Longevity risk and life annuity challenges around the world

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Agenda

- Longevity and other retirement risks
- Current retirement income products
- How retirement income products can be improved
- Insurance firm solvency and risk-based capital
- Challenges for annuities and longevity risk
- A role for government in longevity risk sharing?
- Conclusions

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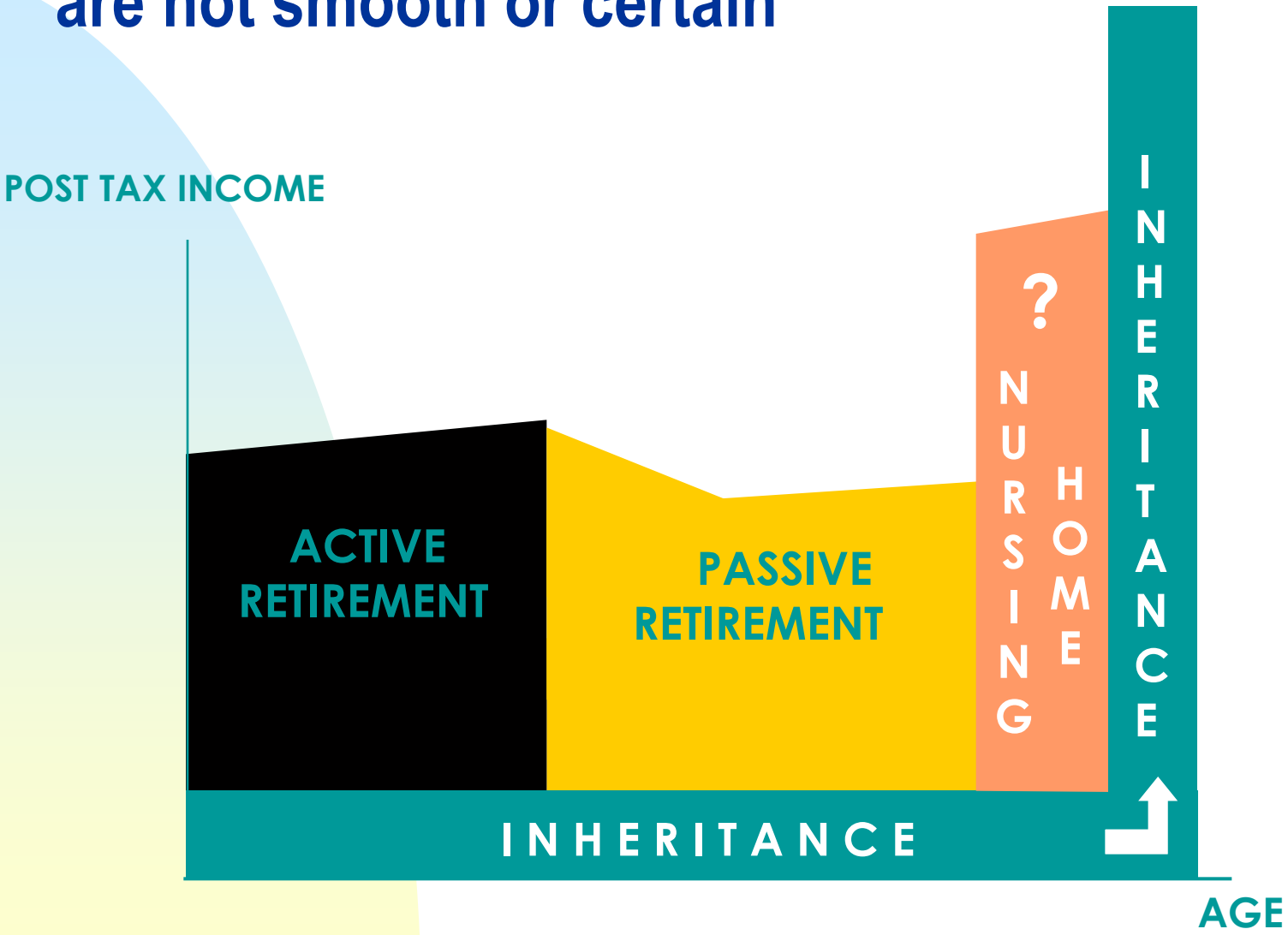
Longevity and other retirement risks

Income needs in retirement are not smooth or certain



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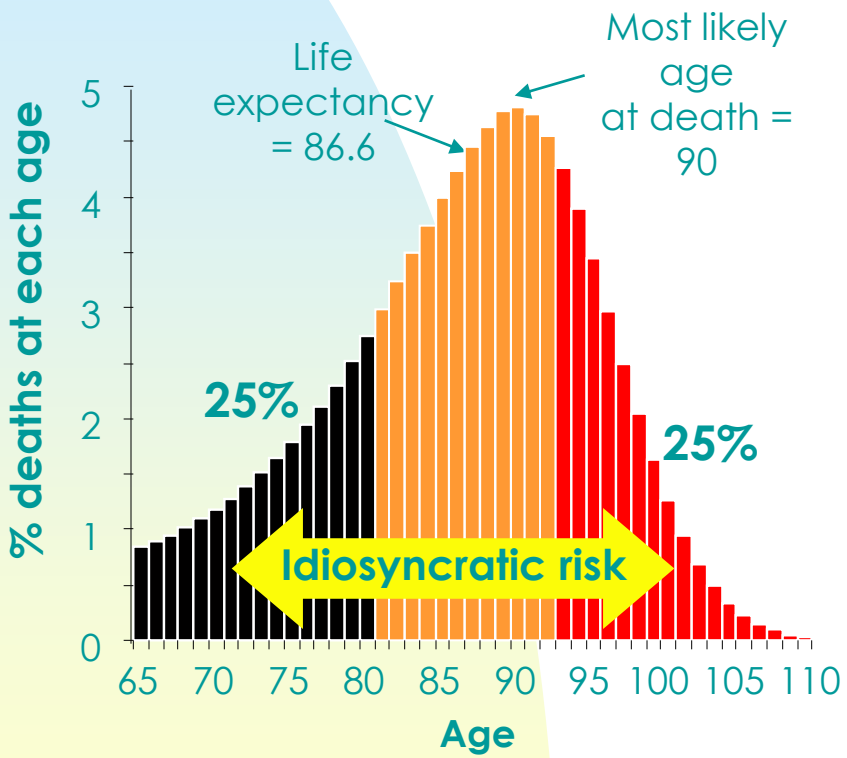
Risks in retirement

- Interest rate risk:
  - when annuity is purchased
- Inflation risk
- Investment and reinvestment risk
- Longevity risk:
  - outliving resources
  - leaving unintended bequests
  - failure to leave intended bequests
- Morbidity or care risk
- Pensioners have limited understanding of these risks

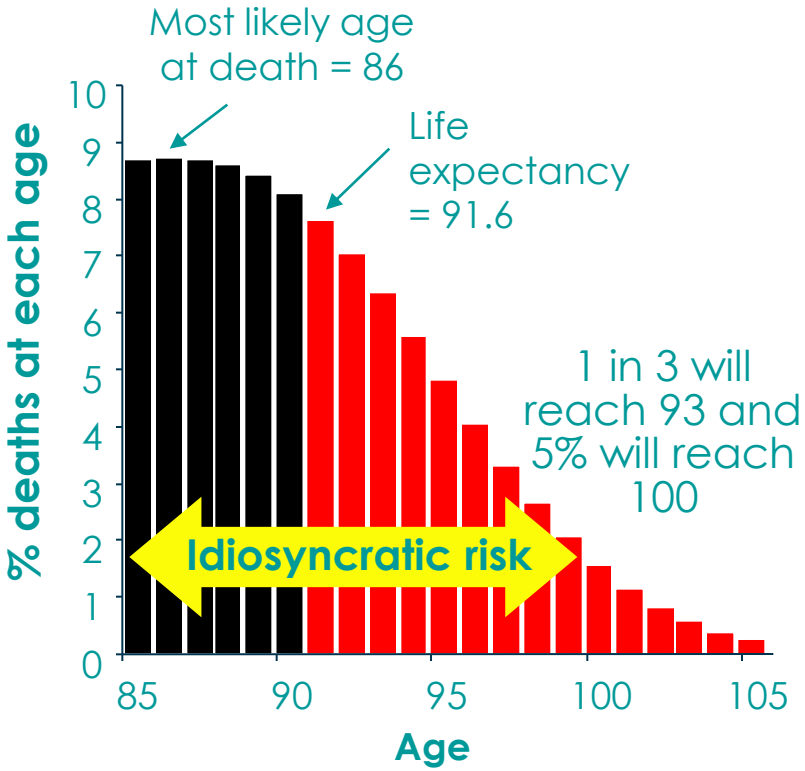
Variability in life expectancy

Expected distribution of deaths: male 65



1 in 1000 chance of living twice life expectancy at age 65

Expected distribution of deaths: male 85



1 in 10 chance of living twice life expectancy at age 85

Source: 100% PNMA00 medium cohort 2007

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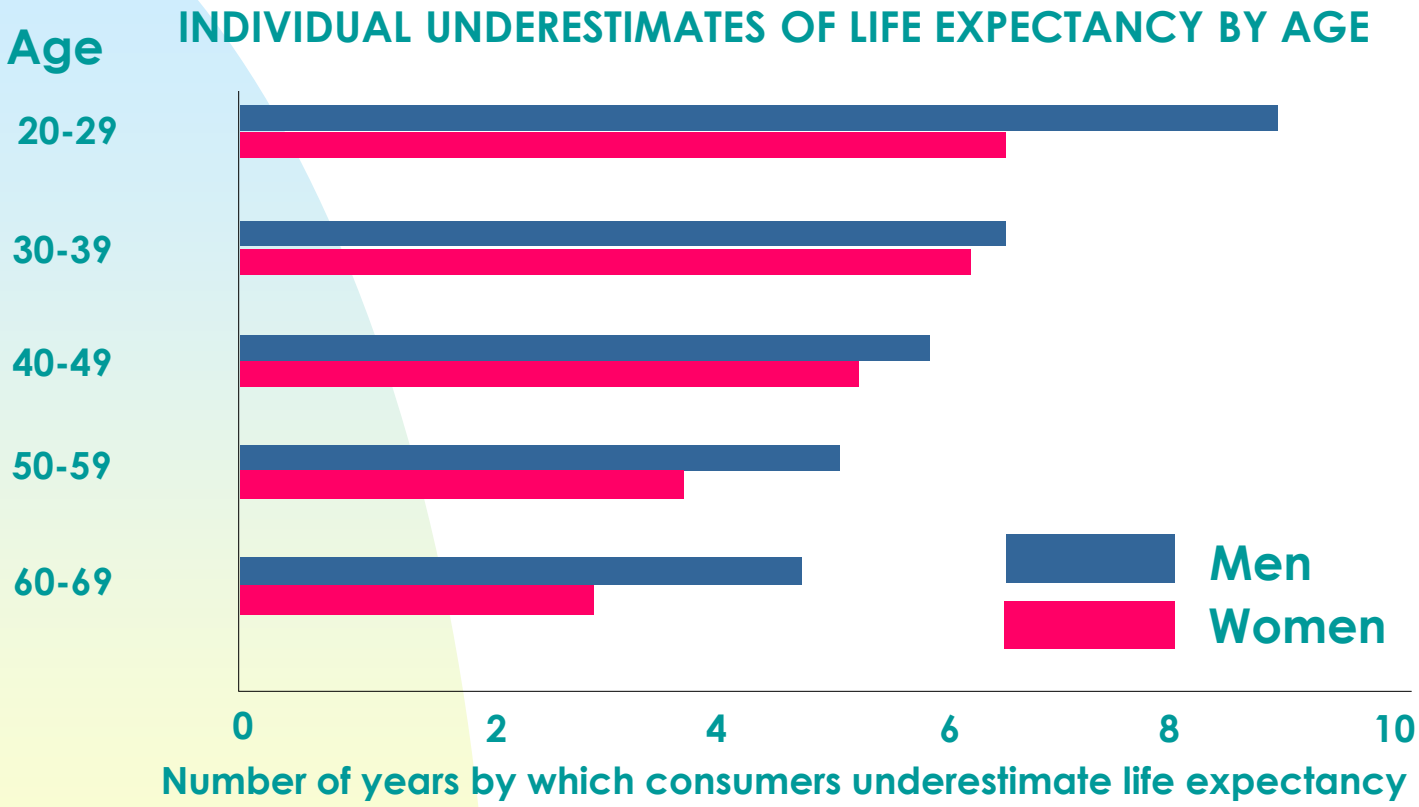
The challenge is huge: Individuals consistently underestimate how long they will live...



