UNIVERSITÉ PARIS 1
PANTHÉON SORBONNE

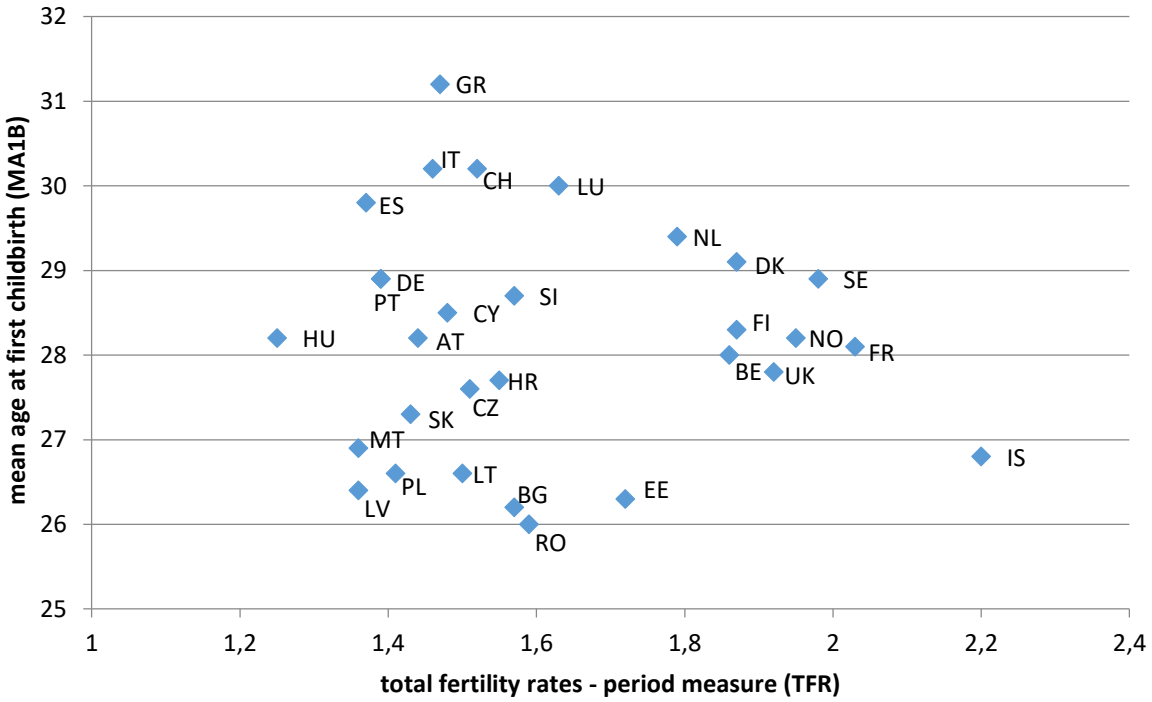
ined
INSTITUT NATIONAL
D'ÉTUDES DÉMOGRAPHIQUES

The later, the more? An analysis of the link between the timing and the intensity of births

Angela Greulich, Laurent Toulemon

Ined – June 2018

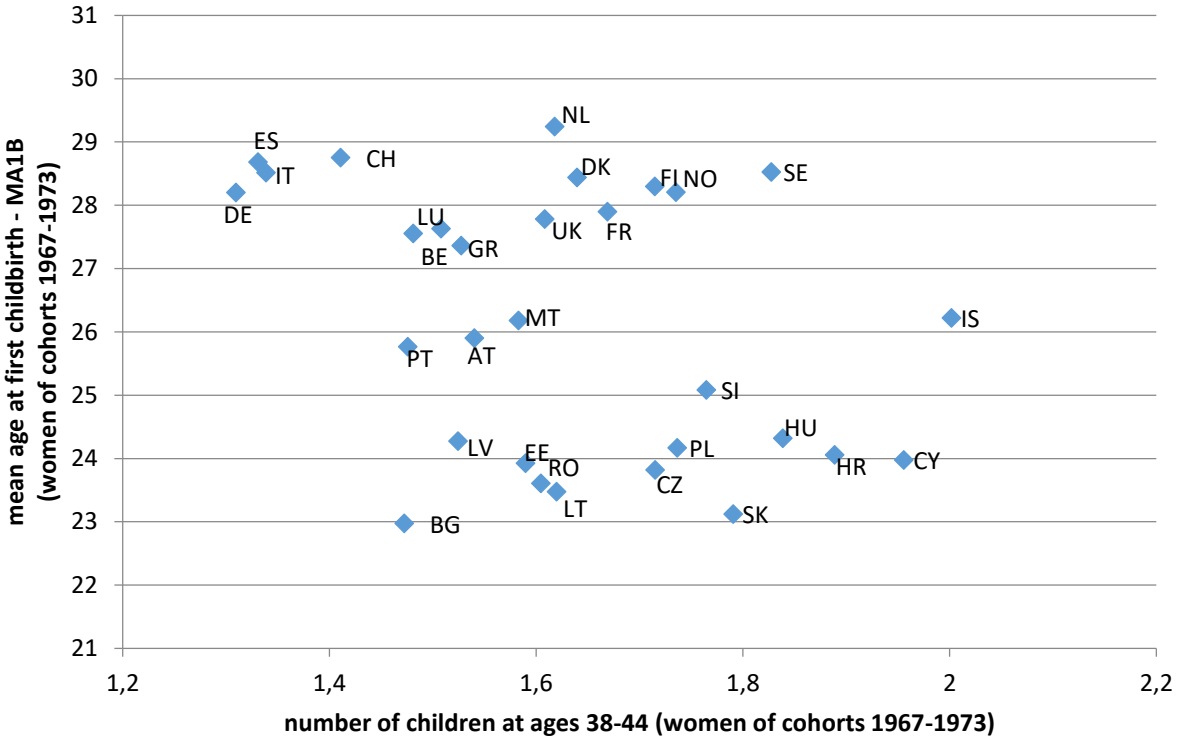
Motivation: no obvious link between TFR and MA1B (period measures)



Mean age at first childbirth against total fertility rates, 30 European countries, 2010 (Data sources: World Bank WDI, UNECE)

AT-Austria, BE-Belgium, BG-Bulgaria, CH-Switzerland, CY-Cyprus, CZ-Czech Republic, DE-Germany, DK-Denmark, EE-Estonia, GR-Greece, ES-Spain, FI-Finland, FR-France, HR-Croatia, HU-Hungary, IS-Iceland, IT-Italy, LT-Lithuania, LU-Luxembourg, LV-Latvia, MT-Malta, NL-Netherlands, NO-Norway, PL-Poland, PT-Portugal, RO-Romania, SE-Sweden, SI-Slovenia, SK-Slovakia, UK-United Kingdom.

Motivation: no obvious link between CFR and MA1B (cohort measures)



Mean age at first childbirth and average number of children at ages 38-44
(women of cohorts 1967-1973)
30 European countries, 2011
(Data source : EU SILC CS 2011)

AT-Austria, BE-Belgium, BG-Bulgaria, CH-Switzerland, CY-Cyprus, CZ-Czech Republic, DE-Germany, DK-Denmark, EE-Estonia, GR-Greece, ES-Spain, FI-Finland, FR-France, HR-Croatia, HU-Hungary, IS-Iceland, IT-Italy, LT-Lithuania, LU-Luxembourg, LV-Latvia, MT-Malta, NL-Netherlands, NO-Norway, PL-Poland, PT-Portugal, RO-Romania, SE-Sweden, SI-Slovenia, SK-Slovakia, UK-United Kingdom.

Research Questions

Background: no obvious link between the timing of first births and fertility levels in Europe.

