Continuous
Mortality Investigation

Institute and Faculty of Actuaries

The Pandemic and Projections

Cobus Daneel

Agenda

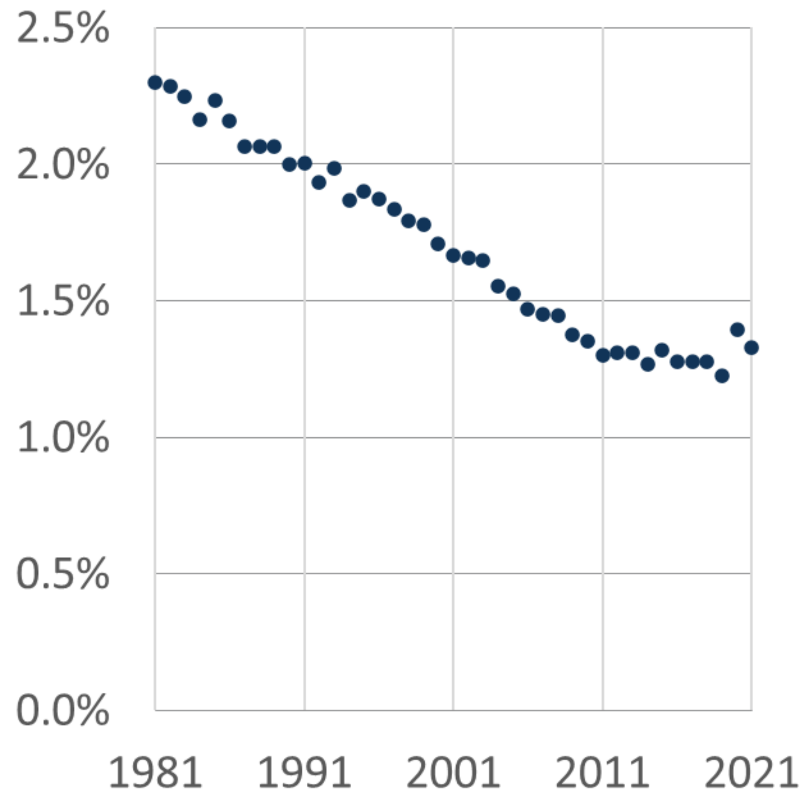
- CMI update:
  - Recent mortality
  - CMI Mortality Projections Model
  - Future plans
- Personal views

Recent mortality

Historical mortality rates

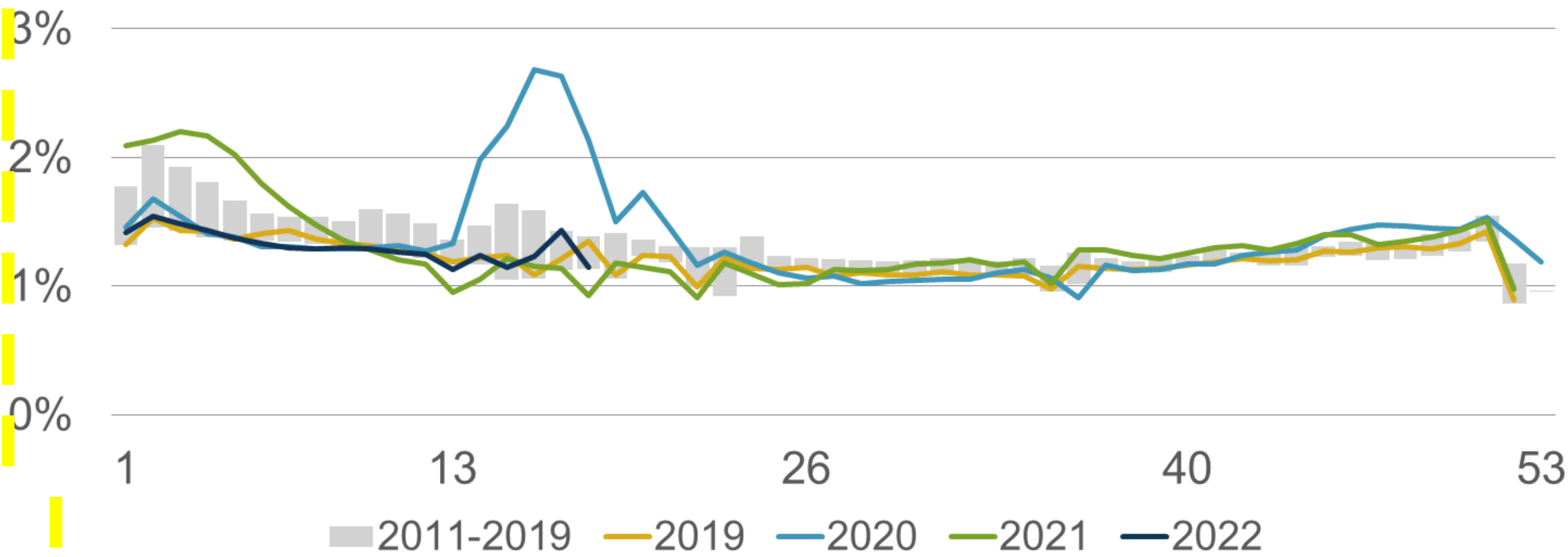
- Mortality varies by age and sex. Age-standardised mortality rates (ASMR) are a form of average that control for changes in population.
- Mortality rates fell by about 45% between 1981 and 2011.
- Notably slower fall after 2011.
- High mortality in 2020 and 2021 due to the COVID-19 pandemic.

