DRAFT VERSION

Union status and first birth in Bulgaria

Transition to first birth within cohabitation vs. marriage

Dora Kostova
Center for Population Studies at the Bulgarian Academy of Science
dgeorgieva@abv.bg

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Introduction

With this paper I would like to investigate the impact of union status (marriage or cohabitation) on the transition to first birth in Bulgaria. The main purpose is to produce some results on fertility behaviour of non-marital unions in Bulgaria and to examine how socioeconomic factors determine this behaviour.

During the socialism the pattern of union formation was early and nearly universal marriage. According to the census* in 2001 13.1% of the population in reproductive age lives in nonmarital union. The biggest part of this cohabitations belong to the ethnic minorities and one relatively small but increasing part are "young cohabitations" (Center for Population Studies, 2001). Second important issue is swift and considerable increase in extra-marital fertility – from 12% in 1990 to 42% in 2001. These changes raise an important question: to what extents are non-marital births occurring within cohabiting unions?

➢ Background

Main changes in Bulgarian fertility and family formation during the last two decades (Development of non-marital unions and non-marital births)

I would like to present some basic indicators to describe the main changes in fertility and family formation pattern in Bulgaria.

- Swift drop in fertility

Pre-transitional period was characterized with:

  - TFR slightly below 1.9 during the 80s.
  - The period first-order TFR was close to unity that indicates a nearly universal parenthood.

After the transition traditional pattern of early and nearly universal motherhood is replaced by:

- swift decrease in TFR. “Lowest-low fertility” levels (this is taken to be TFR below 1.3) were attained in 1995 and in 2002 it is still below 1.3 in spite of slight increase after 1997.
- postponement of the first birth (mean age at birth of first child rose from 22.1 in 1989 to 24.0 in 2002)
- high extra-marital fertility

Fertility out of marriage increased considerably during the last decade from around 12% in 1990 to 42% in 2002. One explanation is that this is a result of falling marital fertility. The relative rise could be explained also by heterogeneity in the population – there is a relatively low decline in fertility in some sub-populations with traditionally high level of extra-marital fertility (like the ethnic group of Roma-Gypsis) (Philipov, 2001). Finally, there is a part of extra-marital fertility that is to be contributed to cohabiting young people.

- Family formation behavior

Until the end of 90s Bulgaria was characterised with high percentage of ever-married people. The legal marriage was the most common pattern of family formation and marriage was prerequisite to have a child. After the transition total female first marriage rate decrease from 0.90 in 1990 to 0.52 in 2001, mean age of first marriage increase from around 21.4 for women and 24.7 for men in 1990 to 24.7 for women and 28.1 for men in 2001.

➢ Research objectives

This paper is focused on the entry into motherhood (first birth). Since most of the first births in Bulgaria during the pre-transitional period were within a marriage, there is no other research focusing on the differences between cohabiting and married women’s decisions about when and in what type of union to have a first child. Reviewing the literature, in Europe this subject is

[*] Fertility and Reproductive Behaviour Survey conducted in parallel to census in 2001, women aged 15-49, men aged 15-59.

widely discussed since the beginning of 80s. It is likely to expect different fertility behaviour within the two types of union.

- The aim of the paper

This paper is aimed to determine whether there are differences in the timing of childbearing within cohabiting unions vs. that of marriage and if so, to examine the extent to which socioeconomic factors accounted for these differences.

- Hypothesis
  - The main hypothesis is that first birth risk is lower in cohabiting unions than that in marital unions and one could expect postponement of the entry into motherhood of cohabiting women compared with married ones.
  - The second hypothesis is that we can expect higher first birth "risks" before 1989 compared with the first birth intensity after the transition.
  - The higher is the educational level, the higher is the postponement of entry into the motherhood.

1. Data, measures and method

➢ Data

The data used in this paper is taken from a survey Coping Strategies, Social Capital and Fertility in Bulgaria (CSSCFB) conducted in June - July 2002. Originally it consists of 10009 interviews – 4775 women aged 18-34 and 5234 men aged 18-59.

CSSCFB contains detailed retrospective question sequences on fertility, cohabitation and marriage histories, education and questions about respondent's social background such as ethnicity, region of residence in childhood and parent's education.

For the analysis sample is restricted only to female respondents who have experience being in a union (3206 women). Further we exclude those cases

with missing values of main variables and those having child before entering first union. After these restrictions the sample we used for the analysis consists of 3062 women under the risk to have first child after first union formation.

- **Measures**

The time variable in the model is time from the first union formation measured in months (grouped).

- Time-varying covariates included in the model.

Union status. In the literature most common way is to treat relationship status as dichotomous variable i.e. cohabitation vs. marriage (Loomis and Landale, 1994, Manning, 1995). According to Leridon & Villeneuve-Gokalp, 1990 and Manting, 1991, decision to transform cohabitation into marriage is linked to the decision to have a child. In order to catch differences in fertility behaviour we create six levels. If the respondent is in a first union - first union: cohabitation, first union: direct marriage, first union: marriage preceded by cohabitation (means that they marry the same partner). If the respondent is childless in a second union - second union: cohabitation, second union: marriage (it could be second marriage or first marriage for those that marry different partner after first cohabitation - first cohabitation finished with dissolution) and out of union related to the period after a union is dissolved.

