CMI update on pension scheme mortality assumptions

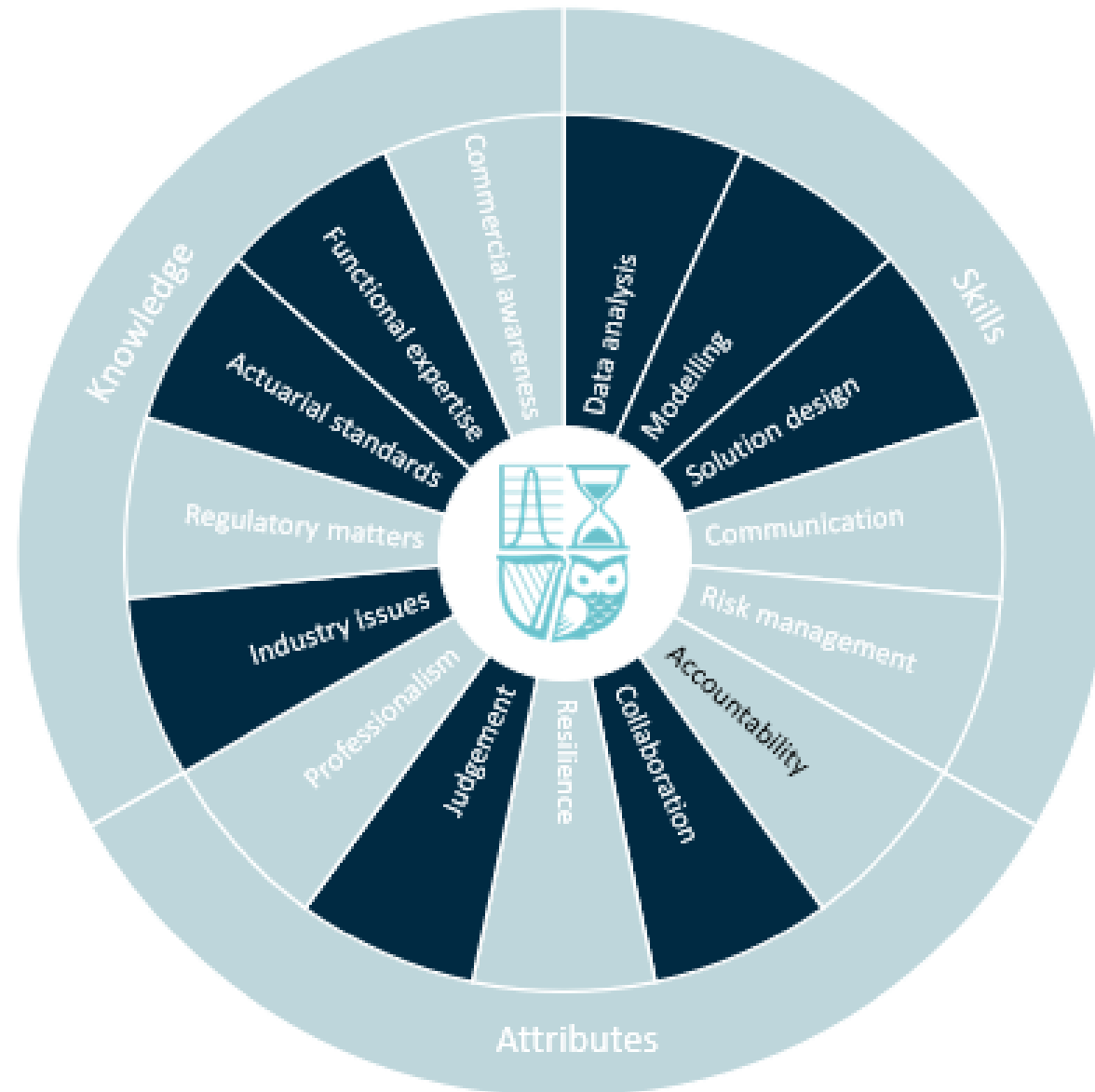Matt Fletcher & Cobus Daneel (Chair Ger Nolan)

12.03.2024

Disclaimer

The views expressed in this presentation are those of the presenter(s) and not necessarily those of their employer(s) (if any) or the Society of Actuaries in Ireland.

Competency Framework Wheel

CMI update for pension schemes
Society of Actuaries in Ireland webinar

Cobus Daneel (Chair of Mortality Projections Committee)
Matt Fletcher (Chair of SAPS Committee)

12 March 2024

Agenda

- The CMI

- Recent mortality – general population and pension schemes

- The "S4" Series of pensioner mortality tables

- CMI Mortality Projections Model and plans for CMI_2023

- Questions

About the CMI

- **Mission:** "To produce high-quality impartial **analysis, standard tables and models of mortality** and morbidity for long-term insurance products and **pension scheme liabilities** on behalf of subscribers and, in doing so, to further actuarial understanding."

- **Vision:** "To be regarded across the world as setting the benchmark for the quality, depth and breadth of analysis of industry-wide insurance company and pension scheme experience studies."

- Formed of various committees including:
  - Self-administered Pension Schemes (SAPS) – collect and analyse mortality data
  - Mortality Projections Committee (MPC) – mortality trends and projections

- Access to many CMI materials is limited to subscribers and academics
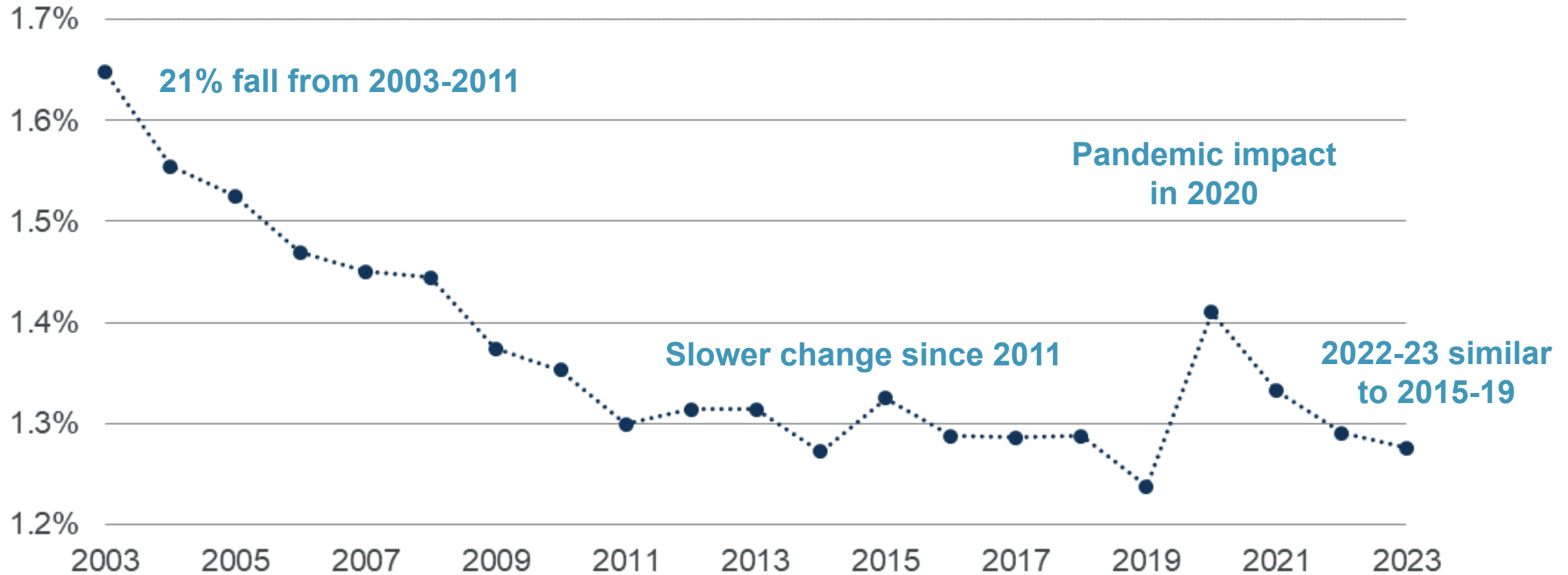
- Centenary year in 2024

