# Adjusted Pension Multiplier

## 28th Colloquium on Pensions and Retirement Research

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# Acknowledgements

Paper is a collaborative effort between

Monica Chen, CSIRO Data 61

Roger Cohen, Betashares

Bonsoo Koo, Monash University

**Aaron Minney, Challenger, Macquarie Business School**

Athanasios Pantelous, Monash University

Peter Toscas, CSIRO Data 61

Zili Zhu, CSIRO Data 61

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# Motivation

Measurement of retirement outcomes

- What does a retiree actually get

Need for a prospective measure

- Choices need to be made at the start of retirement
- Model of future outcomes required

Important trade-off to improve understanding

- Accuracy v simplicity



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# Some accurate options

MDUF[1]:

$$U_0 = \mathbb{E}_0\left[\sum_{t=0}^{T}\beta^t\left\{{}_tp_x\,\frac{c_t^{1-\rho}}{1-\rho} + {}_{t-1|}q_x\,\frac{b_t^{1-\rho}}{1-\rho}\left(\frac{\phi}{1-\phi}\right)^{\rho}\right\}\right]$$

GOFI[2]:

$$GOFI_t = D_t \times \frac{A_t}{B_t}$$

where:

$$D_t = 1 - \frac{\sum_{i=1}^{t}\max(TI_i - income_{i,n}, 0)}{\sum_{i=1}^{t} TI_i}$$

$$A_t = \frac{1}{t} \times \sum_{i=1}^{t}\{1 - \left(\frac{\max(TI_i - income_{i,n}, 0)}{TI_i}\right)^2\}$$

$$B_t = \frac{1}{t} \times \sum_{i=1}^{t}\{1 - \left(\frac{\left[\frac{1}{t} \times \sum_{t=1}^{t}\max(TI_{i,n} - income_{i,n}, 0)\right]}{\left[\frac{1}{t} \times \sum_{i=1}^{t} TI_{i,n}\right]}\right)^2\} = 1 - (1 - D_t)^2$$

1. Bell, D., E. Liu, & A. Shao (2017). *Member's Default Utility Function for Default Fund Design Version 1 ("MDUF v1") Technical Paper No. 3*: Optimal Dynamic Strategies. *Dynamics, 50*, 2.2.
2. Callil, N., H. Danzinger, & T. Sneddon (2018). *Metrics for comparing retirement strategies: a road test.*

# A simple alternative

$$PM_t = \frac{C_t}{A_t^{full}}$$

$PM_t$ is the pension multiplier measure

$C_t$ is the retirement income available for consumption in year t

$A_t^{full}$ is the maximum age pension in year t

Measure retirement income as a proportion of the full age pension.

Easy to do in any year

Can average across retirement

Can model projections but the communication is the same.



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# Simplicity can be used across a simulation

And can include a bequest term

$$PM(B_{67}) = \frac{1}{M}\sum_{i=1}^{M} \frac{\sum_{t=67}^{T=104} \left[C_t^i\left(B_t^i\right) \cdot p_{67,t} + B_t^i \cdot q_{67,t}\right]}{\sum_{t=67}^{T=104} \left[A_t^{i,full} \cdot p_{67,t}\right]}$$

M = number of simulations

$B_{67}$ is the balance at the start of retirement, age 67.

$p_{67,t}$ is the probability of survival from age 67 to t

$q_{67,t}$ is the mortality at age t, measured as a proportion of the population at age 67.

This provides for a full expected value- payments all measured in real terms



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# A simple communication tool

