Retirement Savings as a Rational Choice

Eric French

University College London and Institute for Fiscal Studies

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Savings at Retirement and After Retirement

Savings at retirement:

- High income people have lots of assets.
- Low income people have little assets.

Savings after retirement:

- High income people deplete their assets slowly.
- Low income people, no retirement assets.

Savings as a Rational Choice

- "Rational"
  - Rational expectations: people understand their current situation (e.g., their assets, wages, medical spending, tax system), how it evolves over time, and optimize accordingly
  - Exponential discounting: no time-consistency problem
- Assuming rationality
  - How well can we match savings patterns?
  - What are the key drivers of savings?

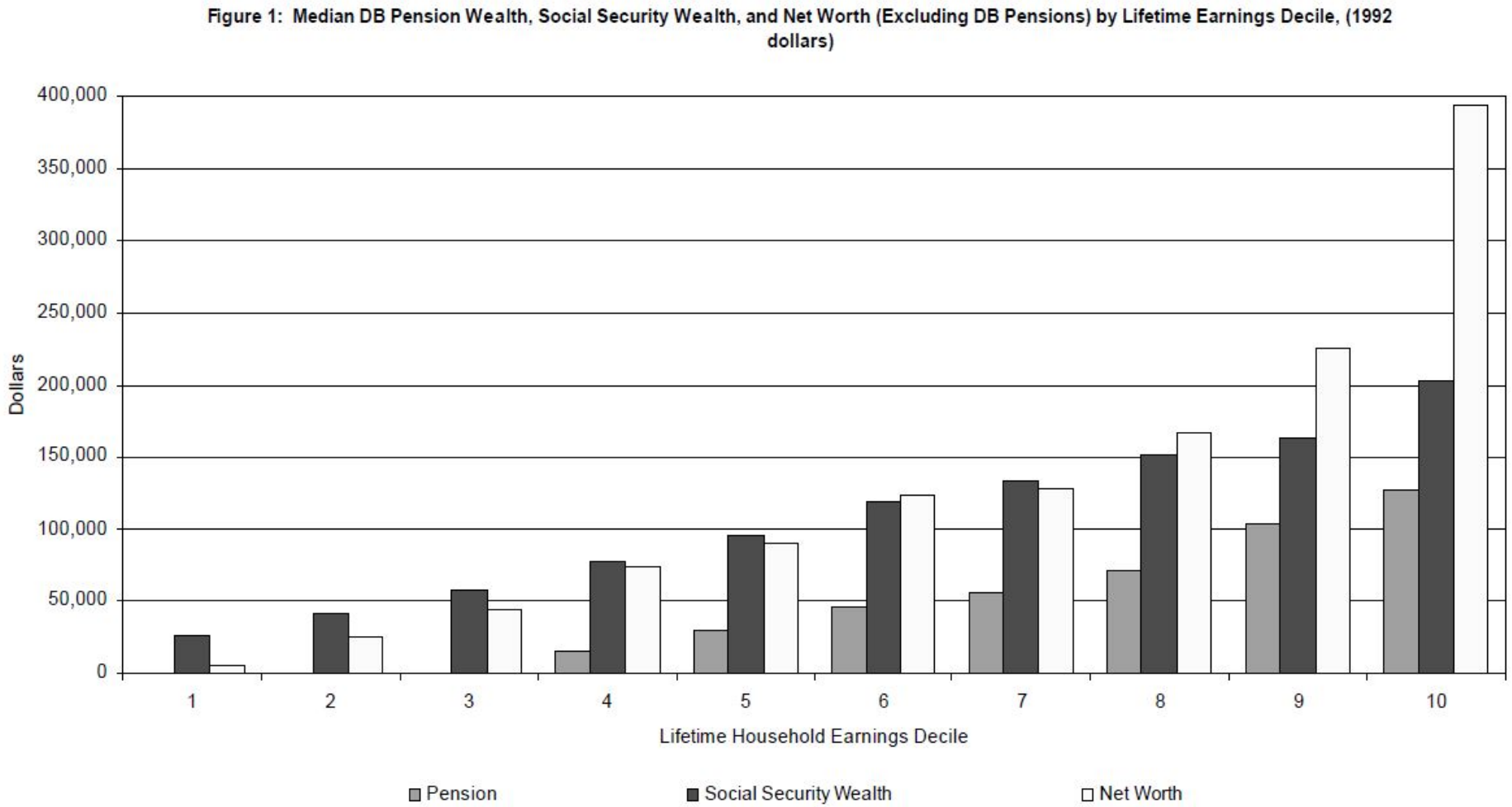
Savings Near Retirement: Benchmark Model