About the CMI

- The CMI focusses on the UK:
  - SAPS data collected from UK pension schemes
  - Mortality Projections Model and most CMI analysis of the general population based on data for England & Wales
- Users of CMI analysis should consider to what extent is it relevant to other countries
- Occasional joint work with the Society of Actuaries in Ireland
  - "Calibration of the CMI Model for Ireland" (Working Paper 141, 2020)
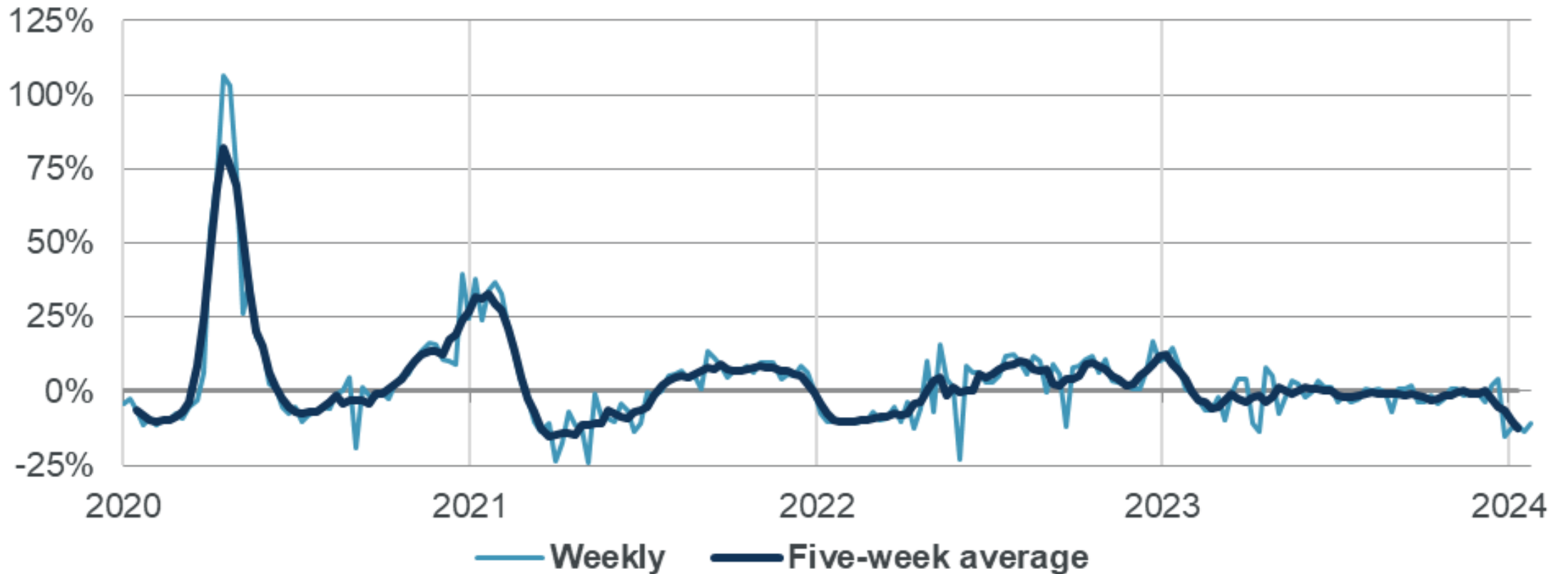 - Current project on Irish term assurances

Recent mortality

CMI update on pension scheme mortality assumptions

Historical mortality – England & Wales

Age-standardised mortality rates (ASMRs), ages 20 to 100, for England & Wales

21% fall from 2003-2011

Pandemic impact in 2020

Slower change since 2011

2022-23 similar to 2015-19

Mortality during the pandemic – England & Wales

Mortality relative to the 2015-2019 average for the corresponding week


Legend: Weekly — Five-week average

CMI mortality monitor

- Publicly available:

  - https://www.actuaries.org.uk/learn-and-develop/continuous-mortality-investigation/other-cmi-outputs/mortality-monitor

- Weekly summaries – analysing age-standardised mortality for England & Wales

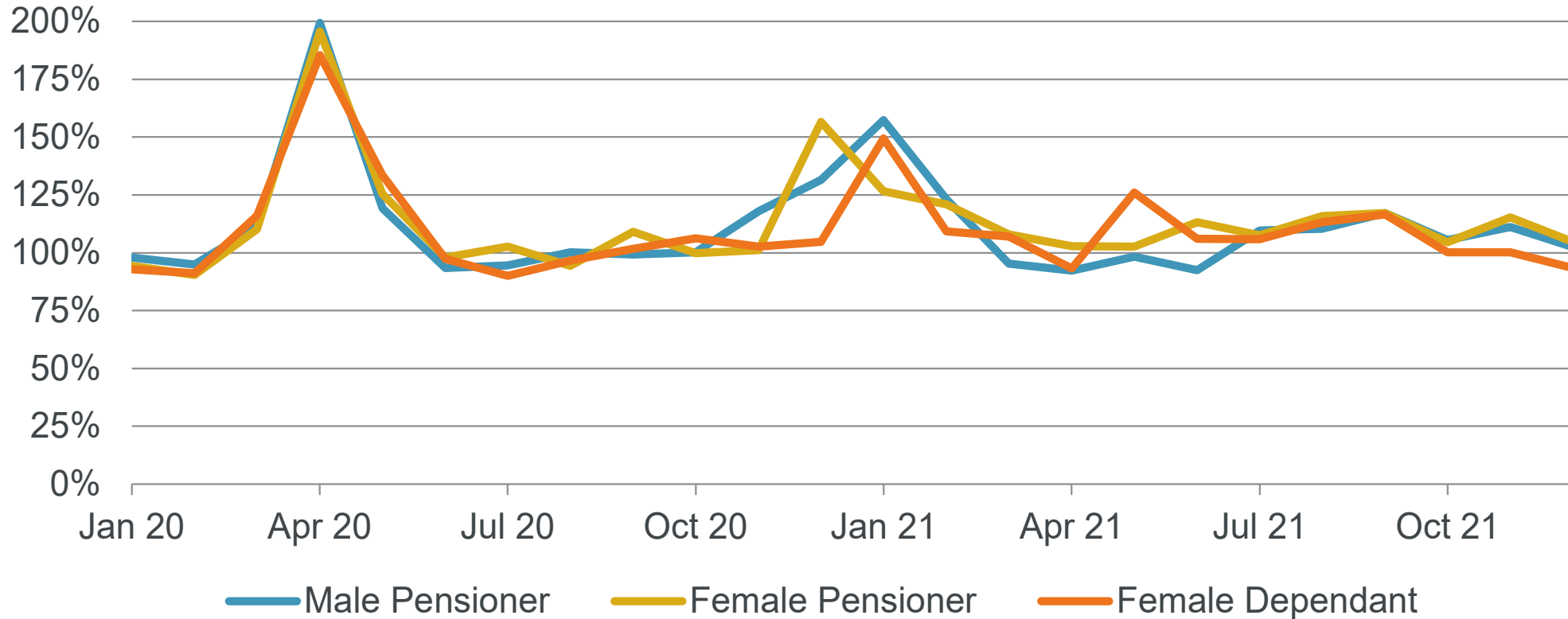- Quarterly more detailed updates – next one expected on April 10

