



DEVELOPING MORTALITY ASSUMPTIONS

Seminario Regional de Capacitación de Supervisores de Seguros de América Latina ASSAL-IAIS, San Salvador

Sesión 6: Actuaría y Estadísticas

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OECD's Good practices for developing standard mortality tables

Understand context

Estimate baseline assumptions

Estimate mortality improvement assumptions

Ensure consistency



Mortality and the Provision of Retirement Income

Mortality and the Provision of Retirement Income



Motivation

- Mortality assumptions determine the expected duration of life products
- Accurate assumptions are crucial to ensure the sustainability of life insurance products, and ensure that there will be sufficient assets to pay claims
- Setting mortality assumptions is a complex process that involves a significant amount of judgement
- Regulators and supervisors need to be able to assess whether the mortality assumptions used in practice are appropriate



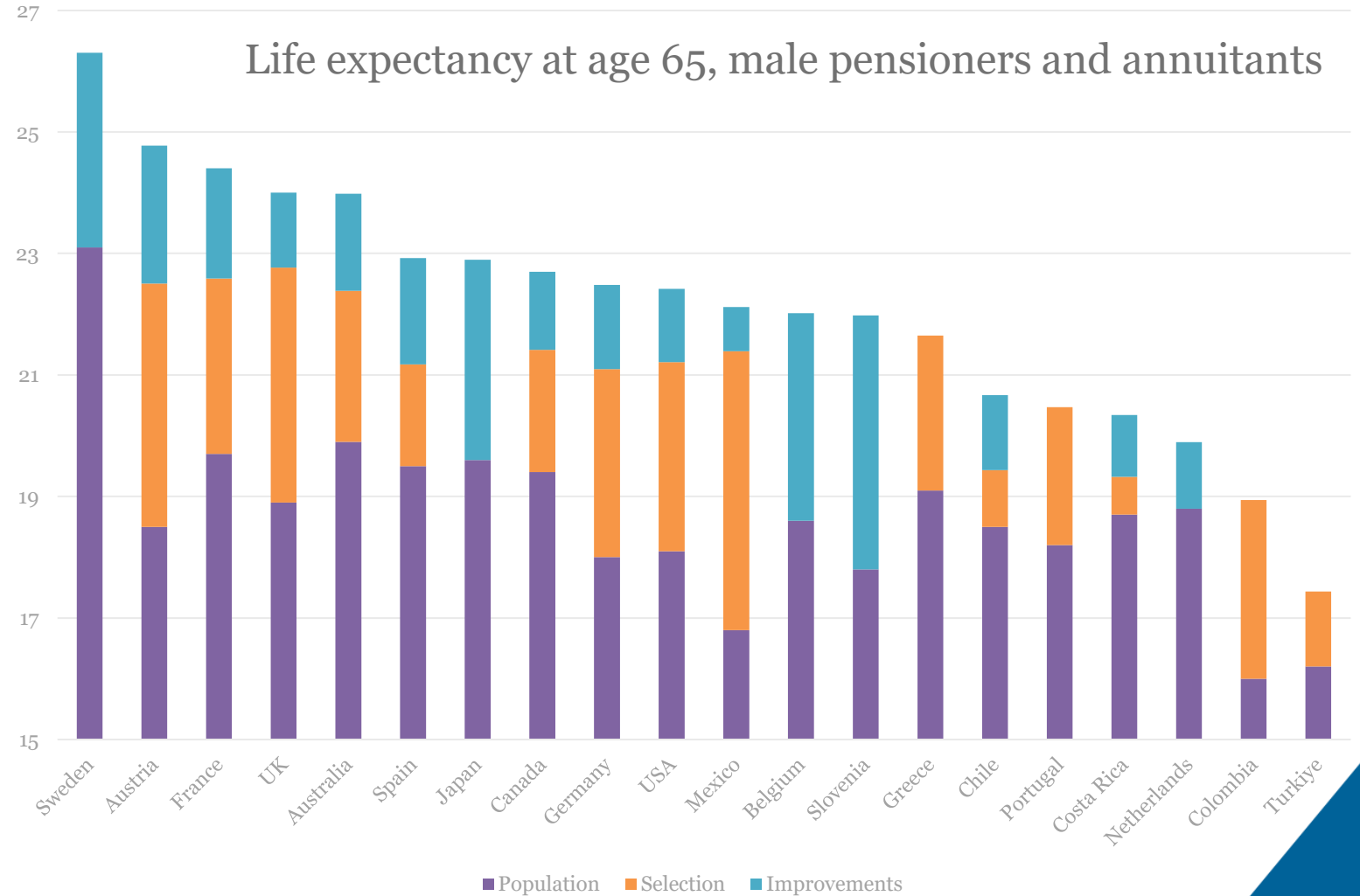
Today's presentation

- The importance of having good assumptions
- The challenges of getting them right
- International approaches



