UNSW-CSIRO Workshop

Risk: Modelling, Optimization, Inference

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Asset Allocation for Self-Funded Retirees

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Retirement risk zone

Sequencing risk & aggressive constant mix

Displaced-V glide path

Why an up-sloping glide-path for retirees?

Bengen

Milevsky

Asset allocation formula

An economics-based plan for a 30-year retirement

Concluding comments

Retirement risk zone

- A fragile period in the financial life cycle of people in DC super.
- Described as running 5 to 10 years either side of the retirement year. Post retirement is especially tricky as your account is being depleted by living expenses.
- Primarily affects people of middle means--a lifelong high weight to growth assets matters less for people at the extremes.

Sequencing risk & “aggressive constant-mix”

- *Sequencing risk:* sensitivity of living standards to the timing of poor investment returns.
- *Aggressive constant-mix*: allocate a high and stable share of the portfolio to growth assets.

❖ Australia: this share tends to be fixed at 70% to 90%--depends on definition of ‘income’ assets.

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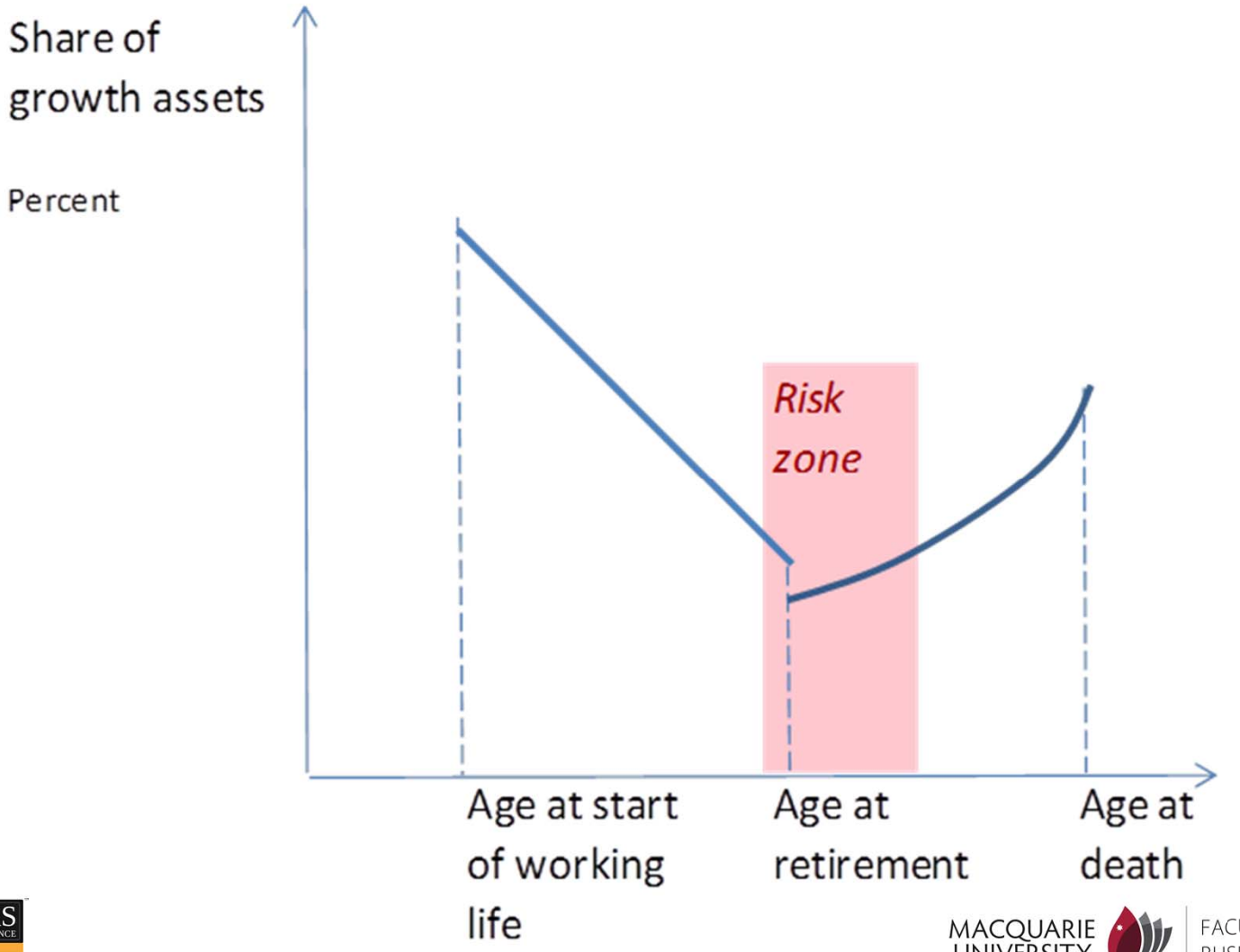
Displaced-V glide path