Mortality in 2024 has relatively low so far

Chart 1: Weekly standardised mortality rates in England & Wales for 2011-2019 and 2022-2024

Legend: 2011-2019, 2022, 2023, 2024
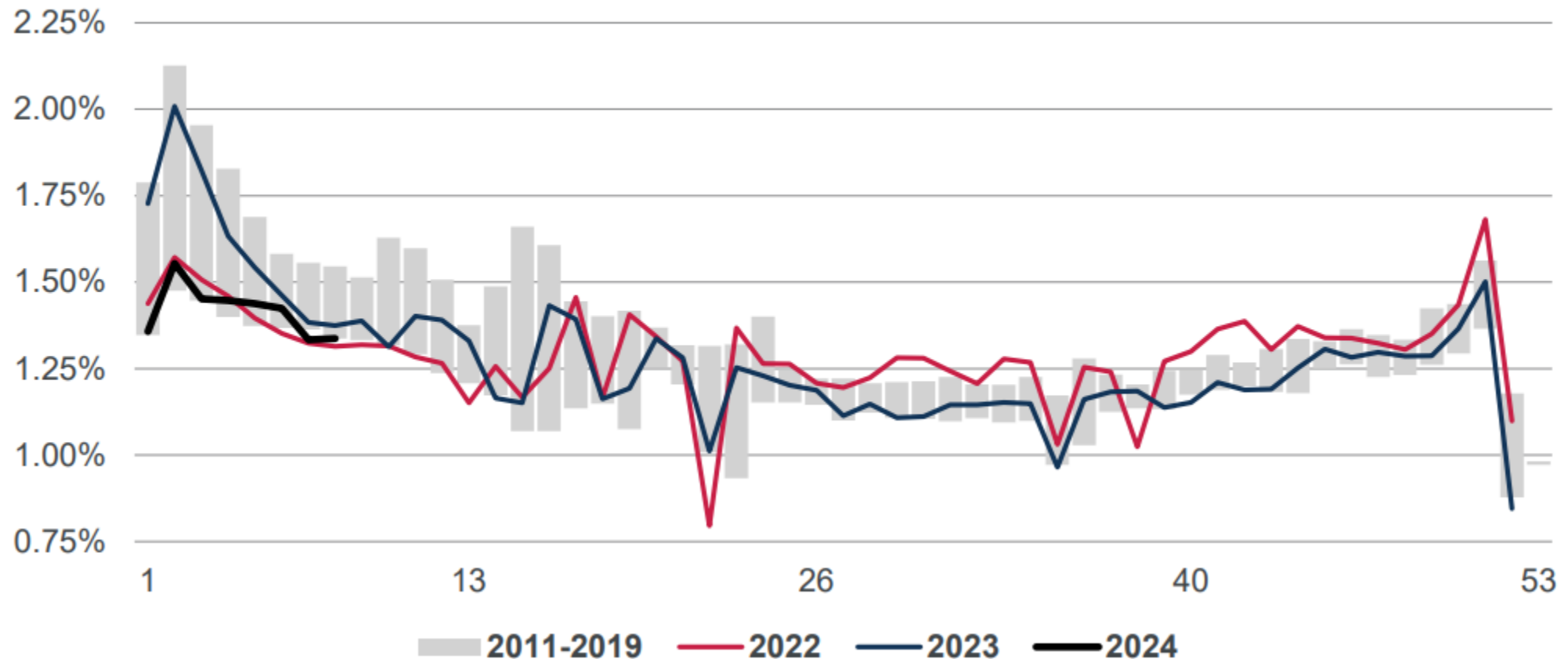
Mortality during the pandemic – SAPS dataset

Ratio of 2020 and 2021 monthly ASMRs to 2019

Legend: Male Pensioner, Female Pensioner, Female Dependant

Mortality during the pandemic – SAPS dataset

Changes in mortality between 2019 and 2020
## for different groups and measures, ages 60-95

Pensioner type	SAPS A/E increase	SAPS ASMR increase	E&W population ASMR increase
Male Pensioner	+10.5%	+10.6%	+15.0%
Female Pensioner	+7.8%	+9.0%	+12.4%
Female Dependant	+6.1%	+2.7%	

Mortality improvements – SAPS dataset

Five-year average improvements, males and females combined
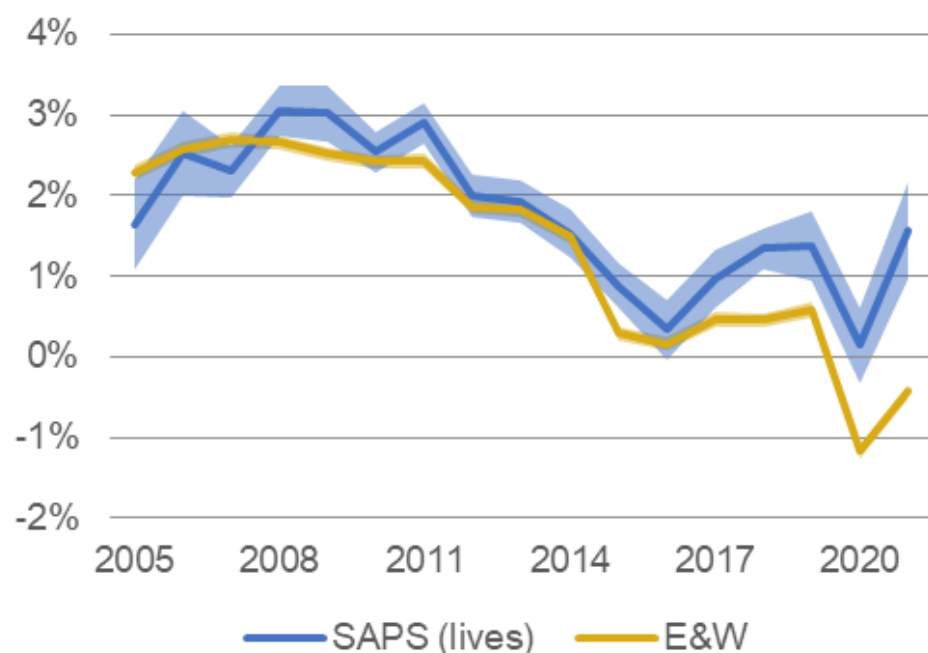
Differences in five-year average improvements, males and females combined
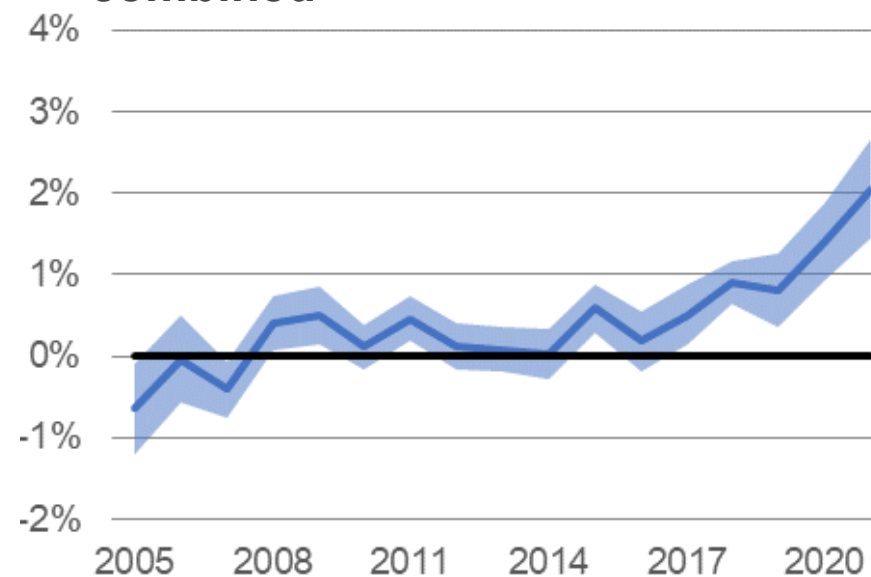
Note: Data used in SAPS improvement calculations uses c. 20% of total SAPS dataset

"S4" Series mortality tables

S4 Series mortality tables

SAPS tables published in 2008 (S1), 2014 (S2) and 2018 (S3)

S4 uses data for 2014-2019 – effective date of 1 January 2017

S4 updates the 30 "Non-IMD" tables included in the S3 Series

S4 has 12 new "IMD" tables based on IMD and pension amount

Index of multiple deprivation (IMD) is a geographical measure based on income, crime, education, health etc and has been shown to be correlated with mortality.