England & Wales ASMRs



Mortality during the pandemic

Weekly standardised mortality rates in England & Wales for 2011 to 2022



- Exceptional mortality particularly in April 2020 and January 2021.
- Mortality in 2022 to date similar to that in 2019.

CMI Mortality Projections Model

CMI Model overview

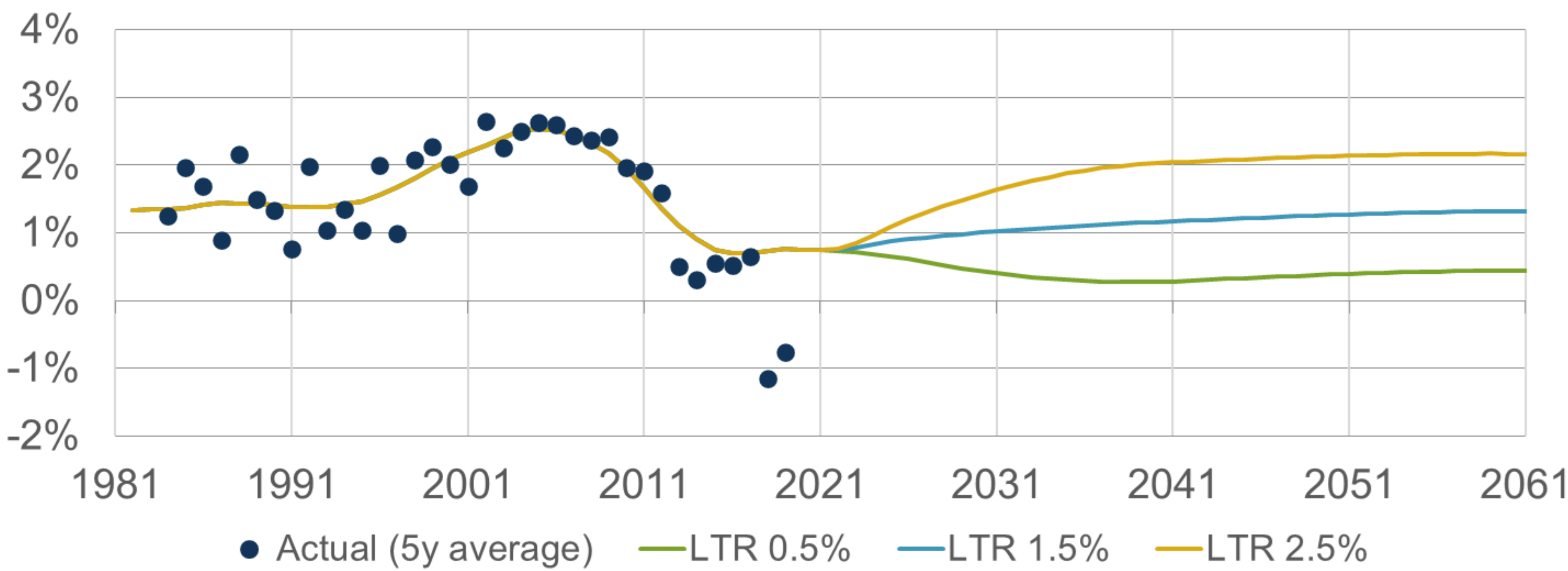
- A model of mortality improvements (i.e. percentage reductions in mortality from year to year) for the England & Wales general population.
- The CMI Model interpolates between “initial” and “long-term” improvements:
  - Initial improvements based on historical data.
  - Long-term improvements specified by the user.
- CMI provides assumptions for everything except the long-term rate. Users can vary these to reflect their views, and different populations.
- Encouragement to consider key assumptions:
  - Period smoothing parameter – sensitivity to new data
  - Initial addition – allow for socio-economic differences
  - Weight for 2020 and 2021 data – impact of the pandemic

Impact of different parameters

- The following charts show results from the latest version, CMI_2021:
  - Actual five-year average mortality rates
  - Fitted/projected mortality rates using different CMI Model assumptions
- Mortality improvements in the CMI Model vary by age and gender. For the charts we show average (age-standardised) improvements.
- We show:
  - standard (“Core”) assumption unless stated otherwise.
  - an illustrative long-term rate of 1.5% p.a. (except where varied).