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1. Under which circumstances does birth postponement facilitate/impede starting a family?
2. What are the consequences of birth postponement for the timing and intensities of births of higher order?
3. Under which circumstances can birth postponement be associated with higher fertility levels for cohorts which are currently at childbearing age?
    - Female education
    - Welfare state regime / family policy setting / region

The data base

European Union's Statistics of Income and Living Conditions (EU-SILC)

- Objective: observe probabilities of childbirth for women by parity, age, and education and transform them into birth intensities
- Country-by country analysis for 32 countries and regional analysis
- Childbirths observed in 2009, 2010 and 2011 (cross-sectional data)
- Due to fertility-linked attrition: observation of childbirths in *t-2*
  - Childbirths in 2009 observed with CS 2011
  - Childbirths in 2010 observed with CS 2012
  - Childbirths in 2011 observed with CS 2013
- *Semi-retrospective approach to correctly attribute education levels*

Semi-retrospective approach

Synthetic cohort for ages 25+

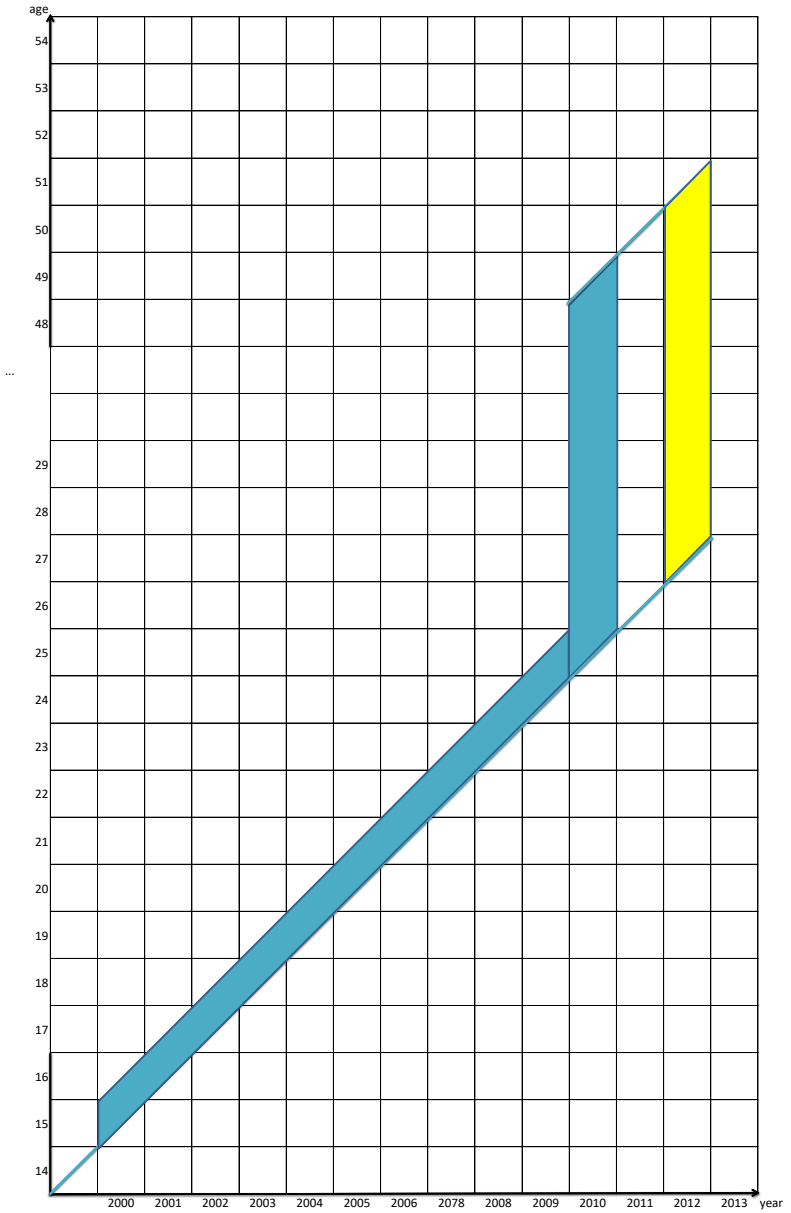
age 25 in 2010 = age 27 in 2012: education completed

Childbirths observed in 2010 (aged 2 at survey)