Non-IMD Tables

		Lives	Amounts All	Amounts Heavy	Amounts Middle	Amounts Light	Amounts Very Light
Pensioners	Males	PML	PMA	PMA_H	PMA_M	PMA_L	PMA_VL
Pensioners	Females	PFL	PFA	PFA_H	PFA_M	PFA_L	PFA_VL
Normal health	Males		NMA	NMA_H	NMA_M	NMA_L	NMA_VL
Normal health	Females		NFA	NFA_H	NFA_M	NFA_L	NFA_VL
Ill-health	Males		IMA				
Ill-health	Females		IFA				
Dependants	Males	DML	DMA				
Dependants	Females	DFL	DFA			DFA_L	DFA_VL

CMI update on pension scheme mortality assumptions

IMD Tables

		Group 1	Group 2	Group 3	Group 4
Pensioners	Males	PMA_G1	PMA_G2	PMA_G3	PMA_G4
Pensioners	Females	PFA_G1	PFA_G2	PFA_G3	PFA_G4
Normal health	Males				
Normal health	Females				
Ill-health	Males				
Ill-health	Females				
Dependants	Males				
Dependants	Females	DFA_G1	DFA_G2	DFA_G3	DFA_G4

SAPS Dataset by calendar year

Lives-weighted exposure by calendar year
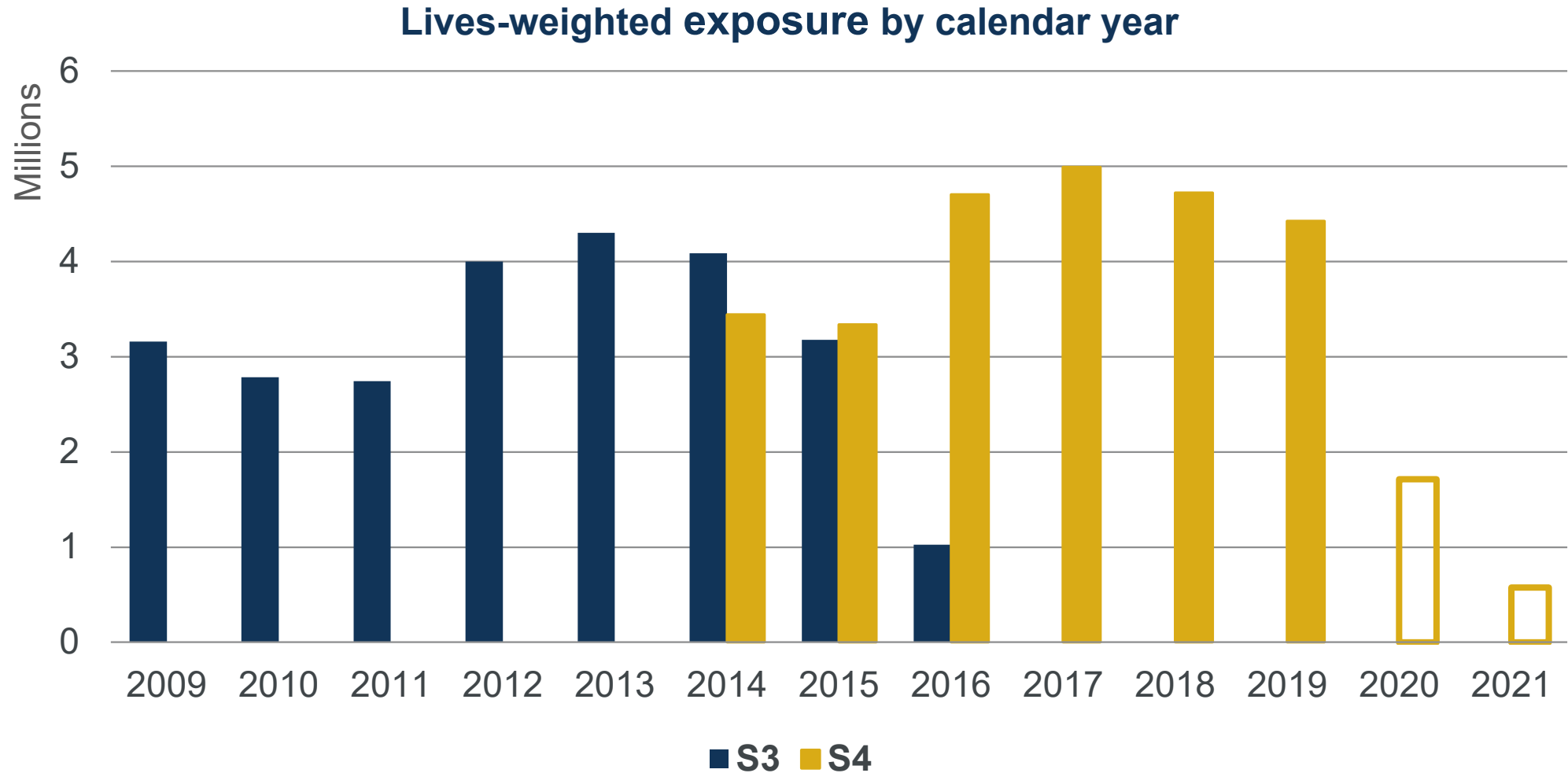
IMD groups

- IMD groups depend on IMD decile and pension amount
- Group 1 has lowest mortality; group 4 has highest mortality

Male pensioners

	0.4-2.7	2.7-5.5	5.5-9	9-15	15-22	22-44	44+
1	1	1	1	2	2	3	4
2	1	1	1	2	2	3	4
3	1	1	1	2	3	3	4
4	1	1	2	2	3	3	4
5	1	1	2	2	3	3	4
6	2	2	2	3	3	3	4
7	2	2	2	3	3	3	4
8	2	2	2	3	3	4	4
9	2	2	2	3	3	4	4
10	2	2	3	3	3	4	4

Female pensioners

	0.1-1	1-2.5	2.5-5	5-9	9-18	18+
1	1	1	1	1	1	2
2	1	1	1	1	2	2
3	1	2	2	2	2	2
4	2	2	2	2	2	3
5	2	2	2	3	3	3
6	2	2	3	3	3	4
7	2	3	3	3	3	4
8	3	3	3	3	3	4
9	3	3	3	3	3	4
10	4	4	4	4	4	4

