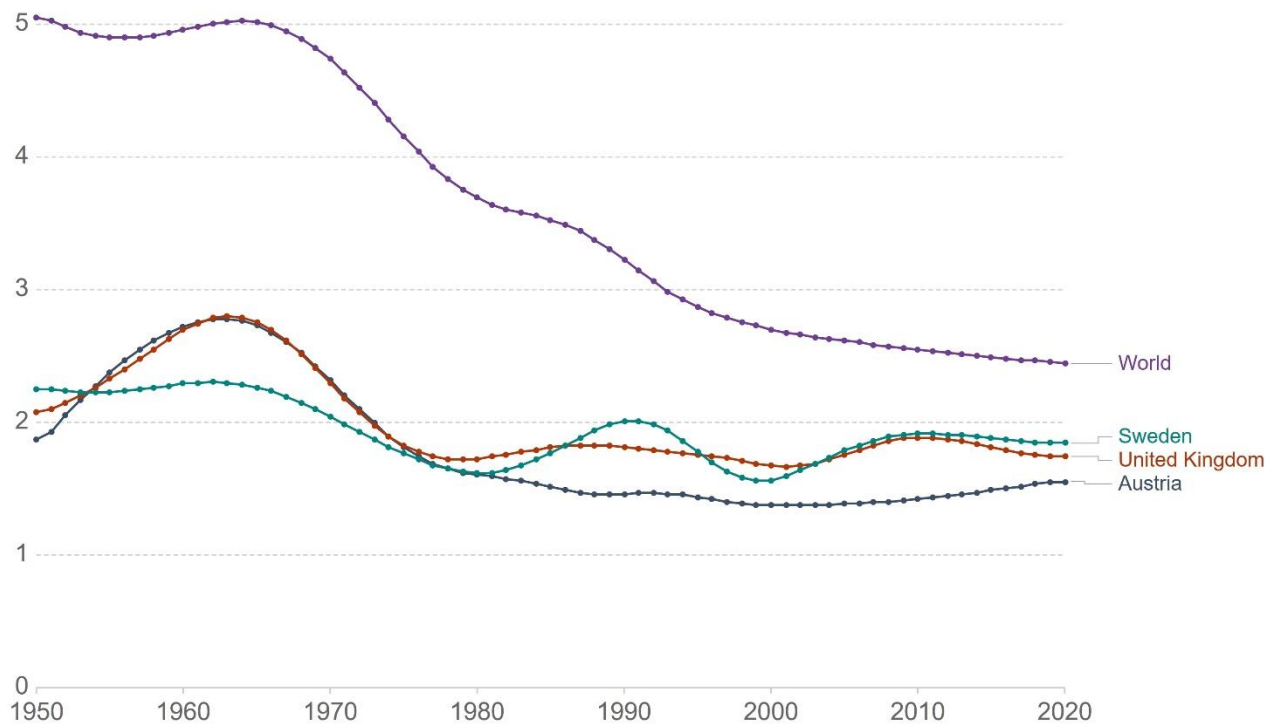


Demographic change

Economic and Fiscal Policy

Drivers

Children per woman



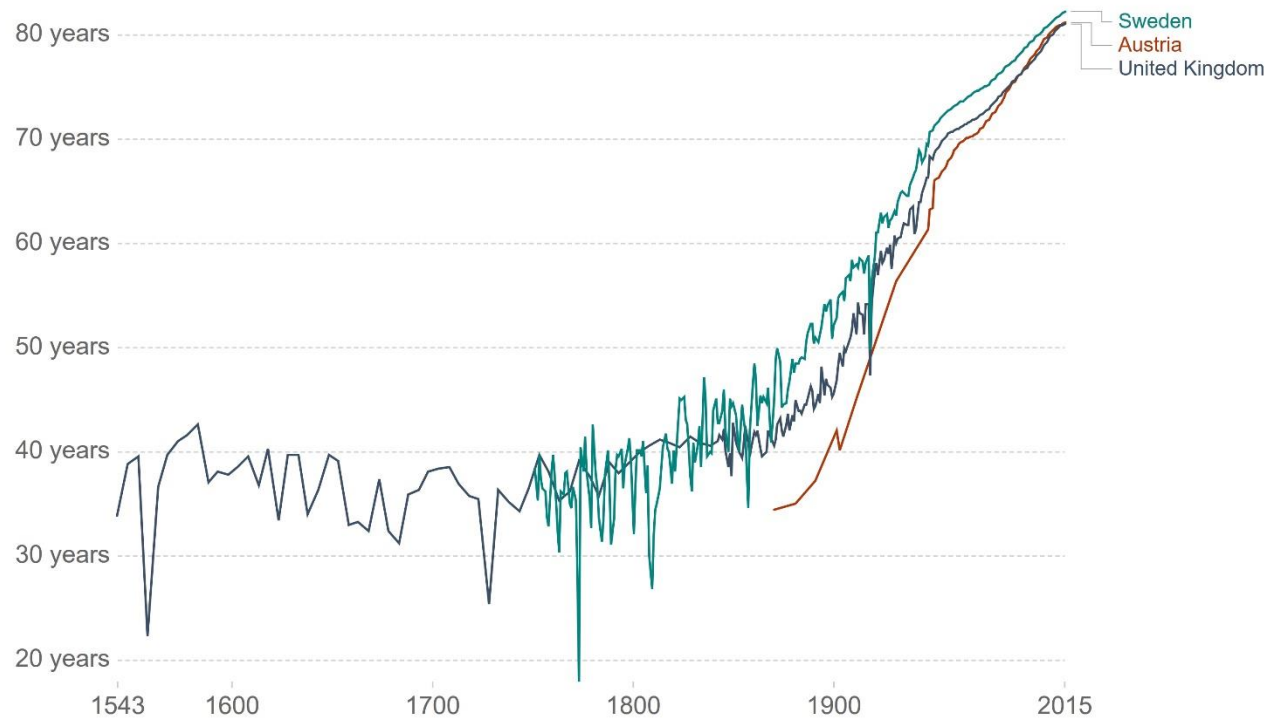
Source: United Nations – Population Division (2019 Revision)

Note: Children per woman is measured as the total fertility rate, which is the number of children that would be born to the average woman if she were to live to the end of her child-bearing years and give birth to children at the current age-specific fertility rates.