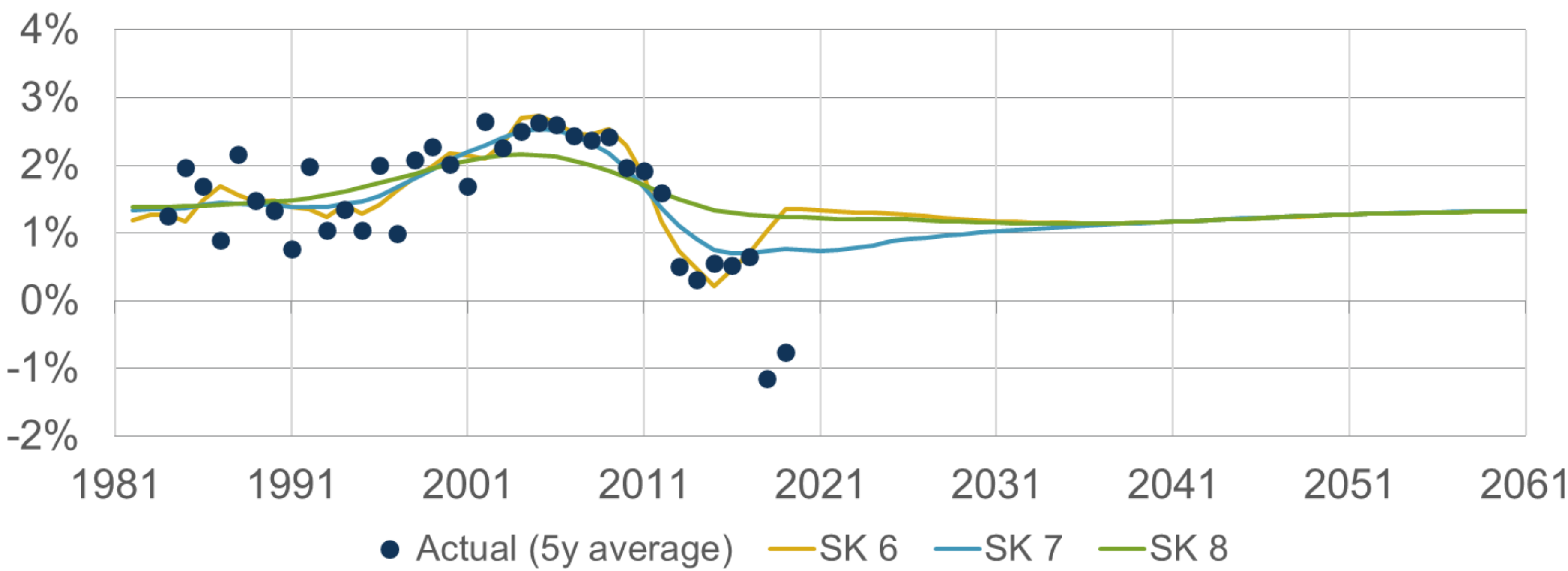
Impact of long-term rate

- No impact at the start (2021)
- Full impact after 20 years only (2041 onwards)



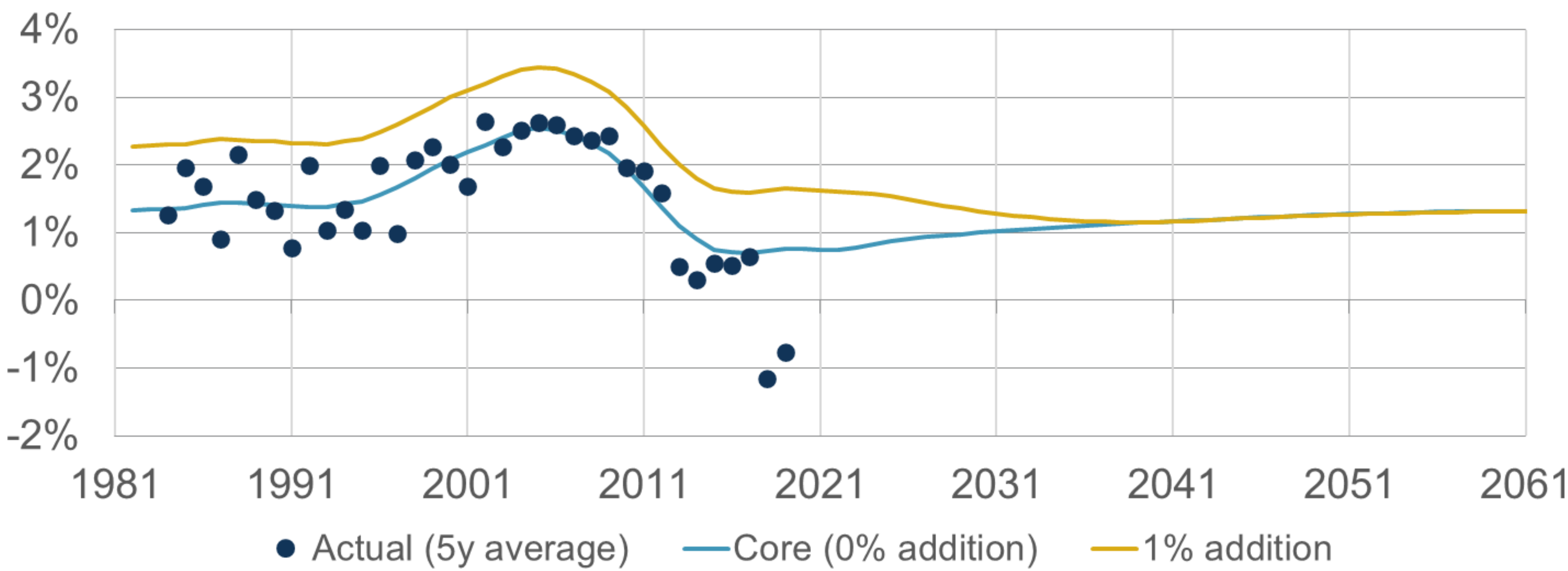
Impact of period smoothing parameter (S_κ)