Female dependants

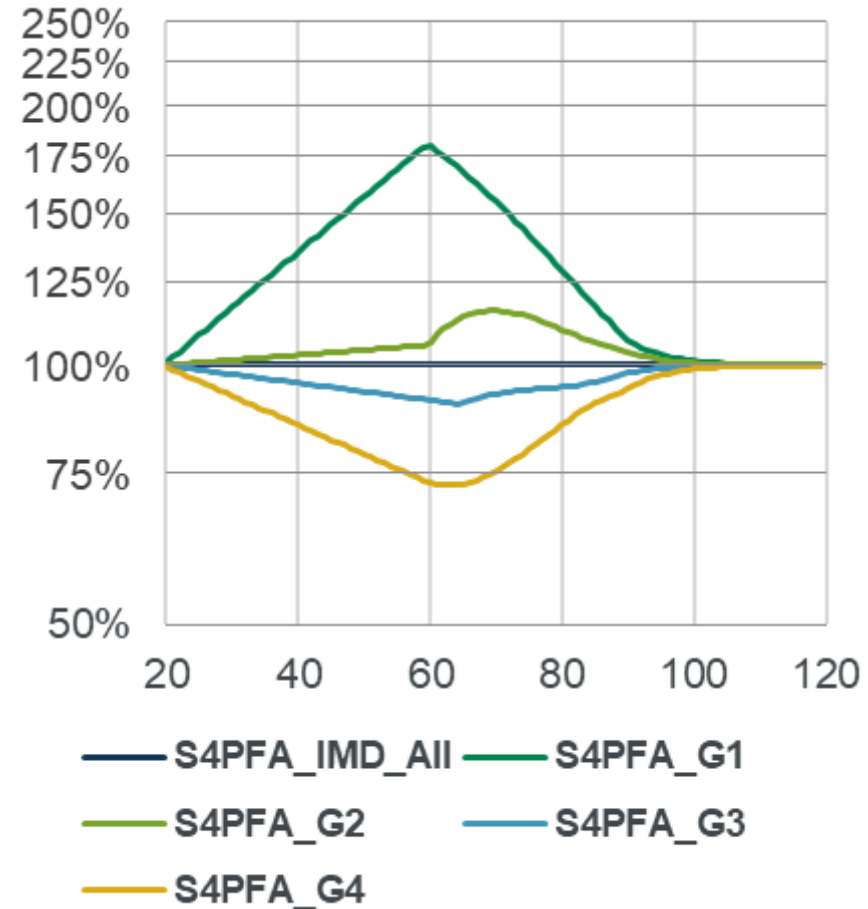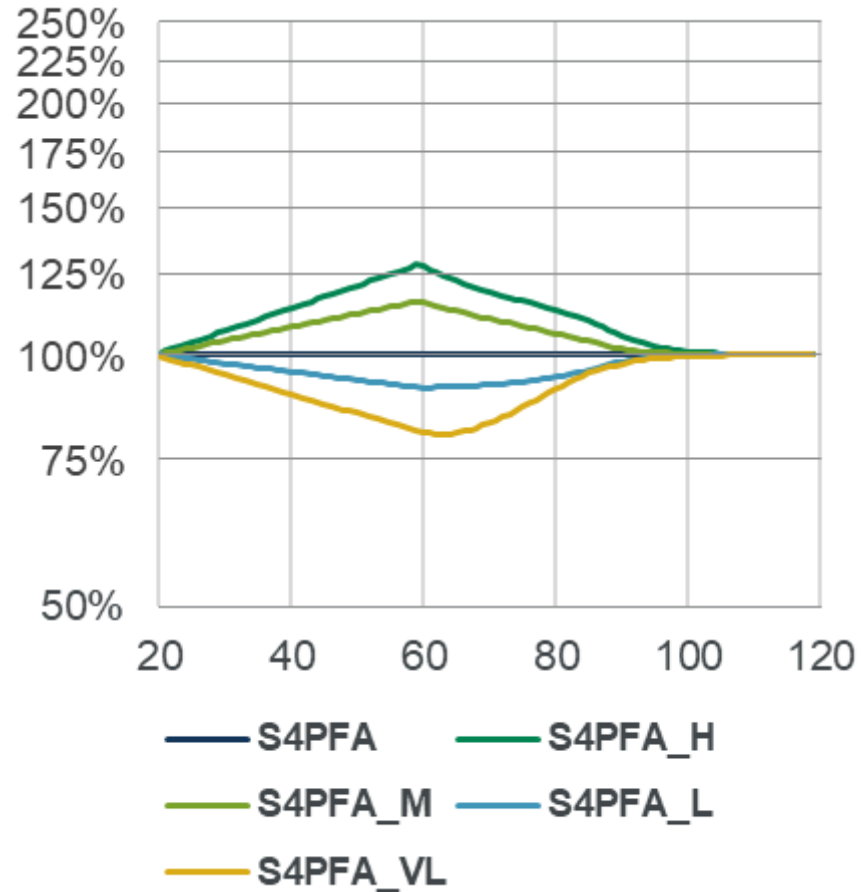|	0.2-1	1-2.5	2.5-5	5-9	9-18	18+
1	1	1	1	1	2	2
2	1	1	1	2	2	2
3	1	1	2	2	2	3
4	2	2	2	2	3	3
5	2	2	2	3	3	4
6	2	2	2	3	4	4
7	2	2	3	3	4	4
8	3	3	3	3	4	4
9	3	3	3	3	4	4
10	3	3	3	3	4	4