The Pension Multiplier will be a number $\geq 1$

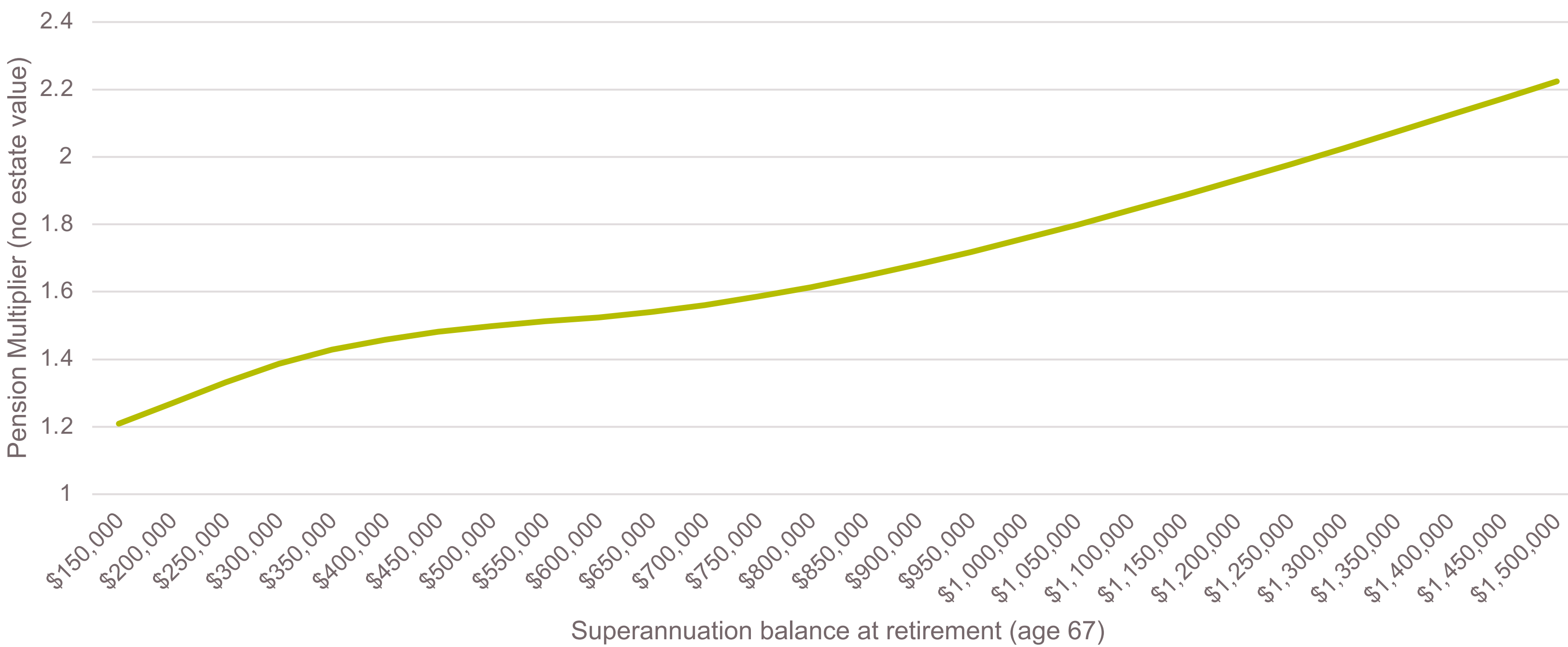
It represents the multiple of the age pension that a retiree would receive

People understand relative comparisons. Will my superannuation make me twice as well off as an age pensioner?

Optimally, the PM would just depend on starting balance, but the retirement income drawdown strategy will matter.

# Pension Multiplier Example

## Assuming only minimum drawdowns taken




Median of Pension Multiplier for each strategy based on balance at the start of retirement (age 67). Single retiree

# Retirement Income drawdown strategies matter

We consider a range of drawdown strategies to consider the difference

min: spending the minimum drawdown only

4%: spending 4% of the initial balance and increasing drawdown with CPI inflation