Sources: O'Brian, Fenn, and Diacon, 2005, self-estimated life expectancy compared with GAD forecast life expectancy; own analysis.

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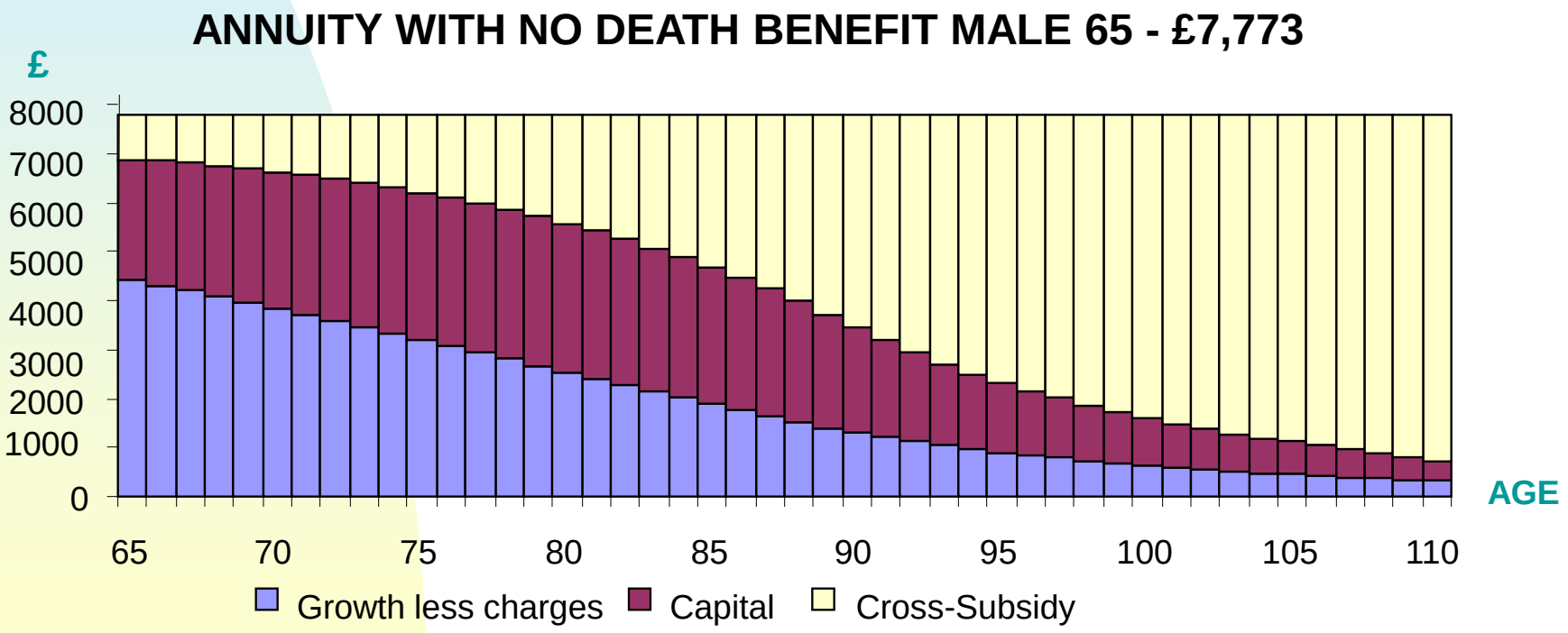
Current retirement income products:

Annuities and phased withdrawal

The lifetime income guarantee provided by an annuity is funded by investment growth, the annuitant's own capital and the capital released by those dying early

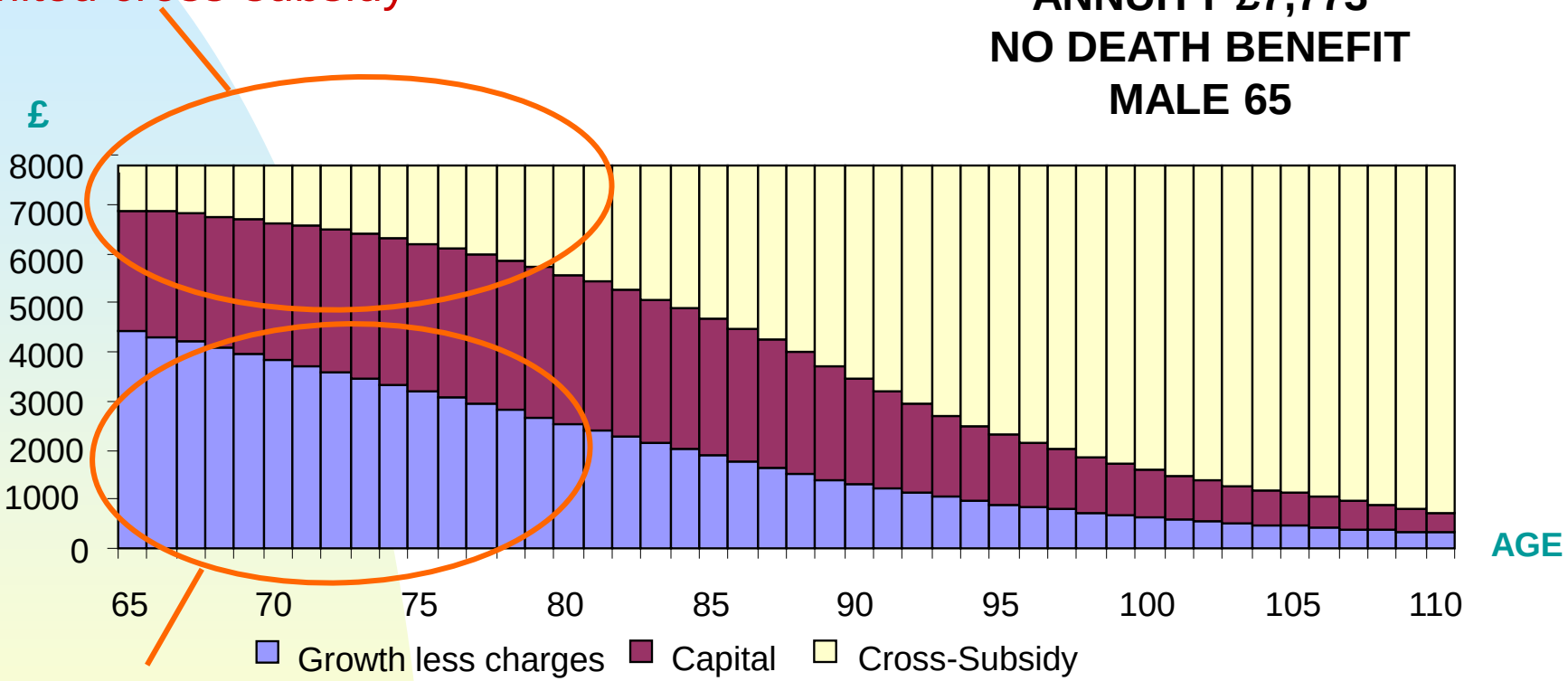
Expected composition of each annuity payment for a male aged 65 purchasing an annuity for £100,000 providing an income of £7,773 payable at the end of each year to all annuitants still alive.



Source: Own analysis using 100% PNMA00 medium cohort 2007

In the early years, investment growth is the most significant constituent of the income payment and cross-subsidy is small