OurWorldInData.org/fertility-rate • CC BY

Drivers

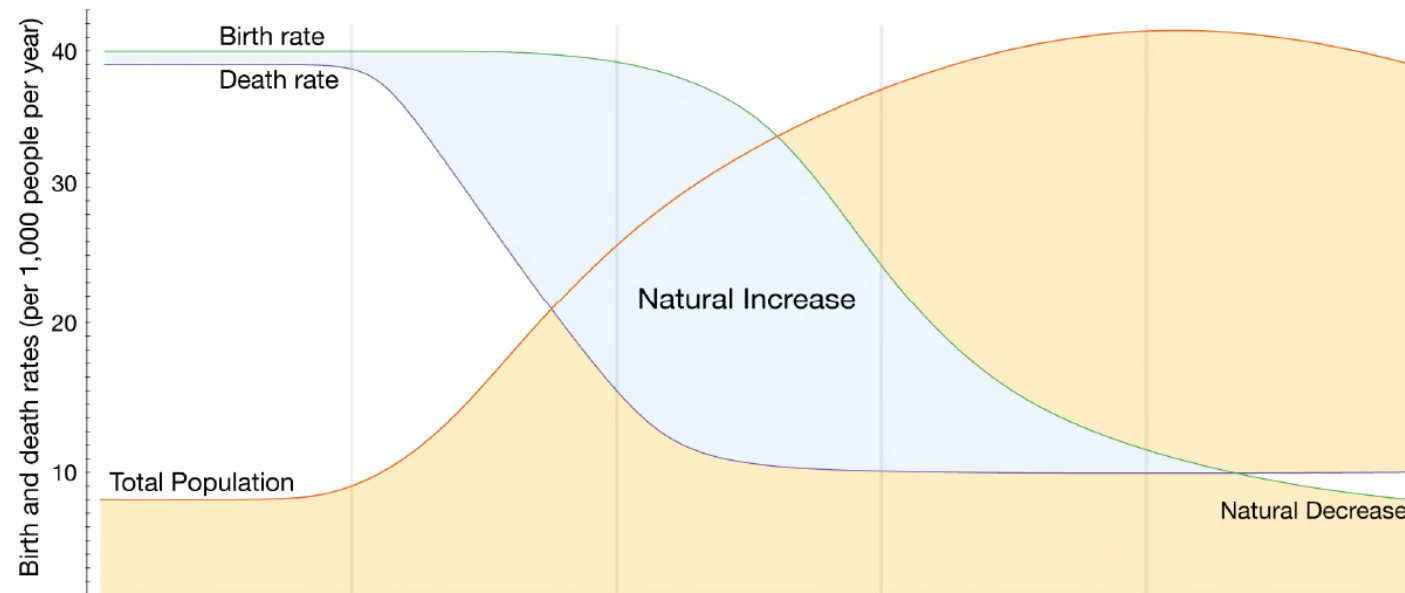
Life expectancy, 1543 to 2015



Source: Riley (2005), Clio Infra (2015), and UN Population Division (2019) OurWorldInData.org/life-expectancy • CC BY
Note: Shown is period life expectancy at birth, the average number of years a newborn would live if the pattern of mortality