Cross-country analysis of 2nd births using EU-SILC

Incl. some notes on data limitations and validation

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Using EU-SILC for demographic analysis in Europe
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Outline

WP3 in the Families and Societies project

Analytical focus:

- effect of women's and men's education on 2nd birth; variation across countries (regions) in Europe
- role of contextual features for education-fertility relationship

Results:

Klesment, M., Puur, A., Rahnu, L., & Sakkeus, L. (2014). Varying association between education and second births in Europe: Comparative analysis based on the EU-SILC data.*Demographic Research*, 31, 813–860.

Puur, A., Klesment, M., Rahnu, L., & Sakkeus, L. (2016). Educational gradient in transition to second birth in Europe: differences related to societal context. Paper presented at the European Population Conference in Mainz, Germany. FamiliesAndSocieties deliverable.

Outline

Theoretical perspectives

Micro-economic theory (Becker 1993) predicts a negative educational gradient in second-order birth

Education improves women's chances in the labour market; increases the indirect cost of childbearing.

Empirical evidence on relationship between female educational attainment and 2nd birth is mixed

In the Nordic countries, Belgium, France, UK, Estonia, Hungary women's educational attainment found positively related to 2nd births.[a] In Bulgaria, Poland, Romania, Russia, Ukraine a negative relationship is found.[b]

[a] Hoem&Hoem 1989; Olah 2003; Vikat 2004; Kreyenfeld&Zabel 2005; Köppen 2006; Neels 2006; Gerster et.al. 2007; Kravdal 2007; Klesment&Puur 2010; Bartus et.al. 2013.

[b] Koytcheva 2006; Rieck 2006; Muresan&Hoem 2009; Perelli-Harris 2008.

Possible pitfalls – time-squeeze, educational homogamy, selection into parenthood.

Research question:

How is educational attainment and second birth intensity associated in contemporary Europe?

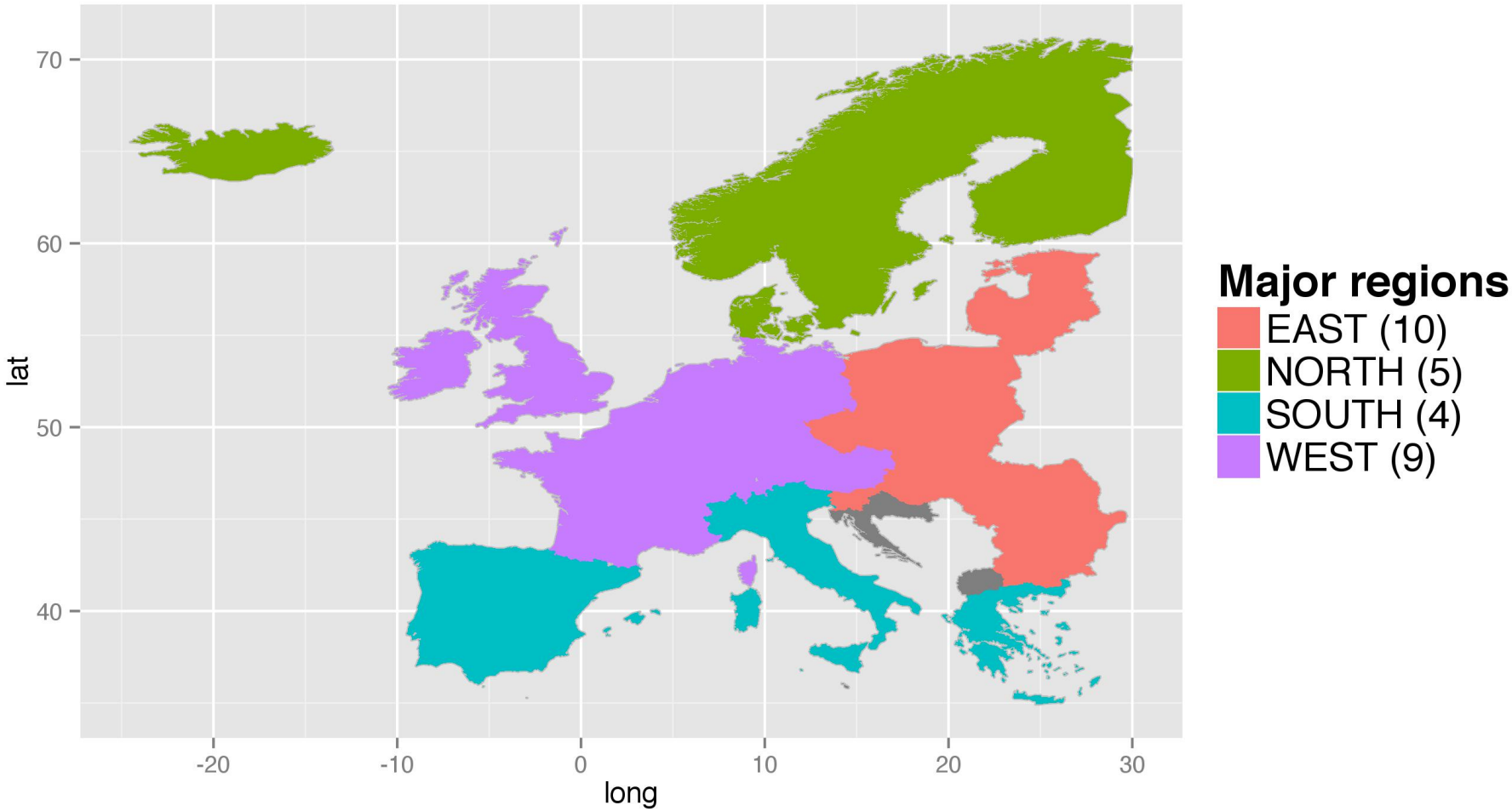
Hypotheses at the level of **larger geographical units** (regions and sub-regions).

Hypotheses:

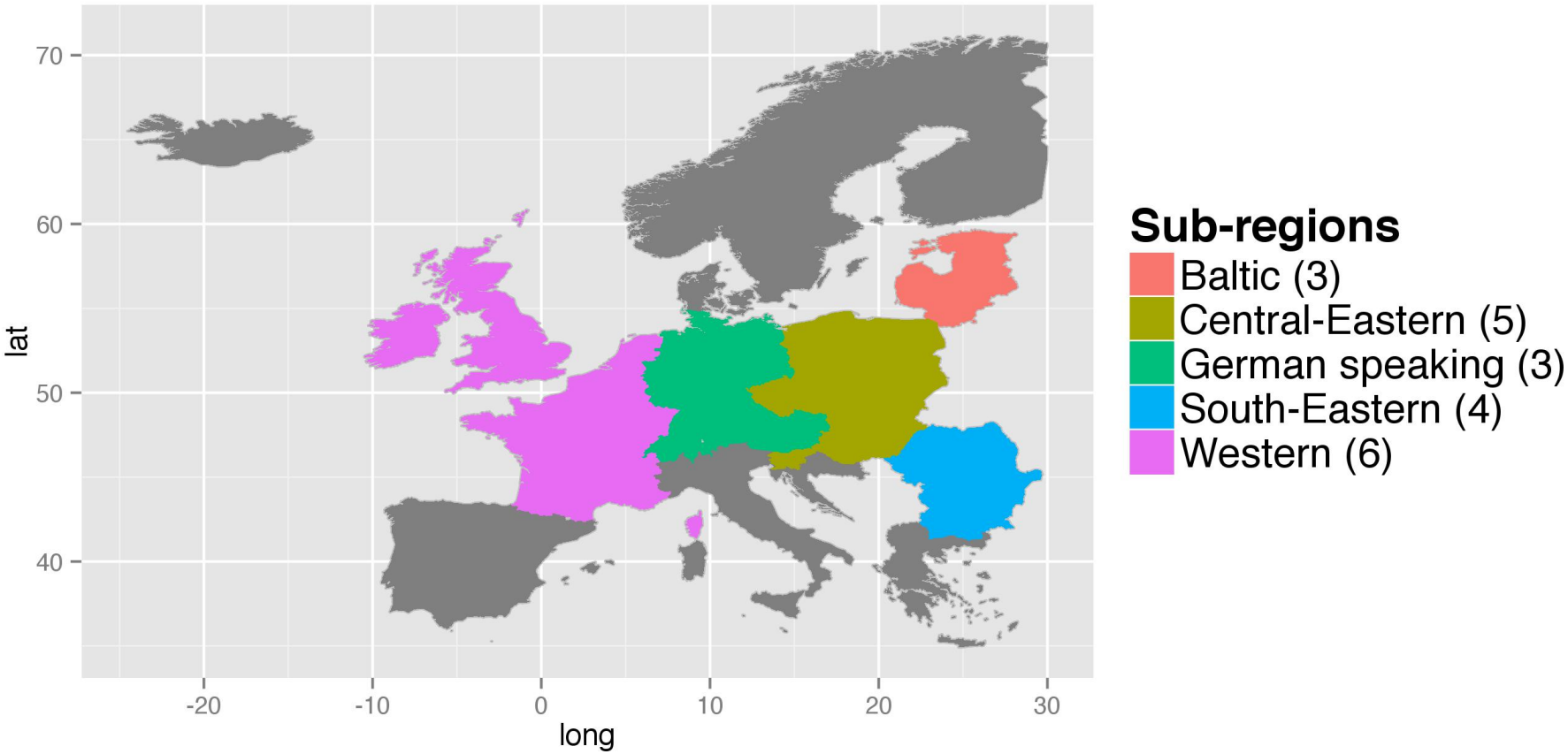
Northern Europe: **positive association**
Western Europe: **positive assoc.** (except German-speaking)
Eastern Europe: **non-positive/negative assoc.** (varying in region)
Southern Europe: **mixed expectations**

Secondary questions: time-squeeze and the partner's effect – how do these effects vary across regions and sub-regions?

