Are highly educated women more likely to give birth to the second child? Evidence from mixture-models

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Background

• Expansion of higher education contributed to a decline in fertility:
  • Highly educated have less time to realize their fertility intentions because:
    • They study longer (Ní Bhrolcháin and Beaujouan 2012)
    • May want to establish their position in the labour market (Gustafsson 2001)
    • Highly educated experience higher opportunity costs (Mincer and Ofek 1982)

• But also arguments that the highly educated may now have larger families:
  • Higher education = higher earning potential & higher income security (Oppenheimer 1997)
  • Improving welfare support for combining work and care
  • Ongoing change in gender roles (Esping-Andersen and Billari 2015, Goldscheider et al. 2015)
Past empirical evidence

• No sign of the reversal at the macro level, e.g. Sobotka et al (2016), Wood et al (2014)

Completed fertility by level of education, women born 1941-70

Past empirical evidence

- **At the micro level** on women who did not yet complete their reproductive careers often find that highly educated are more likely to progress to the second child:
  - Nordic countries (Olah 2003, Vika 2004, Kravdal 2007)
  - France (Köppen 2006)
  - UK (Mathews and Sear 2013)
  - Italy (Impicciatore and Dalla Zuanna 2016)
  - Cross-nationally in Europe (Nitsche et al 2018)

- Some signs that this finding might be due to selection into the sample of mothers (Kravdal 2001, Kreyenfeld 2002, Gottard et al 2015) or that it might be driven by time-squeeze (Klesment et al 2014)
Shortcomings of micro-level research

• Methodological shortcoming of past micro-level studies based on event-history models:
  • EHA models assume that the event will eventually occur
  • They do not separate the effects on the timing from the effects on the quantum

OUR CONTRIBUTION:
• We evaluate the effect of women’s education on the probability of giving birth to the second child (quantum) separately from the timing of this event (tempo) → cure mixture parametric model
• Cure models rarely used in family demography (Gray et al. 2010, Beaujouan and Solaz 2013, Bremhorst et al. 2016)
Our approach

- **Mixture cure model:**

  *Survival function:*

  \[ S(t) = \pi + (1 - \pi) \cdot S_u(t) \]

  where:

  \( \pi \) – the proportion cured (the proportion who are not susceptible to experiencing the event, i.e. the second birth)

  \( S_u(t) \) - survival function for the uncured individuals
Our approach

• The $\pi$ is modelled as a logistic function:

$$\pi = \frac{\exp(\alpha + \beta_1 x_1 + \cdots + \beta_k x_k)}{1 + \exp(\alpha + \beta_1 x_1 + \cdots + \beta_k x_k)}$$

• For modelling the time-to-second birth we use a log-normal distribution:

Source: Telang and Mariappan (2008)
Data

- **Harmonised Histories**
  - Harmonised data from GGS* but also other available data sets
  - full fertility and partnership histories + year at completing highest education

- **Sample**: women born in 1940-1979 (Austria and US women born 1960-1979) with one child
  - observed till birth or the interview but no longer than for 10 years or till age 49 whichever first

- **Education as the main explanatory covariate**: low (ISCED 1-2), medium (ISCED 3-4), high (ISCED 5-6), in education

- **Control variables**: cohort (we also tried to interact cohort and education)
## Results

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<th><strong>Split population model</strong> (coefficients)</th>
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Results: cohorts 1940-59

Predicted proportion not having the second child, cohorts 1940-1959, 95% CI
Results: cohorts 1960-79

Predicted proportion not having the second child, cohorts 1960-79, 95% CI
Results: change over time?

Predicted proportion not having the 2nd child

LOW EDUCATED

HIGH EDUCATED
Conclusions

• The split population models closely reproduce the probabilities of having the second child for the cohorts which ended their reproductive careers.

• The estimated probabilities of second birth for cohorts 1960-79 should be thus quite reliable.

• Overall, we find:
  • Negative educational gradient in many CEE countries.
  • No gradient in most of the countries, positive only in Belgium.
  • Overall no evidence for the reversal in educational gradient in second births across time.
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EURREP website: www.eurrep.org