RoT: the Rule of Thumb strategy of DeRavin et al (2019),

mod: a fixed level of spending based on the ASFA modest benchmark

cft: a fixed level of spending based on the ASFA comfortable benchmark

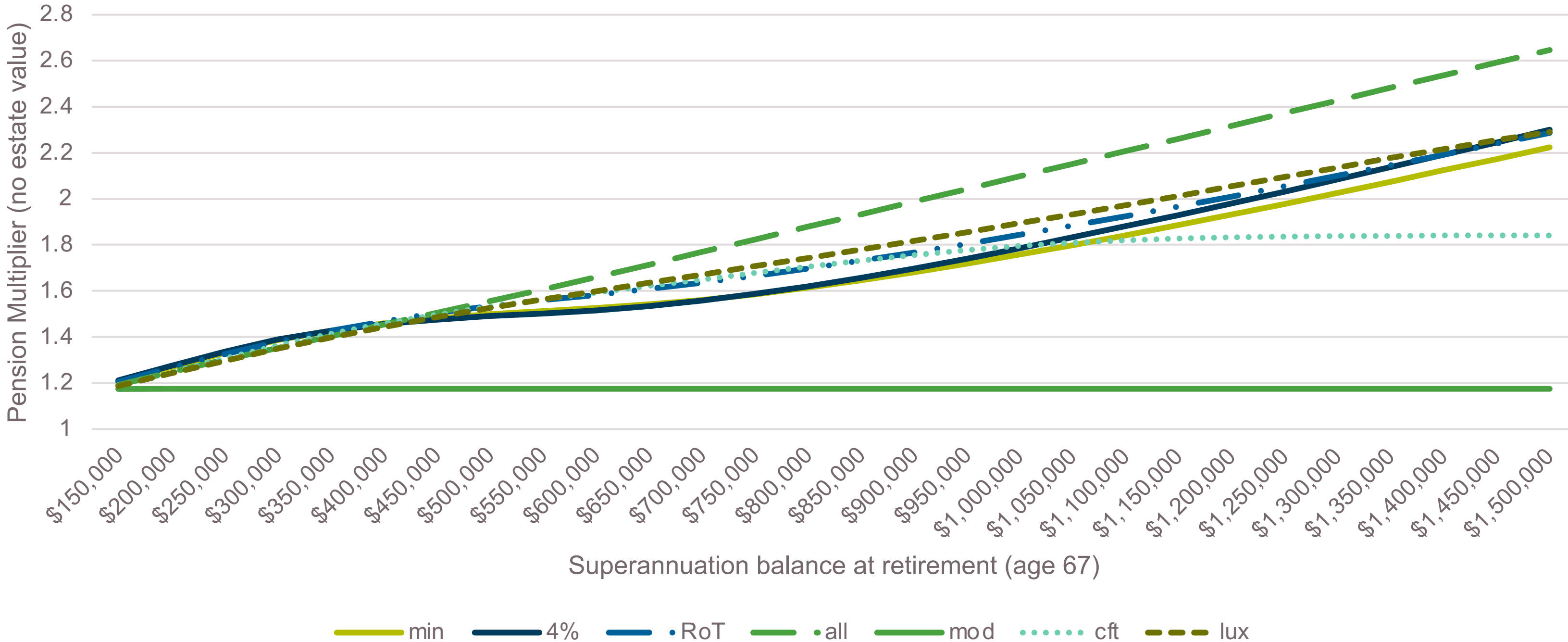
lux: a fixed level of spending based at a ‘luxury’ level of $60,000 a year for a single person.

all: Spend all savings at retirement and receive full age pension for life

De Ravin, J., E. Liu, R. van Rooyen, p. Scully & S.Wu (2019). *Spend your Decennial Age: A Rule of Thumb for Retirement*. Presented to the Actuaries Summit 2019
https://actuaries.asn.au/microsites/actuaries-summit-2019/program-and-presentations/papers

# Pension Multipliers

## Various strategies with different starting balances




Median of Pension Multiplier for each strategy based on balance at the start of retirement (age 67). Single retiree

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# Implications from results

Some variation across drawdown strategies

- Partly accounted for by the difference in estate values

Fixed budgets are not appropriate across all balances

- Most relevant at the sweet spot where the spending level is optimal
- The Retirement Income review made a similar observation

Odd strategies (e.g. spend-it-all) can look good even if not likely to be preferable

