



Defined Benefit Scheme Funding Principles (Part 1)

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Agenda

- **Introduction**
 - What is funding?
 - Why fund?
- **Elements of funding**
 - Projecting future benefits
 - Discounting for interest
- **Key Assumptions**
 - Discount rate
 - Life expectancy (Mortality)
- ***Statutory Funding Objective and associated matters dealt with tomorrow***

What is Funding?

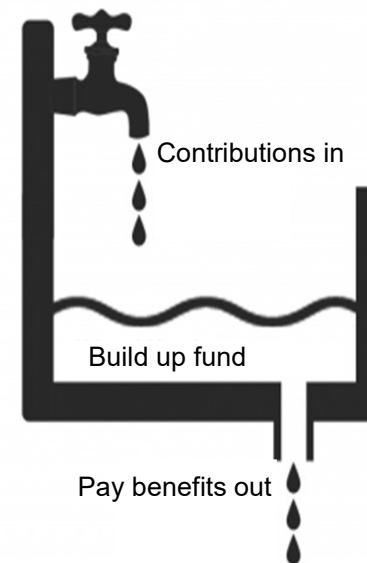


Without funding...

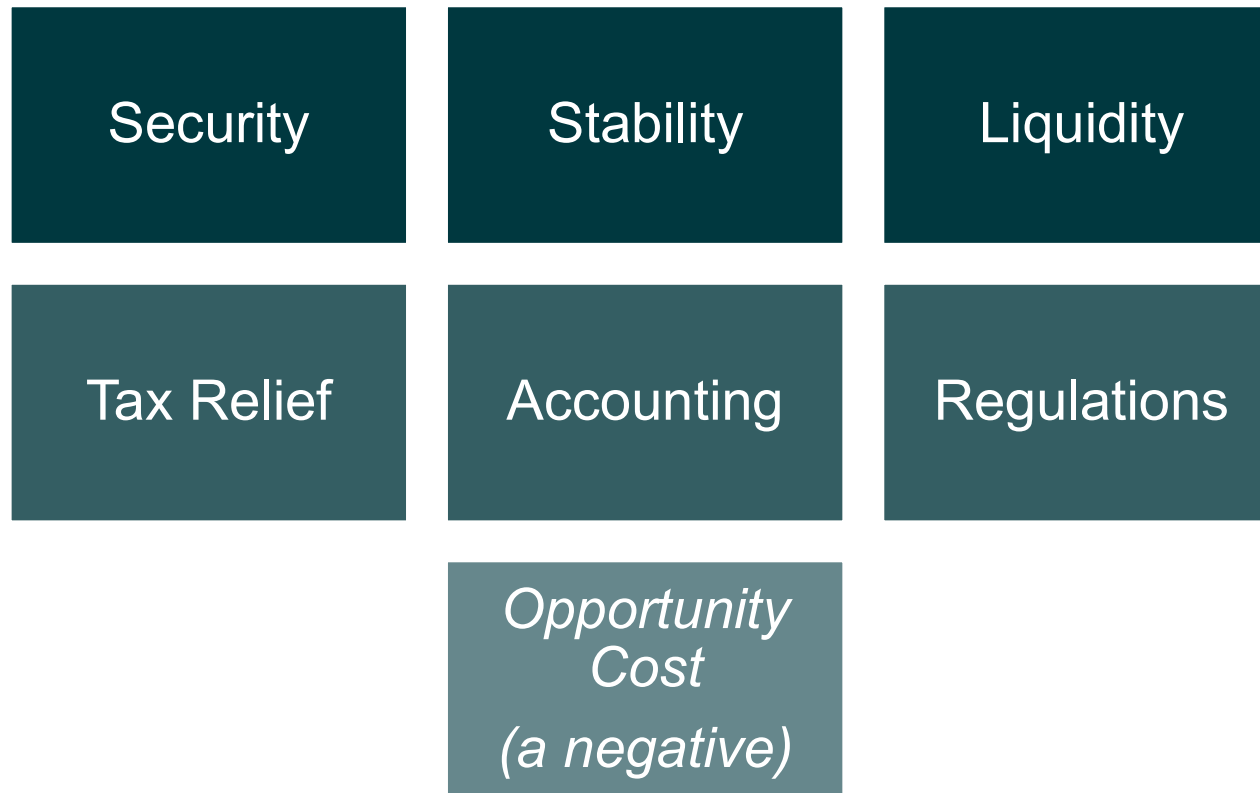
Contributions
= benefits out

What is Funding?

- Contributions are paid in advance and invested with a view to meeting benefits as they fall due
- Normally aim to fund benefits over employees' working lives
- Not all pension schemes are funded:
 - e.g. state pension, Civil Service
 - Contributions meet benefit outgo
 - Puts off a funding problem
 - The pensions time-bomb!



Why Fund?



Elements of funding: projecting future benefits

- Known facts...
 - Benefits = Scheme Rules
 - Current membership data – service, salary etc.
 - Current benefits in payment or deferment



- Assumptions...

