

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

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About the speaker



- **Mengyi Xu**
- Senior Research Associate
- BCom (Hons) UNSW, PhD UNSW, FIAA



- **ARC Centre of Excellence in Population Ageing Research (CEPAR)**
- Produce world-class research on population ageing
- Provide global solutions to the economic and social challenges of population ageing

Agenda

Introduction

Lifecycle model in retirement

Results

Conclusions

Appendix

Agenda



Introduction

Research Background



- Individuals face greater challenges in financing their retirement
 - living longer → harder to allocate resources over time to avoid bankruptcy
 - 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
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- A large fraction of household portfolios held in the form of housing
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- Generally not reduced among people who continue to own (Venti and Wise, 1990; Venti and Wise, 1991; Venti and Wise, 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

Research Overview



Study the impact of housing wealth on demand for life annuities and LTCI

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- Risks: lifespan, health expenditure, house price

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Study the impact of individual risk preference on the demand

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Lifecycle model in retirement

Health dynamics

- Health status: four (4) states based on number of difficulties in independently performing ADLs (Ameriks et al., 2011)
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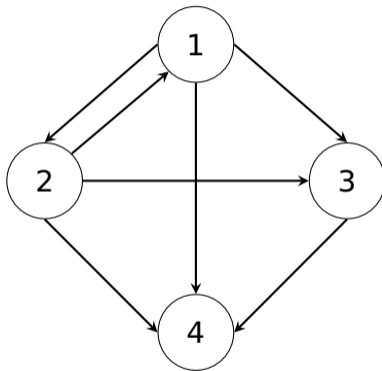
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- allow transition from mildly disabled to healthy state
→ do not allow for recoveries from severely disabled state

Health transitions (Cont')



Housing and financial assets



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- rate of return follows a normal distribution

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Retirement products



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- life annuities
 - level payment for the remaining lifetime
- long-term care insurance (LTCI)
 - 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; Epstein and Zin, 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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- Annuity costs \$14.89 per \$1 annual income

Optimal product choices at retirement

Wealth (\$000)		Single product			Both products		
		Annuity only		LTCI	Annuity		LTCI
Liquid	House	% Liquid	% Total	only	% 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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- LTCI: illiquid housing wealth reduces demand for LTCI
 - overlaps between housing liquidation and LTCI payment → substitution effect

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- LTCI available: illiquid housing wealth can reduce demand for annuities
 - more liquid wealth → better absorb cost of LTCI premium → LTCI enhances demand for annuities

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
 \rightarrow LTCI \uparrow annuity \downarrow

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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 $\gamma \neq 1/\psi$

Impact of preference parameters

(Cont')

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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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 - typically increases the optimal annuitisation rate similar in a way to LTCI
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Study the impact of housing wealth on the demand for life annuities and LTCI in a lifecycle framework

- Presence of home equity
 - typically increases the optimal annuitisation rate similar in a way to LTCI
 - generally reduces the demand for LTCI due to the substitution effect
- 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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Thank you very much for your attention!

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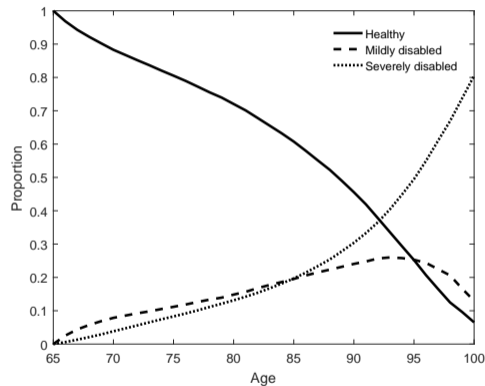
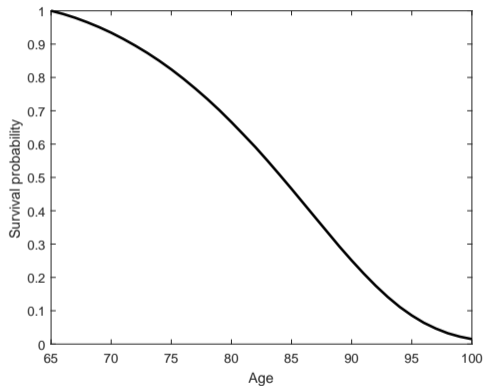
Health expenditure



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

Simulated health states



Simulated health states (Cont')

- ~50% chance of living beyond age 85
- chance of becoming severely disabled significantly ↑ after age 85



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