Education. Because of the survey question and Bulgarian background we decide to group educational levels into three main levels: lower than secondary school includes primary, basic and not completed secondary school; secondary for those that have completed secondary school with final exams and higher than secondary, that includes all levels of university degree (MA, Ph.D.).

Enrolment in education has two levels: enrolled in education or out of education.

Year of transition. It is obvious that there are swift changes in fertility and family development after transition in 1989. In order to describe better changes in transition to first birth we introduce this variable as categorical, dividing the period by November 1989 into two parts: before transition and after transition.

- Time-constant covariates included in the model.

Cohort. Since we have relatively young respondents in this survey we create three cohort groups: women born in 1968-1972, 1973-1977 and 1978-1984. With this covariate we can see not only the cohort effect but also partially the effect of the transition period on first birth risk. The middle cohort (born in 1973-1977) were at the age 12-18 at the beginning of transition and the effect of the political and economical changes on the first birth risk would be stronger for this cohort than for the others.

Age at first union formation. A younger age at start of first union is likely to increase risk of the first birth within a relationship. This is because women who enter union (cohabitation or marriage) at younger age are more likely to invest in a household and family but not in education or professional career (Becker at al., 1977). In the model this covariate is grouped and has three levels of entering the first union at the age up to 18, 19-24 and 25-35.

Ethnicity. Prior researches have shown that ethnic origin is an important determinant of fertility, because of the influence of the values and norms, regarding family and reproduction. After year 1989 Roma-Gypsis have the highest transition to first birth and the lowest to first marriage (Koytcheva, 2003). The main ethnical groups are presented in the survey: Bulgarian, Turks, Roma-Gypsis and others.

Type of first union formation. This variable was introduced in order to analyse the timing of first birth taking in account the union status history. It is dichotomous with two levels cohabitation or marriage.

Region of residence at the age 15 of the respondent. There is a big difference between Sofia as a capital and the other places of residence in

terms of labour market and educational possibilities from one side, and between town and village in terms of social norms and values concerning family formation and transition to motherhood. We include in the model as another factor of cultural influence region with three levels presenting Sofia, other cities and village.

- **Method**

We conduct multivariate analysis of first birth after first union formation. The dependent variable in the analysis is dichotomous variable indicating whether a woman gave birth. Exposure time to the risk of first birth is counted from the date of entering the union to the date of first birth or censoring at the time of the interview. Survival time is measured from the date of union formation for a ten year period. We censored all cases that did not give birth ten years after formation of first union. Time is measured in months.
Independent variables included the variables outlined in the previous section.
For the analysis was used piecewise constant exponential model

$$\mu_{hj}(t) = \mu_{0j}(t) * \exp\left\{\sum_k \beta_{jk} x_{hjk}(t)\right\}$$

where $\mu_{0j}(t)$ is a baseline intensity;

$x_{hjk}(t)$ is the value at time t of variable k for individual h in level j;

β_{jk} is a regression coefficient that measures the effect of this variable on the intensity.

We apply the program EvHA for estimation of the parameters.

3. Results

➢ Descriptive characteristics of the data

In Table 1 we present the descriptive statistics of the variables included in the model below.

Table 1 Descriptive characteristics of variables used in the model (percent of exposure time)

Time-constant covariates		**Time-varying covariates**	
Cohort		**Educational level**	
1968-1972	40.74	lower than secondary	26.84
1973-1977	35.13	secondary	60.59
1978-1984	24.13	higher than secondary	12.57
Age at first union formation		**Enrolment in education**	
up to 18	31.41	in education	16.88
19-24	58.80	not in education	83.12
25-35	9.79		
Ethnicity		**Year of transition**	
Bulgarian	79.62	before transition	12.69
Turkish	9.53	after transition	87.31
Roma	8.46		
others	2.39		
Type of first union		**Union status**	
cohabitation	42.46	1st union: cohabitation	29.67
marriage	57.54	1st union: direct marriage	56.55
Region of residence		1st union: marriage after cohabitation	9.70
Sofia	12.35	out of union	3.09
town	61.05	2nd union: cohabitation	0.68
village	26.60	2nd union: marriage	0.31
Total number of women under observation 3062			

➢ Time to have first child

To analyze differences of timing to have first child after first union formation we use Kaplan-Meier estimates of the survival function. Figure 1 illustrates how directly married women differ from those started with cohabitation. The postponement of the first birth for women lived in cohabitation as a first union is substantial compared with women who marry directly. Figures A and B in

the Appendix give us an idea about the impact of the cohort and region of childhood residence on timing of first birth after first union formation.