in the given year were to stay the same throughout its life.

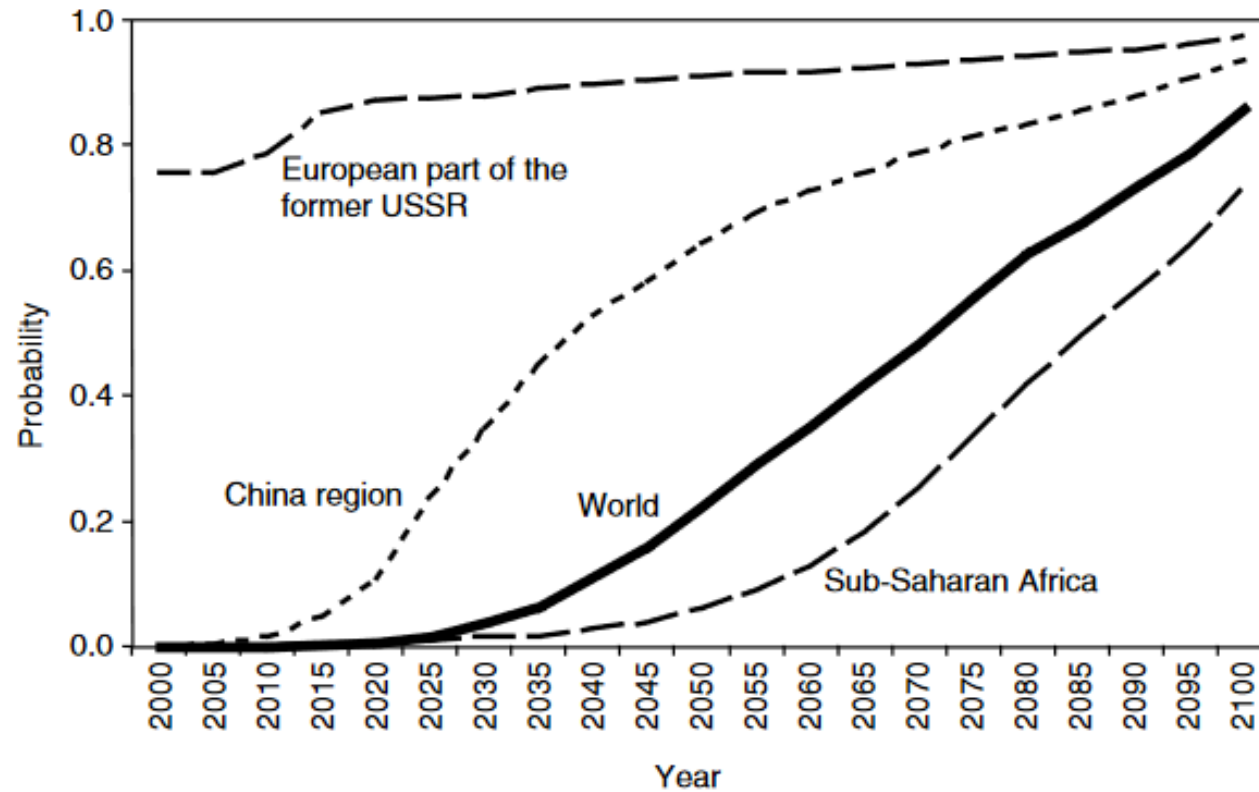
Drivers

Our World
in Data



	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Birth rate	High	High	Falling	Low	Very low
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Very rapid increase	Increase slows down	Stable or slow increase	Stable or slow decrease