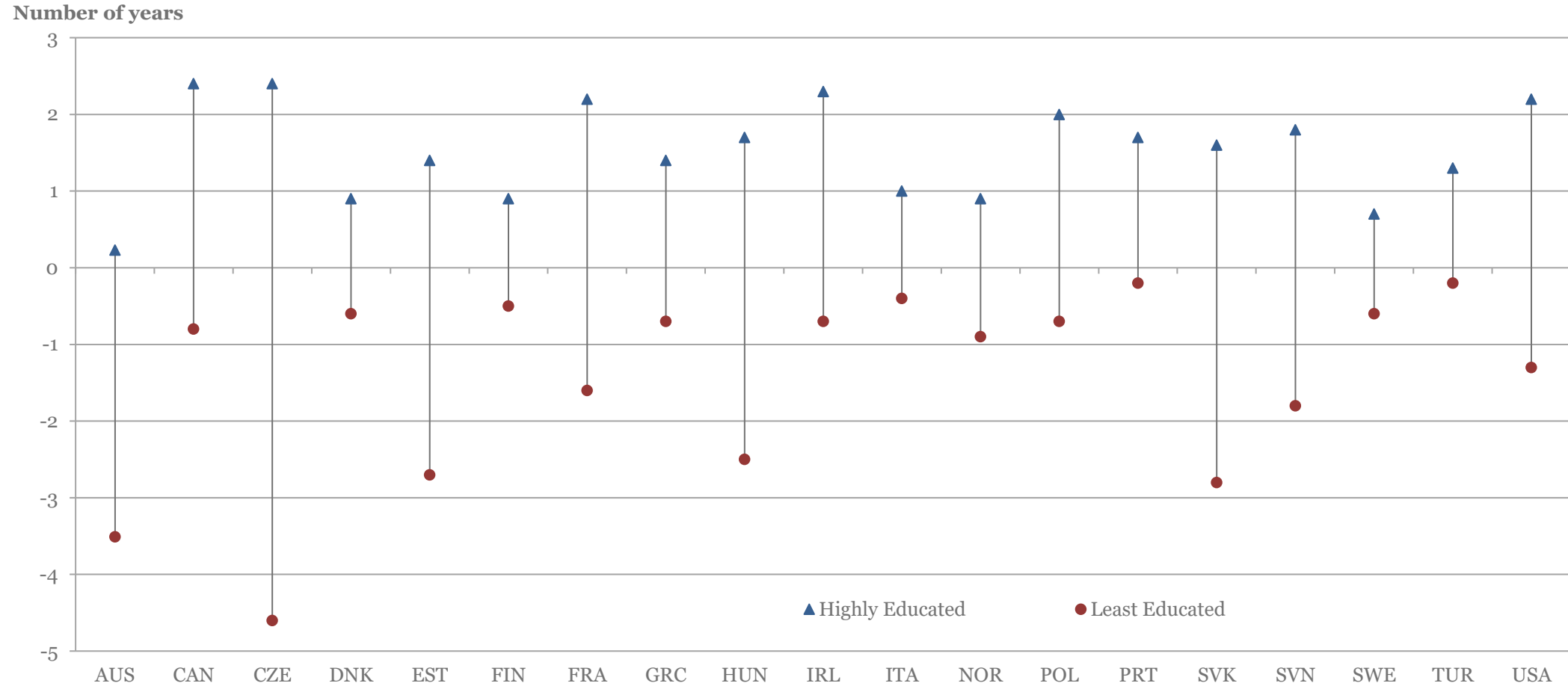
Population mortality tables are insufficient

- Differences between population mortality and annuitant mortality are around 2 to 2.5 years
- Mortality improvements add an additional 1.5 to 2 years





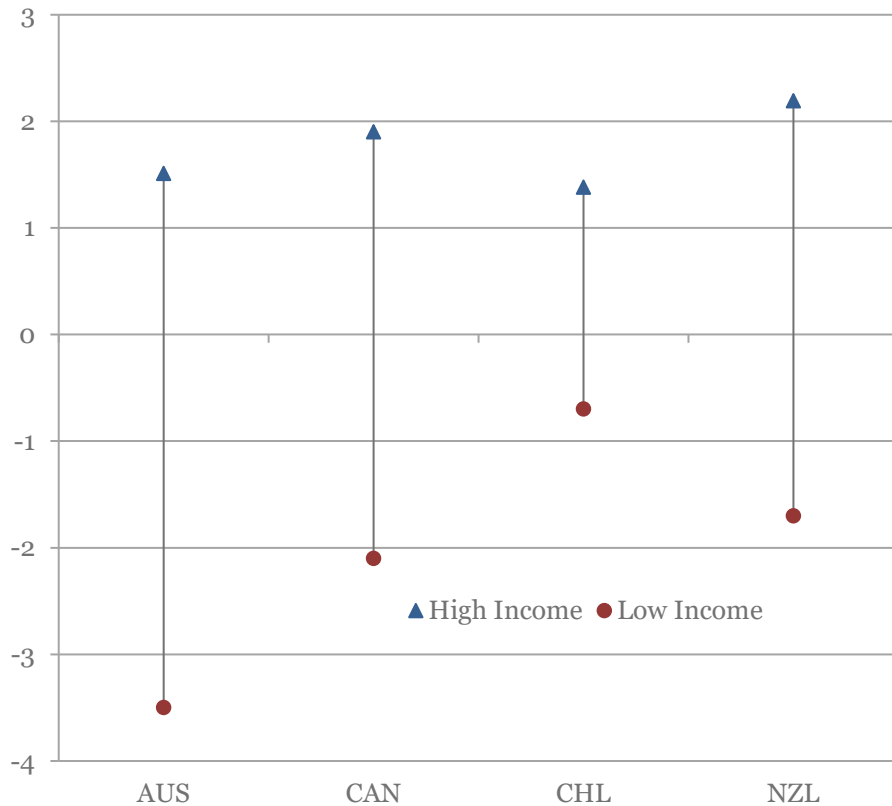
Differences in life expectancy by education at age 65



