Enhancing Retirement Welfare Outcomes with the Australian Home Equity Access Scheme (HEAS)

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Presented at: The Twentieth International Longevity Risk and Capital Markets Solutions Conference (L20)

Background and motivation

- Home equity release enables retirees to convert accumulated home equity into cash, helping fund daily spending as well as basic health and long-term care.
- Take-up of home equity release products remains far below theoretical estimates due to low borrower's demand.
- The Home Equity Access Scheme (HEAS) in Australia:
  - Take-up is also limited (Actuaries Institute, 2024).
  - Tied to the means-tested age pension (Services Australia, 2023):
    - Combined payments from the age pension and HEAS are capped.
    - Retirees with lower means receive a higher pension.
    - A higher pension reduces the annual HEAS withdrawal.
- Question: Why HEAS take-up is limited?
  - Scheme design.
  - Retirees' financial status and risk preferences.
  - Counterpart: A flexible downsizing alternative.

Previous Research I

A majority of studies use time-separable additive utility to compare home equity release products with alternatives:

1. Constant elasticity of substitution (CES) utility (Piazzesi et al., 2007; Cocco and Lopes, 2020; Yogo, 2016).
2. Cobb–Douglas utility (Nakajima and Telyukova, 2017; Shao et al., 2019; Hambel, 2020).

- Adding direct benefit from retaining more home equity raises appeal of home equity release products.
- Choice sets often include renting, owning without release, downsizing (restricted), and home equity release products.
- Take-up falls with:
  - Higher income or wealth, stronger bequest motive, greater risk aversion under restrictive contracts. ▷Financial
  - Better health, higher residential care facility entry risk. ▷Health-related
  - More generous social insurance, tighter borrowing limits. ▷Structural

Previous Research II

Xu et al. (2023) use a recursive (Epstein–Zin) utility (Epstein and Zin, 1989, 1991; Weil, 1989) to study the retirement phase, considering the role of home equity.

- Provide a computationally efficient expression for optimal consumption.
- Restrict home equity release until severe deterioration in health.
- Neglect other objectives such as unlocking home equity for early liquidity infusion and deriving greater benefits from residing in substantial home equity.

This Paper

Using a recursive Epstein–Zin utility framework, we model retiree decisions around consumption and home equity release.

- **Health dynamics**: A multi-state Markov chain model.
- **Economic dynamics**: House price index (HPI), cash rate target, and inflation rate.
- **Income sources**: Means-tested pension income and HEAS withdrawal.
- **Idiosyncratic risks**: Spatially heterogeneous house price and longevity risks.
- **Comparison metric**: HEAS-equivalent downsizing.
  - Measure the downsizing needed to equalise utility with HEAS.
  - Lower retained home equity implies higher HEAS demand.
- **Outputs**: National and postcode-level pattern of demand for HEAS.

Age pension and HEAS

- Age pension income

$$I_t = I_t\left(W_t,\ \mathbb{1}_{\text{Non-homeowner}}\right), \quad \text{where} -1 < \frac{\partial I_t}{\partial W_t} \leq 0. \tag{1}$$

W_t: liquid assets; $\mathbb{1}_{\text{Non-homeowner}} = 1$ if non-homeowner (less privileged, higher pension income).

- The maximum HEAS withdrawal

$$A_t = \left\{\min\left[150\%\text{MPR}_t - I_t, \text{PL}_t - (1+\psi)\,\text{BAL}_{t-1}\right]\right\}^+. \tag{2}$$

  - MPR_t: maximum pension rate; ψ: fixed HEAS interest rate; BAL_{t-1}: outstanding HEAS balance.
  - PL_t: principal limit increasing with age and home equity H_t (influenced by home size S_t and HPI).

Impact of location

Notations: (i) origin o and destination j; (ii) non-mover in j. A mover replaces $@o$ with oj; a non-mover keeps $@j$.

- Change in dwelling size:

$$\Delta S_t = \frac{H_t^{oj}}{\mathrm{HPI}_{j,t}} - \frac{H_t^{@o}}{\mathrm{HPI}_{o,t}}, \tag{3}$$

with area-specific $\mathrm{HPI}_{\cdot,t}$. A lower $\mathrm{HPI}_{j,t}$ permits equity release with limited dwelling size loss; if staying within o, $\mathrm{HPI}_{o,t} = \mathrm{HPI}_{j,t}$.

