observations	*12902*	*10721*	*10722*	*7197*	*12902*	*12902*	*12902*	*12902*	*10721*	*10722*	*7197*	*12902*	*12902*	*12902*

Summary of results

- We find evidence of “involuntary” indebtedness due to poverty, liquidity risk, and incompressible expenditures
- We also find evidence of “behavioural” indebtedness due to emulation
- No evidence of consumption smoothing or equity extraction

Conclusions

- Results reinforce and qualify the controversial hypothesis that inequality matters
  - When account is taken for incompressible expenditures or reference groups
- Capitalists: risk of non speculative investment, a series of speculative bubbles? Investment function selectively effective
- Homeowners: debt deflation, risk derives from change in occupational status and expenditures, but house is essential asset even if cost-saving function not effective
- Propertyless: not just a cyclical pattern of unsustainable consumption. Credit as systematic welfare provider of last resort?
  - Consumption function effective, but what composition?