Elements of funding: projecting future benefits

Financial Assumptions

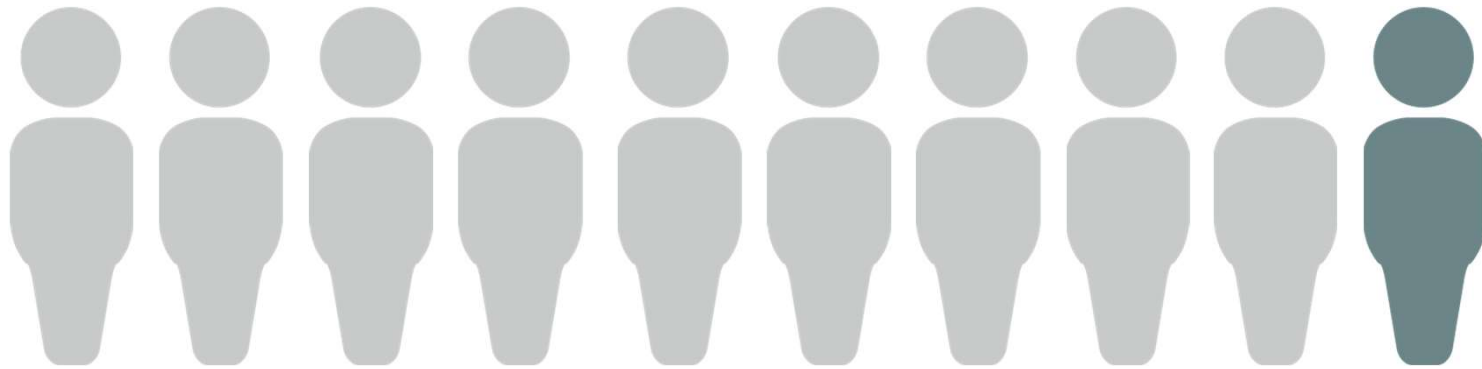
- Salary increases
- Inflation
- Pension increases
- Investment returns for different asset classes
 - For discounting...
-

Demographic Assumptions

- Withdrawal rates
- Retirement rates, including ill health
- Proportion with dependants
- Mortality rates (life expectancy)
- Options exercised
-

Implicitly assume that all underlying member data
is complete, correct and up to date

