Utilizing Superannuation Funds for First Home Purchase

Himasha Warnakulasooriya[1]

Joint work with:
Dr. Hamza Hanbali[2], Assoc. Professor Gaurav Khemka[3], Professor Brett Inder [1]

[1] Department of Econometrics and Business Statistics, Monash University
[2] Department of Economics, Center for Actuarial Studies, The University of Melbourne
[3] Research School of Finance, Actuarial Studies and Statistics, Australian National University

The 32nd Colloquium on Pensions and Retirement Research
UNSW Sydney, November 2024

Outline

- Background
- Problem Formulation
- Results
- Highlights

Housing and Retirement Security

- **Financial Stability:** Home ownership lowers housing costs in retirement, freeing up income.
- **Wealth Building:** A home is a valuable asset, usable for future expenses, *Elsinga et al. (2012)*,*Holzmann (2005)*.
- **Psychological Security:** Owning a home supports stability and well-being in later life.

Overview of the Super Home Buyer Scheme in Australia(Coalition Proposal Scheme)

- **Purpose**: Allows first-home buyers to access up to 40% or $50,000 (whichever is less) of superannuation for property purchase.

- **Eligibility Requirements**:
  - Owner-occupier for a minimum of 12 months.
  - Deposit of at least 5% of the purchase price (excluding super).
  - Withdrawn funds plus any capital gains/losses must be returned to super upon property sale.

- **Eligibility Flexibility**:
  - No income or property price limits.
  - Individual assessment for couples; first-home buyer status needed for one partner only.

Global Examples: Superannuation for Housing

- **Canada:** Home Buyers' Plan (HBP).
- **New Zealand:** KiwiSaver First-Home Withdrawal (KiwiSaver).
- **Singapore:** Central Provident Fund (CPF).
- **Switzerland:** Pension Fund Withdrawals.

Research Objectives

- To evaluate the policy's value proposition for first-time home buyers.
- To assess the impact on buyers' satisfaction.
- To analyze the policy's impact on the government budget.

Life-Cycle Models

- **Option 1:** Purchase a Property with Personal Savings + Home Loan.
- **Option 2:** Purchase a Property with Personal Savings + Super Savings + Home Loan.
  - **Case a:** Prioritizing Super Savings (Super Home Buyer Scheme).
  - **Case b:** Prioritizing Personal Savings.

Life-Cycle Models

- **Option 1:** Purchase a Property with Personal Savings + Home Loan.
- **Option 2:** Purchase a Property with Personal Savings + Super Savings + Home Loan.
  - **Case a:** Prioritizing Super Savings (Super Home Buyer Scheme).
  - **Case b:** Prioritizing Personal Savings.

- Let $i \in \{1, 2\}$ represent the option chosen by the individual or couple.
- Let $d \in \{S, C\}$ denote the household status, where S represents a single individual and C represents a couple.
- Let time $t = 0, 1, 2, \ldots$.

Income Profile in a Life-Cycle Model

Pre-Retirement Income:

- Net Salary ($S_N^d(t)$):

$$S_N^d(t) = S_G^d(t) - Income_{tax}(S_G^d(t))$$

- Superannuation Contribution ($\gamma^d(t)$)

Post-Retirement Income:

- Super Pension Benefits $B^{(i),d}(t)$ and Age Pension $AP^{(i),d}(t)$

Disposable Income ($I_N^{(i),d}(t)$):

-

$$I_N^{(i),d}(t) = \begin{cases} S_N^d(t), & \text{if } t < T_R - 1, \\ B^{(i),d}(t) + AP^{(i),d}(t), & \text{if } t \geq T_R. \end{cases}$$

Income Profile in a Life-Cycle Model

Pre-Retirement Income:

- Net Salary ($S_N^d(t)$):

$$S_N^d(t) = S_G^d(t) - Income_{tax}(S_G^d(t))$$

- Superannuation Contribution ($\gamma^d(t)$)

Post-Retirement Income:

- Super Pension Benefits $B^{(i),d}(t)$ and Age Pension $AP^{(i),d}(t)$

Disposable Income ($I_N^{(i),d}(t)$):

-

$$I_N^{(i),d}(t) = \begin{cases} S_N^d(t), & \text{if } t < T_R - 1, \\ B^{(i),d}(t) + AP^{(i),d}(t), & \text{if } t \geq T_R. \end{cases}$$

Taxes on Income and Savings:

- Savings Tax: Applied to interest earned on accumulated savings.
- Superannuation Tax: Includes taxes on investment earnings and super guarantee contributions.

