

Educational Attainment and Second Births in Romania

Cornelia Mureşan¹

The drastic decrease in fertility in Romania after 1989 is not an unusual trend in the European context. It is common to all Central and Eastern European countries which have undergone economic and social transitions since the fall of communism. However, there are few studies assessing differences in fertility among women with different educational levels either in communist times or after years of continuous transformation. Empirical research about Romania is scarce and what is available is based mainly on aggregate macro data which cannot be used effectively to investigate either the effect of educational level on motherhood or the extent to which motherhood can be combined with fulfilling educational aspirations. The influence of the two different contexts could be substantial in either communist or in more democratic times. In the former, the pro-natalist demographic policy not only encouraged the combining of work and family, but also had a strong coercive side, forbidding family planning and abortion and discouraging divorces. At the same time, education programs for the working population were implemented, especially at low and medium levels of education. Nowadays, in democratic and market economy oriented times, political intervention in private life no longer exists. However, governments are trying to develop programs allowing motherhood to be combined with work. They are also continuously restructuring the education system, to give it more flexibility (especially for higher education), to broaden the coverage of education available to the population, and to align it more strongly with labor market demands.

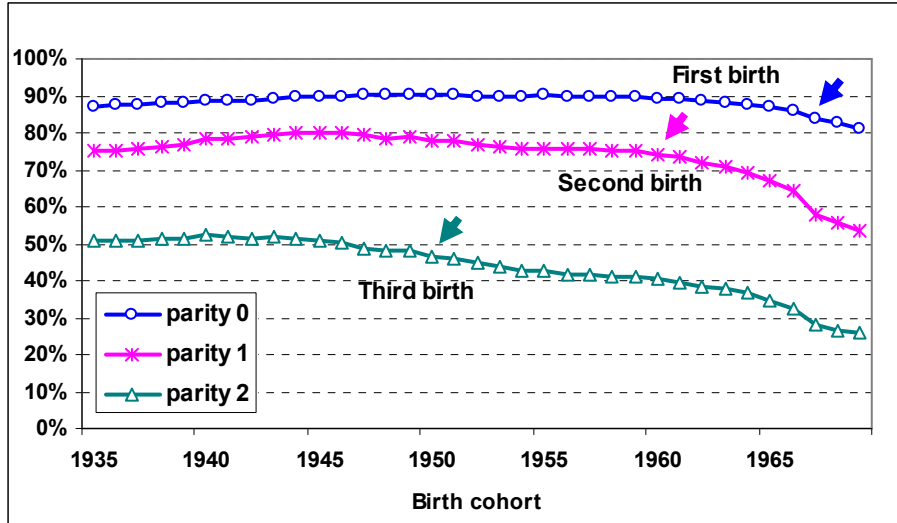
Despite the socio-economic changes, childbearing seems to remain universal but higher order births drop. The two children norm has started to come to an end relatively recently when cohorts born after 1960 have diminished progressively their transition to a second birth (Figure 1). In the meantime educational differences in fertility, more

¹ University Babeş-Bolyai from Cluj, Romania
✉ cmuresan8@yahoo.com

accentuated as the birth order is higher, have increased the most in the case of second birth (figure 2).

Figure 1

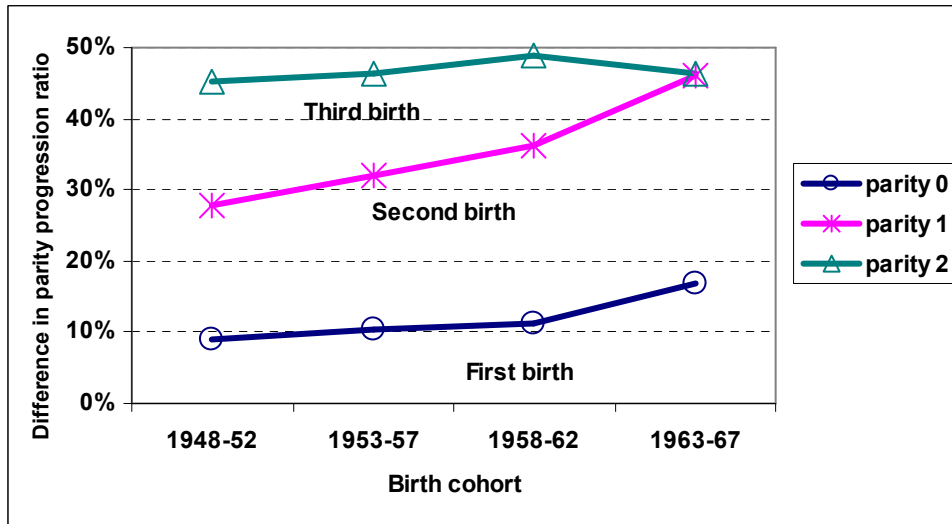
Parity progression ratios by birth cohort, for women born between 1935 and 1969



Source: Census data, NIS (1994; 2003) (author's calculations)

Figure 2

Difference in parity progression ratios between women without any academic qualification and those with a university degree, by birth cohort.



Source: Census data, NIS (1994; 2003) (author's calculations)

This paper concentrates on the effect of education on the risk of second birth as far as its level, enrolment and postponement of entry into motherhood.

It also deals with the extent to which variability in the personal characteristics of women, and their greater or lesser degree of proneness toward motherhood, affect the impact of education on second birth.

Theoretical considerations

The increasing *level of education* for women has been suggested as a major factor behind declining fertility rates. The argument links educational level with demographic behavior via economic considerations, assuming that higher education leads to a higher wage and therefore to a greater “opportunity cost” of childbearing for women. The thinking has been dominated by the theory of “new home economics” (Becker 1991). The extent to which the assumptions of that theory and the assumption of incompatibility between childbearing and employment in particular are met, vary significantly between societies. In some societies, during specific periods, an “income effect” (which is positive) could prevail among highly educated women to an “opportunity cost” effect (which is negative). Women who have received more education could more easily afford to have a second or a third child than other women, and thus may have more than compensated for loss of market benefits caused by another birth. Moreover these women are more likely to have a husband with higher earnings and thus the “income effect” may be strengthened. Such a case was documented in several counties, e.g. Sweden (Hoem and Hoem 1989) . An extended discussion on the effect of societal-level conditions on the relationship between education and fertility may be found in (Liefbroer and Corijn 1999).

Many authors (see e.g., Blossfeld and Huinick 1991) point out that the impact of education level on birth transition is largely explained by the longer time spent in education by the highly educated. A large number of empirical studies demonstrate that birth risks are lower during studies, which is interpreted as the incompatibility of *enrolment in education* with parenthood.

Highly educated women could have a different risk of second birth, simply because of their late entry into motherhood. The influence of education on the first birth can be considered as an *indirect effect* on the second birth. In his book “Postponement of Childbearing and Low Fertility in Europe” Sobotka (2004) cites a study where Beets at

al. (2001) found that highly educated women were the “forerunners” in postponing the first birth in European countries, and estimated that the increasing educational level explains about half of the increase in the mean age of entry into motherhood among Dutch women born between the periods 1931-40 and 1961-65. Age at first birth could either increase or reduce the second birth risk. An increase would be expected when highly educated women have their first child only after finishing education, when they are usually older than other women, so that they have less time at their disposal before reaching the biological limits of fertility. Such a time-squeeze hypothesis could increase the transition rate to the second child, as has been assumed in the West German case (Kreyenfeld 2002). In contrast, late entry into motherhood in countries where early childbearing is the norm may induce older women to give up on the idea of a second birth. This latter hypothesis could play some role in the modern Romanian context.