Drivers



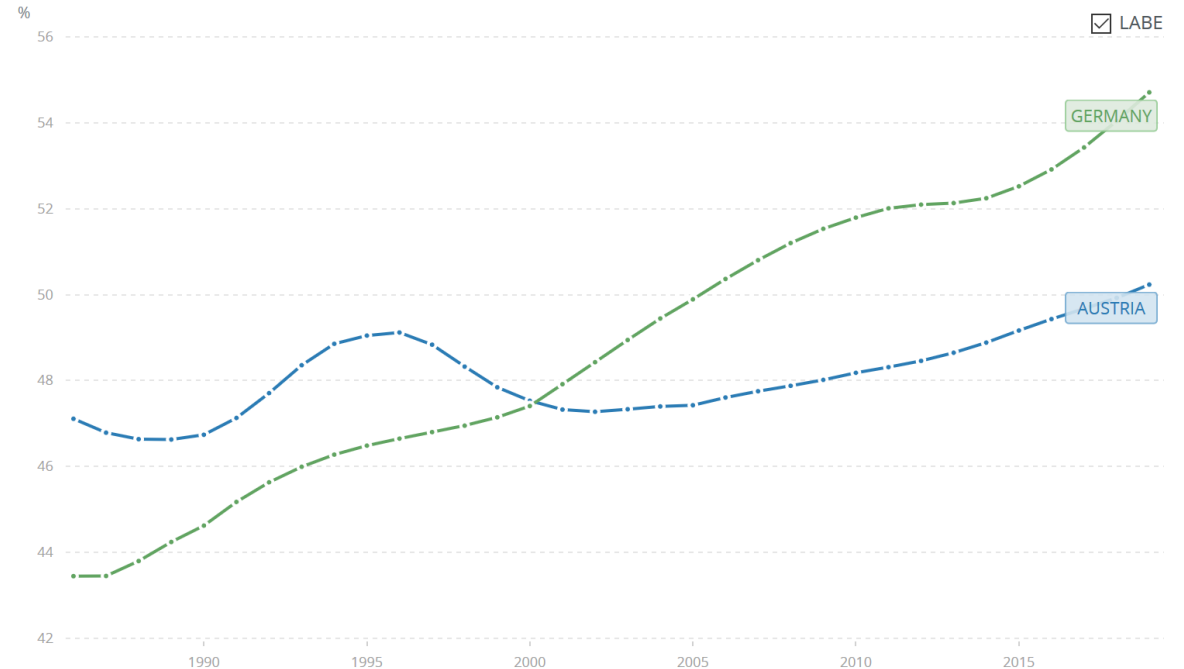
Source: Lutz, Wolfgang, Warren Sanderson, und Sergei Scherbov. „The End of World Population Growth“. *Nature* 412, Nr. 6846 (2. August 2001): 543–45.

<https://doi.org/10.1038/35087589>.

Graph: Probability that the world population size would reach a peak at or before any given year

Economic implications

- Dependency ratio
 - measures the ratio of productive vis-à-vis retired population
 - Increasing dependency ratios imply ageing society
 - Usually: Demographic dependency ratio
- 1 order derivative -> demographic deficit/demographic dividend



Quelle: <https://data.worldbank.org/indicator/SP.POP.DPND?end=2019&locations=AT-DE&start=1986>