Retrospective approach for ages 15-24

i.e. education is observed at age 27; only 1 cohort: 1985

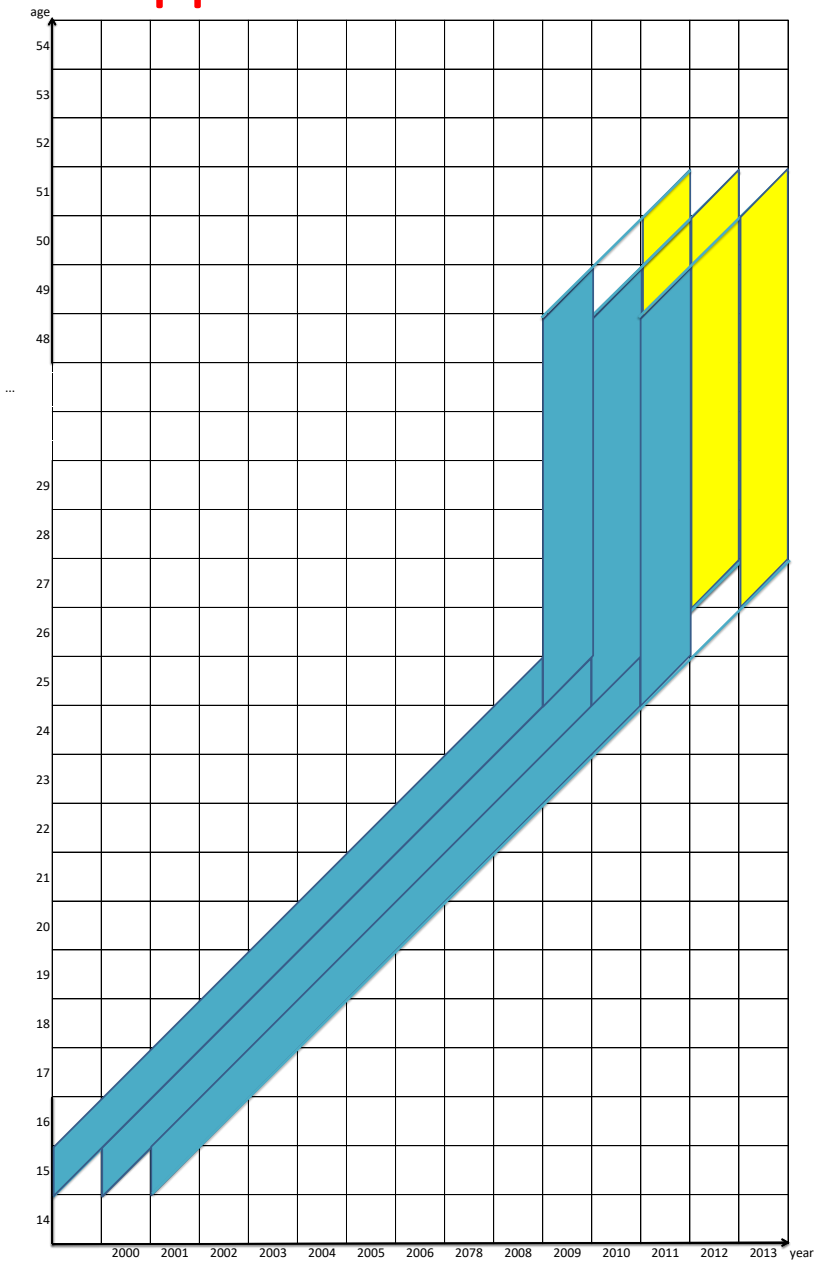
Childbirths observed in 2000-2009



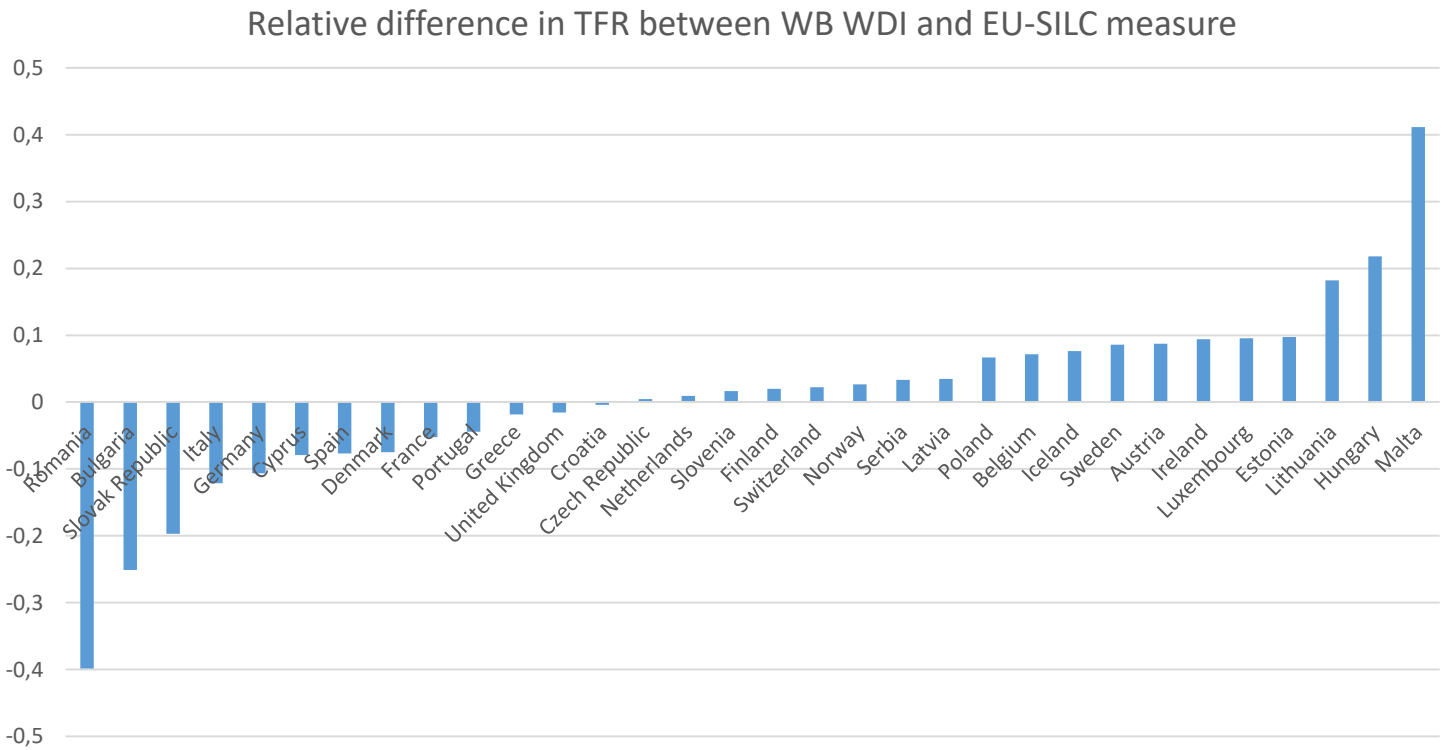
Semi-retrospective approach

Observation of childbirths in 2009, 2010 and 2011 to increase sample size by country

(by using CS waves of 2011, 2012 and 2013)



Data quality check



WB WDI: average TFR 2009, 2010, 2011
EU-SILC: Childbirths observed for years 2009, 2010 and 2011 based on CS waves of 2001, 2012 and 2013

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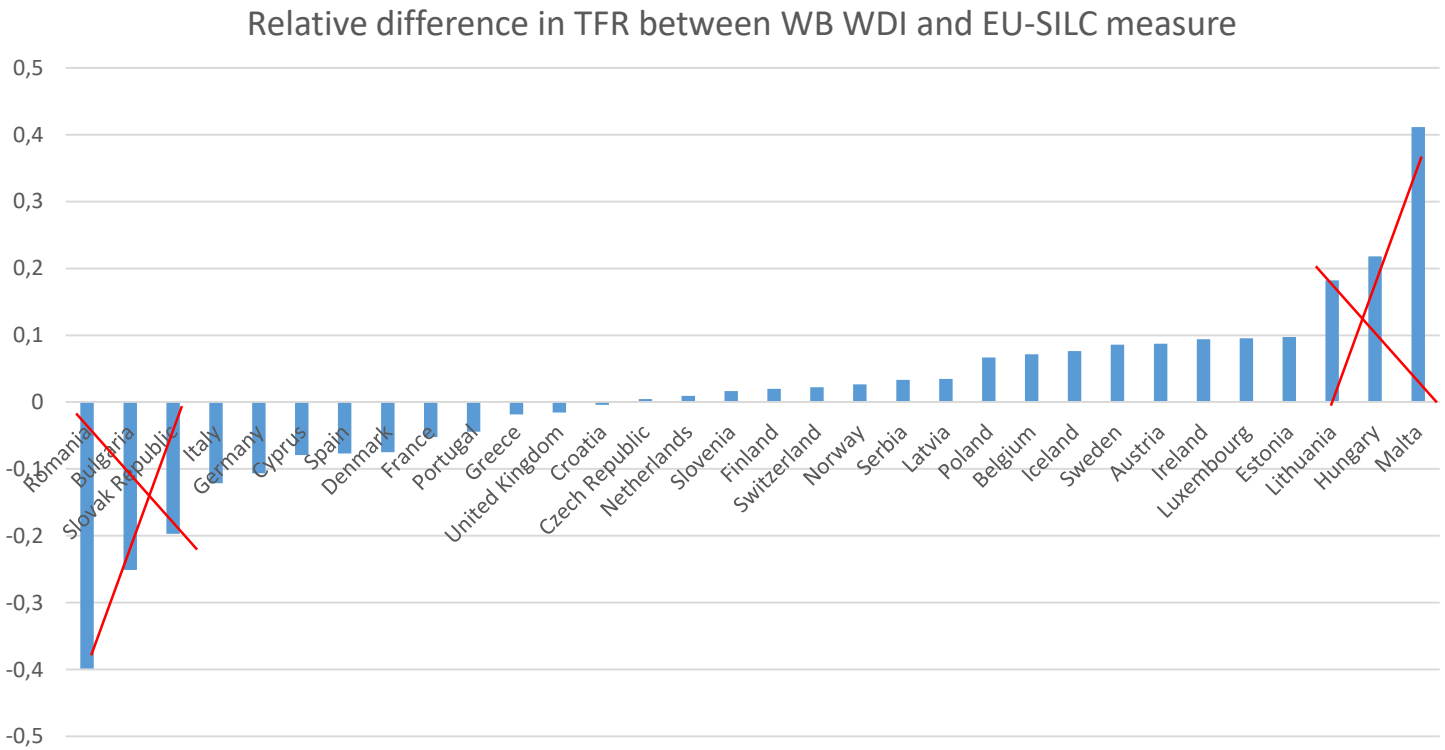

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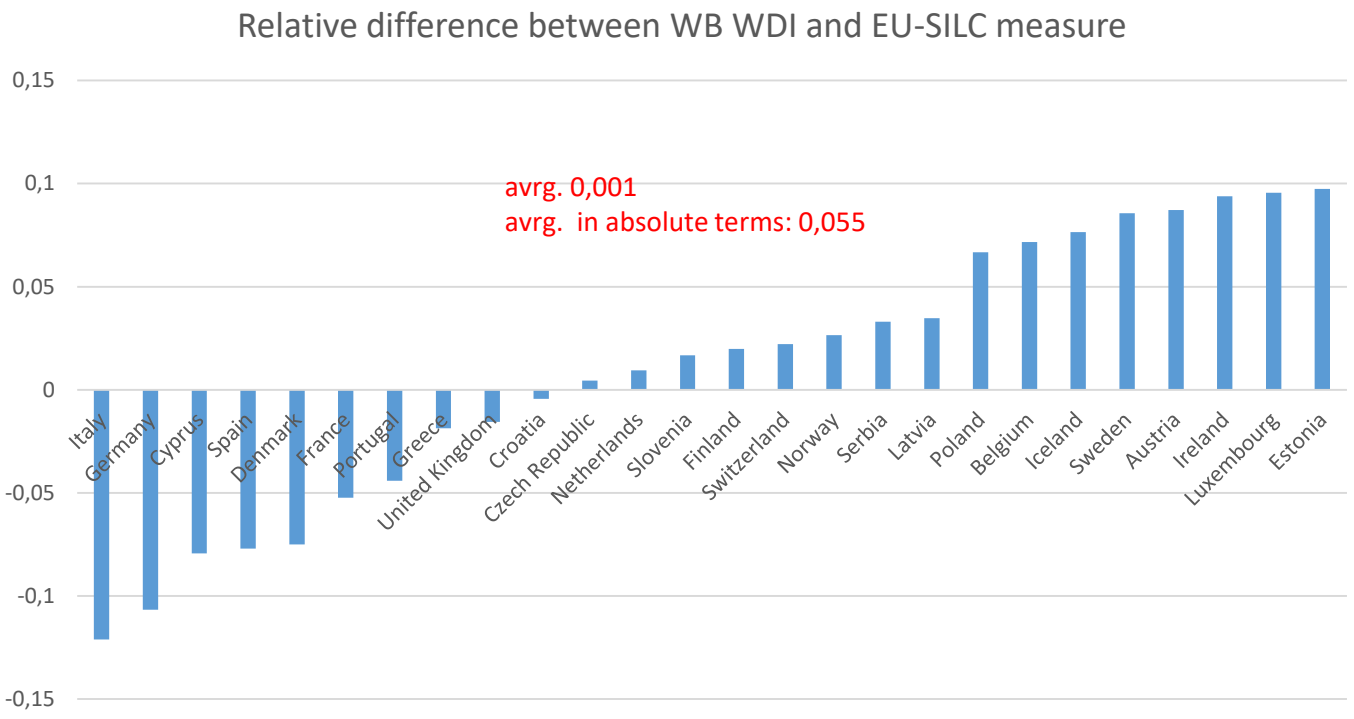

