Saving During Retirement

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Assets held after retirement are large

- More than one-third of total wealth in the United States is held by households whose heads are over age 65 (Wolff 2004).
- Many countries are in similar circumstances.
- Why people save during retirement is a crucial question for
  - The elderly's consumption and welfare.
  - Policy evaluation.

Assets held after retirement do not decline fast with age

- Retired US households and especially those with high income
  - Decumulate their net worth more slowly than implied by a
  - Basic life-cycle model
    - People start retirement with assets and income (Social Security entitlements).
    - There is lifespan uncertainty.
    - People save to smooth their consumption while alive.

Potential saving motives behind this behavior?

Today, we will explore

- Medical expenses
- Heterogeneity in uncertain lifetimes
- Public insurance programs
- Bequest motives

Research joint with Eric French and John Jones, various papers.

Notice that

- The first three factors have to do with risks, and hence affect precautionary savings
  - Medical expenses
  - Heterogeneity in uncertain lifetimes
  - Public insurance programs
- Bequests and family structure are tightly connected to bequest motives.

Identifying precautionary savings vs. bequest motives

- Assets are fungible: They can be used to
  - Smooth consumption in presence of shocks
  - Leave bequests
- How to separately identify saving
  - Against risks (precautionary motives)
  - For one's heirs (bequests and family structure motives)?

Identifying precautionary savings vs. bequest motives

- We can measure the risks well.
- But the strength of two key saving motives also depends on
  - Patience
  - Risk aversion
  - The strength of the bequest motive
  - The extent to which bequests are a luxury good
- These four parameters are hard to separately identify using assets data only.
- Distinction of precautionary savings/bequest motives is crucial (De Nardi, French, and Jones 2016, AR).

Goal for this talk

- Document some retirement US facts
- Discuss the role of these forces in shaping retirement savings
  - Medical expenses (DFJ 2010 JPE and 2016 AER)
  - Bequests
  - Public insurance programs
  - Life expectancy (DFJ 2009 AER P&P)
- What have we learned and what remains to be done?

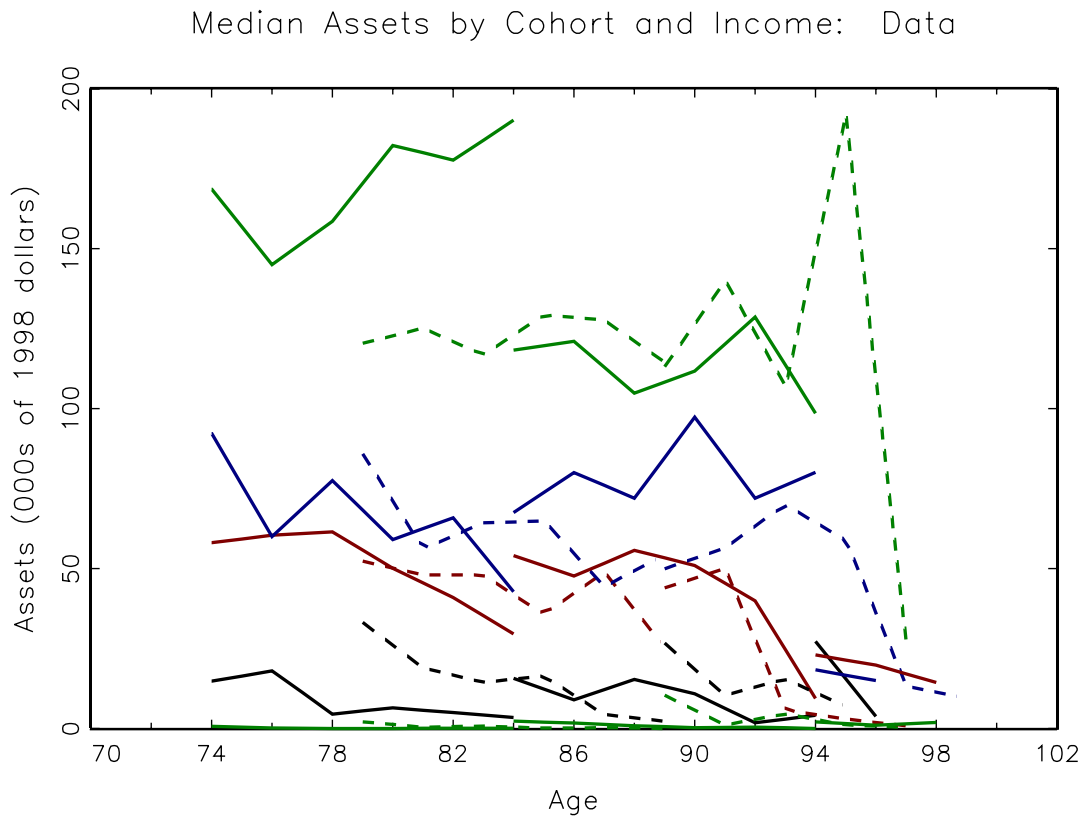
Health and Retirement Survey (AHEAD) data, US

