



SINGAPORE
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Beating the Odds: Redefining Risk

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Trend Risk and Post Pandemic Mortality across the Asia-Pacific Region

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Explore the patterns in the historic data

Compare mortality trends in a selection of Asia-Pacific populations to Europe and North America



Fit a selection of industry models

UK (CMI), US (MIM), and the Netherlands (AG)



Assess the recent emerging data from 2020+

Differences in mortality experience during the pandemic period and beyond

Challenges in interpreting emerging mortality



Conclusions



		Mortality Level - Pre-pandemic		Long-term Mortality Trends		Emerging Post-pandemic Trends	
		2019 Life Expectancy - Males	2019 Life Expectancy - Females	Change in Life Exp. 2003-2019 - Males	Change in Life Exp. 2003-2019 - Females	Change in Life Exp. 2019-2024 - Males	Change in Life Exp. 2019-2024 - Females
Asia 	Japan	81.4	87.5	+3.9%	+2.6%	-0.3%	-0.3%
	Taiwan	77.5	83.8	+4.1%	+4.7%	-0.2%	+0.2%
	Hong Kong	82.0	87.7	+5.0%	+4.3%	+1.5%	+1.2%
	South Korea	80.3	86.3	+8.9%	+6.9%	+0.7%	+0.3%
Europe / US 	United States	76.5	81.6	+2.7%	+2.4%	+0.3%	+0.3%
	Sweden	81.4	84.7	+4.4%	+2.8%	+1.2%	+0.7%
	Switzerland	81.9	85.6	+5.1%	+3.1%	+0.6%	+0.4%
	Norway	81.2	84.7	+5.4%	+3.4%	+0.5%	+0.1%

All mortality data sourced from the Human Mortality Database





Post-Pandemic Uncertainty

Recent mortality trends post-pandemic add uncertainty, challenging traditional forecasting models.



Regional Mortality Divergence

Differences in mortality trends across regions complicate use of global assumptions.

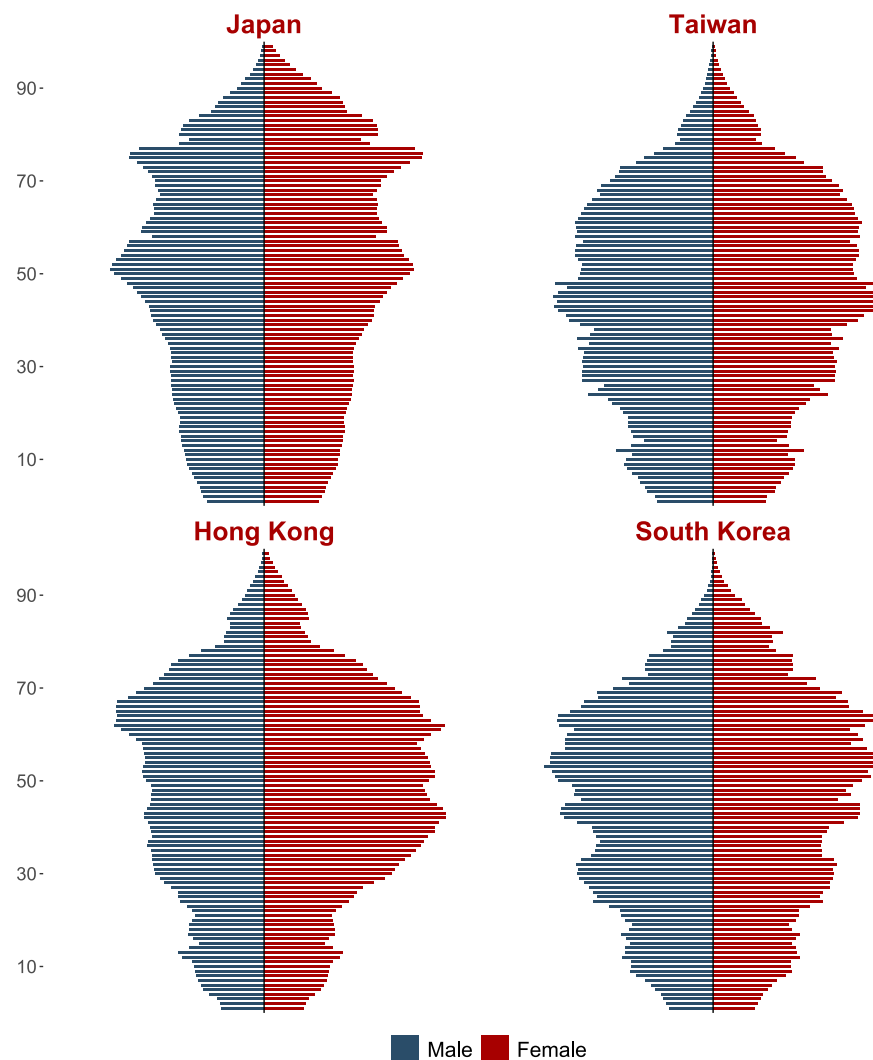


Need for Nuanced Judgment

Insurers require nuanced judgment using recent data and scenario-based approaches.