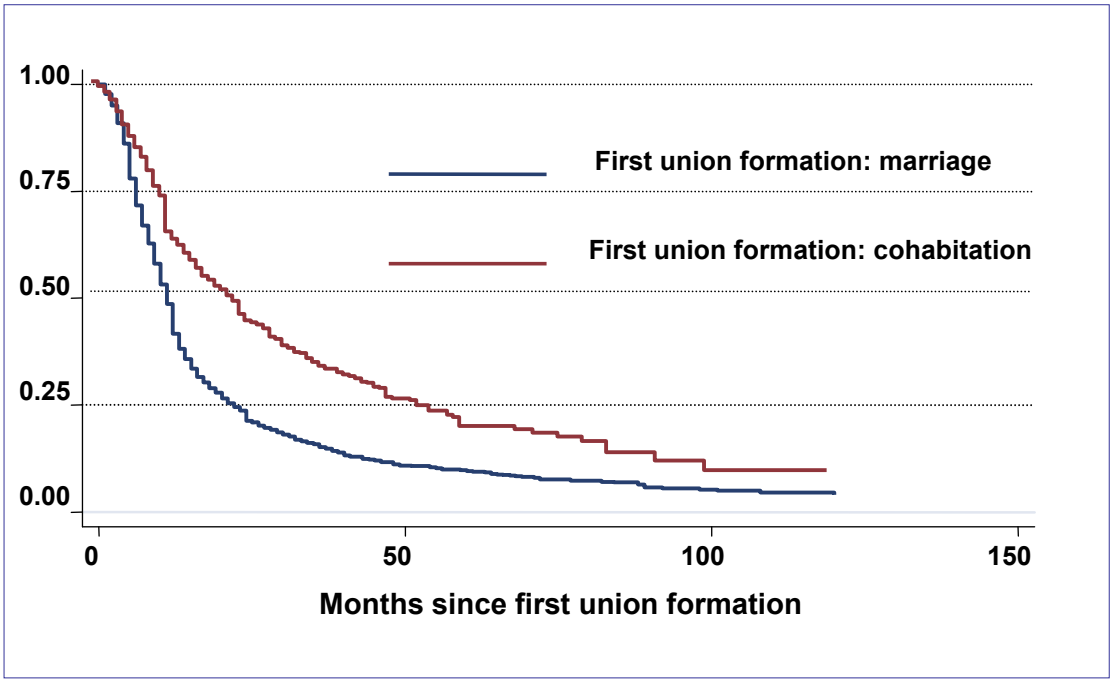

Figure 1 Kaplan-Meier survival estimation by type of first union formation

➢ **Step-wise modeling procedure**

For building the model we use step-wise modeling method (results are presented in table A in the Appendix).

1st stage is a model with only one estimated variable (Time) – baseline;

In the 2nd stage the variables were added one after another to the 1st stage model. Using log-likelihood ratio test we were estimating if each variable improves significantly the model (or this factor is superfluous). It was convenient to start with the most important factors that were expected to explain the differences in timing of first birth. We discover that two of our variables do not improve the model: *age at first union formation* and *ethnicity*. Variable *Age at first union formation* is not significant for the model although one could expect that the younger is respondent at the entering union the higher is first birth risk (Wu, 1996) and it is like this. I presume that part of the

explanatory effect already took place with the other factors included in the model. Thus for further analysis *age at first union formation* was not included in the final model. Factor *Ethnicity* does not improve the model, but we consider it an important determinant of reproductive behaviour and nevertheless it is included in the final model.

- **First birth risk and year of transition**

Looking at the aggregated data there is vast difference in fertility pattern before and after the transition to the market economy in 1989. One of our hypotheses was that transition to first child differs before and after 1989. In the model 2 (see table A in the Appendix) we ascertain that the first birth "risk" after union formation decreases to 0.85 after the transition from the pre-transitional level which corresponds to our expectations. Subsequently (models 3-5) we see that adding other variables such as union status, education and enrolment in education the effect of year of transition weaken and even disappear. It is clear that the year 1989 itself can not change the behaviour concerning entry into parenthood once being in a union, therefore there are some aspects of life that changed – like enrolment in education, family formation patterns etc that explain changes after the year 1989.

➢ **Effect of educational level and type of the union on first birth risk**

Table 2 presents the main effect of union status and education on first birth risk after first union formation.

Table 2 Relative risk of first birth by union status, educational level and enrolment in education. Absolute risks (per 1000 months since first union formation) are presented in Figure 2.

Union status at risk of first birth		**Educational level**	
1st union: cohabitation	1	lower than secondary	1
1st union: direct marriage	2.44	secondary	0.85
1st union: marriage after cohabitation	3.20	higher than secondary	0.70
out of union	0.52		
2nd union: cohabitation	1.14	**Enrolment in education**	
2nd union: marriage	2.94	not in education	1
		in education	0.78
Time (see Figure 2)			

We see that first birth risk is much lower for the group of women who left their union than for those living in union. It is much more likely to have a child in a union than out of a union and much more likely in marriage than in cohabitation. It is also plain that the aptitude to have a child is lower for high educated women than for women with low level of education. Time since first union formation is the time factor in the model and the absolute first birth risks are given in Figure 2 (number of first births per 1000 woman-months lived as a childless since first union formation with the baseline level on the other three factors). The highest is the risk to have a child the first two years after formation of the first union. After that the first birth risk is decreasing.