- Household heads aged 70 or older in 1994
- Consider only the retired singles
- Follow-up interviews every two years
- 2,688 individuals
- Use full, unbalanced panel

Net worth by age and cohort

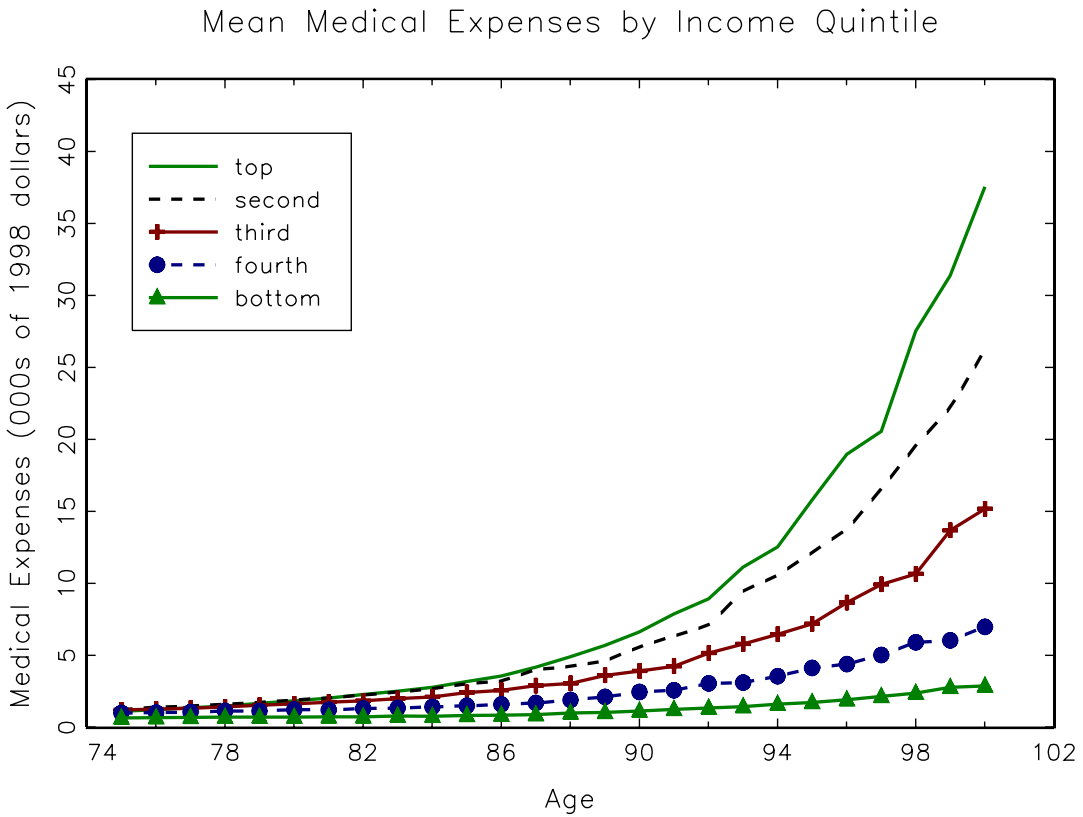
- High-income retirees dissave very little until really old

Net worth by age and cohort



- High-income retirees dissave very little until really old

Average medical expenses



- Out-of-pocket medical costs rise with age and permanent income

Life expectancy at age 70 in the US

- By income:
  - Top quintile of income distribution: 14.7 years
  - Bottom quintile of income distribution: 11.1 years
- By gender:
  - Women: 14.3 years
  - Men 9.7
- People who self report being in good health at age 70 live longer

This might have an important effect on retirement savings.