Scholz, Seshadri & Khitatrakun JPE 2006 - Are Americans Saving "Optimally for Retirement"?

- Use the life-cycle model and and rich data on household wealth and lifetime earnings history to determine 'optimal' wealth for each household
- Compare 'optimal' wealth to observed wealth in Health and Retirement Study (HRS).
- **Argument:** if the model is sensible, and if the household has at least as much wealth as 'optimal' level, the household has not undersaved

Scholz Seshadri & Khitatrakun: Data

Health and Retirement Study linked to Pension and Social Security Records.



Scholz Seshadri & Khitatrakun: Utility

Expected utility is:

$$E\left[\Sigma_{j=t}^{D}\beta^{j}S_{j}U\left(c_{j},n_{j}\right)\right]$$

where:

- β is a geometric discount factor
- c is consumption in period j
- n_j is household 'equivalent' size
- t is first period of economic life, D is last period before certain death, S_j probability of being alive at time j, given alive at t

Uncertainty

Households are exposed to:

1. Earnings uncertainty pre-retirement:

$$\log e_j = \alpha^i + \beta_1 \mathrm{AGE}_j + \beta_2 \mathrm{AGE}_j^2 + u_j,$$

$$u_j = \rho u_{j-1} + \epsilon_j,$$

2. Stochastic out-of-pocket medical shocks post-retirement:

$$\log m_t = \beta_0 + \beta_1 \mathrm{AGE}_t + \beta_2 \mathrm{AGE}_t^2 + u_t,$$

$$u_t = \rho u_{t-1} + \epsilon_t, \quad \epsilon_t \sim N(0, \sigma_\epsilon^2),$$

3. Mortality risk of both spouses post-retirement.

Taxes, Income, Expenses

- Individuals can save at interest rate r
- Pre-retirement: income from earnings, asset returns, means-tested transfers, net of taxes
- Post-retirement: income from Social Security, DB pensions, asset returns, net of medical spending

Model Solution

1. Pick parameters (crucially $\beta = 0.96$, $r = 0.04$)
2. Solve model
3. Simulate model for real households in the data using their actual earnings realizations
4. This yields an 'optimal' wealth target for each household
5. Compare their optimal wealth to their actual wealth