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Transformation of probabilities by age into intensity of first childbirth:

Intensity from the life table: age-specific probabilities grouped in a life table
Conditional life time probability

$x\ (age)$ $\quad qcb_{i,x} = \frac{B_{i,x}}{W_{i,x}}$ $\quad l_x = l_{x-1} - N_{x-1}$ $\quad N_x = S_x * q_x$ $\quad 100 - l_{x+1}$

x: age	prob. 1st cb	Survivors	Events	Cumulated events
15	0,0000			0,00
16	0,0000			0,00
17	0,0000			0,00
18	0,0262	100,00	2,62	2,62
19	0,0149	97,38	1,45	4,07
20	0,0255	95,93	2,45	6,52
21	0,0495	93,48	4,63	11,15
22	0,0610	88,85	5,42	16,57
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
42	0, 05	19,67	2,78	83,10
43	0,0000	16,90	0,00	83,10
44	0,0000	16,90	0,00	83,10
45	0,0000	16,90	0,00	83,10
46	0,0000	16,90	0,00	83,10
47	0,0000	16,90	0,00	83,10
48	0,0000	16,90	0,00	83,10
49	0,0000	16,90	0,00	83,10

Intensities by parity and education

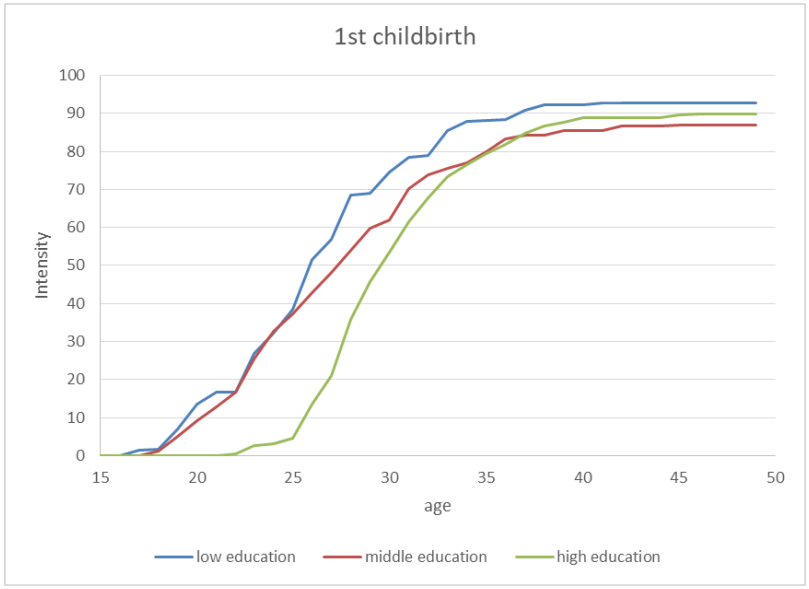
- Country-by-country analysis: problem of small sample size → high probabilities for some groups (very young and old ages, low education, higher parity)
- Solution: we compute the <u>posterior from the prior with Bayes' theorem:</u>
- Each age- and birth-order- and education-specific quotient is estimated based on a prior, which is the average birth-order specific and age-specific quotient (averaged over all education groups).
- Prior: the average birth-order specific and age-specific quotient (averaged over all education groups)
- Posterior: age-and birth-order and education-specific quotient based on the prior

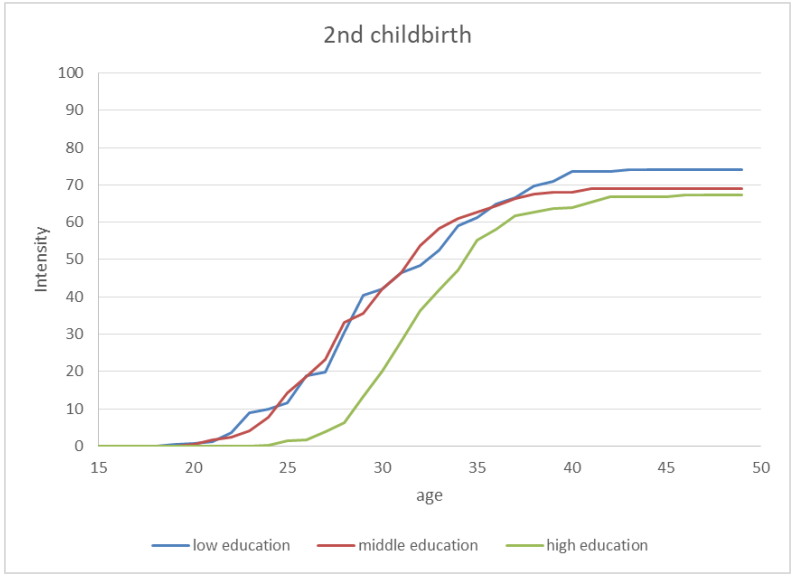
$$posterior = \frac{B + prior}{W + \bar{1}}$$

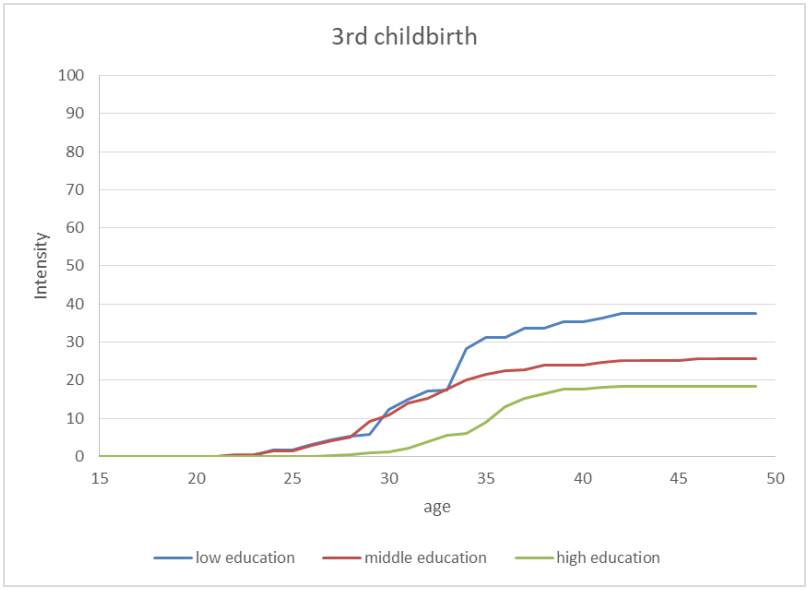
- With taking into account indiv. weights :