2025

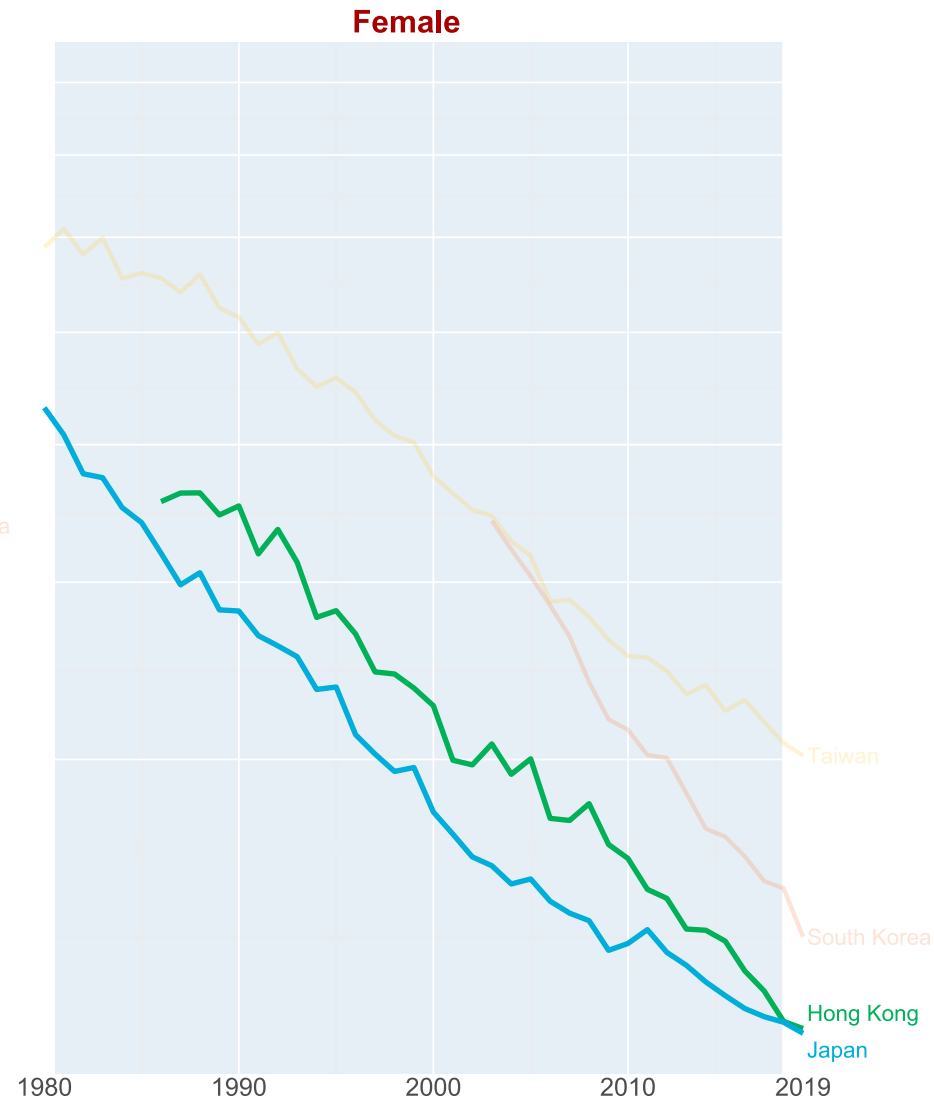
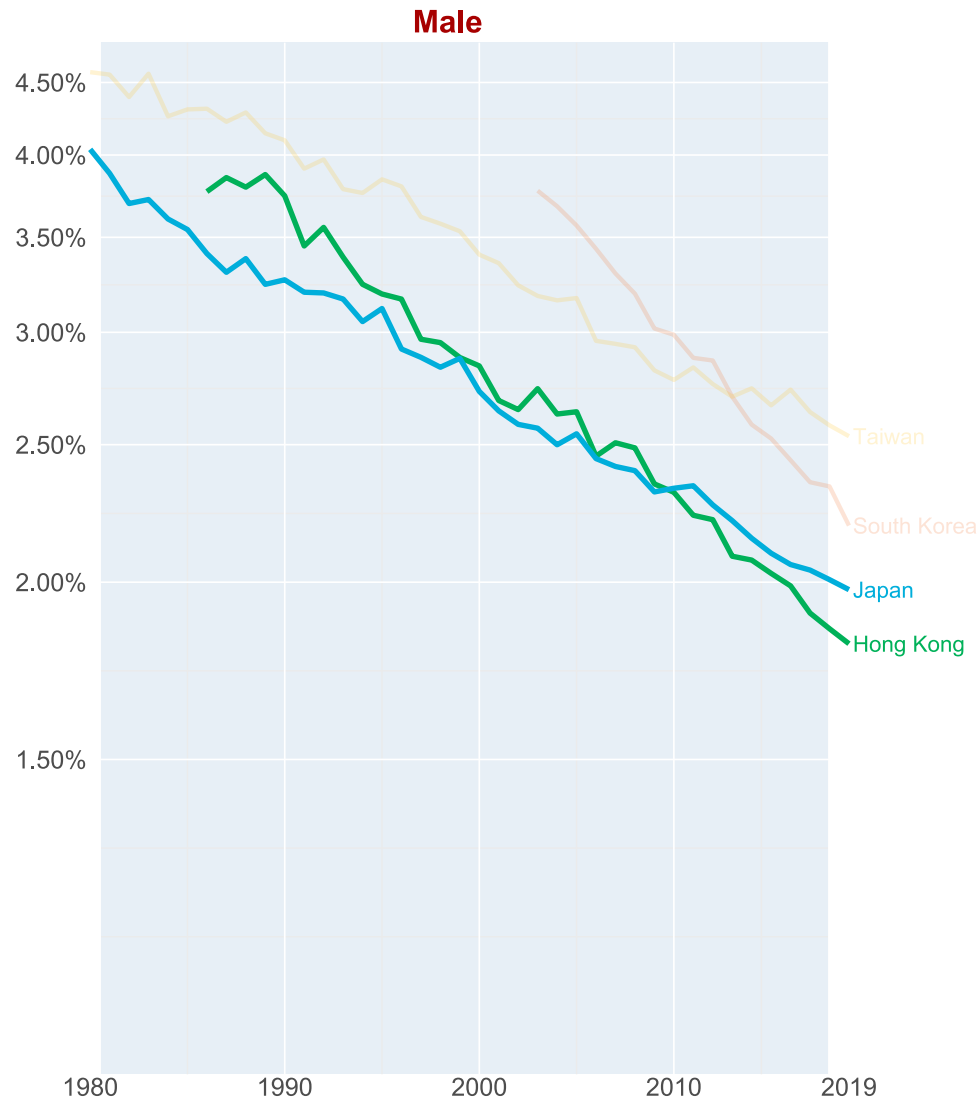