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Why an up-sloping glide path for retirees?

(Assuming household retains capacity to manage growth assets)

1. Discretionary nature of bequests—evidence that bequests are luxury goods is strong.
2. Presence of essential expenditures in the budget (two candidates: energy; keeping up with the Jones's).
3. Reduced (annualized) volatility of returns to growth assets over long horizons (not modelled here).

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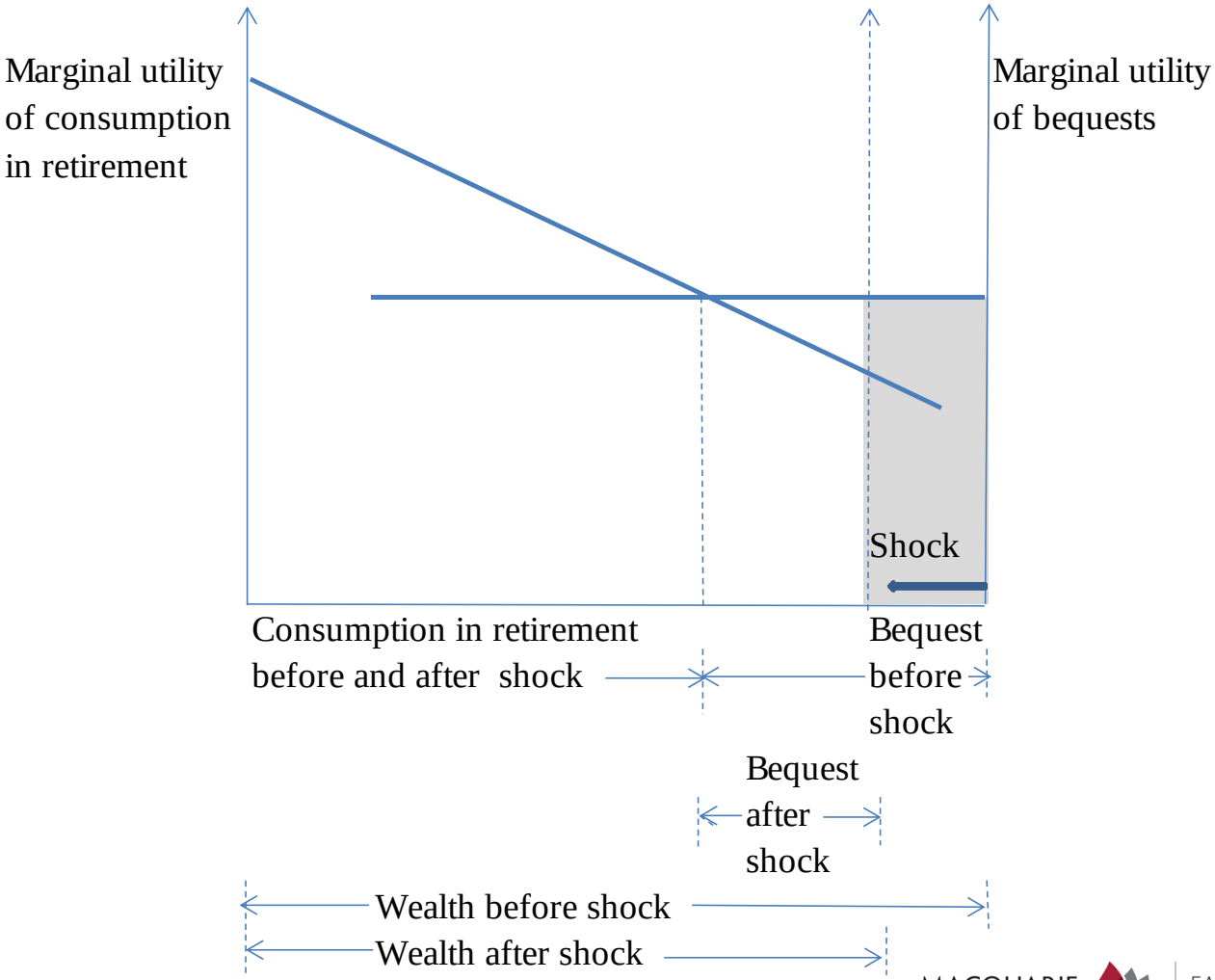
Why an up-sloping glide path for retirees?