Housing and Non-Housing Consumption Profile in Life-Cycle Models

- **Non-Housing Consumption:**

$$C^{(i),d}(t) = \eta_x \times I_N^{(i),d}(t)$$

  - Expenditures on food, clothing, recreation, etc.
  - Proportional to disposable income $I_N^{(i),d}(t)$ with age-dependent factor η_x.

Housing and Non-Housing Consumption Profile in Life-Cycle Models

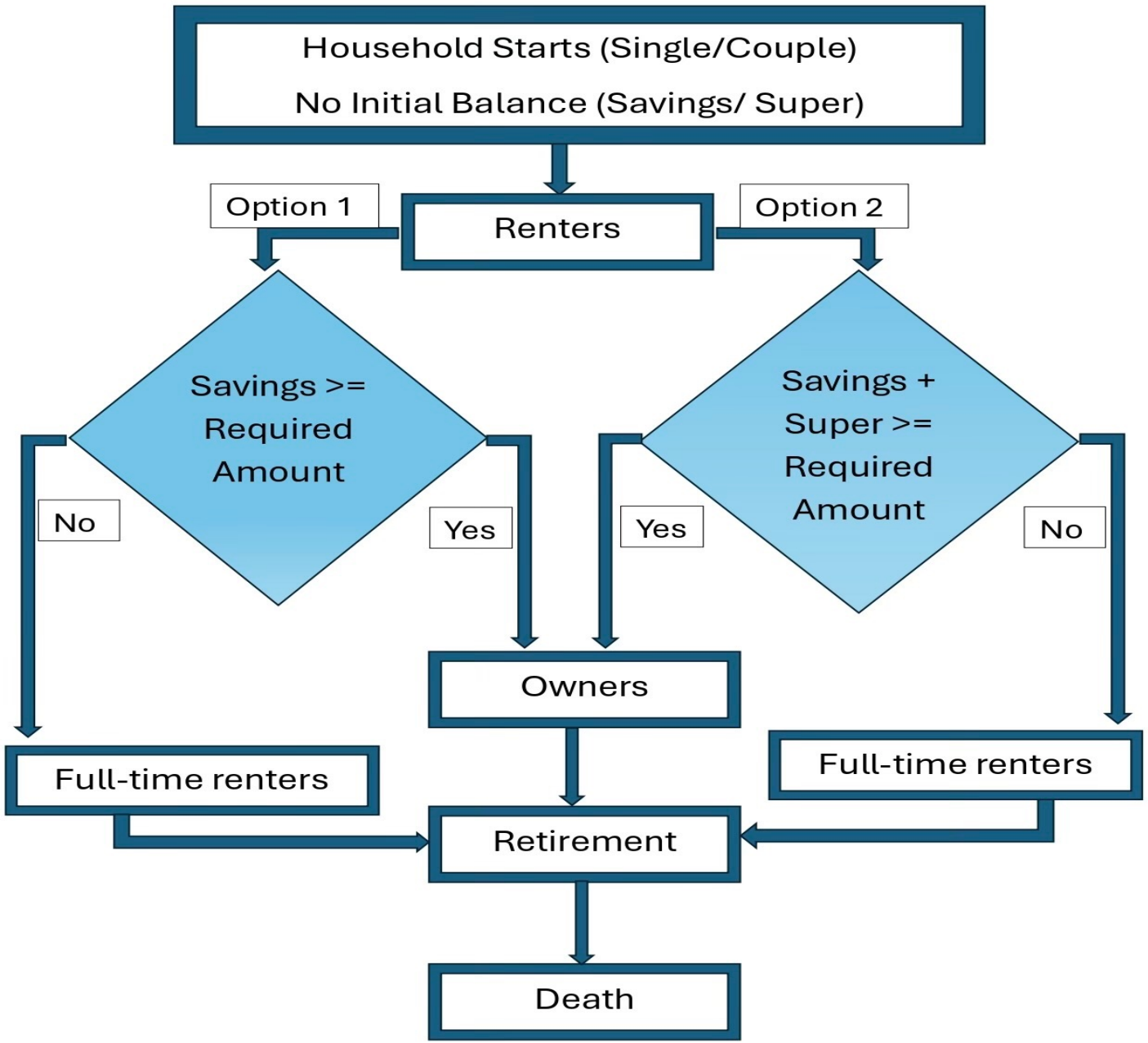
- **Non-Housing Consumption:**

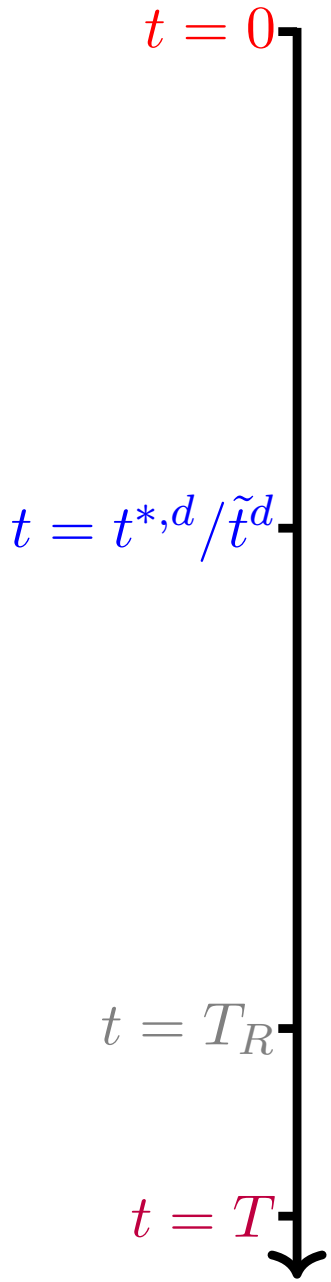
$$C^{(i),d}(t) = \eta_x \times I_N^{(i),d}(t)$$

  - Expenditures on food, clothing, recreation, etc.
  - Proportional to disposable income $I_N^{(i),d}(t)$ with age-dependent factor η_x.

- **Housing Consumption $H_A^{(i),d}(t)$:**
  - **Rent:** $R^d(t)$ (non-homeowners).
  - **Ownership:**
    - ★ Stamp Duty: $SD_{P^d(t)}$ based on Victorian duty rules.
    - ★ Down payment + Additional buffer: $(\delta + \epsilon)P^d(t)$.
    - ★ Mortgage Payments: $m^d(t)$.
    - ★ Maintenance cost $M^d(t)$.

Flowchart Representation: Life-Cycle Model Analysis





Impact on Buyers' Satisfaction

- **Expected Utility: Non-Housing and Housing Cost to the Consumption**