Limited cross-subsidy



Investment growth significant

Source: Own analysis using 100% PNMA00 medium cohort 2007

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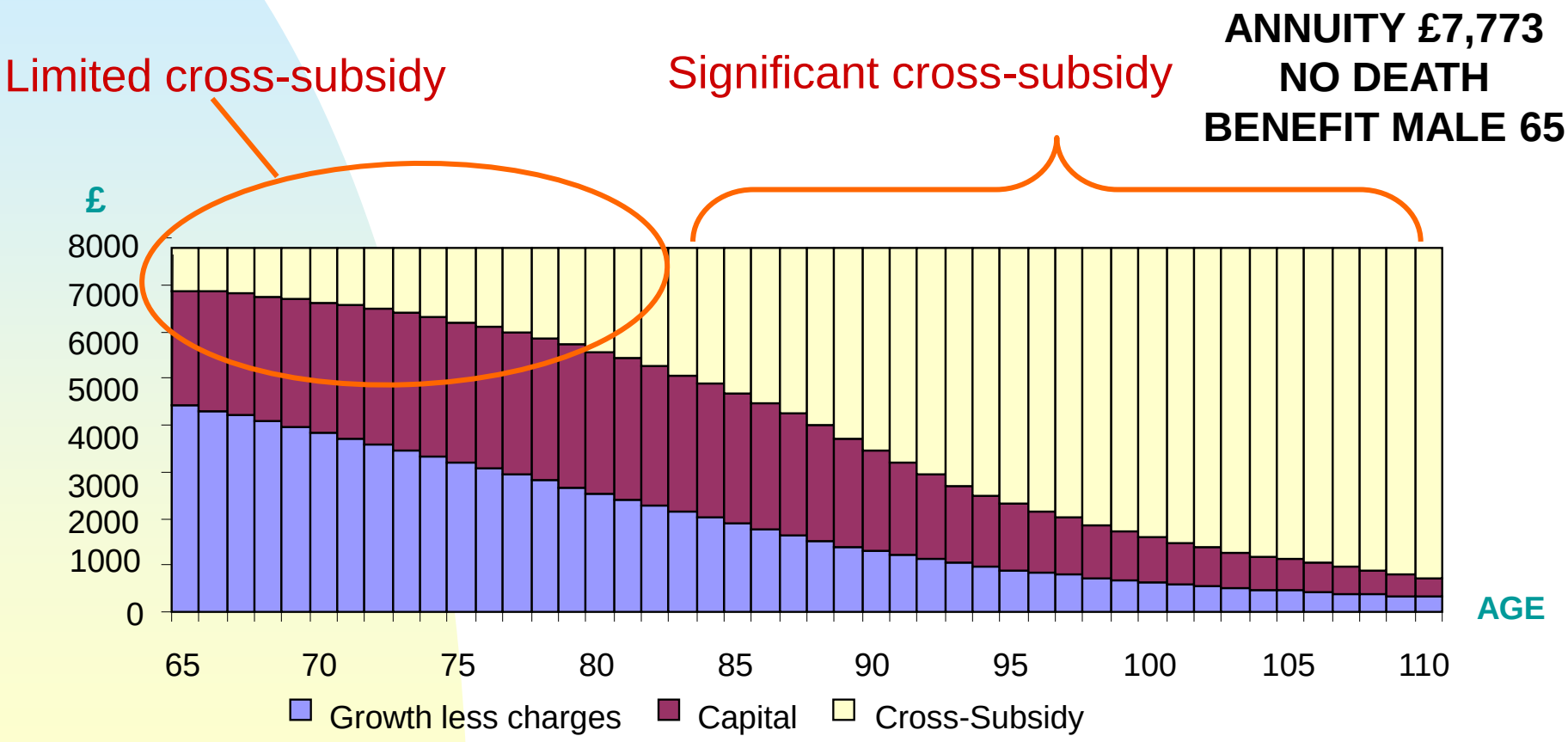
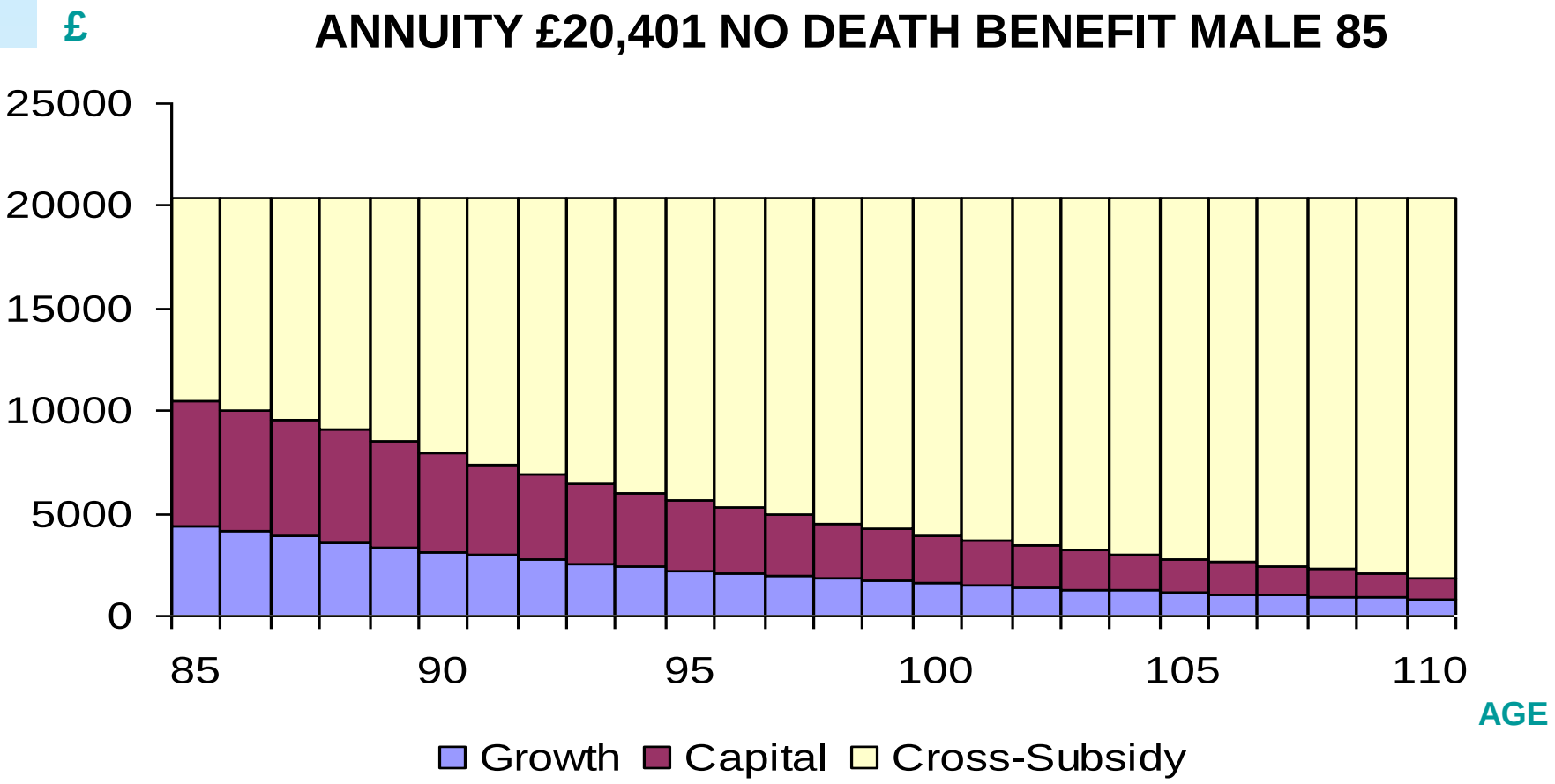
The lifetime income guarantee provided by an annuity is funded by the capital released by those dying early

The funds of those dying in a year are spread over the lives surviving.



Source: Own analysis using 100% PNMA00 medium cohort 2007

At age 85 the cross-subsidy provides half of the guaranteed income and continues to grow in significance



Source: Own analysis using 100% PNMA00 medium cohort 2007

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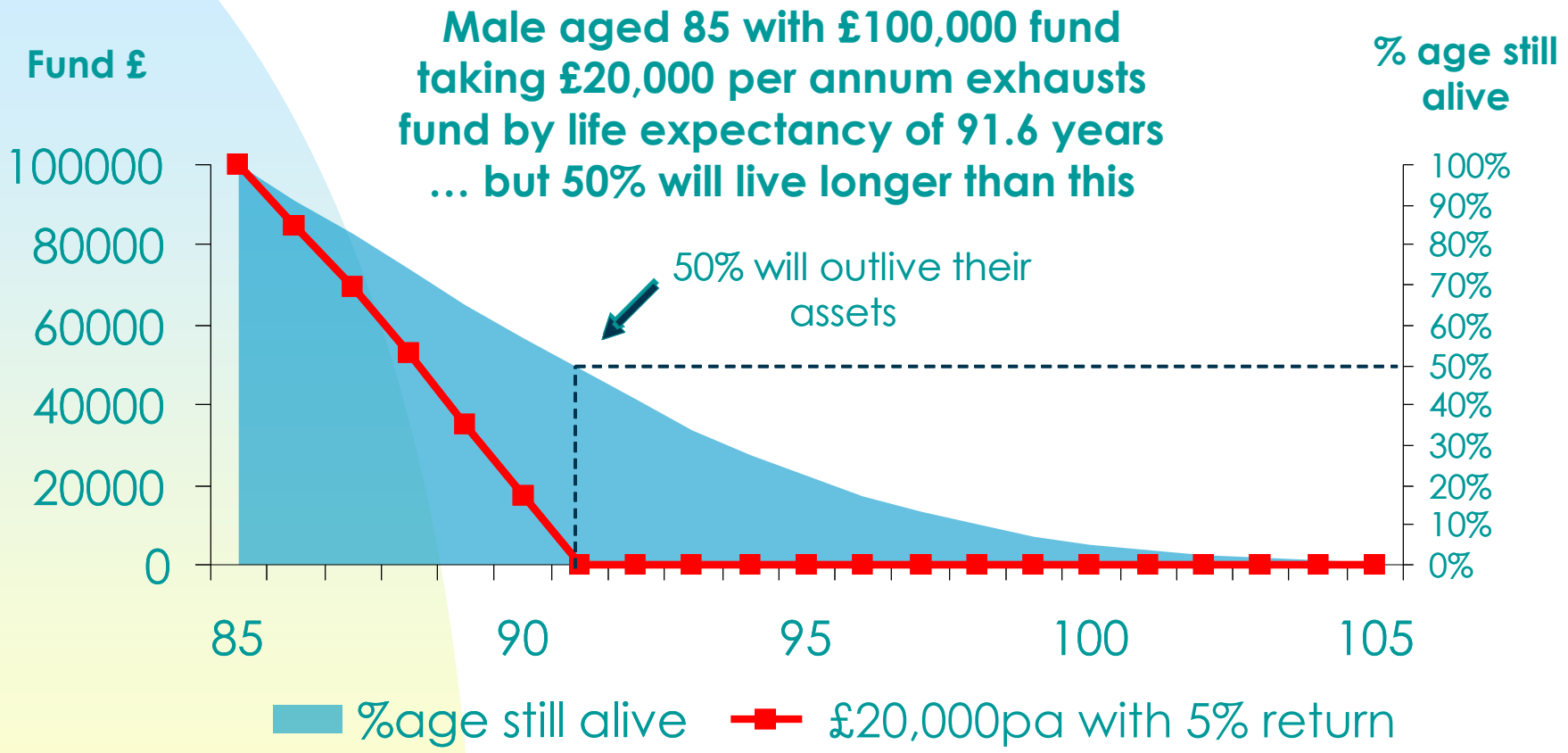
If retirees continue to use phased withdrawal from age 85, many will run out of money