- S_κ of 6 reacts quickly to changes in mortality
- S_κ of 8 reacts slowly to changes in mortality
- For CMI_2021, S_κ of 7 leads to lower initial improvements than 6 or 8



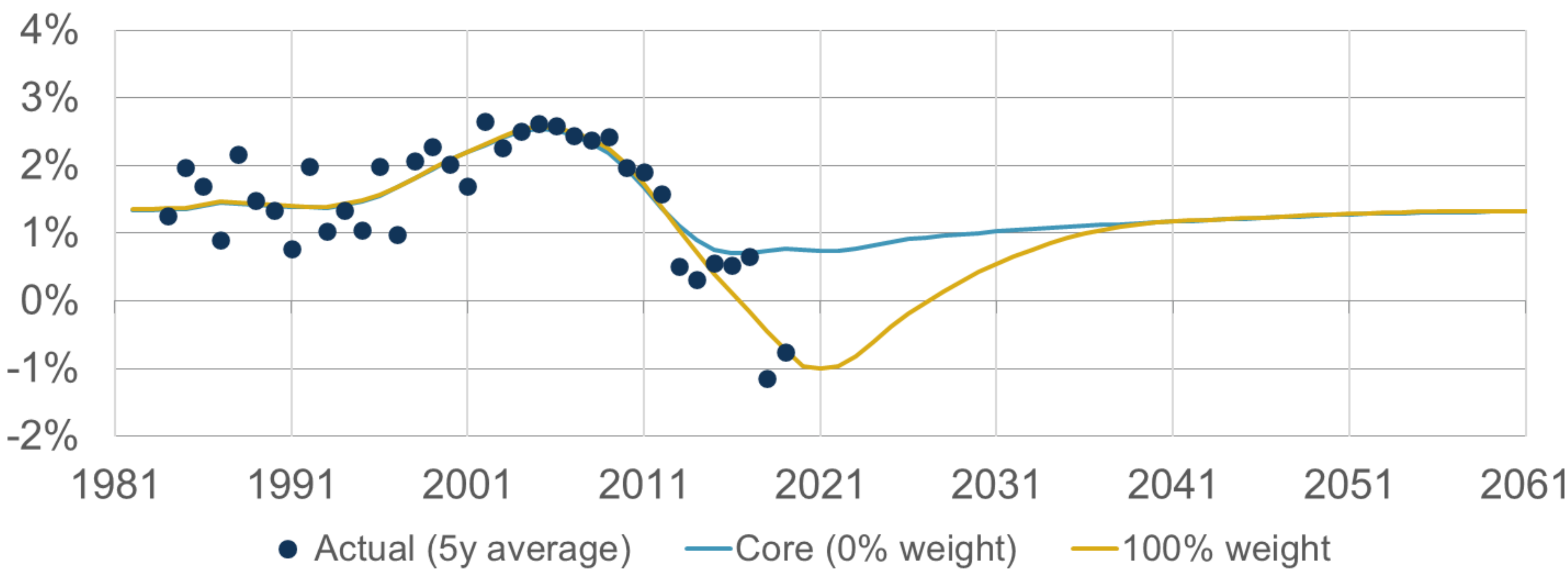
Impact of initial addition (A)

- Initial addition affects initial and past improvements
- Impact disappears after 20 years



Impact of weights for 2020 and 2021 data

- Full weight would have led to negative initial improvements, and persistent low improvements.



Future plans

2021 England & Wales census

- England & Wales census carried out in in March 2021.
- Phased release of results of the 2021 due to start this year.
- Could lead to revisions to ONS population estimates for 2012-2020.
- CMI will monitor the output and its impact on the CMI Model.
- Usual March release date for CMI_2022 might be delayed depending on ONS release schedule.

Future versions of the CMI Model

- CMI_2022 expected to be a largely “business as usual” version:
  - Possible impact of the census, as noted
  - We expect to put weight on 2022 data unless experience in the rest of the year is clearly unusual

- About to start a review of the CMI Model
  - First thorough review (as opposed to “fixes”) since CMI_2016
  - Scope likely to include overall structure, model complexity, goodness of fit, and software