Elements of funding: projecting future benefits



9 in 10 members take max cash

=

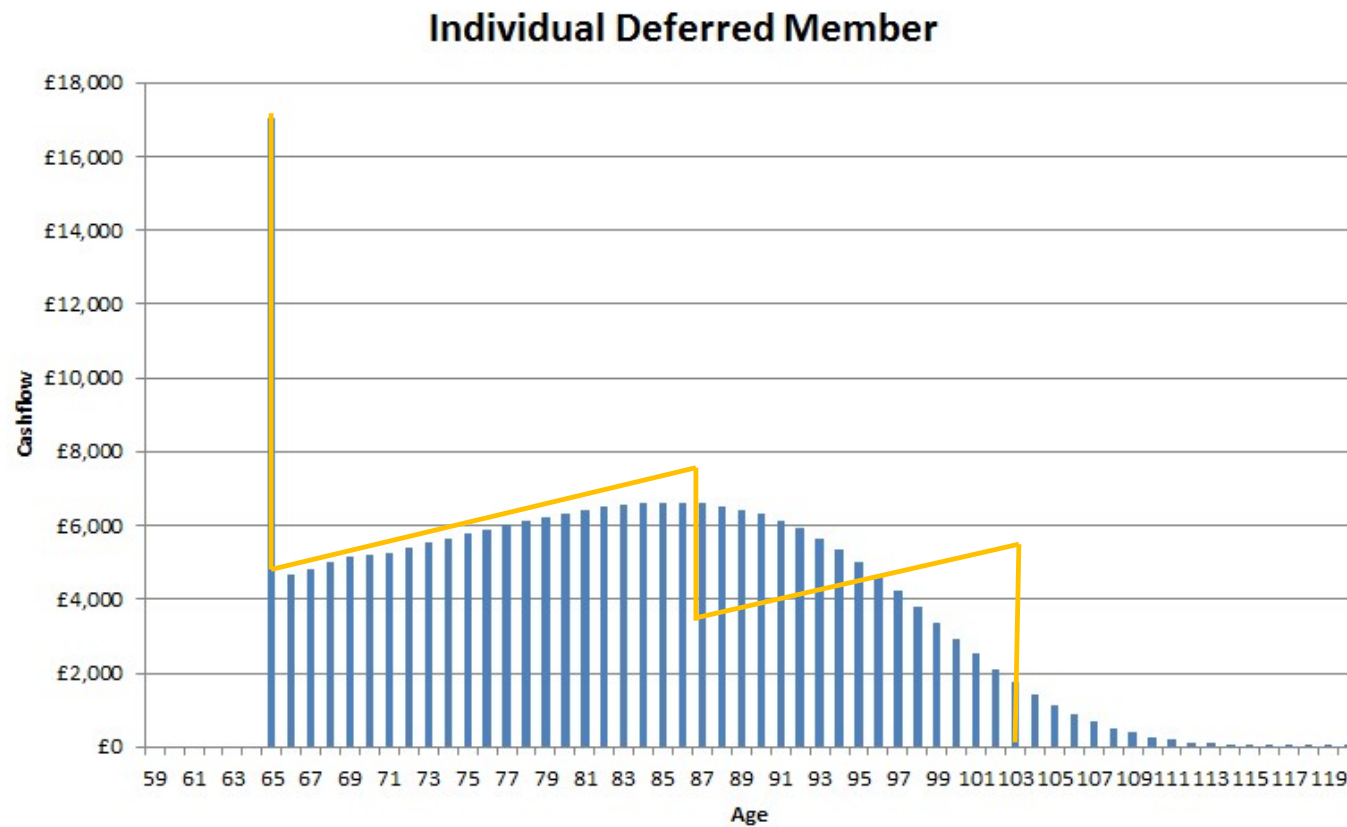
All members take 90% of max cash

9 in 10 members alive

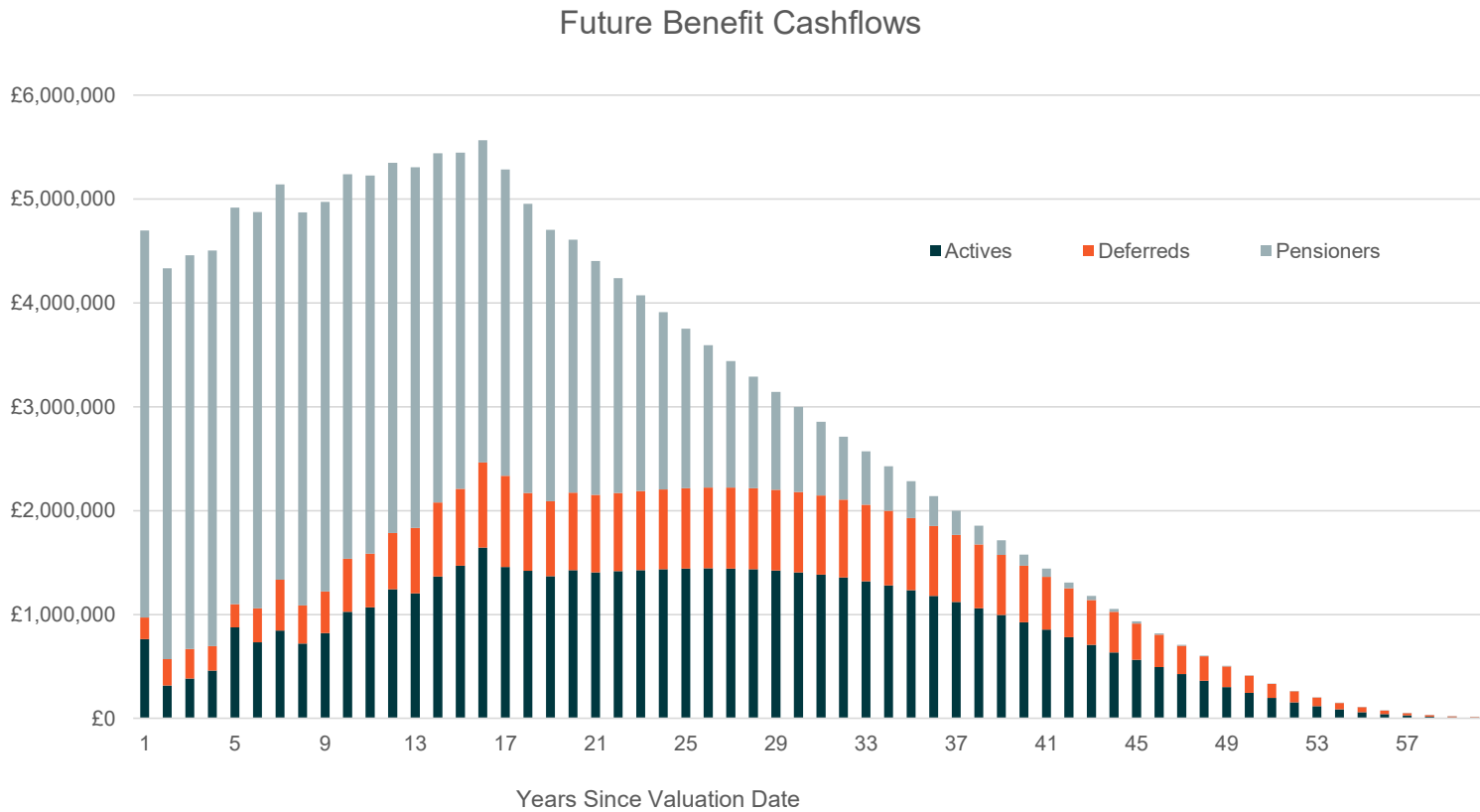
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90% of benefits remain in payment

Elements of funding: projects future



Elements of funding: projecting future benefits

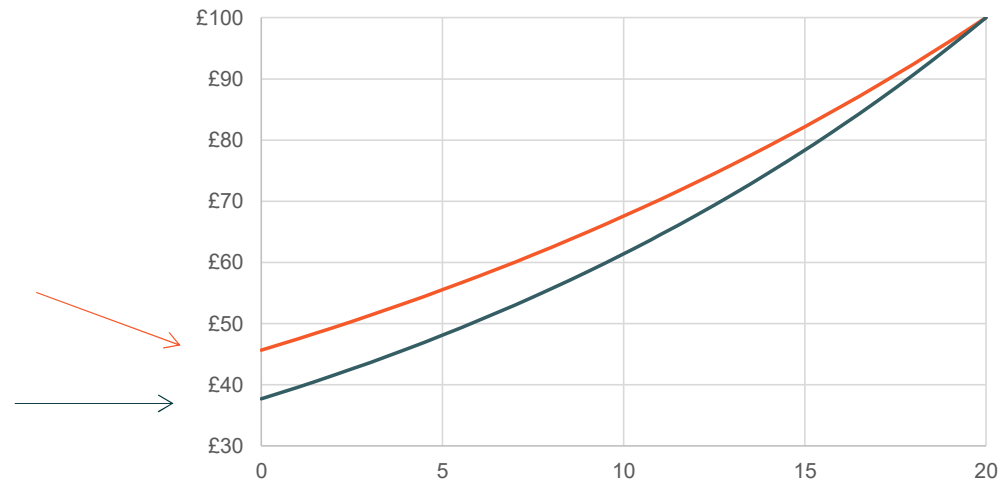


Elements of funding: discounting

- **For most purposes, discounted cash flows are more convenient than actual cash flows:**
- How much do you need now for a payment of £100 due in 20 years' time?

