TWO COMMON TRENDS, TWO DISTINCT TRENDSETTERS: FERTILITY AND NUPTIALITY POSTPONEMENT AND NON-MARITAL CHILDBEARING IN THE CZECH REPUBLIC

PAPER for IUSSP 2009 Conference
15 August 2009

Kryštof Zeman

Vienna Institute of Demography
Austrian Academy of Sciences

krystof.zeman@oeaw.ac.at
http://krystoff.sweb.cz/zeman/

1. Introduction

Since the beginning of the 1990s the fertility and nuptiality behaviour of Czech women has changed substantially. Both the sharp decline in fertility and nuptiality levels and the postponement of childbearing until higher ages have been extensively analysed by a number of authors. Proposed explanations for such changes range from economic constraints (Stloukal 1997, Rychtaříková 2000, 2006) to the change in values and attitudes of individuals and the notion of second demographic transition (Kučera 1997, Rabušic 2001, Sobotka et al. 2003, Philipov and Dorbritz 2003). A deeper examination of individual behaviours reveals that women of different socio-economic status reacted differently with respect to their fertility and nuptiality behaviours. Since educational attainment is an important determinant of socio-economic status and since data about this determinant are readily available (Rychtaříková 2004, Hamplová and Řeháková 2006), we pose the question: What is the role of women's education in the change in level, timing and sequencing of first childbirths and first marriage[1] since the 1990s, and how is it related to the educational transition in the Czech Republic? Our analysis employs the techniques of fertility and nuptiality life tables, constructing tables for 1991, 2001, and 2005 (fertility) resp. 2007 (nuptiality).

2. Theory – The impact of educational attainment on family formation

The negative relationship between women's education and family formation is one of the most consistently reported findings in the literature (e.g. Blossfeld and Huinink 1991, Hoem 1986, Kravdal 2004, Kreyenfeld 2000, Liefbroer and Corijn 1999, Marini 1984, Rindfuss et al. 1980). The relationship between educational enrolment and attainment on

[1] This paper is dealing with first childbirth and first marriage, even if the first order is not always explicitly stated.

one side and entering into marriage and parenthood on the other is dependent on several conditions: in particular, it depends on the level of incompatibility of education, work and family and on the division of gender roles in society. Liefbroer and Corijn (1999) recognise two dimensions of incompatibility of education and labour and family formation: the cultural dimension is related to values and norms concerning the role of women in society, and the structural dimension refers to actual social opportunities and constraints on the roles of women. In societies with a higher incompatibility of the women's roles, the negative effect of education on family formation is expected to be stronger.

There are several reasons why women with higher education postpone childbearing to later ages. First, because schooling is generally incompatible with childbearing in most societies, there is the direct effect of educational enrolment, which is longer for those in higher education (Blossfeld and Huinink 1991). In fact, this effect intensified recently as more women entered higher education and the enrolment period for distinct levels of education lengthened (Morgan and Rindfuss 1999). Second, after finishing schooling women with higher education tend to get better jobs, which means that the opportunity costs to them of having children become higher (Gustafsson 2001) and there is a fear that early withdrawal from the labour market could result in "status loss" (Kreyenfeld 2000). This effect tends to diminish or disappear at older ages, suggesting that women with higher education postpone family formation rather then reduce it (Liefbroer and Corijn 1999, Blossfeld and Jaeninchen 1992).

Concerning the direction of causality between educational level and timing of birth, the reciprocal relationship was found to be dominated by the effect from education to age at first birth (Rindfuss et al. 1980). However, there is still the indirect effect of withdrawing from the educational career due to unwanted/unplanned pregnancy at young ages (Marini 1984). As pointed out by Morgan and Rindfuss (1999), "the younger the mother at the time of the birth, the more likely the birth will be nonmarital".

The close link between marriage and first birth has weakened in recent decades due to the increasing control over own reproduction through contraception and due to the spread of informal types of partnerships. The impact of educational attainment on family formation has recently become much stronger with regard to parenthood than with regard to marriage (Liefbroer and Corijn 1999), since the responsibilities of marriage interfere to a lesser extent with educational enrolment than those of motherhood (Marini 1984). However, higher educated women tend to postpone marriage until later ages (Hoem 1986), and an early marriage can also induce a woman to drop out of education (Billari and Philipov 2003).

According to Oppenheimer (2003), the spouses with less attractive matches (in economic terms) postpone the marriage in favour of staying in unwed partnerships. Since

poorly educated women tend to have relationships with poorly educated men (Srb 2006), these matches are less favourable and have a lower propensity to end in marriage; a larger proportion tends to live long-term in cohabitation that is more prone to dissolve (Zeman 2003).

3. Czech Republic – Background

After the collapse of the communist regime in 1989, the Czech Republic has been passing through an intense economic and societal transition. The fast development triggered profound changes in demographic behaviour of the 1990s. Czech society has been facing a rapid transformation of fertility and nuptiality behaviours accompanied by the weakening of the coupling of the two processes, a spread of cohabitation, an increase in non-marital childbearing, a decrease in the proportion of "shotgun" marriages, the substitution of abortion by modern contraception, and persistently high divorce rates (CZSO 2008, Zeman 2007). The most noticeable demographic trends were the pronounced fertility postponement accompanied by dramatic drop in fertility levels (Table 1), the deep decline in marriage rates (Table 2) and resulting increase in the proportion of single women and non-marital childbirths.