The populations have all aged substantially over time

Age and gender distributions vary considerably between the populations

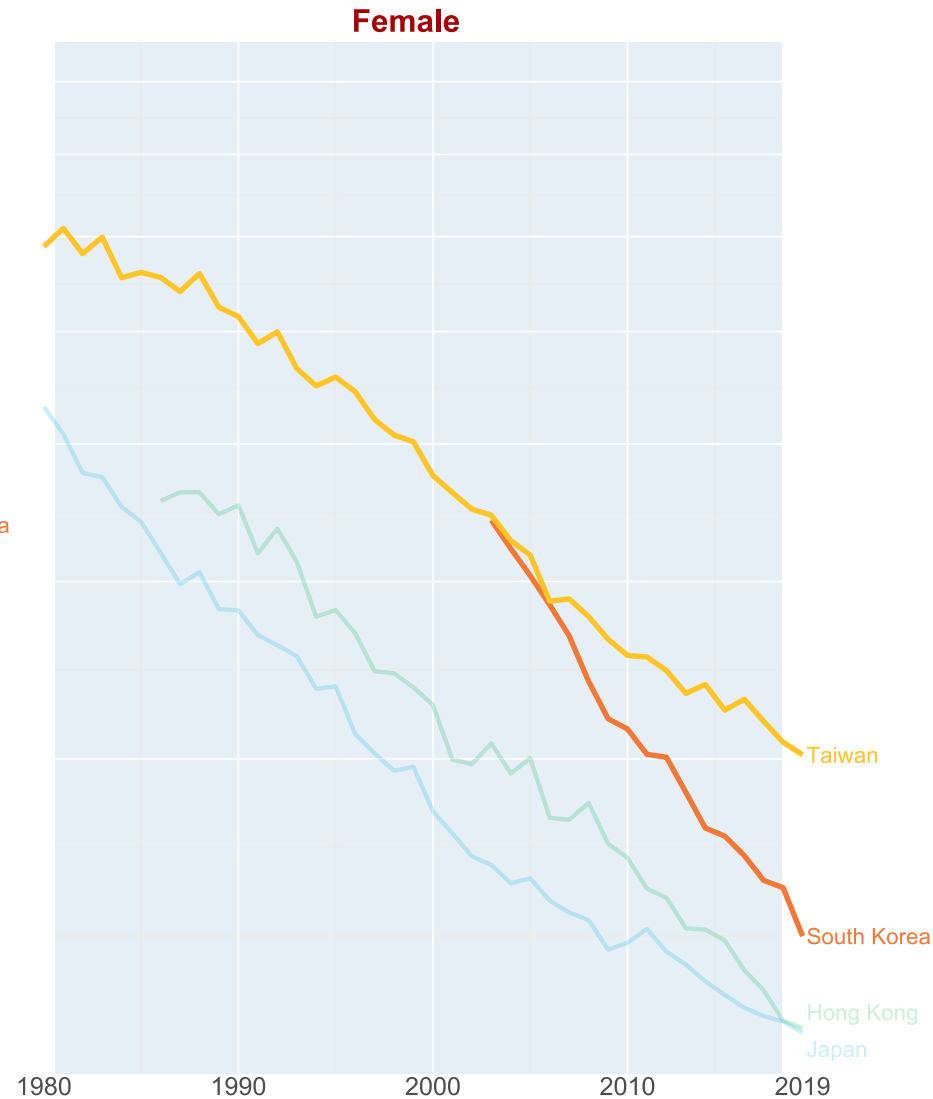
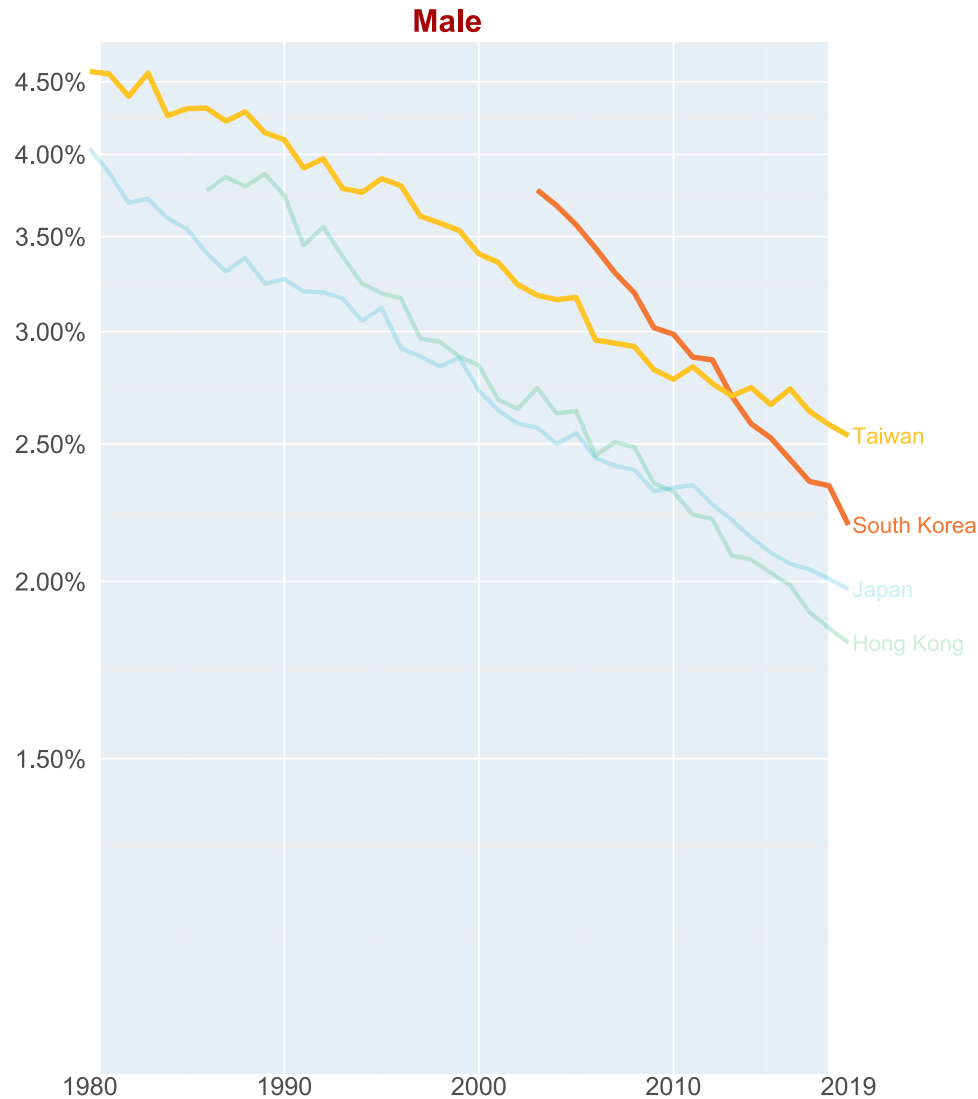
	Average Age	
	Male	Female
United Kingdom	39.7	41.4
Netherlands	40.8	42.5
United States	38.0	40.0
Australia	37.9	39.5
New Zealand	37.5	39.1
Japan	45.5	48.7
Hong Kong	43.5	44.4
Taiwan	40.5	42.3
South Korea	40.8	43.1