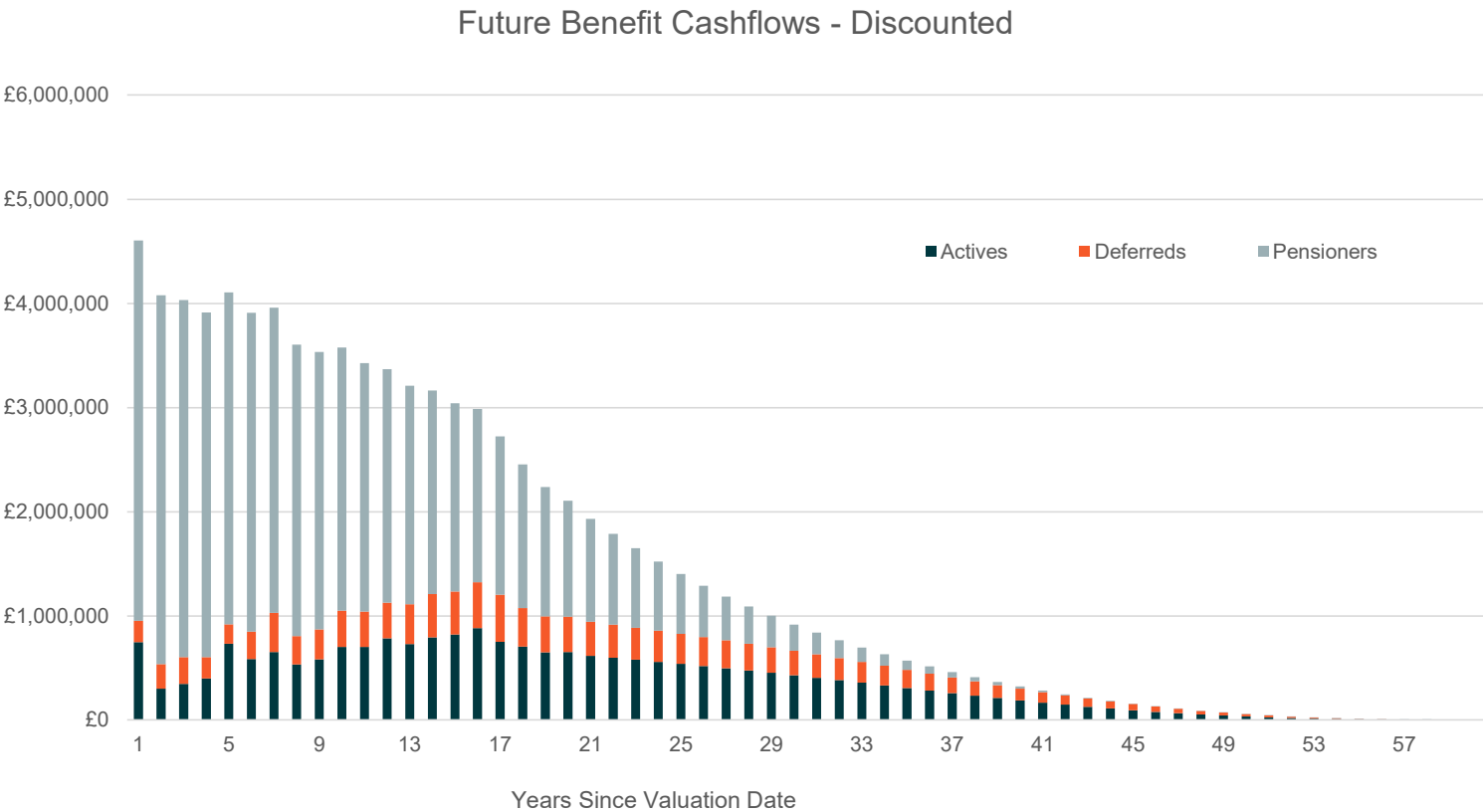
£46 if discounted at 4% p.a.

£38 if discounted at 5% p.a.
(around 18% less)



- **Apply probabilities to uncertain payments: £38 x 90% = £34**

Elements of funding: discounting



Discount and sum all expected cash flows to determine the total present value

Interlude – some terminology:

- The sum of money required now to meet a future liability is usually referred to as the present value of the liability.
 - Actuaries may refer to this as the discounted value.
 - Sometimes just use liabilities for short but can cause confusion
 - New Term: Technical Provisions
- The rate of interest used to derive the present value is referred to as the discount rate.