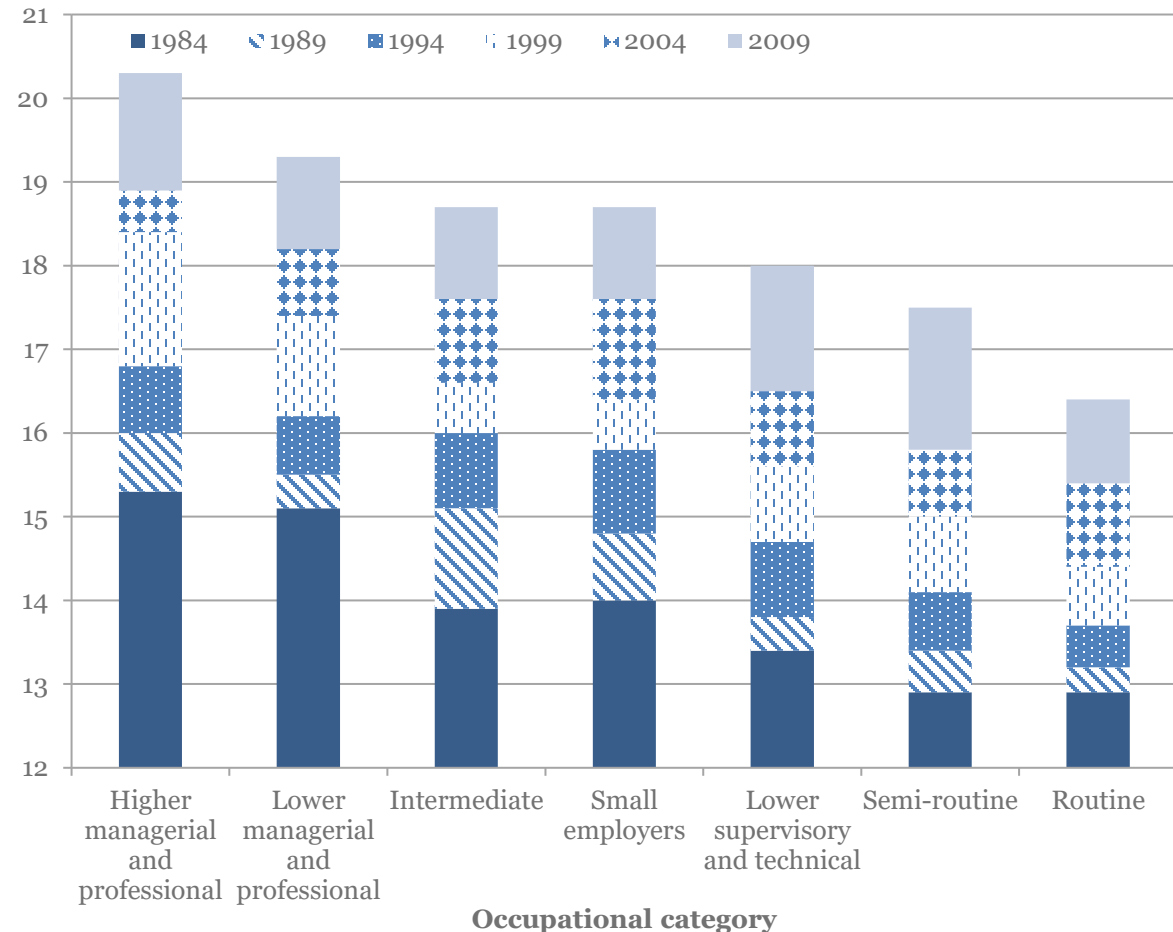


Similar differences by income and occupation

Difference in the level of life expectancy at age 65 between the males with the highest and lowest incomes



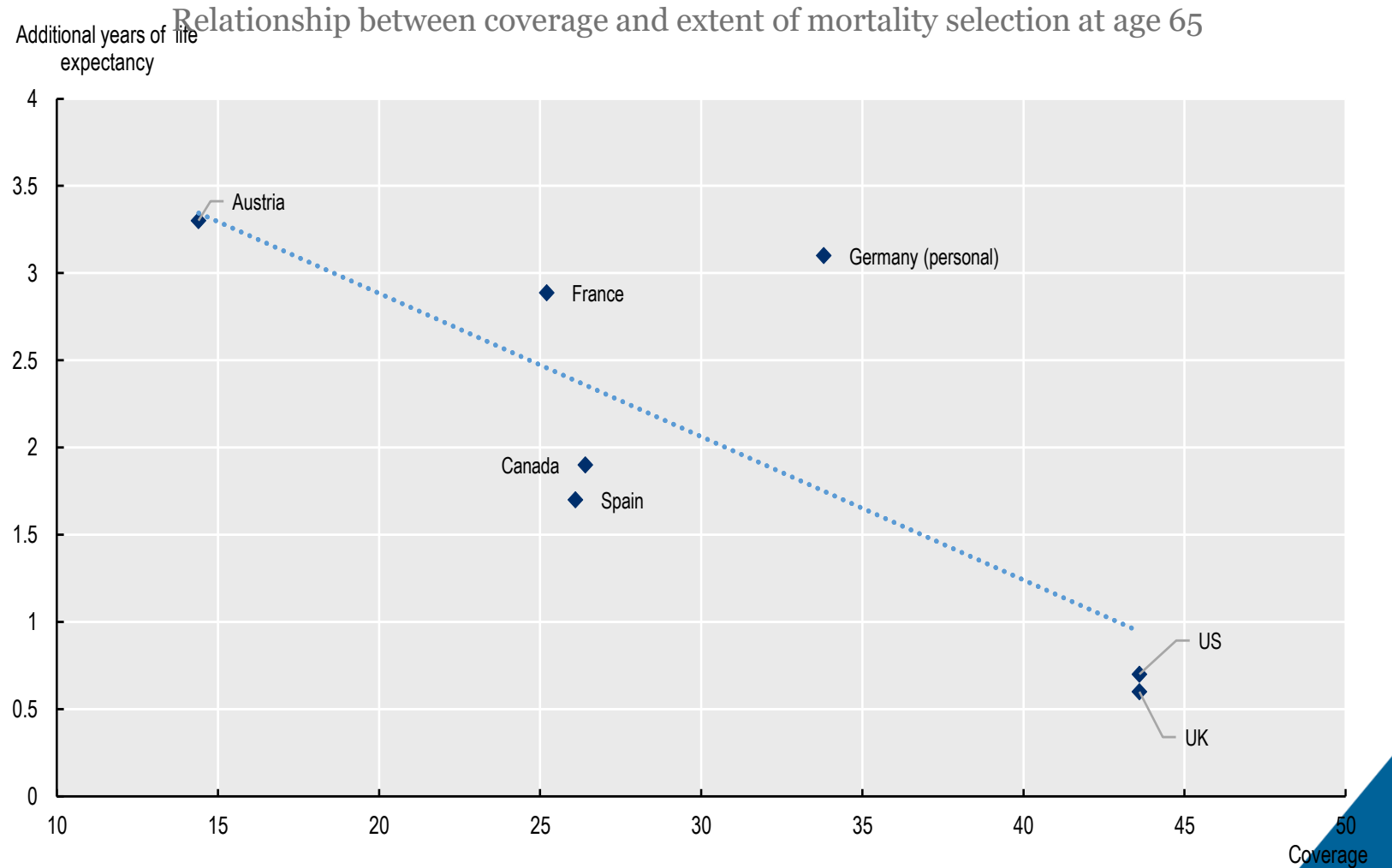
Evolution of life expectancy at 65 for males in England & Wales by occupational category





Insurance coverage impacts selection

- Depends on the proportion of the population covered
- Varies by type of insurance
- Varies by age