Results – male pensioners

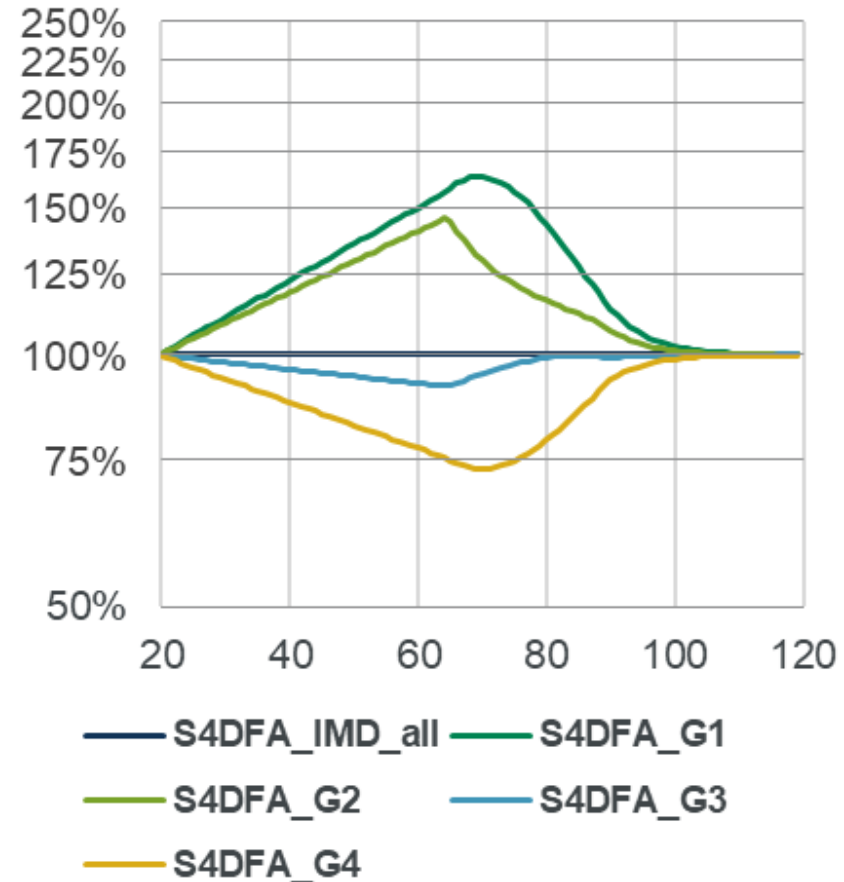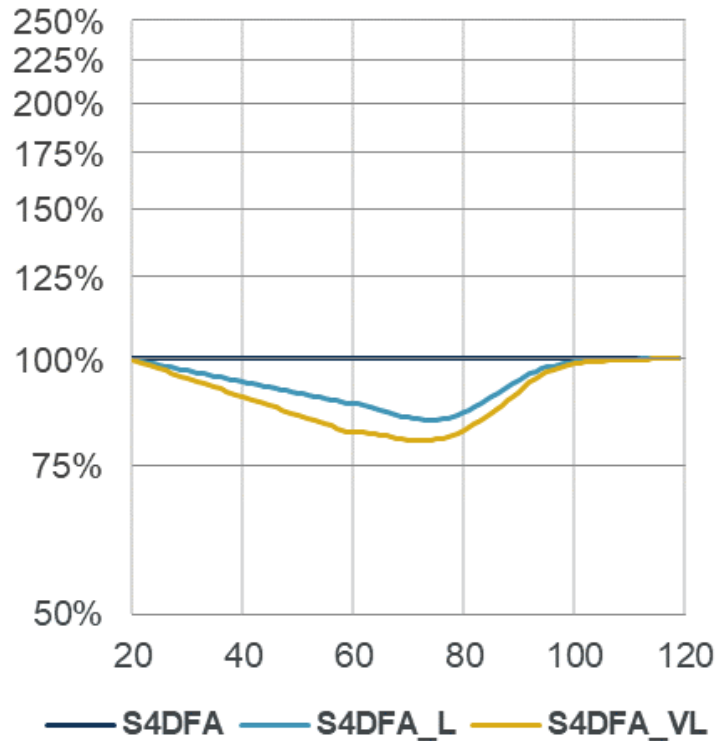**Mortality rates for male pensioners, relative to the appropriate "all" table**
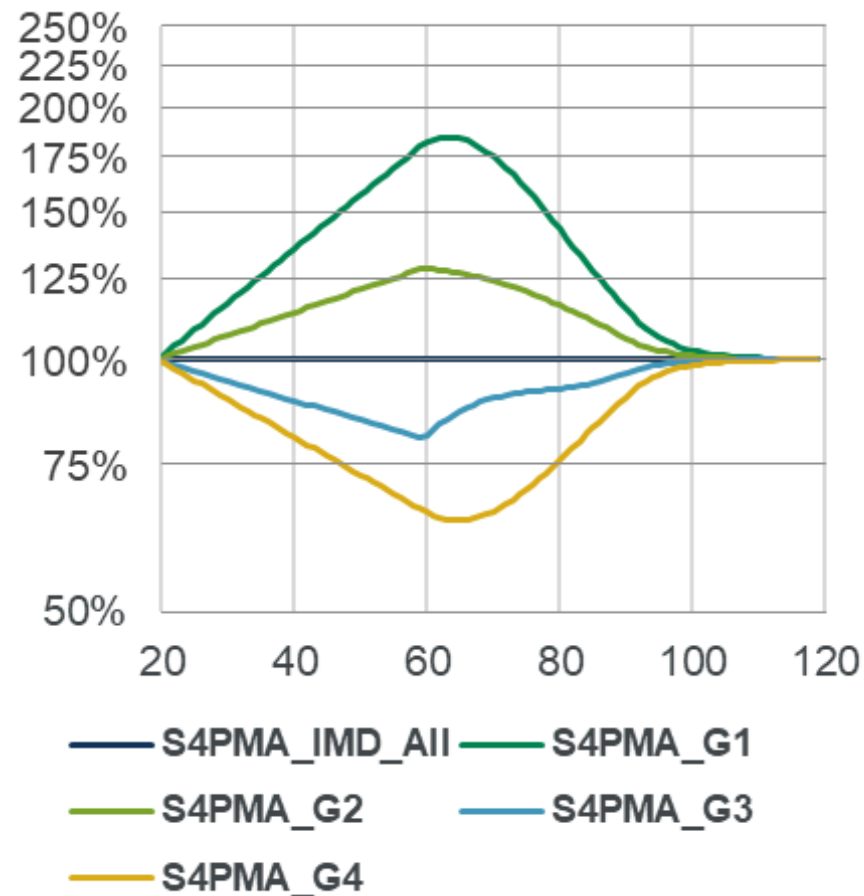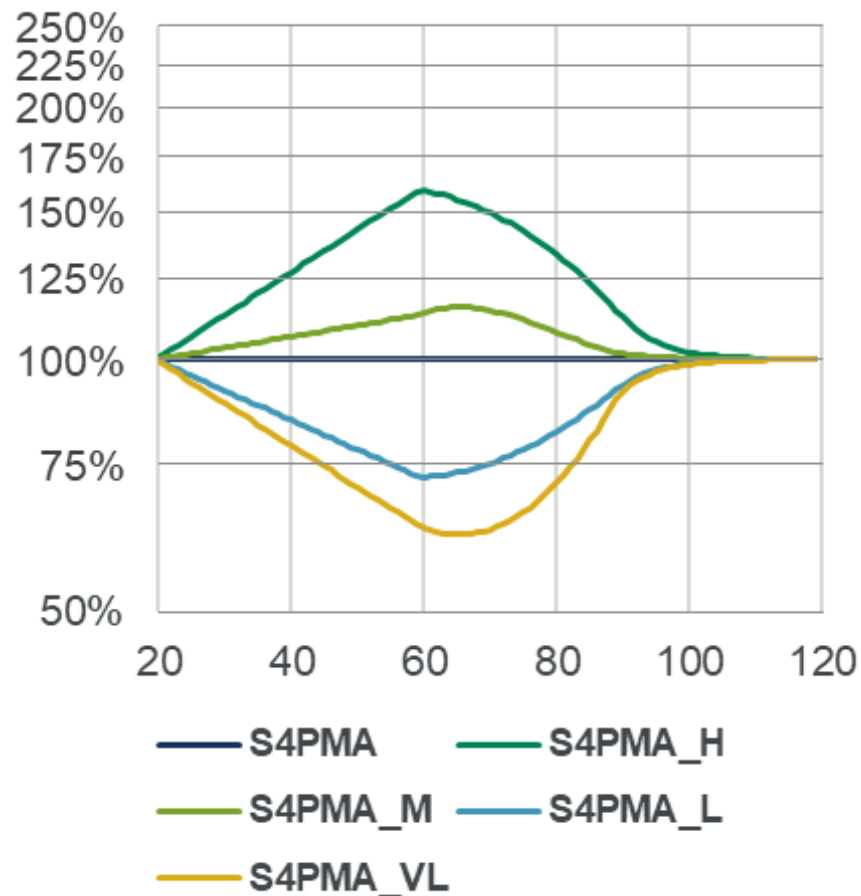
Results – female pensioners

Mortality rates for female pensioners, relative to the appropriate "all" table

Results – female dependants

Mortality rates for female dependants, relative to the appropriate "all" table

Caveats

Changes in the composition of the dataset from S3 to S4

Changes in the amount band limits from S3 to S4

Some changes in the methods used to produce the tables

Mortality improvements since the effective date of S3

S3 tables were affected by an error in data submitted to us for 2012-2016 *(our note on the data issue)*

Comparative life expectancies - Male

Table	S4	Relative to S4PMA	Relative to S3
S4PML	19.551	−5.2%	−0.2%
S4PMA	20.629	-	−0.9%
S4PMA_H	18.632	−9.7%	−0.2%
S4PMA_M	20.101	−2.6%	−0.7%
S4PMA_L	21.844	+5.9%	−1.0%
S4PMA_VL	22.529	+9.2%	−1.0%
S4NMA	21.050	+2.0%	−0.2%
S4NMA_H	19.020	−7.8%	+0.7%
S4NMA_M	20.537	−0.4%	−0.2%
S4NMA_L	22.127	+7.3%	−0.4%
S4NMA_VL	22.834	+10.7%	−0.7%
S4IMA	17.624	−14.6%	−2.9%
S4DML	18.325	−11.2%	+0.7%
S4DMA	18.515	−10.2%	+1.0%