Alternatively: Eurostat forecasts

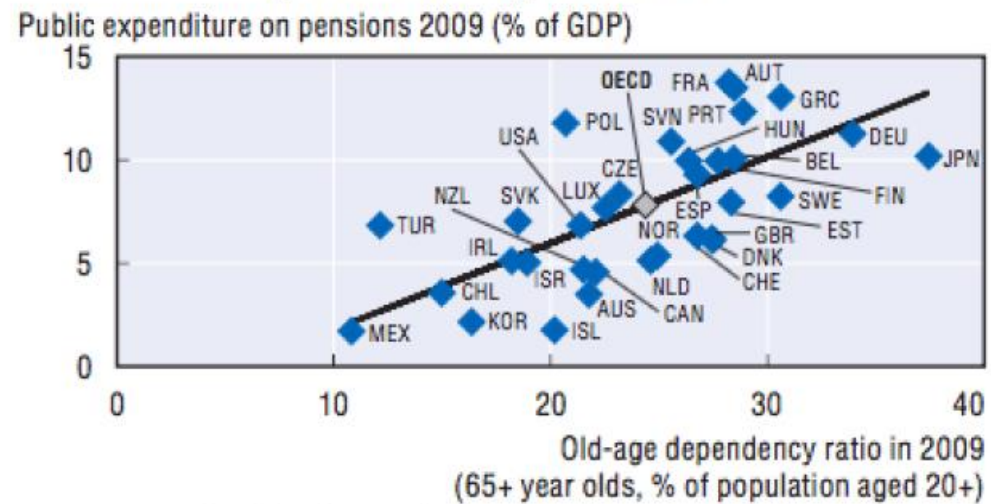
Economic implications

- Assume:
 - no intergenerational redistribution (pension systems, family)
 - No health effects (static retirement age)
- Capital markets
 - ratio of savers and dissavers changes as the ratio of working to retired population changes
 - Life-cycle saving
 - No net saving - Ageing means higher proportion of dissavers + more saving
 - Expectations of longevity increase overall saving in transitory phase – zero change in net saving in equilibrium

Economic implications

6.3. Demographic pressures and public pension expenditure

Source: OECD 2009



Economic implications

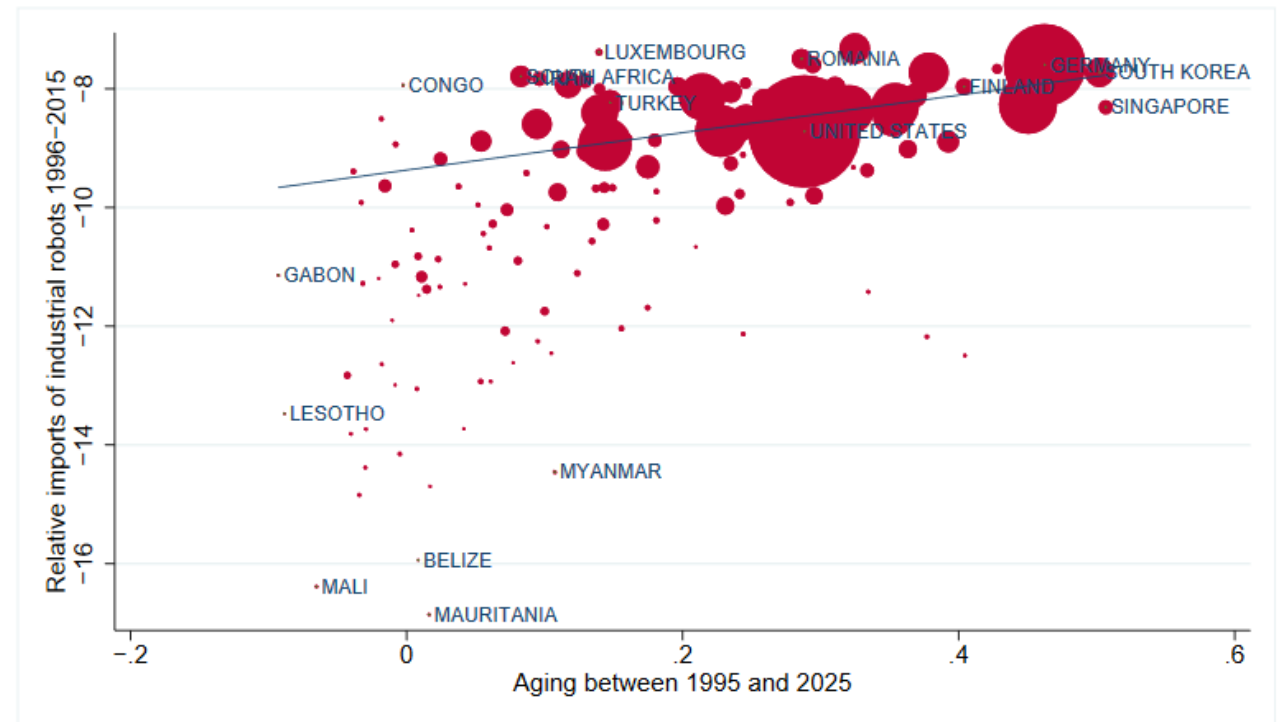
- Mechanical: Ratio of producers and consumers
- *Cost of supporting retired*
 - $$= \frac{\text{Consumption of retired}}{\text{GDP}}$$
 - $$= \frac{\# \text{ of retirees}}{\# \text{ of employees}} \times \frac{\text{Average consumption retirees}}{\text{Average productivity employees}}$$