After year 2000 much of the demographic trends continued, however in slower pace. Drop in marriage levels relaxed at low levels of slightly above 70% of women entering marriage before age 50. Slower postponement of fertility has been accompanied by moderate recuperation of fertility at ages above 30, resulting in increase of total first birth fertility rate from the minimum of 0.52 in 1996 to 0.73 in 2008. The proportion of non-marital first births further increased to 44% in 2007.

Table 1: Fertility indicators in the Czech Republic - FIRST BIRTHS

FIRST BIRTHS	1991	2001	2007
Number of live births	64,762	43,337	54,050
Total fertility rate	0.91	0.54	0.69
Mean age of mothers	22.4	25.3	27.1
Proportion of non-marital births	12%	29%	44%

Table 2: Nuptiality indicators in the Czech Republic - FIRST MARRIAGES OF WOMEN

FIRST MARRIAGES OF WOMEN	1991	2001	2007
Number of first marriages	55,748	39,218	42,032
Total female first marriage rate (per 100)	92.1	73.3	71.1
Mean age at marriage	22.2	26.8	28.4
Proportion single at age 30	7%	14%	32%

Proportion of women staying single until their thirties have doubled between 1991 and 2001, and again doubled during next six years, reaching almost one third. Among men, the share already overpassed one half. Mean age at marriage, once bonded with the mean age of first birth, increased by higher margin, signalling the decoupling of the two events of marriage and birth of a first child.

3.1. Educational expansion

Since the system change in 1989, the perception of the importance of education has increased substantially. The economic transformation has generated the need for a highly educated workforce and the investment into education became economically advantageous because of the reduction of the risk of unemployment and increasing income stratification. Broader opportunities for higher education have led to the extension of the period spent by young people in education, but the education at certain levels also lengthened. Female participation in higher education rose faster than that of males, leading to the levelling off of the proportions of males and females in university education (CZSO 2009a). The overall increase in the education of the female population is mirrored by the changing distribution of live births by education of mother, and distribution of women by highest attained education[2].

Table 3: Proportion of 1st live births by education of mother

FIRST BIRTHS	Primary	Low. Sec.	Up. Sec.	University	Total (N)
1991	11%	41%	40%	8%	64,762
2001	11%	34%	44%	12%	43,337
2007	9%	25%	47%	18%	54,050

Table 4: Proportion of women at age 25-34 by finished level of education

Women at age 25-34	Primary	Low. Sec.	Up. Sec.	University	Total (N)
1991	14%	36%	39%	11%	658,368
2001	9%	37%	43%	11%	777,849
2007	7%	32%	44%	17%	840,552

Tables 3 and 4 show not only the speed of educational expansion in the Czech Republic, but also the fast drop in the proportion of primary educated women, who are becoming increasingly selective group, either in social, economic, or ethnic terms. According to the data from 2008 the female unemployment rate of 5.6%[3] was distributed extremely uneven through educational categories: among primary educated 18.4% of the workforce were looking for a job, among the two categories of secondary education it was 6.7% and 3.5% resp., and among university educated only 1.8% were unemployed (CZSO 2009b).

The wage level of university-educated employees rose from 134% of the average wage in 1988 to 165% in 1996 (Večerník 1999: 119) and to 173% in 2008 (CZSO 2009c). Among women the differences are slighly lower than among men, but still the median earnings of primary educated women are by 17% lower than total female median, while for university educated it is by 47% higher. In total, women earn by 20% less than men (ibid.).

[2] We use four levels of finished education measured at the time of event (birth, marriage): primary education, lower secondary education; upper secondary education with the "maturita" qualification and university education. We sometimes refer to the first two educational groups as "lower educated" and to the two latter as "higher educated". See Chapter 4 for details.

[3] The gender unemployment gap is depicted by the total unemployment rate of 3.5% for males compared to 5.6% for females.

3.2. Compatibility of work and childrearing – family environment and family policy

In the Czech society, the relics of socialist establishment interfere with the outcomes of fast market change accompanied by a broad change in values and attitudes of a post-modern world. Female labour force participation, almost universal before 1990, has declined only slightly, to 49% of all women older than 15 years in 2008, with another 4% on parental leave and 4% being house-wives (CZSO 2009b). As opposed to the situation in Western Europe, only small (but increasing) proportion of employed women work part-time – 9% of women worked part-time in 2005 and 15% in 2008 (ibid.). The lack of opportunities for part-time employment constitutes a constraint for women who want to combine work and childcare.

There was a high level of institutionalised childcare during the socialist period, making it easier for women to combine childbearing (which occurred often at very young ages) with work. After 1990, the supply of nurseries for children younger than 3 years of age almost collapsed. In 2008 there were only 46 state-run nurseries, serving a total of 1,400 children (ÚZIS 2009), whereas kindergartens are still widely available and used by about 90% of children aged 3-5 years (CZSO 2009a).

On the other hand, the current social system is fairly generous and encourages mothers with young children to stay at home, contributing to the educational differences with regard to family formation: lower educated women with worse career prospects and lower wages tend to stay home with children, while better educated women postpone or forego childbearing on behalf of their professional careers. Higher educated women also tend to return to work from parental leave earlier than the lower educated (Kuchařová et al. 2006).

