

Centre d'Estudis Demogràfics

**TO FORM A UNION WITHOUT HAVING A CHILD.  
THE LENGTHENING OF THE INITIAL PERIOD OF  
LIFE IN UNION BEFORE PARENTHOOD.  
A STUDY BASED ON EUROPEAN FFS DATA**

Daniel DEVOLDER  
Francesca GALIZIA

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**Resum.-** *Unions sense fills. L'allargament del període de vida en unió abans de tenir el primer fill. Un estudi basat en la Family and Fertility Surveys (FFS)*

Un dels principals canvis associats a la Segona Transició Demogràfica és el retard en l'edat de tenir el primer fill, allargant-se el període d'unió sense plans de tenir-los. El retard és possible gràcies a la utilització dels mitjans anticonceptius, fet que contrasta amb la Primera Transició Demogràfica, a on els mitjans anticonceptius s'empraven després del naixement dels fills.

En aquest estudi s'analitzen les diverses dimensions d'aquest ajornament. En primer lloc, es quantifica l'augment temporal d'aquest període inicial sense fills; en segon lloc s'analitza la forma en què aquest canvi modifica el model de la Primera Transició Demogràfica; finalment, s'apunten possibles determinants, emprant dades sobre el temps dedicat per les dones a estudiar i a treballar, i de la transició de la cohabitació al matrimoni. La font bàsica d'informació és la Fertility and Families Surveys, per a 17 països.

**Paraules clau.-** Allargament del període d'unió al naixement del primer fill; Segona Transició Demogràfica, Primera Transició Demogràfica, Family and Fertility Surveys.

**Resumen.-** *Uniones sin hijos. La ampliación del período de vida en unión, antes de tener el primer hijo. Un estudio basado en la Family and Fertility Surveys (FFS)*

Uno de los principales cambios asociados a la Segunda Transición Demográfica, es el aplazamiento en la edad de tener el primer hijo, ampliándose el período de unión sin planes de tenerlos. La demora es posible gracias a la utilización de los medios anticonceptivos, hecho que contrasta con la Primera Transición Demográfica, donde los medios anticonceptivos se utilizaban después del nacimiento de los hijos.

En este estudio se analizan las dimensiones de este aplazamiento. En primer lugar, se cuantifica el aumento temporal de esta etapa inicial sin hijos; en segundo lugar, se analiza la forma en que este cambio modifica el modelo de la Primera Transición Demográfica; finalmente, se apuntan posibles determinantes utilizando datos sobre el tiempo dedicado por las mujeres a estudiar y a trabajar, y de la transición de la cohabitación al matrimonio. La fuente básica de información es la Fertility and Families Surveys, para 17 países.

**Palabras clave.-** Ampliación del período de unión al nacimiento del primer hijo; Segunda Transición Demográfica, Primera Transición Demográfica, Family and Fertility Surveys.

**Abstract.-** *To form a union without having a child. The lengthening of the initial period of life in union before parenthood. A study based on European FFS data*

The authors of the Second Demographic Transition scheme single out the postponement of the age at first childbearing as the main effect of the changes in habits of young adults associated with this transition. This postponement is accompanied by an increase in the length of the initial period of life in partnership when the couple has no plan yet to have children. This change is made possible by the use of contraceptive means by people living in partnerships in order to delay first childbearing. This is in sharp contrast with the First Demographic Transition, which was also characterized by the extension of the use of

contraceptive means, but only after the birth of children. So contraception was used then to control fertility, when it is used nowadays to extend the period of life when no irreversible decisions, like having a child, have been made yet.

In this work, we study various dimensions of this postponement of childbearing by couples. First, we try to quantify the magnitude of the increase in the duration of this initial period, when the couple delays parenthood. Second we have a look at the way this change in fertility behaviours in the first years of union change the duration model that was typical at the end of the First Demographic Transition. Finally, we investigate the possible determinants of the increase of this initial period using data on time spent by women studying and working, and of the transition from cohabitation to marriage. We use data from Fertility and Families Surveys for 17 countries and apply life table techniques and proportional hazard modelling.

**Keywords.-** Postponement of childbearing; Second Demographic Transition, First Demographic Transition, Family and Fertility Surveys.