$$\mathbb{E}_0\left[\mathcal{U}_{CH}^{(i),d}(C_t, H_t)\right] = \sum_{t=0}^{T} v^t \, {}_tp_{25}^d \left(\frac{[\omega C^{(i),d}(t) + (1-\omega)H^{(i),d}(t)]^{1-\rho}}{1-\rho}\right).$$

- **Expected Utility: Bequest**

$$\mathbb{E}_0\left[\mathcal{U}_{B}^{(i),d}(B_t)\right] = \sum_{t=0}^{T} v^t \, {}_{t-1|}q_{25}^d \left(\frac{[Bh^{(i),d}(t) + Bs^{(i),d}(t)]^{1-\rho}}{1-\rho}\left(\frac{\phi}{1-\phi}\right)^{\rho}\right).$$

Impact on Buyers' Satisfaction

- **Expected Utility: Non-Housing and Housing Cost to the Consumption**

$$\mathbb{E}_0\left[\mathcal{U}_{CH}^{(i),d}(C_t, H_t)\right] = \sum_{t=0}^{T} v^t \, {}_tp_{25}^d \left(\frac{[\omega C^{(i),d}(t) + (1-\omega)H^{(i),d}(t)]^{1-\rho}}{1-\rho}\right).$$

- **Expected Utility: Bequest**

$$\mathbb{E}_0\left[\mathcal{U}_{B}^{(i),d}(B_t)\right] = \sum_{t=0}^{T} v^t \, {}_{t-1|}q_{25}^d \left(\frac{[Bh^{(i),d}(t) + Bs^{(i),d}(t)]^{1-\rho}}{1-\rho}\left(\frac{\phi}{1-\phi}\right)^{\rho}\right).$$

- **Certainty Equivalent (CE):**

$$CE^{(i),d} = \left[(1-\rho)\mathbb{E}_0\left[\mathcal{U}^{(i),d}(X_t)\right]\right]^{\frac{1}{1-\rho}},$$

where X_t represents either **non-housing and housing consumption** (C_t, H_t) or **bequest** (B_t).