An unwanted or unplanned pregnancy, especially at a young age, can also seriously reduce and reschedule both the educational career and family formation processes. In the past 15 years, the spread of modern contraception and the improvement of sexual education contributed to a drop in teenage pregnancies and abortions, which were used during socialism as "contraception *ex post*". While in 1991, 18% of first births was born to teen-age mothers, in 2007 it was only 5% and the fertility rate among them dropped by three quarters[4]. However, the phenomenon of unwanted pregnancy resulting in teenage motherhood still persists especially among girls from families of lower socio-economic status, who then often become lone mothers (Vašková 2006).

[4] The drop in interruptions was less significant: While in 1991, 18% of women undergoing first interruption were of teen age, until 2007 the proportion decreased only to 14%.

4. Data and methods

As shown by Park (1976), parity-adjusted cumulative birth rates (PATFR) have several advantages compared to conventional period total fertility rate (TFR). While TFR can be described as "uncontaminated by the influence of the age distribution" (Ryder 1965: 297), the PATFR is further uncontaminated by the influence of the parity distribution. The PATFR is also less affected by the postponement of fertility upon older ages (Sobotka 2004). For the computation of fertility and nuptiality life tables in three distinct periods, 1991, 2001 and 2005/2007, we use individual data on births and marriages in 1991-2007 provided by the database of the Czech Statistical Office. The data contain several variables for each recorded birth (marriage), including the information on the woman's current attained education level.

We use four levels of finished education measured at the time of event (birth, marriage): Primary education (including missing and unfinished basic education); Lower secondary education without the "maturita" qualification (including vocational training); Upper secondary education with the "maturita"; and University education. There is no time-varying characteristic on education available and no information about educational enrolment. However, our variable covers the "educational history" in the sense that we have information about the highest level of education at time of event. We do not have information about potential continuation of (or return to) educational enrolment. We assume that education is finished at first childbirth (see also Marini 1984, Rindfuss et al. 1980), arguing that in the Czech Republic, education enrolment and childcare are generally incompatible (Kantorová 2004, Klasen and Launov 2006, Sobotka et al. 2003)[5].

For the computation of fertility and nuptiality life tables, we aggregate the data on first births and first marriages according to the age and educational attainment of the women, obtaining the occurrences. The exposures are taken from the Population and Housing Censuses 1991 and 2001. For nuptiality tables we use the population structure of women by age, educational attainment and marital status (keeping single women), for fertility tables we use the population structure of women by age, educational attainment and number of children ever born (keeping childless).

For the most recent period, the exposure was estimated using different sources. The proportion of women by parity and education in 2005 was estimated using data from GGS 2005, further smoothed for random fluctuations and converted to age structure of Czech Statistical Office and to educational structure taken from Labour Force Survey 2007. The proportion of single women by education in 2007 was estimated using data

[5] Observing the data set we found that from women who have delivered both their 1st and 2nd children in 1991-2005, 17% of primary educated and 5-7% of the others progressed in education between 1st and 2nd childbirth.

from Labour Force Survey 2007, converted to age-marital status structure from Czech Statistical Office[6].

The potential discordance between data from vital statistics (occurrences) and censuses and other sources (exposures) concerning overestimation of the number of childless women with primary (and finished) education at young ages has been avoided by: 1/ adjusting exposure population for education reached during the year instead of at the beginning of the year; 2/ adjusting the numbers of primary educated women aged 15-20 for estimated proportion of those still enrolled in education who will eventually progress to higher education category.

The life tables were computed using the parity and age intensities (occurrence/exposure) method. First birth intensities for a given calendar year are computed as the number of children of parity one born in given year to mothers at a given age (considered fertility life span 15-45 years), divided by the corresponding number of childless (parity zero) women, i.e. (using notation of Park 1976):

$$f_{1,x} = b_{1,x} / w_{0,x}$$

where $f_{1,x}$ is the probability that a woman of parity 0 at age x will bear her first child between ages x and $x+1$, $w_{0,x}$ is the number of women of parity 0 at age x at the beginning of given year, and $b_{1,x}$ is the number of the first order births born to women between ages x and $x+1$. Further computations are made as follows:

- root table number of childless women at age 15: $L_{0,15} = 1$
- table number of births: $B_{1,x} = f_{1,x} * W_{0,x}$
- table number of childless women: $W_{0,x+1} = W_{0,x} - B_{1,x}$
- age-parity index of total fertility: $PATFR_1 = \Sigma_x B_{1,x}$
- ultimate childlessness: $W_{0,46} = (1-PATFR_1)$

The nuptiality life tables use a similar concept (considered nuptiality life span 15-49 years), with the intensities computed as the number of first marriages divided by the number of single women (s) at a given age x:

$$n_{s,x} = m_{s,x} / w_{s,x}$$

Both tables are computed for 4 categories of education separately.