- Union status.

From survival analysis (Figure 1 presented above) we observe difference in transition to first birth by *type of first union* - women who directly marry have their first child earlier than those started with cohabitation. In the model, if we use instead a time-varying covariate for union status and compare only first union - cohabitation and marriage, it is two and a half times more likely to

have a first child in a direct marriage than in cohabitation. The “risk” to give a first birth in a marriage preceded by cohabitation is even higher (about 30% higher than in a direct marriage). This could be proof for the most common view that cohabiting partners who marry do this with the purpose of having children and providing a legal context for their offspring.

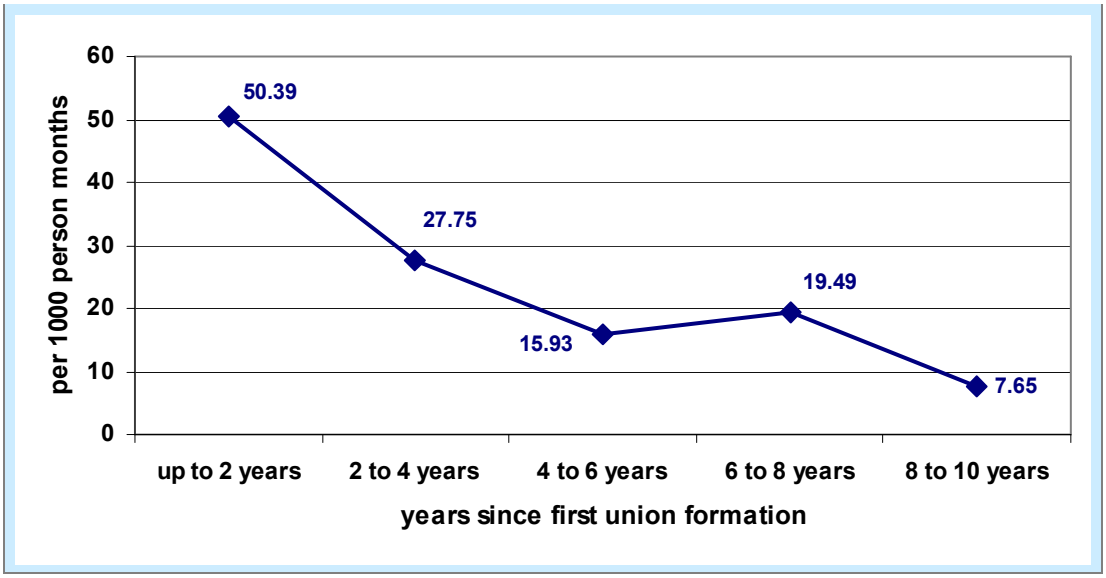

Figure 2 Absolute first birth risk (per 1000 person-months since first union formation by years), standardized for type of the union, educational level and enrolment in education.

- Education

The education of women is considered as one of the most important determinants of first birth timing. Higher education attainment is associated with higher occupational prestige and more time spent in the labour market. (Marini, 1984) Most of the previous studies have found that educational attainment has a delaying effect on entry into parenthood. In the model women with university degree has 30% lower risk to enter motherhood than those with lower than secondary school. Along with educational level we introduce enrolment in education as explanatory variable. As a result, women enroled in education have lower risk for first birth than women that did not study at that time, given that they already live in a coresidential union.

- **Effect of type of the union and educational level on first birth risk with respect to cohort, place of residence and ethnicity.**

The second main effect model shown in table 3 adjusts the first model for the effects of cohort, region of residence and ethnicity (model 9, table A in the appendix).

Table 3 Relative risk of first birth by union status at risk of first birth, educational level and enrolment in education, cohort, region of residence and ethnicity.

Union status at risk of first birth		**Enrolment in education**	
1st union: cohabitation	1	not in education	1
1st union: direct marriage	2.51	in education	0.80
1st union: marriage after cohabitation	3.30		
out of union	0.54	**Year of transition**	
2nd union: cohabitation	1.19	before transition	1
2nd union: marriage	3.00	after transition	1.08
Educational level		**Residence**	
lower than secondary	1	Sofia	1
secondary	0.92	town	1.14
higher than secondary	0.78	village	1.18
Cohort		**Ethnicity**	
1968-1972	1	Bulgarian	1
1973-1977	0.87	Turkish	1.06
1978-1984	1.00	Roma	1.24
		others	1.15
Time (see Figure A in appendix)			

- Type of the union

We hypothesize at the beginning that first birth risk is lower for cohabiting women than for married. Our results proof this hypothesis. Consequently the hypothesis was that one could expect higher postponement of entry into the motherhood in cohabiting unions in comparison with married couples. To analyze if there is a postponement effect we made a model with interaction between time covariate (years since first union formation) and the fixed covariate "type of first union formation" (Figure 4 and model 9 of Table A).