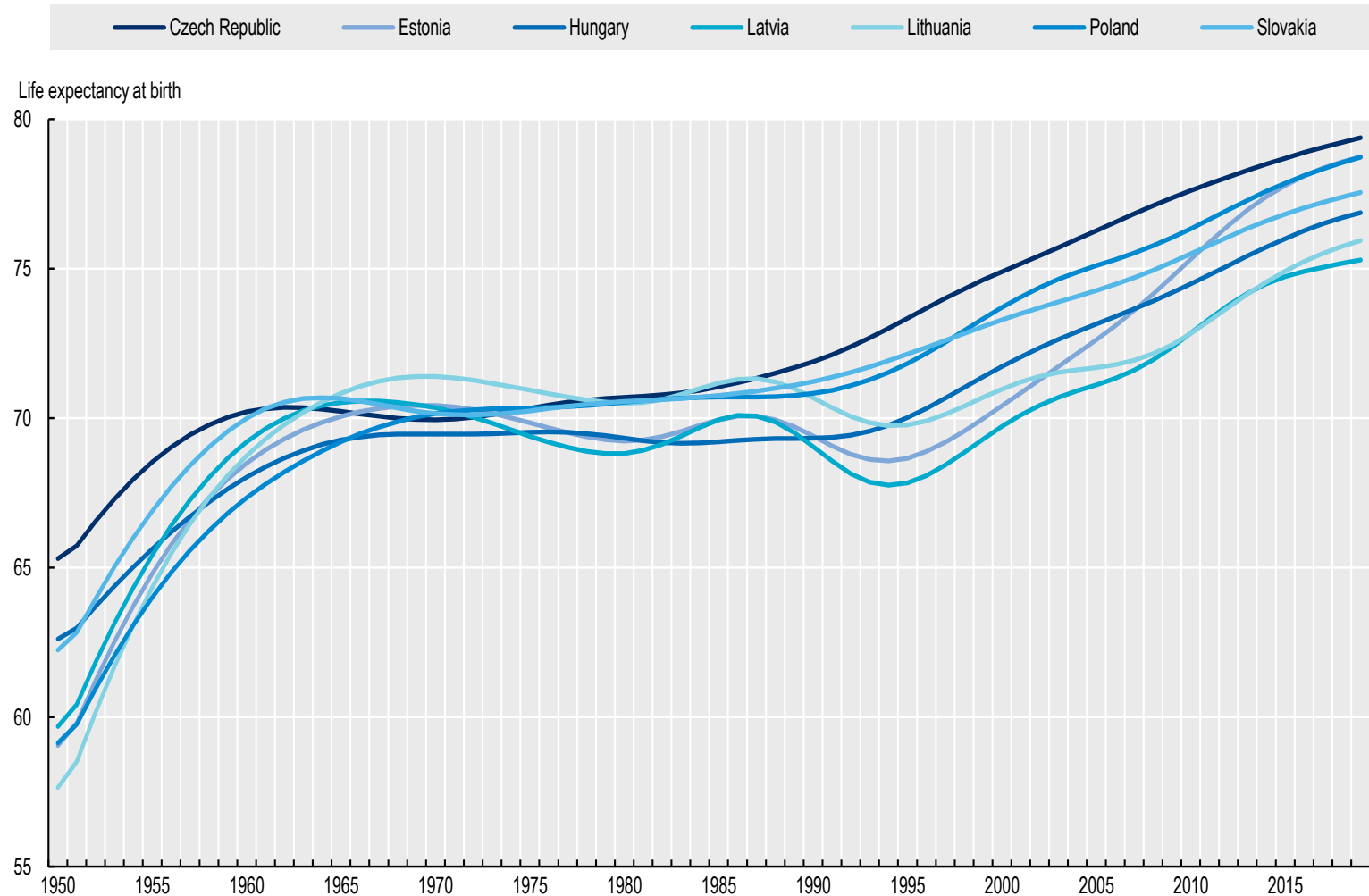
Different approaches to project mortality

Linear extrapolation of log mortality	Other extrapolative model	Graduation/Interpolation	Multi-population	Demographic projections	Approximation
Australia	Austria (pensions)	Austria (insurance)	Denmark (ATP)	Italy (Insurance)	Belgium (MR-FR)
Belgium (Plan3)	Chile (MT-2014)	Canada	France	Mexico	Japan (insurance)
Czech Republic	Costa Rica	Chile (TM-2020)	Netherlands	France (IA2015)	Korea
Denmark (FSA)	Iceland	Ireland			
Germany	Italy (pensions, various models used)	Israel			
Lithuania	Peru	Switzerland (Menthonnex)			
Norway	Slovenia	United Kingdom			
United States (insurance)	Sweden	United States (pensions)			