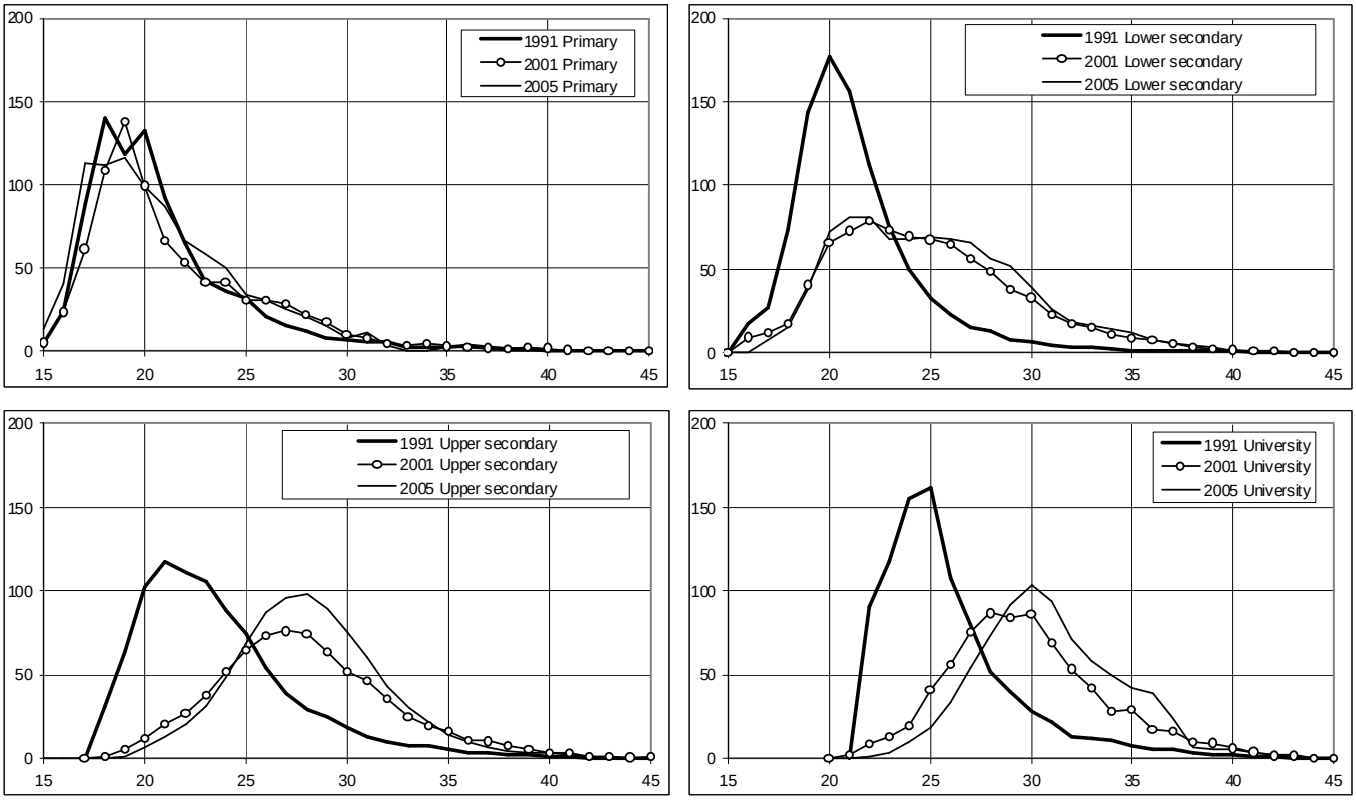
[6] The indicators for 2005/2007 are less accurate due to the nature of the source data. The indicators for total population might differ from other sources due to the different methodology used.

5. Results: How education interacts with fertility and nuptiality

5.1. Fertility

Table 5 presents aggregate indicators obtained from the life tables based on parity-and-age adjusted intensities of period first child fertility. The table further contains indicator of timing and postponement of fertility – the mean age of mother; and the proportion of fertility realised after age 30, which reveals the level of "recuperation", as commonly referred to for fertility catch-up among those who postponed it until after age 30 (Lesthaeghe and Moors 2000). The complement of $PATFR_1$ to 1 captures the proportion of ultimately childless. For illustration we added charts of first order table births by education.

Chart 1: First order table births by education of mother, 1991, 2001 and 2005



From the Chart 1 is apparent that the fertility behaviour of primary educated women did not change during the last 15 years. The schedule with the peak around age 20 remains the same, as well as resulting values of total fertility and mean ages. Among higher educational categories there is apparent drop in the fertility at young ages (around 20 for secondary educated and around 25 for university educated). However, the maximum remains at young age for lower secondary educated. The upper secondary and university educated are those with most apparent changes in fertility schedule: The maximum moved 5-7 years ahead and the drop of births at young ages was compensated by the increase in older ages.

The deepest drop in fertility level during the 1990s occurred among higher educated women, for whom the proportion of childless increased from 8% in 1991 to around 25% in 2001. The main driving force behind this drop was the postponement of fertility onset until later ages, as indicated by the increase in mean age at first birth by 4-4.5 years to 28 years among upper secondary educated and to almost 30 years among university graduated. The overall fertility level of higher educated dropped to levels around 0.75.