Impact on Government Budget

- **Federal Government Net PV Calculation:**

$$E[\text{NetPV}_0^{\text{Fed},(i),d}] = \sum_{t=0}^{T} v^t {}_tp_{25}^d \big(\text{Income}_{tax}^d(t) + \text{Savings}_{tax}^{(i),d}(t) + \text{Super}_{tax}^{(i),d}(t) - AP^{(i),d}(t) \big).$$

Impact on Government Budget

- **Federal Government Net PV Calculation:**

$$E[\text{NetPV}_0^{\text{Fed},(i),d}] = \sum_{t=0}^{T} v^t {}_tp_{25}^d \Big(\text{Income}_{tax}^d(t) + \text{Savings}_{tax}^{(i),d}(t) + \text{Super}_{tax}^{(i),d}(t) - AP^{(i),d}(t) \Big).$$

- **State Government Net PV Calculation (Victoria):**

$$E[\text{NetPV}_0^{\text{State},(i),d}] = \sum_{t=0}^{T} v^t {}_tp_{25}^d \left(SD_{P^d(t)} + PT_{tax}^d \right).$$

Results

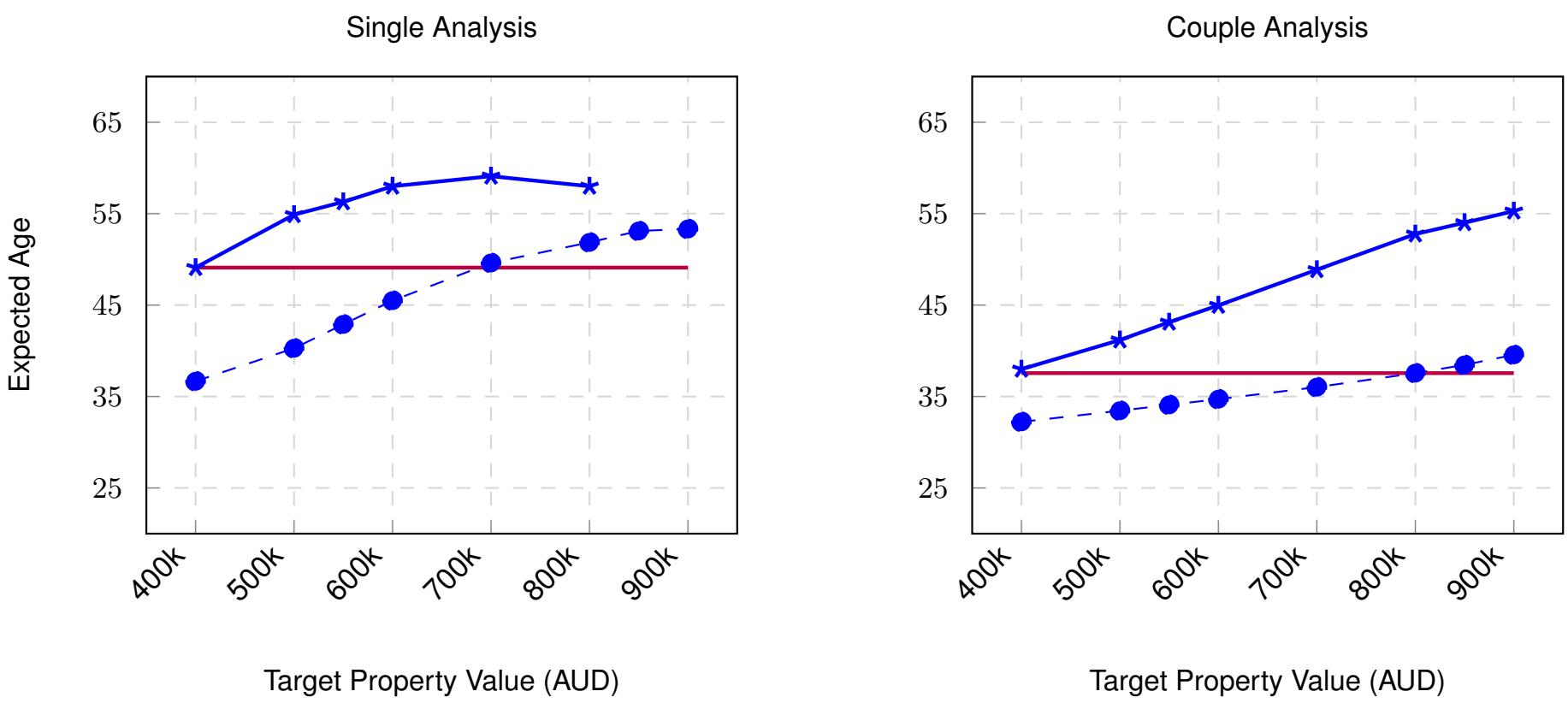
- The main results are aligned with the primary objectives of the study.
- First, we report the expected minimum age for purchasing a house, with and without policy, for both single and couple analyses under option 1 and 2.
- Second, we report the results obtained for the certainty equivalent (CE) comparison of buyers' consumption, bequests, and total between option 1 and 2.
- Finally, we report the results obtained for the policy's impact on the government budget.

