Reproductive Decision-Making and Human Capital

A meta-analysis

Maria Rita Testa Fabian Stephany

Vienna University of Economics and Business

Vienna Institute of Demography

Wittgenstein Centre for Demography and Global Human Capital

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Background

College graduate women usually tend to have fewer children than women with a high school degree or a lower education level (Bjoerklund 2006).

Empirical evidence indicates that more educated women do not intend to have fewer children than less educated women (Testa 2010).

Fertility postponement of highly educated women and parity-specific distribution of their fertility intentions play an important role (Sobotka 2009).

Main Objective

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Whether and to what extent are highly educated women able to anticipate the negative effects of their postponement and incorporate them into their lifetime fertility intentions?

More frankly: To what extent do they still desire or plan (maybe unrealistically) a family of two (or more) children?

Hypotheses

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H1 - The educational gradient on intended fertility is negative.

H2 - The negative educational gradient weakens over time.

H3 - The educational gradient even reverses in countries with a) low GDP, b) persistent traditional gender roles, and c) insufficient supply of public childcare.

Methodology

Part one - Examination of existing studies addressing the topic with the use of a meta-analysis, with the aims of:

- assessing the relationship between fertility decisions and education in a quantitive manner,

- inspecting temporal and cross-country changes in the fertility intention-education link.

Part two - Contradictory and unresolved findings emerging from the meta-analysis will be examined.

Methodology - the meta-analysis

The methodology of meta-analysis has been used increasingly in social sciences.

Meta-analysis is used to synthesize and interpret research results from different studies under one topic of interest.

Its advantage in comparison to classical reviews of existing literature lies in the clear and systematic way of comparing inter-study results.

Methodology - stepwise fashion

1) Suitable research papers are collected according to the criteria of comparability.

2) Coefficients of each study are recalculated to the so called *effect sizes*.

-> **Main trade-off**: Comprehensive but not too heterogeneous!

Methodology - literature selection

1) Appropriate studies were identified in *Google Scholar* and *Web of Knowledge* via certain keywords.

2) Previously undiscovered references, given in the selected papers were included in the selection.

3) Experts were consulted for recommendations.

4) Papers have been excluded if they did not meet certain requirements.

Methodology - our sample

The resulting sample contains **57 papers** with **142 distinct study lines**.

91 lines focus only on female education and fertility intention, 28 lines focus only on men, and 23 lines do not distinguish between the two.

Data reaches from 1979 to 2011 with a strong regional focus on Europe (92 lines).

Methodology - effect sizes

The effect size should refer to the difference in fertility intentions between a 'high' and a 'low' educated group.

$$ES = \begin{cases} COEF_{high} - COEF_{low}, \\ \log(COEF_{high}) - \log(COEF_{low}), \quad for\ Exp.Models. \end{cases} \tag{1}$$

Methodology - random model

We assume a random model, i.e. there are several 'true' effect sizes according to the selected sample.

The effect sizes in the actually performed studies are just a (**random**) sample of a particular distribution of effect sizes (Borenstein et al. 2010):

$$Y_i = \theta_i + \varepsilon_i, \quad \varepsilon_i \sim N(0, \sigma_i^2) \tag{2}$$