In accordance with our theoretical considerations we will investigate all three aspects of the impact on second birth in Romania namely educational level, educational enrolment, and indirect influence of educational attainment versus age at first birth. In a further step we will look at how changes in the socio-political regime, in family policies, and in the educational system affect the impact of education on second births. Finally we will control for other demographic and social-background factors, as well for unobserved heterogeneity in order to assess the true dynamic of the impact of education on second birth risk in Romania.

Data and methods

This study is based on data collected by the Generations and Gender Survey (GGS) at the end of 2005, the women sub-sample with 6,009 cases. For second birth risk modeling we used responses from 4,778 one child mothers, a number of 135 being excluded for various reasons. There were 3,016 second births.

The dependent variable is the exact time of second birth (the middle of the month and the year). One-child mothers are exposed to risk only after 9 months from the previous birth.

Our key explanatory variable is current educational status, which combines 3 levels (low, medium, and high) for those out of education and a one additional category which amalgamates the status of being currently enrolled, no matter at which level of education. This is a time-varying covariate constructed on the basis of declared final educational level, date of completion, and whether the respondent is enrolled at time of interview. Minimal imputations have been made, for those not reporting the date of ending education, namely those without education or only primary education. Every respondent is considered to be enrolled in education all the time until her declared final educational level is attained. Such a definition of educational enrolment still remains strongly anticipatory, i.e. it assumes that the respondent will not return to take more education. Until the late 1990s, when alternatives to daytime higher education started to emerge, there were limited opportunities to return to the educational system and thus we can have confidence in our results. In contrast, strong anticipatory bias could affect our findings post 2000, since increasingly more students, especially women, including mothers, have returned to the educational system in order to gain a first degree diploma as required by the new market economy professions.

Another crucial covariate for our study is the period. We want to contrast childbearing behavior in socialist times with that in post-socialist times. Although the fall of the communist regime at the end of 1989 is an important node for our calendar, it is not sufficient, since other breaks, such as social policy changes (especially policies concerning abortion), feature in Romanian history. In order to cover all the above mentioned changes we use eight periods defined as follows:

- before 1957 – after the period of war, the installation of the communist regime, illegal character of abortion
- 1957-1966 – socialist times, legal and free-of-charge abortion, before the onset of pro-natalist policies, Soviet inspired educational system
- 1967-1979 – socialist times, a “parenthesis” in the natural development of reproductive behavior, with both incentive and coercive aspects included in demographic policies
- 1980-1984 – socialist times, revised educational system
- 1985-1989 – last years of socialist period

- 1990-1994 – post-socialist times, old family policies, but without coercive aspects
- 1995-1999 – post-socialist times, changing family policies, continuously reformed educational system
- 2000-2005 – post-socialist times, relatively generous family policies, emergence of alternatives to the full-time form of higher education.

Among other covariates with the age at first birth, we aim to capture all indirect influences of educational attainment on the transition to a second birth from the first, since education affects the entrance into motherhood. It is a time-constant variable. We also use a third time-varying covariate, beside educational status and period, namely marital status. It is an important proximate determinant of childbearing, whatever birth order one studies, and for us it has five categories: single mother; in first cohabitation; in first marriage; separated; in a further union (no matter if it is cohabitation or marriage). Additionally we introduce social background characteristics known to have an influence on fertility decisions, i.e. place of living until the age 15, and number of siblings.

We apply a piece-wise linear hazard regression to model the transition to a second birth as a function of an underlying risk modified by a vector of covariates. The *Starting Models*, beside the baseline duration spline, have 3 covariates introduced successively: educational status, age at first birth, and calendar year. The *Basic Model* is used, when we switch to deal with the effect of education by period. Here the educational status and the period are interacted. Before continuing to jointly model repeated births, we further introduce, in the next *Enhanced Model*, the marital status (tv) and two other social background characteristics, namely the character of place where respondent grew up, and number of siblings. The last regression *Joint Model* is a multilevel one. I jointly consider the first, the second, and the third births, and thus allow the assessment of unobserved heterogeneity, with a common term introduced in every equation. All the three transitions are modeled as piece-wise linear hazard regressions, with less and simpler covariates for the first birth and the third birth. Previous Enhanced Model was retained for the second birth.

Overall effect and direct influence of educational level

As a first step we estimate a model where we control only for the educational status of the respondent. Table 1, Model 1 reports the results from this model. Having a university degree decreases the risk of having a second child by 32% $((0.47/0.69-1)*100\%)$ compared to respondents with a high school or vocational qualification, and by 53% compared to women without any qualification. This is a result that we would have expected based on home-economics theory or other previous studies (Ghețău and Arghișan 2006, Mureșan 2007).

Table 1.

Event-history models of the transition to the second birth. "Starting Models"

	Model 1	Model 2	Model 3
Baseline by duration since first birth:			
Intercept	-2.19 ***	-1.90 ***	-2.24 ***
Slopes:			
0.75-2 years	0.75 ***	0.75 ***	0.77 ***
2-4 years	-0.27 ***	-0.26 ***	-0.26 ***
4-6 years	-0.15 ***	-0.14 ***	-0.15 ***
6-15 years	-0.28 ***	-0.29 ***	-0.30 ***
Educational status			
Relative risks:			
<i>Out of education</i>			
no degree	1	1	1
high school or vocational degree	0.69 ***	0.76 ***	0.75 ***
university degree	0.47 ***	0.65 ***	0.65 ***
<i>In educational improvement</i>			
	0.60 ***	0.63 ***	0.64 ***
Regressor spline by age at first birth			
Slopes ¹⁾ :			
15-22 years		-0.08 ***	-0.07 ***
22-26 years		-0.07 ***	-0.08 ***
26-30 years		-0.07 **	-0.07 **
30-40 years		-0.08 *	-0.08 **
Duration spline by calendar year			
Slopes ²⁾ :			
1950-1957			0.04
1957-1966			-0.04 ***
1966-1968			0.40 ***
1968-1980			-0.03 ***
1980-1985			0.04 *
1985-1990			0.00
1990-1995			-0.11 ***
1995-2000			0.03
2000-2005			-0.03
Log-likelihood	-16573	-16472	-16395

Notes: a) Method: event-history model; dependent variable: transition to second birth measured from 9 months after first birth

b) The covariates: educational status, age at first birth, and calendar year, are introduced successively

c) *** highly significant $p \leq 0.01$; ** significant $0.01 < p \leq 0.05$; * weakly significant $0.05 < p \leq 0.10$

¹ The nodes are exact ages 22, 26 and 30.

² The nodes are January 1st 1957, January 1st 1966, etc.
Source: GGS 2005 Romania (author's estimations)

As soon as we introduce the regressor spline for age at first birth into the model (No. 2), the direct effect of educational attainment weakens. However, with a 14% $((0.65/.76-1)*100\%)$ lower risk of a second birth compared to women with a medium level of education, and a 35% lower risk compared to women with a low level of education, the respondents with a high level of education still behave as expected. Educational attainment has a strong and significant effect in lowering the risk of a second birth. This negative gradient does not change with the introduction of the third duration spline which captures the effect of the calendar year (Model 3).