Go to Simulation Procsses

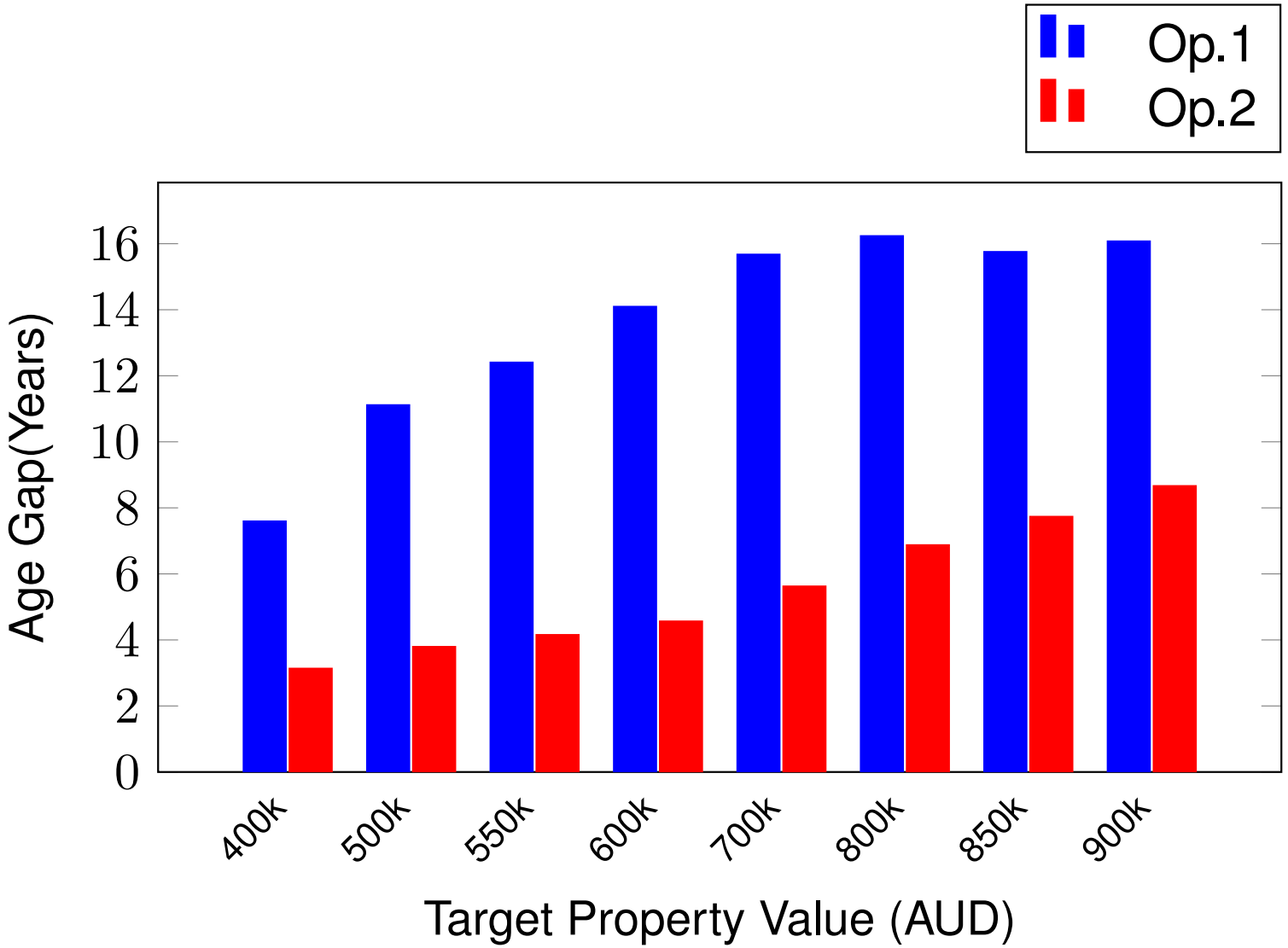
Expected Minimum Age for Purchasing a House