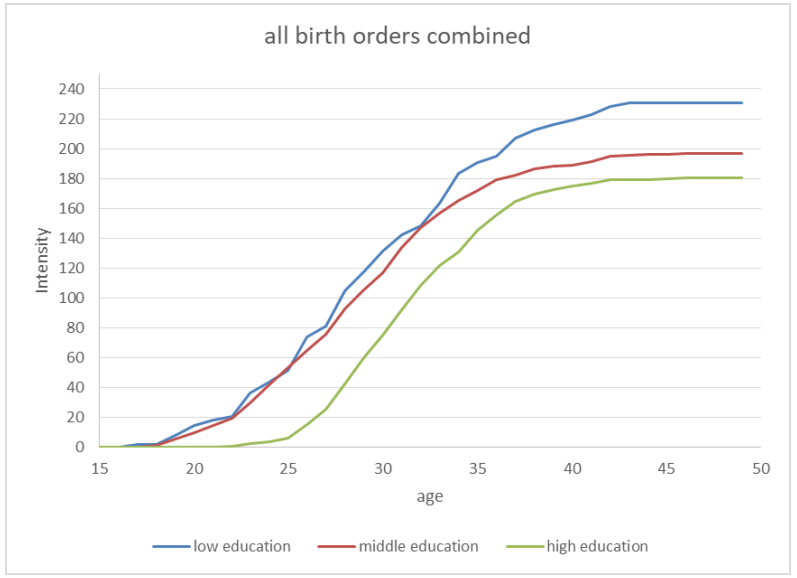
$$posterior = \frac{B_w + prior * \bar{w}}{\mathrm{W}_w + \bar{w}}$$