Elements of funding: recap

- The level of benefit payments depends on future salary growth, inflation etc.
- The likelihood of a benefit being paid depends on life expectancy, as well as marital status etc.
- Actuarial present values require a discount rate to be chosen, which is related to assumed future investment returns.
- Cautious (“prudent”, “strong”) assumptions place a higher value on the liabilities. Optimistic (“weak”) assumptions place a lower value on the liabilities

Key assumptions: Discount rate

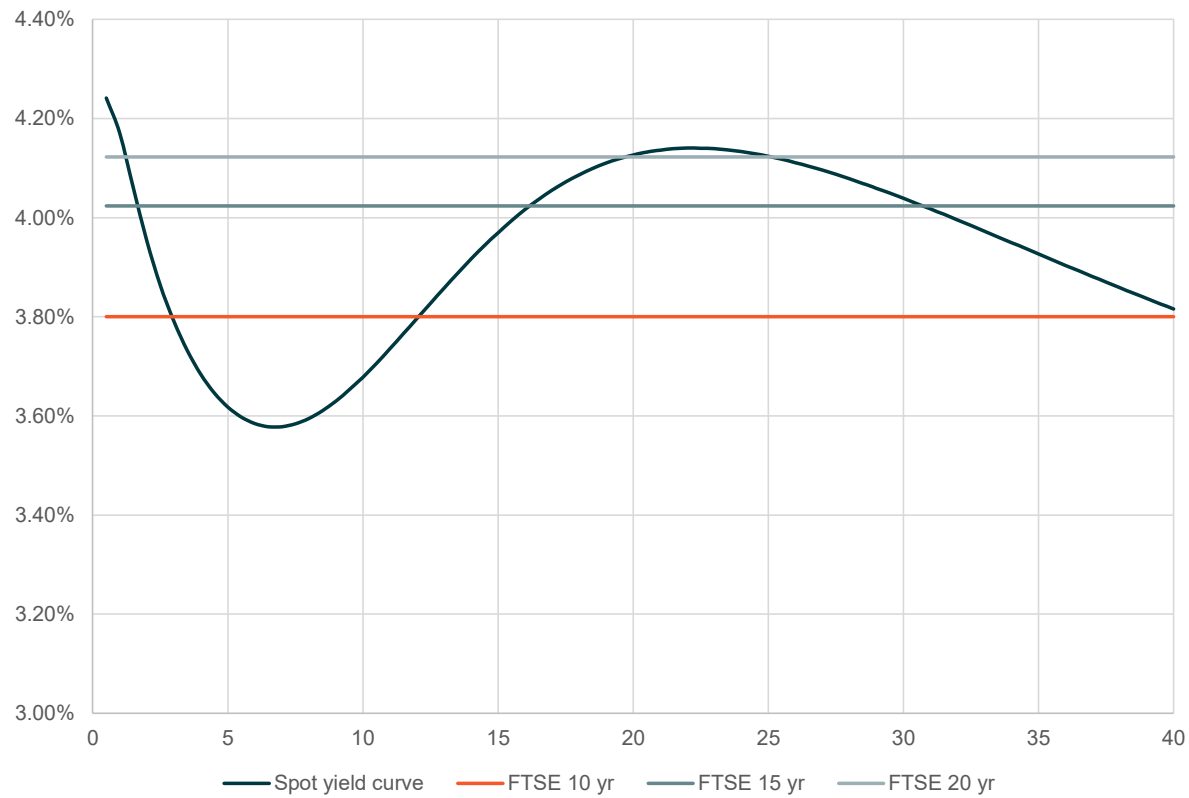
- Very significant impact – especially on cash flows a long time in the future
- Should not exceed expected return on investments
- Usually set between ‘risk-free’ rate and expected return
- Excess over the risk-free rate is referred to as the ‘risk premium’

Key assumptions: Discount rate

- Start with gilt yields, say 4.00% p.a.
- Addition (risk premium) for
 - Corporate bonds 0.5% - 2.0%
 - Equities 2.0% - 5.0%
 - Diversified Growth 1.0% - 4.0%
 - Property 1.0% - 3.0%
- Overall could use anything from 4.00% to 9.00% p.a. This gives a very wide range of results!

Key assumptions: Discount Rate

Which gilt yield to use?



(Data at 30 April 2023)