Major regions



Sub-regions


70
60
50
40
lat
-20
-10
0
10
20
30
long
Sub-regions
Baltic (3)
Central-Eastern (5)
German speaking (3)
South-Eastern (4)
Western (6)

Data & methods

EU-SILC

– 2005 and 2011 cross-sectional
– 29 countries: the EU-27 member states (except Malta) plus Iceland, Norway and Switzerland.

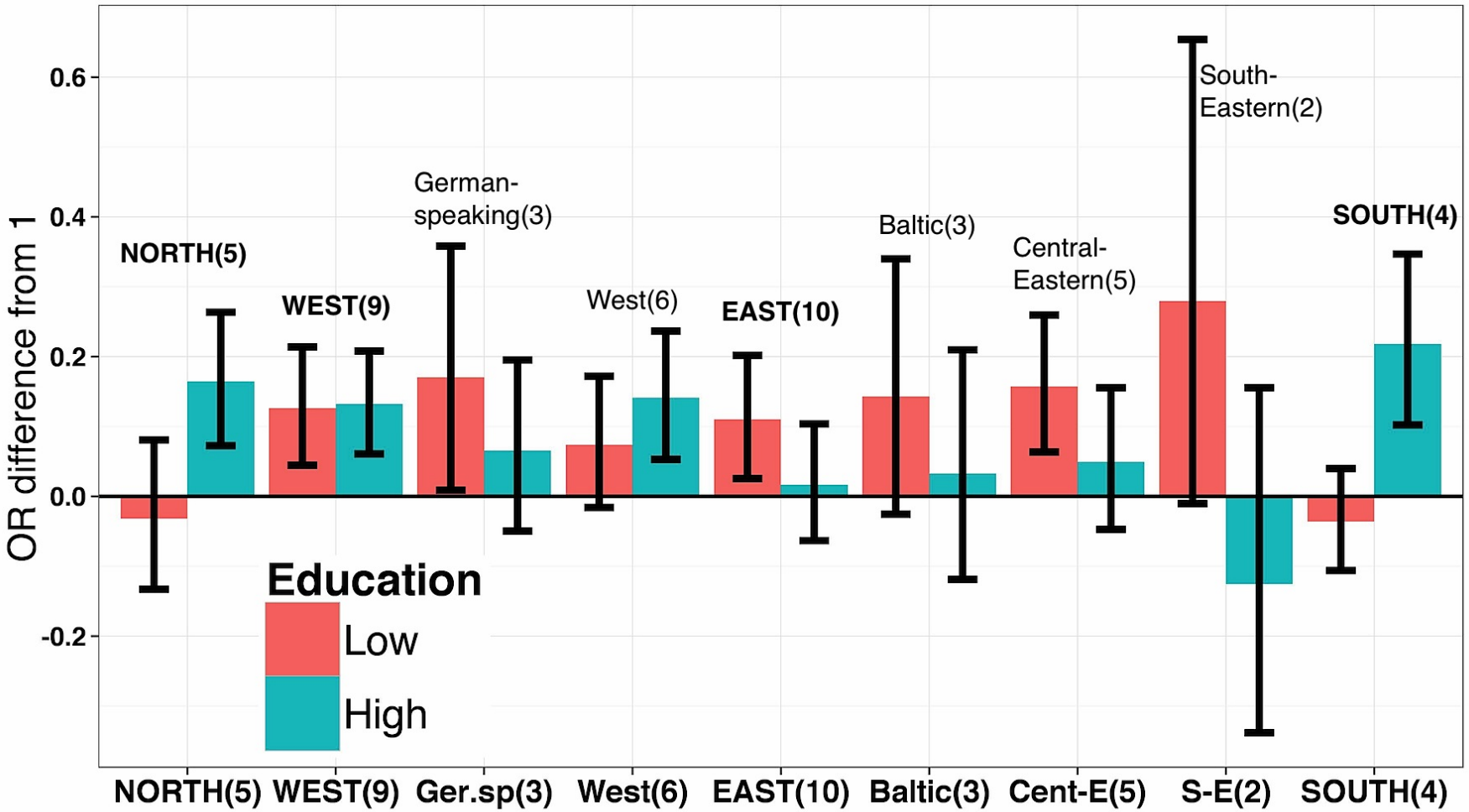
Own-child method reconstruction of birth histories

– women aged 16–40 at the time of the survey, linked to their co-residing children (∼1965–1995 birth cohorts; 1990s–2000s calendar period)
– 69,663 first-time mothers and 41,681 second births included in the analysis

Discrete-time event history analysis

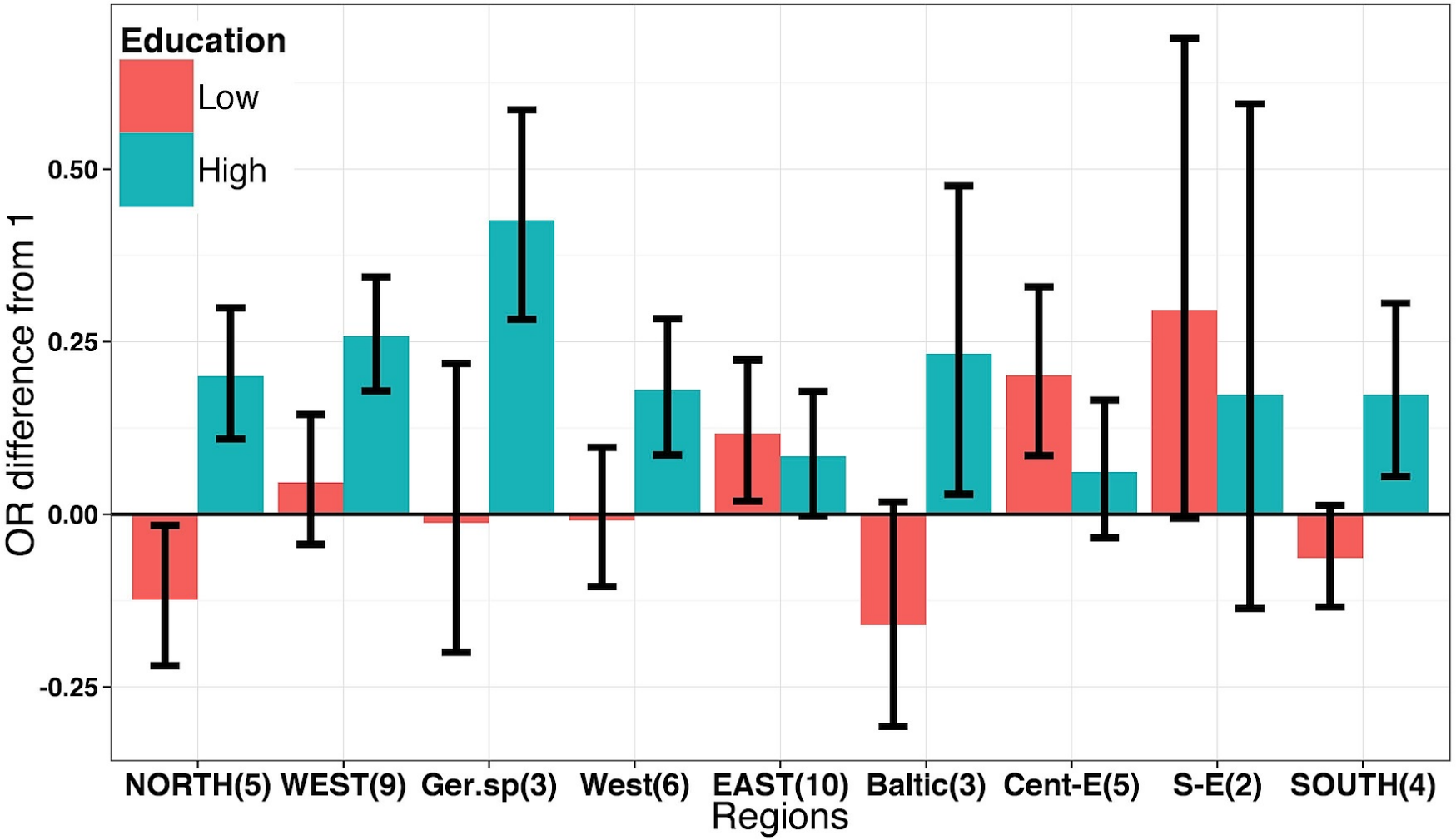
– separate models for each region and subregion
– a mixed effect model with country-level grouping
– controls: age at 1st birth, partnership status, partner‘s educational attainment, foreign background.