Table 5: Fertility life tables indicators, first birth order, 1991, 2001 and 2005

1991-Education	**Primary**	**Low. Sec.**	**Up. Sec.**	**University**	**Total**
$PATFR_1$	0.87	0.95	0.92	0.92	**0.93**
- realised at age 15-29	0.83	0.92	0.84	0.80	**0.88**
- realised at age 30-45	0.03	0.03	0.08	0.11	**0.05**
Ultimate childlessness	13%	5%	8%	8%	**7%**
Mean age of mothers	20.8	21.4	23.6	25.9	**22.6**
Prop. of fertility real. after age 30	4%	3%	8%	12%	**5%**

2001-Education	**Primary**	**Low. Sec.**	**Up. Sec.**	**University**	**Total**
$PATFR_1$	0.81	0.84	0.74	0.76	**0.77**
- realised at age 15-29	0.77	0.71	0.51	0.39	**0.57**
- realised at age 30-45	0.04	0.13	0.24	0.37	**0.21**
Ultimate childlessness	19%	16%	26%	24%	**23%**
Mean age of mothers	21.6	24.9	28.0	29.8	**26.8**
Prop. of fertility real. after age 30	5%	15%	32%	49%	**27%**

2005-Education	**Primary**	**Low. Sec.**	**Up. Sec.**	**University**	**Total**
$PATFR_1$	0.91	0.89	0.84	0.79	**0.83**
- realised at age 15-29	0.88	0.74	0.56	0.28	**0.56**
- realised at age 30-45	0.03	0.15	0.28	0.50	**0.28**
Ultimate childlessness	9%	11%	16%	21%	**17%**
Mean age of mothers	21.0	25.2	28.2	30.9	**27.6**
Prop. of fertility real. after age 30	3%	17%	33%	64%	**33%**

Change 2005-1991	**Primary**	**Low. Sec.**	**Up. Sec.**	**University**	**Total**
Drop in PATFR1 15-29	-	-0.18	-0.28	-0.52	**-0.32**
Increase in PATFR1 30-45	-	+0.12	+0.20	+0.39	**+0.22**
Proportion of recuperated PATFR	-	66%	72%	75%	**70%**
Increase in mean age of mothers	+0.2	+3.9	+4.6	+5.0	**+5.0**

On the contrary, primary educated women experienced only relaxed decrease in fertility level, and more importantly there was only slight increase in mean age at first childbirth, which was only 21.6 years in 2001. The proportion of primary educated, who had their first childbirth in their thirties remains very low, less than 5%.

After year 2000 there was moderate increase in fertility rates not only at older ages, but also at age 15-29, with the exception of university educated, for whom the proportion starting fertility path after 30^{th} birthday increased to 64% and the mean age of university educated first-time mothers exceeded the age 30. Between 1991 and 2005 about 66-75% of the fertility level drop at age 15-29 was compensated by its increase at age 30-45.

5.2. Nuptiality

The decrease in level of nuptiality and its postponement were more pronounced than those of fertility and they were more evenly distributed across the educational groups. They also continued after year 2000. Apart from the past, when marriages were concentrated just at the beginning of the adult life of women, now they are more evenly distributed along the age spectrum, with apparent postponement of maximum until later ages among higher educated women. Among primary educated the total first marriage rate dropped in 1991 to 2007 by highest margin, from 83 to 57 per cent, and the proportion ultimately single thus increased to more than 40%. Unlike at fertility, mean age rose by 5 years and 30% of fertility that shrank at age 15-29 was recuperated at age 30+. On the other part of educational spectrum stand university educated women, whose drop in total first marriage rate was not so pronounced (from 93 to 77 and back to 85 per cent), but whose postponement was more apparent: In 2007 already 40% of university educated women entered marriage after age 30, and the recuperation of marriages not realised at age 15-29 was 76%. The two secondary educated groups stand somewhat in-between the two described groups.