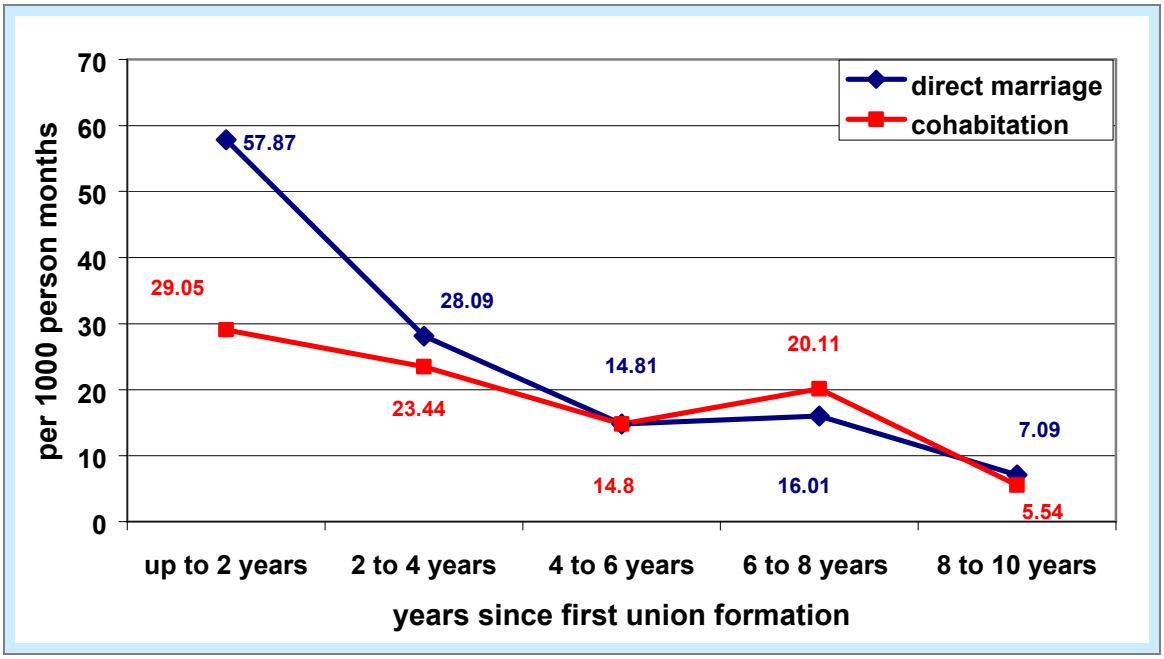

Figure 4 First birth risk after union formation by type of first union formation, standardized for region of residence, ethnicity, cohort, education, enrolment in education and year of transition.

The pattern of first birth for directly married women is to have first child relatively soon after marriage and then the risk is decreasing. The absolute risk to have a child the first two years after marriage is almost three times higher than if one starts with cohabitation. Women who started to live with a partner without marriage have different behavior. The risk to have a child soon after first union formation is much lower if one enters cohabitation. The

propensity to have a child up to fourth year is substantially lower for women start with cohabitation than for the women that directly marry. We can say that the type of first union reflects on timing of first birth and one could expect postponement of first birth if woman enter cohabitation compared to directly married woman if we control for the other factors.

In order to study deeply the effect of union formation on first birth we made a model with a three-way interaction between time covariate (years since first union formation), type of first union formation and the time-varying union status at risk of first birth but the results were a bit puzzling. Therefore we decided to make an interaction model with two covariates only - time covariate and union status at risk of first birth (Figure 5).