Region models: woman's education (ref=medium)



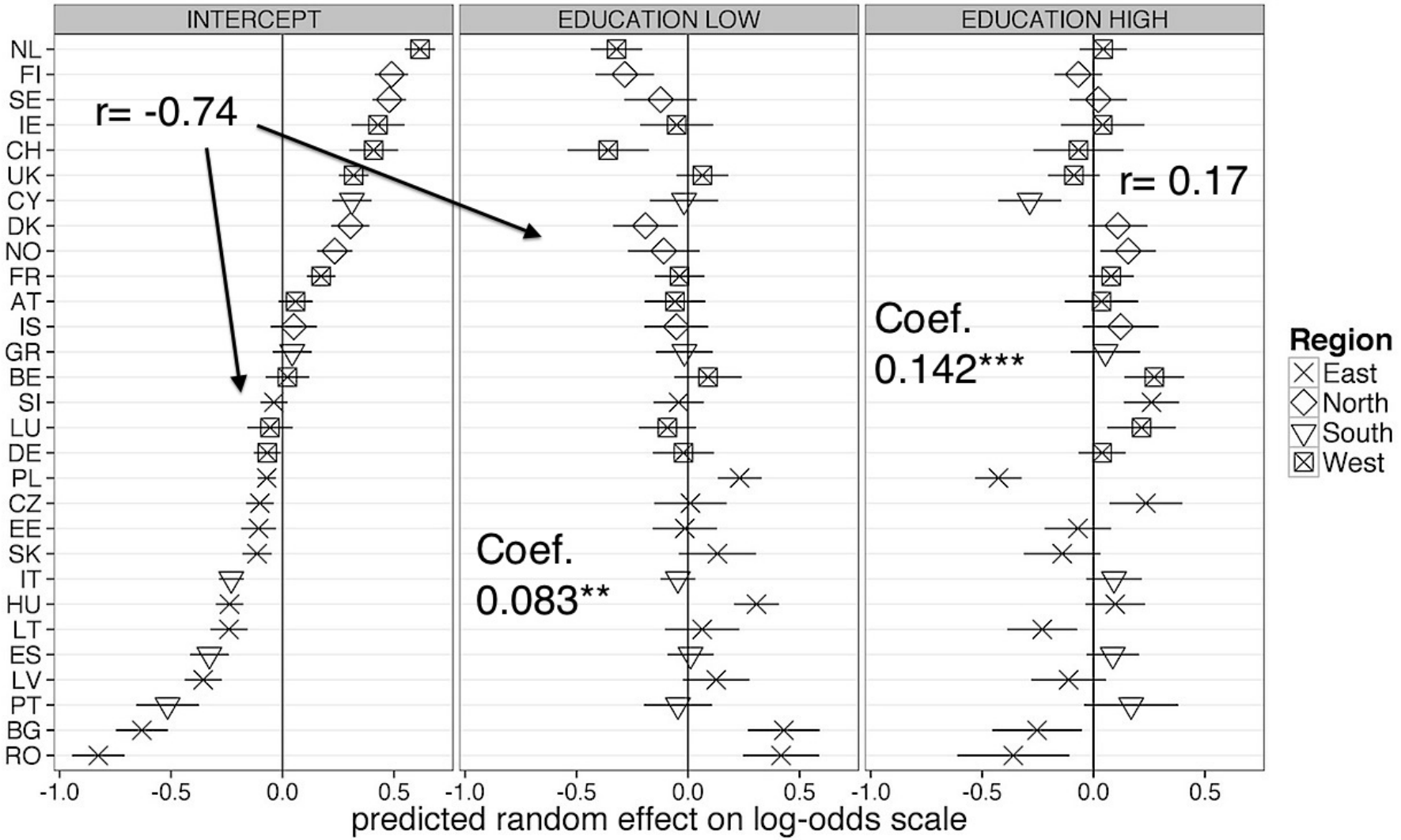
Note: odds-ratios from logistic regression, 95% CI.

Region models: partner's education (ref=medium)



Odds-ratios from logistic regression, 95% CI

Mixed effect model: woman's education (ref=medium)