$$\theta_i = \theta + \mu_i, \quad \mu_i \sim N(0, \tau^2) \tag{3}$$

Methodology - measures of fertility intention

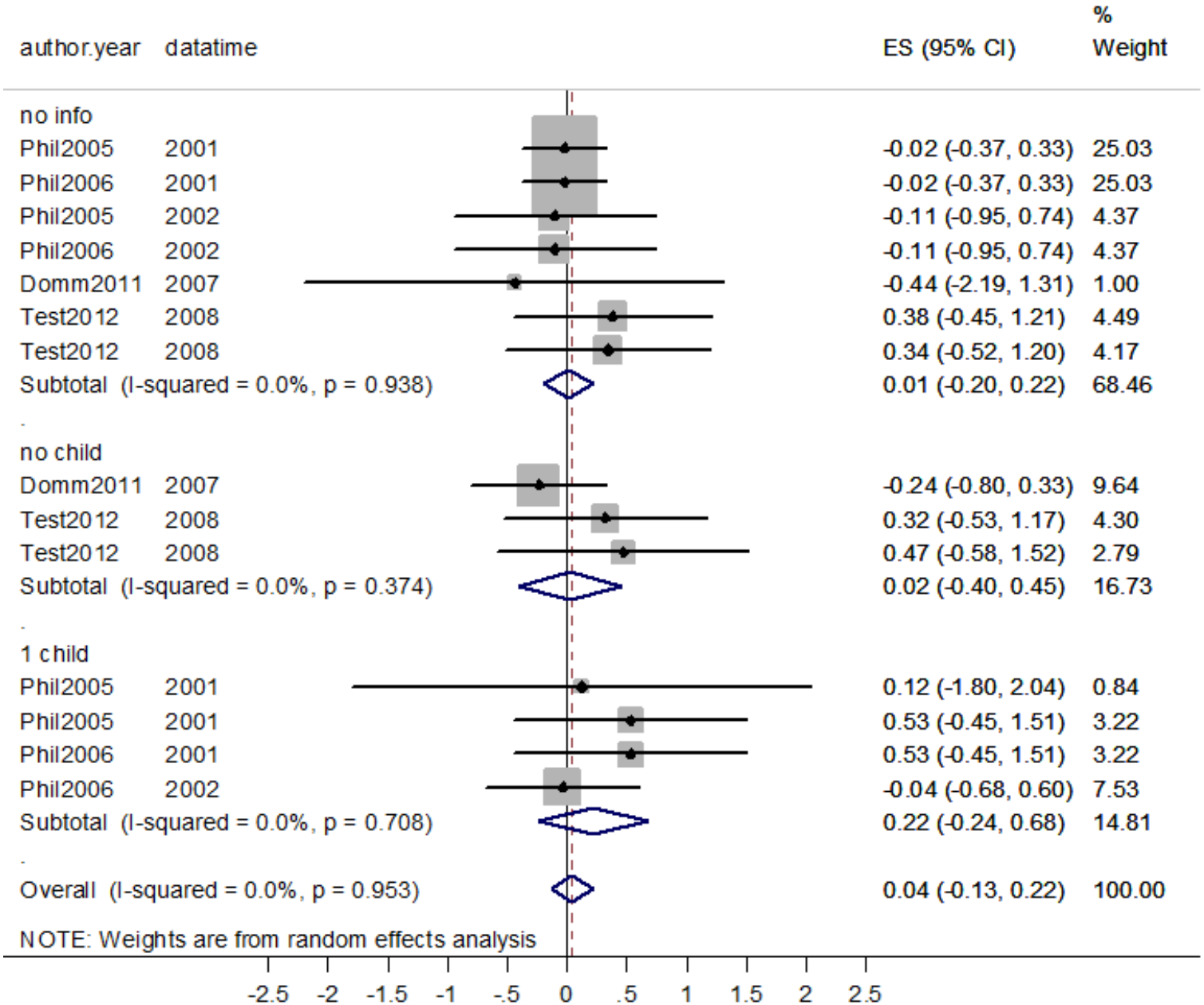
One important distiction between measures of fertility intentions needs to be made between:

1) **general** (childbearing) intentions,

2) child-**number** intentions,

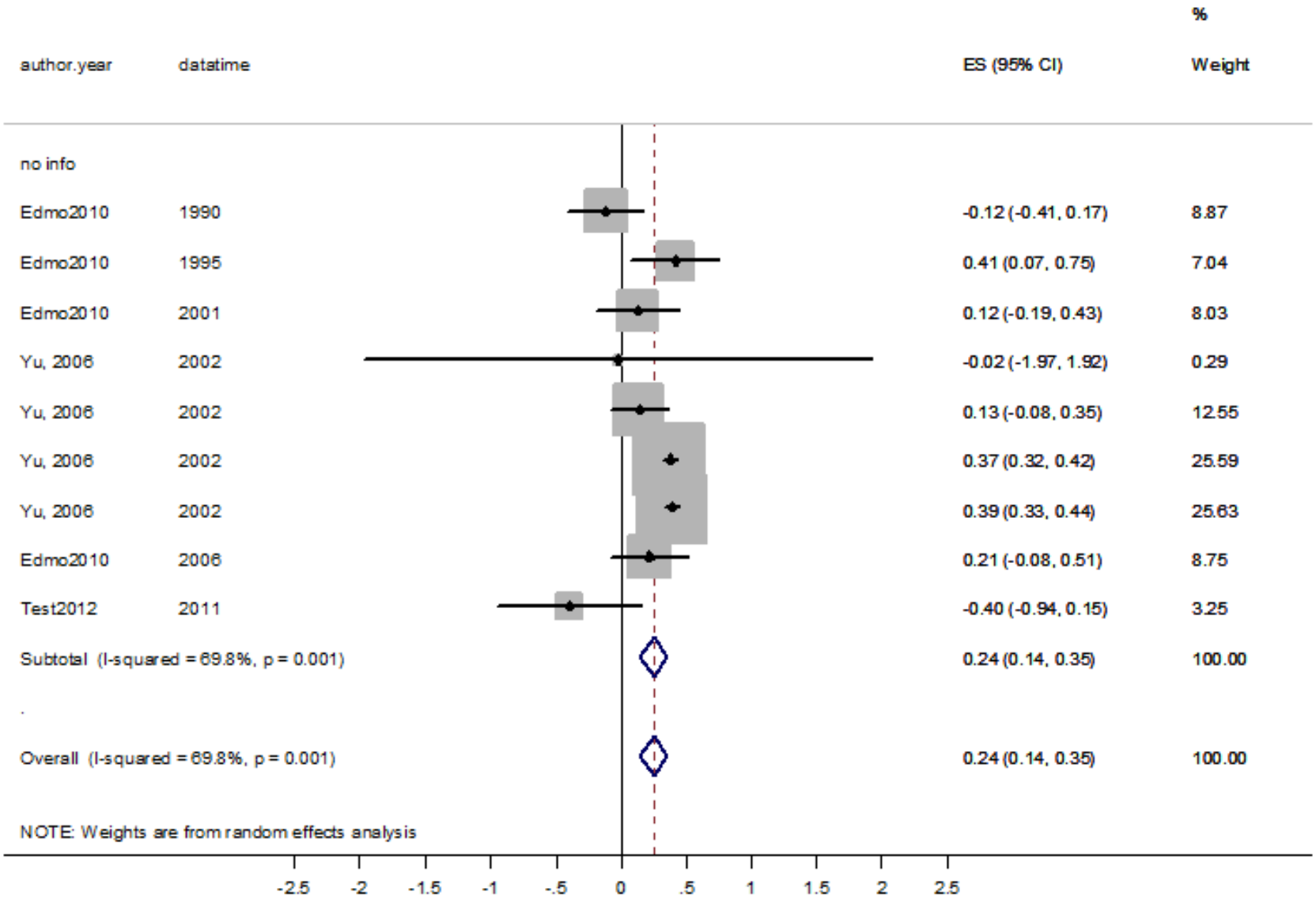
3) and child-**timing** intentions.