Chart 2: First table marriages by education of woman, 1991, 2001 and 2007

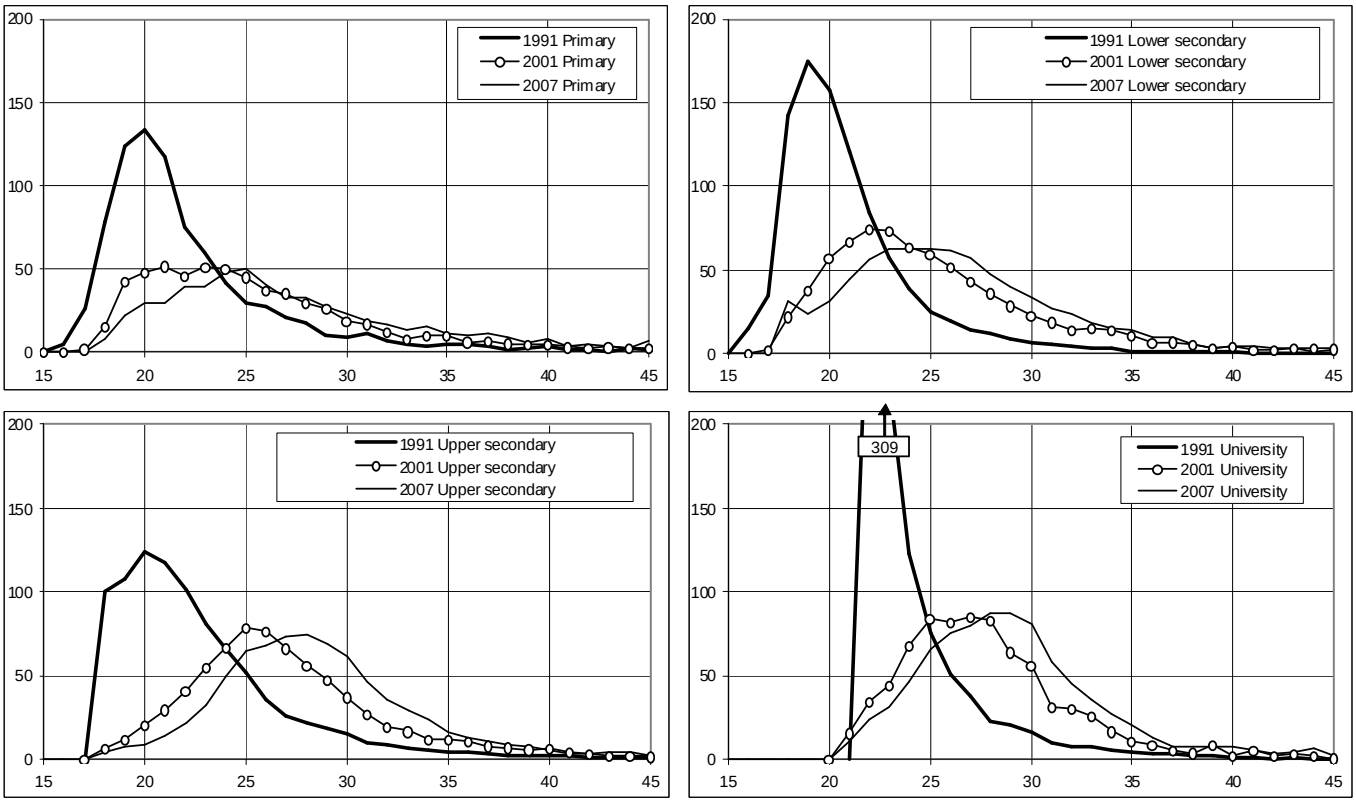


Table 6: Nuptiality life tables indicators, 1991, 2001 and 2007

1991 - Education	Primary	Low. Sec.	Up. Sec.	University	Total
Total female first marriage rate (per 100)	83.1	93.9	92.2	93.2	**92.1**
- realised at age 15-29	76.5	90.4	85.1	86.5	**86.7**
- realised at age 30-49	6.7	3.5	7.1	6.7	**5.4**
Ultimately single	17%	6%	8%	7%	**8%**
Mean age at first marriage	22.4	21.1	22.7	24.3	**22.2**
Prop. of nuptiality real. after age 30	8%	4%	8%	7%	**6%**

2001 - Education	Primary	Low. Sec.	Up. Sec.	University	Total
Total female first marriage rate (per 100)	60.4	75.8	73.9	77.5	**73.3**
- realised at age 15-29	48.0	61.6	55.6	55.9	**56.3**
- realised at age 30-49	12.4	14.2	18.3	21.5	**17.0**
Ultimately single	40%	24%	26%	23%	**27%**
Mean age at first marriage	25.8	25.5	27.3	27.9	**26.8**
Prop. of nuptiality real. after age 30	21%	19%	25%	28%	**23%**

2007 - Education	Primary	Low. Sec.	Up. Sec.	University	Total
Total female first marriage rate (per 100)	57.1	77.4	77.0	84.8	**71.1**
- realised at age 15-29	39.9	58.0	48.7	50.8	**46.7**
- realised at age 30-49	17.2	19.4	28.3	34.0	**24.4**
Ultimately single	43%	23%	23%	15%	**29%**
Mean age at first marriage	27.6	26.7	28.7	29.2	**28.4**
Prop. of nuptiality real. after age 30	30%	25%	37%	40%	**34%**

Change 2007-1991	Primary	Low. Sec.	Up. Sec.	University	Total
Drop in marital intensity 15-29	-36.6	-32.4	-36.4	-35.7	**-40.0**
Increase in marital intensity 30-49	+10.6	+16.0	+21.2	+27.2	**+19.0**
Proportion of recuperated TFMR	29%	49%	58%	76%	**47%**
Increase in mean age	+5.2	+5.7	+6.0	+4.8	**+6.3**

5.3. The interplay between nuptiality and fertility and non-marital children

The impact of education on the levels of fertility and nuptiality works in opposite directions: the level of fertility is lower among higher educated and higher among lower educated, whereas the level of nuptiality is lowest among primary educated and moderate among both the secondary and university educated. The age at family formation is strongly correlated with the level of education, adding approximately 3-4 years to mean age at childbearing and ½-1 year to mean age at marriage for each educational level. The different timing and sequencing of marriage and childbearing is demonstrated by the fact, that among lower educated the mean age at marriage is several years higher than the mean age at first childbirth, whereas among higher educated the first birth comes after marriage according to the mean ages.

The proportion of non-marital births has been the highest among primary educated women even before the 1990s. Since that time it increased into tremendous proportions, reaching 82% of first births in 2007. On the other side of the spectrum are university educated mothers, who are the most conservative in the sequencing of childbirth and marriage: Only 23% of them start fertility career outside marriage, which is far lower proportion than among any other educational category.