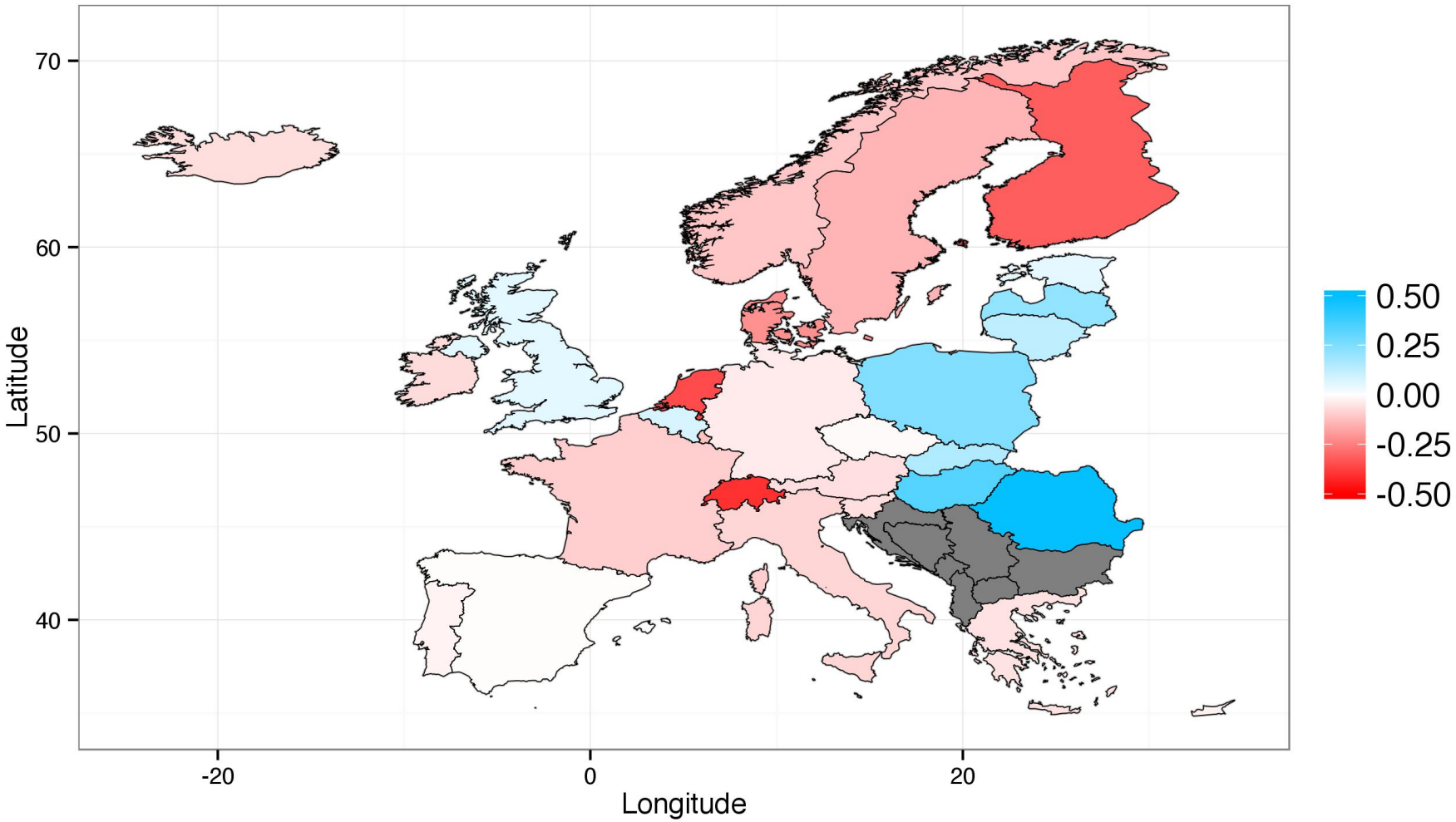


Figure: Country differences in the effect of LOW education vs MEDIUM

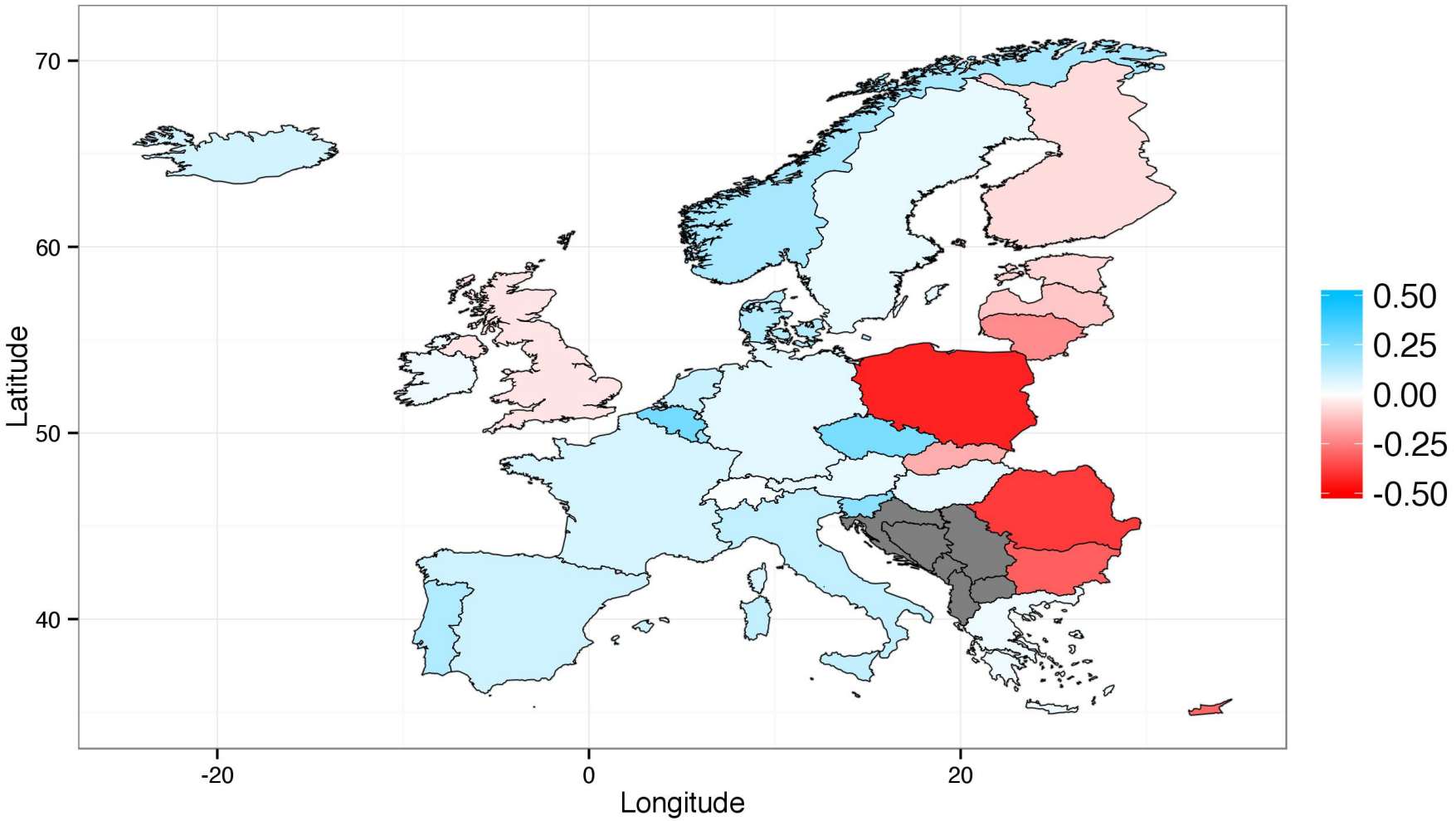


Figure: Country differences in the effect of HIGH education vs MEDIUM

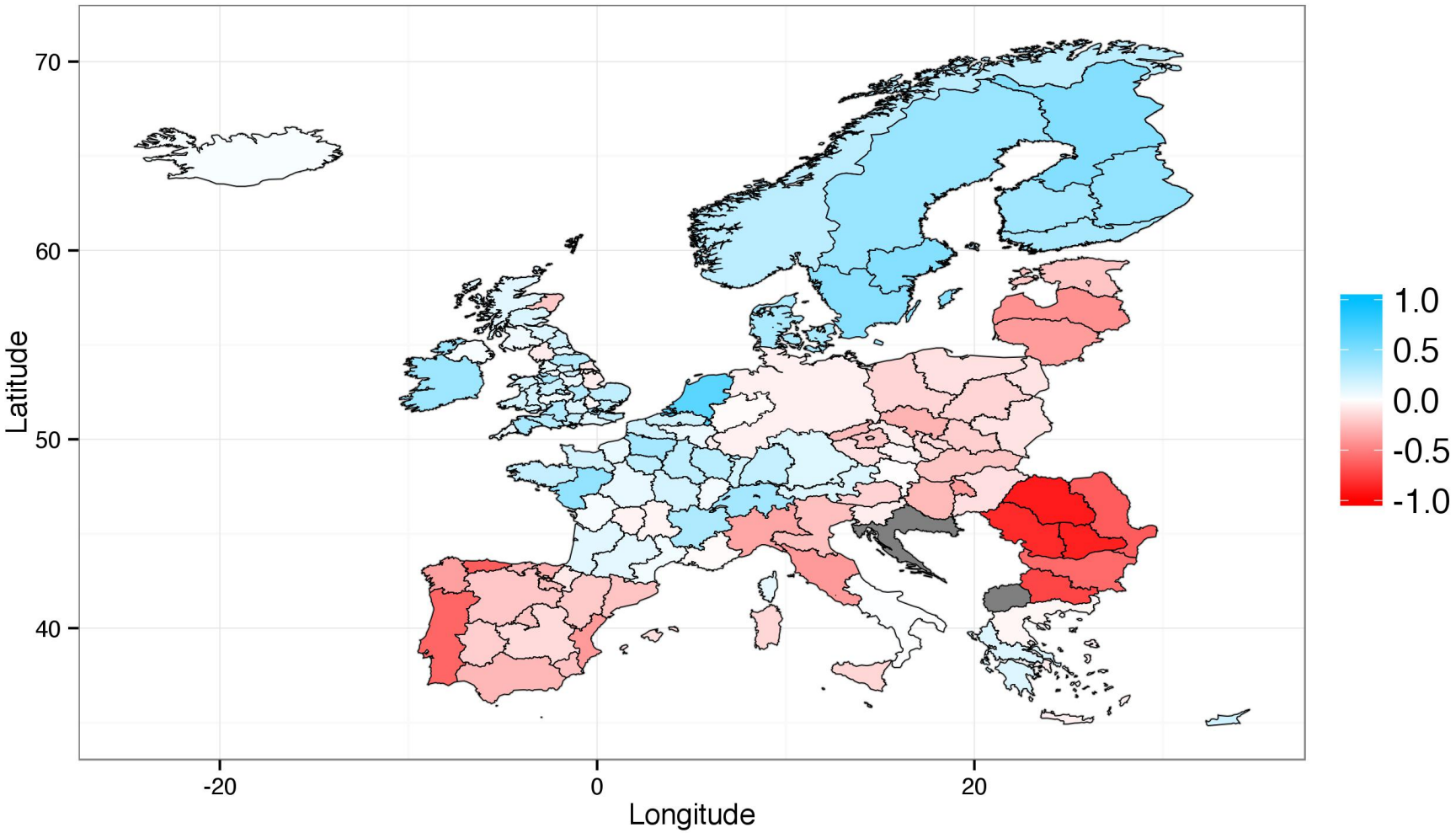
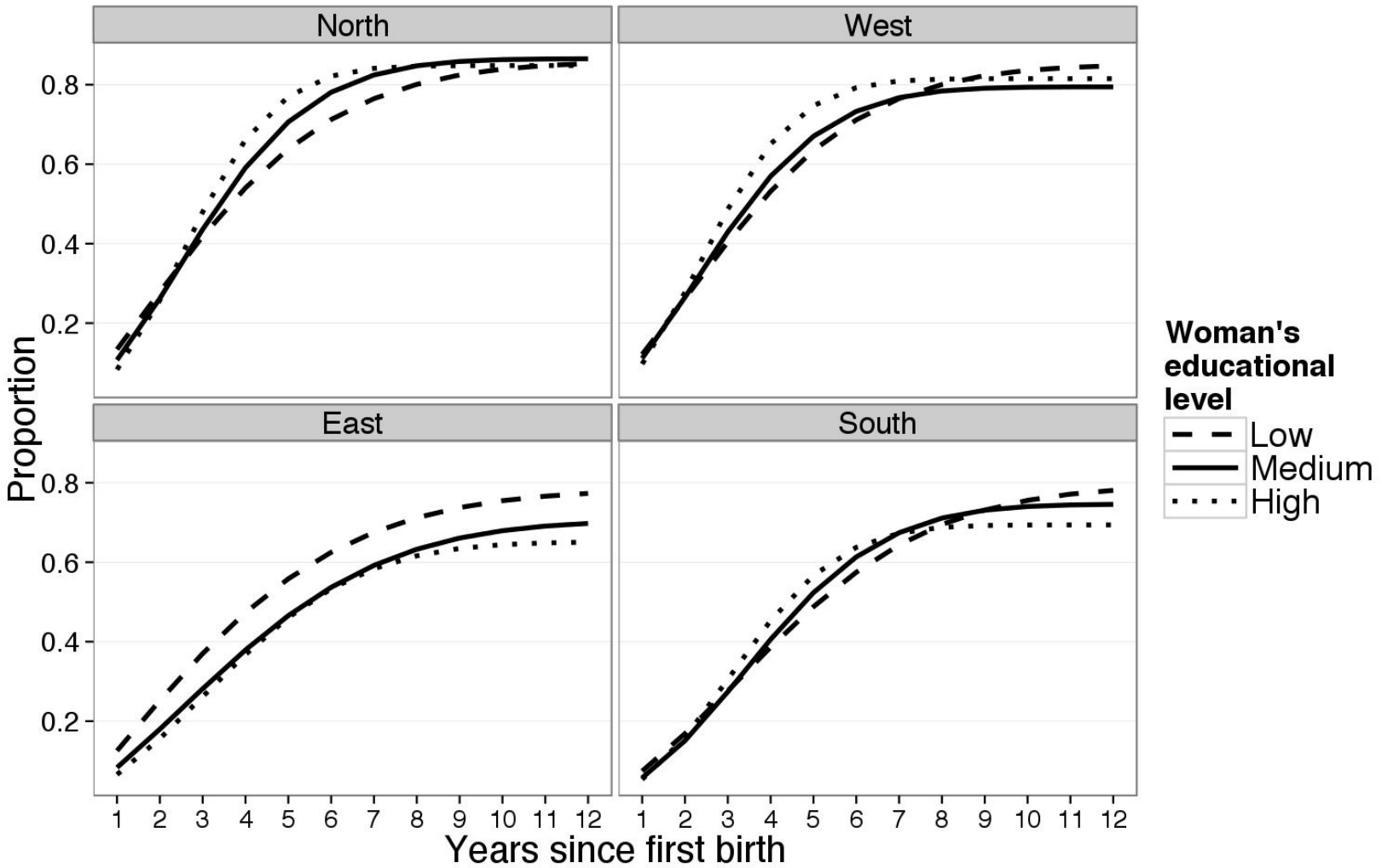


Figure: NUTS2-level random intercept variation

Time-squeeze? Positive effect of ed. in South-Europe



Model-based cumulative proportion of having 2nd child.