We mostly see a fall in life expectancies

Dependant tables see a rise in life expectancies

Comparative life expectancies - Female

Table	S4	Relative to S4PFA	Relative to S3
S4PFL	22.306	−1.7%	+0.2%
S4PFA	22.683	-	−1.0%
S4PFA_H	21.935	−3.3%	+1.4%
S4PFA_M	22.327	−1.6%	−0.2%
S4PFA_L	23.017	+1.5%	−1.6%
S4PFA_VL	23.249	+2.5%	−2.6%
S4NFA	23.165	+2.1%	−0.6%
S4NFA_H	22.217	−2.1%	+2.4%
S4NFA_M	22.881	+0.9%	+0.3%
S4NFA_L	23.412	+3.2%	−1.2%
S4NFA_VL	23.562	+3.9%	−1.9%
S4IFA	20.435	−9.9%	−4.8%
S4DFL	20.974	−7.5%	−0.8%
S4DFA	21.789	−3.9%	−0.8%
S4DFA_L	22.617	−0.3%	−0.8%
S4DFA_VL	22.926	+1.1%	−1.2%

As for males, we mostly see a fall in life expectancies

Future plans for SAPS

Annual experience analysis

Expect to publish 2015-2022 analysis in April 2024

"One-off" analyses, between graduations

Possible topics – mortality by IMD, industry, duration

Plans and timing for "S5" tables depend on mortality experience

How will mortality in 2022 onwards compare to S4?

Mortality projections

CMI Model overview

A model of improvements (i.e. annual reductions in mortality)

Interpolates between "initial" and "long-term" improvements

CMI estimates initial improvements based on England & Wales data

Users must make their own long-term rate assumption

Users encouraged to consider and vary parameters to reflect their views, and different populations

Impact of the pandemic on the Model

- Implicit principle of the Model:
  - Recent mortality improvements are a guide to short-term future mortality improvements

- A reasonable assumption from the first version, CMI_2009, to CMI_2019

- Business-as-usual CMI_2020 would have reacted too strongly:
  - Extreme mortality during the pandemic not a guide to later mortality

- CMI introduced "weights":
  - CMI_2020 – no weight on 2020 data
  - CMI_2021 – no weight on 2020-2021 data
  - CMI_2022 – no weight on 2020-2021 data but 25% weight on 2022 data

Proposal for CMI_2023

- Proposal is for Core weights of:
  - 100% for 1983-2019
  - 0% for 2020-2021
  - 10% for 2022-2023

- CMI acknowledges uncertainty:
  - For 2022-2023, four MPC members preferred 10% weights, three preferred 25% weights
  - Methods other than weights produce reasonable results
  - Consultation paper considers "overlay" approach – margin over pre-pandemic view

- Proposal results in similar life expectancies to CMI_2022

- Consultation closed on 11 March – CMI will update on methods by 28 March

Impact of CMI_2023 proposal

Progression of life expectancy at age 65
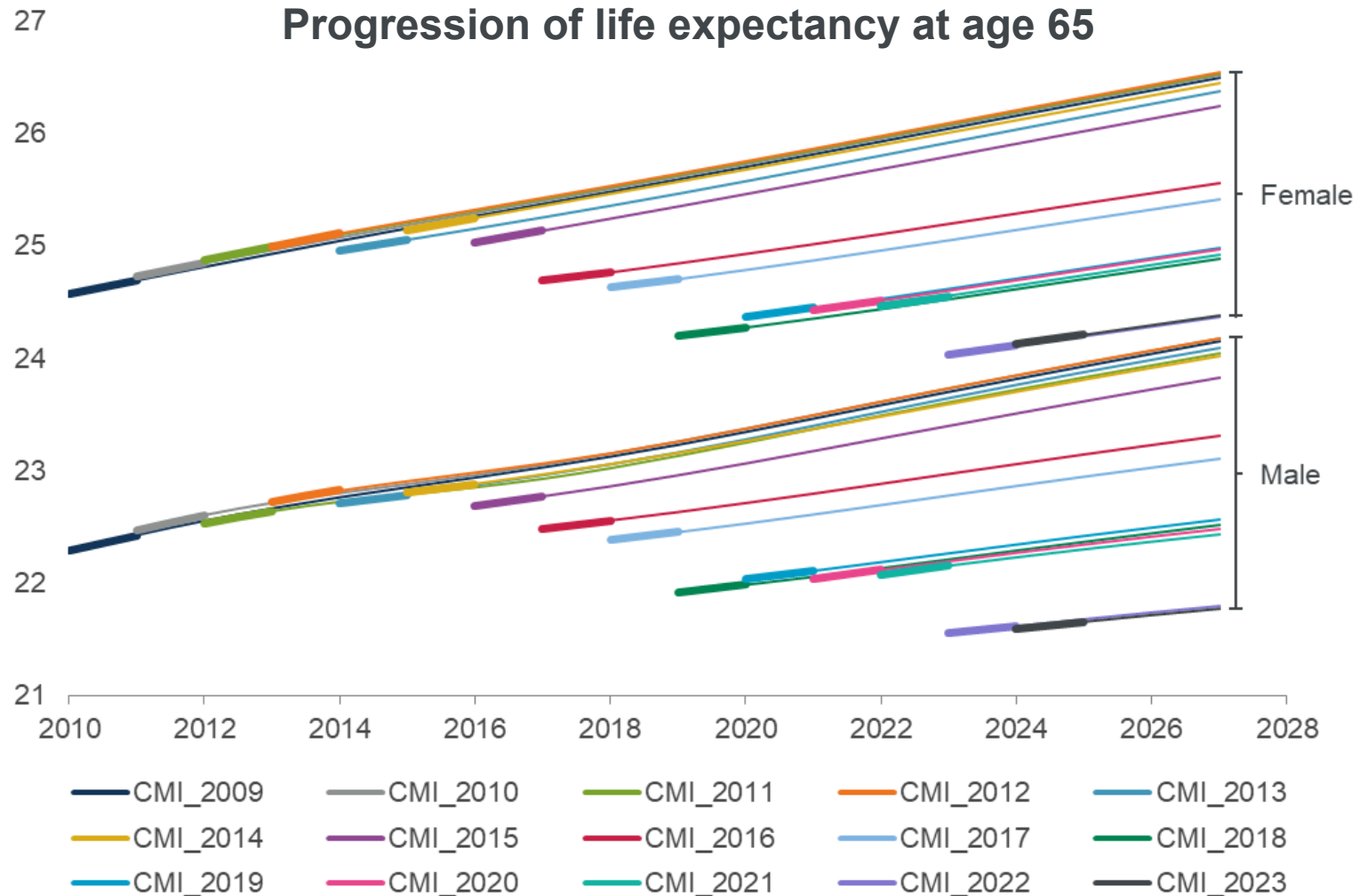
Impact of different weights in CMI_2023

