Higher education compensating for low fertility – A microsimulation approach

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9th World Congress of the IMA

8.1.2024 Vienna
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

Males

Females

- Higher tertiary
- Lower tertiary
- Secondary vocational
- Secondary general
- Primary

Year

2008 2018 2028 2038
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.