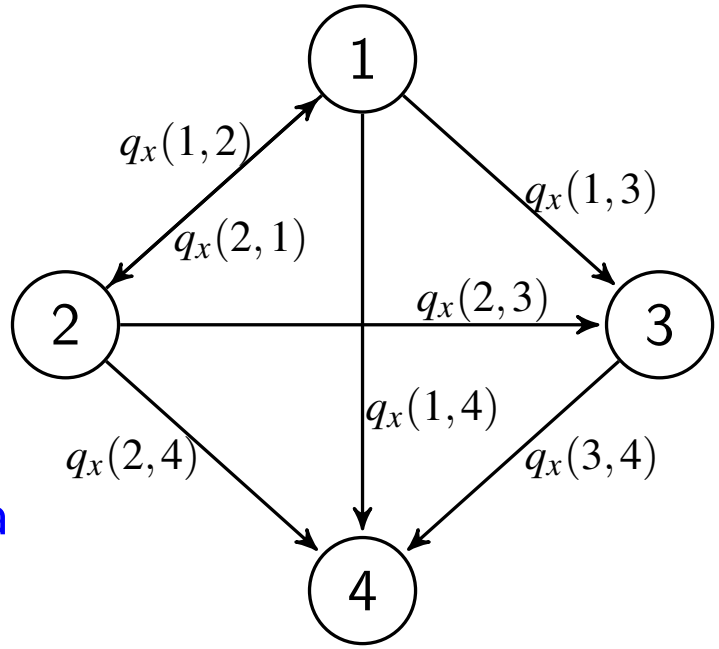
- Mover mortality (Finkelstein et al., 2021):

$$\log \bar{m}^{oj}(x) = g(x) + \kappa(\zeta_j + \bar{\vartheta}_j) + (1-\kappa)(\zeta_o + \bar{\vartheta}_o), \tag{4}$$

where g is the baseline age (x) effect, ζ place effects, $\bar{\vartheta}$ average health capital; $\kappa \in [0,1]$ weights destination versus origin and is held fixed after calibration.

Health dynamics

- Four-state Markov chain model with transition intensities $q_x(\cdot,\cdot)$.
- HEAS is terminated for severely disabled users due to the presumed inability to maintain home equity effectively (Service Australia, 2022), consistent with previous studies (Cocco and Lopes, 2020; Nakajima and Telyukova, 2017; Shao et al., 2019).
- Estimation: Generalised linear model (GLM) featuring a logarithmic link (Fong et al., 2015).
- Health dynamics are calibrated according to spatially heterogeneous mortality rates (influenced by κ).



States:

1: Healthy

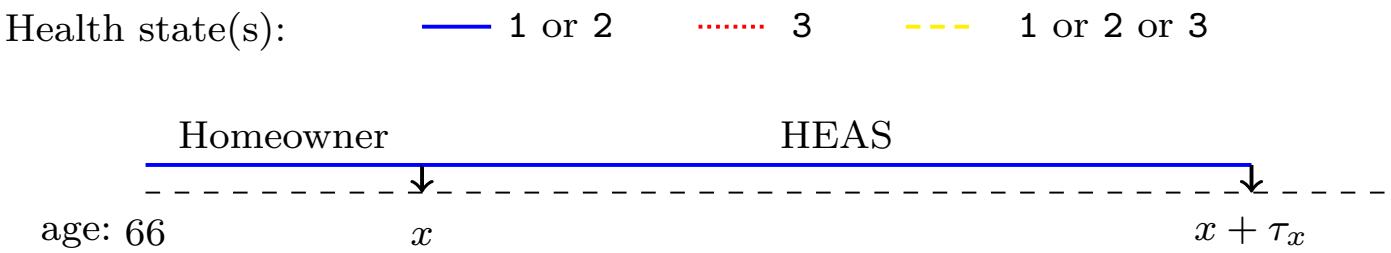
2: Mildly disabled

3: Severely disabled

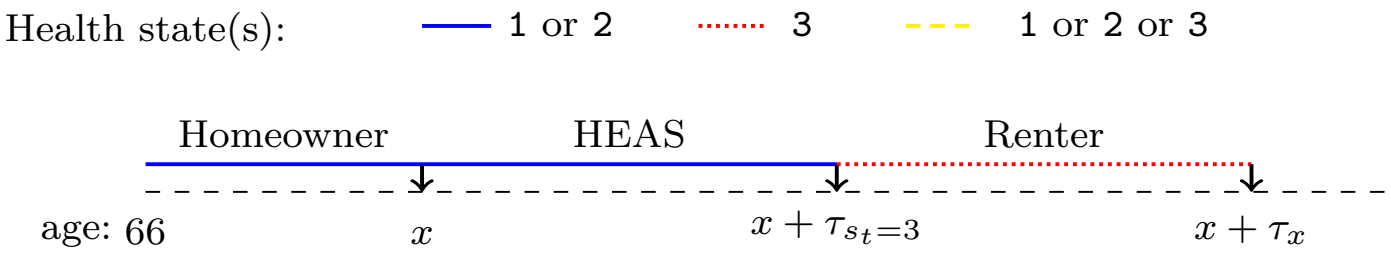
4: Deceased

Strategies for home equity release

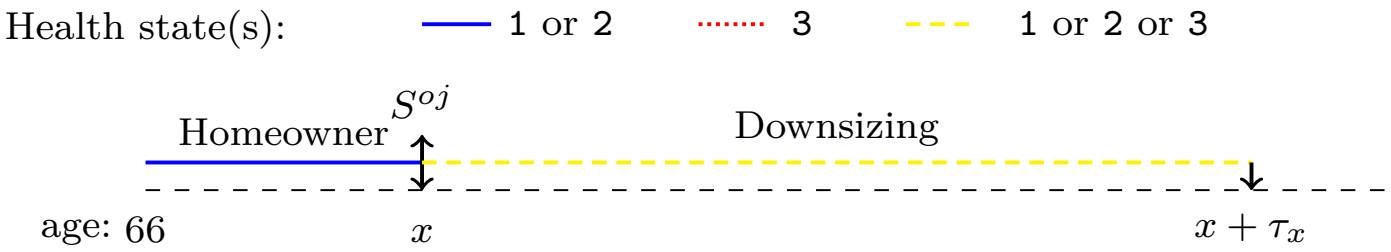
$\tau_{s_t=3}$: first time entering State 3; τ_x: death time.



(a) Case 1 (a)



(b) Case 1 (b)