The only changes concern the intercept of the duration baseline which increases (from Model 1 to Model 2) and decreases (from Model 2 to Model 3) because the baseline category becomes more specific; women aged 18 at first birth in Model 2 and women aged 18 at first birth and exposed to risk in calendar year 1950 in Model 3.

Effect of enrolment

As discussed in the section concerning variables, we are interested in catching the institutional effect of being enrolled, in addition to the effect of the educational attainment itself. Many authors ignored this effect in their studies of transition to a second birth (Hoem and Hoem 1989, Hoem 1996, Hoem et al. 2001) arguing that such a factor has no influence since most respondents have completed their studies before the first child is born, and similarly before being at risk of second birth (Kreyenfeld 2002, p. 24). Other authors, like us, have included an educational enrolment variable so we can compare our results to theirs (Köppen 2006, Koytcheva 2006).

Even if, as expected, the risk of a second birth for enrolled women is significantly lower than for their counterparts with a low level of education (by about 40%), it remains as high as that of the women with an university degree. The estimate is robust even after controlling for age at first birth and calendar year (Model 3). We are a little surprised by such a high risk of a second birth for enrolled women, but we think that these women have placed themselves in a birth-prone category by having their first birth and being enrolled at the same time. Another explanation is that the educational system is such that

it makes it relatively easy to combine motherhood with obtaining an education. In fact, with similar assumptions as ours for the time-varying educational status covariate, Köppen (2006: 317-318) finds that West German women who are enrolled have only a 23%-33% lower second birth risk than out-of-education women, and French mothers who are enrolled have only a 14% lower second birth risk than the highly educated, not-enrolled women and an even higher risk, 24%, when compared to those with a medium level of education. For Bulgaria, where the enrolment variable construction benefited from more detailed information about all interruptions in people's educational careers, the findings shows a lower (by 42%) birth risk for women in education compared to those out of education (Koytcheva 2006: 208). But when the enrolment variable was constructed with assumptions similar to ours, the in education mothers were found to have only a 32% lower second birth risk than the out of education ones (Koytcheva 2006: 193).

Instead of wondering about the relatively high risk of birth for enrolled mothers we propose a deeper investigation of what it means in the Romanian context. Women having children and being enrolled, are considered to be either in a part-time or a distance learning type of enrollment, i.e. we mean a status of mothers who try to achieve their educational aspirations by attending high-school in the evenings and/or through correspondence, weekend, or distance learning tertiary education. All of these forms of alternative learning were available to a certain extent in socialist times, and, especially the latter, in the continuously developing educational environment of democratic Romania.

Even if for the socialist times we do not have to worry about anticipatory bias being introduced by the construction of our time-varying educational status covariate, we still have to be careful with the interpretation of the "in education" category, and be aware of the ambition of the socialist regime to provide working people with access to education, by organizing evening vocational and high schools for them. In such schools the rhythm of teaching was less demanding and the requirements relaxed, but the duration of study was longer than in usual full-time education. Young parents, forced by the need to leave day school early in order to support their families, still had the opportunity to continue their studies in evening high schools. Less possible, because of the very few

places available, was part-time attendance at university; however, it did exist in the form of correspondence studies.

During all the times under consideration, post-socialist and socialist, alternative forms of education, including higher education at weekends and through distance learning, have existed and proved very popular with working people and those who were already parents. Their studies last longer, but they usually combine them with work and childbearing.

For the above reasons, the “in education” category in this study has to be associated with part-time education, evening schools, and distance/correspondence higher education. To ensure that our results are compared with similar topics in the literature we propose to use the label “in educational improvement” rather than the label “in education” or “enrolled” as has been used in studies about first births in Germany (Hoem and Kreyenfeld 2007, Zabel 2007).

Indirect influence of education through first birth

Because a woman’s education level influences transition to a second birth, it has an important effect on postponing motherhood.

We have shown earlier that by introducing a factor for the effect of age at first birth (in Model 2) the effect of educational status decreases, but remains negative and statistically significant. This means that both the direct influence of level of education and the indirect influence of postponed motherhood have their own roles in the transition to a second birth. All the slopes of the log-hazard functions, between the nodes (ages at first birth 15, 22, 26, 30, and 40), are negative and statistically significant, meaning that the linear spline decreases continuously. The older a woman is at her first birth the lower her second birth risk.

The different social meaning of age at first birth for different social groups could be ignored if absolute age at first birth is used in a study that analyses the effect of education on childbearing. We therefore followed a suggestion by B. Hoem (1996) who pointed out the relevance of using age at birth relative to the level of education at birth. Having a first child after the age of 25 may have an entirely different social meaning for

university graduates than for women with compulsory education only. Therefore we used relative age instead of absolute age in a further model which was otherwise similar to Model 3. We partitioned women's ages at first birth into the following quartiles for each level of education, "youngest", "rather young", "rather old", and "oldest". We assume that a woman who has had her first child much later than other women with the same level of education will have the lowest risk of producing another child, whereas those who become mothers comparatively early are more family-prone and therefore more likely to have a second child. If controlling for relative age causes the direct effect of educational level to change or even disappear, then we conclude that a woman's educational level influences the age pattern of first birth, but is not important in determining whether the woman has the second birth. If the direct effect of education does not change, then we conclude that the social meaning of becoming a mother at an older age depends more on the average meaning in the population as a whole, than it does for the different levels of education of the women.

As we see in Table 2, there is a gradually decreasing relative risk of a second birth from the youngest group to the oldest. The older the woman is among her similarly educated colleagues, the lower her risk of a second birth. In contrast, if there is no change concerning the direct influence of educational attainment or educational enrolment, then the social meaning of becoming a mother is the same for all mothers regardless of their education, and educational attainment continues to play a significant role in reducing second birth risks.

Table 2.

Relative risks of second birth according to education status and relative age at first birth

	Relative risk	Sig.
Relative age at first birth		
youngest	1	
rather young	0.82	***
rather old	0.69	***
oldest	0.49	***
Educational status		
<i>Out of education</i>		
no qualification	1	
high school or vocational qualification	0.76	***
university degree	0.64	***
<i>In educational improvement</i>		
	0.65	***

Notes: a) Method: event-history model; dependent variable: transition to second birth measured from 9 months after first birth
 b) Covariates: educational status, relative age at first birth, calendar year as a duration spline

c) *** highly significant $p \leq 0.01$; ** significant $0.01 < p \leq 0.05$; * weakly significant $0.05 < p \leq 0.10$
Source: GGS 2005 Romania (author's estimations)