Economic implications

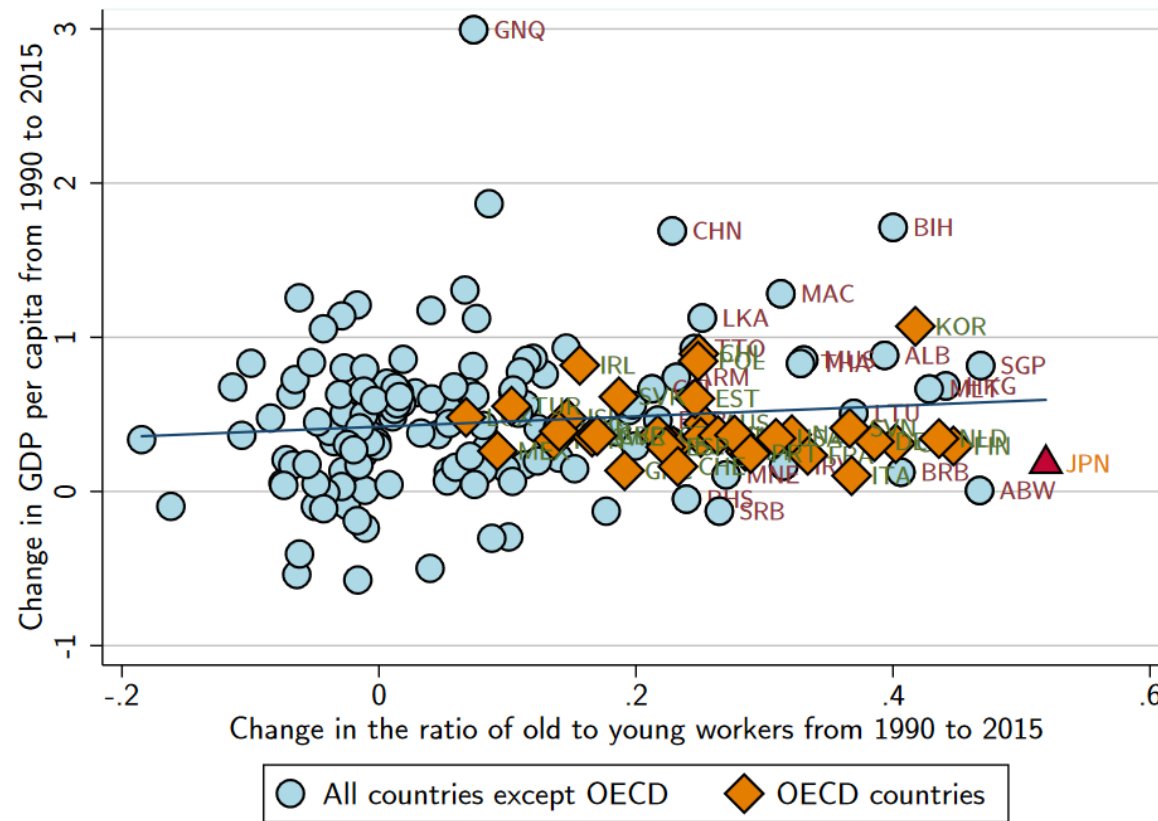
- Some workers may decide to work longer given the wage effects.
 - Are older workers less productive?
 - Recent studies cast doubt on declining productivity among older workers
 - Börsch-Supan and Weiss (2016): Mercedes-plant in Germany. Conclusion: „Based on our study of the relation between workers' age and their productivity in an assembly plant of a truck manufacturer, we cannot confirm the wide-spread opinion that older workers are less productive than younger workers”
 - Study by Crespo et al. (2013) Austrian data. Conclusion : „Our results indicate that firm productivity is not negatively related to the share of older employees it employs“
 - Potential explanations for weak age dependency of productivity?
 - Sectoral change (care work, ...)
 - Technological change
 - ...
 - But there are limits...