Conclusions

Woman's education and second births

– **Positive association** in Northern and Western Europe, excl. the German-speaking sub-region. Also in Southern Europe.
– **Mostly negative association** in Eastern Europe.
– **U-shaped association** in Western Europe as a whole and also in the pooled mixed effect model.

Role of partner's education

– **Positive association** in Northern, Western (strongest in the German-speaking sub-region) and Southern Europe.
– **Negative association** in Eastern Europe (except the Baltic sub-region)

Outline

Study presented at European Population Conference 2014

In this study we ...

– analyse how the educational attainment of a male partner is associated with woman's transition to second birth.

We are guided by the following questions:

- differences in European countries/regions in the effect of partner's education?
- importance of man being higher, similarly or lower educated than a woman?

Effect of man's education

Along the lines of micro-economic theory (Becker 1993) – man's education has a positive effect

– higher income of a man can support larger family;
– due to income potential more likely to be selected as husband by family-oriented women;
– highly educated have more stable partnerships.

- Empirical evidence on the effect of male partner's education generally supports the economic theory – e.g. in Austria, Denmark, Estonia, France, Germany, Hungary, Norway, Spain.[1]
- However, some studies find a negative association.[2]

[1] Kreyenfeld 2002; Oláh 2003; Prskawetz and Zagaglia 2005; Köppen 2006; Kravdal 2007; Gerster et al. 2007; Klesment and Puur 2010; Bartus et al. 2013, Adsera 2011, Brodmann et al. 2007

[2] Aldieri, Barone and Vinci 2006.

Effect of male partner's education (ref: medium educated)

GE index	Region or subregion	Intercept	Male partner low educated	Male partner high educated
73.9	**North**	-2.48***	-0.157***	0.136***
60.0	W(6)	-2.88***	0.007	0.136***
56.5	**West**	-2.71***	0.038	0.195***
51.5	German-sp.(3)	-2.43***	-0.085	0.293***
45.2	**South**	-3.16***	-0.068*	0.135**
45.0	Baltic(3)	-2.91***	-0.137	0.196*
43.8	CE(5)	-2.81***	0.095**	0.064
42.2	**East**	-2.87***	0.089**	0.043
35.7	SE(2)	-3.45***	0.317**	0.037

Controls: woman's time since 1st birth, woman's educational attainment, woman's enrollment, woman's age at 1st birth, survey year.
*p<0.1; **p<0.05; ***p<0.01

- effect of partner education positive in all regions except Central-Eastern and South-Eastern Europe.
- positive effect partner education stronger in regions of asymmetrical gender roles.

Combined education variable (ref: homogamy of medium educated)

Region or subregion	Intercept	Partner less educated	Partner more[3] educated	Both low educated	Both high educated
North	-2.46***	0.025	0.028	-0.248***	0.329***
W(6)	-2.85***	0.028	0.028	0.018	0.335***
West	-2.70***	0.067	0.118***	0.099	0.395***
German-sp	-2.42***	0.017	0.235***	0.092	0.442***
South	-3.13***	-0.06	-0.06	-0.109**	0.374***
B(3)	-2.91***	0.008	0.129	-0.079	0.396**
CE(5)	-2.81***	0.015	0.113**	0.37***	0.102
East	-2.87***	0.04	0.095**	0.213***	0.08
SE(2)	-3.49***	0.270*	0.262*	0.473***	0.065

*p<0.1; **p<0.05; ***p<0.01

- contrast between homogamy at different levels of education – positive gradient in North and South.
- negative effect of education in Central-Eastern and South-Eastern Europe.

[3] includes medium and high educated men

Summary of results

- The effect of partner's education positive in Northern, Western and Southern Europe, negative in some parts of Eastern Europe. No income effect in the latter?
- The effect of partner's education seems to be stronger in countries of asymmetrical gender roles.
- Partner's effect on timing of 2nd child (especially Southern Europe); not necessarily influencing quantum.

Thank you for your attention!

Outline

Birth timing

Own Child Method (Coleman and Dubuc 2010; Dubuc 2009).

OCM without the need to establish links between parent and child – resident children are ID-linked to parents. Backdating time of birth from child's age.

Some assumptions

- infant and child mortality is negligible;
- non-resident children are exceptional up to certain mother's age (we chose age 40);
- time-fixed partnership status (and partner's education) cause only moderate bias in estimates.

Assessing data limitations

- Invisible non-resident child – underestimation of 2nd birth rate of the lower educated (CEE region issue – low mean age at first birth, more likely to have non-resident children before age 40).
- Time-invariant partner data – underestimation of missing partner, unpredictable bias due to change of partner.
- Time-invariant partner's education – possible overestimation of last (higher) degree.

Assess limitations using a demographic survey - GGS.

– **% of non-resident children of mother's below age 41;**
– **likelihood of partner change after first birth;**
– **likelihood of partner's education change after 1st birth.**

Number of resident and nonresident children in GGS

Table: GGS, 1+ parity women up to age 40 by education

	Resident total			Non-resident total		
Education						
	Low	Mid	High	Low	Mid	High
Austria	2.03	1.69	1.64	0.13	0.04	0.02
Belgium	2.08	1.78	1.75	0.10	0.09	0.06
Bulgaria	2.03	1.54	1.39	0.11	0.05	0.01
Estonia	1.92	1.74	1.66	**0.15**	0.07	0.06
France	2.26	1.90	1.80	0.08	0.03	0.02
Germany	1.85	1.71	1.68	**0.14**	0.06	0.06
Hungary	2.28	1.73	1.72	**0.15**	0.04	0.01
Lithuania	1.67	1.60	1.45	0.02	0.04	0.00
Norway	1.94	1.96	1.99	0.09	0.05	0.02
Romania	1.97	1.54	1.28	0.12	0.04	0.00

Note: including biological, non-biological, and dead.