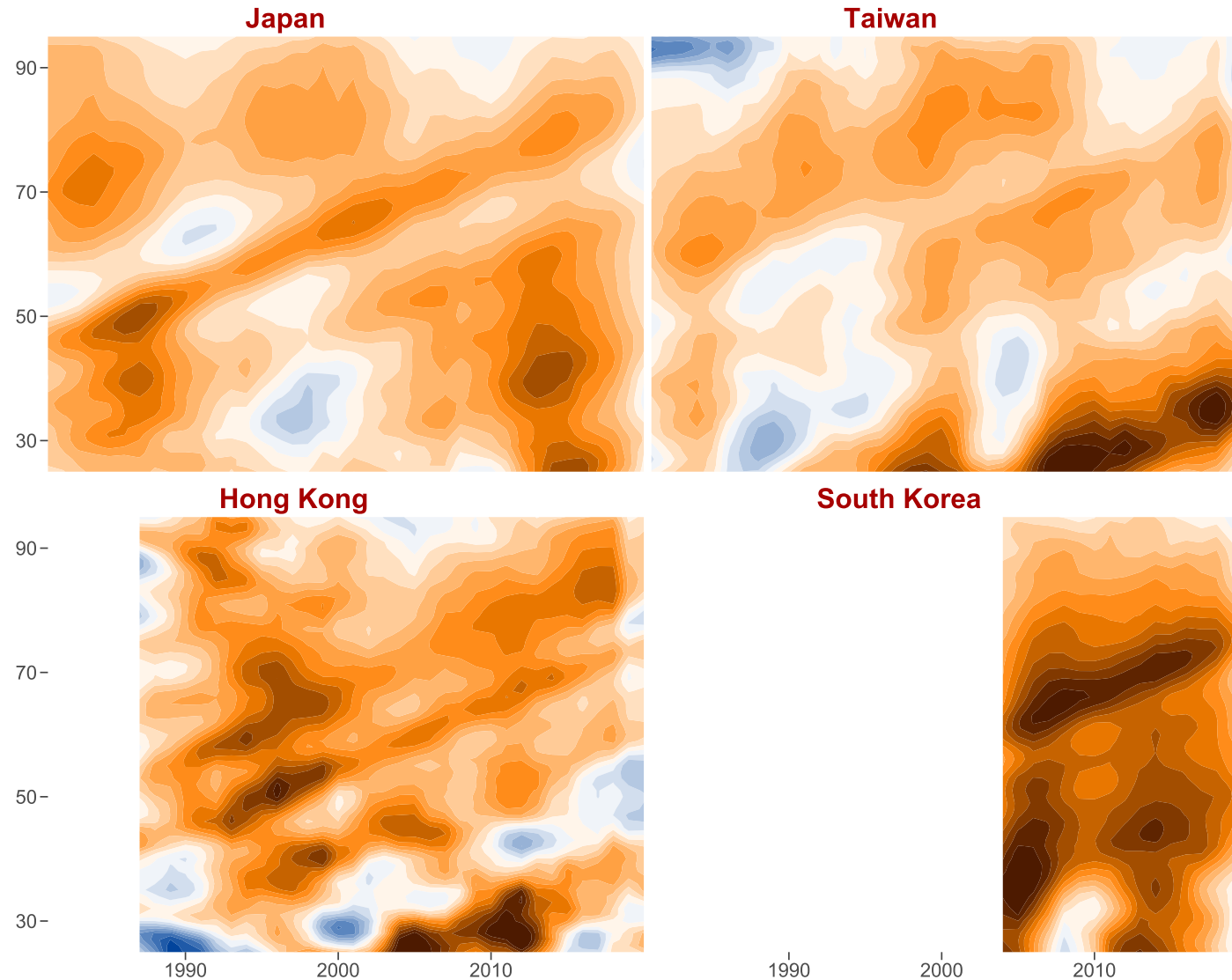
Age-standardised mortality rates control for shifting age profiles, and allow comparison between populations





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Heatmaps show trends by age and calendar year, with improvements shown in amber and deteriorations in blue