Effect of calendar year

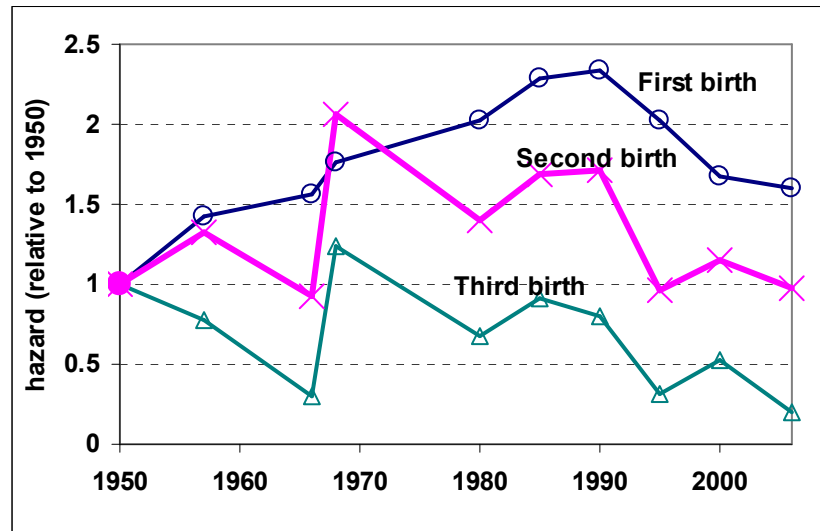
Before moving on to the effect of education by period, we investigate the effect of calendar year on second birth. As expected, the multiple changes in family policies that have taken place during the more than a half a century under study (1948-2005) strongly affected birth risks, regardless of the birth order (Figure 3).

A general assessment is that after the fall of the communist regime (end of 1989) all birth risks plummeted, and this decrease was more rapid for second and third births than first births. While the first birth risk continued to decrease until 2000, the second birth risk (and the third birth risk as well) stopped falling in 1995. Since then the frequency of having a second child is as high as it was at the middle of 20th century when the birth deficit was well known. The deficit started during the Second World War and lasted through the years of regime change in a country that was included in the list of war losers and was consequently obliged to pay for that loss, particularly in its human work force. The second birth risk started to recover after 1950 (first births as well, but not third births) until 1957 when, following the trend in soviet-block countries, abortion was legalized and made free-of-charge. During 1957-1966 second and third birth risks fall, and one-child families start to gain adherents. It seems that first manifestations of the “second demographic transition” when women start to limit their family size are as early as the late 1950s in terms of second births, and even earlier in term of third births².

² The Total Fertility Rate decreased sharply between 1957 and 1966, reaching less than two births per women in 1964.

Figure 3.

First, second, and third birth intensities. Duration splines by calendar year



Notes: a) Method: event-history models; dependent variables: transition to first birth measured from age 15, transition to second birth measured from 9 months after first birth, and transition to third birth measured from 9 months after second birth
 b) Covariates: educational status and calendar year. Models for second births and for third births additionally include age at previous birth as a regressor spline.
 c) Graph constructed on the basis of 3 separate models (one for each birth order)
 Source: GGS 2005 Romania (author's estimations)

The sudden interdiction of abortion at the end of 1966 catches pregnant women unprepared and forces them to give birth (the total number of births doubled in 1967). Between 1966 and 1968, as we can see from the figures, the birth rate increases, and not only for second birth risks, but for third births as well, underlining the established practice of reducing family size by aborting second and third pregnancies. The “golden age” of Ceausescu’s regime, with its declared demographic policies, lasted between 1967 and 1989. Emerging industry needed an increasing work force, which included women, and the Romanian family policy was set and developed in those years. Incentives and coercive measures together resulted in more births of any order, as compared to the periods before 1967 or after 1989. Moreover, the second birth risk was very sensitive to periodic re-enforcements of pro-natalist policies from 1974 and 1983 (see Mureşan 1996). The birth rate declines every time the corps-control weakens and it rises again when anti-illegal-abortion measures are strengthened. We can clearly see in Figure 3 the gradual decrease until 1967 of second birth risk and its upsurge in 1985-1989.

First birth risk development is much smoother than the more sensitive second and third birth risks. The general trend is to increase until 1990 and then to decrease after that time. Still the changes in family policies are remarkable, and our graph shows by the changes in slopes of the hazard function how first births were affected by changes in family policies. First signs of increasing childlessness are not before the 1990s. Third birth risk development over time is very similar to the development of the second birth risk, with the important difference that it never returns again to its pre-Second World War level. The highest risk of a third birth during the period under study is in 1967, when it by chance equaled the already low risk of the post-war period.

The second birth risk is the most sensitive to family policies. It has been affected dramatically by every change. After the Second World War it increases; after abortion legalization it decreases; after the abortion ban it shoots up; it decreases gradually during the relaxation of the corps control of the pro-natalist regime, but increases again when the measures are reinforced; when the abortion ban legislation is abolished second birth risk falls off; implementation of new family policies in late 1990's slightly increases the second birth risk, and it has leveled off since then.

Effect of education by period

In such a changing context we are interested in the roles of educational attainment and enrolment in different periods. In order to get such insights we employ an interaction of women's educational status with a categorical variable for the period, instead of considering separately the current educational status variable and the calendar year spline. The interaction effects of this model are shown in Table 3 and represented in Figure 4. The baseline is fixed to the women with a low level of education during 1985-1989, whose risk of second birth is therefore 1, the highest risk over all educational groups in any period.

There are two ways of reading the table, and interpreting the figure. First, one can compare the relative risks along rows, and then pay attention to the columns. Alternatively, one fixes the educational level in order to investigate the differences within the period for the various educational categories. Second, one can read the table column-

wise, and then observe the differences between points on the verticals. One then compares the effect of education by period.

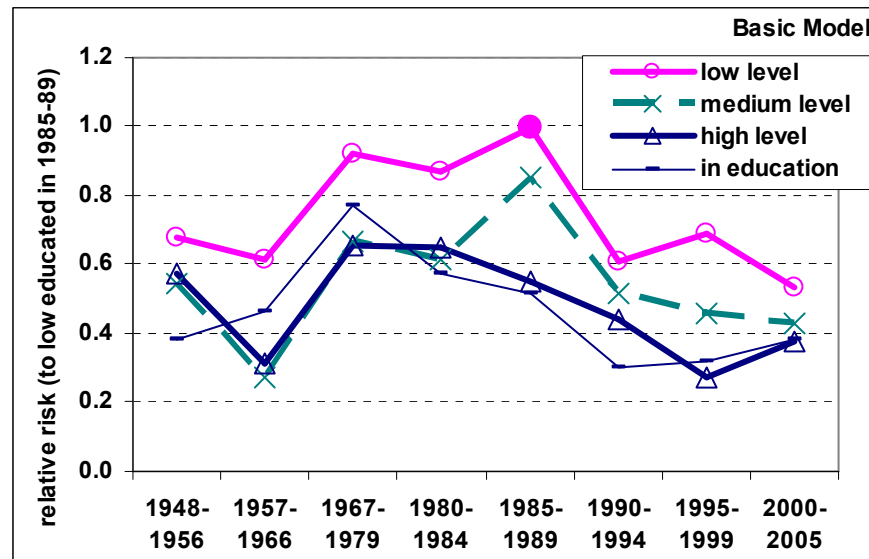
Table 3.
Interaction between education and period. "Basic Model"

	1948	1957	1967	1980	1985	1990	1995	2000
	-	-	-	-	-	-	-	-
	1956	1966	1979	1984	1989	1994	1999	2005
Educational status								
<i>Out of education</i>								
no qualification	0.68	0.61	0.92	0.87	1	0.61	0.69	0.53
high school or vocational qualification	0.54	0.27	0.67	0.61	0.85	0.52	0.46	0.43
university degree	0.58	0.32	0.65	0.65	0.55	0.44	0.27	0.38
<i>In educational improvement</i>								
	0.38	0.46	0.77	0.57	0.52	0.30	0.32	0.38

Notes: a) Method: event-history model; dependent variable: transition to second birth measured from 9 months after first birth
b) Covariates: interaction between educational status and period, and age at first birth as a regressor spline

Source: GGS 2005 Romania (author's estimations)

Figure 4.
Second birth relative risks, by education and period. "Basic Model"



Notes: a) Method: event-history model; dependent variable: transition to second birth measured from 9 months after first birth
b) Covariates: interaction between educational status and period, and age at first birth as a regressor spline

Source: GGS 2005 Romania (author's estimations)

Each line shape has its own specificity, meaning that women with different educational attainments and educational enrolments reacted in their own ways to major changes over time in family policies and/or in educational systems.