Simple model of having a nonresident child, GGS data

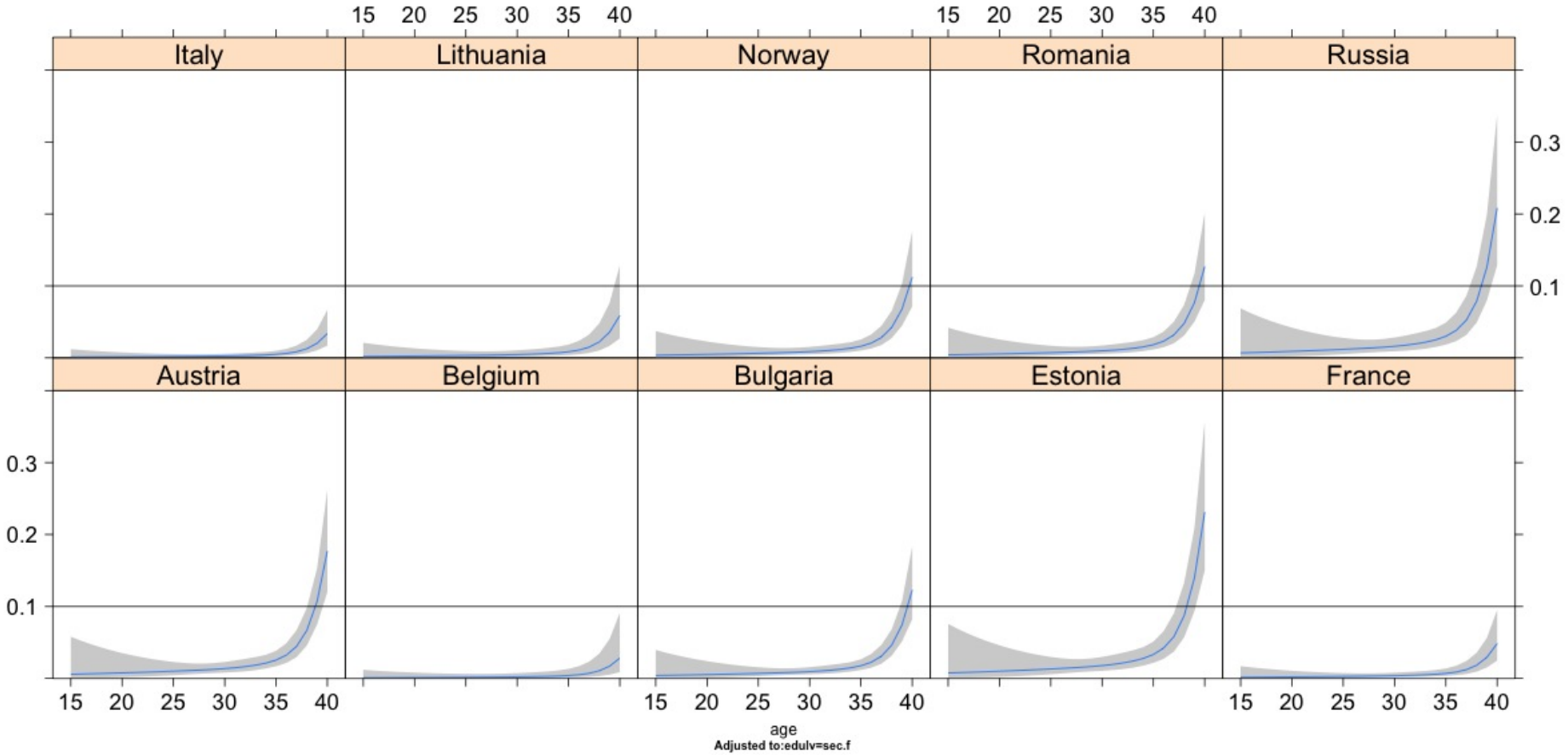
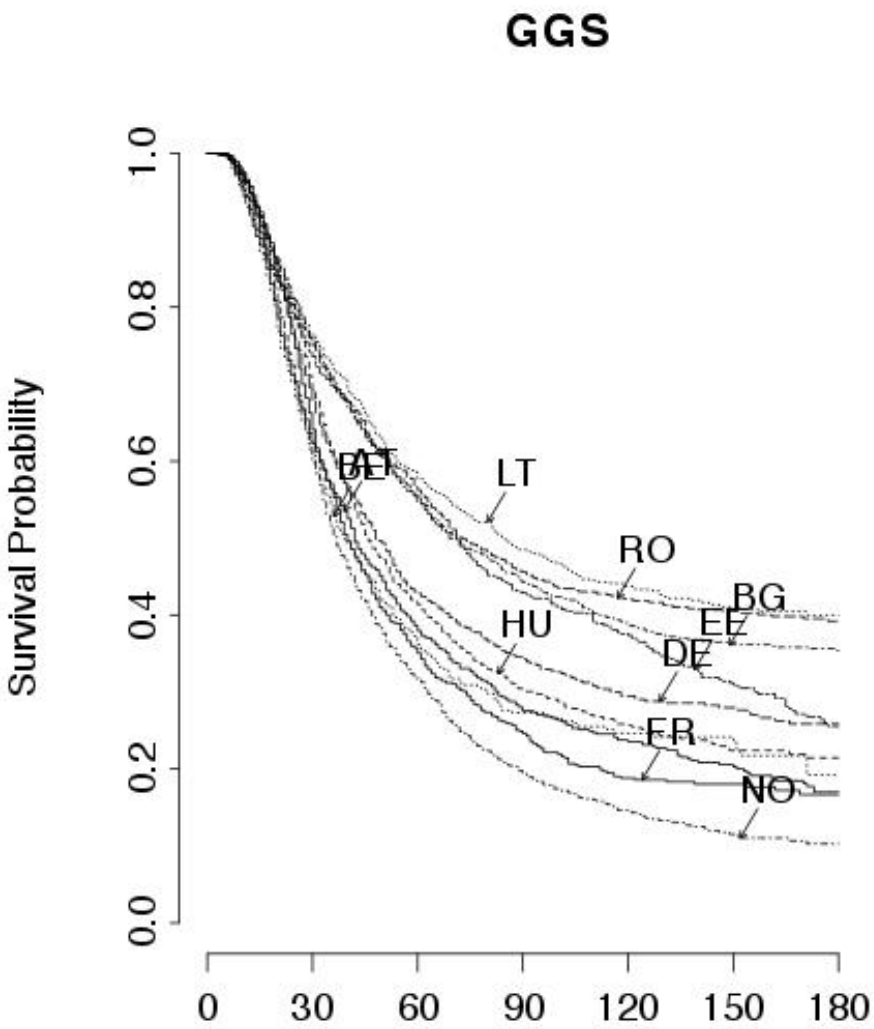
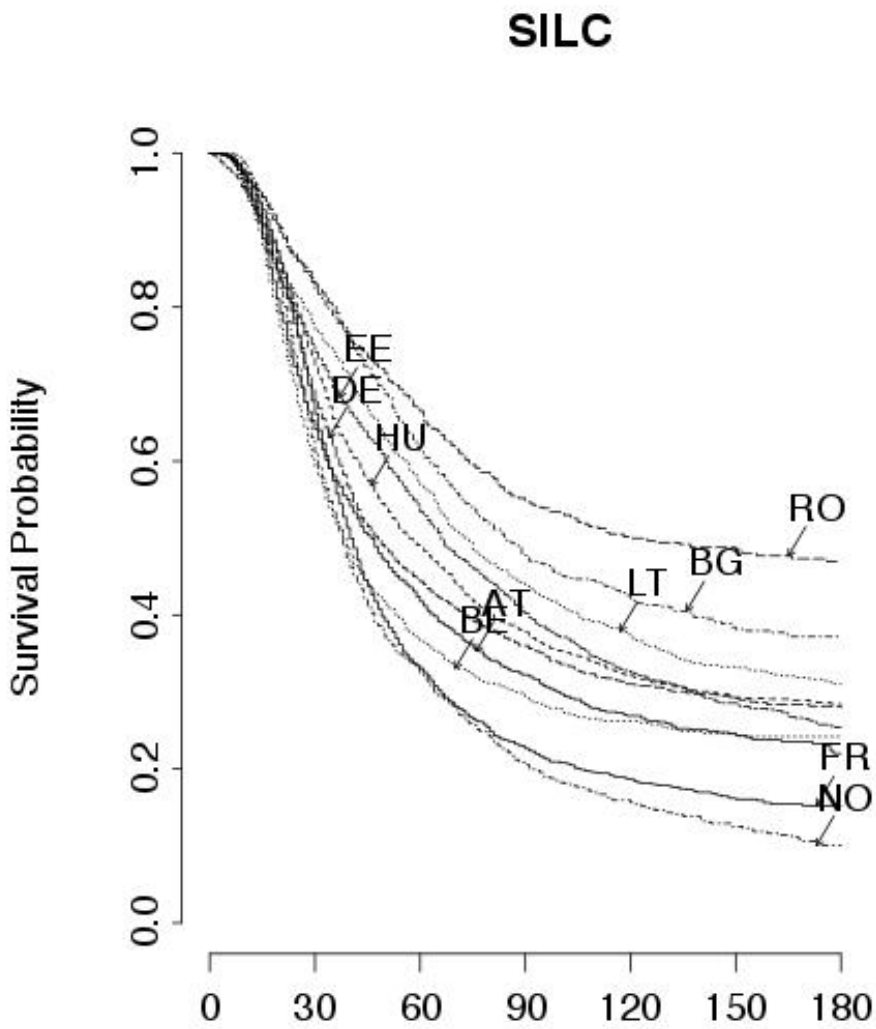