Diagonal patterns (cohort effects) are a feature for all of the populations

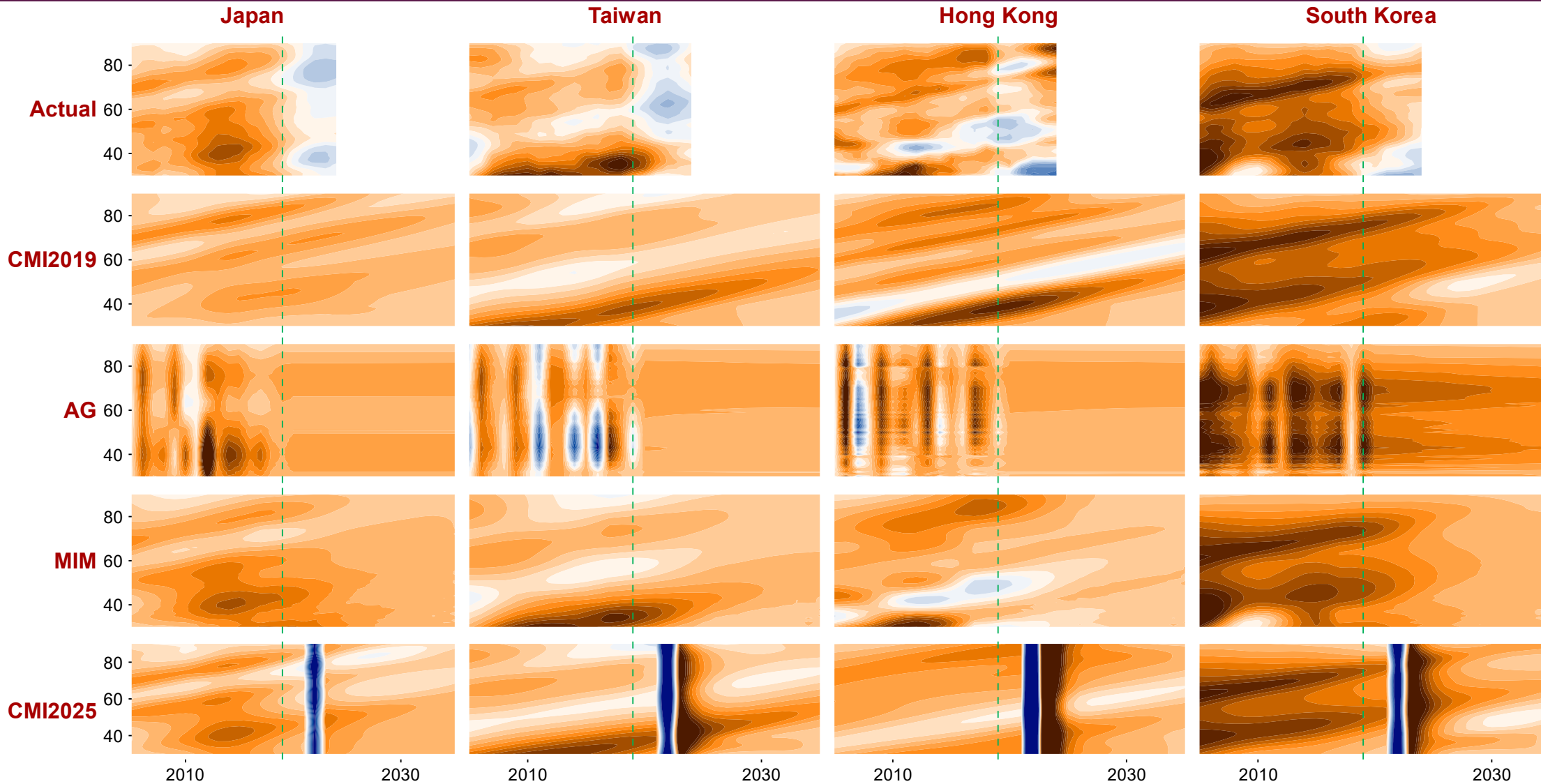


Model	Description
CMI_2019 United Kingdom (Pre-pandemic)	Models mortality as a function of age, period and cohort (i.e. year of birth) effects. Initial projected rates are a continuation of recent trends, with smoothing applied. These converge over time to a user-defined long-term rate of annual improvement.
CMI_2025 United Kingdom (Post-pandemic)	Same underlying structure as CMI_2019, but with an “overlay” that explicitly models excess mortality relating to the pandemic, which runs off over time.