The past does not always predict the future: political drivers

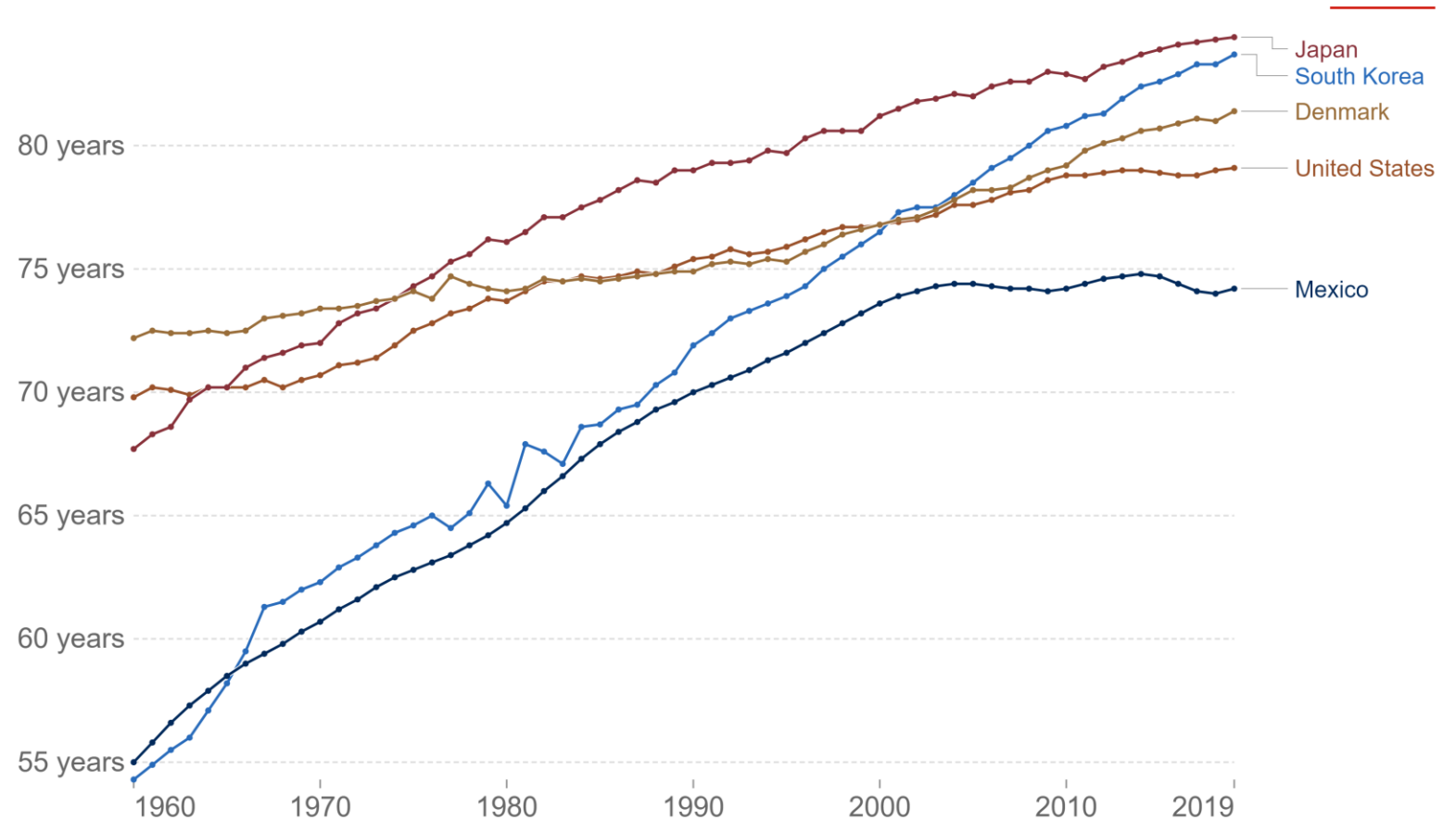
- The collapse of the USSR





Economic and societal drivers

- Economic development
- Smoking
- Drugs
- Violence



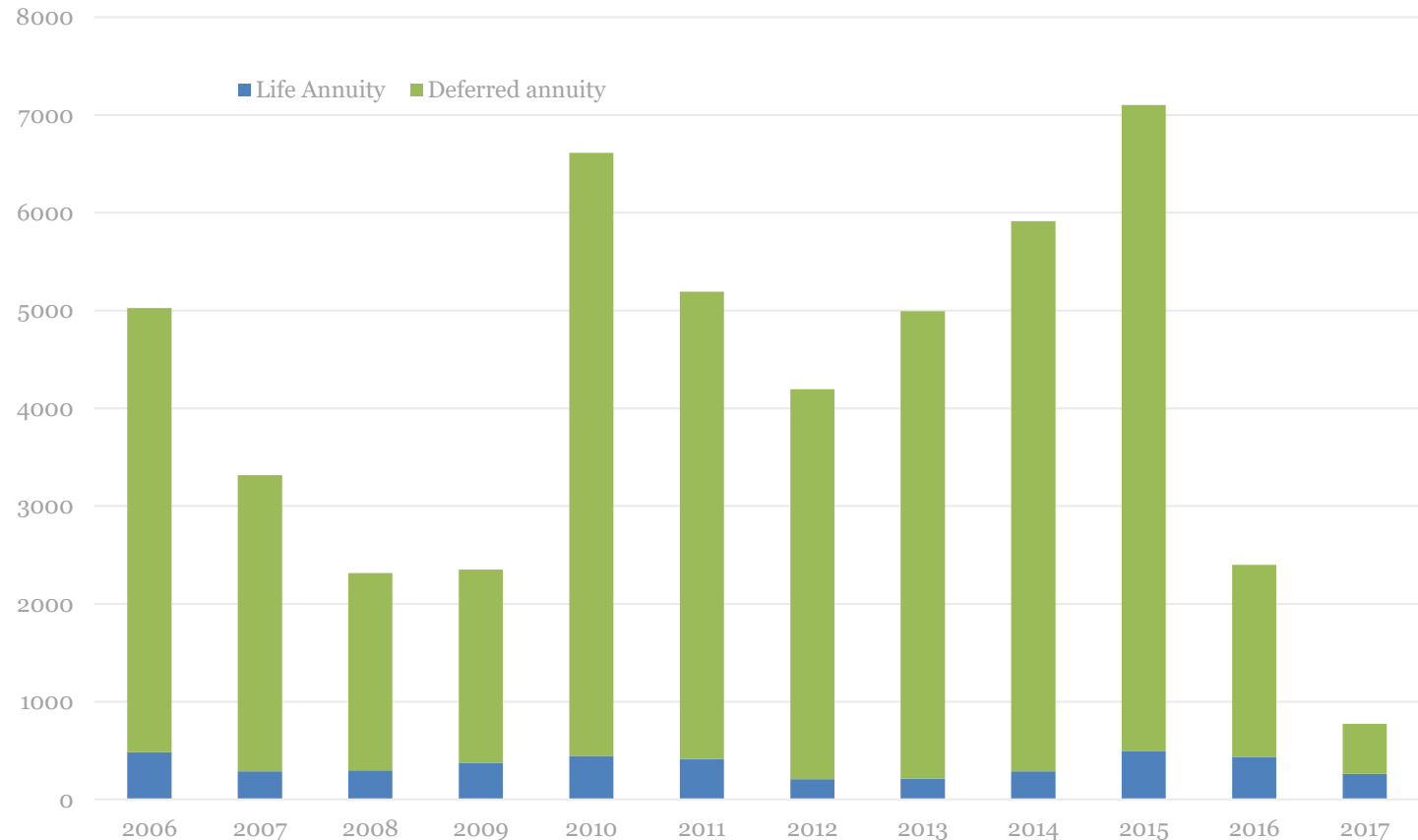