Retirement Savings Facts, summary

- Medical expenses rise fast with age and permanent income during retirement.
- Many elderly individuals keep lots of assets.
- High income individuals deplete their assets more slowly than low income individuals.
- High income people, women, and healthy people live much longer.

This holds true for both singles and couples. We will focus on singles in this talk.

More Facts: Heterogeneity

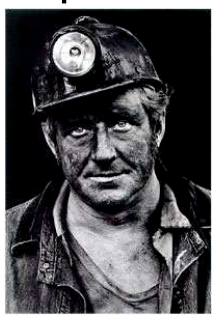
- Data show considerable heterogeneity in
  - Life expectancy
  - Medical expenses
- By:
  - Age
  - Gender
  - Permanent income
  - Health

Heterogeneity implications

- For saving behavior
  - Differential mortality $\Rightarrow$ Heterogenous saving rates, with high PI people and women saving more.
  - Medical expenses rise quickly with age $\Rightarrow$ Keep assets for old age.
  - Medical expenses rising with PI $\Rightarrow$ High PI people dissave more slowly.

Heterogeneity implications: continued

- For observed sample: **mortality bias**
  - Sample changes: High PI people + women live longer



  - In an unbalanced panel, this causes observed assets to **increase** with age

How do we address these questions?

We write down a structural model, which we estimate in two steps:

- First step: Estimate mortality and medical expenses as a function of age, gender, health and permanent income.
- Second step: Use first step results to estimate our model with method of simulated moments.

More on the second step

- Match median assets by permanent income quintile, cohort and age.
- Correct for cohort effects by using cohort-specific moments and initial conditions.
- Correct for mortality bias (rich people live longer) by allowing mortality rates to depend on permanent income and gender.

Benchmark model

- **Singles only,** abstract from spousal survival.
- **Households** maximize total expected lifetime utility.
- **Flow utility** from consumption (CRRA). Utility can vary with health.
- **Rational expectations.** Expectations about mortality rates, health cost distribution, etc., are estimated from the data.
- **Bequest motive.** Functional form follows De Nardi (2004): bequests are a luxury good.

Uncertainty

- **Health status:** age-, gender- and permanent-income-specific Markov chain.
- **Survival:** function of gender, age, health status, and permanent income.
- **Medical expenses:**

$$\begin{aligned} \ln(m_t) &= m(g, h_t, I, t) + \sigma(g, h_t, I, t)\psi_t, \\ \psi_t &= \zeta_t + \xi_t, \\ \zeta_t &= \text{AR(1) shock}, \\ \xi_t &= \text{white noise shock}. \end{aligned}$$

Constraints

- Standard asset accumulation equation
- Government transfers support a consumption floor
- Borrowing constraint

Recursive formulation

$$V_t(x_t, g, I, h_t, \zeta_t) = \max_{c_t, x_{t+1}} \Bigg\{ [1 + \delta h_t] \frac{c_t^{1-\nu}}{1-\nu} + \beta s_{g,h,I,t} E_t \Big(V_{t+1}(x_{t+1}, g, I, h_{t+1}, \zeta_{t+1}) \Big) + \beta (1 - s_{g,h,I,t}) \theta \frac{(x_t - c_t + k)^{(1-\nu)}}{1-\nu} \Bigg\}$$

x_t = cash-on-hand

g = gender; I = permanent income

h_t = health status (0 $\Rightarrow$ bad, 1 $\Rightarrow$ good)

ζ_t = persistent health cost shock

Estimation results (DFJ 2010 JPE)

- The model's estimated preference parameters are consistent with many other estimates ($\nu = 3.8$, $\beta = 0.97$).
- Estimated government insurance is stingy (consumption floor: \$2,600 a year).
- The model fits the data well.
- The model generates similar mortality bias to the one in the data.