ASMRs (ages 20 to 100) for various weights on data for 2022 and 2023

Legend: 25/50, 25/25, 10/10, 0/0 (NP1), 100/100 (NP2)
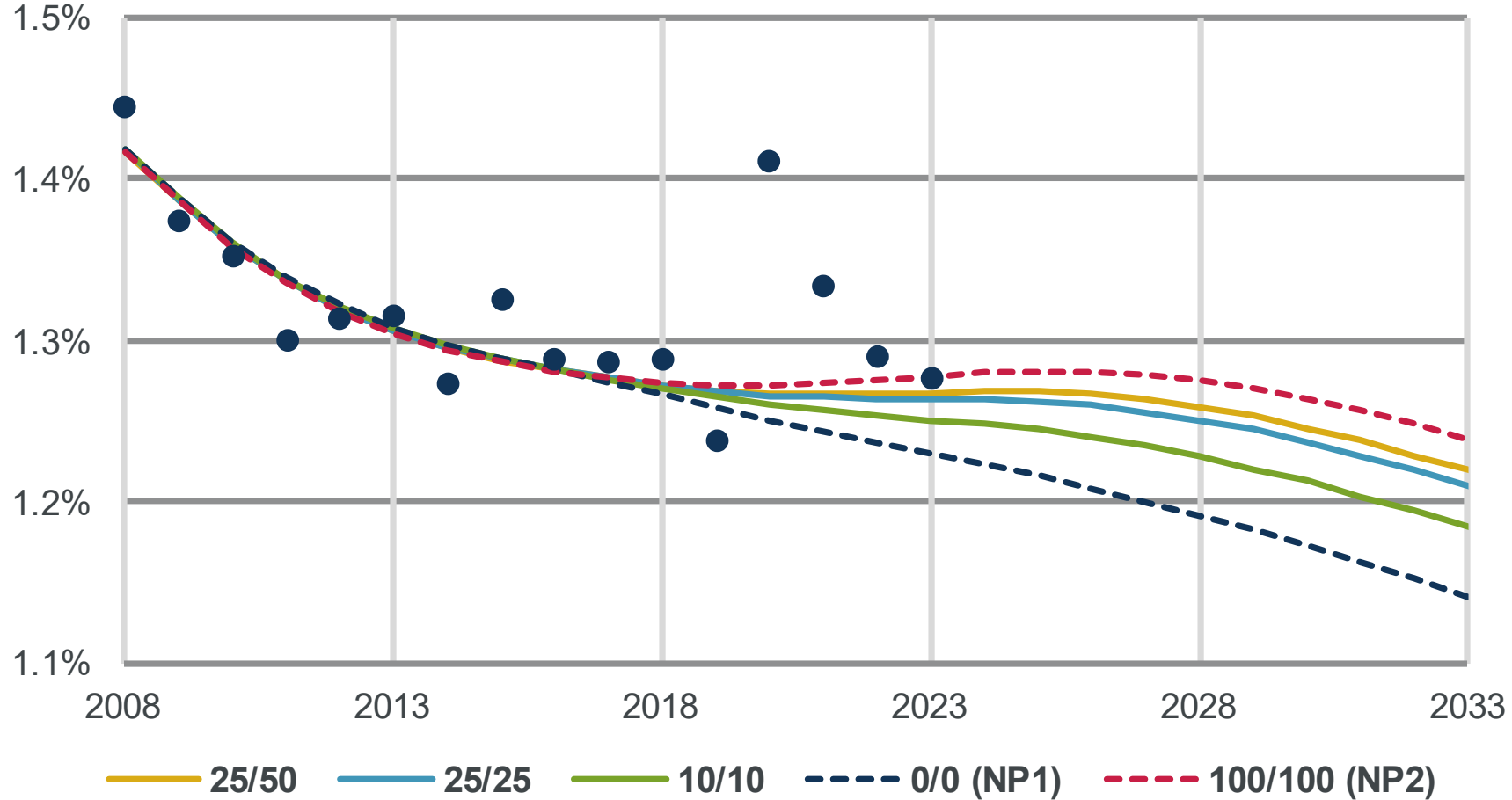
Impact of different weights in CMI_2023

Annual improvements for various weights on data for 2022 and 2023

Legend: 25/50 · 25/25 · 10/10 · 0/0 (NP1) · 100/100 (NP2)
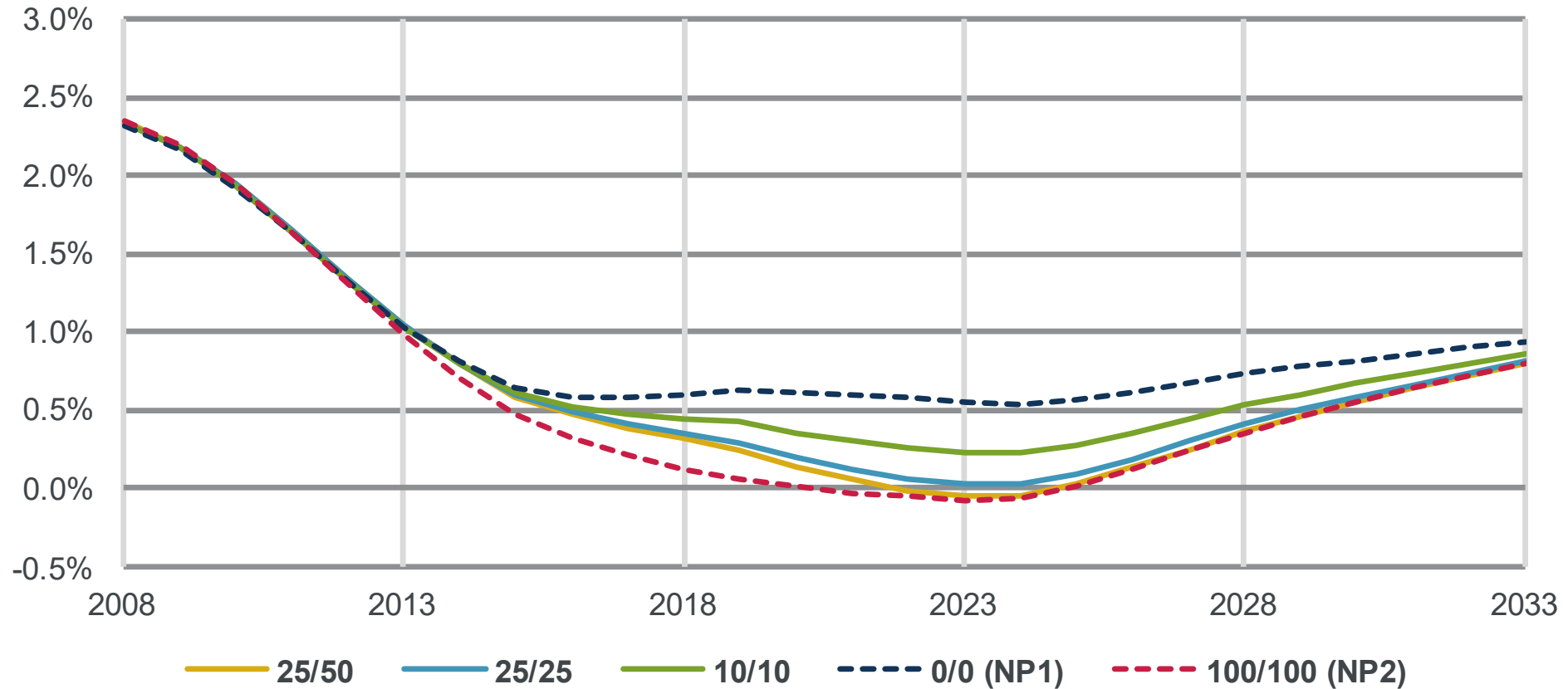
Impact of different parameterisations

Impact on life expectancy at age 65 compared to core CMI_2022

Using S3PxA tables (with improvements from 2013), and illustrative long-term rate of 1.5% p.a.

2022/23 weights	Male	Female	Average
100%/100%	-1.6%	-1.0%	-1.3%
25%/50%	-1.1%	-0.6%	-0.9%
25%/25%	-0.9%	-0.5%	-0.7%
10%/10%	**-0.1%**	**+0.1%**	**0.0%**
0%/0%	+1.3%	+0.9%	+1.1%

12 March 2024