CMI Model parameters

- Personal view

- 24 May 2022

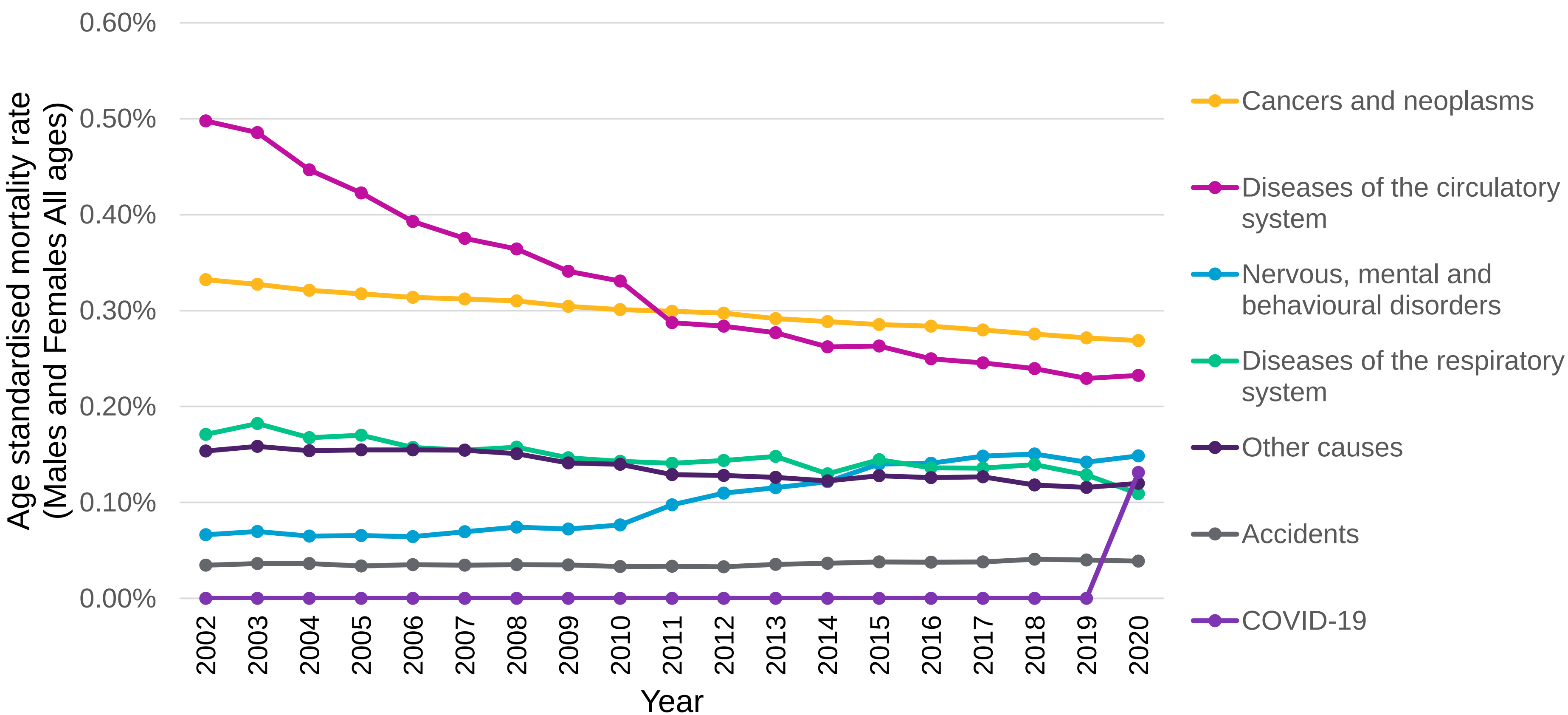
Personal view

Allowing for COVID-19

- 2020 and 2021 will automatically come through as an experience item – it is about what happens in the future
- In time the CMI Model will converge to the post-COVID trend in time
- The 2020 and 2021 weights have an additive effect (at lower values)
- There is more than one way to allow for COVID-19 in mortality assumptions (e.g. weight parameters, long-term rate or base table multipliers)
- COVID-19 will have many direct and indirect effects and it is still only one element of a much wider picture
- Prudent assumptions may be less affected than best estimates