Mortality bias

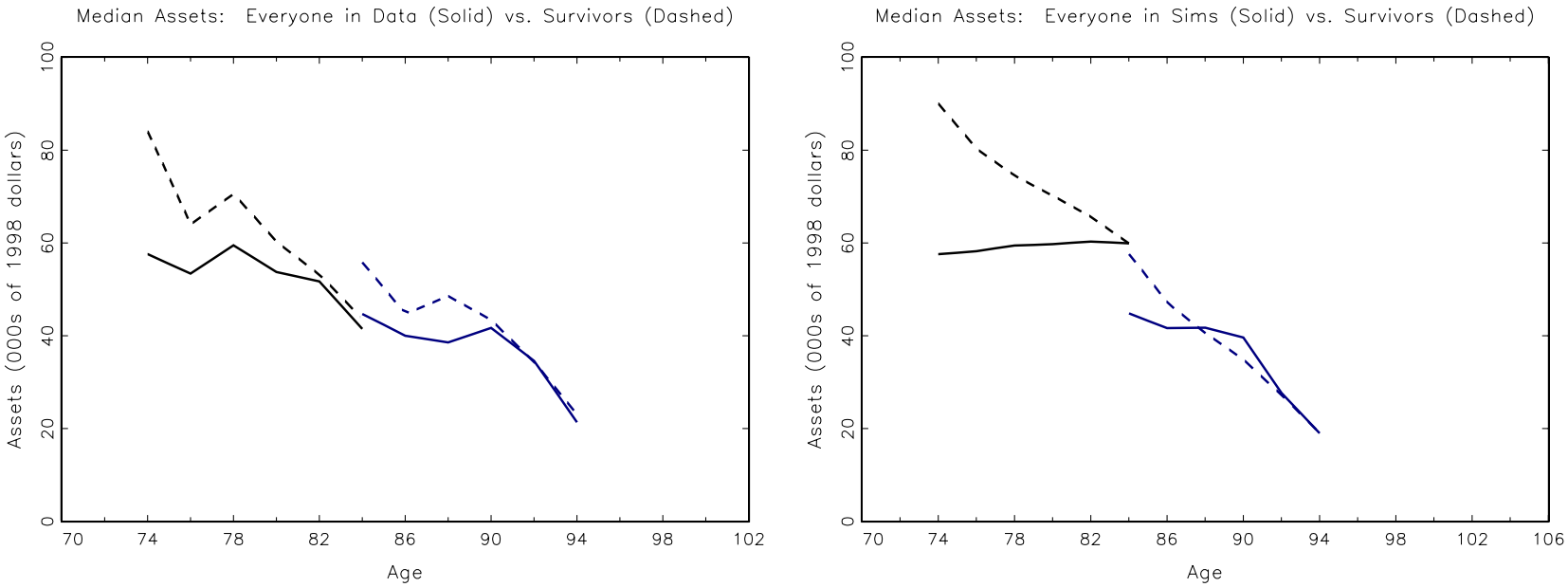
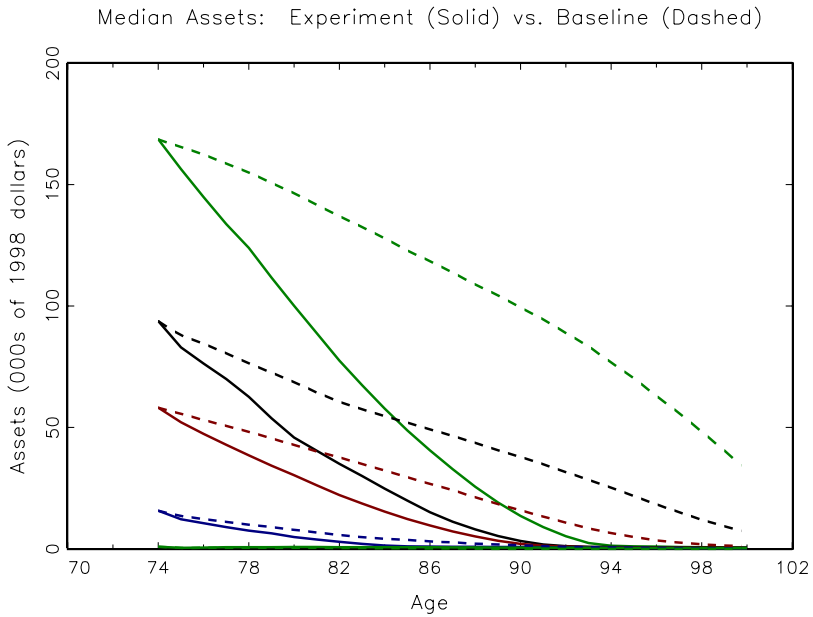