## Résumé

Les auteurs du modèle de la Seconde Transition Démographique indiquent que le retard de l'âge à la première maternité en est la principale caractéristique, et serait la conséquence des changements de coutumes des jeunes adultes associés à cette transition. On observe dans ce travail que ce retard est accompagné par un accroissement de la durée de la période initiale de vie en couple, quand celui-ci n'a pas encore d'intention d'avoir un enfant à court terme. Ces changements sont rendus possibles par l'utilisation croissante de moyens contraceptifs par les couples vivant en union, *avant* la naissance de leur premier enfant. Ceci s'oppose à ce qui se produisit au cours de la Première Transition Démographique, qui se caractérisa aussi par l'extension de l'usage de la contraception, mais seulement *après* la naissance des enfants. Donc la contraception était utilisée dans le passé pour limiter la descendance, quand elle l'est maintenant pour étendre la durée de vie pendant laquelle n'ont pas encore été prises de décisions irréversibles, comme avoir des enfants.

Dans ce travail, nous étudions plusieurs dimensions de ce retard de la première maternité. En premier lieu nous quantifions l'importance de l'accroissement de cette période de vie en couple avant qu'ait été prise la décision d'avoir un premier enfant. En second lieu nous analysons les conséquences de ce changement de comportement sur le modèle de durée de l'union avant la première conception qui était typique à la fin de la Première Transition. Finalement nous recherchons les déterminants possibles de cet allongement de la période initiale de vie en couple sans enfants, retenant surtout les variables liées à l'usage du temps, comme les études ou le travail des femmes, ainsi que la transition de la cohabitation au mariage. Nous utilisons les données des enquêtes de famille et de fécondité des Nations Unies (FFS) pour 16 pays, et appliquons des techniques de table de survie et de modélisation du risque relatif.

**Mots clés.-** Retard de la première maternité, Seconde Transition Démographique, Première Transition, Family and Fertility Surveys.

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**1.- Introduction**<sup>3</sup>

In one of the different formulations of the "Second Demographic Transition" Model, one of its two main authors presented a clever way to compare it with the classical or First Demographic Transition, speaking about fertility as well as family formation behaviours (Lesthaeghe, 2000).

Beginning with fertility changes in time, Lesthaeghe observed that during the First Demographic Transition (hereafter FDT), which took place in Europe during the 19th Century until the Second World War, fertility decreased mainly after age 30, as a consequence of the reduction in family size. On the contrary, during the Second Demographic Transition (hereafter SDT), which began during the 1970s and is still taking place, fertility is decreasing before 30 years of age, as a consequence of the postponement of the age at first childbearing. The transformation of reproductive behaviours that took place during both transitions is closely associated with the extension of contraceptive use, and also its greater effectiveness in recent times. However, according to Lesthaeghe, there

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is an important difference between the two transitions: during the first one, contraception was used to limit family size, so it was used mainly *after* the birth of children. On the contrary, during the SDT, contraception use increases mainly *before* the birth of the first child.

Changes in the fertility regime during the FDT have been analysed in different ways. For example Coale and Trussel (1974) have proposed to do it taking into account the age of women, using the distance between a curve of observed marital fertility rates by age of mothers and the natural fertility schedule introduced by Henry. Henry (1953) himself introduced earlier a measure of contraception use based on birth order, which allowed him to show that the fertility fall during the FDT depended on parity: the decrease was relatively higher for births of third or fourth order than for the first two ones. Finally Page (1977) presented a model of fertility control based on marriage duration: fertility decreased exponentially with duration during the transition. The study of fertility patterns during the FDT has shown that, before that transition, fertility levels depended mainly on women age, taken as a proxy for biological factors. On the contrary, at the end of the FDT, fertility was mainly a function of marriage duration, with a high level during the first two years and a steep fall after 2 or 3 years of union. Fertility also depended on parity, with a strong decrease mainly for births at order third or more. In comparison, reproductive changes during the SDT are increasingly a function of age (due to the postponement of first childbearing) and possibly also of parity (with a concentration on the first two births for each woman). But the effects of this transition on the relation between fertility levels and union duration have not been studied in details. Generally speaking, the postponement of the age at first childbearing is the main demographic consequence of the SDT. So it is of considerable interest to explore its determinants, the proximate as well as the substantial ones. For example a preliminary step in the exploration of its factors is to determine if it is mainly a consequence of a postponement in the age at partnership or of an increase in the length of the interval between the start of the union and the first birth. If the latter explanation is true, then we should observe a fall in fertility levels at the beginning of the union, and an increase latter, which could mean either that there is a change in the functional dependence of fertility on duration, or that union duration is no longer a determinant of fertility levels. On a more substantial level of explanation, and if the postponement of childbearing is due to the increase of this interval, this could mean that there is a disconnection between the start of reproductive life and the union formation,