Source: Our World in Data



Policy drivers

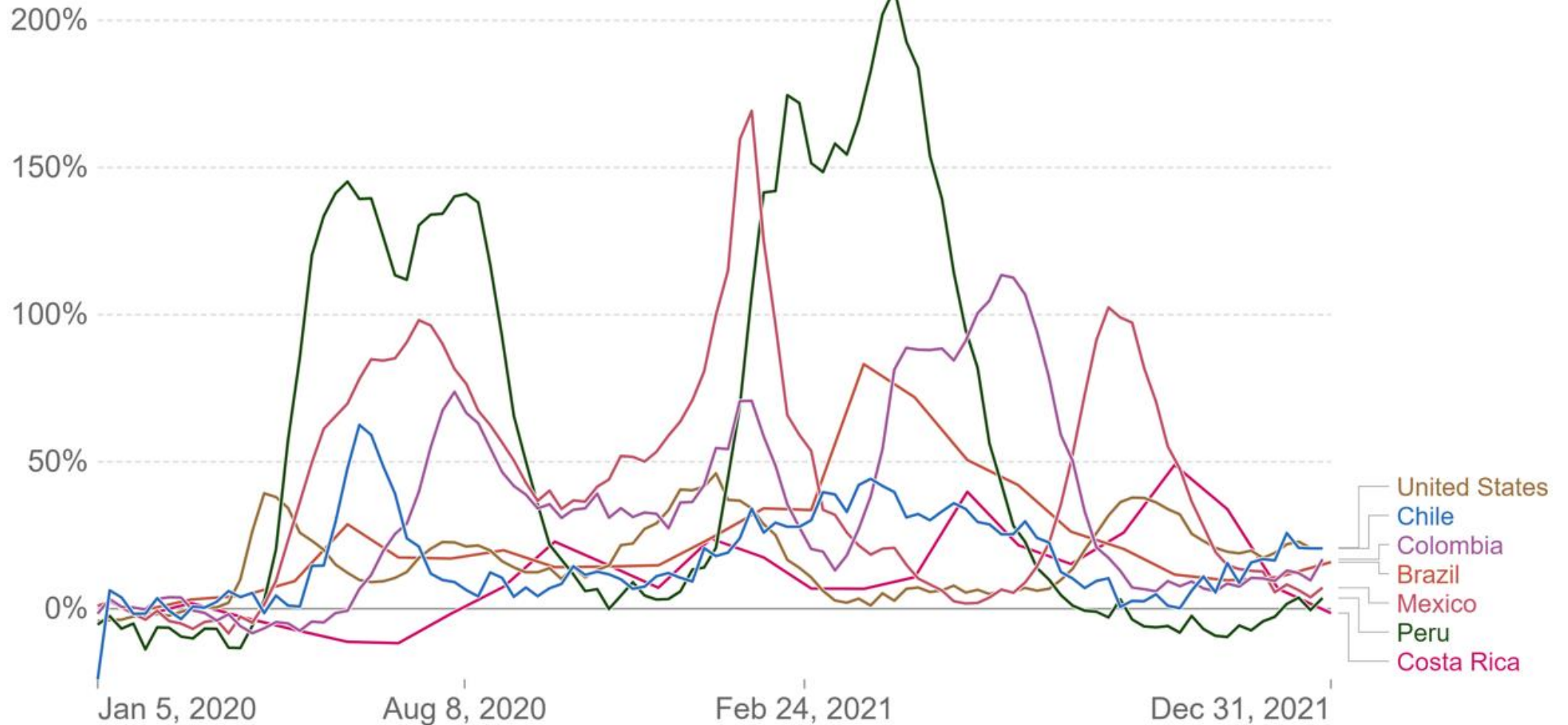
- 2008 pension reform in Chile
- Removal of requirement to annuitize in Peru

Annuity sales, Peru





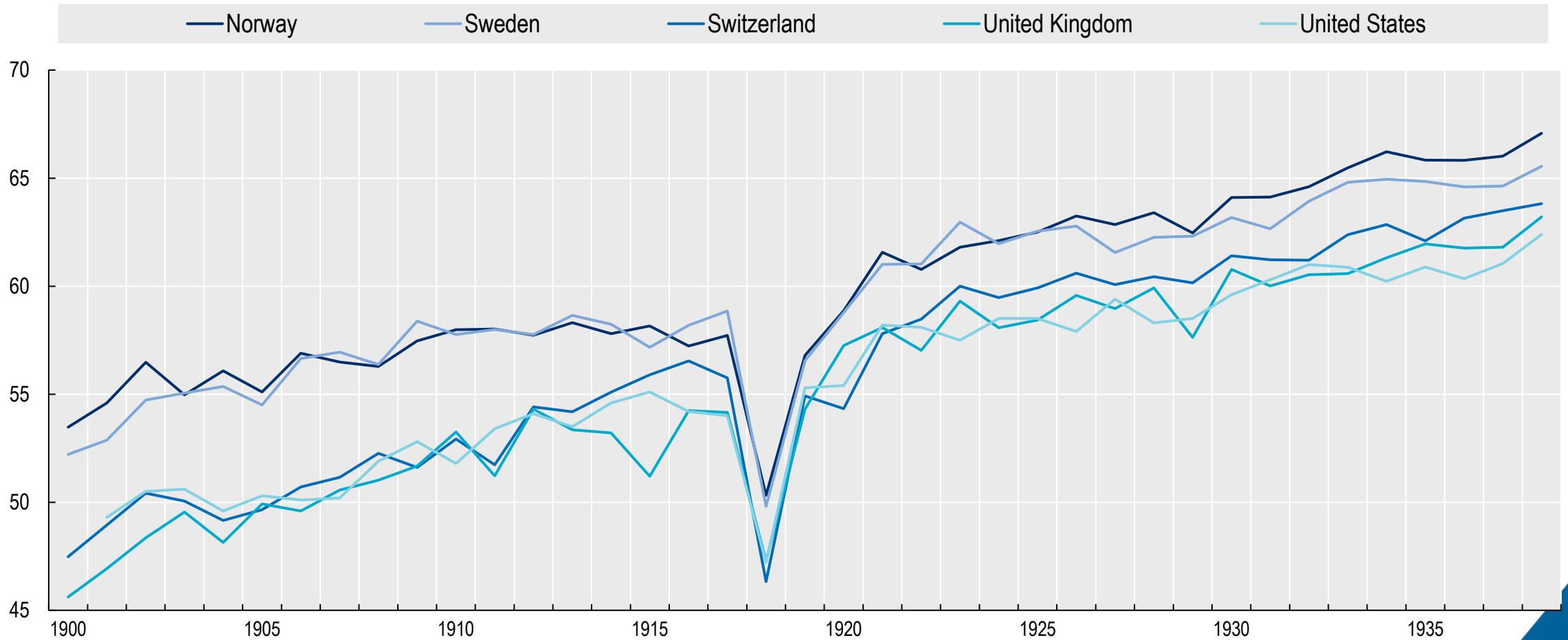
Excess mortality during the COVID-19 pandemic: 2020-2021