Source: Own analysis using 100% PNMA00 medium cohort 2007 and £100,000 fund

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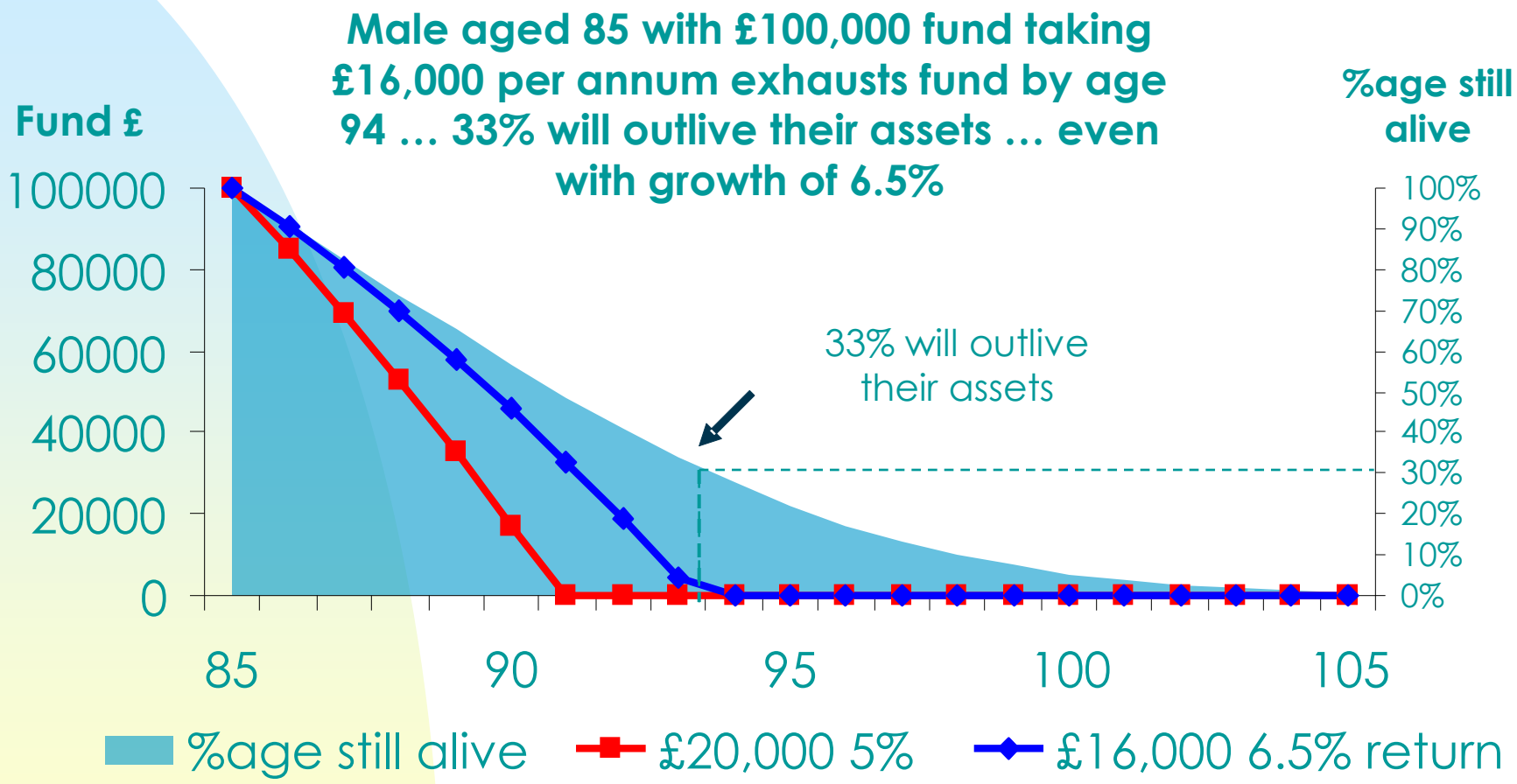
Reducing income taken and increased investment returns have little impact on the erosion of the fund at older ages



Source: Own analysis using 100% PNMA00 medium cohort 2007 and £100,000 fund

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An annuity is the best option for most of the mass market

- Most pensioners have limited means
- Mass market households are likely to have to accept a relatively simple strategy with default options
- Primary focus on maximising retirement income
- Reliance on State and any housing equity for providing for health care and other retirement contingencies
- Bequests typically left more by chance
  - mainly in form of residual housing equity

Optimisation for the mass affluent is very complex

- Optimisation is an extremely difficult task for pensioners in their 60s **looking forward** to retirements of 20 years or more
- Very difficult task to optimise controlled run down of pensioner's assets throughout retirement
- Pensioners have varying needs and face many risks
- Many pensioners **have not** focused on many of these risks:
  - makes optimisation difficult
- Optimal solutions are likely to differ:
  - because each set of needs and risks differ

As life expectancy reduces optimisation becomes easier

- Fortunately as people get older, optimisation task becomes easier:
  - fewer risks around
  - investment considerations become easier
  - when people go into nursing home income expenditure become less volatile

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How retirement income products can be improved

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Issues to take into account

- People need reassurance that it pays to save
- Pension death benefits are generous for phased withdrawal – not for annuities
- Phasing into annuitization may be more acceptable
- Annuity products with equity linking might be valuable for those who are sufficiently risk tolerant

Money-back or capital-protected annuity

- Any pooling of mortality needs to be perceived to be fair by the public:
  - Currently, this is not true!
  - At younger ages, annuity mortality cross-subsidy gives poor value to those dying early

- Money-back or capital-protected annuity:
  - Removes single biggest consumer objection to annuities:
    "*If I die soon after I retire, the annuity provider will keep my fund*"

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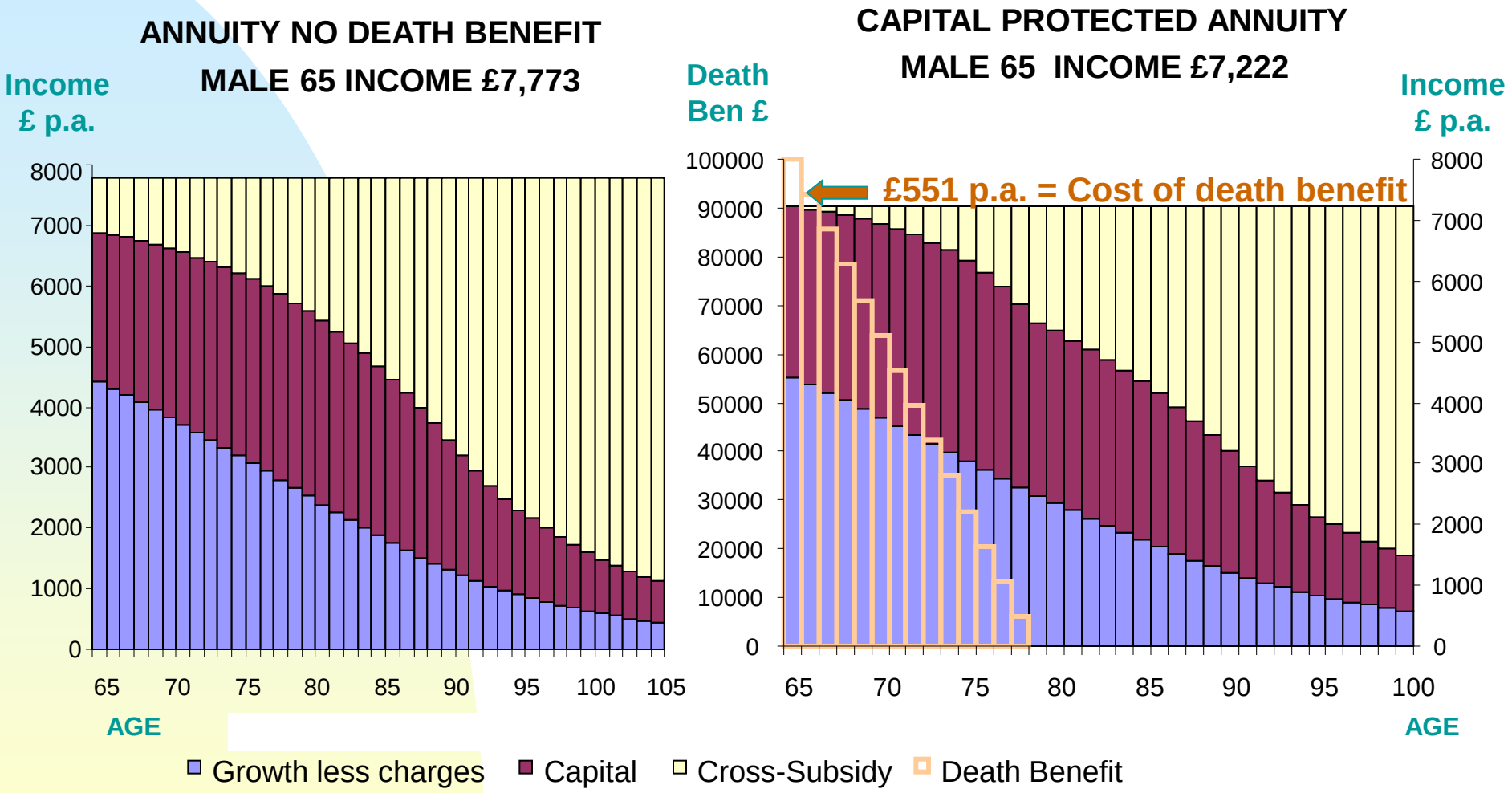
Money-back or capital-protected annuity



Source: Own analysis using 100% PNMA00 medium cohort 2007

US-style variable annuity

- GMAB – guaranteed minimum accumulation benefit
  - Guaranteed minimum fund at end of accumulation phase
- GMDB – guaranteed minimum death benefit
  - Guaranteed minimum fund on death of insured
- GMIB – guaranteed minimum income benefit
  - e.g. ‘five for life’
  - but < annuity and higher charges, e.g. 60bp for 5% guarantee
  - when VA was offering ‘5 for life’, fixed annuity was offering ‘7.5 for life’
- GMWB – guaranteed minimum withdrawal benefit
  - guaranteed minimum amount from fund on periodic basis, regardless of fund performance
  - if for life, then equivalent to GMIB

Other new product ideas

- Advanced life deferred annuity (ALDA)
  - An annuity that begins paying after a significant deferral period, e.g. 20 or 30 years
- Life care annuity
  - An income annuity that pays an increased benefit if the purchaser needs care

Insurance firm solvency and risk-based capital

Solvency II (2014)