Results - child-timing intentions



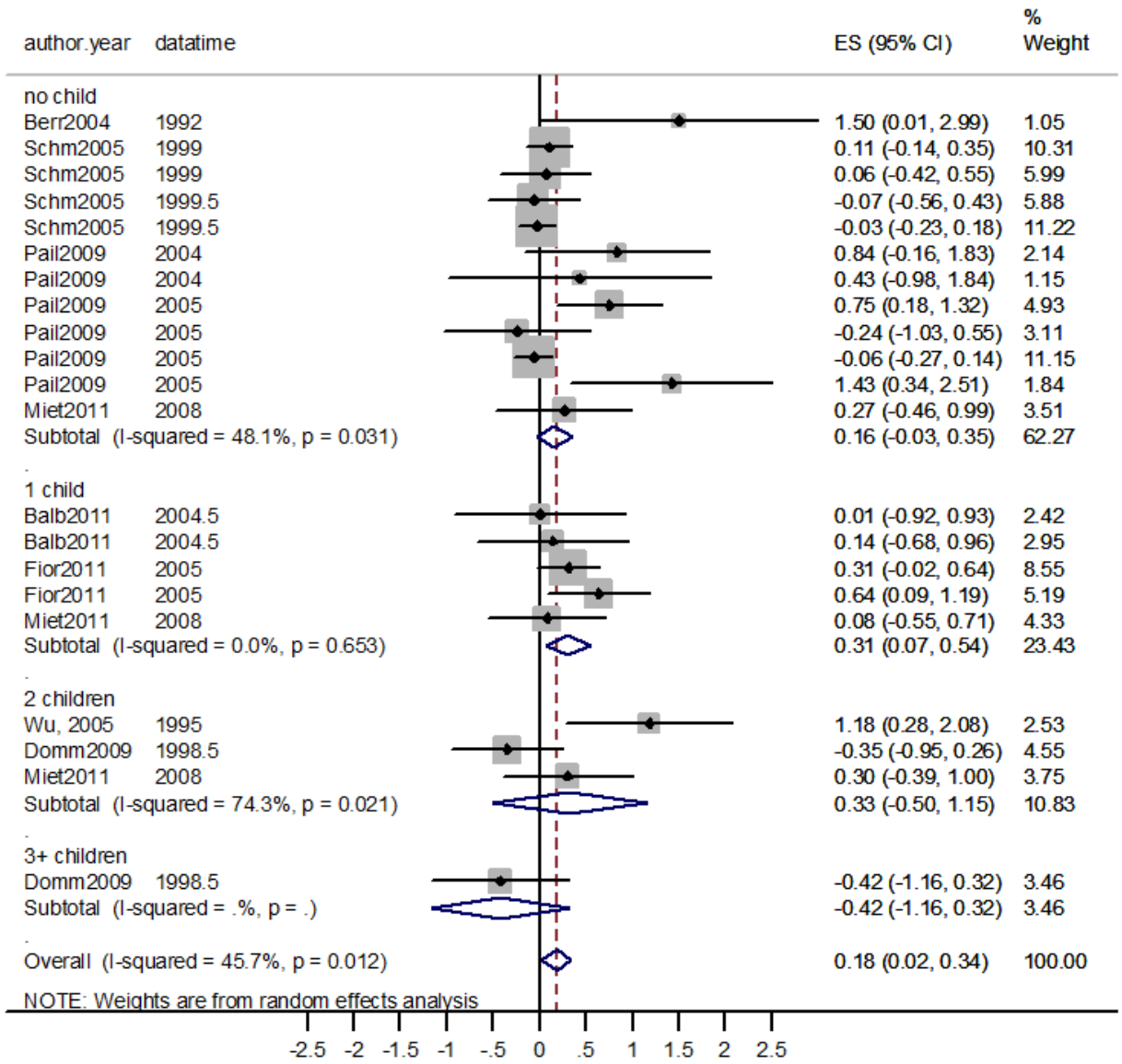
Educational gradient on timing, by parity (STATA 13.1), 10 Jun 2014