(c) Case 2

Utility framework

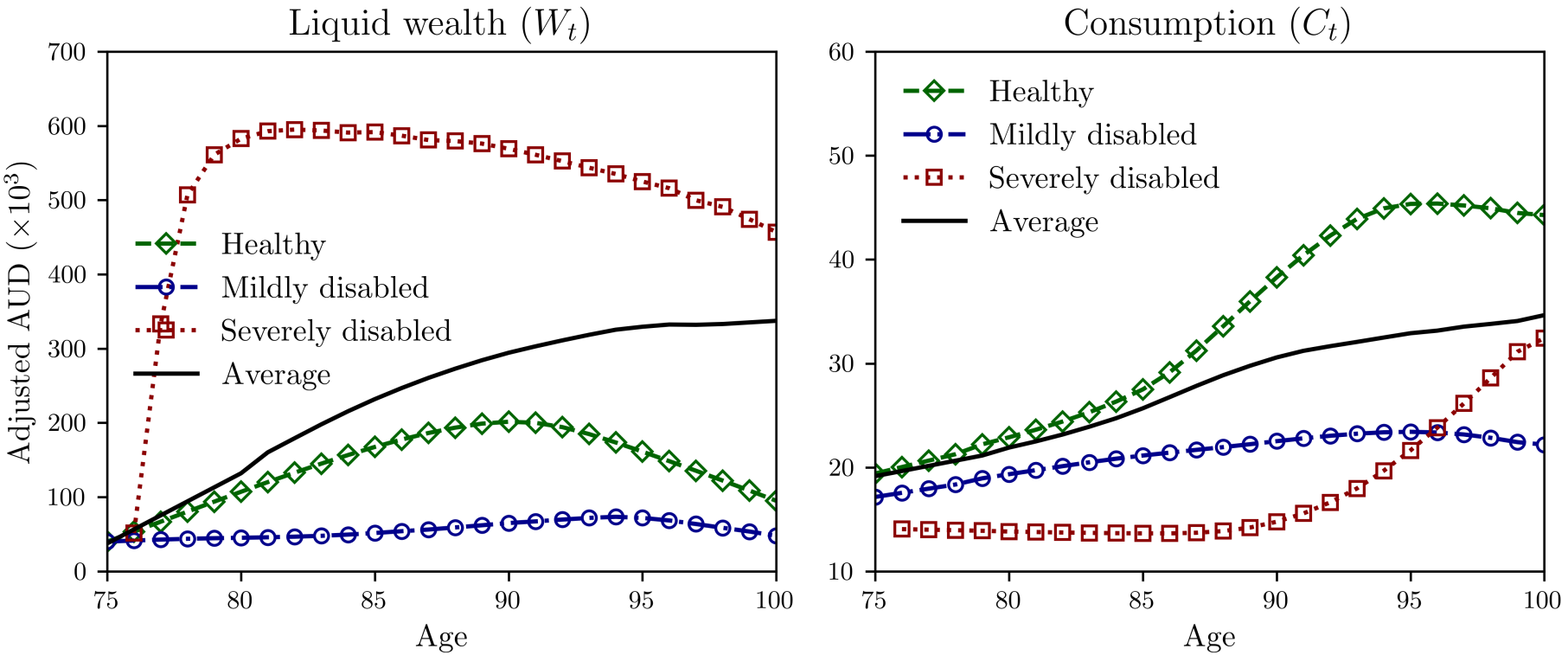
$$
\begin{aligned}
V_t &= V(W_t, S, s_t, t) \\
&= \max_{O_t} \Bigg\{ (1-\beta) C_t^{1-\rho} + \beta \Bigg[\mathbb{E}_t \Bigg[\sum_{k \neq 4} \pi_{x+t}(s_t, s_{t+1} = k) V(W_{t+1}, S, s_{t+1} = k, t+1)^{1-\gamma} \\
&+ \pi_{x+t}(s_t, s_{t+1} = 4) b^{\gamma} W_{t+1}^{1-\gamma} \Bigg] \Bigg]^{\frac{1}{\theta}} \Bigg\}^{\frac{1}{1-\rho}}, \quad \theta = \frac{1-\gamma}{1-\rho},
\end{aligned} \tag{5}
$$

- s_t: health state; $\pi_{x+t}(s_t, s_{t+1})$: transition probability; γ: risk aversion; $\frac{1}{\rho}$: elasticity of intertemporal substitution (EIS); b: bequest motive; β: subjective discount factor.
- Optimising decisions:

$$
O_t = \begin{cases} \{S^{oj}, C_t\}, & \text{for } t = 1 \text{ and downsizing;} \\ C_t, & \text{if else.} \end{cases} \tag{6}
$$