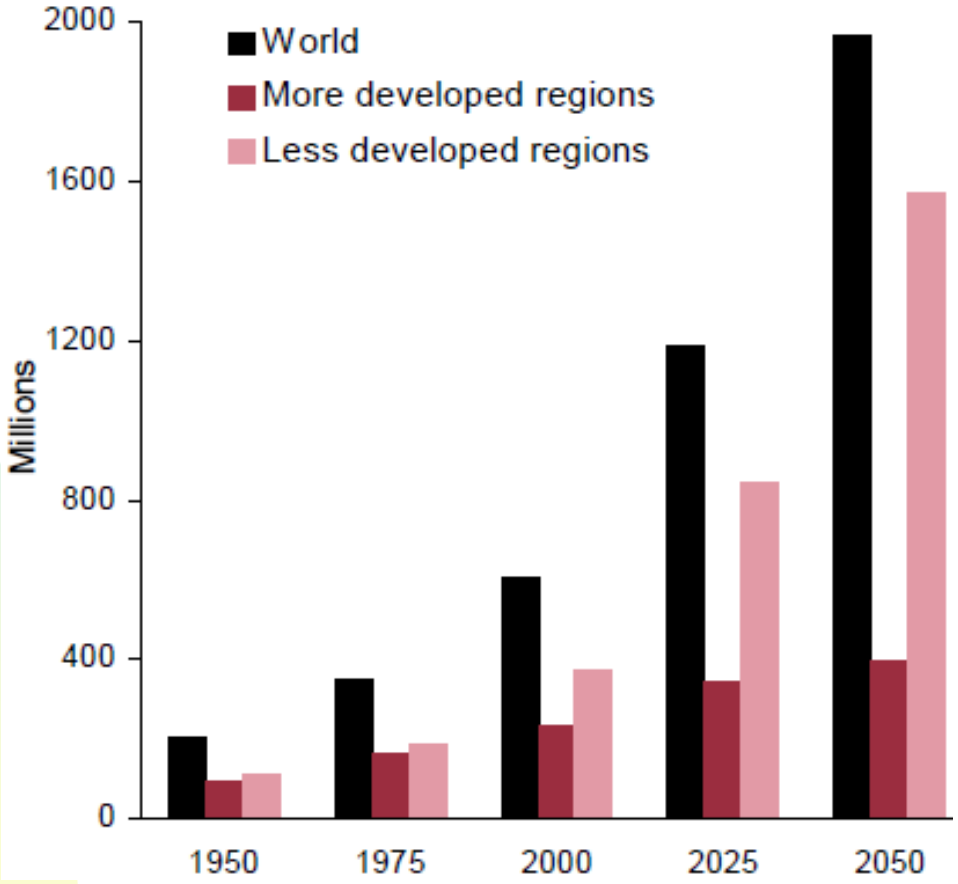
- Three pillar approach in EU (same as Basel II):
- **Pillar 1:**
  - Minimum capital charges will apply to:
    - underwriting, credit, market and operational risks
  - Standard Model or Internal Risk Based (IRB) Model to determine regulatory capital:
    - aim to bring regulatory capital closer to economic capital
- **Pillar 2**
  - Supervisory pillar
    - operates ‘ladder of intervention’ between SCR and MCR
- **Pillar 3**
  - Market discipline through greater information disclosure

Solvency II (2014)

- **Solvency Capital Requirement (SCR)**
  - Set as minimum capital to attract S&P BBB rating:
    - 'has *good* financial security characteristics, but is more likely to be affected by adverse business conditions than are higher rated insurers'
  - Equiv to 99.5% probability that insurer survives one year
    - i.e., can experience a single 1-in-200 year negative event and still meet all its liabilities to policyholders
- **Minimum Capital Requirement (MCR)**
  - Minimum level of regulatory capital needed
  - Below this supervisor will order suspension of new business or winding up of whole firm
    - unless firm offers credible recovery plan

Challenges for annuities and longevity risk

Population aged 60 or over: World and development regions, 1950-2050



Source: World Population Ageing: 1950-2050 (United Nations)

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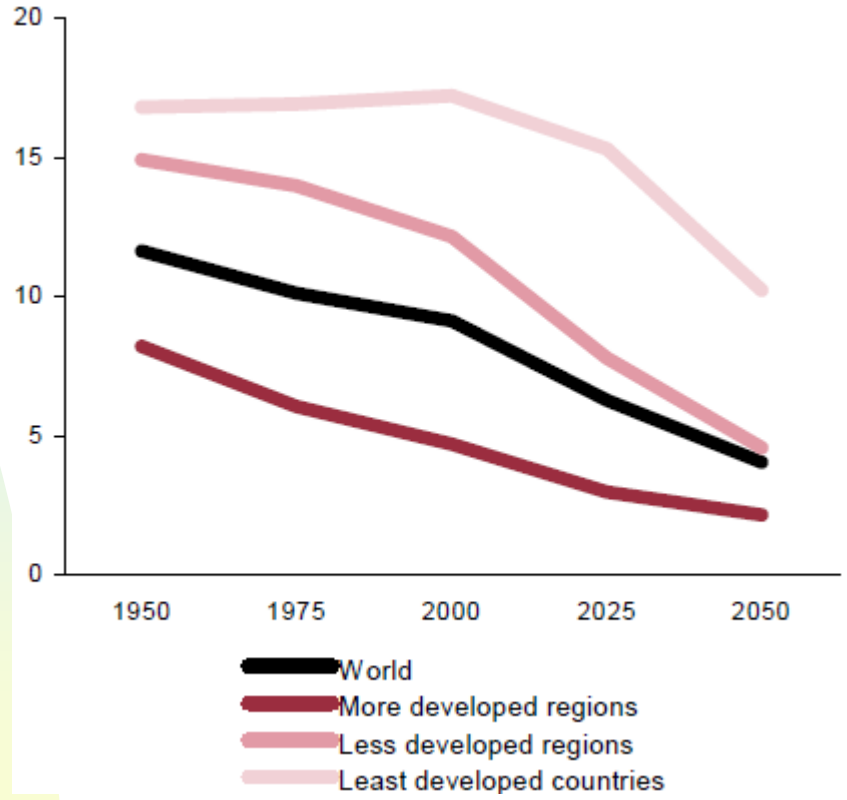
Potential support ratio: World and development regions, 1950-2050



Source: World Population Ageing: 1950-2050 (United Nations)

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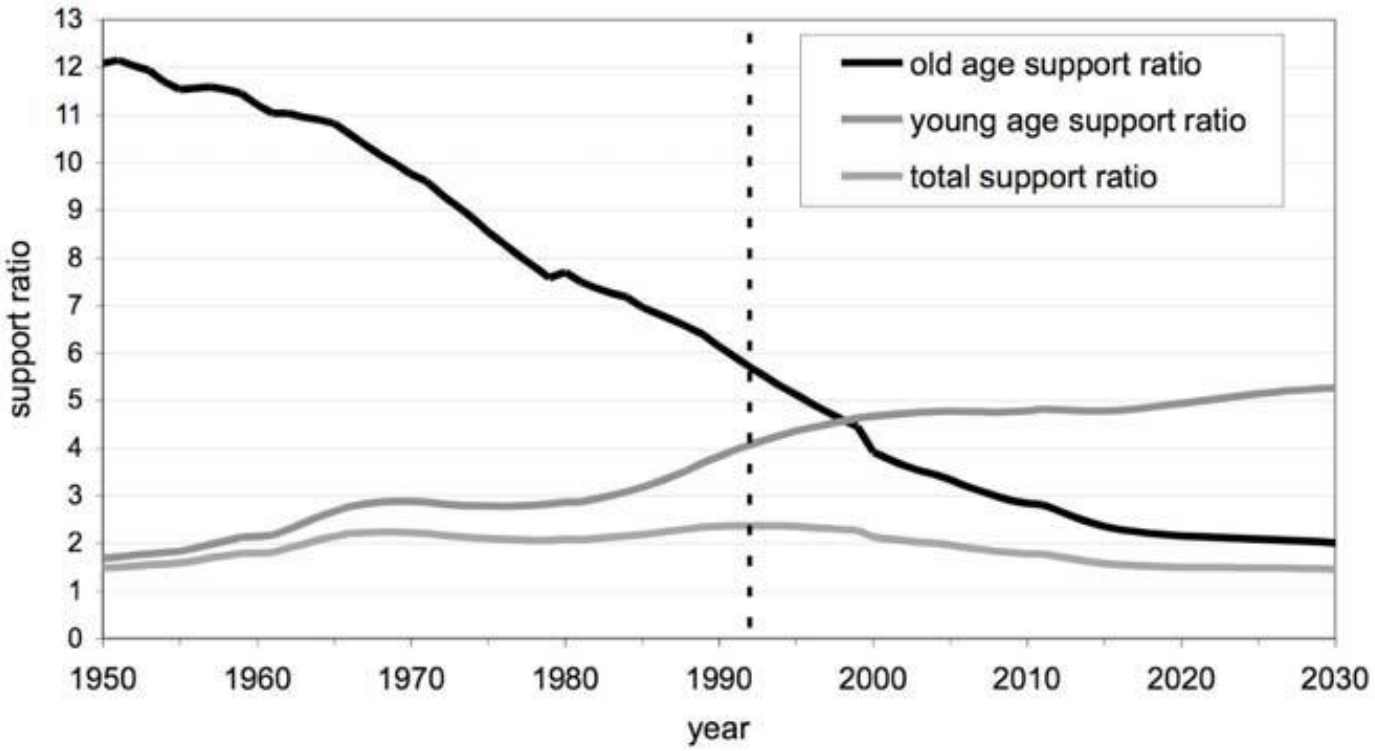
Total support ratio (TSR) and economic growth

- Ratio of the number of workers to the number of both young and old people
  - High TSR is typically associated with rapid economic growth
    - Cf China, India and Korea
- In Japan, TSR peaked in 1992 and its economy has been fairly static since

Support ratios in Japan



Source: Fig. A2 in Mayhew (2009)

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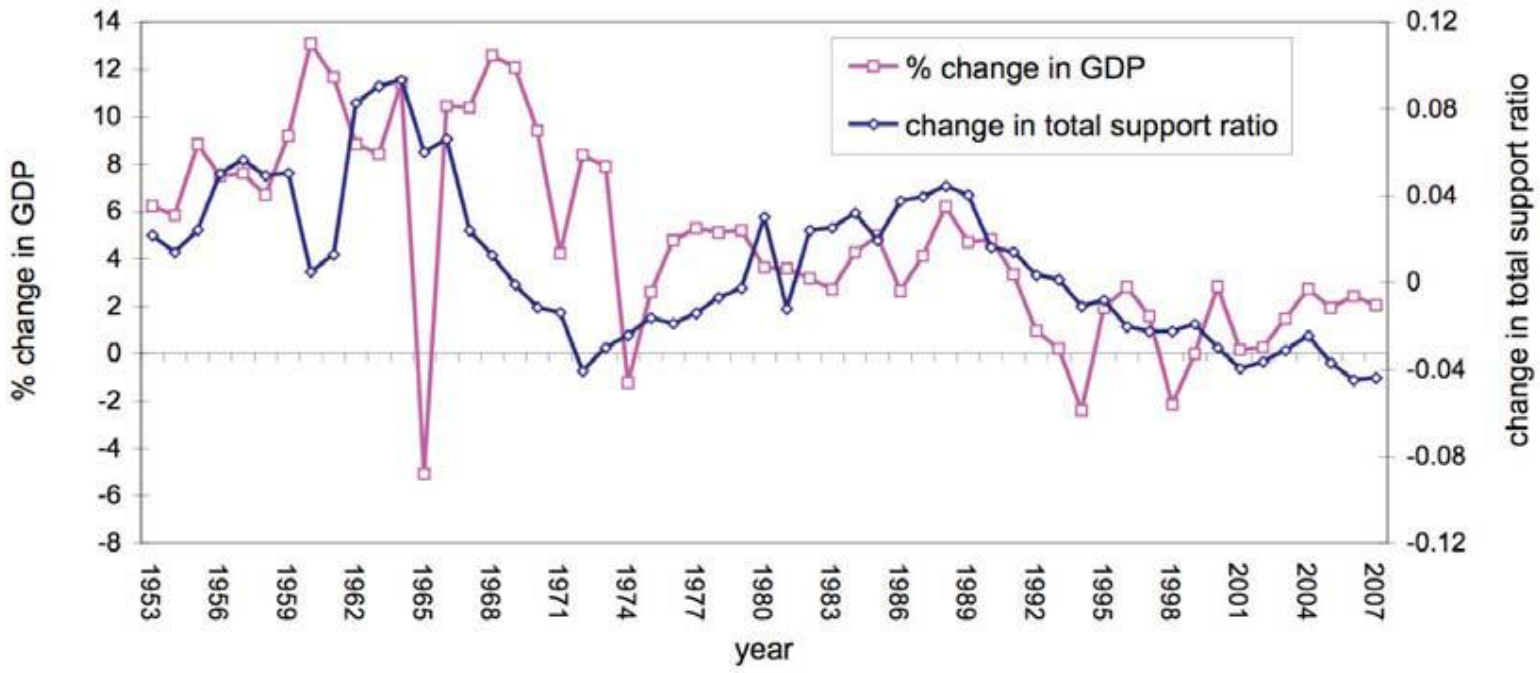
Relationship between growth rate in GDP and changes in TSR in Japan