something that could be new and characteristic of the SDT. This would mean also that, for an increasing proportion of unions, there is a new stage in their life cycle, an initial phase after the start of the partnership, during which childless couples have no immediate plan to become parents.

We will try in this work to determine whether we can speak of the apparition of this new initial stage of the union life cycle, characterized by a conscious postponement of the start of the reproductive life. In the case we observe the existence of that stage, we will determine whether its length is increasing, as forecasted by the SDT model. The theoretical explanations used by its authors have a cultural foundation. Changes in fertility behaviours are related with the diffusion of new social norms in which the interests of individuals are privileged above those of the group. The increase in cohabitation, of divorce, of the social and economic activity of women could be the consequences of the predominance of individual choices over the stability and the unity of families. An important aspect of these changes in family formation norms is what Lesthaeghe calls the 'de-standardisation of life courses': the traditional life cycle sequence of studies-work-leaving parental home-marriage-children breaks during the SDT in favour of multiple alternate or mixed sequences. In this way, the first years of life in union often coincide with the end of studies years; the proportion of couples that cohabit increases as well as does the proportion of women who work. We will test whether this new initial stage is a consequence of the need to adapt to the generalisation of these new sequences. If this is not the case, the existence of this new stage could then be seen as the manifestation of a genuine desire of young couples to dispose of a 'childfree' period of time, something new and characteristic of the SDT.

## **2.- Data and measurement issues**

We use data from the Family and Fertility Surveys (FFS) conducted in 23 countries in the 1990s under the coordination of United Nations. In each country around 4.000 women and 2.000 men aged between 15 and 54 years were interviewed. We work only with data for women, and don't take into account the data for men. The main justification for doing so is that the changes we analyze affect principally women (for example regarding studies after the start of union or the increase in activity rates).

One of the principal interests of these surveys is the fact that the questionnaire and the codification of its results is the same for all countries, which ease considerably comparative analysis. Another important advantage for us of using these surveys is that the demographic and social changes we want to study began during the 1970s. So the FFS provide data for birth cohorts whose union formation period took place just before that time as well as cohorts that experimented fully the impact of these changes. We have chosen to work with a high number of countries, in order to cover the larger diversity of situations we can. We use the data for 16 countries, after having excluded those for the non-European one (United States, Canada and New Zealand), as well as those for Bulgaria, Greece, Sweden and Switzerland (those last ones for diverse practical reasons). The results of this study will show that there are great differences in family formation behaviours between two groups of countries: those that until the 1990s had a socialist economy and the rest of the countries. So in this study we will refer to the first group in a generic way as the 'East European', and to the second as the 'West European countries'. Also, in order to study better the differences between these two groups of countries, we have disaggregated the data for Germany into those for West and East Germany, which in the end increases our country count to 17.