Economic implications

- Compensating technological change
- Acemoglu & Restrepo (2019): Capital intensity
- Mechanisms?
 - Labour cost
 - Interest rate



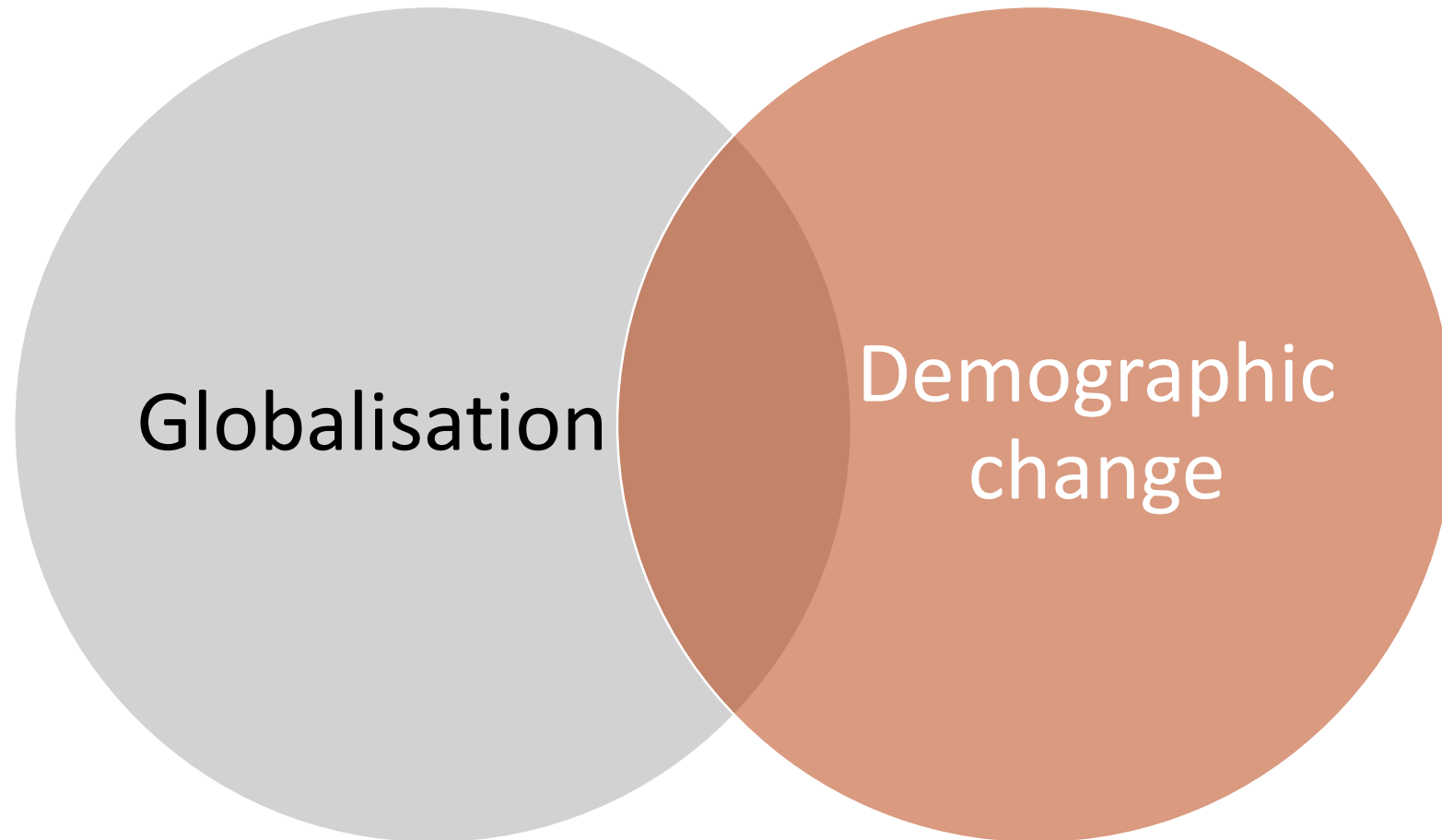
Economic implications



Policy

- What policy measures would be most effective in maintaining prosperity given adverse economic effects of the demographic transition?

Interacting challenges



Reforms

- Pension reforms
 - Paradigmatic vs parametric
 - Including
 - Additional pillars, shifting from PAYG to funded pillars
 - Retirement age increase (statutory, early retirement)
 - Declining generosity (slower accumulation, more time)