Source: Fig. A3 in Mayhew (2009)

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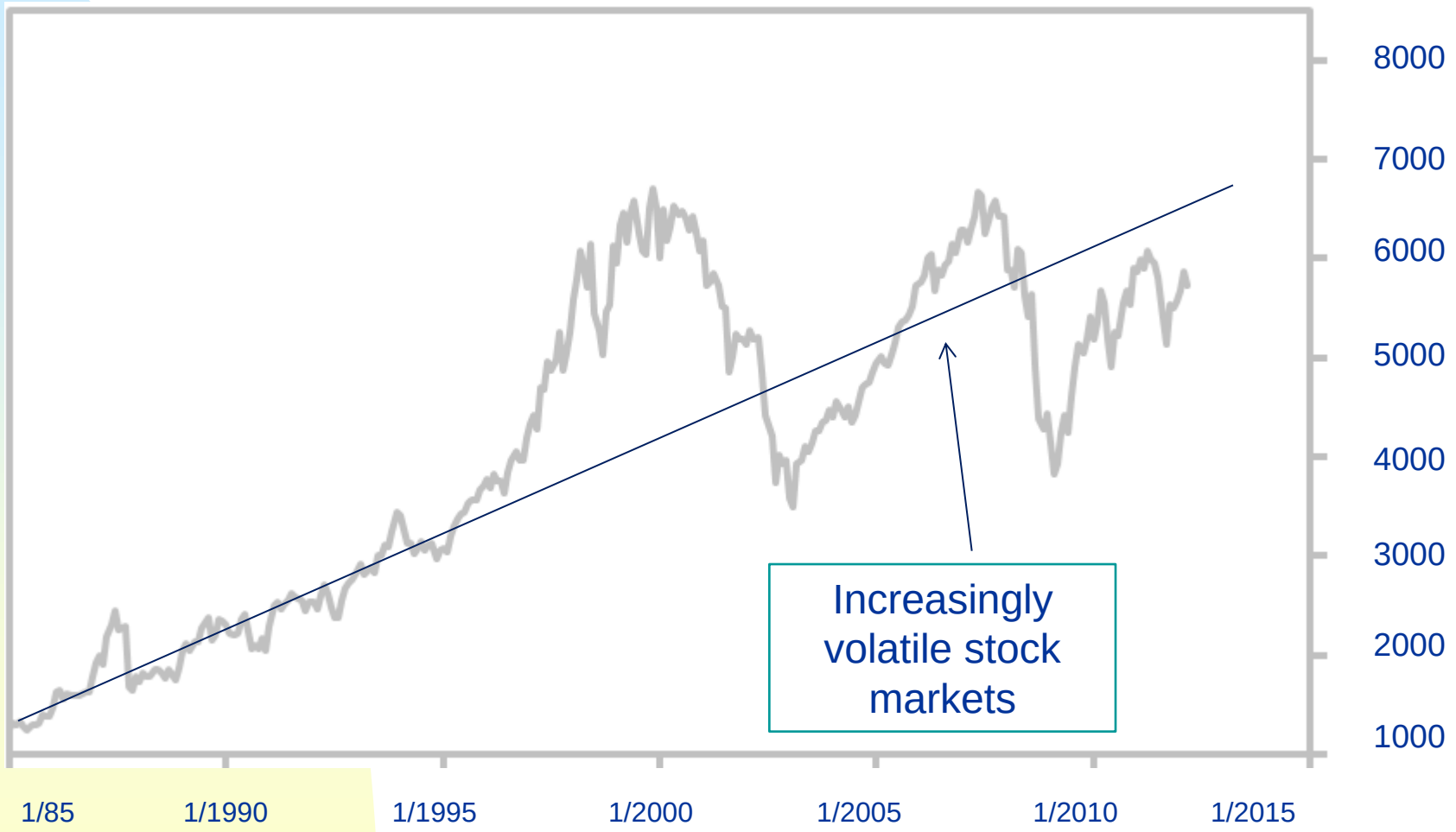
Implications of an ageing population

- Living standards likely to fall in some countries with fast-ageing populations:
  - GDP growth in EU and Japan could fall from 2% to 1% pa
  - US likely to escape this fall
    - due to more flexible labour markets
- Higher growth rates in countries with slower ageing populations
- More volatile stock markets
  - As capital flows to economies with higher returns
- Lower real interest rates
  - Investment demand falls with a smaller population
    - by more than savings falls?

FTSE100 Index 1985-2012



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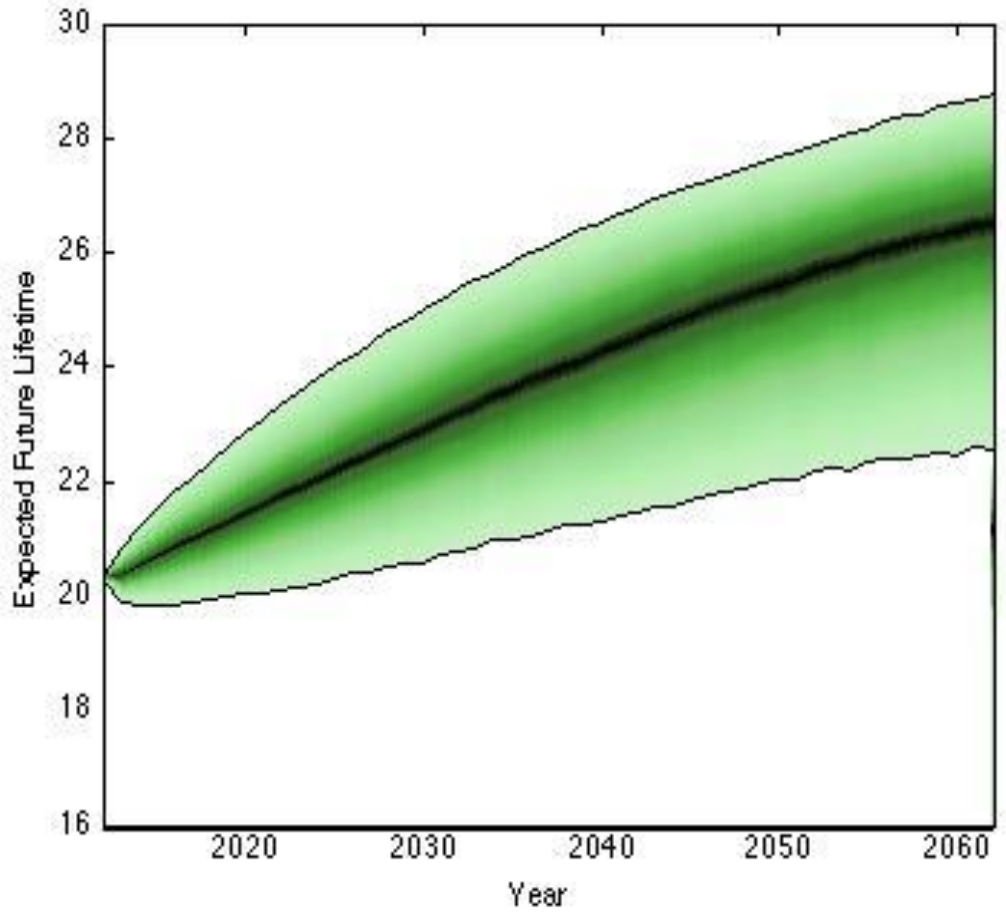
Implications for pension products

- Fixed annuities
  - Increasing longevity, low interest rates, and SII seriously reduce payments:
    - SII reduces payments by up to 20%
- Phased withdrawal and investment-linked annuities:
  - Increasingly volatile stock markets lead to increasingly volatile payments
  - Mitigated by a smoothing fund

A role for government in longevity risk sharing?

Longevity fan chart for 65-year old male (Cairns-Blake-Dowd model)