HEAS enhances healthy ageing

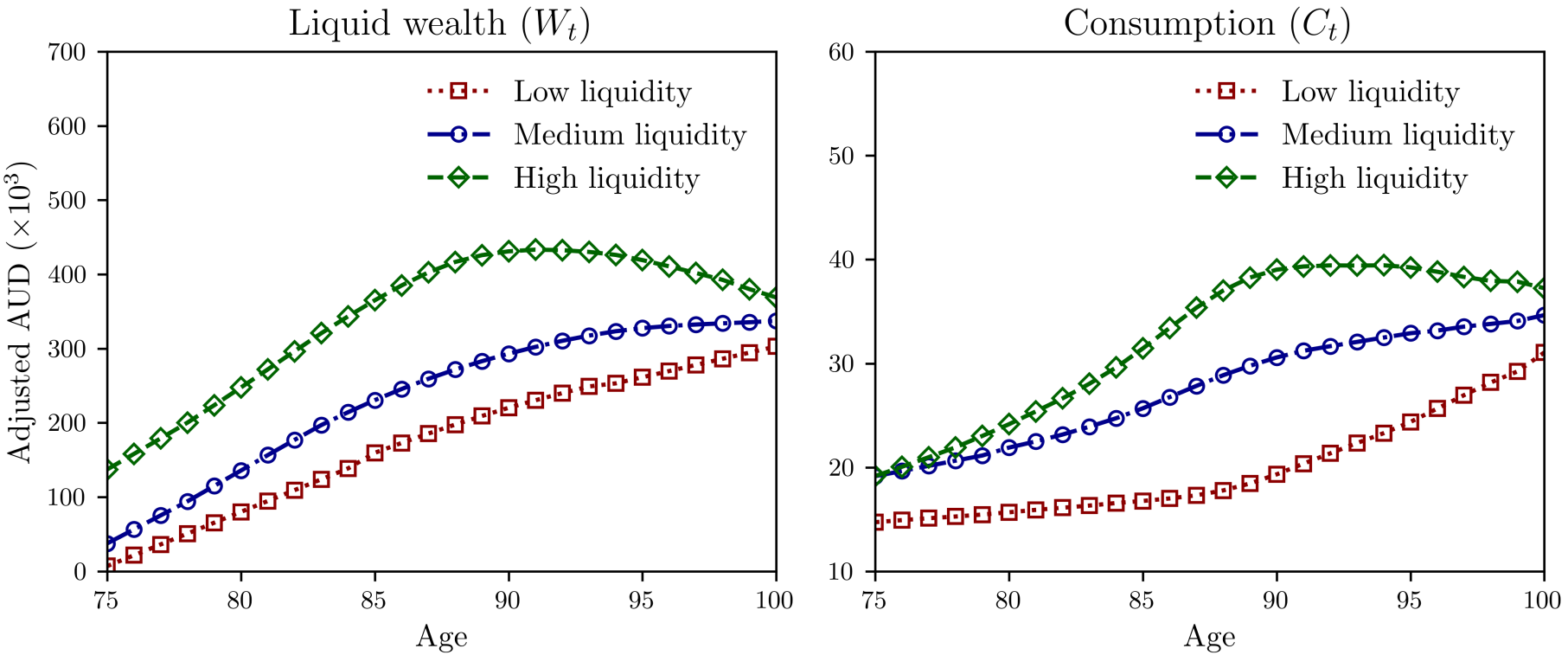
- **Healthy/Mildly disabled:** Liquid wealth follows a "hump shape", rising initially due to precautionary savings for future health costs, then declining with age (De Nardi et al., 2025).
- **Severely disabled:** An early health decline forces higher savings to cover future costs, highlighting the risk of premature home equity loss (Cocco and Lopes, 2020).



Restriction of HEAS payment limits total benefits

Same total assets but *different initial liquid wealth*:

- **High-liquidity retirees** maintain larger wealth buffers from precautionary savings.
- **Low-liquidity retirees** (often full pensioners) cannot meet their savings needs because HEAS payments are capped at 50% of the maximum pension rate (Nakajima and Telyukova, 2017).