Scholz Seshadri & Khitatrakun: Results

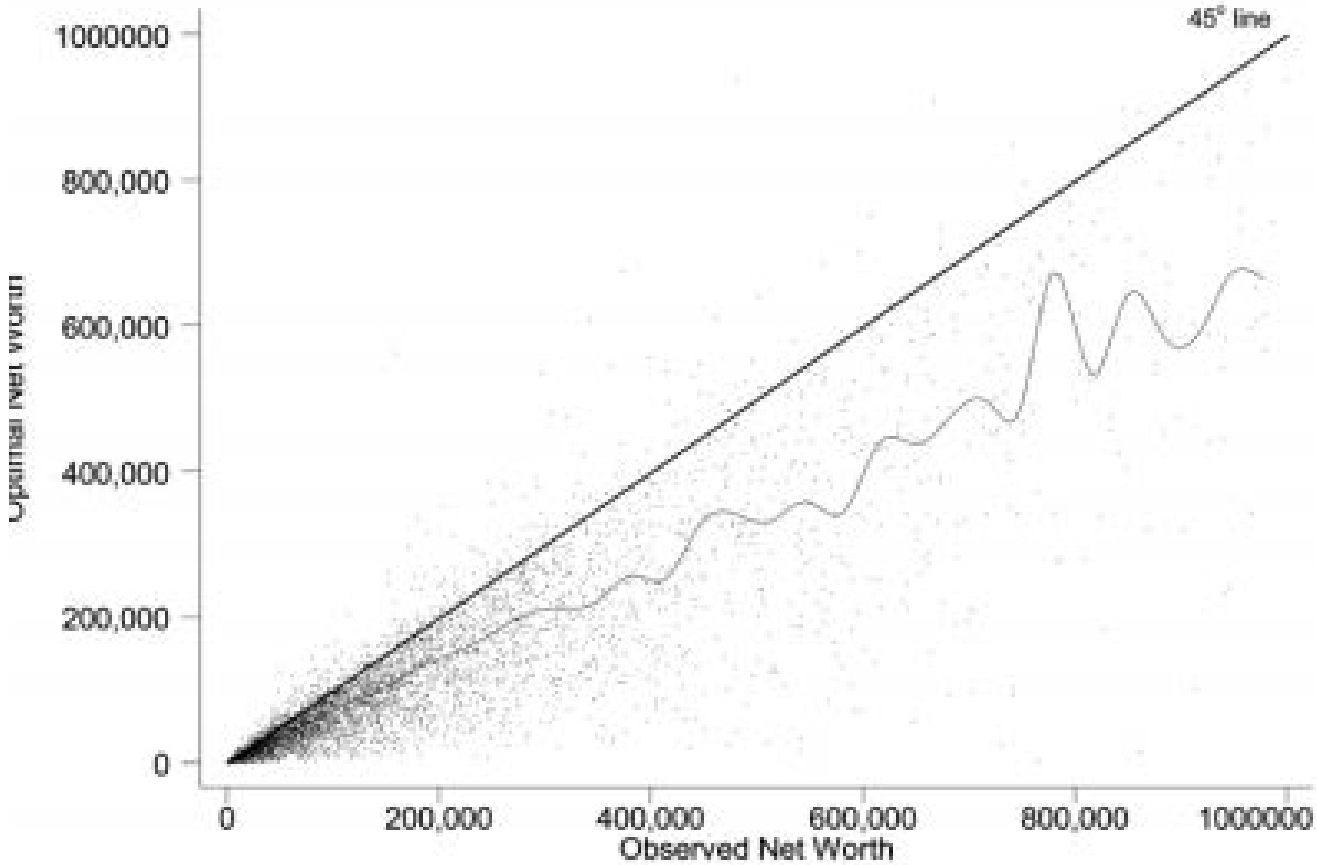


FIG. 2.—Scatter plot of optimal and actual wealth. Observed net wealth is constructed m the 1992 HRS. Optimal net worth comes from solving the baseline model described the text.

Key Drivers of Savings

- **Retirement income replacement rates are critical**
  Social Security and DB pensions replace a high share of income when working, especially for the low income
- **Accounting for household size is critical**
  Low income households have more kids, on average, depresses savings of the low-income
- **Timing of income is critical**
  Low income + borrowing constraints when young $\Rightarrow$ low savings rates when young, high savings rates when old
- **Not accounting for these features leads to significantly worse model fit**

Important Directions for Future Work

- Importance of factors outside this model such as financial literacy (Lusardi, Michaud, Mitchell, JPE, 2017)
- More recent cohorts with lower DB pensions wealth: evidence of fall in wealth of households for more recent cohorts

Savings after retirement by age and lifetime income

from De Nardi, French, and Jones (JPE, 2010)

AHEAD cohort of HRS data (unbalanced panel, singles only)