Results - child-number intentions



Educational gradient on size, by parity (STATA 13.1), 10 Jun 2014

Results - general intentions



Educational gradient on general intentions, by parity (STATA 13.1), 10 Jun 2014

Results - general intentions - meta-regression

Table 2a - Meta regression explaining general fertility intentions (all countries)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	General Intentions	General Intentions	General Intentions	General Intentions	General Intentions
<2000	0.00575	0.0505	-0.00389	-0.0826	-0.783
	(0.125)	(0.145)	(0.167)	(0.304)	(0.766)
2001-2005	0.213*	0.144	0.221	0.0577	-0.601
	(0.120)	(0.123)	(0.146)	(0.283)	(0.766)
2005+ (ref.)					
Sample Size	-1.62e-05***	-1.63e-05***	-1.56e-05***	-2.56e-05	-6.58e-06
	(3.07e-06)	(3.15e-06)	(3.23e-06)	(1.54e-05)	(2.97e-05)
AT & DE (ref.)		-			-
France		0.222			0.0312
		(0.195)			(0.528)
NL & UK		0.00452			0.0125
		(0.192)			(0.443)
Italy		0.451**			0.338
		(0.214)			(0.563)
Eastern Europe		0.110			0.383
		(0.146)			(0.640)
Nothern Europe		0.238			
		(0.243)			
US & CA		1.143**			
		(0.499)			
Gender			-0.139		0.0513
			(0.149)		(0.306)
# of children				0.154	-0.0883
				(0.299)	(0.520)
children (yes/no)				-0.0555	-0.0989
				(0.445)	(0.879)
Constant	0.0809	-0.00311	0.175	0.253	0.871
	(0.0869)	(0.0988)	(0.176)	(0.268)	(0.726)
Observations	57	57	47	23	19
Inter-study variance[a)]	0.0327***	0.0259*	0.0375***	0.0545***	0.142
Regions	19	19	16	10	8
Papers	26	26	18	9	7
Start	1984	1984	1990	1990	1990
End	2011	2011	2011	2011	2011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
a) Residual heterogeneity statistic, with H0: tau²=0.

Conclusions (so far)

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1) On average, the educational gradient appears to be slightly positive in all three dimensions of fertility intentions.

2) By looking at descriptive statistics, a variation of the gradient can be observed over time, parity, and gender.

3) The results of the meta-regression underline that the gap in intentions between 'high' and 'low' educated women is significantly higher in Italy and Nothern America.

4) A sizeable part of the inter-study variance can be explained by inter-regional differences.

Caveats

- Differences in the fertility-intention-gap can not be clearly traced back to an elevated intention of the 'high' educated ones.

- Questions asking for intentions have been phrased differently across surveys (Desire, Plans, Intentions).

- Different groups of educational scaling have been merged together.

- Some measures, for example standard errors, had to be 'recalculated'.

Future work

Elaborate further on the reasons for regional differences by controlling for

- GDP,

- gender roles (UN Human Development Report),

- and childcare availability.

Thank you very much for your attention!

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contact@fertilityeducation.at

Technical Appendix

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meta-regression model

$$y_i = \alpha + \beta x_i + \varepsilon_i + \mu_i, \quad \varepsilon_i \sim N(0, \sigma_i^2),\ \mu_i \sim N(0, \tau^2)$$

standard error calculation

$$SEES = \begin{cases} \sqrt{SE_{high}{}^2 + SE_{low}{}^2}, & if\ refrence\ lies\ in\ between \\ SE_{low}, & if\ SE_{High}\ is\ reference, \\ SE_{high}, & if\ SE_{Low}\ is\ reference. \end{cases}$$

standard error estimation

$$SE_{low}^{est} = \left| \frac{ES_{low}}{invnormal\left(p_{low}/_2\right)} \right|, \ SE_{high}^{est} = \left| \frac{ES_{high}}{invnormal\left(p_{high}/_2\right)} \right|$$

p-value estimation

$$p^{est} = p^* + \frac{(1-p^*)}{2}, e.g., 0.05 + \frac{(1-0.05)}{2} = 0.05 + 0.475 = 0.525$$