The Role of Annuitized Wealth in Post-Retirement Behavior

John Laitner, Michigan       Dan Silverman, Arizona State
Dmitriy Stolyarov, Michigan

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Late Life Behavior is “Puzzling,” Hard to Analyze

- Retirement research often calls for structural, lifecycle analysis
- But puzzles and technical obstacles challenge workhorse models
  - Retirement consumption
  - Post-retirement saving
  - Lack of annuitization
  - Determinants of bequests
  - Kinks, discontinuities, and non-convexities
Approaches to the Puzzles and Technical Obstacles

- Modelling response to the puzzles has been selective, numerical, or two-period
- Robustness is a concern
- Challenge to identify common drivers behind the puzzles, or make predictions about dynamics
This Paper

- Agenda/strategy:
  - Develop an estimable, multi-period model rich enough to accommodate “puzzles”
  - Keep it analytically tractable/teachable
  - Reveal the incentives that link the puzzles, understand when they emerge.

- Specific to this paper
  - **Post-retirement saving**
  - Lack of annuitization
  - Determinants of bequests
  - **Non-convexity from Medicaid’s guarantee**
  - **Importance of portfolio, not just wealth level**
“Decumulation of wealth after retirement is an essential aspect of the life cycle theory. Yet simple tabulations of wealth holdings by age ... do not support the central prediction that the aged dissave.” Kotlikoff and Summers (1988)
Model Overview

- Post-retirement behavior of single-person households.
- Poisson transitions between health-status states
  - $\lambda$ is hazard to low health;
  - $\Lambda$ is subsequent hazard to death
- Means-tested public assistance – Medicaid nursing home expenditure
- Basic model: household starts with annuity income $a$ and bequeathable assets $b$; it chooses consumption, saving
- State-dependent utility: low health brings higher marginal utility of consumption expenditure
- No intentional bequests
Modelling Challenge – Medicaid Guarantee
Key Assumption: Verification Problems

- Distinguish health from medical status – medical is insured.
- Think of health status as measured by ADLs:
  - Trouble with (i) bathing, (ii) eating, (iii) dressing, (iv) walking across room, (v) getting out of bed
- Verifiability problems seem more acute for these activities.
- We assume the extreme: verification problems mean there is no long-term care insurance, or annuities conditioned upon health status.
Key Assumption: State-Dependent Utility

- For $h = H$, think $u(x) = \frac{x^\gamma}{\gamma}$ with $\gamma < 0$
- For $h = L$, think $U(x) = u(\omega \cdot x)$ with $\omega \in (0, 1)$
- Then $U(x) = [\omega]^\gamma \cdot u(x) \equiv \Omega \cdot u(x)$, $\Omega > 1$
- Poor health thus means lower utility but higher marginal utility
  - As in Laitner and Silverman (2012) we can estimate $\omega$ and $\gamma$ from the change in $\ln(x)$, first upon retirement and then upon the arrival of poor health.
Household solves

\[ V(B,a) \equiv \max_{X_s} \int_0^\infty e^{-(\Lambda+\beta)t} \cdot U(X_t) \, dt \]

subject to:

\[ \dot{B}_t = r \cdot B_t + a - X_t \]

\[ B_t \geq 0 \quad \text{and} \quad B_0 = B \]

Solutions satisfies

\[ \frac{\dot{X}_s}{X_s} = \frac{r - (\Lambda + \beta)}{1 - \gamma} \]
Household solves

\[ V(B,a) \equiv \max_{X_s,T} \int_0^T e^{-(\Lambda+\beta)t} \cdot U(X_t) \, dt + e^{-(\Lambda+\beta)T} \frac{U(\bar{X})}{\Lambda + \beta} \]

subject to: \[ \dot{B}_t = r \cdot B_t + a - X_t \]

\[ B_t \geq 0 \quad \text{and} \quad B_0 = B \]

Solutions satisfies

\[ X^*_t = \begin{cases} \bar{X} \cdot e^{\sigma(t-T^*)}, & \text{for } t \in [0,T^*] \\ \bar{X}, & \text{for } t > T^* \end{cases} \]
Last Phase of Life – Optimal Consumption

(i) \( a \geq X \)

(ii) \( a < X \)

\( X^* \)

\( X_0 \)

\( a \)

\( T^* \)

\( \tilde{X} \)

\( \bar{X} \)
\[ v(b,a) = \max_{x_s} \left\{ \int_0^\infty e^{-(\lambda+\beta)s} \left[ u(x_s) + \lambda V(b_s,a) \right] ds \right\} \]

subject to: \[ \dot{b}_s = r \cdot b_s + a - x_s, \]

\[ b_s \geq 0 \]

\[ a \quad \text{and} \quad b_0 = b \quad \text{given.} \]
Behavior Depends on Portfolio and Interest Rates

Standard interest rate $r < \bar{r}$

High annuitization $a > \bar{a}$

Target for bequeathable wealth $b^*_\infty$; (dis)save to that level or the arrival of poor health.
Behavior Depends on Portfolio and Interest Rates

High interest rate – $r > \bar{r}$

Low annuitization – $a < \bar{a}$

Here $b_\infty^*$ designates key threshold for Medicaid use upon poor health.
Theory identifies three types of household distinguished by their annuity income

- Low resource $a < \bar{a}$ – never saves in good health, very likely take up Medicaid
- Middle class $a \in (\bar{a}, \bar{X})$ – may save to delay/escape Medicaid
- Top group $a \geq \bar{X}$ – may also save but just to support higher marginal utility of expenditure in poor health. Never take up Medicaid

Annuity income is key because it is illiquid and because it is taxed by Medicaid.
Retirement Saving Puzzle – Calibration

Table A1 initial conditions

Normalized weighted average

- $\gamma = -1.00$
- $\gamma = -0.75$
- $\gamma = -1.25$
Other Puzzles

- Study annuity demand by endogenizing choice of $a$ at retirement
- Simple calibration suggests zero annuity demand is optimal for middle class households who fear are reasonably concerned they will rely on Medicaid.
- Study determinants of accidental bequests and reveal the importance of time in good health
Conclusions and Ongoing Work

- Tractable life-cycle model is consistent with
  - Continued saving after retirement
  - Lack of voluntary annuitization
  - Heterogeneous bequests without heterogeneity in bequest motives.

- Annuitization (via social security or pensions) and interest rates play critical roles

- Ongoing work estimates the model and studies spillovers between interest rates, annuitization, and take-up of public programs.

- Incorporate (imperfect) LTC insurance markets