MIM United States	Although structurally different to CMI_2019, principles are similar – initial projected rates are smoothed continuation of recent trends, with these converging to a user-defined long-term assumption.
AG Netherlands	Models mortality as a function of age and period effects. Multi-population model which uses data from similar countries to help inform long-term mortality trends.

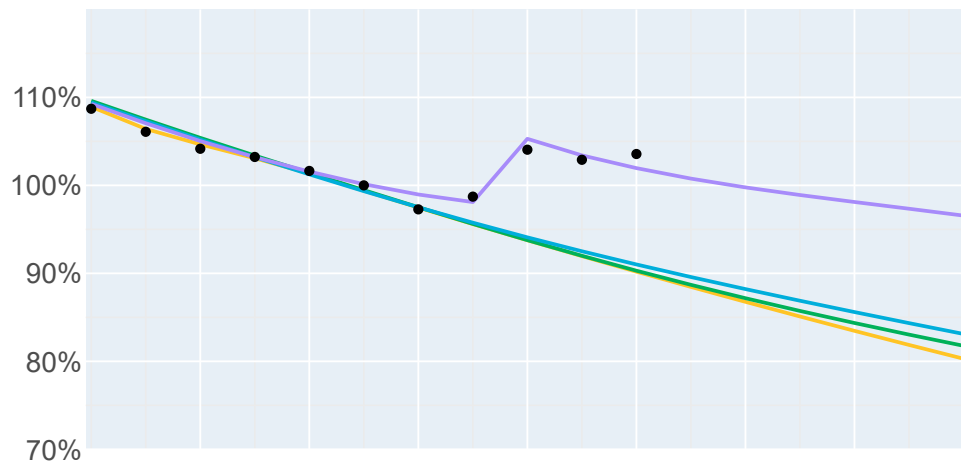
Only CMI_2025 has functionality for facilitating pandemic excess mortality.



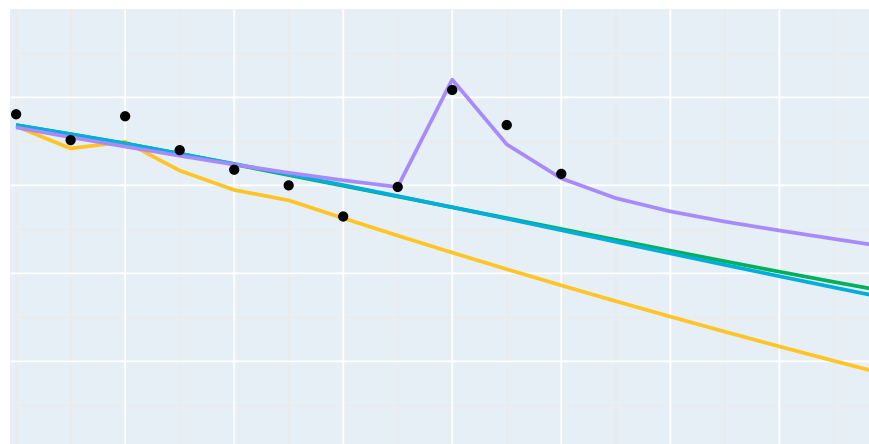
Comparing mortality projection models - males