Of course there is a question of what proportion of unmarried mothers are lone mothers without partner, and how many of them are living in unmarried cohabitation,

which might be eventually transformed into marriage. These issues are discussed in different paper (Zeman 2009). For our argumentation are sufficient the data from Table 7 that show clear educational stratification of having first child out of marriage. The trendsetters of non-marital childbearing are clearly primary educated mothers, followed by lower secondary educated. Higher educated women tend to marry first before having children, even if sometimes only during pregnancy[7].

Table 7: Proportion of non-marital first births by education of mother (%)

FIRST BIRTHS	Primary	Low. Sec.	Up. Sec.	University	Total
1991	42%	12%	6%	6%	**12%**
2001	71%	33%	19%	12%	**29%**
2007	82%	56%	38%	23%	**44%**

6. Conclusions and discussion

In this article we argue that social and economic changes in last two decades have influenced distinct socio-economic categories of women differently. We have shown that the transition of fertility and nuptiality behaviours was not uniform but strongly correlated to the educational level of women. The higher is the educational attainment of women, the more conservative is their pathway of family formation. While low-educated women tend to become mothers at young age and frequently outside marriage, higher educated women postpone childbearing until later ages but then they mostly conceive their first child traditionally after marriage.

Our analysis confirmed findings from other countries about the negative effect of women's education on the entry into parenthood (Rindfuss et al. 1980, Liefbroer and Corijn 1999, Kreyenfeld 2000). We also confirmed the findings of Kantorová (2004) and Klasen and Launov (2006), who analysed more detailed data from the Female and Fertility Survey data for the Czech Republic, 1997, and who found that women with an upper secondary or university education have comparatively lower first-birth risks than the lower educated and that after 1990 the impact of women's education on timing of entry into motherhood intensified. Our data also satisfy the hypothesis that women with higher education postpone family formation rather then completely reduce it (Liefbroer and Corijn 1999, Blossfeld and Jaeninchen 1992).

The number of possible reasons and impacts is manifold. A high female labour participation rate combined with the traditionally uneven division of gender roles has persisted in the Czech society even after the end of the previous regime. The difficulty of combining work and family, increased among higher educated women with more highly-rated jobs; thus the relative costs of childbearing have become higher. On the other hand, the current setting of family policy makes it more advantageous for low educated

[7] In 2007, 45% of primary educated women who conceived inside marriage married during pregnancy. For lower and upper secondary educated the figure was 36% and 29%, resp., and for university educated only 22%.

women with poor employment prospects to choose childbearing in place of a career. The value change of post-modern society shifted attitudes towards cohabitation and non-marital childbearing and to alternative lifestyles in general. Marriage lost its universal interconnection with childbearing and family formation.

The impact of education on family formation has been intensified by the educational expansion since the 1990s: the increasing proportion of women attending and finishing upper secondary and tertiary education has gradually enlarged their distribution in the population, and the rise in the mean number of years spent in education itself postponed the onset of family formation. Educational expansion thus contributed to the general decrease in level of fertility and nuptiality and to the postponement of family formation to later ages.

The analysis of fertility and nuptiality behaviour by finished education has revealed that the trendsetters of non-marital childbearing are mothers with primary education who frequently have children outside marriage. The trendsetters of fertility postponement are on the contrary university and upper secondary educated, who postpone the childbearing and marriage until after the age of 30, but on the other hand they are behaving traditionally by timing the first childbirth inside marriage. We conclude that there is no general explanation of the transitional fertility and nuptiality behaviour in the Czech Republic, as women of different socio-economic statuses are reacting differently to the social, economic and value changes.

Acknowledgements

I am thankful to Anna Šťastná (Research Institute for Labour and Social Affairs, Prague), for providing me with the figures from Generations and Gender Survey 2005, to Jiří Vejrych (Czech Statistical Office) for providing me with the results of Population Census 1991 and 2001, and to Ondřej Nývlt (Czech Statistical Office) for providing me with the data from Labour Force Survey 2007.

References

Billari, F. C. and D. Philipov, 2003. Mutual relationships between education and women's entry into a first union: the case of Central and Eastern Europe. In.: I. E. Kotowska and J. Jóźwiak. *Population of Central and Eastern Europe. Challenges and Opportunities.* European Population Conference, 26-30 August 2003. Warsaw: 201-218.

Blossfeld, H.-P. and J. Huinink, 1991. Human capital investment or norms of role transition? *American Journal of Sociology* 97: 143-168.

Blossfeld, H.-P. and U. Jaeninchen, 1992. Educational expansion and changes in women's entry into marriage and motherhood in the Federal Republic of Germany. *Journal of Marriage and the Family* 54: 302-315.

CZSO, 2008. *Vývoj obyvatelstva České republiky v roce 2007*. Czech Statistical Office, Prague.

CZSO, 2009a. *Schools and School Establishments in School Year 2008/2009.* Czech Statistical Office, Prague.

CZSO, 2009b. *Employment and Unemployment in the Czech Republic as Measured by the Labour Force Sample Survey - Annual Averages 2008.* Czech Statistical Office, Prague.

CZSO, 2009c. *Structure of Earnings Survey 2008.* Czech Statistical Office, Prague.

GGS, 2005. *Generations and Gender Survey 2005*. Czech Republic.

Gustafsson, S., 2001. Optimal age at motherhood. Theoretical and empirical considerations on postponement of maternity in Europe. *Journal of Population Economics* 14: 225-247.