Luxury bequests buffer wealth shocks



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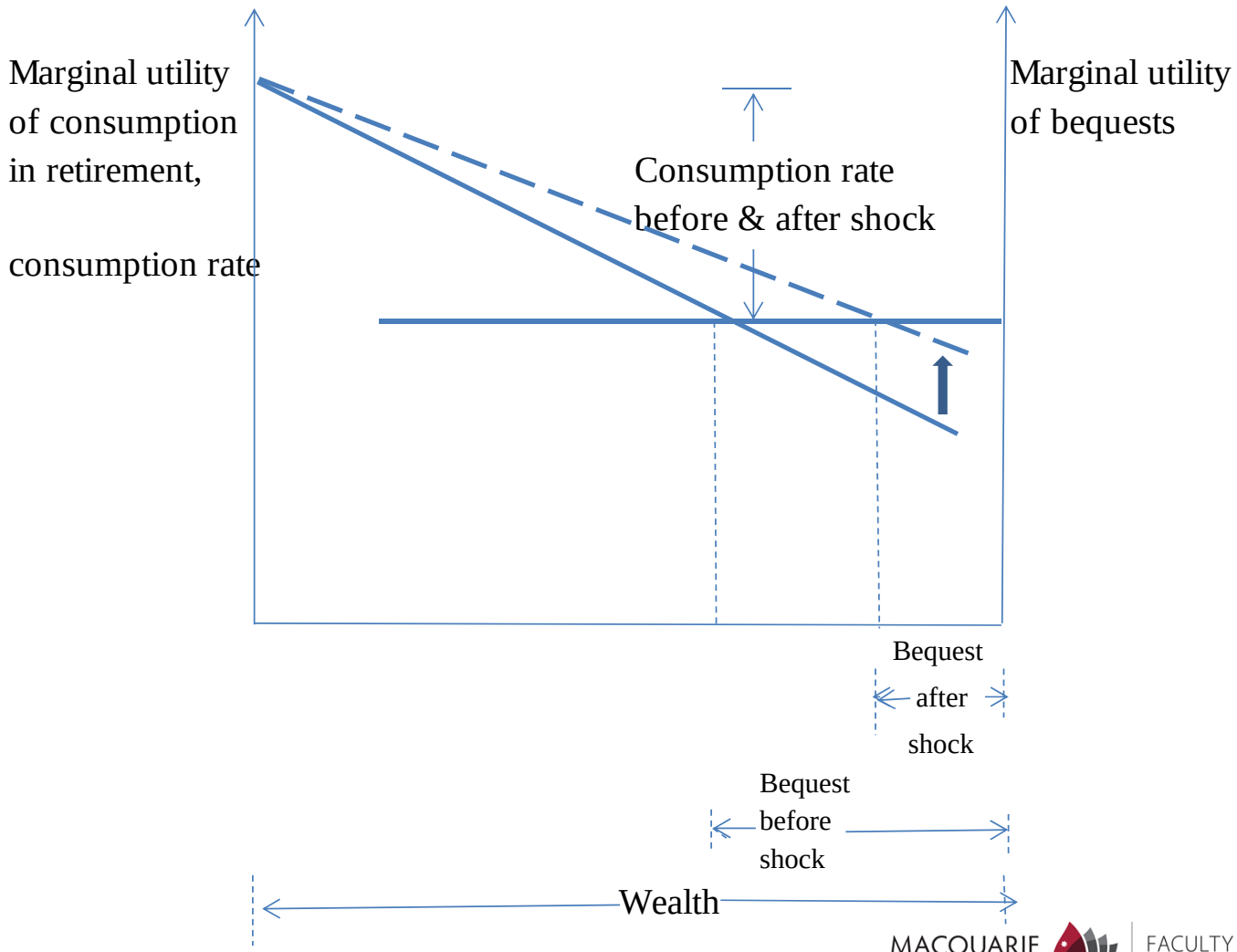
Why an up-sloping glide path for retirees?