- No negative utility from variability or shortfall in income

# Designing a shortfall measure

Capture penalty for variation in income

Calculate an expected shortfall measure (relative to Pension multiplier)

$$ShortFall_t^i = max(0, \frac{PM(B_{67}) - PM_t^i}{PM(B_{67})})$$

Again, this can be calculated for projected simulations:

$$ShortFall(B_{67}) = \frac{\sum_{t=67}^{104} \sum_{i=1}^{M} ShortFall_t^i * p_{67,t}}{(104 - 67) * M}$$

The impact of drawdown strategies is very different



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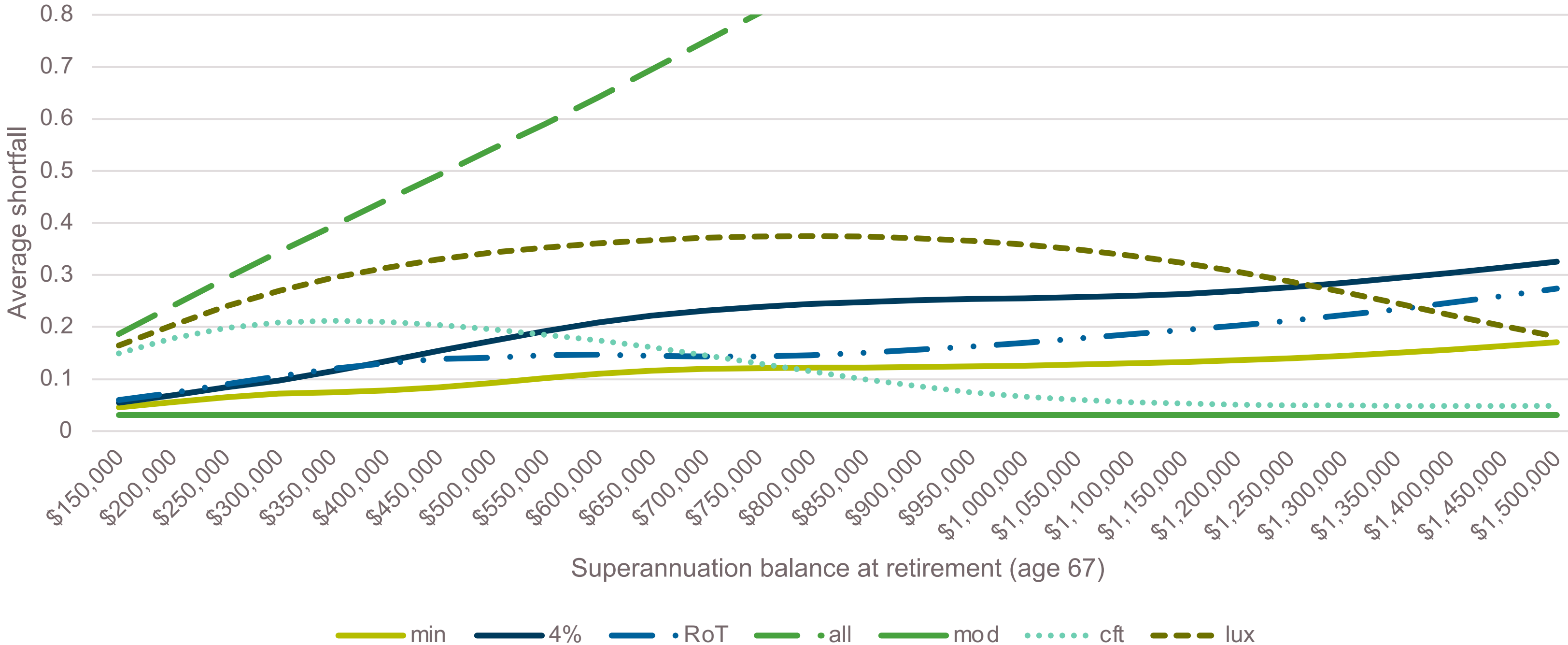
# Average shortfall measure

## Various strategies with different starting balances




Average shortfall median for each strategy based on balance at the start of retirement (age 67. Single retiree

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# The adjusted pension multiplier