Figure: Left panel → AHEAD data; right panel → benchmark model

Estimation results: bequests

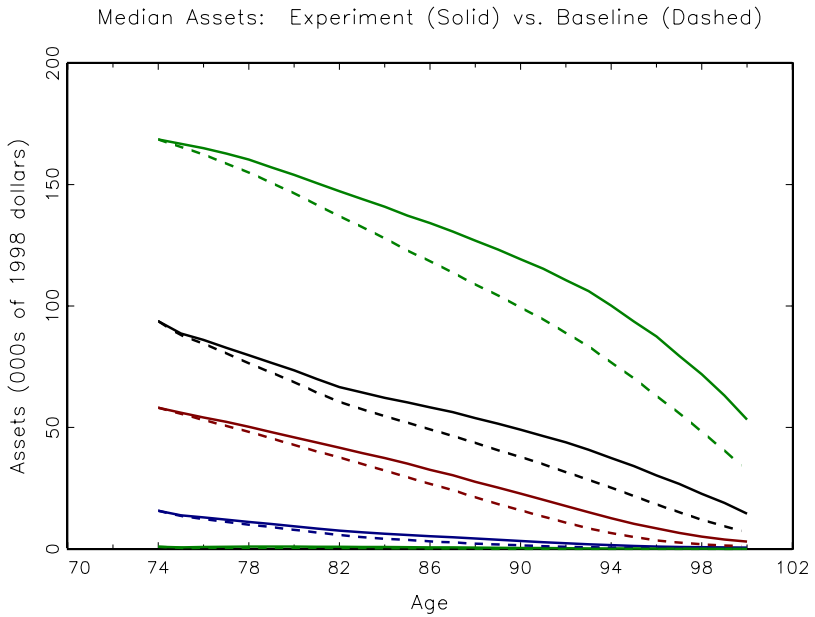
- Bequest motives are large for the richest people, but very imprecisely estimated.
  - They do not improve the model's fit.
  - They do not not change other parameters.
- This does **not** mean bequests are unimportant:
  - The estimated bequest motive implies that **the period before certain death** the rich bequeath 88 cents of every dollar.
  - Our moments (mainly assets) likely are not enough to identify bequest motives.

Eliminating medical expenditures



- Eliminating out-of-pocket medical expenditures has a big effect on savings.

Reducing the consumption floor by 20%



- Lowering the consumption floor has a significant effect on savings, especially for richer singles.