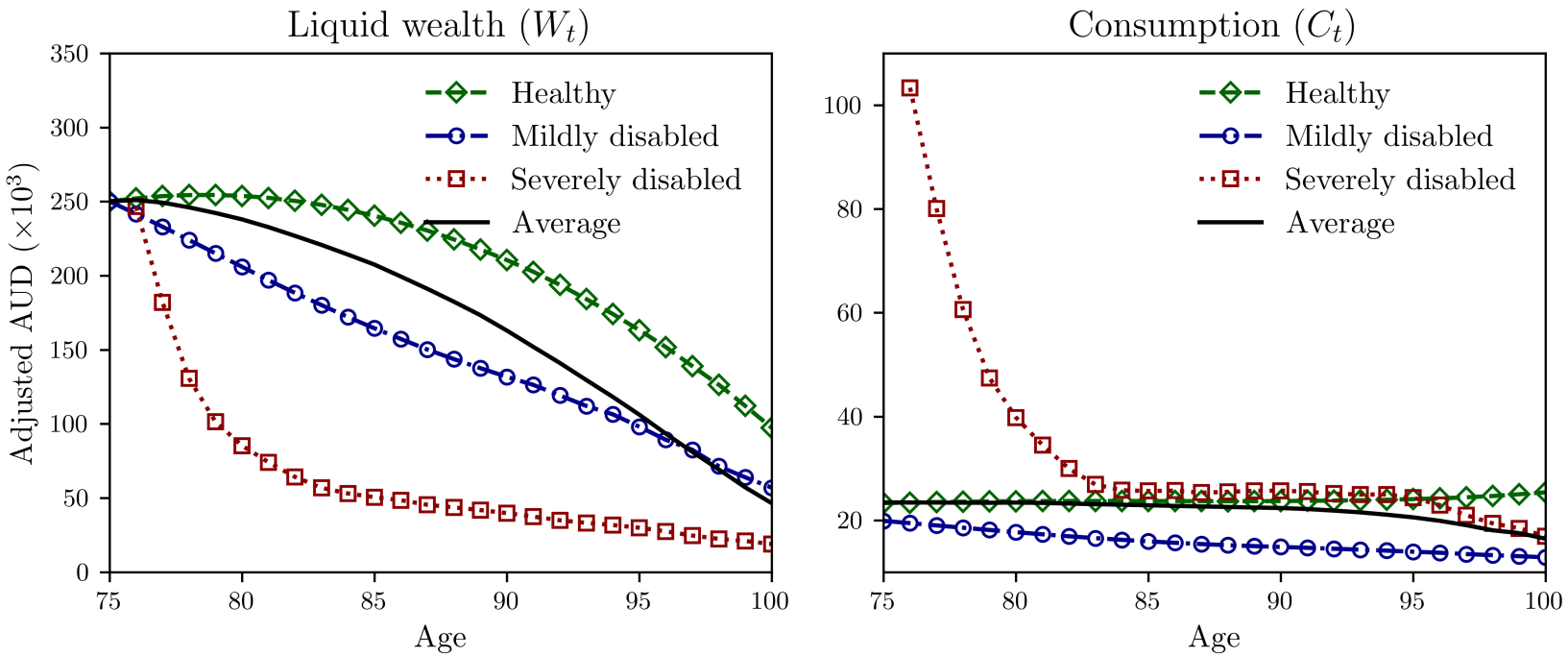


Sensitivity analysis: impact of risk profiles on HEAS users

- Bequest motive (b):
  - Retirees with weaker bequest motives consume more and save less, prioritising current spending over leaving an inheritance (Lockwood, 2018).
- Risk aversion (γ):
  - More risk-averse individuals consume less and accumulate significantly more precautionary savings.
  - HEAS withdrawals may fail to meet the precautionary savings needs of highly risk-averse users.
- EIS ($1/\rho$):
  - Individuals with a lower EIS (who prioritise short-term satisfaction) consume more and save less early in retirement.
  - This depletes their liquid wealth, constraining their financial capacity to increase consumption later in life.

Downsizing in an HEAS-equivalent framework

- Our baseline model assumes no housing utility, making the optimal downsizing strategy one that retains only 14.75% of home equity.
- The HEAS-equivalent comparison requires retaining a larger share of home equity (76.75%) to match the benchmark utility.
- This constrained liquidity creates more concave wealth paths, highlighting that home equity is central to retirement savings dynamics (Suari-Andreu et al., 2019).



HEAS vs downsizing: National level

Define attractiveness via

$$\alpha_S = \frac{U\left(S^{\text{new}@j}\right)}{U\left(S^{@j}\right)}, \quad V^{\text{Downsizing}}\left(S^{\text{new}@j}\right) = V^{\text{HEAS}}.$$

U is analogous to the utility from consumption; Lower $\alpha_S \Rightarrow$ HEAS more attractive.

Table: Attractiveness of HEAS-equivalent downsizing strategies α_S.

Liquidity	**Bequest motive** (b)			**EIS** $(1/\rho)$			**Risk aversion** (γ)		
	0.5	2	10	0.2	0.5	0.8	2	5	7
Low	0.741	0.778	0.818	0.786	0.778	0.769	0.774	0.778	0.786
Medium	0.754	0.792	0.831	0.794	0.792	0.788	0.789	0.792	0.795
High	0.769	0.809	0.837	0.811	0.809	0.799	0.816	0.809	0.802

- Stronger bequest, higher EIS, and lower liquidity $\Rightarrow$ lower α_S.