Subtract the expected shortfall from the Pension Multiplier

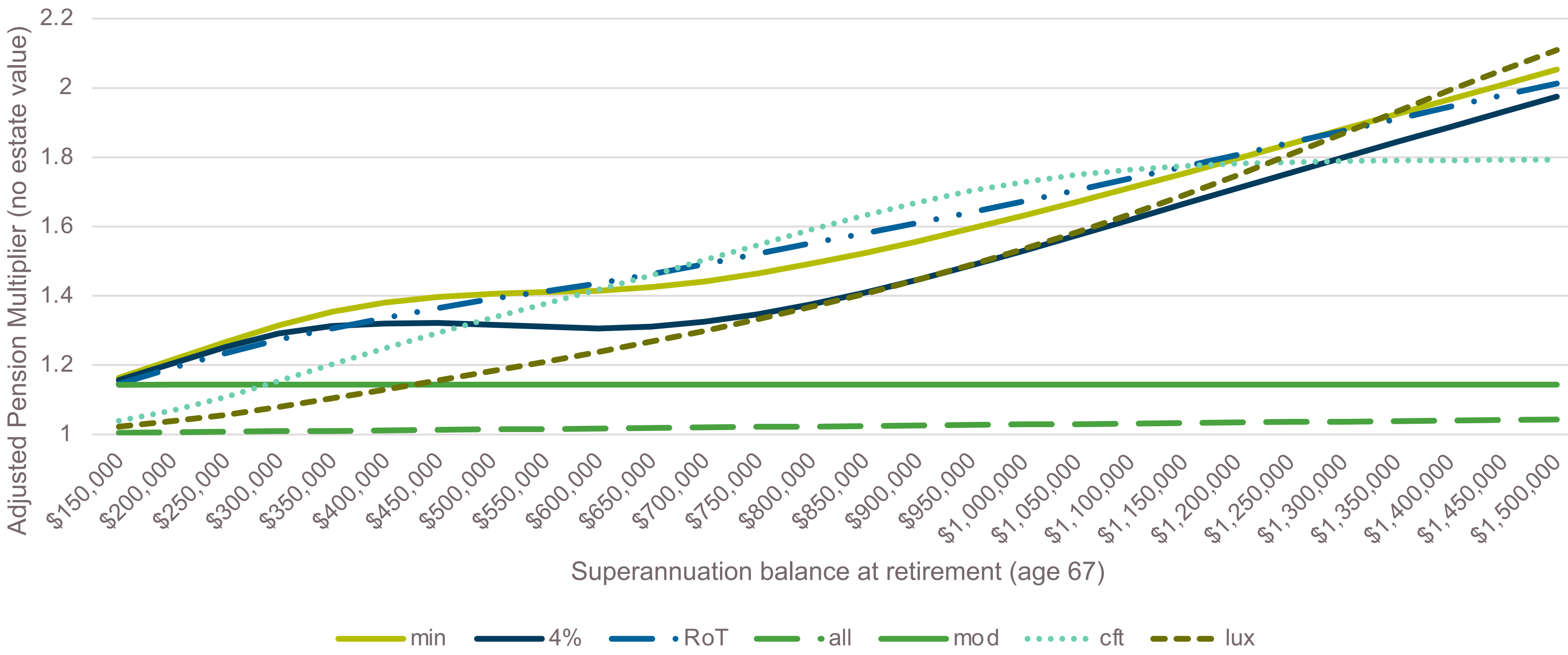
- Effectively places a double weight on downside

Different drawdown strategies work better for different starting balances

- ‘Optimal’ strategy is hard to pin down
- Can find a strategy close to optimal – Rule of Thumb

# Adjusted Pension Multipliers

## Various strategies with different starting balances




Median of Adjsuted Pension Multiplier for each strategy based on balance at the start of retirement (age 67). Single retiree

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# Work-in-Progress

Finding a perfect measure of success is retirement is difficult

- Unlikely to be a single best option

Seek value in a measure that people will understand

Need to incorporate estate value into the modelling

- Exponential growth problem when average return> growth in age pension
- Adjusted Pension Multiplier downgrades inappropriate strategies
- Consider other ways to ensure income pattern is smooth

# Thank you

If you have a question,

I might have an answer.