Personal view

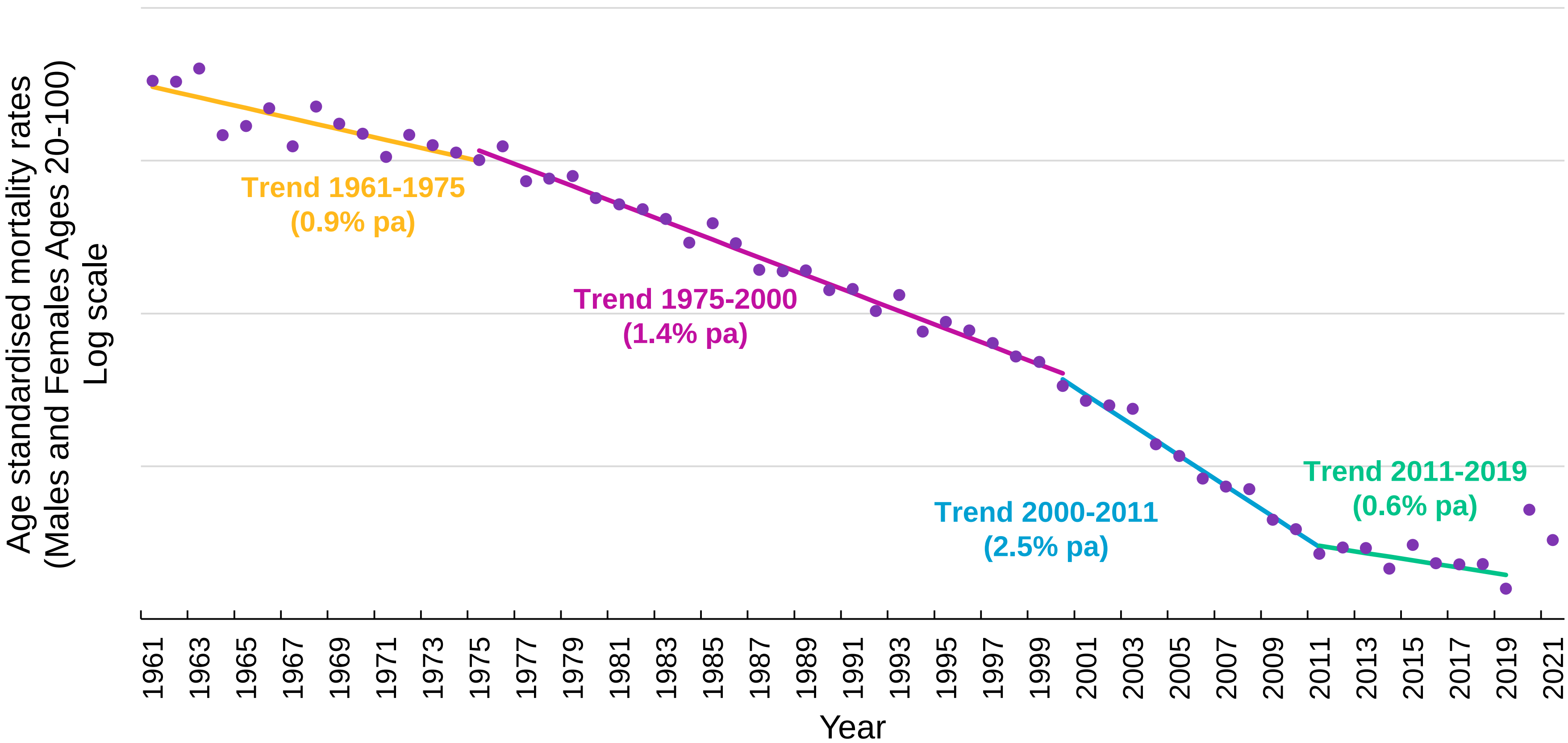
Causes of death



Source: WTW based on data published by ONS. SMRs are estimates based on age banded data.