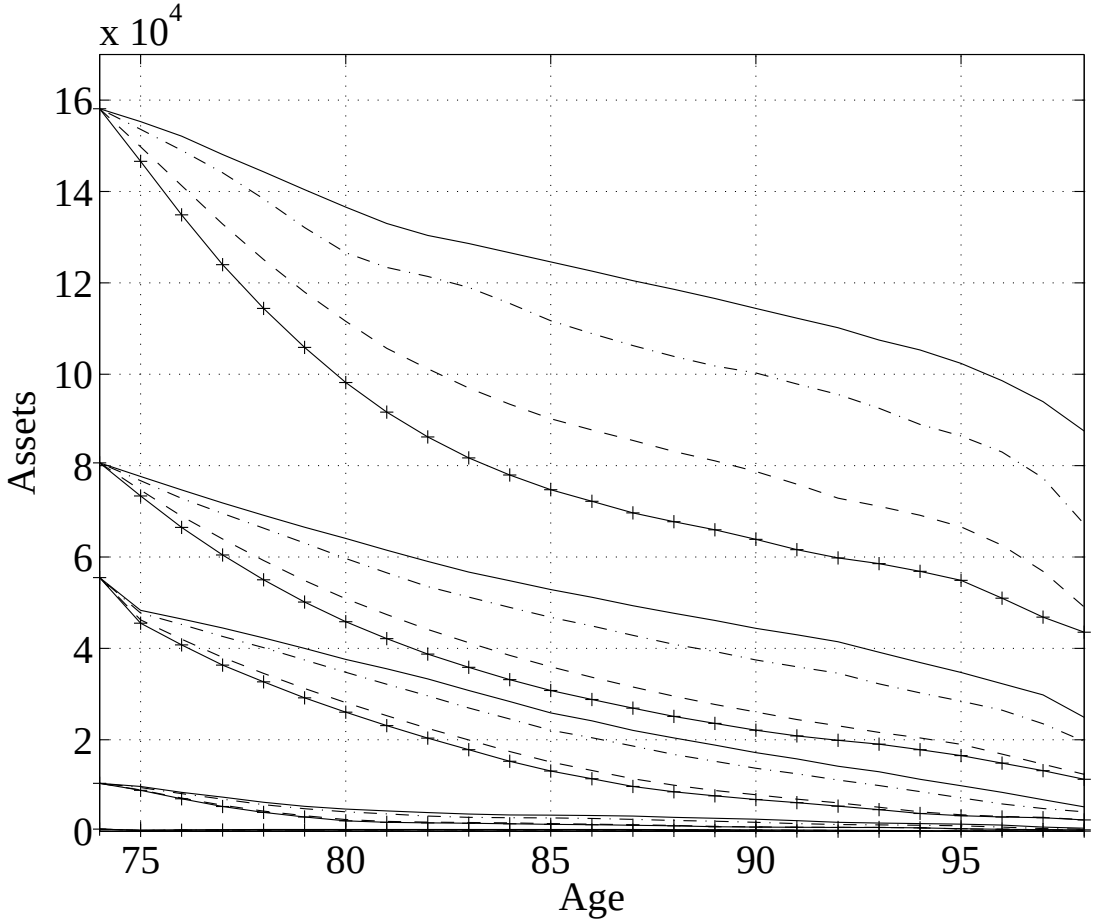
Conclusions from DFJ 2010 JPE, and 2016 AER

- Medical spending that rises fast with income and age goes a long way to explaining savings of single retirees
- Social insurance (from Medicaid) affects savings even of the high income
- Above results robust to allowing for
  - Endogenous medical spending
  - Bequest motives