New Ownership Access

Better Property Purchases

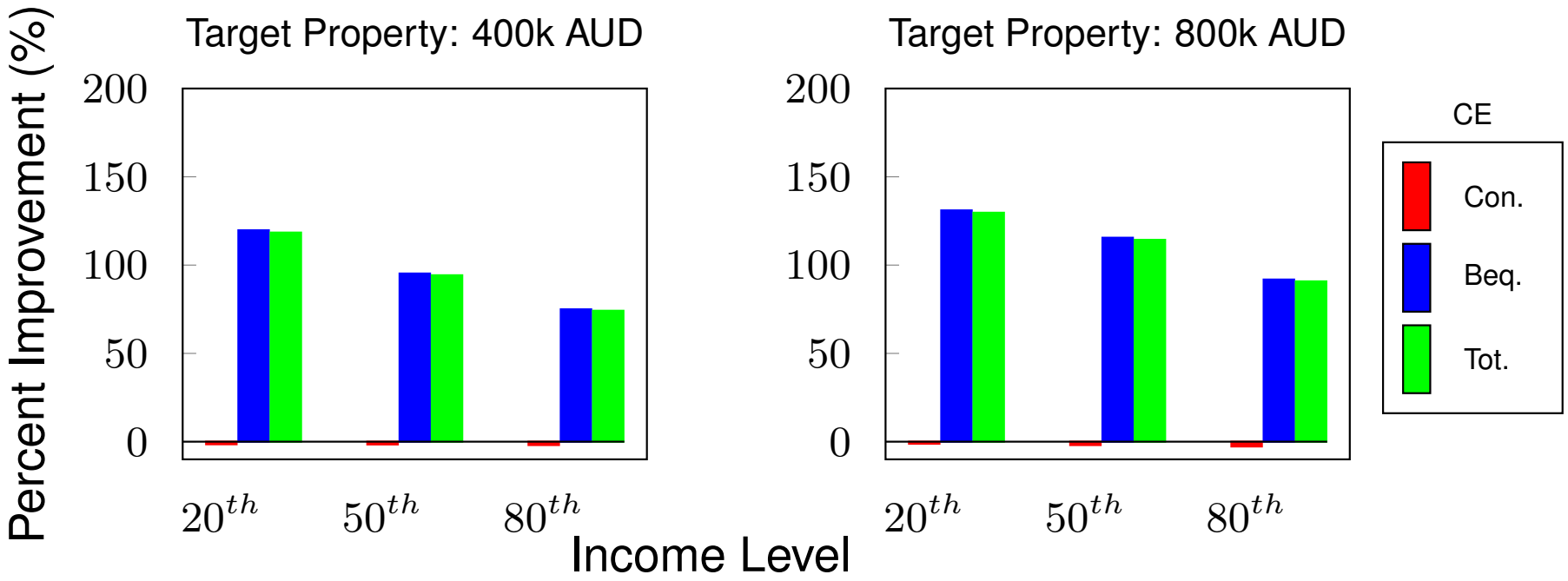


Income Inequality Reduction



- Age Gap(Years) $= E[x]^{20th} - E[x]^{80th}$

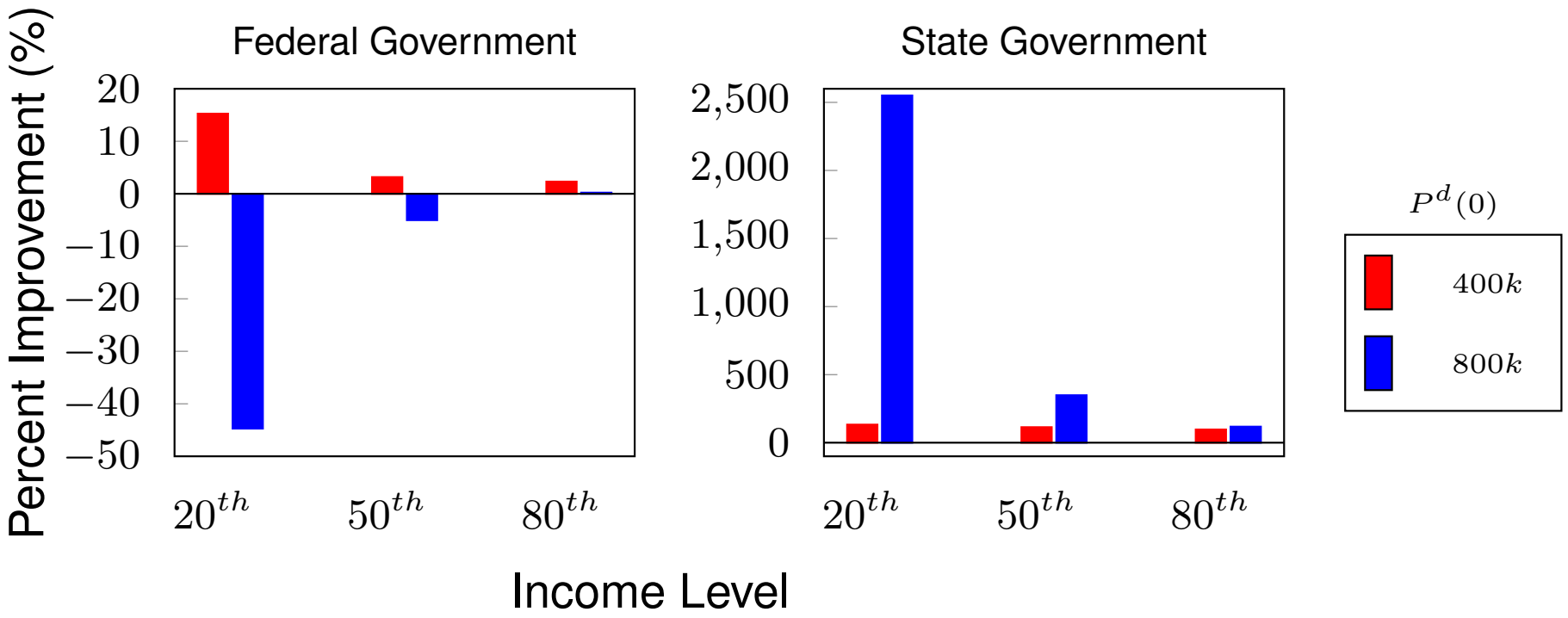
Impact of the Policy on Buyers - CE Comparison



$$\text{Percentage} = \left(\frac{\text{CE}^{(2),d} - \text{CE}^{(1),d}}{\left|\text{CE}^{(1),d}\right|} \right) \times 100\%.$$

Details

Impact of the Policy on Government - Net PV Comparison



$$\text{Percentage} = \left(\frac{\mathbb{E}[\text{Net PV}_0^{(2),C}] - \mathbb{E}[\text{Net PV}_0^{(1),C}]}{\left|\mathbb{E}[\text{Net PV}_0^{(1),C}]\right|} \right) \times 100\%$$

Details

Highlights: Policy Impact

Pros

- **New Ownership Access:** Enables lower-income earners to become homeowners.
- **Early Home Purchase:** Facilitates sooner or better property purchases.
- **Income Inequality Reduction:** Helps bridge the housing gap.
- **Improved Buyer's Satisfaction:** Enhances satisfaction in terms of bequests and consumption costs.
- **State Benefits:** Boosts property tax revenue.

Cons

- **Increased Federal Costs:** Higher age pension costs due to lower superannuation balances.

Future Works

- Policy's Impact on Australian house prices.

References

Andréasson, J. G., Shevchenko, P. V., and Novikov, A. (2017). Optimal consumption, investment and housing with means-tested public pension in retirement. *Insurance: Mathematics and Economics*, 75:32–47.

Elsinga, M., Quilgars, D., and Doling, J. (2012). Where housing and pensions meet.

Holzmann, R. (2005). *Old-age income support in the 21st century: An international perspective on pension systems and reform*. World Bank Publications.

Khemka, G., Tang, Y., and Warren, G. J. (2024). Cascade model for australian housing. *Australian Economic Papers*.

Thank You

Questions?