HEAS vs downsizing: National level

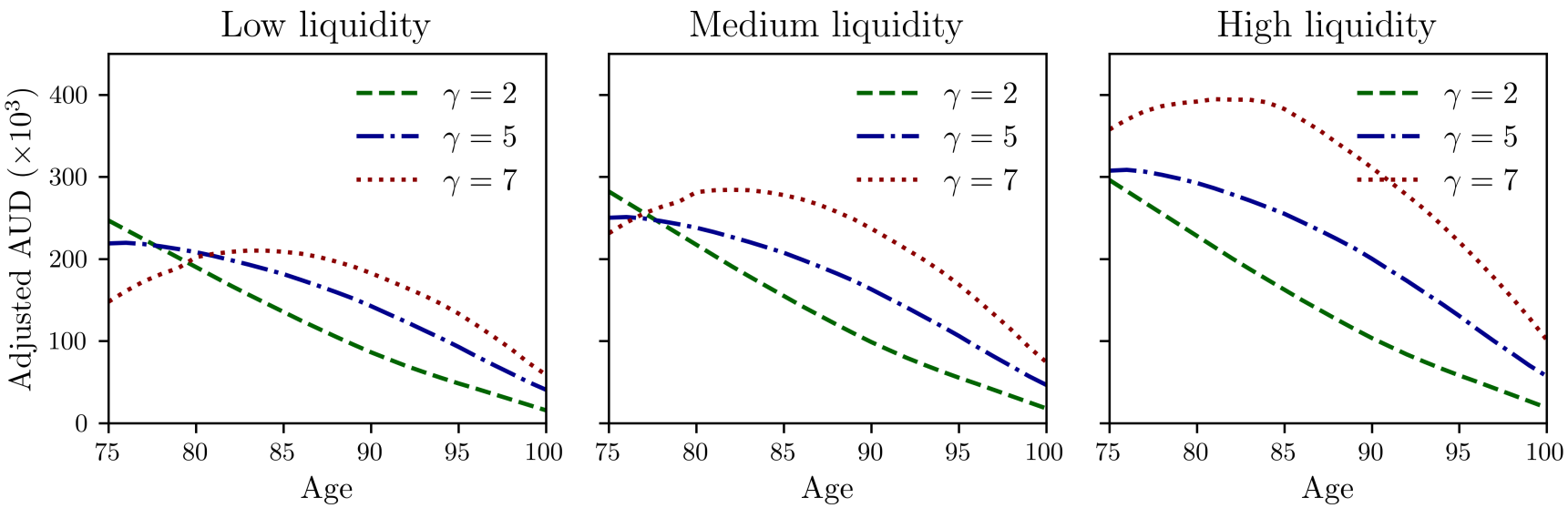


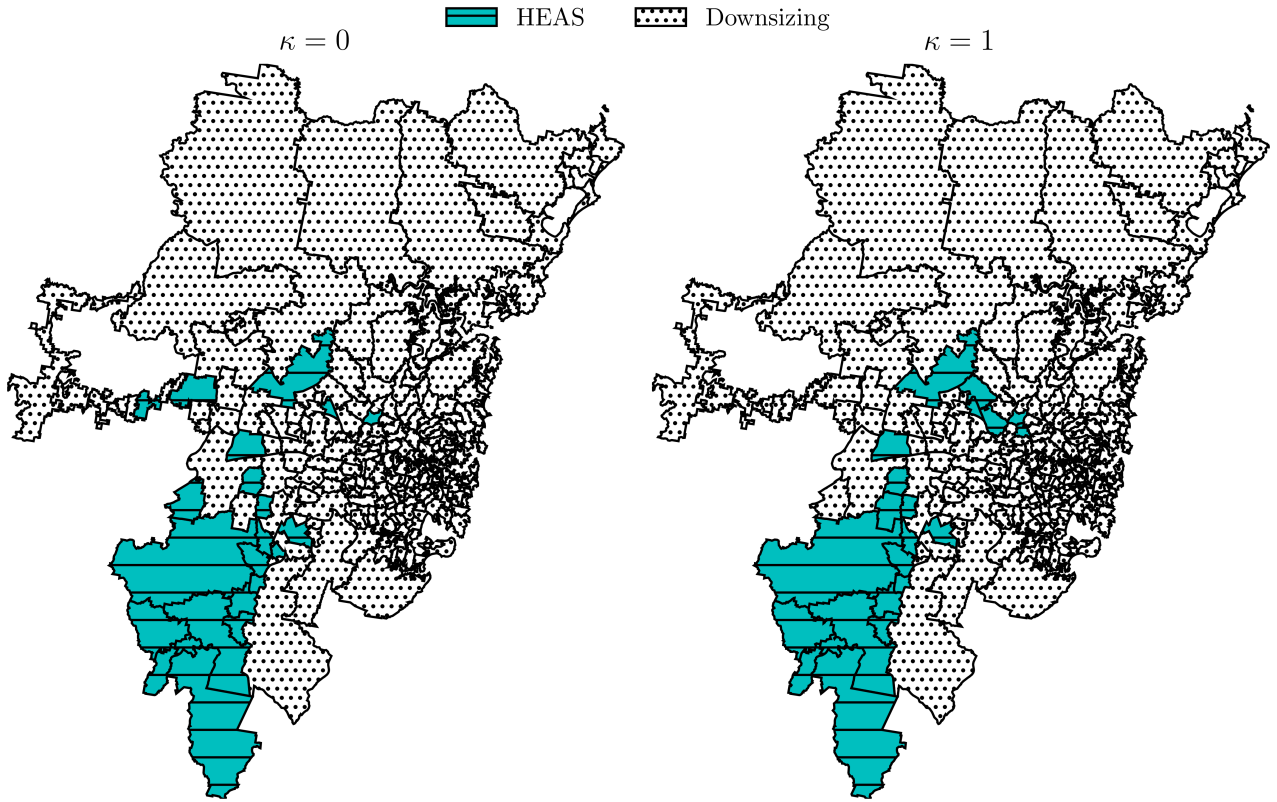
Figure: Impact of liquidity on liquid wealth trajectories for retirees who choose to downsize with different risk aversion: HEAS-equivalent case.

- Lower initial liquid wealth implies higher retained home equity, indicating that HEAS is less favoured and downsizing is more favoured.
- With low liquidity, higher risk aversion favours downsizing (buffers matter); as liquidity rises, risk-averse users tilt back toward HEAS.

HEAS vs downsizing: Postcode level (Greater Sydney Area)

Allow relocation: choose destination to maximise retained home-equity utility subject to HEAS-equivalent lifetime utility.

- κ=0: HEAS-preferred suburbs feature larger equity, lower current prices, and higher expected price growth (Davidoff, 2015).
- κ=1: higher life-expectancy areas rise in preference; top choices remain robust, indicating home-equity effects dominate.



Key takeaways

- HEAS benefits "asset-rich, cash-poor" retirees but the withdrawal cap tied to the pension binds for full pensioners.
- Early equity liquidation at severe disability raises precautionary saving and erodes gains.
- Preferences matter: lower bequest motive and higher EIS increase HEAS appeal; high risk aversion reduces it unless initial liquidity is higher.
- HEAS-equivalent downsizing produces more concave wealth paths, highlighting the role of housing.
- Spatial heterogeneity is material: HEAS is preferred where equity is larger, current prices are lower, expected price growth is higher, and life expectancy is longer.
- Policy implication: calibrate caps and pricing to local conditions; relax limits where HEAS is less preferred.

Contributions

- Recursive Epstein–Zin with Australia's means-tested age pension and HEAS; contrasts with time-separable setups in the reverse-mortgage literature (Cocco and Lopes, 2020; Nakajima and Telyukova, 2020; Xu et al., 2023).
- Utility-equivalent metric α_S to compare HEAS and downsizing, applied at postcode level; results are consistent with housing-cycle effects (Davidoff, 2015).
- HEAS withdrawal caps limit benefits for pension-reliant, low-liquidity retirees; aligns with non-declining late-life wealth and precautionary saving patterns (Poterba et al., 2011; Ameriks et al., 2020; Nakajima and Telyukova, 2017).
- Risk-profile channels (bequest, risk aversion, intertemporal substitutability) match established mechanisms (Lockwood, 2018; Yogo, 2016; Shao et al., 2019).
- Home equity's role helps explain the retirement-savings puzzle in our comparisons (Suari-Andreu et al., 2019).

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