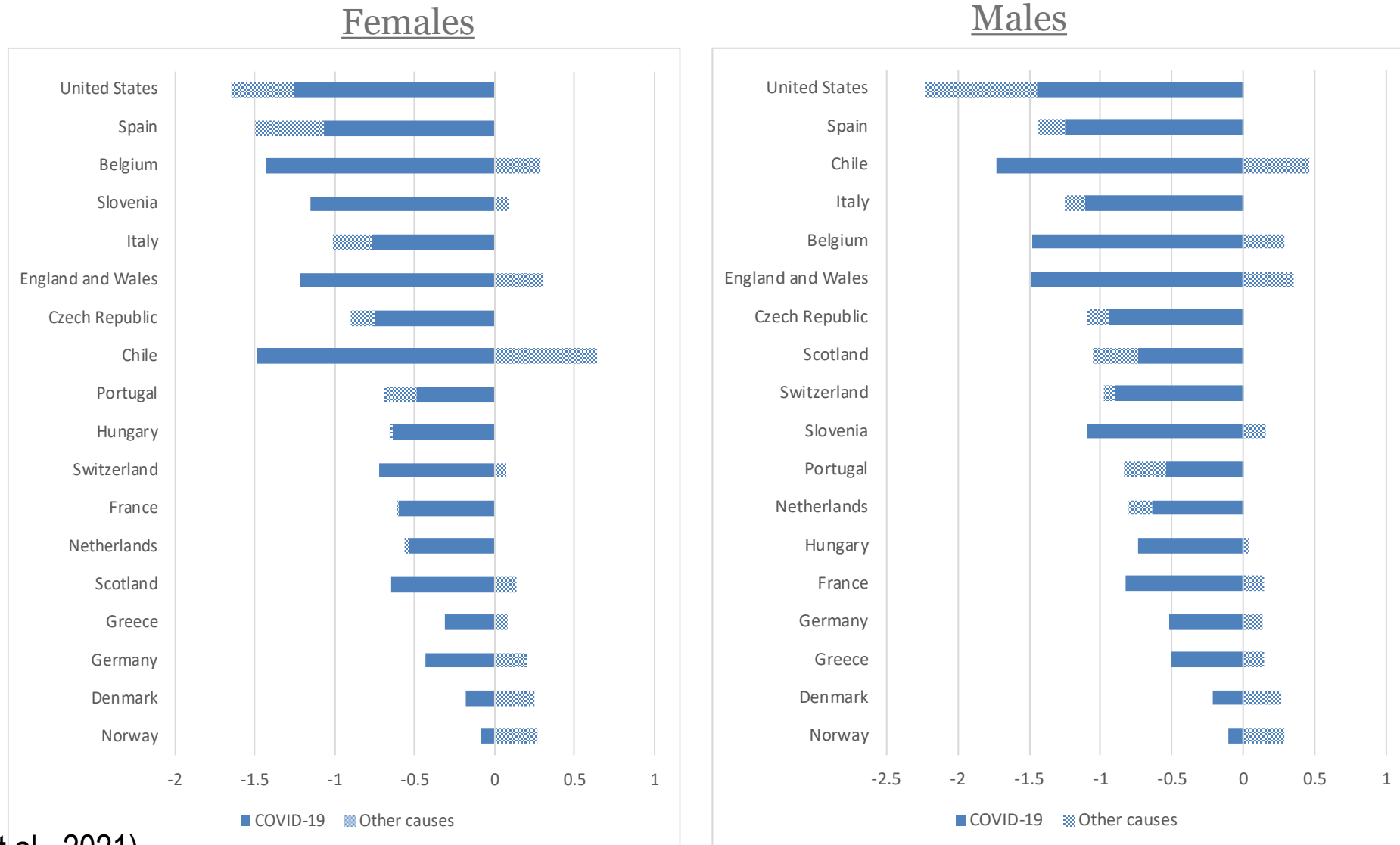
Pandemics

Life expectancy at birth around the Spanish Flu





COVID: Decomposition of the change in period life expectancy at birth





Indirect impact: healthcare access

- Healthcare access
 - 94% of 135 countries experienced disruption to essential health services
 - Disadvantaged groups of the population most affected
 - Larger impact in developing countries
 - Vaccine programs (non-COVID) disrupted
 - Maternal and child mortality particularly impacted
- Healthcare avoidance
 - Non-COVID hospital admissions down
 - Out-of-hospital non-COVID deaths increased, particularly during lockdowns



Indirect impact: lockdown

Substance abuse

Depended on impact on access

Suicide

Initial decrease in many countries, but women and adolescents more negatively impacted

