

**Education and the timing of second births.  
The role of employment and union stability\***

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**Abstract**

There is a growing body of literature showing a positive association between education and the transition to second births. Although this finding is often interpreted in terms of the selection, time-squeeze and the partner effect hypotheses, the underlying mechanisms are still unknown. First, there is some evidence that female education might be interpreted in terms of an income effect. Second, previous studies did not consider the mediating role of partnership quality. Using longitudinal data from the Hungarian Generations and Gender Survey, this paper provides further evidence on the underlying mechanisms. The relationship between education and the spacing of second births is examined using lognormal survival models. The income effect is controlled by including employment and labor market experience as additional explanatory variables. The selection and the partnership quality mechanisms are controlled by estimating the survival model of interest simultaneously with a probit model of being a mother and a survival model of union dissolution, respectively.

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## Motivation and research questions

Recent studies on the relationship between education and the transition to second births often report a positive educational gradient (Kreyenfeld 2002, Gerster et al. 2007, Kravdal 2001, 2007, Klesment and Puur 2010, Mureşan and Hoem 2010, Billingsley 2011, Bartus *etal* 2013). Since this finding contradicts the economic theory of fertility, the positive effect of female education on the transition to second births is often interpreted in terms of selection, time-squeeze and partner effect. (Kreyenfeld 2002). The selection effect hypothesis states that women with a strong unobserved preference for children are over-represented among those who postpone the first birth, and this unobserved characteristic is responsible for the fast transition to second birth. The time-squeeze hypothesis argues that women who postpone the first birth are closer to the end of their reproductive span, which reduces the waiting time to the second birth. Finally, the partner effect hypothesis states that the positive effect of family income on childbearing, known as the income effect, suppresses the opposite effect of the shadow price of raising high-quality children.

The mechanisms behind the positive educational gradient are unknown. Although some of the above mentioned studies found evidence in support of the selection and the partner effect hypotheses, other studies show that the effect of education remains significant even after controlling for either selection or the partner's education. The net effect of education might be explained in terms of income effect, however actual income or proxies for income were not included in the empirical analyses. Finally, the above mentioned studies did not control for the effect of union stability. The timing of childbearing depends, among others, on the latent hazard of union dissolution (Lillard 1993, Lillard and Waite 1993). This latent hazard should be lower among highly educated women because they tend to live with or married to highly educated men, and highly educated men (and women) enjoy substantial wage advantages over men (and women) with lower education. The relatively fast transition to second births therefore might reflect the effect of the unobserved satisfaction with the union.

The paper deals with the timing of second births in one of the post-communist countries, Hungary. More specifically, an attempt is made to answer the following research questions: (1) Can the positive effect of higher education on the transition to second births be explained away in terms of union stability? (2) Can the positive effect of higher education be interpreted in terms of the income effect?

The present paper extends and improves the analyses reported in Bartus *etal.* (2013) as follows. (1) An attempt is made to control for the income effect mechanism by controlling for time-

varying employment status and labor market experience. (2) Following the simultaneous equation methodology proposed by Lillard, the effect of the latent hazard of union dissolution will be controlled by modeling the timing of second births and the timing of union dissolution jointly. (3) While the analyses in Bartus *et al* (2013) used exclusively time-constant variables, the present paper uses a multi-spell dataset with time-varying covariates.

### **Sample and variables**

Data for the analyses come from the three first waves of the panel survey *Turning Points of the Life Course*. The project was launched in 2001, then data collection was repeated in 2004 and 2008. The second wave of the survey corresponds to the first harmonized wave of the Generations and Gender Survey.

For the purposes of empirical analyses, we use women born between 1961 and 1983 who have participated in all of the three waves (N=2467). Exclusion of women born prior to 1961 is due to the fact that employment statuses before 1975 are unknown and the risk period starts with age 14. Thus the time-varying employment status of women born in 1961 or later and turning 14 in 1975 or later is observed.

A standard multi-spell survival dataset were constructed from answers to retrospective survey questions on children born, spells of partnerships, employment and educational enrollment. The dataset span the age interval 14-49. The key explanatory variable is current educational level: we distinguish between primary, lower-secondary, upper-secondary and tertiary educational levels. Since we do not have reliable and time-varying information on income, we use an indicator variable for employment and labor market experience to capture the income effect. Union status at the time of first conception as well as the duration of the union are also known. We make a distinction between traditional marriages, formed prior to the first conception and short-gun marriages, formed between conception and delivery.

### **Analytical strategy**

The starting point of the empirical research is the estimation of the survival model of time to second birth on education, employment, labor market experience and several control variables including age and its square, birth cohort and period. To control for the time-squeeze explanation, interaction terms between education and the age variables is introduced to the model.

The starting model is extended into two directions. (1) In order to control for the selection hypothesis, the survival model is estimated jointly with a probit model of being a mother (of one child) using the sample of all women. (2) In order to control for the effect of the latent hazard of separation, we estimate the above survival model simultaneously with a survival model of union dissolution. Finally, the survival model of second births will be estimated jointly with the probit model of being a mother and the survival model of union dissolution.

All survival models are lognormal survival models. All joint models assume the correlation and the joint normality of the residuals. Systems of seemingly unrelated lognormal survival models and probit models are estimated with the Stata module `cmp` (Roodman 2011).

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