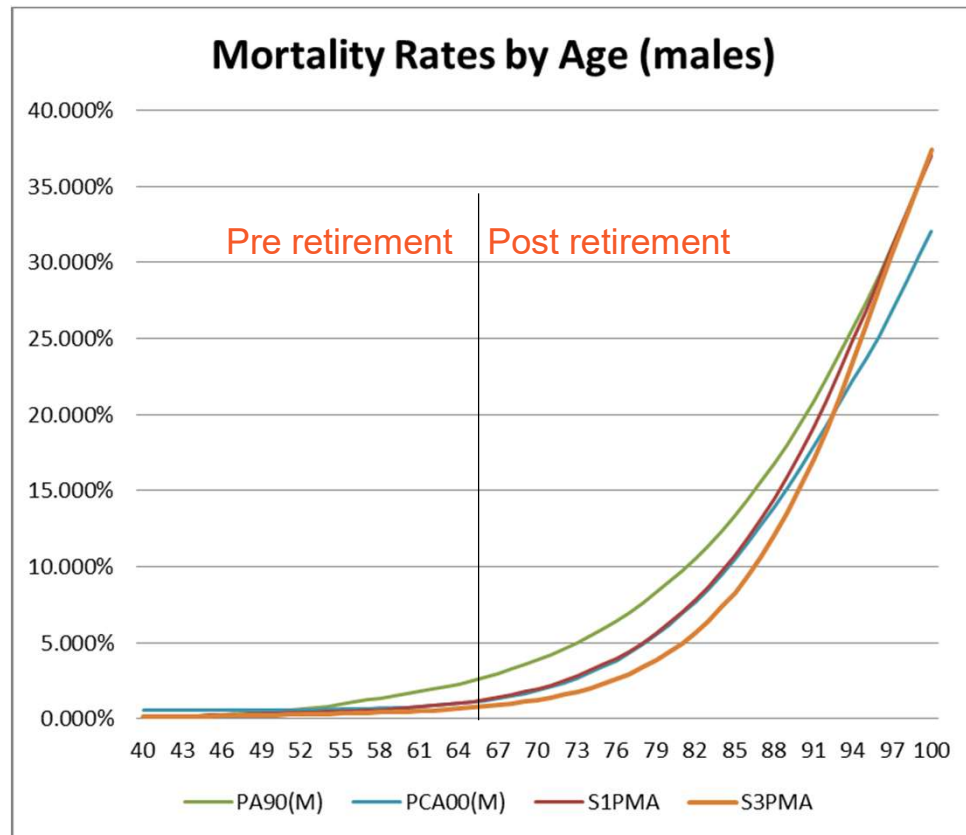
Key assumptions: Discount rate

- Single discount rate method
 - The same risk premium is used for all future cashflows
- Dual discount rate method
 - Reflects expectation of future investment strategy
 - Pre-retirement, assume invested in assets that seek growth (for Employer affordability)
 - Implicitly assume that as members come to retirement, assets are switched into bonds (manage volatility of financial position, ultimately for security)

Key assumptions: Life Expectancy

- Actuaries use mortality rates rather than life expectancy
- E.g. if 100,000 lives age 65 and 1,000 die within a year, the mortality rate at age 65 is 1%
- Life expectancy is easier to communicate
- Extensive data, but not always easy to apply
- Two assumptions
 - Current ('base') mortality rates
 - Future improvements to mortality rates

Key assumptions: Life Expectancy



PA90 – data collected from **insurance companies** between 1987 and 1989

PCA00 – data collected from **insurance companies** between 1999 and 2002

S1PA – data collected from **pension schemes** between 2000 and 2006

S3PA – data collected from **pension schemes** between 2009 and 2016

Mortality rates – Sources of data

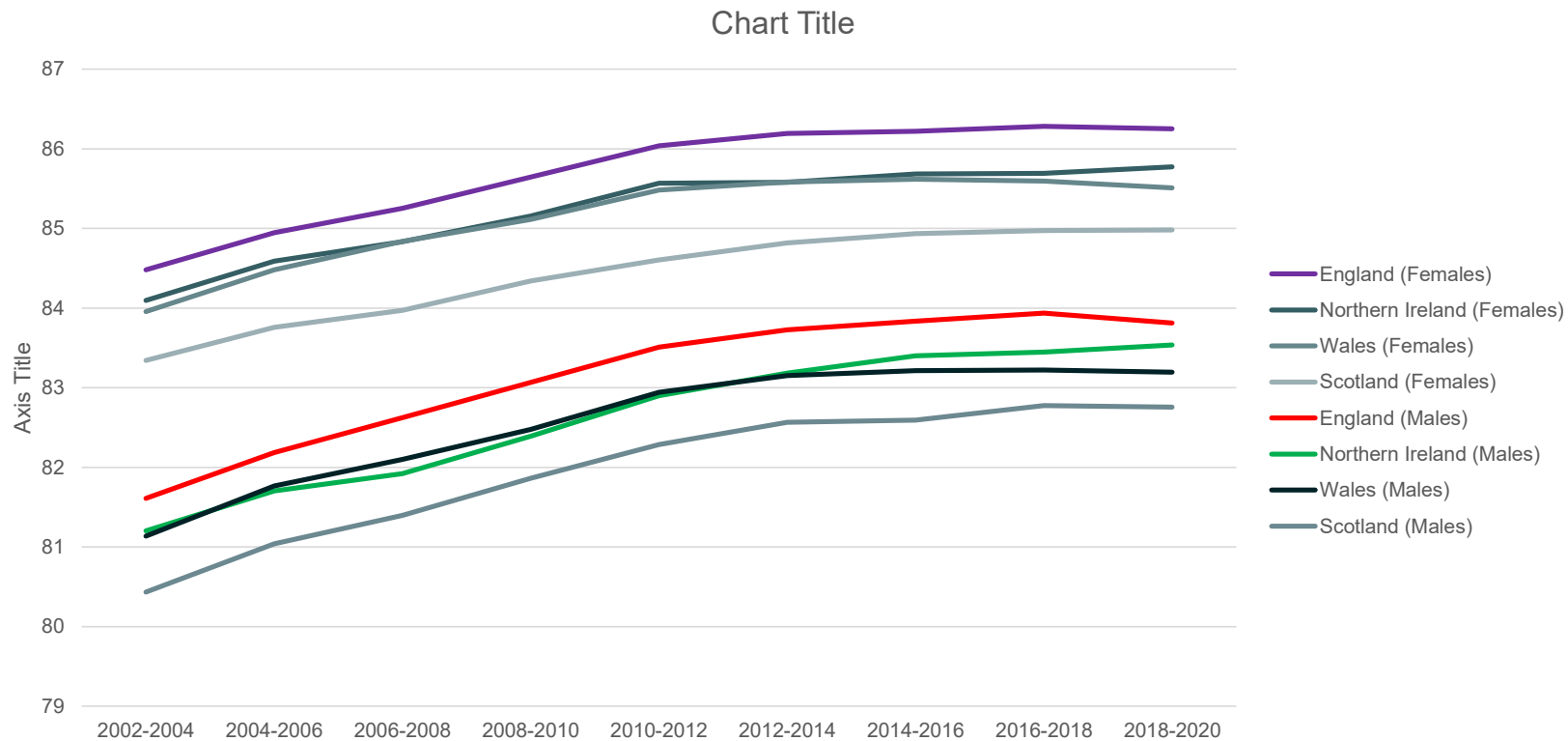
- Office for National Statistics / Government Actuaries Department
- Actuarial Profession (CMI)
 - Insurance company data
 - SAPS
- Own scheme experience
- Other sources (e.g. international)