Two Cases for Superannuation Fund Usage (Option 2)

- **Case a: Prioritize Super Withdrawal** Go Back
  - Prioritize maximum superannuation fund withdrawal.
  - Remaining amount covered by savings account.
  - Proportions:

$$d_F = \min\left(\beta, \frac{\bar{F}^d}{F_-^{(2),d}(\tilde{t}^d)}, \frac{\delta P^d(\tilde{t}^d)}{F_-^{(2),d}(\tilde{t}^d)}\right),$$

$$d_S = \max\left(\frac{\alpha P^d(\tilde{t}^d)}{A^{(2),d}}, \min\left(\frac{(\delta+\epsilon)P^d(\tilde{t}^d) + SD_{P^d(\tilde{t}^d)} - d_F F_-^{(2),d}(\tilde{t}^d)}{A_-^{(2),d}(\tilde{t}^d)}, 1\right)\right).$$

- **Case b: Prioritize Savings Withdrawal**
  - Prioritize maximum savings account withdrawal.
  - Remaining amount covered by superannuation fund.
  - Proportions:

$$d_F = \min\left(\frac{(\delta+\epsilon)P^d(\tilde{t}^d) + SD_{P^d(\tilde{t}^d)} - d_S A_-^{(2),d}(\tilde{t}^d)}{F_-^{(2),d}(\tilde{t}^d)}, \beta, \frac{\bar{F}^d}{F_-^{(2),d}(\tilde{t}^d)}, \frac{\delta P^d(\tilde{t}^d)}{F_-^{(2),d}(\tilde{t}^d)}\right)$$

$$d_S = \max\left(\frac{\alpha P^d(\tilde{t}^d)}{A_-^{(2),d}(\tilde{t}^d)}, 1\right).$$

Parameters in Utility Calculation

Go Back

- ρ - Risk aversion coefficient.
- ω - Preference parameter between housing and non-housing consumption.
- ϕ - Strength of the bequest motive.
- v^t - Time preference parameter (discount rate).
- $C^{(i),d}(t)$ - Total consumption excluding housing at time t.
- $H^{(i),d}(t)$ - Housing service flow/expenditure at time t: Rent paid before purchase and imputed rent after.
- $Bh^{(i),d}(t)$ - House value at time t.
- $Bs^{(i),d}(t)$ - Savings and superannuation balance at time t.
- ${}_tp_x^d$ - Survival probabilities.

Simulation Process

Go Back

- **Timeframe**: Simulates financial dynamics for an individual and a couple (as a single entity) from age 25 to 110, starting in calendar year 2024.
- **Key Variables**: Includes stochastic (income, house prices, returns, borrowing rates) and deterministic (tax rates, super contributions, age pensions, super pensions) factors.
- **Data**: Initial values based on 2023 data(from ABS/RBA); future values calculated using real growth rates estimate from the econometric model in Khemka et al. (2024).
- **Survival Probabilities**: Derived from the latest life tables with mortality improvement adjustments. Unisex probabilities for singles (Andréasson et al., 2017):, joint probabilities for couples.
- **Simulations**: Analyzes multiple savings and super account balance paths across 86 time points for 11 income levels, 9 property targets, and both single and couple cases, considering housing Options 1, 2a, and 2b.

The Impact of the Policy on Buyers

Go Back

- The grouped bar chart on the slide (19) presents the results for the CE of cost to the consumption, bequests, and total, comparing Option 1 and Option 2a.
- Each income group contains three sub-bars: the percentage increase or decrease in CE values in Option 2a compared to Option 1.
- The percentage is calculated as : $\left(\frac{\text{CE}^{(2),d} - \text{CE}^{(1),d}}{\left|\text{CE}^{(1),d}\right|} \right) \times 100\%$
- Reference for interpreting values:
  - Negative percentages in CE cost to consumption: Option 2 is preferable.
  - Positive percentages in CE bequest and total: Option 2 is preferable.

The impact of the policy on government budget

Go Back

- The grouped bar chart on slide 20 shows the percentage change in income and costs for federal and state governments under Option 2a compared to Option 1.
- Each panel represents three income groups, with two sub-bars indicating lower and higher target house prices.
- The percentage is calculated as:

$$\left(\frac{\mathbb{E}[\text{Net PV}_0^{(2),C}] - \mathbb{E}[\text{Net PV}_0^{(1),C}]}{\left| \mathbb{E}[\text{Net PV}_0^{(1),C}] \right|} \right) \times 100\%$$

- Reference for interpreting values:
  - Negative percentages - Option 1 is better.
  - Positive percentages - Option 2 is better.