Personal view

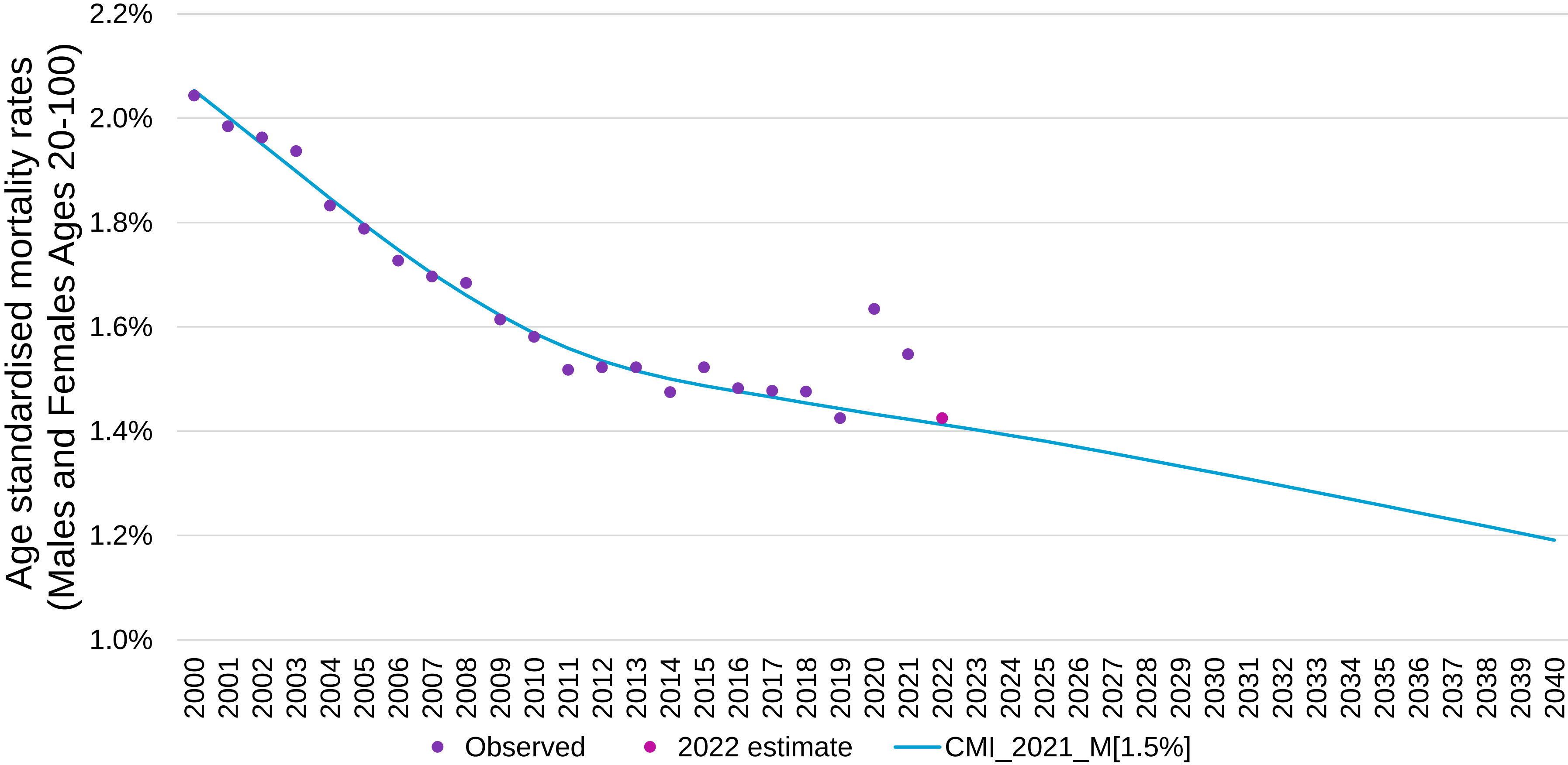
Historical context



Source: WTW based on data published by ONS and CMI (including high age adjustments)

