Higher education compensating for low fertility – A microsimulation approach

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9th World Congress of the IMA

8.1.2024 Vienna

Finnish Centre for Pensions
ELÄKETURVAKESKUS

Background

- The total fertility rate in Finland has collapsed from 1.87 in 2010 to 1.26 in 2023 (estimated)
- Would it be possible to compensate some of the economic impacts of the decline by higher education?
- Microsimulation is a natural approach for such an analysis
- Joint work with demographers Julia Hellstrand, Mikko Myrskylä, Jessica Nisén and Ziwei Rao

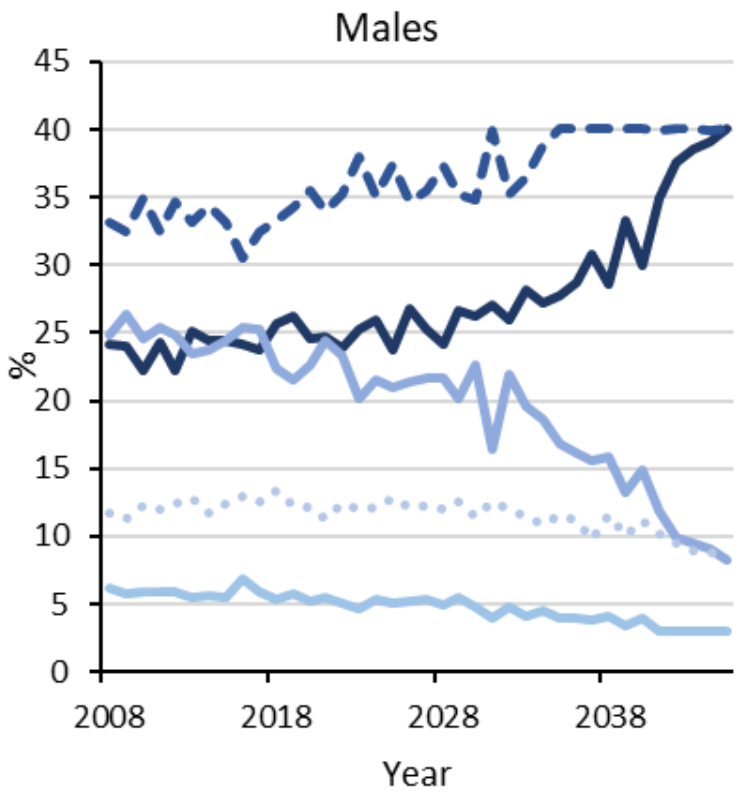
ELSI model

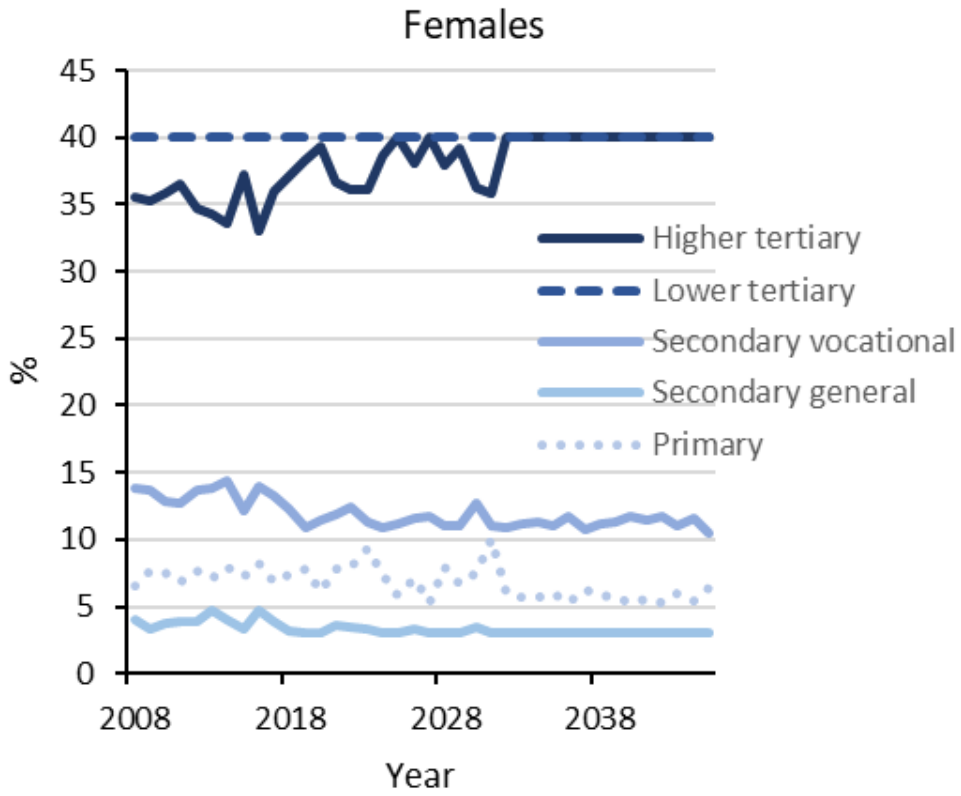
- Microsimulation model with dynamic aging in one-year time steps
  - Rule-based modelling, no behavioral equations
- Based on administrative register data
  - 100 % sample of the adult population of Finland
- Simulates working careers, earnings and statutory pensions
- Calibrated with the LTP semi-aggregated model via a micro-macro link
- Designed for simulating pension benefit distributions

Scenarios

- Baseline: official population projection from 2021 with TFR 1.45
- Low fertility scenario with TFR 1.3
- High education investment scenario
  - TFR 1.3
  - The money saved from education when TFR decline 1.45->1.3 is re-invested in educating the remaining population higher
  - Realistic bounds for the educational distribution from international comparisons