Intensities of childbirth by education - France

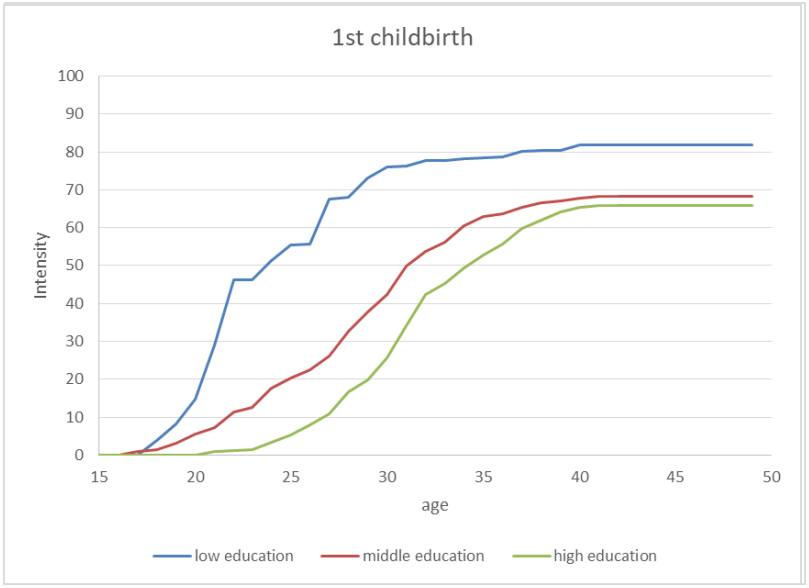


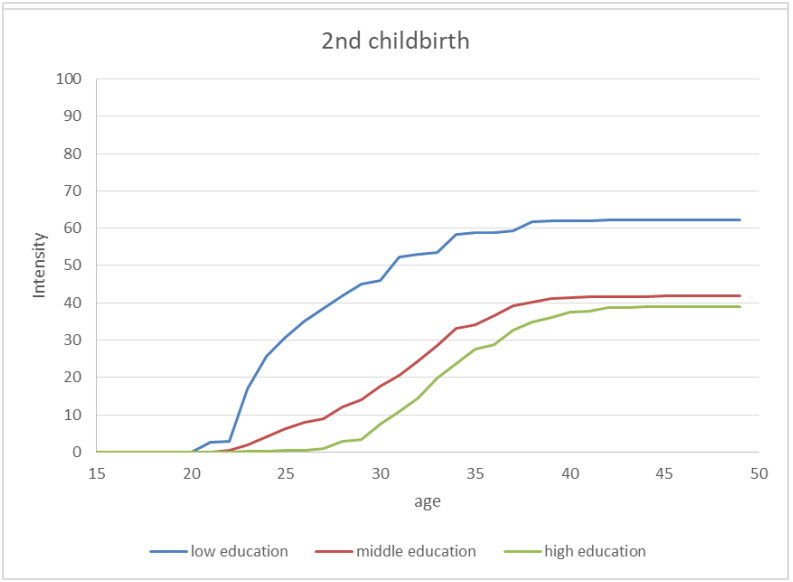


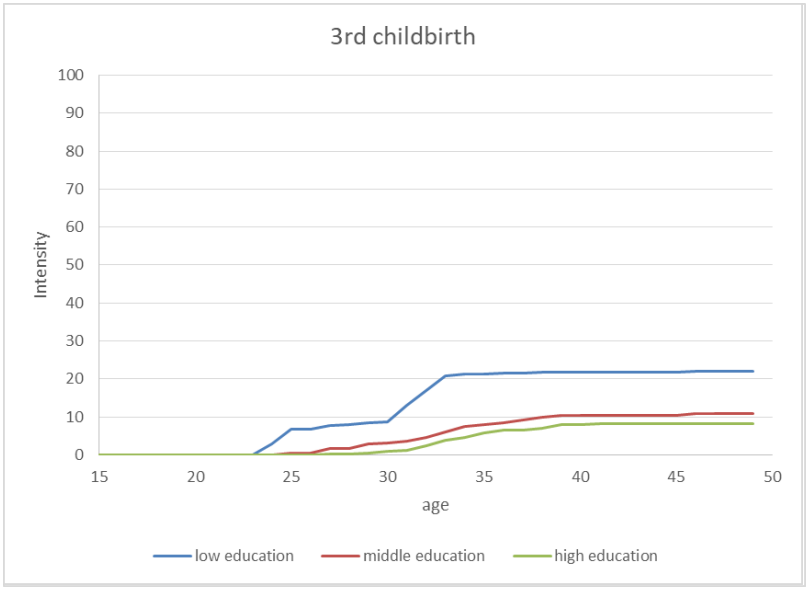


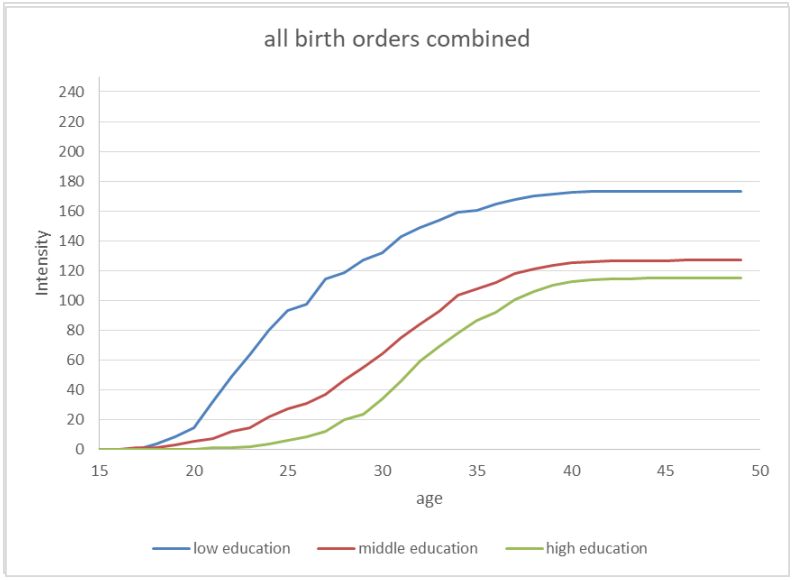


Intensities of childbirth by education - Germany

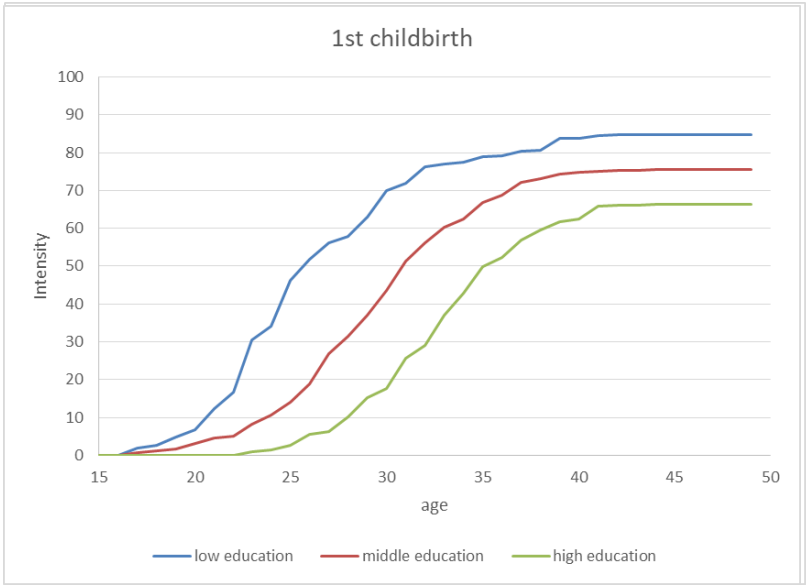


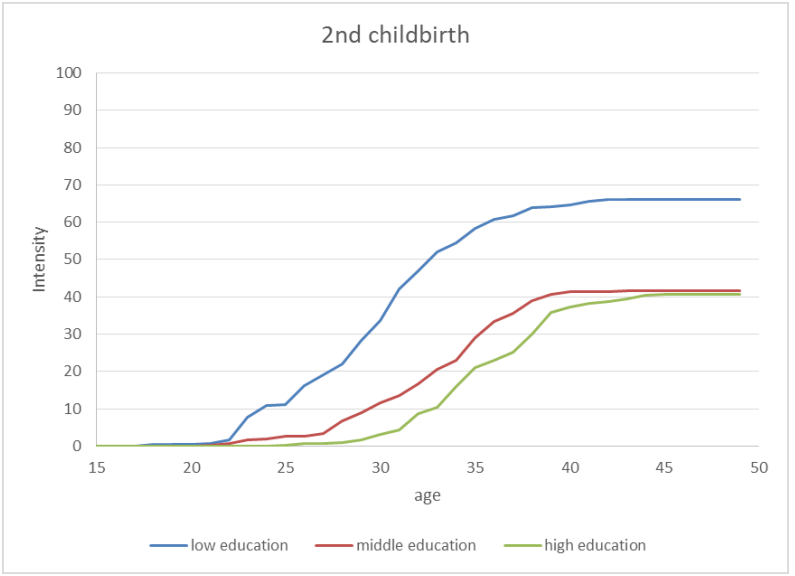


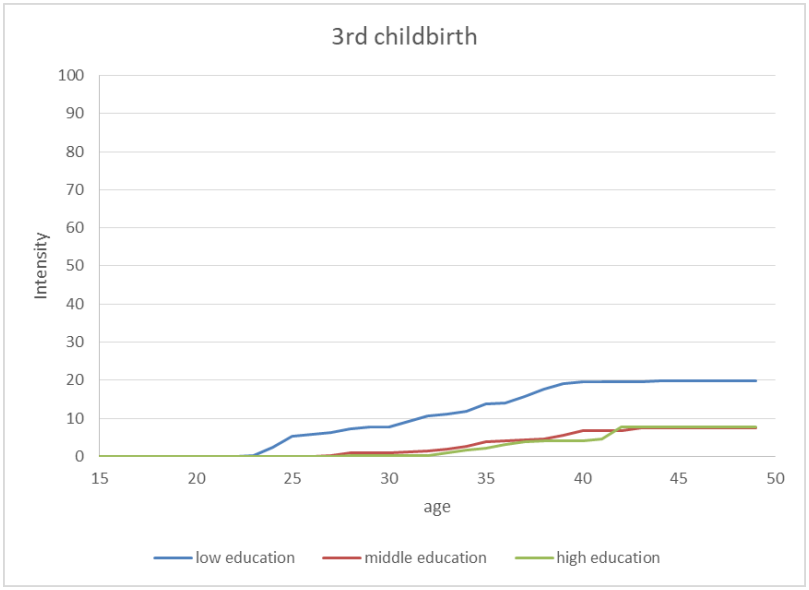


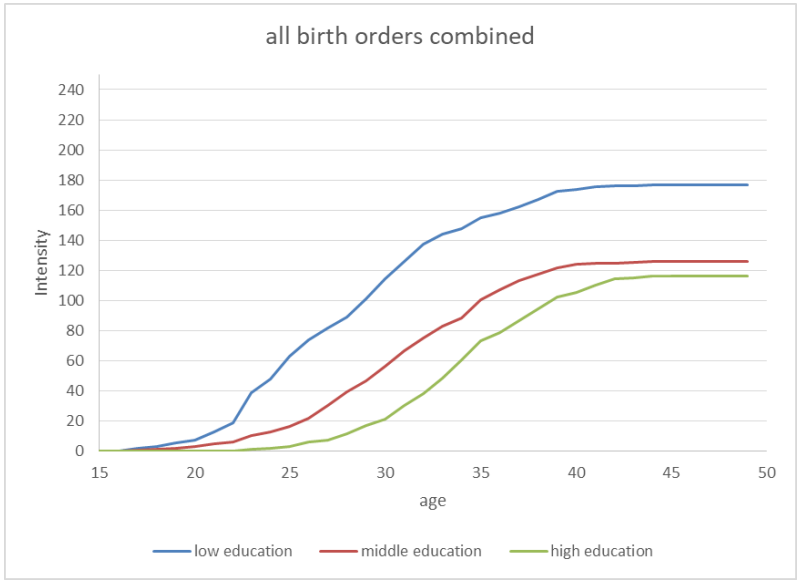


Intensities of childbirth by education - Italy

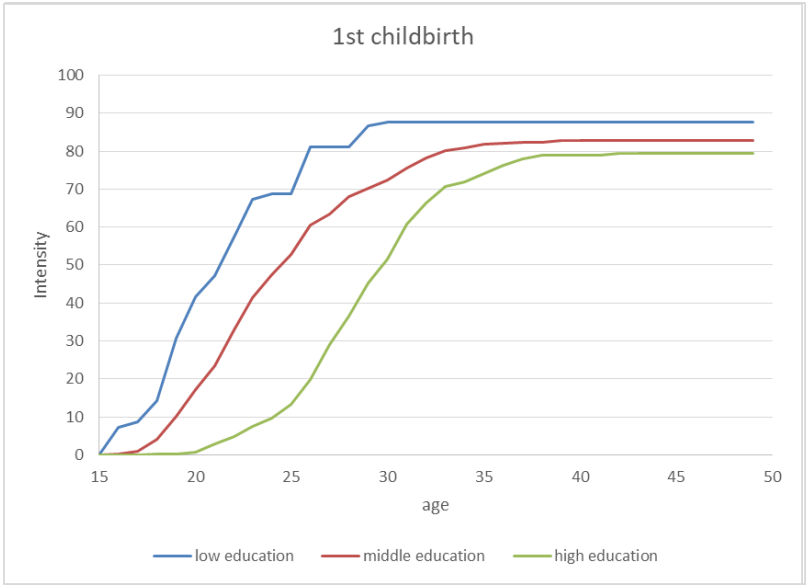


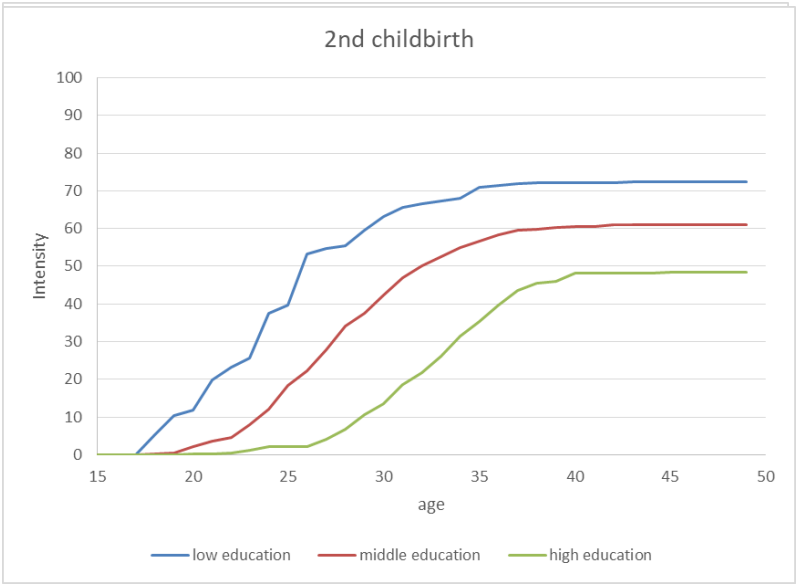