University degree holders have in general smoother changes in their second birth risk than other holders of qualification or those with no qualification. Their birth risk decreased continuously in the last two decades of the twentieth century, without a peak in the late 1980s, such as occurred for the women with a low or a medium level of education. The most probable explanation is that they have learnt, since 1967, how to control their reproductive behavior without relying on abortion, in contrast to their lower educated counterparts who have been more affected by the up and down corps control during the pro-natalist period and by the abolition of the abortion ban in 1990.

Women with a low level of education were less affected in the late 1950s and the early 1960s by the first legalization on abortion (in 1957), proving that the leading abortion users at that time were the more educated women. The birth risk decreases between 1957 and 1966 by 45% for women with a high level of education, by 50% for those with a medium level of education, but by only 10% for those in "low level of education" category. In contrast, in 1990 when abortion became again legal and free of charge the women with a low level of education rely heavily on it, reducing by 40% their second birth risk. From 1995, the second order birth risk stops decreasing among women with no qualification, and levels off after than. The developing family policies seem to fit quite well with the expectations of women with a low level of education.

The women with a medium level of education in the early 1990s, when abortion was again available, are more like the those with a low level of education regarding the dramatic nature of the second birth risk decrease (by 39%). This is very different from the situation during the period when abortion was legalized for the first time (in the late 1950s) when they behaved more like the highly educated. Since the mid 1990s high school and vocational qualification holders seem to have profited from the updated family policies, slowing the reduction of their second birth risk which, up to 2005, remained as high as it was in the 10 previous years. However the risk is about 15%-30% less than that for women with no qualification.

For mothers in educational improvement, their second birth risk is more or less similar with that of the university degree holders. Depending on the period, those who combine motherhood with education have either slightly higher or slightly lower second

birth risks than women with a university degree, but the general trend is the same. During the 1950s, 1960s, and 1970s, combining education and motherhood was slightly more compatible with a second birth than for holders of some academic qualification or a university degree. We can explain this by the efforts of the communist government, newly installed in power at the end of the 1950s, to give working people access to education, especially those coming from the “working classes”, workmen and peasants. Large numbers of these people were enrolled in evening vocational education classes. By the 1980s, the situation has gradually changed. Those in educational improvement tend to be undergraduate students who have to be working people as well. They could have been enrolled in part-time, correspondence studies. Their second birth risk decreases and, during the early 1990s, it becomes significantly lower than the risk of the university degree holders. In the late 1990s, the increasing demand for the new professions and skills of the market economy push many mothers to enroll in distance-learning university education, and we can see (Figure 4) their second birth risk has stabilized since then, being at the same level as for higher educated women. Higher education, as well as educational improvement during motherhood seems to be a good predictor of low second birth risk.

If we now look at Table 3 column-wise and Figure 4 by vertical lines, we can see how second birth risk is affected by educational attainment in each period. A general assessment remains constant over time. More precisely, women with a low level of education always have a higher second birth risk than those with a high level of education ones. The difference between the two varies. The women with a medium level of education behave sometimes more like those with a low level of education, some times more like those with a high level of education, or they can lie in between.

Let us see where the differences between women with a high level of education and those with a low level of education are larger or smaller as compared to the general 35% found previously in Model 3. We find the largest difference occurs during the last years of the socialist period, when women with university degrees have a 45% lower second birth risk as compared to women with no qualification, and not during the post-socialist times as might be expected. The late 1980s was the worst period for intellectuals who were discriminated against in favor of the less educated people who sometimes had

better salaries and easier access to “rationed” food, and who cared less about different kinds of freedom. However, the negative educational gradient, firstly observed in the late 1980s, consolidates during market economy times. The smallest differences are during the years close to the Second World War (15%) and during the first years after the fall of the communist regime (28%), proving that times with widespread social disturbances affect all kind of people equally, including in terms of second births. A similar small difference (28%) can also be observed during the last period of 2000-2005, but we refrain from any assessment for this period because we think that our results are strongly biased by the construction of our educational status variable which becomes strongly anticipatory and no longer suitable for times when there is a general return to the educational system after years of interruption.

As concerns second birth risk of the mothers with a medium level of education we find a perfect similarity with that of those with a high level of education until the mid 1980s, and an in-between position after then, i.e. lower risk than for mothers with a low level of education, but a higher risk than for those with a high level of education. The progressive modernization of the educational system, despite its weaknesses, left behind the older ideological propaganda and equalization character of education, introducing competition and merit criteria instead of political criteria for rewarding talent and work. This quiet and progressive change has been reflected in changed attitudes and birth control ability differences between people with various educational attainments, and we may think that it is manifest in the choice for a second birth (after 1980).

Other determinants of childbearing

We have seen that until now, education has a significant negative effect on second birth risk regardless of the period under study. But childbearing is strongly influenced by marital status, an important proximate demographic determinant for any birth order risk, in all societies and at all times. We wondered if, by introducing marital status in our analysis, the effect of education disappears or not, or to what extent it is weakened. Our “Enhanced Model” includes marital status as a time-varying. It includes other social background covariates, like character of place where respondent grew up until age 15, and number of siblings (both time-constant variables), as well.

We assume that marriage and having children are strongly connected in a society in which marriage is valued, as it is in Romanian society. The large majority of second order children, 91% in our sample, were born in a first marriage, but increasingly more are born in first cohabitations or in second unions, so we are interested in evaluating the risks for these smaller groups of women as well.

Social background determinants can influence childbearing as well. Women who grew up in more traditional, family-oriented contexts, as rural regions are, are expected to have a higher risk of second births than those from urban areas. In Romania in 2005 about half the population was still living in rural areas (even if they were older than the urban population, and thus there are proportionally less women in their reproductive periods), so that knowing about childbearing differentiation is important in any studies. The number of siblings is another proxy for the social context in which a woman grew up. Those who have more siblings are socialized differently, they are accustomed to large families with many relatives, and they are expected to have more children when they form their own families.

Table 4.