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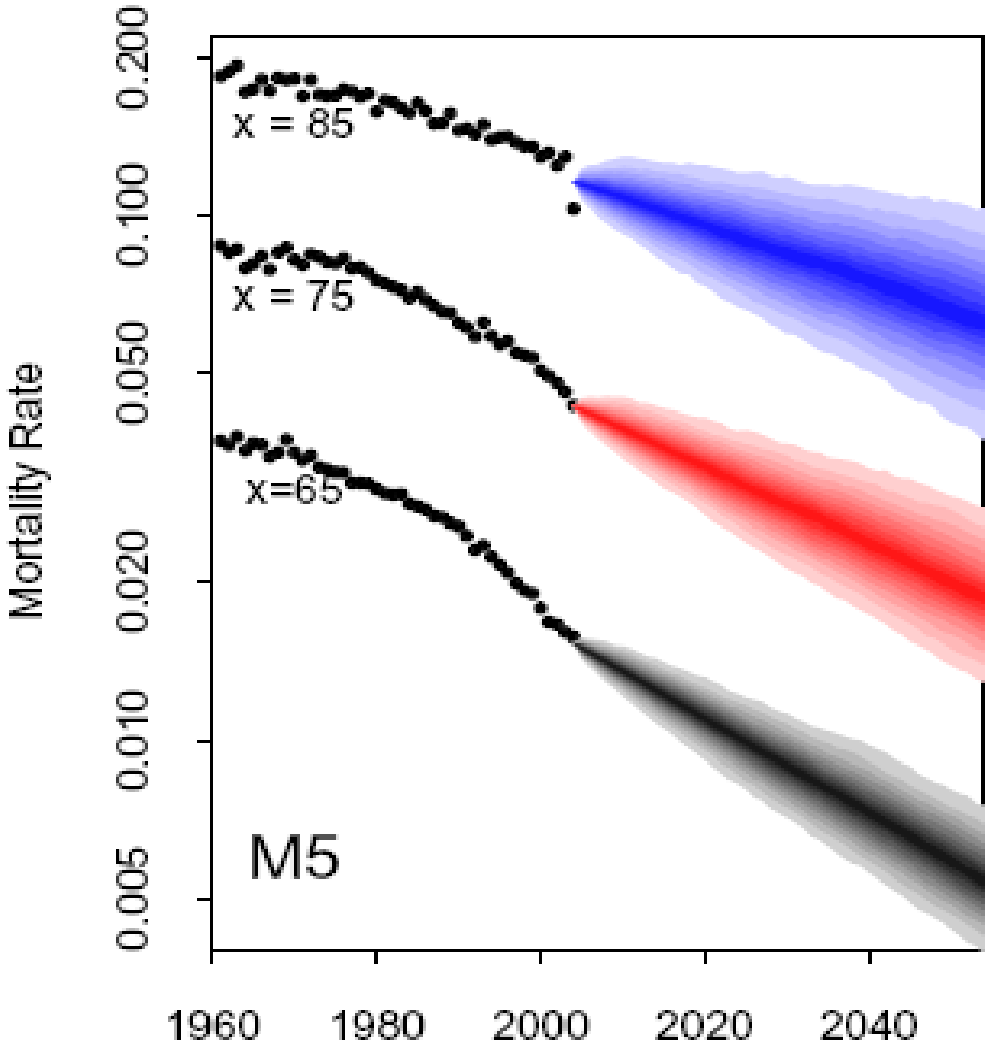
Mortality fan charts (CBD model)



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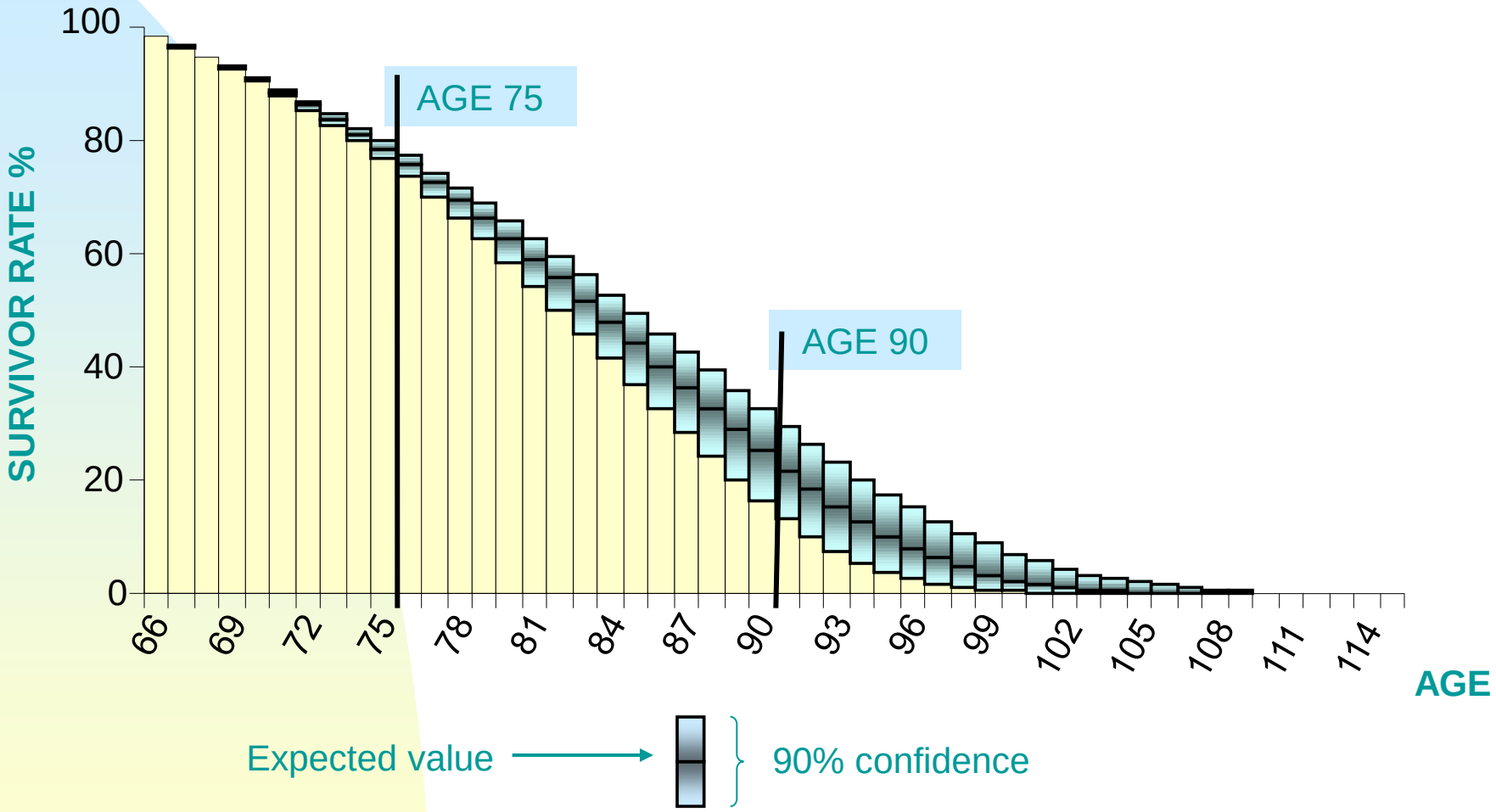
Survivor fan chart for 65-year-old male (CBD model)



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Decomposition of longevity risk

Total longevity risk

=

Aggregate longevity risk

[Trend risk]

+

Specific longevity risk

[Idiosyncratic

and modelling risks]

Government hedges

Private sector hedges

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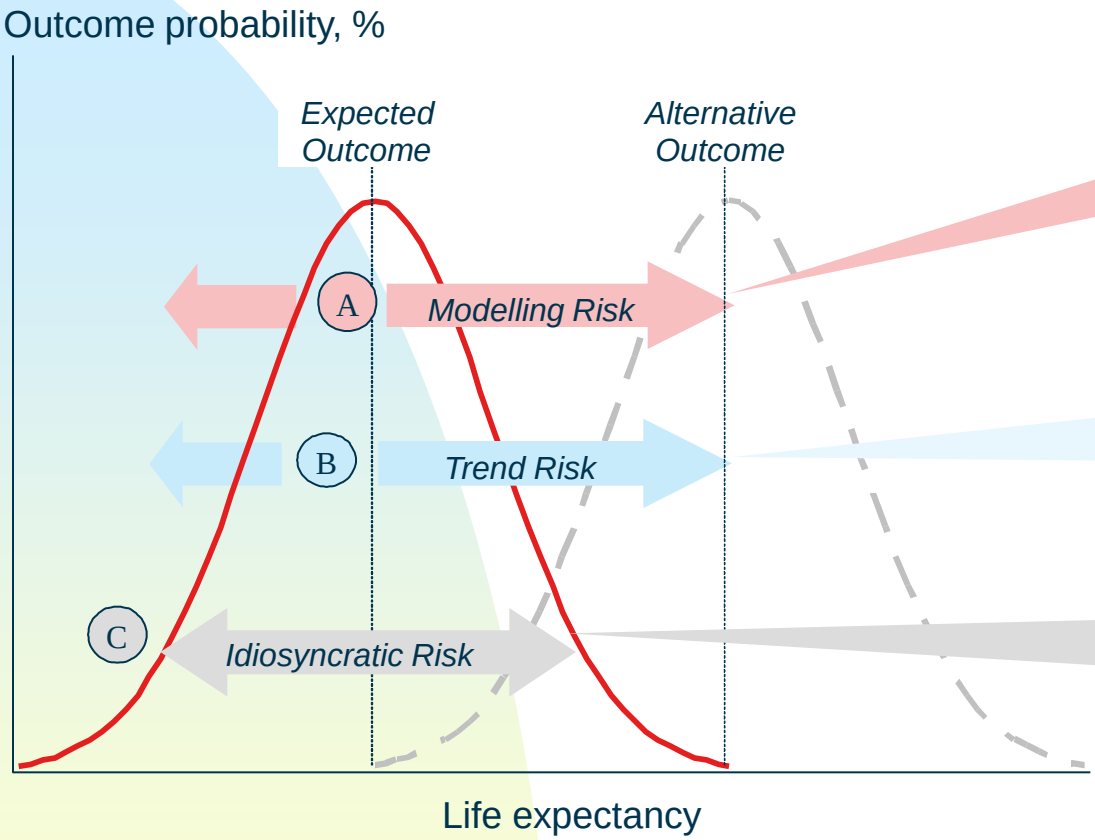
Longevity risk is driven by three underlying risks



A Modelling Risk: Risk that probability distribution is incorrectly modelled due to a limited data set.

B Trend Risk: Risk that large unanticipated changes in socio - economic environment or health care significantly improve longevity.

C Idiosyncratic Risk: Risk that mortality rates still vary from the expected outcome as a result of random chance.

Modelling Risk and Idiosyncratic (Random Variation) Risk are greater the smaller the number of scheme members and the greater the distribution of scheme benefits.