Life expectancy heterogeneity, AER 2009

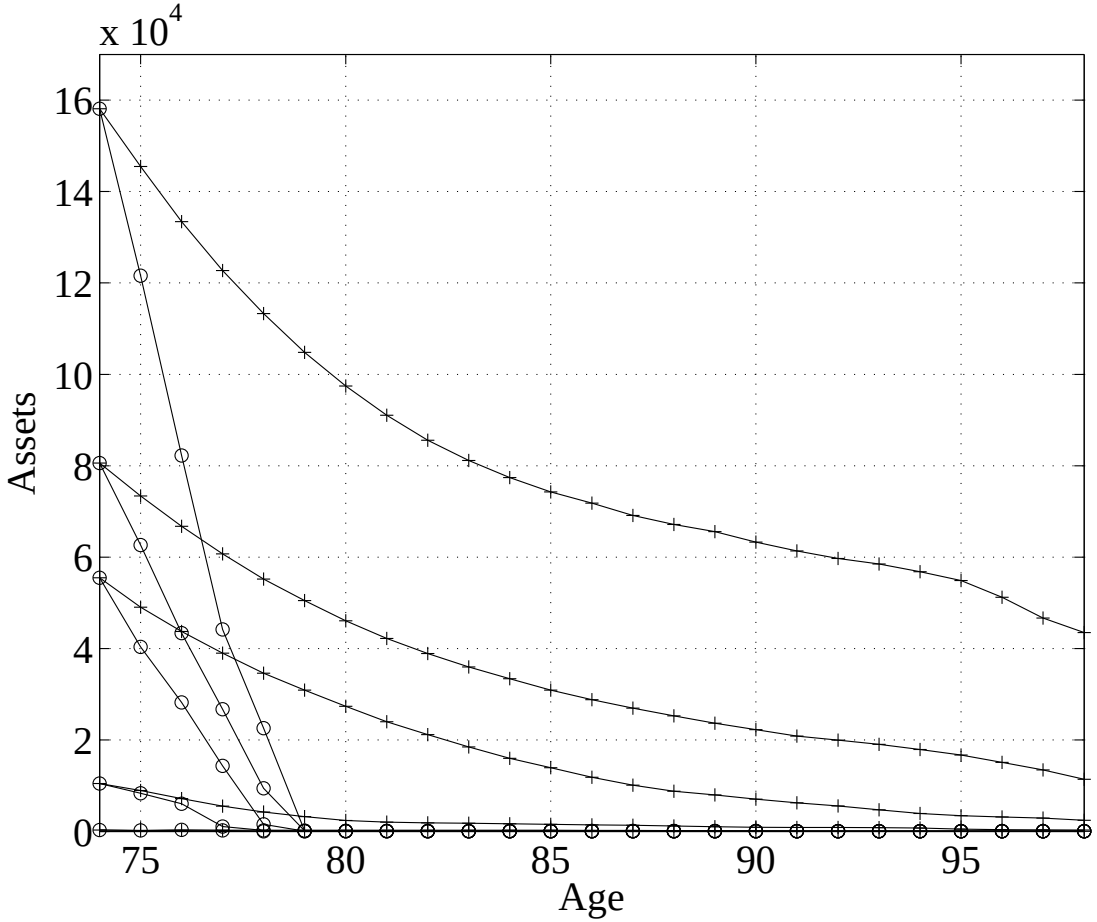
How much of the asset accumulation of old rich people is due to longer life expectancy and lifespan risk?

Median net worth, various mortalities



Savings by age and permanent income. From top: baseline; all sick; all males and sick; all male, sick, and poor.

Median net worth: eliminating lifespan risk



Savings by age and permanent income. All male, sick, and poor.
Top: with lifespan uncertainty. Bottom: no lifespan uncertainty.

Life expectancy and savings, conclusions (DFJ 2009 AER)

- Differences in life expectancy related to health, gender, and permanent income are important to understanding savings patterns across groups.
- The effect of each factor is of a similar order of magnitude.
- The risk of living beyond one's expected lifespan has huge effects on saving.

Medicaid paper (DFJ 2016 AER)

- Better model means-tested government health insurance.
- Also match program participation, not just assets.
- Find larger bequest motives. Why?
  - Matching Medicaid recipiency identifies a more generous Medicaid.
  - This requires weaker precautionary savings and stronger bequest motives.
- Medical expenses still key to explain savings.

What have we learned so far more broadly?

- Medical expenses have large effects on savings during retirement, especially for higher income people.
- Heterogeneity in mortality is large and important. So is lifespan uncertainty.
- Government insurance also affects the savings of initially well-off people.
- Careful measuring and modeling of both risks and insurance and additional target moments (than assets) are crucial for disentangling saving motives.

What have we learned so far about identification?

We can fit patterns of dissaving after retirement using

- Precautionary motives
- Bequest motives

Both motives imply similar patterns of dissaving.
$\Rightarrow$ Several preference parameter configurations fit retirement savings.

What's the solution?

Use other data to distinguish between precautionary motives and bequest motives, such as

- Government insurance take up rate: De Nardi, French and Jones (2016).
- Private insurance choices: Lockwood (2015), Inkmann and Michaelides (2012).
- Hypothetical responses: Ameriks et al. (2015).
- Housing: Nakajima and Telyukova (2015).

Broader ideas for future research

- Evaluating more the role of the family and savings. How should we model the family? How does the family affects risks and insurance?
- Do children help parents? Do they do it for money?
- How should be best model health investment? What moments should we match?
- Cross-country comparisons.