Relative risks of second birth by marital status and social background. “Enhanced Model”

	Relative risk	Sig.
Marital status		
Lone mother	0.70	***
Separated mother	0.24	***
In a first marriage	1	
In a first cohabitation	0.97	
In a repeated union	1.57	***
Character of place where respondent grew up		
Rural	1	
Urban	0.85	***
Number of siblings		
No siblings	1	
One or more	1.49	***

Notes: a) Method: event-history model; dependent variable: transition to second birth measured from 9 months after first birth
 b) Covariates: interaction between educational status and period, age at first birth as a regressor spline, marital status, residency area, and number of siblings
 c) *** highly significant $p \leq 0.01$; ** significant $0.01 < p \leq 0.05$; * weakly significant $0.05 < p \leq 0.10$

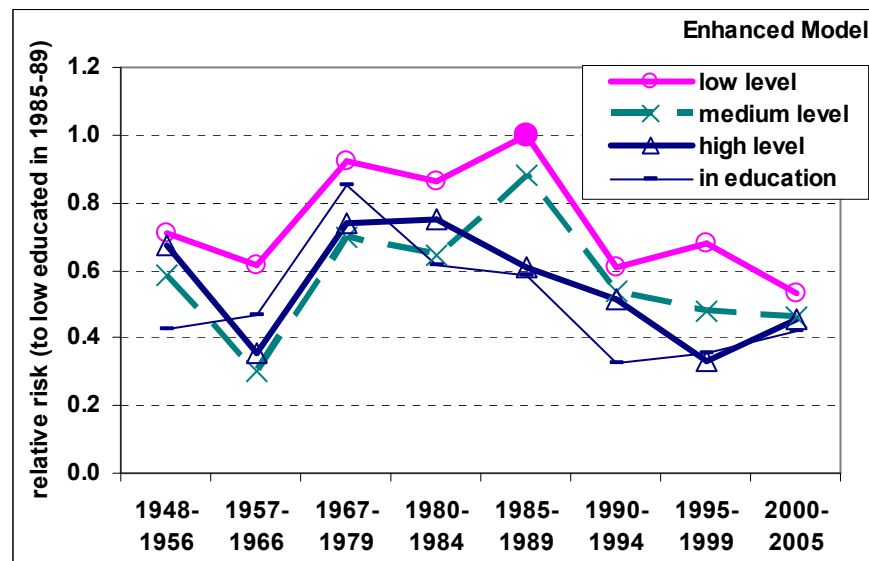
Source: GGS 2005 Romania (author’s estimations)

Our expectations were only partially confirmed. Table 4 shows the results. The risk of having a second child is not greater in a first marriage than it is in a first

cohabitation, not if other covariates are controlled for. However we have to be aware that it does not mean that there are as many births in the context of a first cohabitation as there are in a first marriage, since cohabitation is much less prevalent. Instead, a second birth to a single mother is lower by 30% for women in a first marriage, and it is much less risky (by 76%) for a separated mother not yet in another union. The higher risk (157%) for an additional child for women in a repeated union compared to women in a first marriage shows how important it becomes for a re-partnered women to have a second child. The influence of social background characteristics operate in the more expected way. Women who grew up in rural areas have a 15% higher second birth risk, and those who have siblings have a 49% higher chance of having their own larger families.

Figure 5.

Second birth relative risks, by education and period. “Enhanced Model”



Notes: a) Method: event-history model; dependent variable: transition to second birth measured from 9 months after first birth
 b) Covariates: interaction between educational status and period, age at first birth as a regressor spline, marital status, residency area, and number of siblings
 Source: GGS 2005 Romania (author’s estimations)

Another interesting result, found by adding supplementary covariates to our “Basic Model”, which is concerned only with the direct and indirect effect of education and period, is that adding marital status does not change the effect of education on second birth risk. However, by introducing the social-background covariates, our “Enhanced Model”, the effect of education weakens inside every period (Figure 5). There is less variation, and sometimes the highly educated seem to have higher second birth risks than

those with a medium level of education (especially in the period 1980-1984). However, the strong effect of period does not change. Every group of women with similar educational attainments and educational enrolments have the same trajectory of risks over time as found by the “Basic Model”.

Effect of selectivity

Our last finding involving the effect of unobserved heterogeneity which, if not controlled, could bias our results, is very interesting. Living in rural areas during childhood and having sisters and brothers can contribute to the development of such a personal characteristic as being more “childbearing-prone” in these cases. If such an unobserved characteristic plays a main role in second births, as has been proved in some European societies like Norway (Kravdal 2001) or West Germany (Kreyenfeld 2002) for college educated women, then the role of education could vanish altogether. In contrast, in Bulgaria, unobserved heterogeneity does not play a similar role: Using both the 2001 Census data and the 2002 Social Capital Survey data, Koytcheva (2006, p. 227) does not find any significant differences between higher and secondary educated women, and the identified higher second birth risk of women with a low level of education increases when an unobserved individual characteristic is included in a Joint Model of transitions to first and to second births.

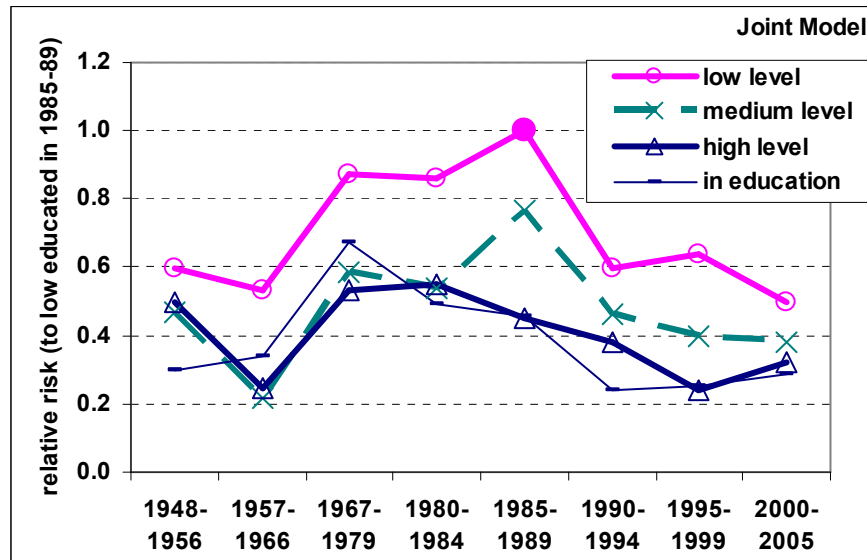
Our “Joint Model” beside the equation for transition from first to second births, includes two other equations, one for the transition to motherhood and one for transition to third births. We do so because first births in relationships are almost universal in Romania, or at least they were until very recently, therefore we need more repeated events in order to have confidence that the unobserved heterogeneity factor (ε_i) catches the “childbearing-oriented” individual characteristic.

The changes in the effect of level of education on birth risk are in the direction expected, as Figure 6 shows for the second births and Table 4 shows for first and third births. Far from vanishing, the differences between women with no academic qualification and those with university degree as a consequence of higher educational attainment become an even stronger predictor of lower births risks, as soon a term for

unobserved heterogeneity is introduced. Now, the largest difference over time³ is as large as 63% (it was 61% according to the “Basic Model” and diminished to 51% according to the “Enhanced Model”), but all other differences are accentuated. For example, during the period following the fall of communism, 1990-1994, it is 36% while the “Enhanced Model” found only a 16% difference. If, in Romania, there were no differences between women with a medium and a high level of education until the mid 1980s, as was the case in Bulgarian at about the same time (Koytcheva 2006), the differences appeared before the political regime changed, and they have held since then during the transition to a market economy and more democratic times. Those with no qualification have consistently had higher second birth risks than all the other women with an academic qualification or degree.