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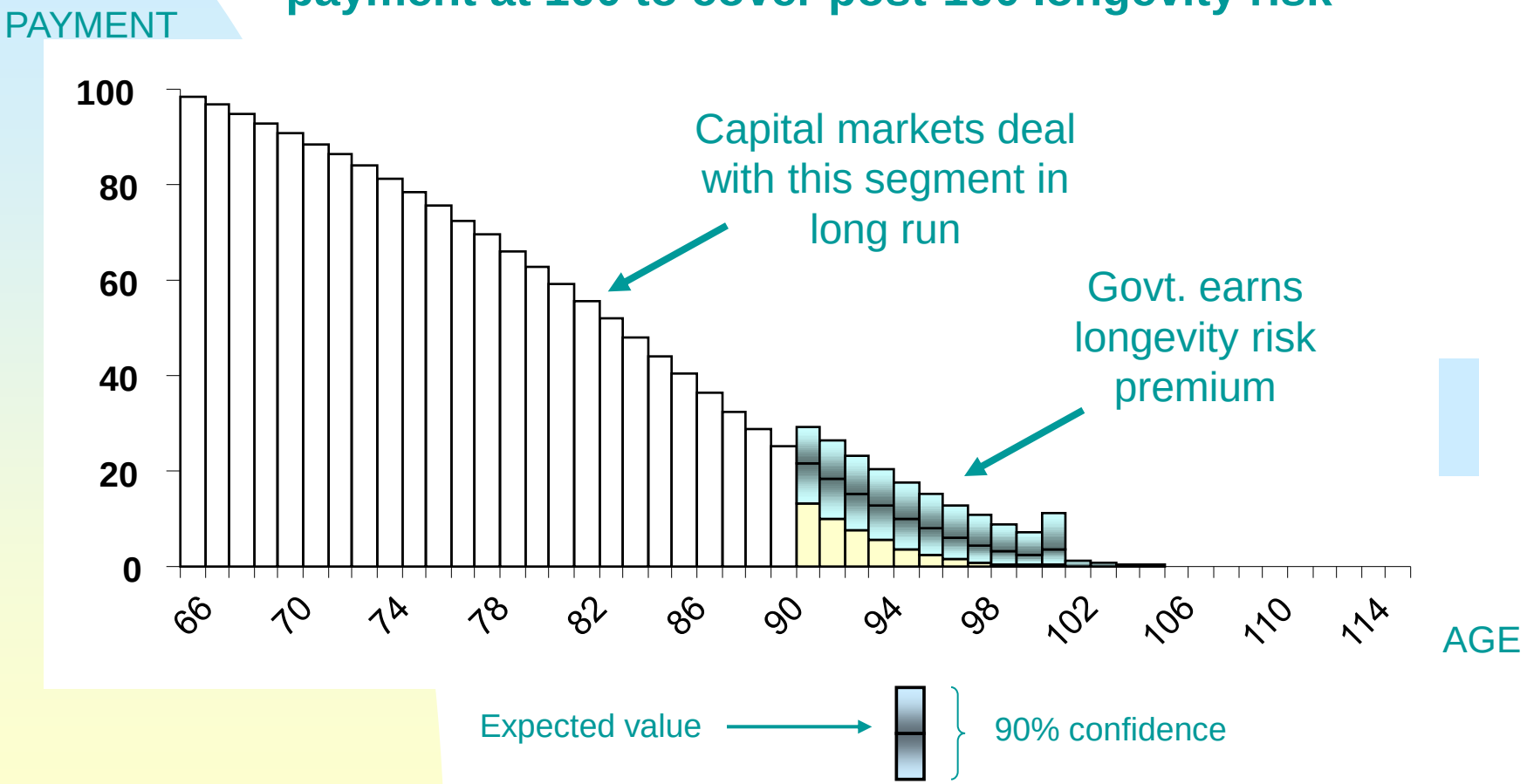
Potential role for government in helping to hedge longevity risk

Tail risk longevity bond from age 90 with terminal payment at 100 to cover post-100 longevity risk



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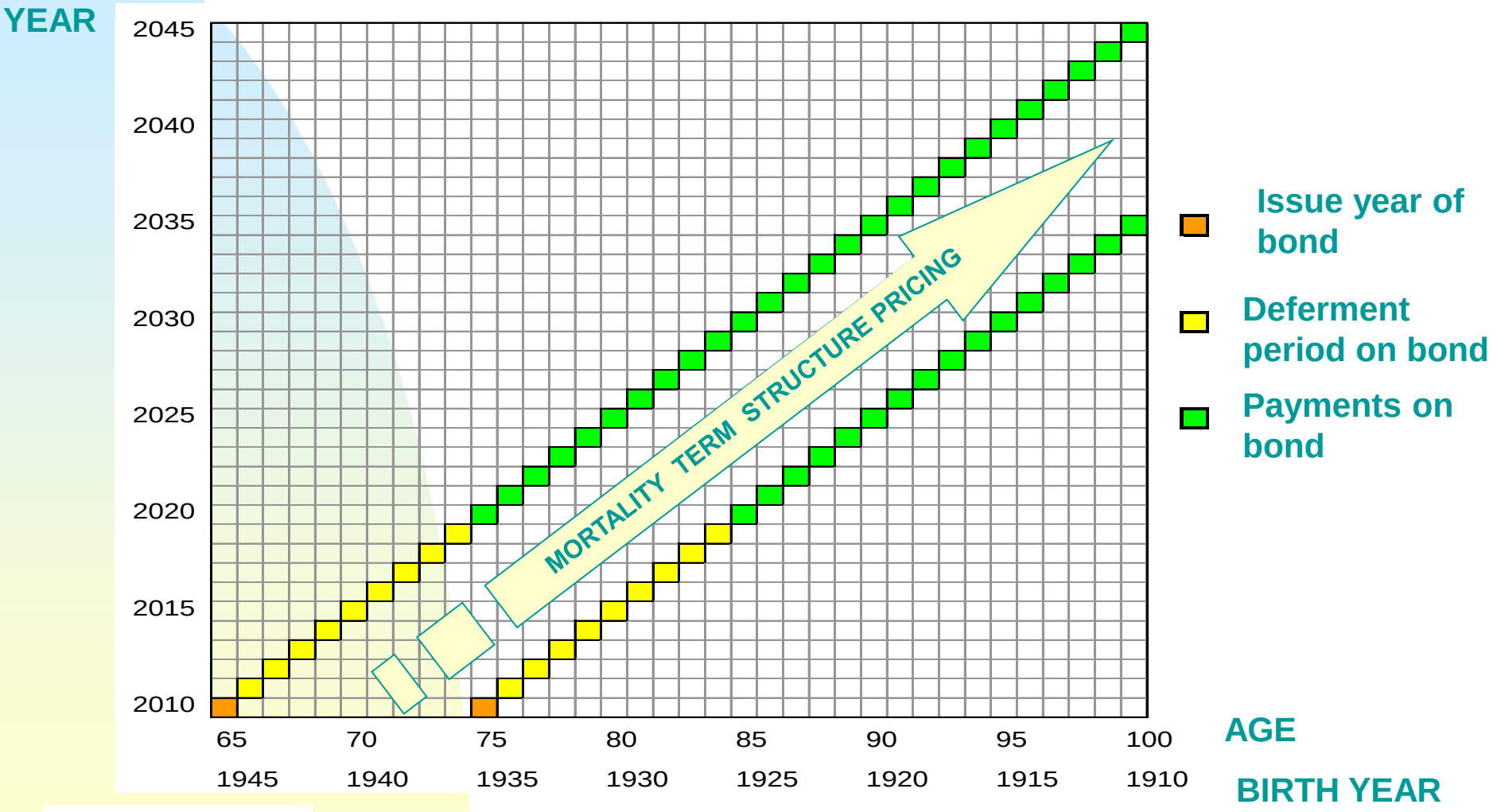
Longevity bond cash flows across ages and time



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Conclusions

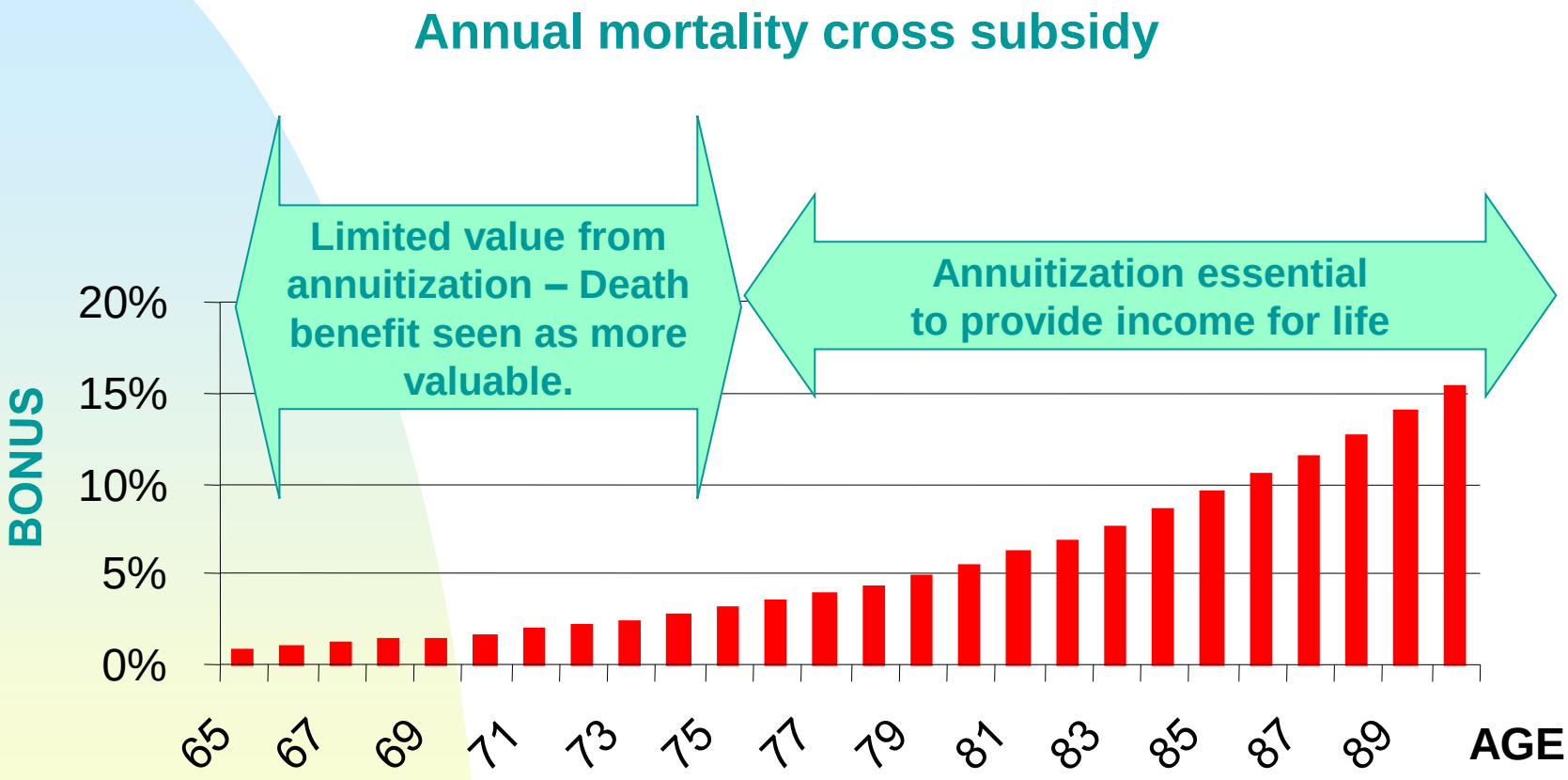
- Limited ability to hedge interest rate, inflation and investment risks long term:
  - We will have to cope with living in an increasingly volatile financial world

- Hedging longevity risk becomes THE single most important consideration:
  - Essential at the level of the individual
  - Feasible at the macro level with longevity bonds

Conclusions

- Annuities can be improved:
  - Capital protection
  - Smoothing fund
  - Deferred annuities
  - Linking to care costs
- But too much regulatory capital and we kill the goose that lays the golden egg!
- Also high charges can lead to significant consumer detriment

But it's if not when to annuitise



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Thank you!

Longevity 10:

Tenth International Longevity Risk and Capital Markets Solutions Conference

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Santiago, Chile

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