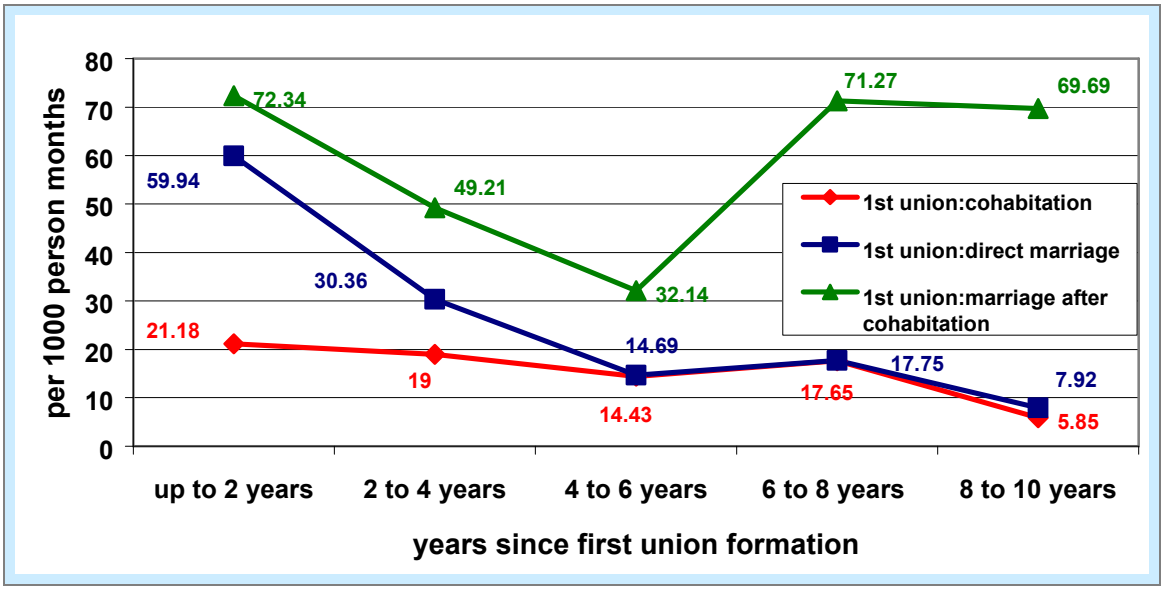

Figure 5 First birth risk after union formation by type of the union at risk of first birth (first union shown only), standardized for place of residence, ethnicity, cohort, year of transition, education and enrolment in education

On Figure 5 we present the absolute first birth risk for three categories of the factor, namely the three possibilities for the first union: marriage after cohabitation (green curve), direct first marriage (blue) and first union - cohabitation (red). Taking into account only the first union we see that first birth risk for women starting with cohabitation and then marry the same

partner is much higher for the whole time period than for women that marry directly. In such cases, the marriage formation seems to be strongly connected to the decision to have a child.

- Educational level

We hypothesized that an increase in education is likely to result in a lower probability of first childbearing after union formation. As we saw above the higher education is related to lower first birth risk. In order to estimate the effect of education on time of first birth we made a model with interaction between level of education and time covariate. (Figure 6)

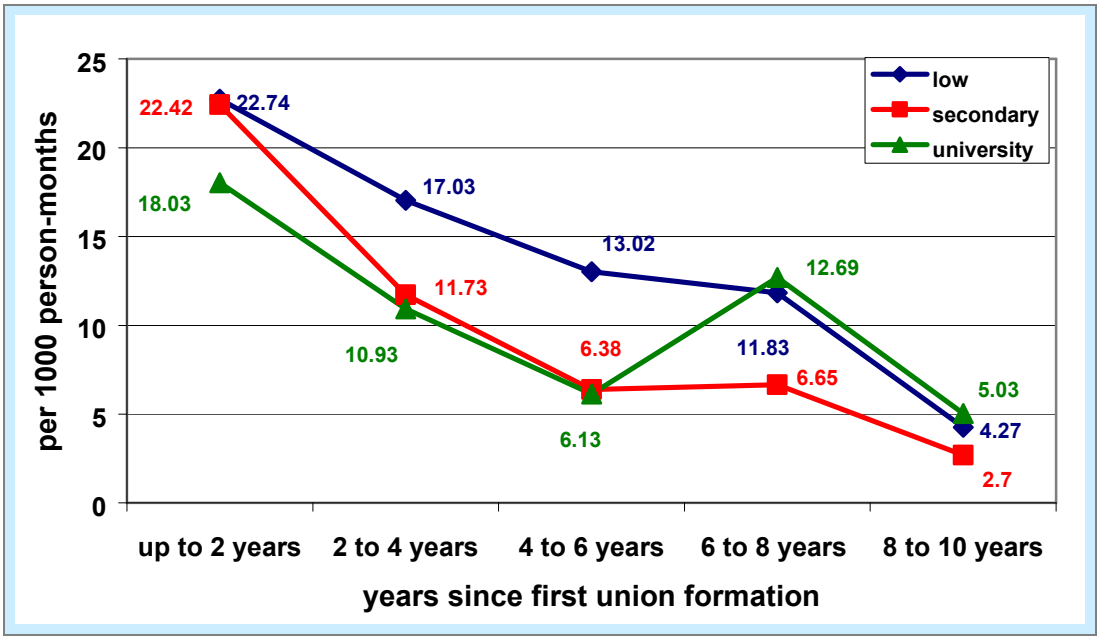

Figure 6 First birth risk after union formation by level of education, standardized for region of residence, ethnos, cohort, year of transition, enrolment in education and union status under the risk of first birth.

For all educational groups patterns of first childbearing are similar – higher first birth risk the first two years after union formation and then decrease of the propensity to have a child. Six to eight years after union formation we could perhaps see indication that women with university degree often postpone the

first birth. (It is more likely to have first child six to eight years after first union than in two to four years.)

4. Summary and conclusions

With this paper we have attempted to improve the understanding of childbearing behavior in cohabitational relationships in comparison with those of marriage in Bulgaria. Using the recent data from the survey Coping Strategies, Social Capital and Fertility in Bulgaria we examined the effect of union formation, union status at first birth and educational level along with the other variables known to be important on the timing and likelihood of a woman to have a first child after entering the first union. The results provide support to our hypotheses made at the beginning that is more likely to have a child in a marital union than in a cohabitation and we can expect postponement of first birth in cohabitational union in comparison with that of marriage.