Education levels by birth year in high education investment scenario



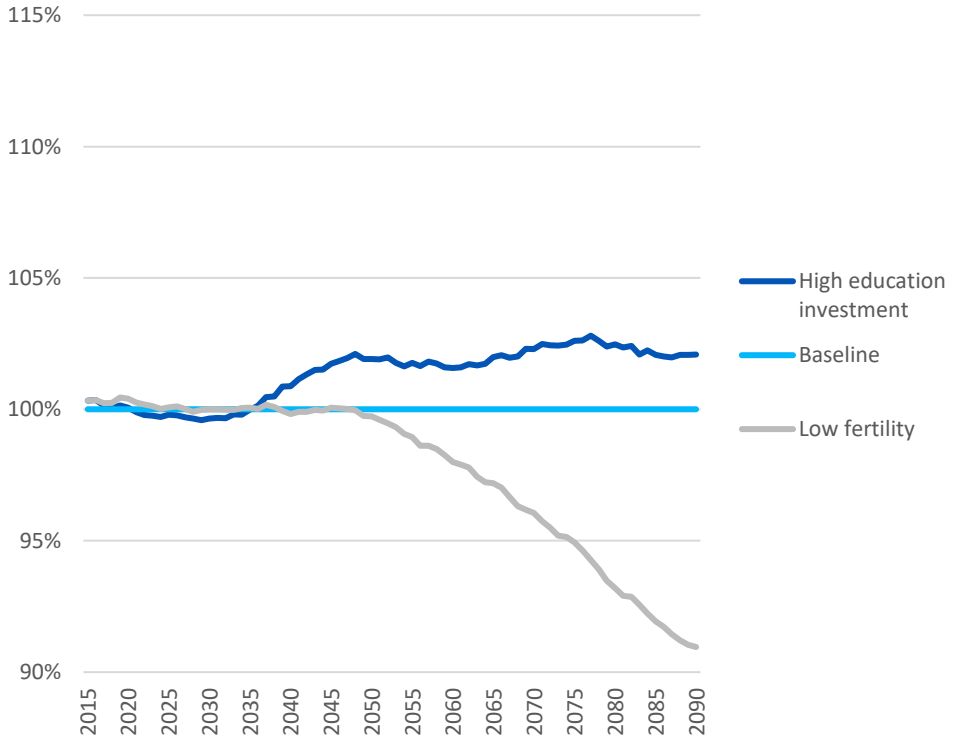


Microsimulation analysis

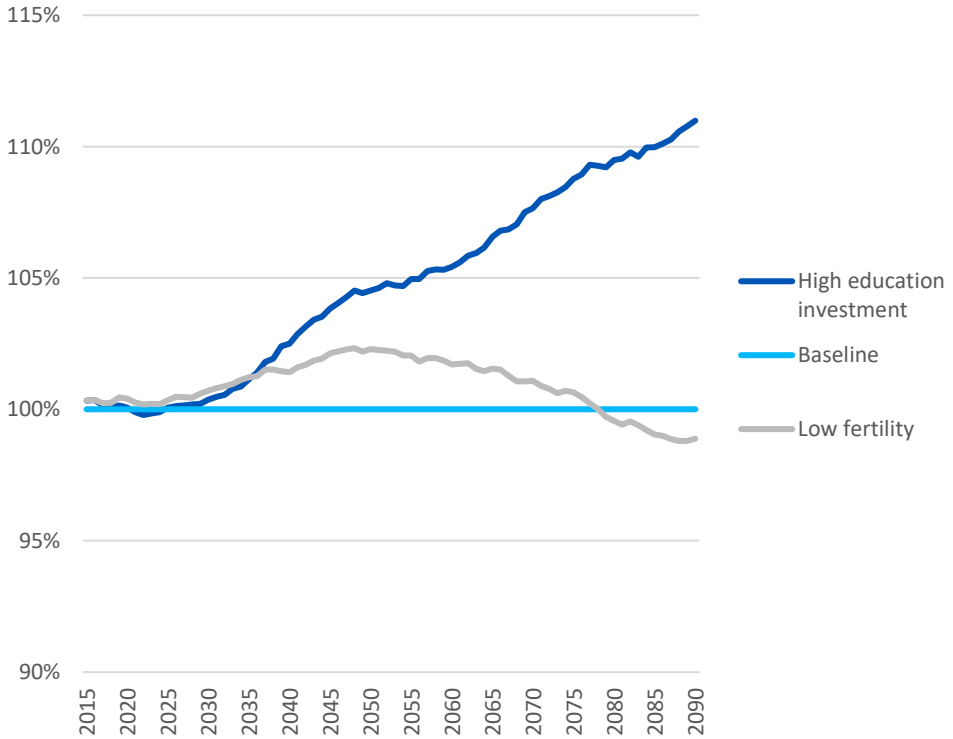
- Baseline and low fertility scenario simulated in the standard manner
- For the high education investment scenario we
  - Manipulate the education transitions to get desired education distributions
  - Fix the age-sex-education specific transition probabilities
  - Turn off the micro-macro link so that the impacts of the higher education are not overwritten
  - Change the pension index time series to correspond to the simulated wage growth

Results, in relation to the baseline

Wage sum



GDP per capita



Discussion

- The analysis is static in the sense that only direct impacts of the higher education are taken into account
- The new highly educated are assumed to be similar to the highly educated in the baseline scenario
  - In reality this might hold true only partially
  - The impact of the educational investments is so large that it is highly meaningful even if there are some diminishing returns