Figure 6.

Second birth relative risks, by education and period. “Joint Model”



- Notes:
- a) Method: event-history model; dependent variables: transition to first birth measured from age 15, transition to second birth measured from 9 months after first birth, and transition to third birth measured from 9 months after second birth
 - b) Covariates: for first birth: educational status, calendar year; for second birth: interaction between educational status and period, age at first birth, marital status, residency area, number of siblings; for third birth: educational status, age at second birth, calendar year
 - c) All three models include a common jointly-estimated term of unobserved heterogeneity
- Source: GGS 2005 Romania (author’s estimations)

The effect of selectivity in western countries has also been shown to be important in analyzing second birth risk (Kreyenfeld 2002). But the results contrast with our results.

³ During 1995-1999

In Austria (Hoem et al. 2001), in Great Britain (Kreyenfeld and Zabel 2005), in France (Köppen 2006), in Norway (Kravdal 2001), in Sweden (Hoem 1996, Hoem and Hoem 1989, Oláh 2003), and in West Germany (Kreyenfeld 2002, Kreyenfeld and Zabel 2005, Köppen 2006), the second birth risk was found to be higher among highly educated women. Controlling for personality characteristics, the positive effect of education on second births usually disappears. In Romania the negative effect of education correspondingly becomes stronger. The explanation is similar. Highly educated women stay in education longer, have births later in life, and thus their fertility affects the later general birth risk than does the fertility of lower educated women. When one does not control for unobserved heterogeneity the results are biased, and they better reflect the behavior of those who become mothers early, i.e. the women with a low level of education and/or the more childbearing-prone ones. In western countries highly educated women have, in fact, similar second birth risks to those with a low level of education, but those who are more childbearing-prone have their second births sooner thus biasing the true effect of education. In Romania the university educated women have a lower risk of second births, but among them those who are more family-oriented have their second birth sooner, and this biases the true extent of the negative effect of education on second births.

As for second births, after controlling for the unobserved heterogeneity factor, the effect of education on first and third births appears accentuated, as one can see from Table 5. First birth risk is lower by 33% for women with high school or vocational qualifications, and by 49% for women with a university degree, compared to those with at most compulsory schooling. Moreover, it seems that third birth risk concerns mostly women with a low level of education since the risk is 69% higher than for women with a medium level of education and 82% higher than for an university degree holders.

Table 5.
Relative risks of first and third birth, by educational status.” Separate and Joint Models”

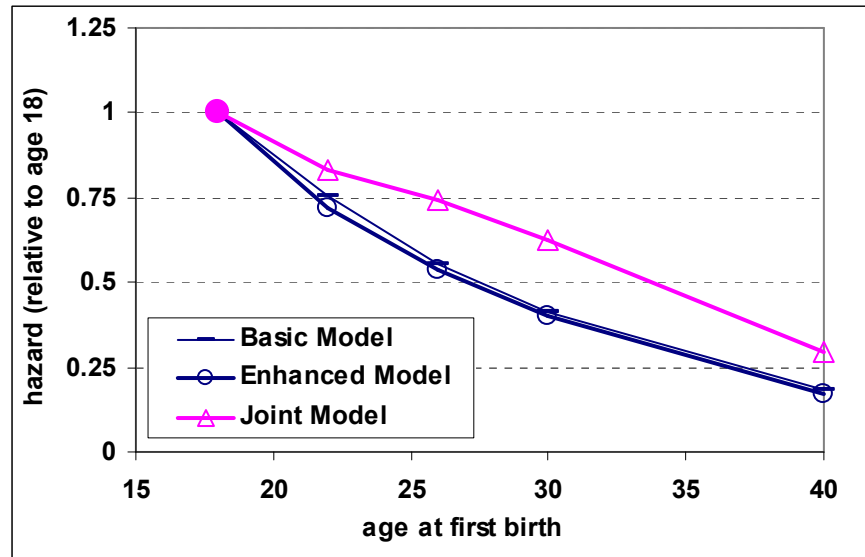
	Separate Model	Joint Model
Educational status		
First birth		
<i>Out of education</i>		
no qualification	1	1
high school or vocational qualification	0.75 ***	0.66 ***
university degree	0.68 ***	0.51 ***
<i>In educational improvement</i>	0.28 ***	0.23 ***
Third birth		
<i>Out of education</i>		
no qualification	1	1
high school or vocational qualification	0.38 ***	0.31 ***
university degree	0.24 ***	0.18 ***
<i>In educational improvement</i>	0.50 ***	0.37 ***

Notes: a) Method: event-history model; dependent variables: transition to first birth measured from age 15, transition to second birth measured from 9 months after first birth, and transition to third birth measured from 9 months after second birth
 b) Covariates: for first birth: educational status, calendar year; for second birth: interaction between educational status and period, age at first birth, marital status, residency area, number of siblings; for third birth: educational status, age at second birth, calendar year
 c) The Joint Model differs from the Separate Model only by an additional term for unobserved heterogeneity

Source: GGS 2005 Romania (author’s estimations)

The standard deviation of the unobserved heterogeneity term from the “Joint Model” is equal to 0.58 and is significantly different from zero. A “normal”, woman, neither very childbearing-oriented nor against-childbearing, has a second birth risk according to her educational level as described above (Joint Model). The same model shows us, by the changed slopes of the regressor spline, illustrated in Figure 7, that age at first birth is not, in fact, so important in lowering the second birth risk, but the results have been biased by the “childbearing-oriented” women who enter motherhood at a low age. The bias arises from their large number in the sample and they seriously affect the results when one does not control for heterogeneity.

Figure 7.
Second birth intensity, regressor spline by age at first birth



The personal characteristics of the more “childbearing-oriented” women are an important factor in childbearing, and omitting the heterogeneity term in such an analysis leads to unwanted consequences, namely misleading results. Had we not controlled for it, we would not have seen the true importance of educational level in second birth risk, and we would not have realized how much a low level of education is associated with “childbearing-proneness”, while career oriented persons have to choose between education and more children. Having an educational improvement status is relatively compatible with work and family, up to the point that university attainment allows the combination of work with a larger family, which is not so easy.

Conclusions

The lower intensity of second births for women with high levels of education appears to be a true result and is not due to misspecification, at least not in the domain covered by the covariates at our disposal. If this were not so, the effect would disappear or be reversed when other covariates are added, but this does not prove to be the case. The higher *opportunity cost* hypothesis of higher educated women from the “home-economics-theory”, and not the higher income hypothesis, seems to apply in Romania. However, the differentials between the fertility of women with different education levels

do not show the same trends over different periods in Romanian history. Convergence is observed in periods of important political regime changes, but divergence is the trend during more stable periods. Family policies concerning abortion regulation have a strong influence on the fertility of women with a low or a medium level of education, but they have less influence on the fertility of women with university degrees (with the only exception of the sudden abortion ban in 1967 which found every category of women, regardless educational attainment, unprepared). The progressive remission of ideology and the development of a merit-based educational system introduced differences between the fertility of women with high school or vocational degrees and those with university degrees, for the first time in late 1980s, just a few years before the great revolt of intellectuals in December 1989 which paved the way for a more democratic society.

