

Demand for annuities and long-term care insurance with recursive utility: Impact of housing

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Outline

- 1 Introduction
- 2 Lifecycle model in retirement
- 3 Results
- 4 Conclusions

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- Individuals face greater challenges in financing their retirement
 - living longer → harder to allocate resources over time to avoid ruin
 - likely to spend more time in disability → expensive healthcare cost
- Growing interest in retirement products
 - life annuities → hedge longevity risk
 - long-term care insurance (LTCI) → tackle healthcare cost

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- Only a handful of papers consider home equity among the studies looking at optimal consumption and portfolio choice during retirement
- The role of housing wealth among the elderly can hardly be overlooked

Research Motivation

- High home ownership rates among people aged 65 and over
- A large fraction of household portfolios held in the form of housing
 - median ratio of home equity to all assets 56% among 62+ (Davidoff, 2009)

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- A large fraction of household portfolios held in the form of housing
 - median ratio of home equity to all assets 56% among 62+ (Davidoff, 2009)
- Generally not reduced among people who continue to own (Venti and Wise, 1990, 1991, 2004)
 - left to heirs
- Selling often associated with losing spouse or entering into a nursing home (Walker, 2004; Venti and Wise, 2004)
 - can insure against uncertain healthcare cost

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- Risks: lifespan, health expenditure, house price

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Study the impact of γ and ψ on the demand

- γ : risk aversion; ψ : elasticity of intertemporal substitution (EIS)
- Epstein-Zin-Weil-type utility (Epstein and Zin, 1989, 1991; Weil, 1989)
 - generalise the power utility model
 - separately identify risk aversion and EIS

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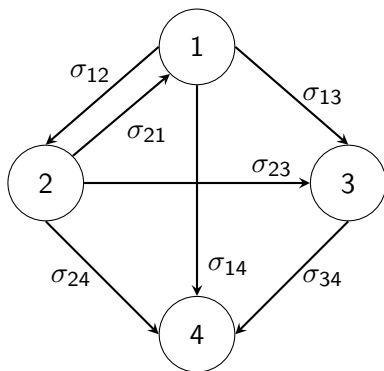
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 - severe disability is usually chronic in nature that substantially reduces the possibility of recovery (Ferri and Olivieri, 2000; Olivieri and Pitacco, 2001)
- allow transition from mildly disabled to healthy state
- do not allow for recoveries from severely disabled state

Health transitions (Cont')



$$\begin{array}{ccc} \sigma_{jk} & \xrightarrow{\text{matrix exponential}} & \pi(s_{t+1} = k | s_t = j) \\ \text{transition intensity} & & \text{transition probability} \end{array}$$

Health expenditure

Model health expenditure that is not covered by the government

- A deterministic process given the health state (Ameriks et al., 2011)
- Relative price of healthcare increases at a rate of q per annum

Housing and financial assets

- Housing asset
 - majority of retired homeowners have paid off their mortgages
→ assume the individual lives in a mortgage-free home at retirement

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 - gross rate of return $R_{H,t+1}$ from time t to time $t + 1$
 - $\ln(R_{H,t+1}) \sim \mathcal{N}(\mu_H, \sigma_H^2)$
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Retirement products

At the point of retirement, individuals can access fairly priced products offered by private companies

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- life annuities
 - choose the proportion of liquid assets to annuitise
 - level payment for the remaining lifetime
- long-term care insurance (LTCI)
 - choose the percentage coverage
 - cover healthcare cost for severely disabled state

Do not explicitly model the public offering of similar products

Preferences

Epstein-Zin-Weil-type preferences (Epstein and Zin, 1989, 1991; Weil, 1989)

- Risk aversion (γ)
- Elasticity of intertemporal substitution (EIS) (ψ)
- Reduces to the power utility model when $\gamma = 1/\psi$

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Base case analysis

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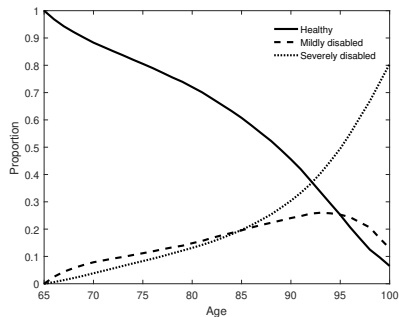
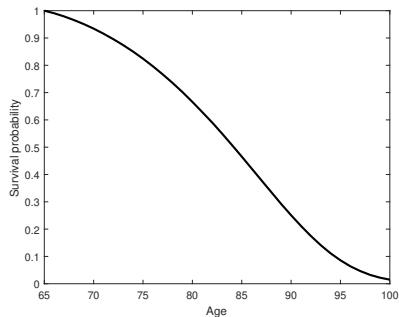
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- Annuity costs \$14.89 per \$1 annual income

Simulated health states



- $\sim 50\%$ chance of living beyond age 85
- chance of becoming severely disabled increases significantly after age 85

Optimal product choices at retirement

Wealth (\$000)		Single product			Both products		
		Annuity only		LTCI only	Annuity		LTCI
Liquid	House	% Liquid	% Total		% Liquid	% Total	
500	0	0.30	0.30	0.93	0.71	0.71	0.92
220	280	0.94	0.41	0.89	0.65	0.29	0.81

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 - presence of home equity lowers the barrier to annuitisation
- LTCI: illiquid housing wealth reduces demand for LTCI
 - home equity serves as an insurance against healthcare costs

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- LTCI available: illiquid housing wealth can reduce demand for annuities
 - depends on the amount of liquid wealth (found in the sensitivity analysis)

Impact of preference parameters

	Annuity	LTCI
Coef. of relative risk aversion		
$\gamma = 2$	↑	↓
$\gamma = 10$	↓	↑
Elasticity of intertemporal subs.		
$\psi = 0.2$	↑	↓
$\psi = 0.7$	↓	↑

↑: increase compared to the base case

↓: decrease compared to the base case

Demand for annuities and LTCI

- $\gamma \uparrow \rightarrow$ more risk averse
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Demand for annuities and LTCI

- $\gamma \uparrow \rightarrow$ more risk averse
 \rightarrow LTCI \uparrow annuity \downarrow
- $\psi \downarrow \rightarrow$ more concerned about intertemporal consumption smoothing & less concerned about insuring against health risk
 \rightarrow LTCI \downarrow annuity \uparrow

Impact of preference parameters (Cont')

- Power utility model: $\gamma \times \psi \equiv 1$
 - $\gamma \uparrow \rightarrow \psi \equiv 1/\gamma \downarrow$
 - inadequate in determining the demand when $\gamma \neq 1/\psi$

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In reality,

- Individuals have relative risk aversion greater than the reciprocal of the EIS (Brown and Kim, 2013)
- Individuals have heterogeneous preference parameters
 - risk tolerance and the EIS are essentially uncorrelated across individuals (Barsky et al., 1997)
 - the rich have larger EIS than the poor (Ogaki and Atkeson, 1997)

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- Presence of home equity
 - typically increases the optimal annuitisation rate (when annuities alone are available)
 - can enhance demand for annuities if there are sufficient liquid assets (when LTCI is also available)
- Importance of separating risk aversion and EIS
 - a higher γ and a lower ψ have opposite effects on the demand for annuities and LTCI
 - the power utility model is unable to disentangle the impact of these two factors

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