I have to underline one limitation in the analysis. We examine all cohabiting women together without taking into account that for the ethnic group of Roma-Gypsis cohabitation has different meaning. According to the legalization they live in cohabitation but according to their traditions and norms they accept this as a marriage. Our future work will address the ethnical aspect of childbearing within cohabitational unions in comparison with marriage.

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Appendix 1

Table A Stepwise model for the first birth risk after first union formation

	m_1	m_2	m_3	m_4	m_5	m_6	m_7	m_8	m_9	m_10
time (in years)										
up to 2 years	*50.39*	*58.31*	*29.56*	*29.16*	*29.91*	*29.87*	*30.14*	*25.62*	*23.49*	*56.01*
2 to 4 years	*27.75*	*32.5*	*17.38*	*17.12*	*17.51*	*17.57*	*17.57*	*15.15*	*13.82*	*33.31*
4 to 6 years	*15.93*	*18.72*	*10.44*	*10.29*	*10.5*	*10.56*	*10.45*	*9.07*	*8.27*	*18.81*
6 to 8 years	*19.49*	*22.91*	*12.69*	*12.5*	*12.69*	*12.61*	*12.45*	*10.78*	*9.84*	*21.55*
8 to 10 years	*7.65*	*9*	*5.02*	*4.95*	*4.96*	*4.81*	*4.71*	*4.1*	*3.7*	*7.64*
year of transition										
before transition		1	1	1	1	1	1	1	1	1
after transition		0.85	0.94	1.02	1.02	1.07	1.11	1.07	1.08	1.08
union status at risk of first birth										
1st union: cohabitation			1	1	1	1	1	1	1	
1st union: direct marriage			2.35	2.49	2.45	2.46	2.46	2.45	2.51	
1st union: marriage after cohabitation			3	3.24	3.2	3.26	3.24	3.21	3.3	
out of union			0.49	0.52	0.52	0.53	0.53	0.53	0.54	
2nd union: marriage			2.71	2.96	2.94	2.83	2.82	2.94	3	
2nd union: cohabitation			1.12	1.16	1.14	1.12	1.12	1.13	1.19	
education										
lower than secondary				1	1	1	1	1	1	1
secondary				0.82	0.85	0.84	0.87	0.86	0.92	0.99
higher than secondary				0.7	0.7	0.7	0.75	0.73	0.78	0.86
enrolment in education										
not in education					1	1	1	1	1	1
in education					0.78	0.79	0.79	0.8	0.8	0.78
cohort										
1968-1972						1	1	1	1	1
1973-1977						0.87	0.85	0.87	0.87	0.87
1978-1984						1.01	0.97	1.01	1	0.95
age at first union formation										
up to 18							1			
19-24							0.94			
25-35							0.85			
residence										
Sofia								1	1	1
town								1.15	1.14	1.19
village								1.2	1.18	1.26
ethnicity										
Bulgarian									1	1
Turks									1.06	1.03
Roma									1.24	1.11
others									1.15	1.22
type of first union										
marriage										1
cohabitation										0.56
LR	-10646	-10643	-10431	-10416	-10407	-10402	-10400	-10398	-10395	-10522
df		1	5	2	1	2	2	2	3	
χ^2		6.3	424.6	29.8	17.0	11.2	3.3	6.88	7.44	
p		p<0.05	p<0.000	p<0.000	p<0.000	p<0.01	N.S.	p<0.05	N.S.	

Table B Exposure time by level of variables

Time-constant covariates	time at risk	Time-varying covariates	time at risk
Cohort		**Educational level**	
1968-1972	24644	lower than secondary	16660
1973-1977	23726	secondary	37055
1978-1984	13762	higher than secondary	8417
Age at first union formation		**Enrolment in education**	
up to 18	19752	in education	9614
19-24	36282	not in education	52518
25-35	6098		
Ethnicity		**Year of transition**	
bulgarian	48638	before transition	4988
turkish	5949	after transition	57144
roma	6347		
others	1198		
Type of first union		**Union status**	
cohabitation	27901	1st union: cohabitation	20035
marriage	34231	1st union: direct marriage	33273
Region of residence		1st union: marriage after cohabitation	2774
Sofia	8257	out of union	751
town	37546	2nd union: cohabitation	302
village	16329	2nd union: marriage	4997
Total time at risk 62132			