Variation in life expectancy

- Gender
- Age
- Pension funds vs. general population
- Occupational factors
- Regional factors
- Pension size
- Variations over time

Life expectancy by region

Expected ages at death for 65 year olds



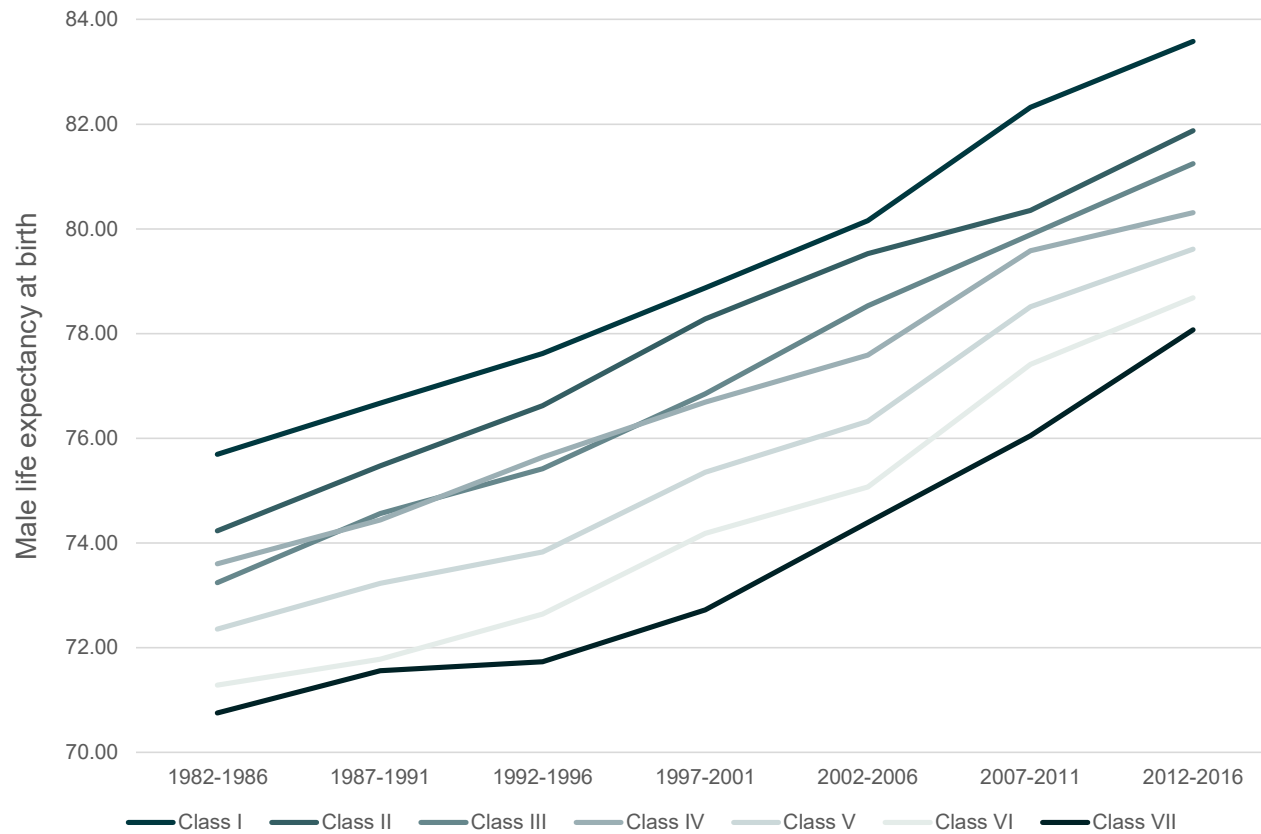
Source: ONS

Male life expectancy by local area (2018-20)

For a 65 year old

Highest	
Westminster	88.1
Kensington and Chelsea	88.0
Camden	86.9
Hart	86.0
Lowest	
Glasgow City	80.3
Manchester	81.0
West Dunbartonshire	81.0
Kingston upon Hull	81.2