Potential drivers of retirement savings

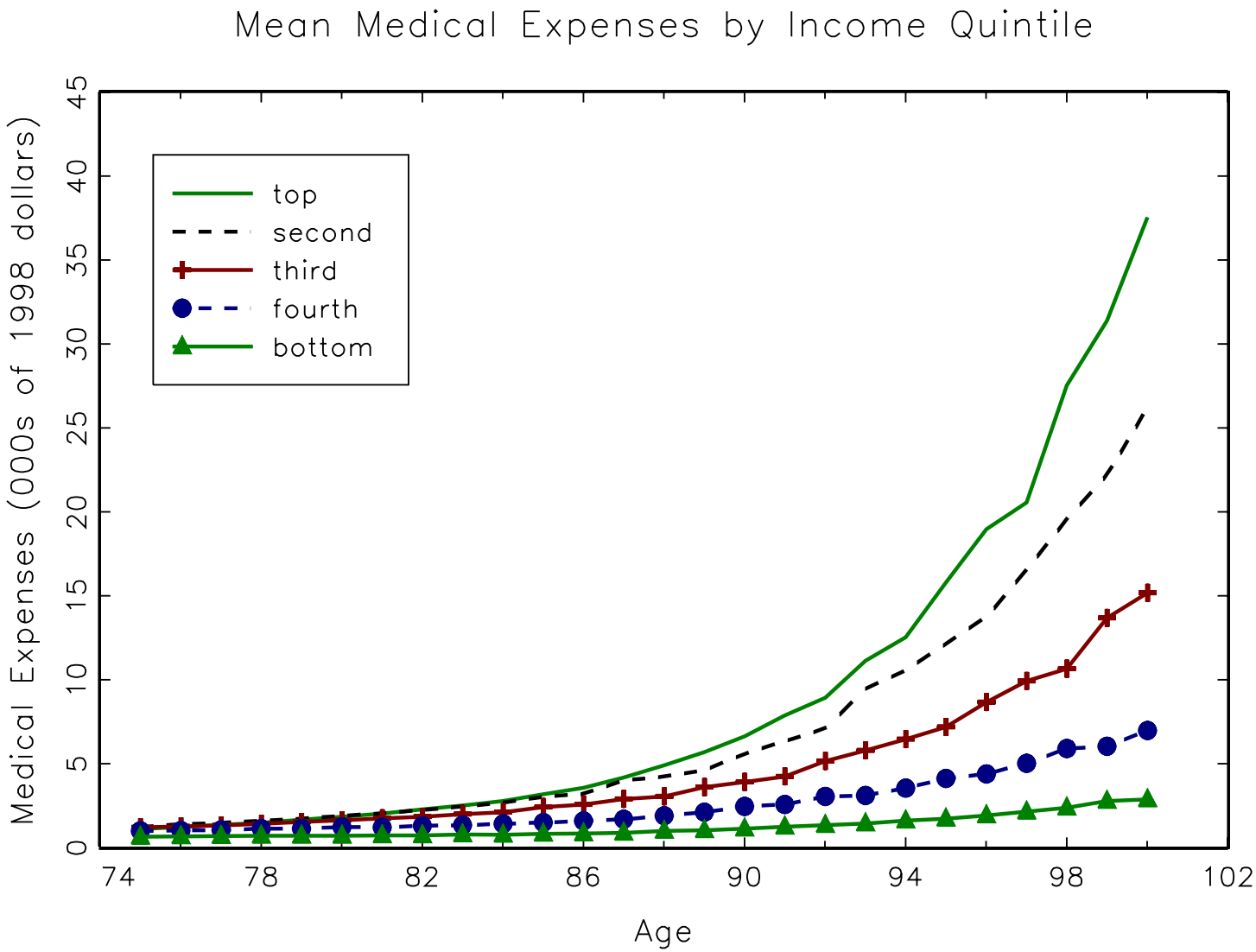
- **Precautionary motive:** medical expense risk/uncertain lifetimes.
- Bequest motives.
- Other motives (e.g., housing/home ownership).