Personal view

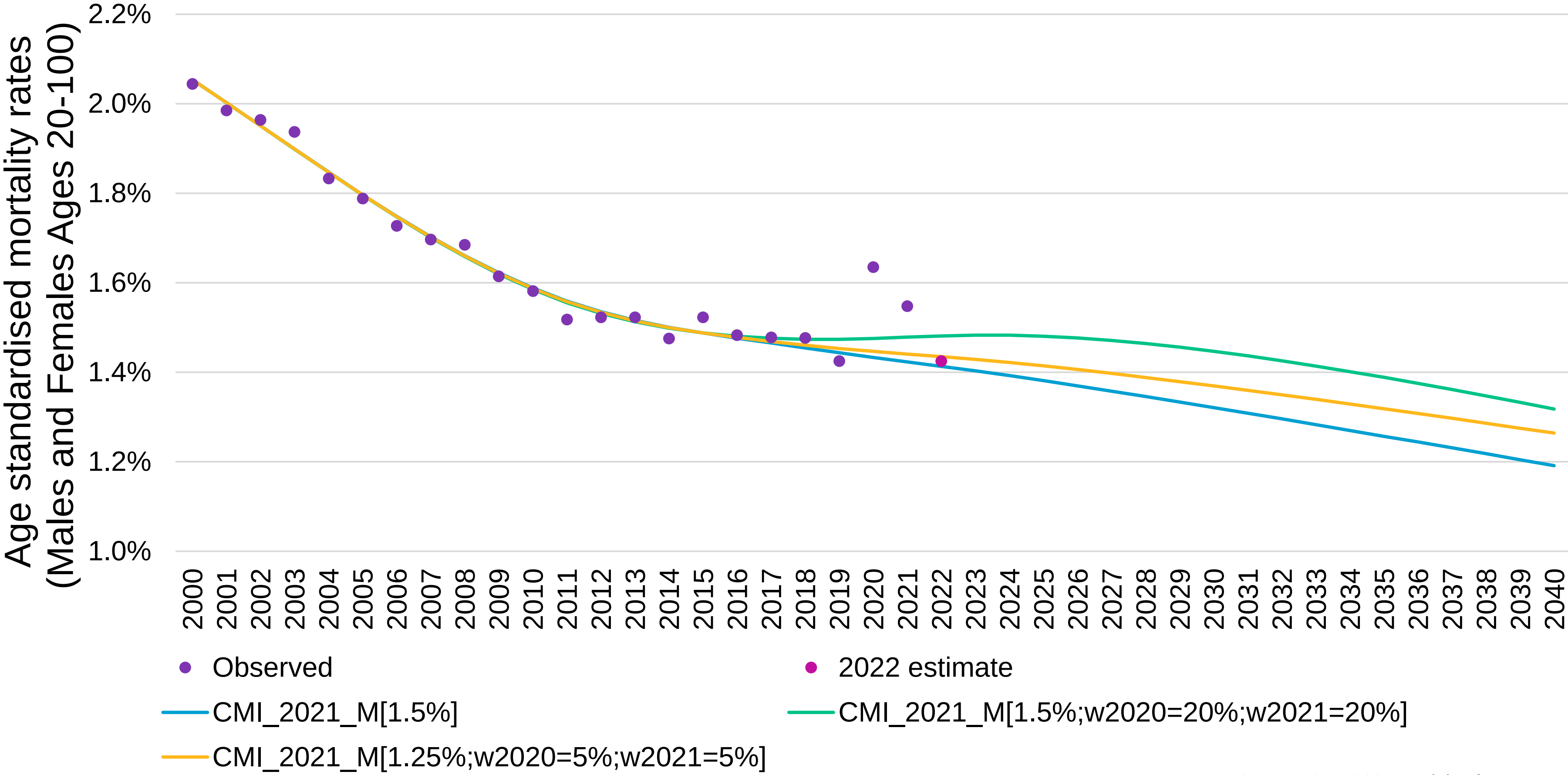
Projecting forward



Source: CMI_2021 model software

Personal view

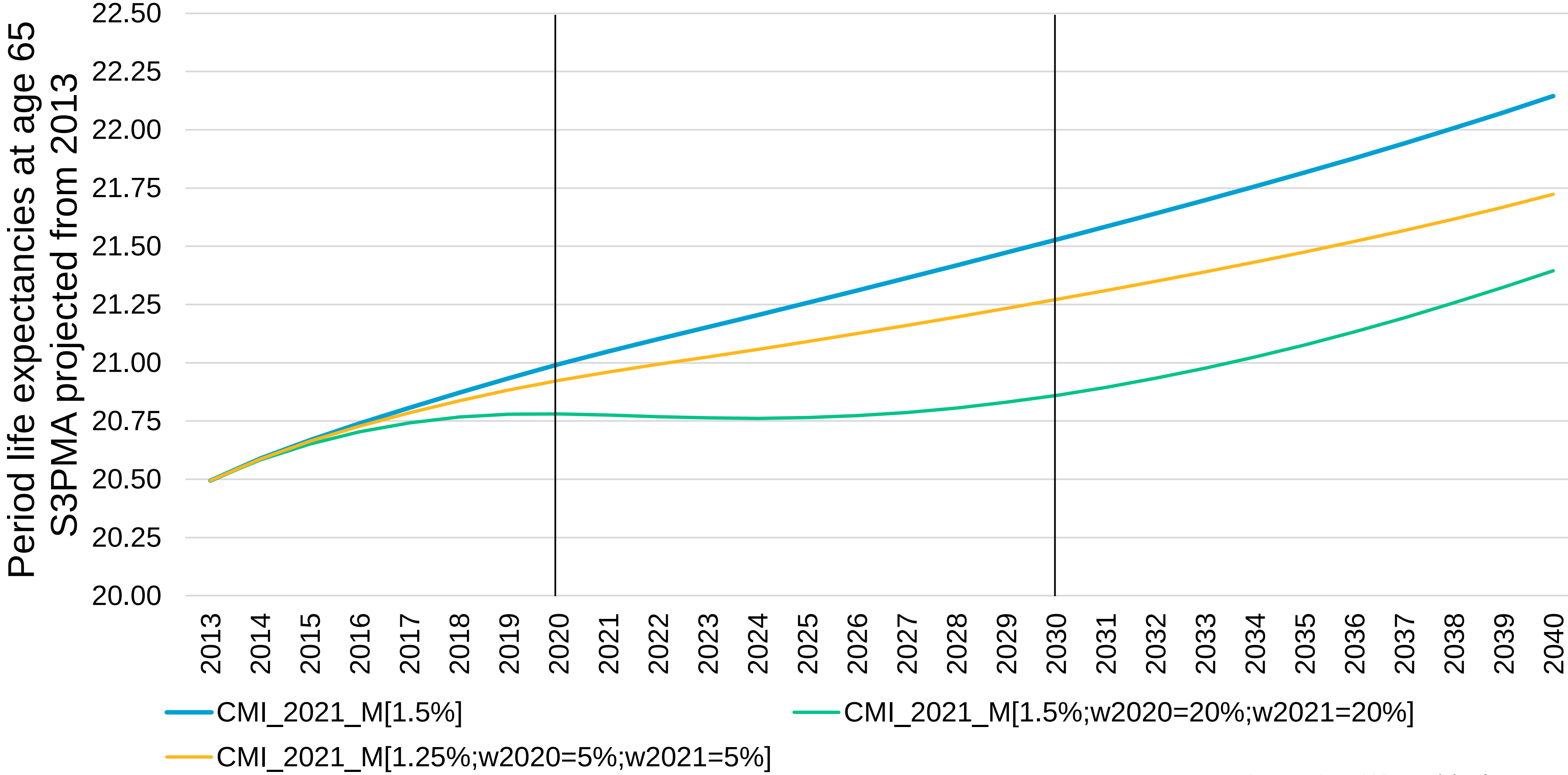
Potential paths of mortality rates



Source: CMI_2021 model software

Personal view

What does it mean in terms of life expectancies



Source: CMI_2021 model software

Personal view

My best estimates (24 May 2022)

Parameter	My best estimate	Comfortable range	Outer edges
Long term rate	1.25% pa	1% - 1.5% pa	0.75% - 1.75% pa
Smoothing parameter (S_κ)	7	6.5 – 7.5	6 - 8.5
Initial addition (A)	Dependent of socio-economic composition of population	0% - 0.75% pa (skewed towards bottom end of range)	0% - 1.0% pa
Weight parameters (w_{2020} and w_{2021})	5%	0% - 10%	0% - 20%

Personal view

Comments on TPR’s 2% liability impact figure

- It is a limit, not a target
- What is the starting point?
- What is the Scheme’s longer term objective? If you are targeting buy-out should more attention be paid to assumptions adopted by insurers?
- Where is the prudence?
- It is not a limited time offer
- TPR likely to take holistic view

Questions

Comments

The views expressed in this presentation are those of the presenter.

Continuous
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