Figure: Probability of nonresident 1st child by age, controlled for education

Outline

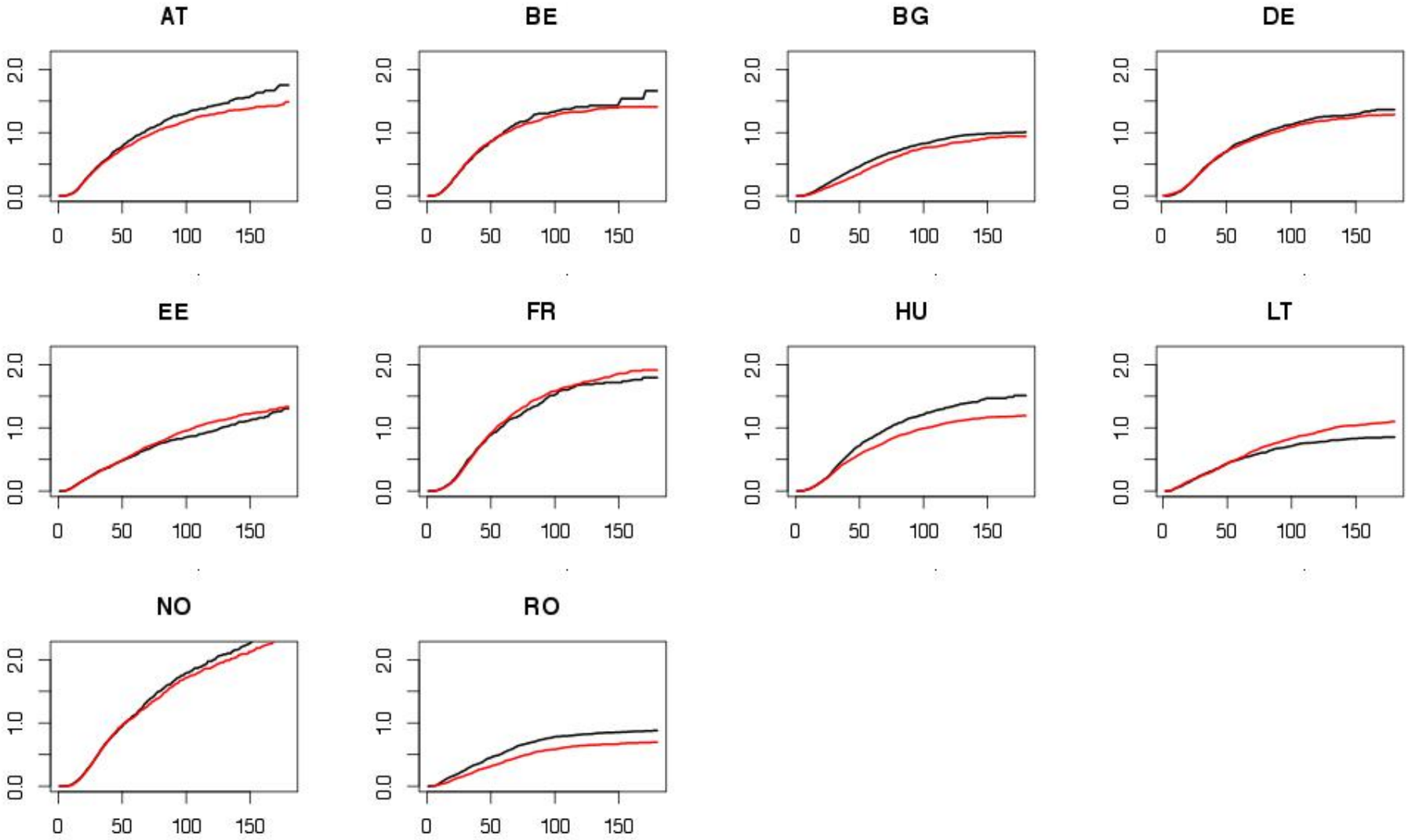
Overall 2nd birth survival differences



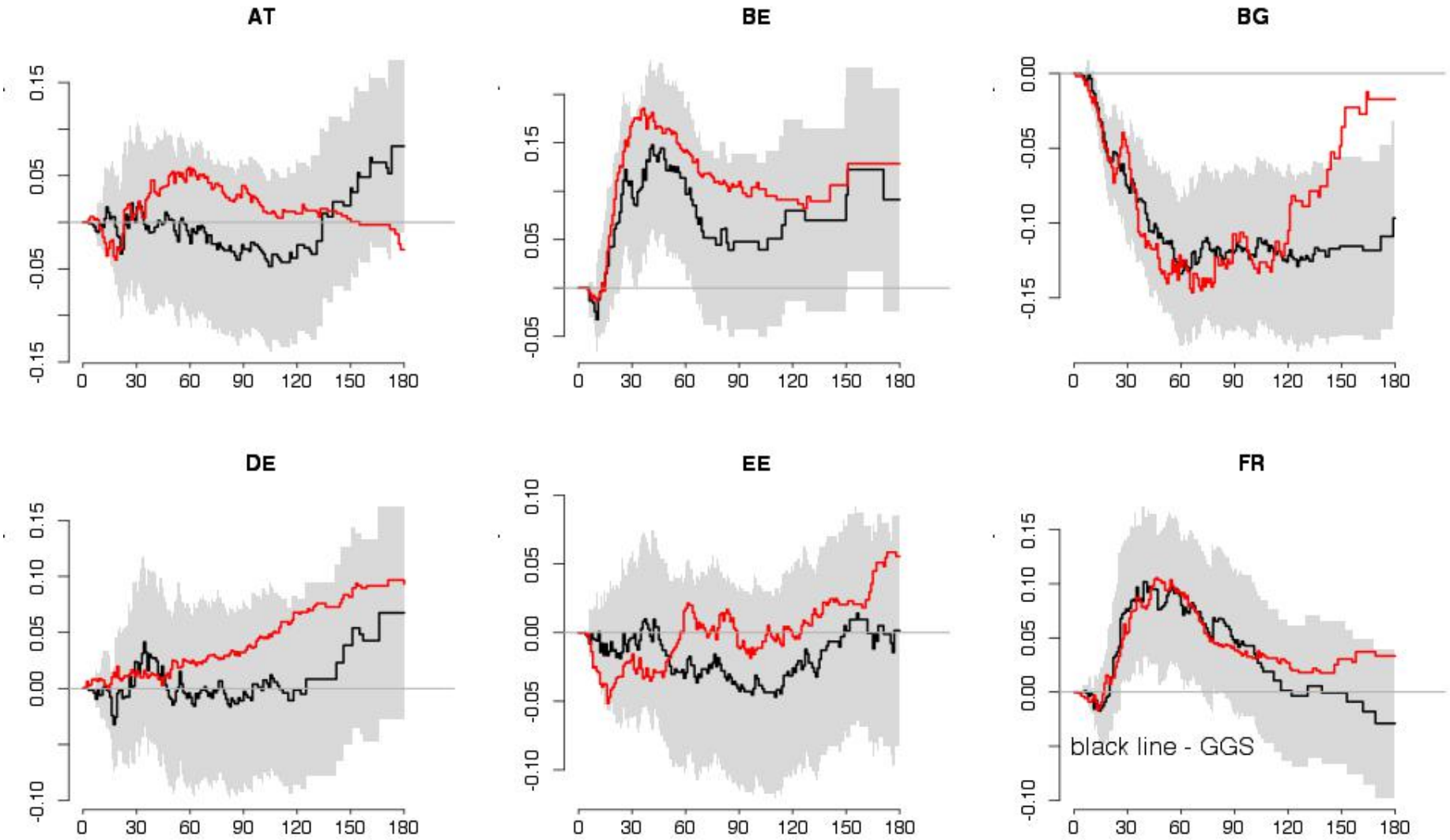


H_0 from separate CoxPH, GGS vs SILC

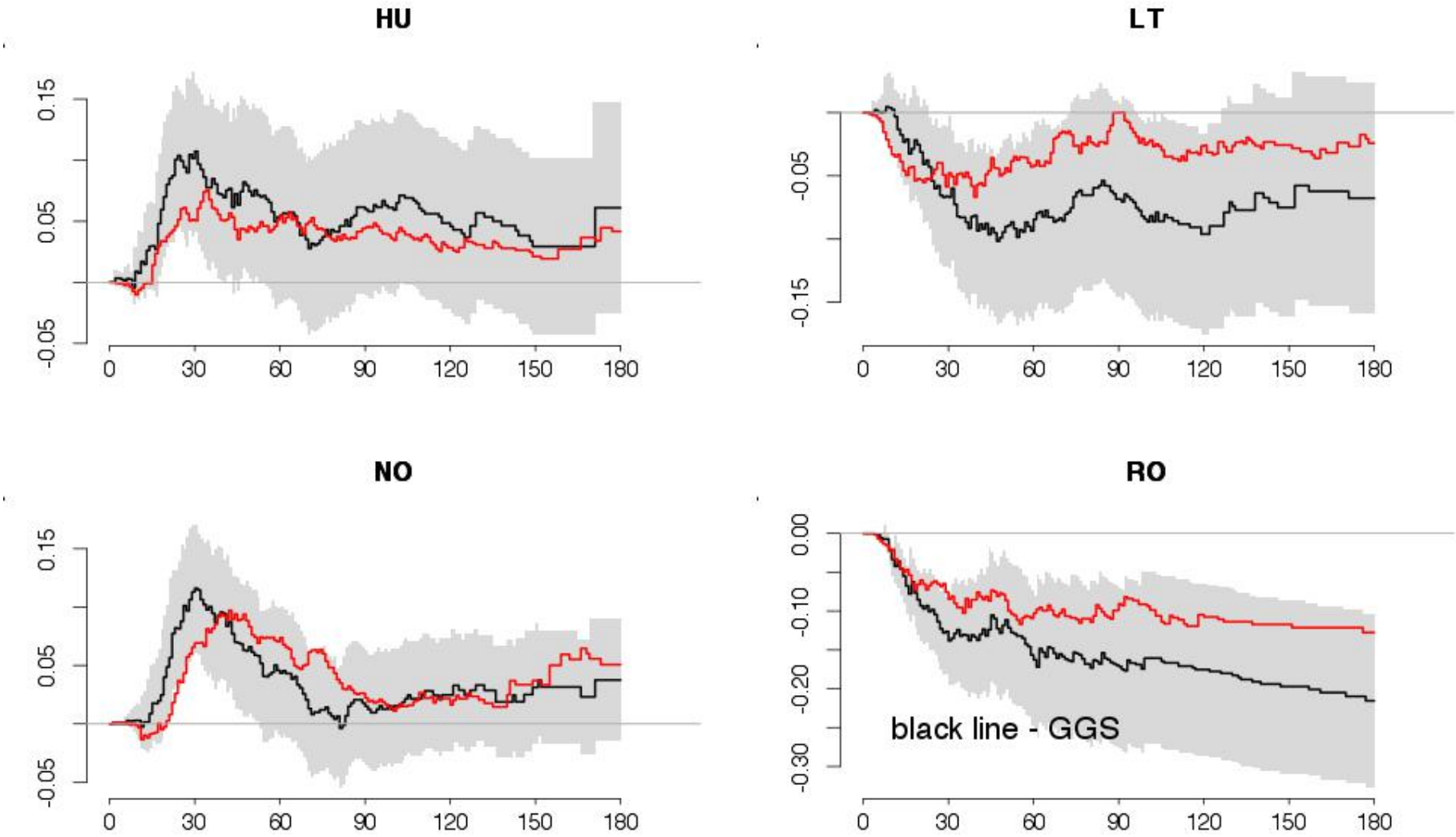
model – woman's education, age at 1b, age at 1b sq., partner's education