Key issue: many of the above motives affect savings patterns in similar ways, so it is difficult to disentangle the importance of the them

Medical expenses and longevity in the US

- Longevity rises with permanent income. Life expectancy at age 70:
  - Low income: 11.1 years
  - High income: 14.7 years
- Out-of-pocket medical costs rise with age and permanent income

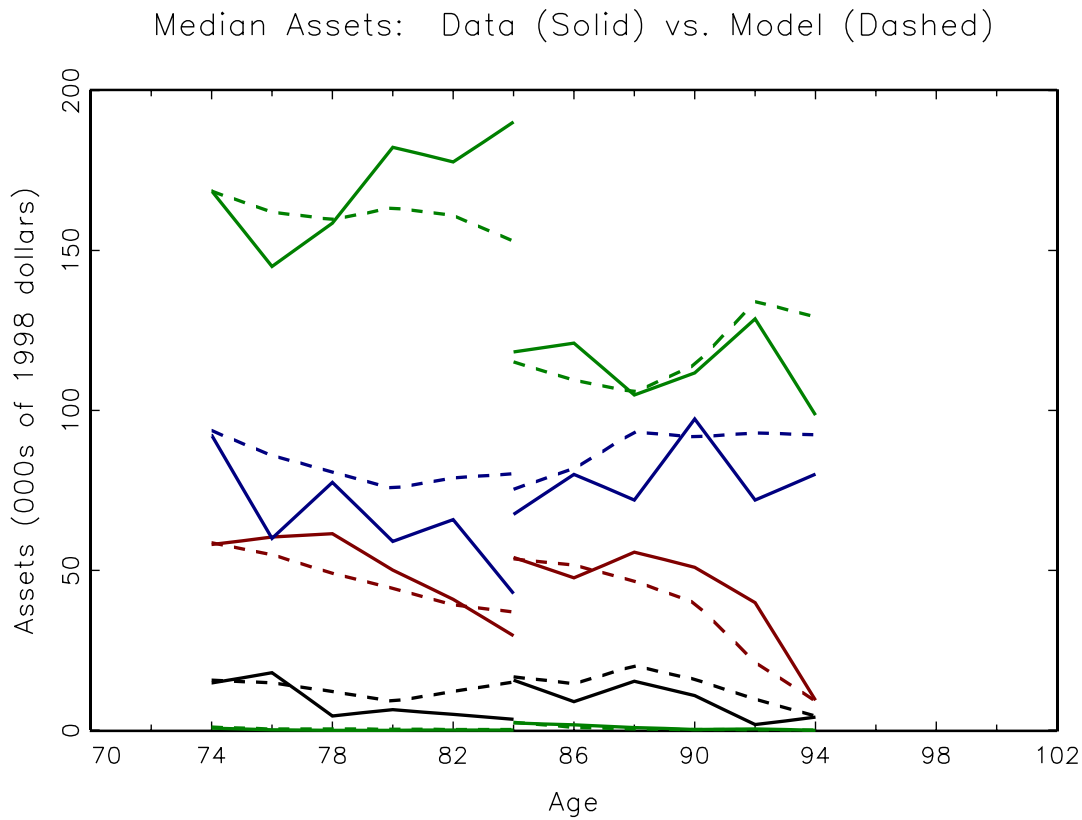
Average medical expenses, AHEAD data



De Nardi, French, and Jones: Methods

- Estimate life cycle model that allows for heterogeneity in medical spending, longevity, income
- Choose utility function parameters to match asset profiles

Median assets by cohort and income quintile: data and benchmark model



Solid line: data

Dashed line: model prediction

Key drivers of savings after retirement

- Both longevity and medical spending rise with permanent income $\Rightarrow$ key driver of savings of the rich
- Bequest motives may be important, but adding bequest motives to model only modestly improves fit

Key drivers of savings, before and after retirement

- Modeling demographics and budget sets is key
  - Before retirement: Household size
  - After retirement: longevity and medical spending risk
- Modeling risks is key
  - Before retirement: earnings risk
  - After retirement: medical spending and mortality risk
- To model this accurately we need high quality, long panels such as the HRS