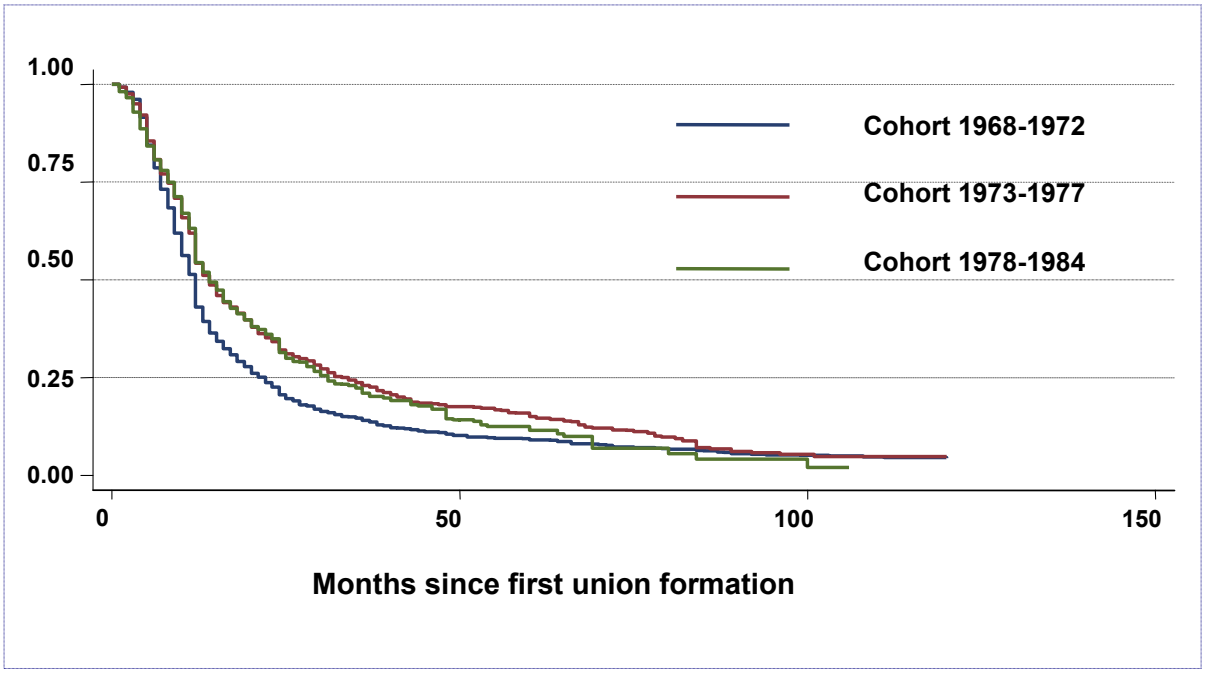

Figure A Kaplan-Meier survival estimation by cohort

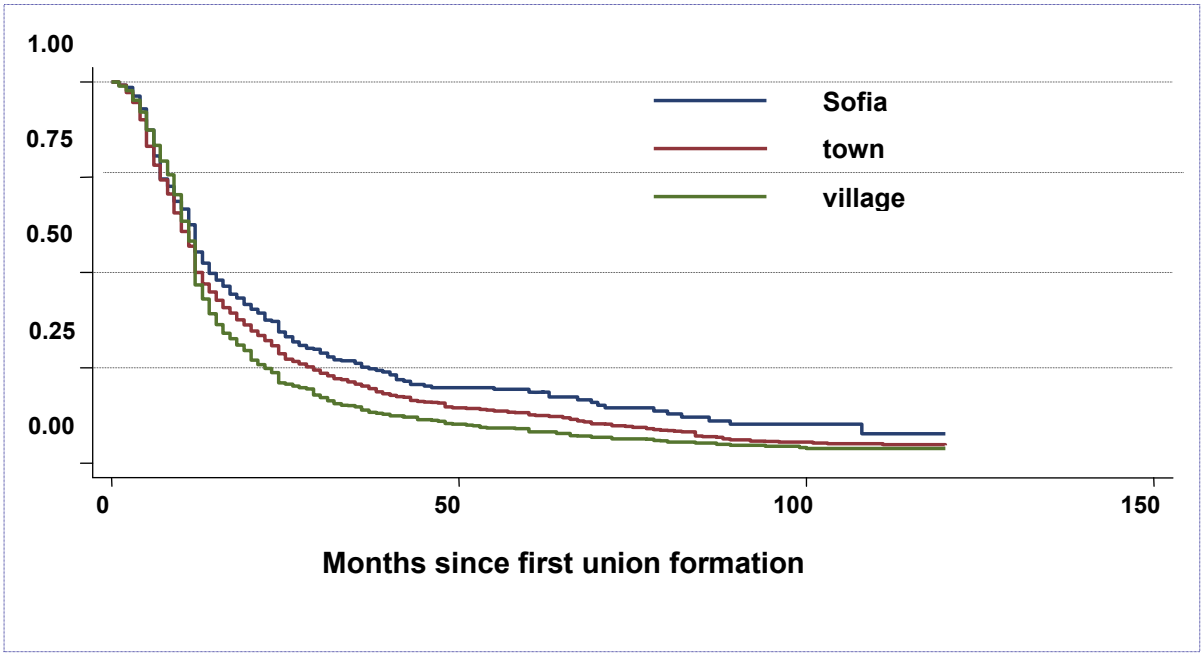

Figure B Kaplan-Meier survival estimation by region of residence

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