Luxury bequests buffer longevity shocks



Bengen

- Generally assumes constant-mix allocations. *4 steps:*

  1. Divide 20th-century data into numerous (possibly overlapping) 30-year spans
  2. Estimate how long a given real spending rate would have lasted over each historical span
  3. Estimate the probability a given spending rate can last 30 years (i.e., perform a ruin analysis).
  4. Recommend spending rates and asset allocations that trade off running out of money against leaving an overly generous estate.

Bengen (ctd)

- Recommended spending rate: 4% of initial capital.
- Recommended allocation to growth assets: 50% - 75% of capital.
- Empirically documented that bear markets are particularly damaging in early retirement.
- Cf. Merton 1969, 1971:
  1. Current spending is an age-dependent fraction of *current* financial wealth,
  2. Constant mix *not optimal in general.*

Milevsky et al

- Pioneering line of argument: you're retired for 3 decades & gross decade-average returns follow

  1.07, 1.27, 0.87

  or

  1.07, 0.87, 1.27.

  The *1st* sequence will generally be preferred.

  - .."the ideal risk management product [GMWBs] would convert [constant-mix wealth] paths that lead to early ruin and extend their lifespan by mitigating the negative return in the first 5 to 10 years".

Milevsky et al

Issues for Australian applications

- The emerging market for retirement derivatives may be confined to self-funded retirees of middle means:
  - ❖Age Pension: a negative-beta asset & provides longevity insurance. Why should less-affluent retirees buy insurance against market and longevity risks when our gov't provides it for free?
  - ❖Rich retirees tend to self-insure.

Milevsky et al
Retirement derivatives compared

- GMWBs probably preferable to collars, as long-maturity collars may impart excessive conservatism.
- *Methuselah puts* may be preferable to GMWBs, as they are micro-founded. Distinctive features:

❖ A strike price related to the parameter describing the extent to which bequests are luxuries

❖ Exercisable at the date of death (like funeral benefits).

Asset allocation formula

$$x^*(t) = \left(\frac{\alpha - r}{\delta o^2}\right)\left[1 - \frac{h}{rw(t)}(1 - e^{-r(T-t)}) + \frac{\theta a}{w(t)}e^{-r(T-t)}(1 - N(-d_2))\right].$$

Economics-based plan for a 30-year retirement: ensuring the spending plan drives asset allocation

• Expected real return to growth assets	5% pa
• Volatility of returns to growth assets	20% pa
• Real return to safe assets	2% pa
• *Luxury bequest* parameter [non-standard]	$20,400
• Propensity to bequeath	0.92
• Financial wealth taken into retirement	$1 million
• Annual expenditures on essentials	$2,900
• Rate of time preference	3.7%

Economics-based plan for a 30-year retirement (ctd)

Years into retirement	Spending/wealth ratio Expected, per cent	Growth assets/wealth ratio Expected, per cent
0	4.8	45
5	5.2	47
10	5.8	49
15	6.7	51
20	8.0	55
25	10.5	62
29	14.7	73

An economics-based plan for a 30-year retirement
Discussion

- Retirement spending is $48,000 pa, or $8,000 pa higher than under the 4 per cent rule.
- Can implement by a *bucket strategy:* finance early retirement mostly by interest-bearing assets, & finance late retirement mostly by growth assets.
- Expected estate: $285,027. Could use instead for an unexpectedly long life, or unexpectedly low returns, or uninsurable late-life health setbacks.

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Concluding comments

- Before mass DC super, lifetime asset allocation typically followed displaced-V glide paths.
- “Pension applications in December 2008 were around 50% higher than the number recorded in October of the same year” (Harmer 2009).
- Responsibility for shifting practice away from aggressive constant-mix rests with the industry, ASIC, APRA and individual households.