Femicide

While domestic violence increased, deaths did not necessarily increase

Homicide

Overall crime decreased more

Traffic accidents

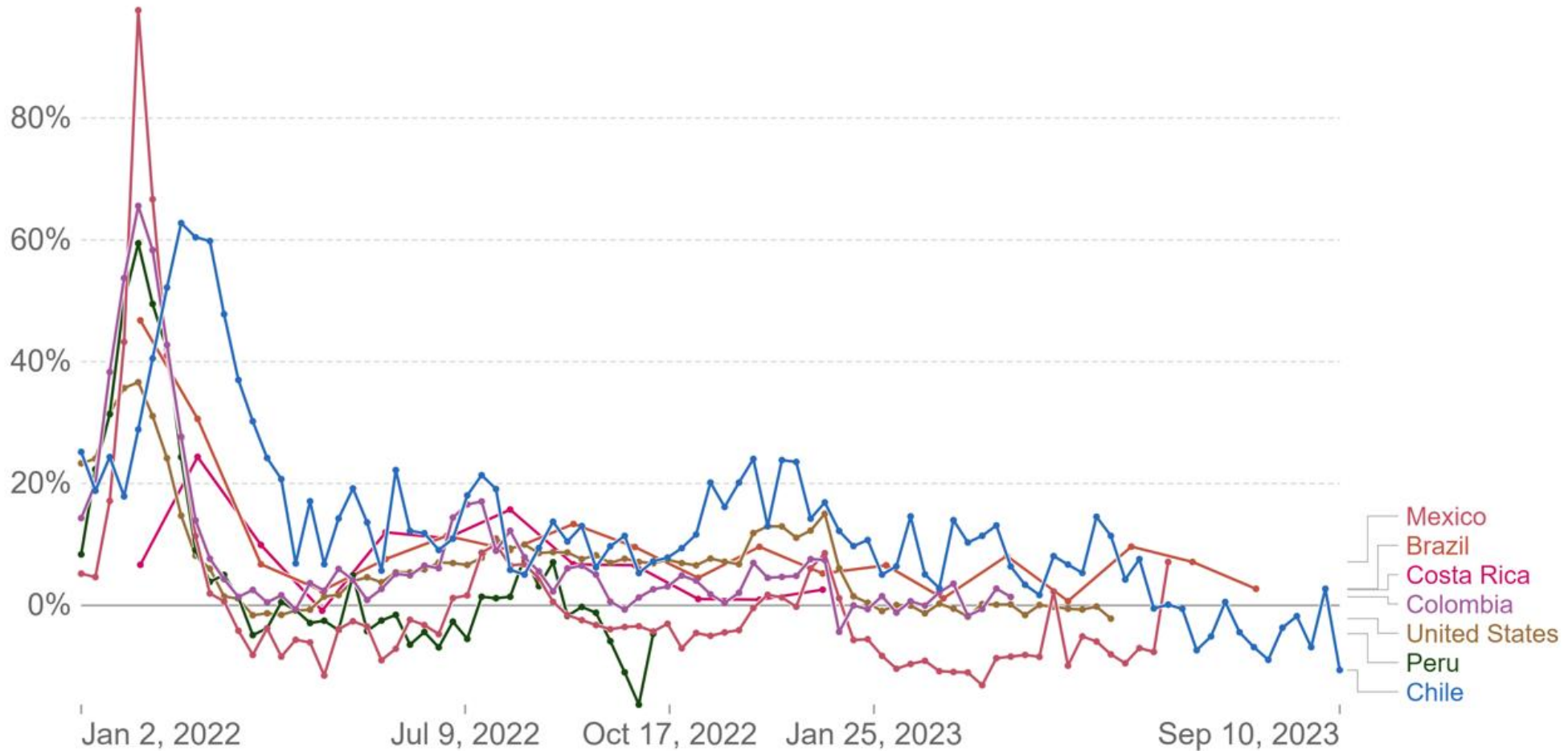
Decrease was not proportional with the change in traffic

Contagious diseases

Virtual elimination of the flu epidemic, which could reduce future immunity



Excess mortality during the COVID-19 pandemic: 2022-2023





Long-term improvement rates assumed

Jurisdiction	Model	Long-term improvement rate
Austria (insurance)	Lee-Carter	Halves initial value over 100 years
Canada	WH graduation + interpolation	1% over 20 years for age 60-80, grading down linearly to 0.2% at age 100 and 0% at age 105
Chile	WH graduation + interpolation	1% over 20 years
Denmark (ATP)	Saint model	Western European trend
Germany (Insurance, 2nd order)	Linear extrapolation	75% of population experience 1972-1999 (1-3%); period of convergence is user input
Iceland	CBD	Decline over years 20 to 45 to 1%
Ireland	CMI	User input (default of 1.5%)
Israel	CMI	1.25% for males, 1.5% for females
Lithuania	Linear extrapolation	Lithuanian experience over 1995-2017 over 20 years
Netherlands	Li-Lee	Average difference with European population since 1983
Switzerland	Menthonnex	Implicit – allows for the rectangularisation of the curve
United Kingdom	CMI	User input (default of 1.5%)
United States (pensions)	WH graduation + interpolation	1.35% over 10/20 years horizontal/diagonal convergence

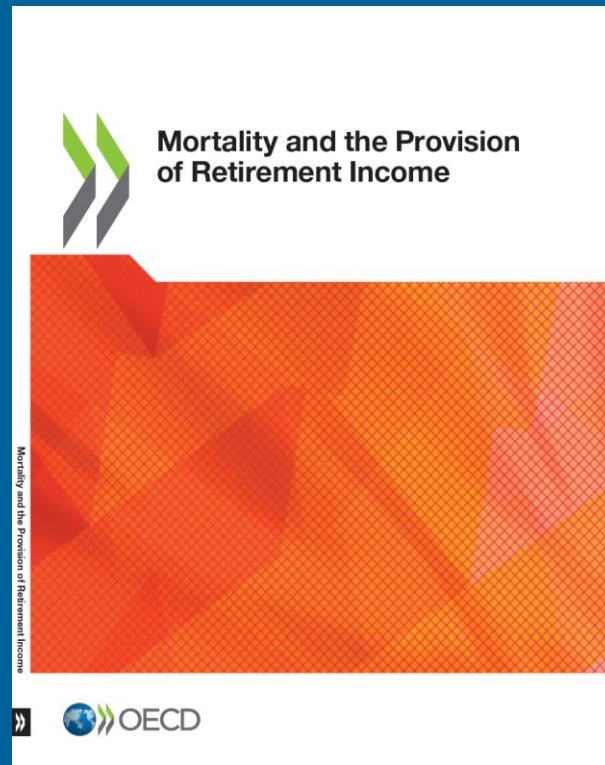


Looking forward

- Artificial Intelligence and machine learning have significant potential to help overcome a lack of data
 - Identify other variables significantly correlated with mortality
 - GDP
 - Socioeconomic indicators
- But context matters
 - Assumptions will still need to be justified



GRACIAS !



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