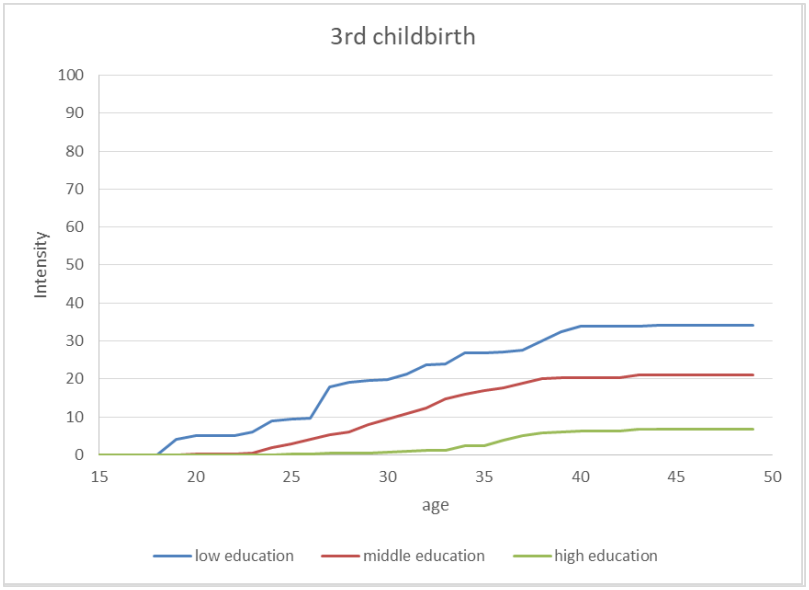


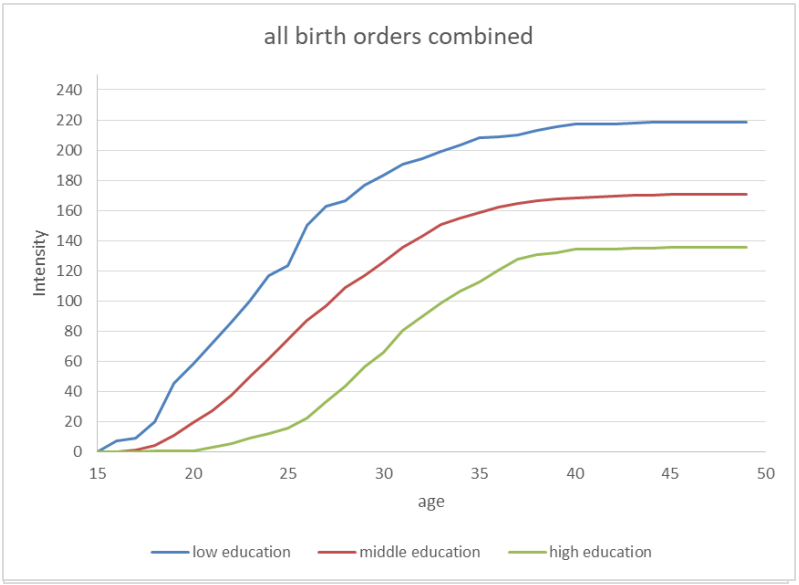


Intensities of childbirth by education - Poland

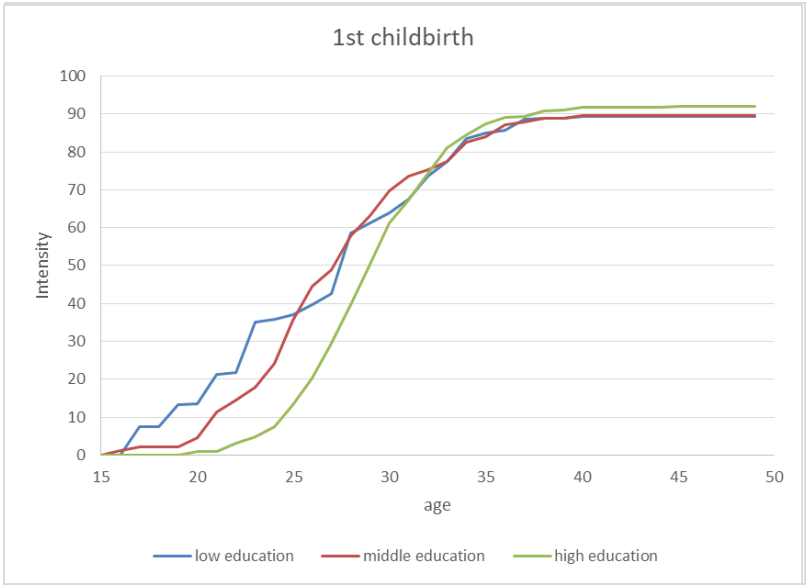


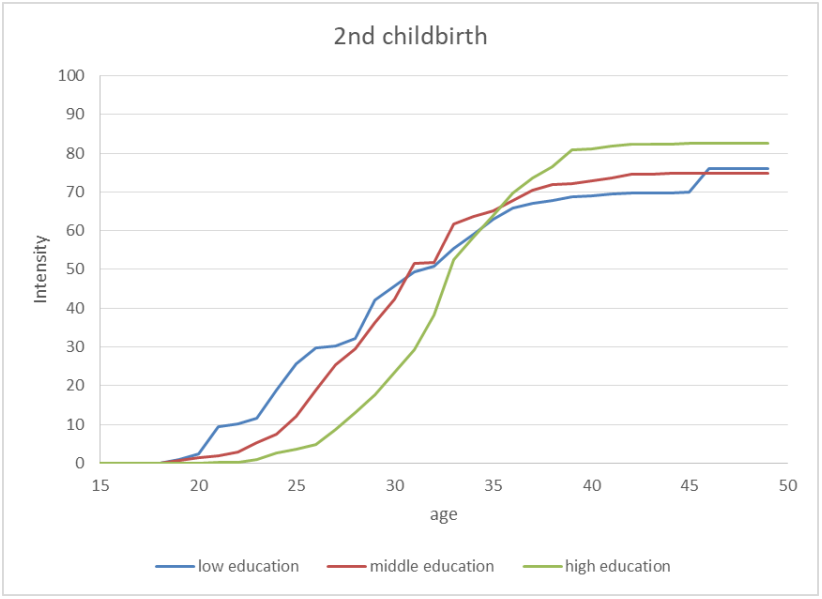


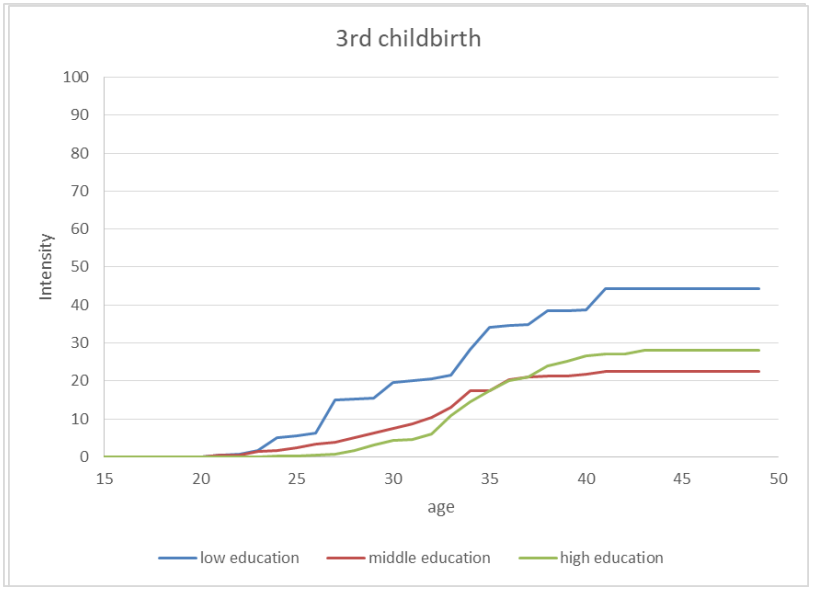


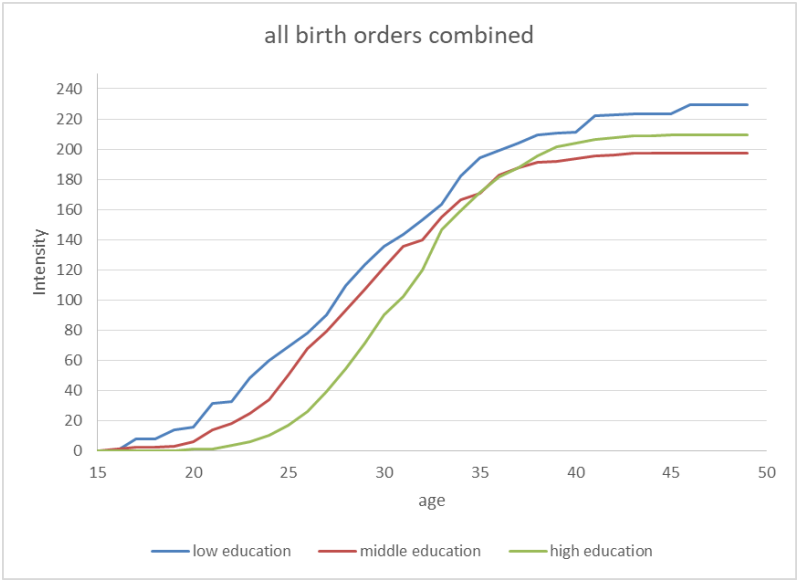


Intensities of childbirth by education - Sweden

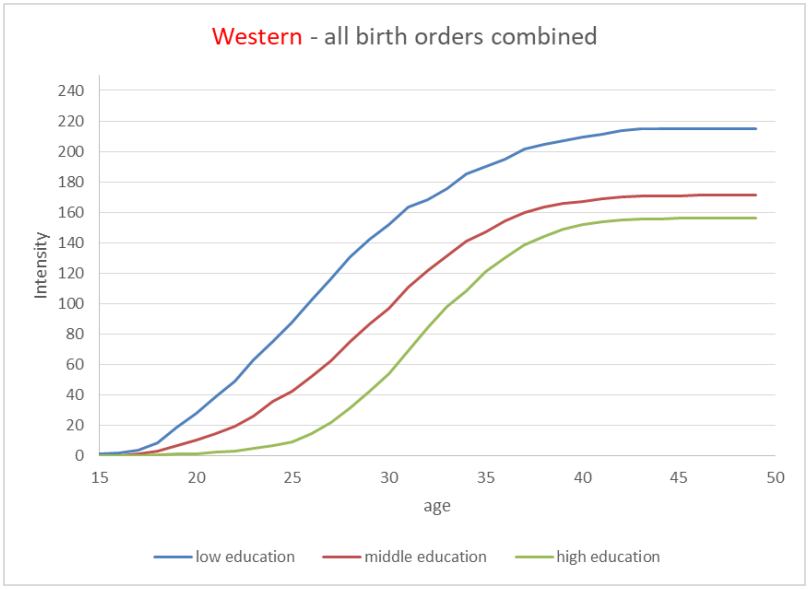


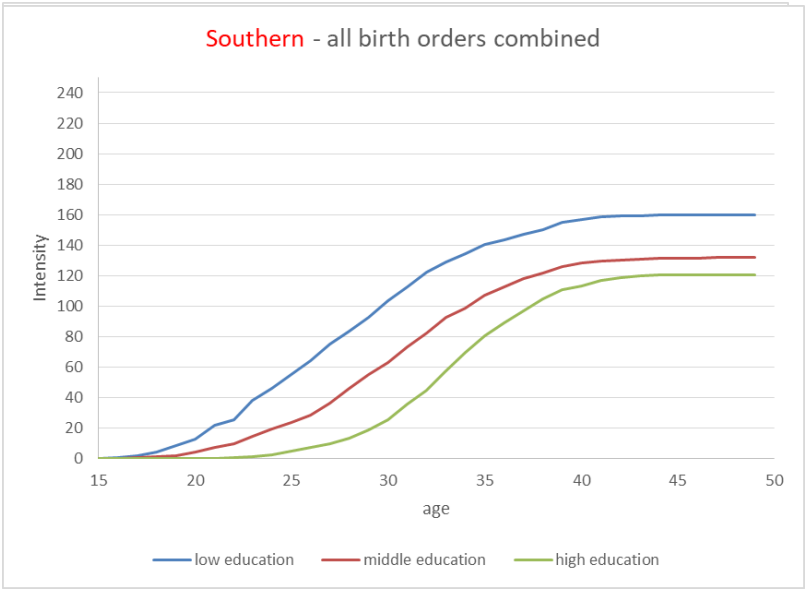


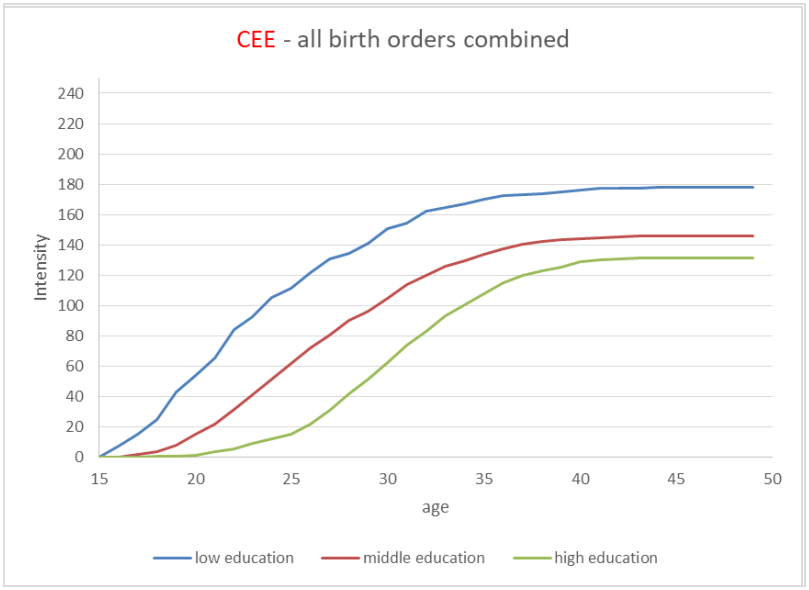


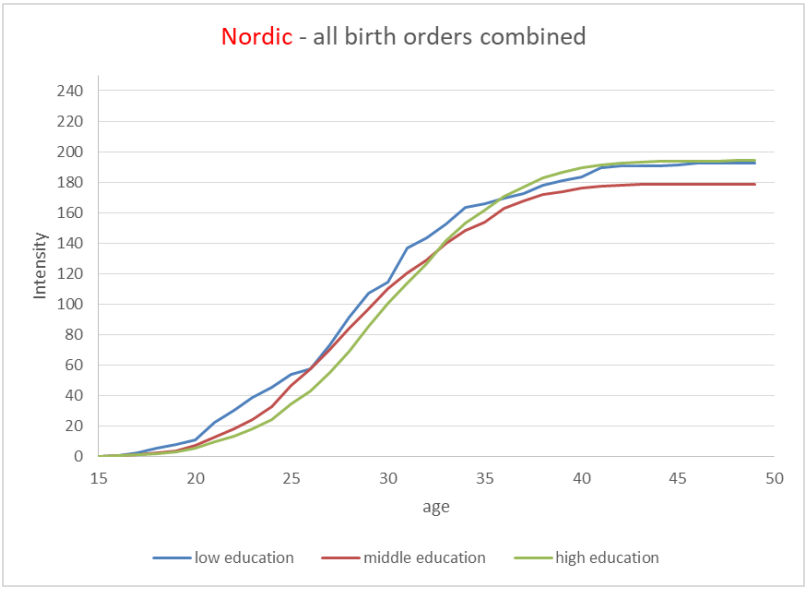


Intensities of childbirth by education and region









Outlook

- Integrate more recent waves: What is behind the recent decline in fertility in the Nordic countries, France, Belgium? Middle income squeeze? Tempo effects?

- Quantify the measurement bias by comparing results to results based on census data and HFD
- Integrate partner information, other socioeconomic measures

- Projections of future CFR by education, employment status, occupation etc. based on socio-economic survey data: micro-simulations which take into account individual and contextual factors (socsim)