Trends in life expectancy by socio-economic class



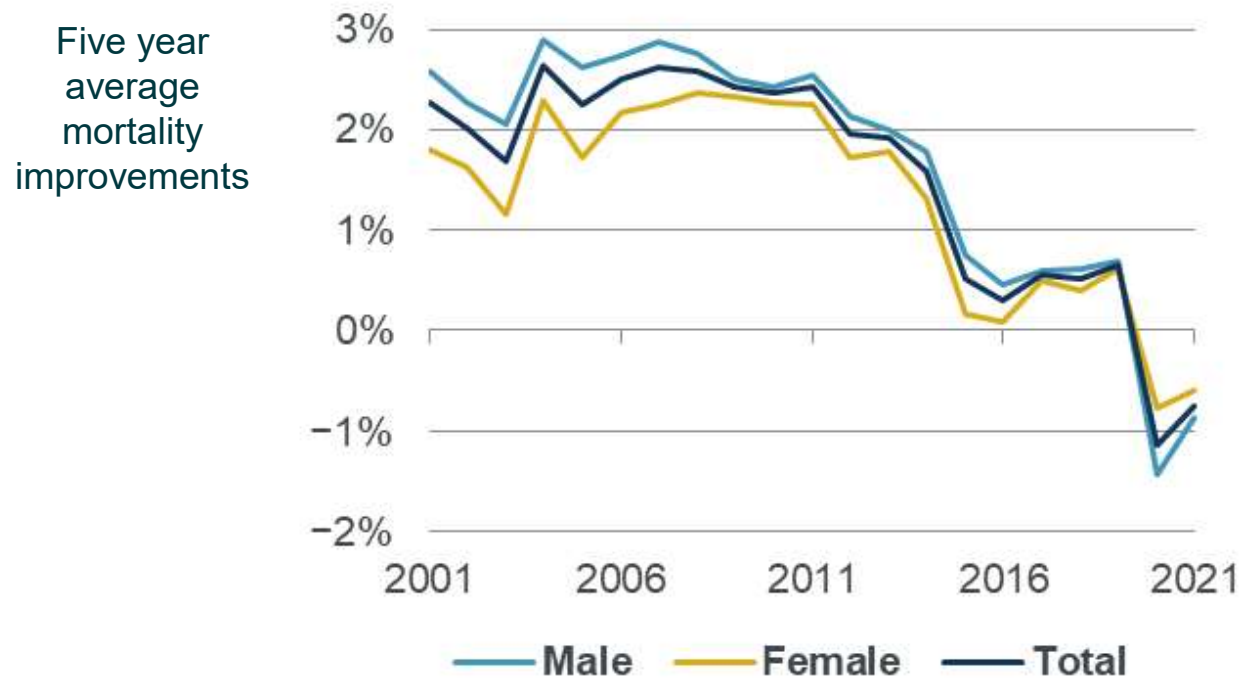
Measuring Mortality Improvements

- Rate of improvement compares the proportions dying *at each age* from *one year to the next*.

E.g.

- if 1.00% of males aged 65 died in 2018, and 0.97% of males aged 65 died in 2019
- The mortality rate (for males at age 65) has improved by 3%
- In practice, a lot more information is required to establish trends.

Mortality trends, 2001 to 2021

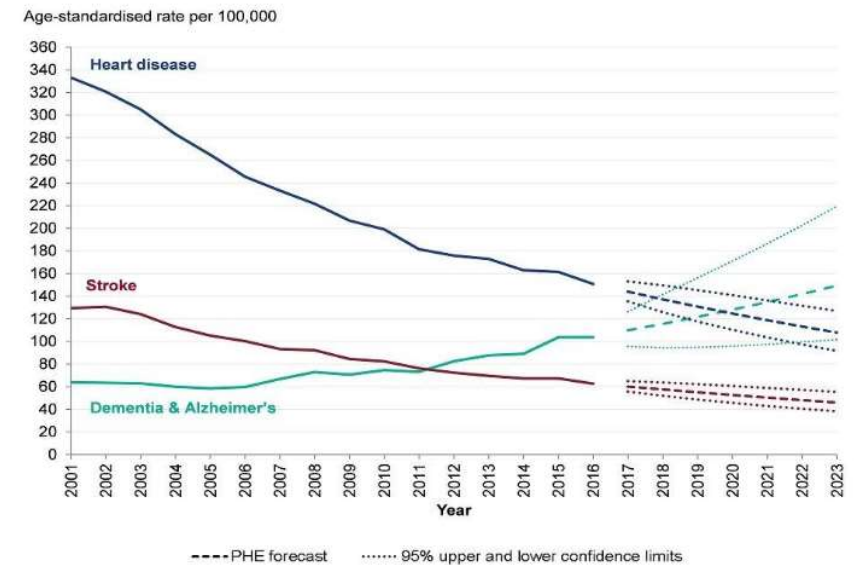


Average mortality improvements were 2% p.a. or higher for most of the period 2001-2011, but have since fallen to around 0.5% p.a. (2020 and 2021 notwithstanding)

Source: CMI

Possible future scenarios

- Improvements revert to a higher rate
 - As each major cause of death is reduced, medical resources are re-deployed and successfully tackle the next most significant cause
- Improvements continue at a slower pace
 - Other factors take over (e.g. obesity and inactivity); reduction in smoking levels off.
- No further improvements (or even reversal?)
 - Obesity, climate change, pandemics etc...



Source: Public Health England

What impact might Covid-19 have?

Lower Life Expectancies

- Direct impact (>200,000 'COVID' deaths)
- Indirect deaths (delays in treatment etc)
- Lasting effects on those infected
- Effects on unemployment, levels of debt, etc
- Further pandemics?

Higher Life Expectancies

- Average health of post-Covid population
- Change in work-life balances
- Better hygiene practices
- Better diet?
- People getting fitter?
- Future responses?

Approaches in practice

- Select 'base' mortality using best available information on current mortality for your scheme.
- Overlay an allowance for improvements – based on year of birth:
 - Most schemes will be using the latest 'CMI' model (2021)
 - Need to make an assumption on long-term improvements
 - Typically assume rates revert to between 1% and 2% p.a.
- If risk is unacceptable, consider insurance or hedging



Questions?



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