Our findings also document the institutional effect of education. Being “in educational improvement” significantly lowers the risk of a second birth if one compares those enrolled with the women with no qualification. However the risk is not lower when one compares those “in educational improvement” with the highly educated ones: Regardless of the period under observation, university degree holders and women in educational improvement have more or less similar risks of second births. Combining education with motherhood does not seem to be more “costly” than the opportunity cost paid by mothers with university degrees who decide on a second child.

The strong negative effect of the age at first birth, found if one does not control for a personality dimension when modeling the second birth, weakens once we control for unobserved heterogeneity. More family-prone, highly educated women self-select from among those who start their childbearing-career earlier, as do those with no academic qualification, having a second birth sooner, and their birth risk biases the true impact of education on second order fertility (when one neglects the role of self-selectivity). Women with university degrees try to catch up on the time out of motherhood that they spent in education, by having at least one birth before their 30s, but more often than not they limit their offspring to a single child, sufficient for personal fulfillment and meeting the “requirement” in a society where childbearing is universal.

References

- Agabrian M. (2007). "Relationships between School and Family: The Adolescents' Perspective." *Forum: Qualitative Social Research* [On-line Journal] 8(1), Art. 20. Available at: <http://www.qualitativeresearch.net/fqs-texte/1-07/07-1-20>.
- Becker G. (1991). *A Treatise on the Family*. Cambridge: Harvard University Press.
- Beets G, Dourleijn E, Liefbroer A, Henkens K. (2001). *De timing van het eerste kind in Nederland en Europa*. Rapport No. 59. Den Haag: NIDI.
- Blossfeld H, Huinick J. (1991). "Human Capital Investments or Norms of Role Transition? How Women's Schooling Careers Affect the Process of Family Formation." *American Journal of Sociology*, 97: 143-168.
- Ghețău V, Arghișan L. (2006). "Behind the Surprising Stability of Romanian Fertility." *Entre Nous*, 63: 24-26.
- Hoem B. (1996). "The Social Meaning of the Age at Second Birth for Third-Birth Fertility: A Methodological Note on the Need to Sometimes Re-specify an Intermediate Variable." *Yearbook of Population Research in Finland*, 33: 333-339.
- Hoem B, Hoem JM. (1989). "The Impact of Women's Employment on Second and Third Births in Modern Sweden." *Population Studies*, 43: 47-67.
- Hoem JM. (1986). "The Impact of Education on Modern Family-Union Initiation." *European Journal of Population*, 2: 113-133.
- Hoem JM, Prskawetz A, Neyer G. (2001). "Autonomy or Conservative Adjustment? The Effect of Public Policies and Educational Attainment on Third Births in Austria." *Population Studies*, 55: 249-261.
- Hoem JM, Kreyenfeld M. (2006). "Anticipatory Analysis and its Alternatives in Life-Course Research. Part 1: The Role of Education in the Study of First Childbearing." *Demographic Research*, 15, 16: 461-484.

- Kantorova V. (2004). "Education and Entry into Motherhood: The Czech Republic during State Socialism and the Transition Period (1970-1997)." *Demographic Research*, Special Collection 3, 10: 245-270.
- Köppen K. (2006). "Second Births in Western Germany and France." *Demographic Research*, 14, 14: 295-330.
- Koytcheva E. (2006). Social-Demographic Differences of Fertility and Union Formation in Bulgaria Before and After the Start of Societal Transition. Doctoral dissertation. University of Rostock, Germany.
- Kravdal O. (2001). "The High Fertility of College Educated Women in Norway: An Artifact of Separate Modeling of Each Parity Transition." *Demographic Research*, 5, 6: 185-215.
- Kravdal O. (2004). "An Illustration of the Problems Caused by Incomplete Education Histories in Fertility Analyses." *Demographic Research*, Special Collection 3, 6: 135-154.
- Kreyenfeld M. (2002). "Time-Squeeze, Partner Effect or Self-Selection? An Investigation into the Positive Effect of Women's Education on Second Birth Risks in West Germany." *Demographic Research*, 7, 2: 15-47.
- Kreyenfeld M, Zabel C. (2005). "Female Education and the Second Child: Great Britain and Western Germany Compared." *Zeitschrift für Wirtschafts und Sozialwissenschaften/Schmollers Jahrbuch*, 125: 145-156.
- Liefbroer AC, Corijn M. (1999). „Who, What, Wher, and When? Specifying the Impact of Educational Attainment and Labour Force Participation on Family Formation.“ *European Journal of Population*, 15: 45-75.
- Lillard L, Panis C. (2003). aML Multilevel Multiprocess Statistical Software, Version 2.0. EconWare, Los Angeles, California.
- Ministry of Education and Research [Romania] (2001). The Romanian Education System. The National Report. Bucharest. Available at www.ibe.unesco.org/International/ICE/natrap/Romania.pdf [Date of access: June 06, 2007].

- Miroiu A, Pasti V, Codiță C, Ivan G, Miroiu M, editors. (1998). *Învățământul românesc azi* (Romanian Education Today). Iași: Polirom.
- Mureșan C. (1996). « L'évolution Démographique en Roumanie: Tendances Passées (1948-1994) et Perspectives d'Avenir (1995-2030). » *Population*, 4-5: 813-845.
- Mureșan C, Hărăguș PT, Hărăguș M, Schroder C. (2007). Romania: Childbearing Metamorphosis within a Changing Context. In: T. Frejka, editor. *Childbearing Trends and Policies*, forthcoming.
- Mureșan C. (2007). "Family Dynamics in Pre- and Post-Transition Romania: a Life-Table Description." *MPIDR working paper*, WP-2007-018.
- NIS (National Institute of Statistics) [Romania] (1994). *Recensământul populației și locuințelor din 7 ianuarie 1992*. Bucharest.
- NIS (National Institute of Statistics) [Romania] (2003). *Recensământul populației și locuințelor din 18 martie 2002*. Bucharest.
- Oláh L. (2003). "Gendering Fertility: Second Births in Sweden and Hungary." *Population Research and Policy Review*, 22, 2: 171-200.
- Sobotka T. (2004). *"Postponement of Childbearing and Low Fertility in Europe."* *Population Studies*. Amsterdam: Dutch University Press.
- Stoica L. (2006). *Politica educațională ca sursă a dezvoltării sociale. România în context european.*(Educational Policies as Source of Social Development. Romania in European Context.) In: Zamfir C, Stoica L, editors. *O nouă provocare: dezvoltarea socială*. Iași: Polirom: 240-250.
- Zabel C. (2007). *Do Imputed Educational Histories Provide Satisfactory Results in Fertility Analysis in the West German Context?* *MPIDR Working Paper*, WP-2007-022.
- Zamfir C. (2000). *Politica socială în România în tranziție.*(Social Policies in Romania in Transition) In: Zamfir E, Bădescu I, Zamfir C, editors. *Starea societății românești după 10 ani de tranziție*. Bucharest: Expert.