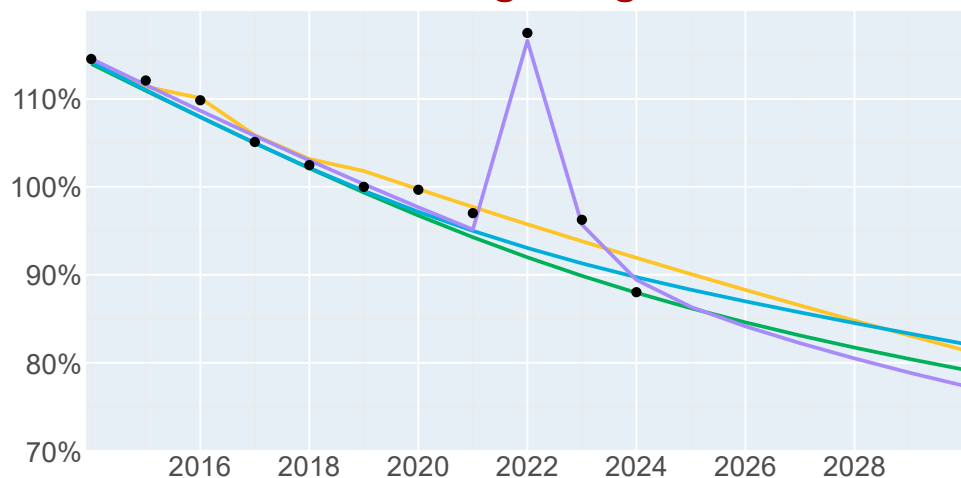
Japan



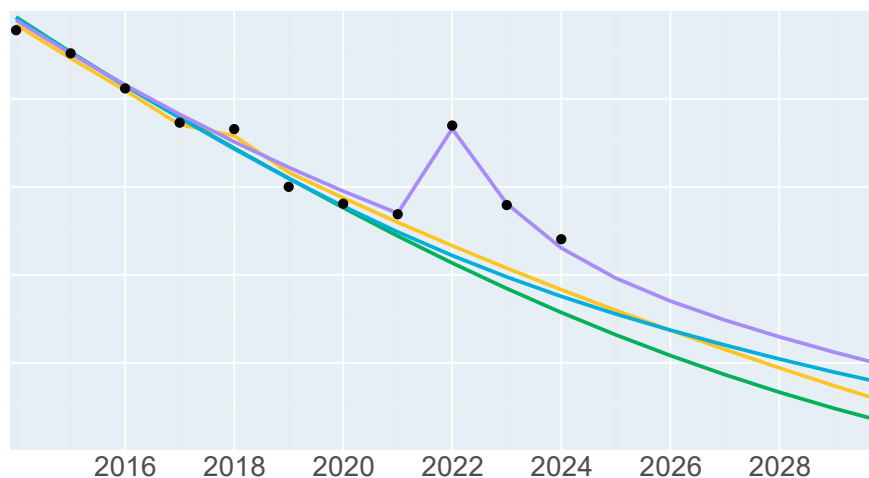
Taiwan



Hong Kong



South Korea



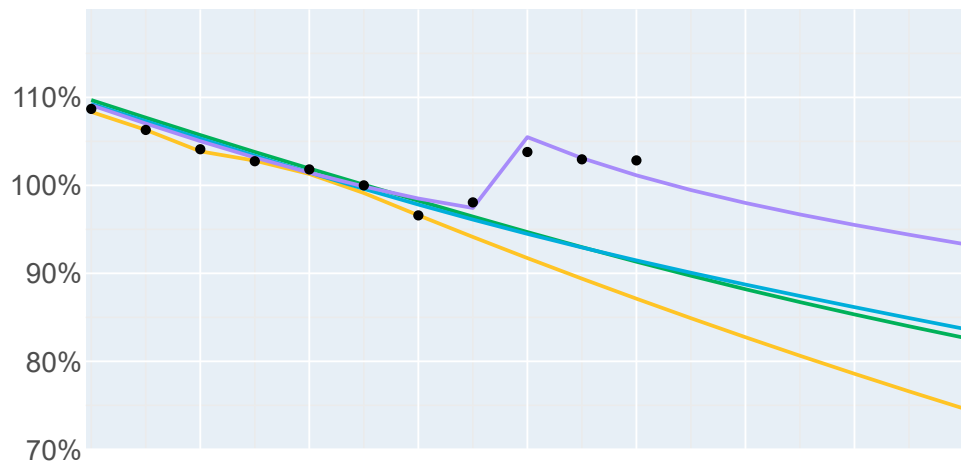
— AG — CMI2019 — MIM — CMI2025 • Actual

All models other than CMI_2025 have been calibrated to pre-pandemic data (up to 2019)