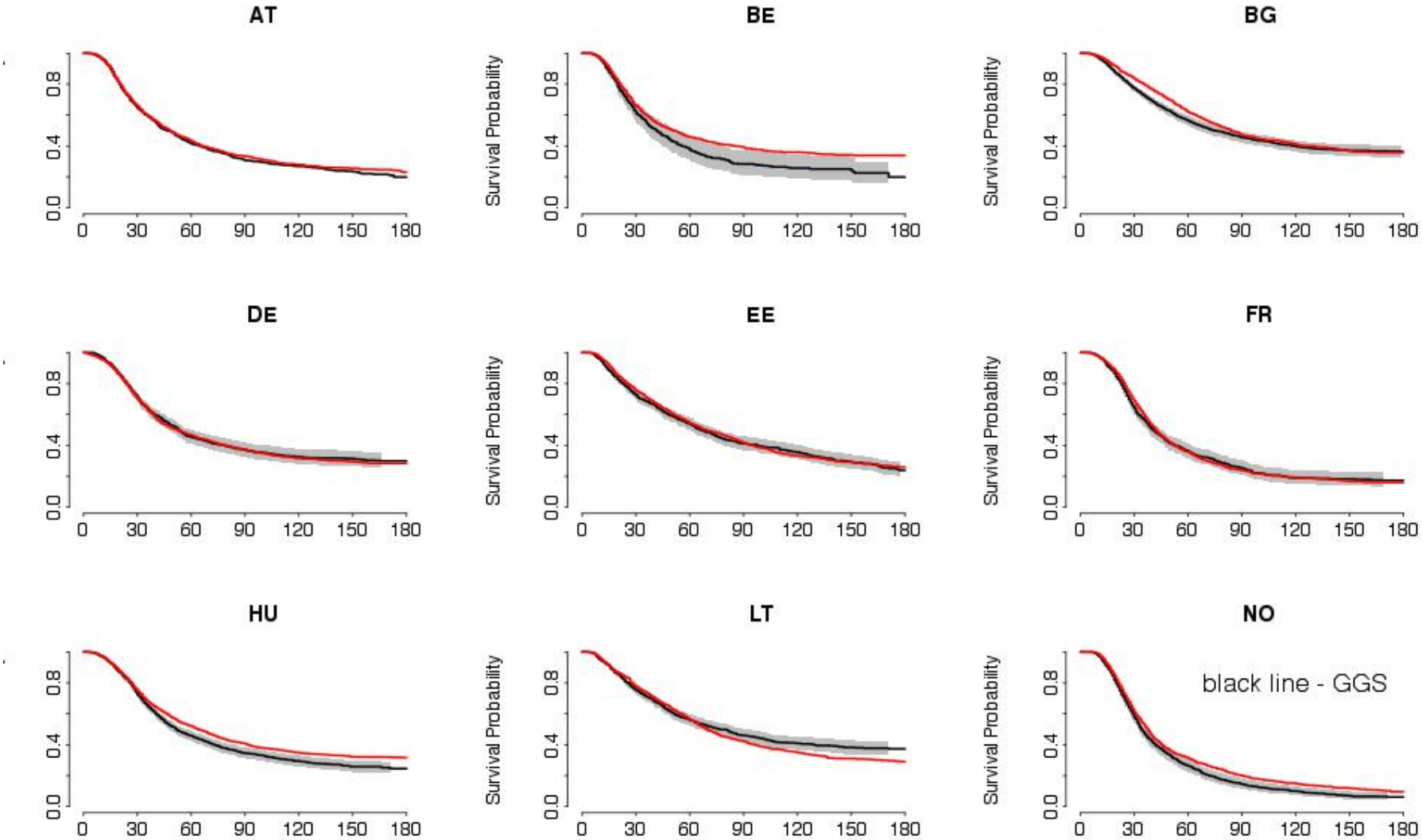
Survival difference by education
K-M difference Medium-High 1



K-M difference Medium-High 2

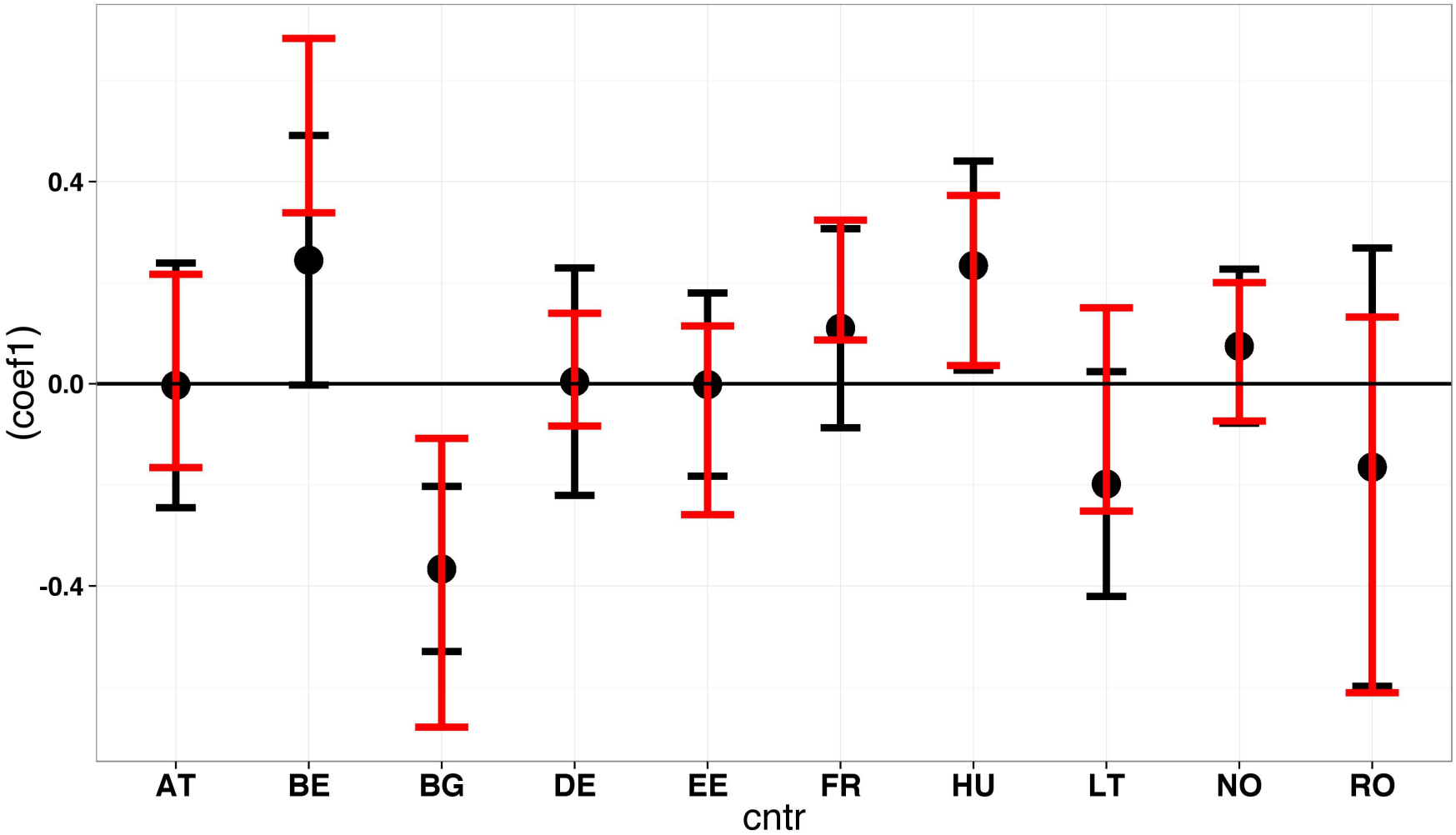


CoxPH predicted survival for Highly educated (cntrl: age 1b + partner edu), weighted data



Coef. of Highly educated in CoxPH (ref=medium)

model – woman's education, age at 1b, age at 1b sq., partner's education; weighted data; (black is GGS)



Time-invariant vs time-dependent partner's education, GGS

	AT	AT	BG	BG	EE	EE
Time-constant partner's education						
Low	0.888		1.411***		1.169	
Medium	1		1		1	
High	0.923		1.219*		1.052	
Missing partner	0.462***		0.512***		0.522***	
Time-varying partner's education						
Low		0.856		1.442***		1.207
Medium		1		1		1
High		0.893		1.215*		1.084
Missing partner		0.274***		0.400***		0.261***
1-2 years	0.348***	0.347***	0.436***	0.443***	0.589***	0.577***
3-4 years	1	1	1	1	1	1
5-6 years	0.587***	0.616***	0.810**	0.819*	0.960	0.996
7-9 years	0.389***	0.405***	0.503***	0.510***	0.563***	0.595***
10-15 year	0.208***	0.209***	0.178***	0.180***	0.534***	0.540***
Low edu	1.148	1.199	1.746***	1.759***	1.116	1.172
Medium edu	1	1	1	1	1	1
High edu	1.132	1.095	0.661***	0.662***	1.000	0.987

Exponentiated coefficients
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TFR comparison Eurostat vs EU-SILC