Hamplová, D. and B. Řeháková, 2006. Mimomanželská plodnost: individuální charakteristiky žen a vliv regionu. In.: Hamplová, D. (ed.) *Mimomanželská plodnost v České republice po roce 1989: sociální a ekonomické souvislosti.* Institute of Sociology of the Academy of Sciences of the Czech Republic, Prague: 26-39.

Hoem, J. M., 1986. The impact of education on modern family-union initiation. *European Journal of Population* 2: 113-133.

Kantorová, 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): 245-274.

Klasen, S. and A. Launov, 2006. Analysis of the determinants of fertility decline in the Czech Republic. *Journal of Population Economics* 19: 19-54.

Kravdal, Ø., 2004. An illustration of the problems caused by incomplete education histories in fertility analyses. *Demographic Research: Special Collection* 3(10): 135-154.

Kreyenfeld, M., 2000. Educational attainment and first births: East Germany before and after unification. *MPIDR Working Paper* WP-2000-011, Rostock.

Kučera, M., 1997. K interpretaci charakteristiky demografických procesů v České republice. *Demografie*, 4(39): 269-270.

Lesthaeghe, R. and G. Moors, 2000. Recent trends in fertility and household formation in the industrialized world. *Review of Population and Social Policy* 9: 121–170.

LFS, 2007. *Labour Force Survey 2007.* Czech Statistical Office, Prague.

Liefbroer, A. C. and M. Corijn, 1999. Who, what, where and when? Specifying the impact of educational attainment and labour force participation on family formation. *European Journal of Population* 15: 45-75.

Marini, M. M., 1984. Women's educational attainment and the timing of entry into parenthood. *American Sociological Review* 49(4): 491-511.

Morgan, S. P. and R. R. Rindfuss, 1999. Reexamining the link of early childbearing to marriage and to subsequent fertility. *Demography* 36(1): 59-75.

Oppenheimer, V. K., 2003. Cohabiting and marriage during young men's career-development process. *Demography* 40(1): 127-149.

Park, C. B., 1976. Lifetime probability of additional births by age and parity for American women, 1935–1968: A new measurement of period fertility. *Demography* 13(1): 1-17.

Philipov, D. and J. Dorbritz, 2003. Demographic Consequences of Economic Transition in Countries of Central and Eastern Europe. *Population studies 39*. Council of Europe Publishing, Strasbourg.

Rabušic, L., 2001. Value change and demographic behaviour in the Czech Republic. *Czech Sociological Review* 9(1): 99-122.

Rindfuss, R. R., L. Bumpass and C. St. John, 1980. Education and fertility: Implications for the roles women occupy. *American Sociological Review* 45(3): 431-447.

Rychtaříková, J., 2000. Demographic transition or demographic shock in recent population development in the Czech Republic? *Acta Universitatis Carolinae Geographica* 1: 89-102.

Rychtaříková, J., 2004. Změny generační plodnosti v České republice se zaměřením na vzdělání žen. *Demografie* 46(2): 77-90.

Rychtaříková, J., 2006. Je vysoký podíl dětí narozených mimo manželství v ČR projevem westernizace? *Zpravodaj České demografické společnosti* 40: 4-7.

Ryder, N. B., 1965. The measurement of fertility patterns. In.: Sheps, M. C. and J. C. Ridley (eds.) *Public Health and Population Change.* University of Pittsburgh Press: 287-306.

Sobotka, T, 2004. *Postponement of childbearing and low fertility in Europe*. PhD Thesis, University of Groningen. Amsterdam: Dutch University Press.

Sobotka, T. K. Zeman and V. Kantorová, 2003. Demographic shifts in the Czech Republic after 1989: A second demographic transition view. *European Journal of Population* 19(3): 249-277.

Srb, V., 2006. Vzdělanostní homogamie a heterogamie v manželství v České republice v roce 2001. *Demografie* 48(4): 289-290.

Stloukal, L., 1997. Changing patterns of extramarital conceptions in the Czech Republic, 1960-1993. *Journal of Biosociological Science* 29: 471-489.

ÚZIS, 2009. Činnost kojeneckých ústavů a dětských domovů pro děti do tří let a dalších zařízení pro děti v roce 2008. [Activity of institutes for infants and homes for children up to 3 years of age and other institution for children in 2008]. *Aktuální informace* 15.

Vašková, R., 2006. Rozhodovací procesy -náctiletých těhotných dívek vedoucí k volbě časného rodičovství. In.: *Hamplová*,D., P. Šalamounová and G. Šamanová (eds.). *Životní cyklus – sociologické a demografické perspektivy.* Institute of Sociology of the Academy of Sciences of the Czech Republic, Prague.

Večerník, J., 1999. Inequalities in earnings, incomes, and household wealth. In: J. Večerník and P. Matějů (eds.). *Ten Years of Rebuilding Capitalism: Czech Society After 1989*. Academia, Prague: 115–136.

Zeman, K., 2003. *Divorce and marital dissolution in the Czech Republic and in Austria – The role of premarital cohabitation.* Diploma Thesis, Charles University in Prague.

Zeman, K., 2007. Population development in the Czech Republic in 2005. *Czech Demography* 1: 3-15.

Zeman, K., 2009. The link between women's education and non-marital childbearing in the Czech Republic. *Romanian Journal of Population Studies* 1: 90-108.