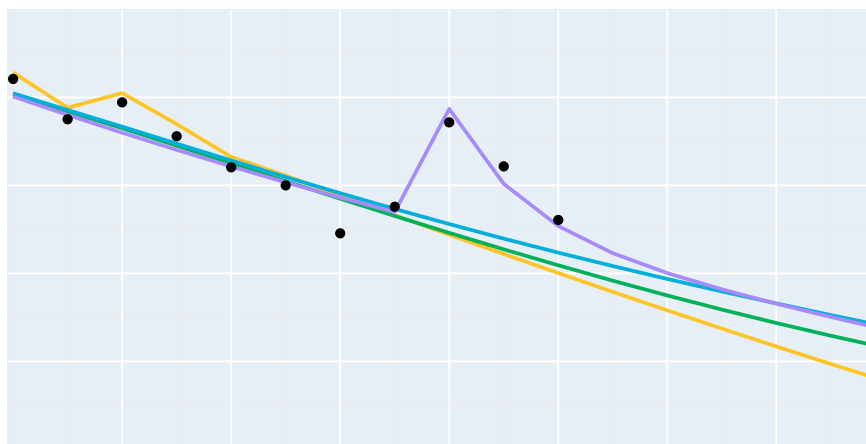
CMI_2025 has been calibrated to data up to 2024. The overlay for modelling excess mortality applies from 2022, with the run-off profile set to approximately mirror emerging experience in 2023-2024 (e.g. slower run-off for Japan, faster run-off for Hong Kong)



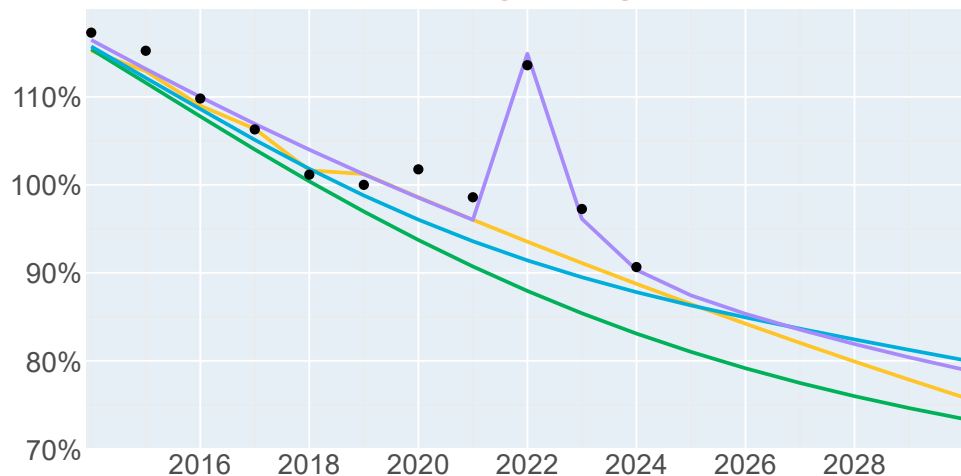
Japan



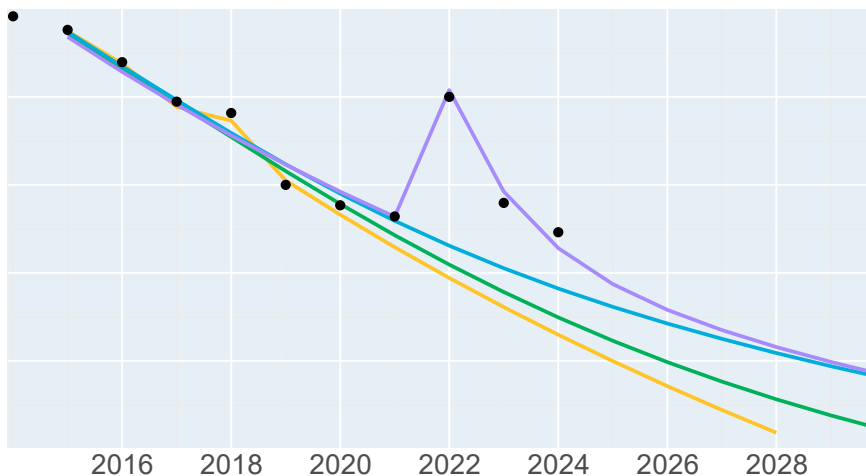
Taiwan



Hong Kong



South Korea



— AG — CMI2019 — MIM — CMI2025 • Actual

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What could this mean in terms of projected mortality rates?

	Males			
	CMI_2019	CMI_2025	AG	MIM
Japan	82	96	81	84
Taiwan	87	92	80	86
Hong Kong	80	77	80	83
South Korea	73	78	74	77

Table shows projected mortality levels (ASMRs) in 2030 as a % of 2019 levels based on pre-pandemic data

	Females			
	CMI_2019	CMI_2025	AG	MIM
Japan	83	94	75	84
Taiwan	81	83	77	83
Hong Kong	76	78	75	81
South Korea	71	77	67	76

e.g. a result of 85% would imply average improvements of about 1.5% from 2020-2030

$$1 - \exp\left(\frac{\log(0.85)}{11}\right) \approx 1.5\%$$





Populations in the Asia-Pacific region have variety in demographic and socio-economic profiles, and these differences have also varied over time



Historical mortality improvements have been very strong in these populations relative to European and North American reference populations



There is variation in the output of the models, and model selection and calibration could have material impacts on valuation of annuity / pension business



Mortality experience since onset of Covid-19 pandemic has been heterogeneous between populations. Insights from international populations can help but approaches in one population might not easily be applicable to other regions.

Impacts are possibly ongoing, and it can be difficult to discern between continued pandemic impacts and actual ongoing shifts in mortality