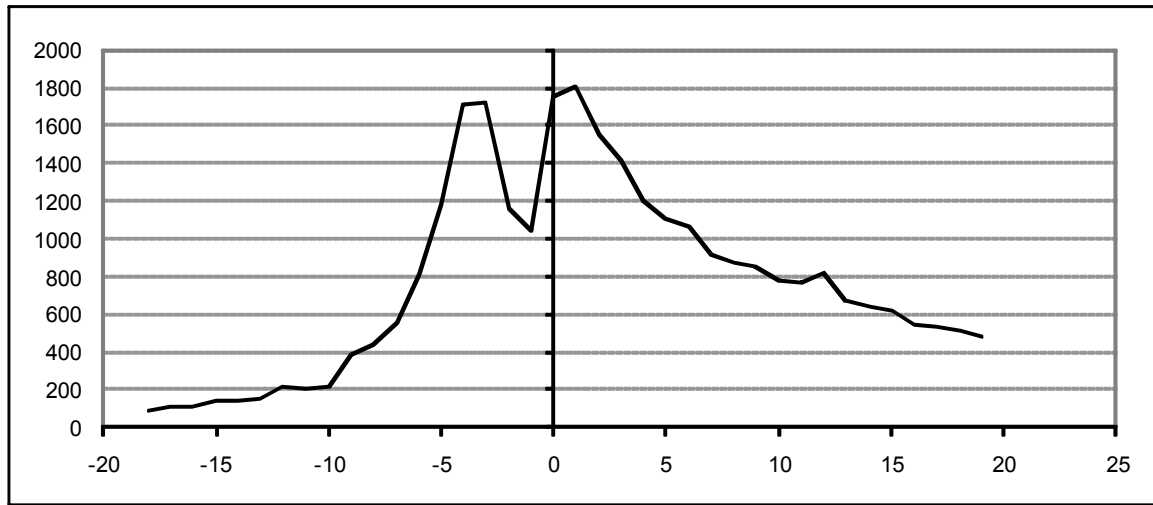
Before we start with the description of the methodology and the results of the study, it is convenient to talk about the way we measure the length of the couple life cycle stage before parenthood. We want to estimate the duration of the interval between the start of the union and the moment when the couple has decided to have a first child. Age at first partnership can be observed with reasonable accuracy, because the FFS have a question asked on its date. But this is not so for the second age, as there is no question on the moment when the couple decided to start its reproductive life. And even if there were one, its results would be doubtful, as it is somewhat fuzzier and more difficult to remember that moment than one associated with a material change like living together. In fact the FFS questionnaire has a series of questions on the contraception use spells that could have been used to estimate this age at the start of the reproductive life. But that part of the questionnaire was optional, and very few countries used it. So we are forced to use as a proxy the age at first conception. This creates two different problems. First the age at first conception is in general higher than the age at the moment the couple decided to have a first child. These two ages will coincide in approximately 20% of the cases, which is the value of the probability of a fecundation in a menstrual cycle for non-contraceptive couples

with a woman aged between 20 and 35 years. So for 80% of the cases, the two ages will not be equal, and the exact time to conception cannot be predicted at the individual level. Its mean and median duration will be around 7 and 4 months respectively, taking also into account the heterogeneity of fecundability between women. Therefore we will need to subtract these values from the mean or median duration we will observe. The second problem that creates the use of the age at first conception is that a proportion of the women living in couple will not experiment a conception even when they want one. This is due mainly to sterility or hypofertility, and will occur for less than 5% of the cases. This second problem has no solution, and the couples in that situation will be confounded with the cases of couples that really don't want to have children.

Another related issue is how we estimate age at first conception. We do it excluding induced abortion (as well as adopted, foster, or step- children) and computing for each woman the minimum age either of her first live birth, or of her first spontaneous abortion, or of her first stillbirth, or of her age at the probable end of pregnancy if she is pregnant at the time of the survey. We then subtract to this age a fixed value for the duration of the pregnancy (9 months for a live birth, 8 months for a stillbirth, and 2 months for a miscarriage).

In order to check for the quality of the results, we then compare the month of first conception with the month of beginning of the first partnership, for women who had both events. Figure 1 shows the monthly total count for women of the 17 countries studied. We observe that the number of first conceptions is at its maximum in the first two months of the first partnership, and much higher than the month before, which is consistent with what could be expected. It is interesting to observe that there is a second bulge at around 3 or 4 months before the start of the first union, which concentrates the conceptions that accelerate or provoke the union formation. Another interesting observation is that the prenuptial conception count increase at a faster pace during the 10 months period before the start of the first partnership. These conceptions correspond to births that occur after the beginning of the union and are in part the results of anticipative behaviours *stricto sensu*, the other part being the conceptions that provoke a partnership 3 or 4 months after ('prenuptial conception' are the result of behaviours that either anticipate the partnership or trigger it, so in that sense they are the sum of these two components. See for example Henry 1951, or Léridon, 1990).

**Figure 1.- Month of first conception in relation with month of start of first partnership**



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Source: FFS data. The data shown is the count of first conceptions by month until or since the month of start of the first partnership, for women of the 17 countries who had both events. First conceptions include miscarriages, stillbirths and ongoing pregnancies at time of survey. Computed on unweighted data.

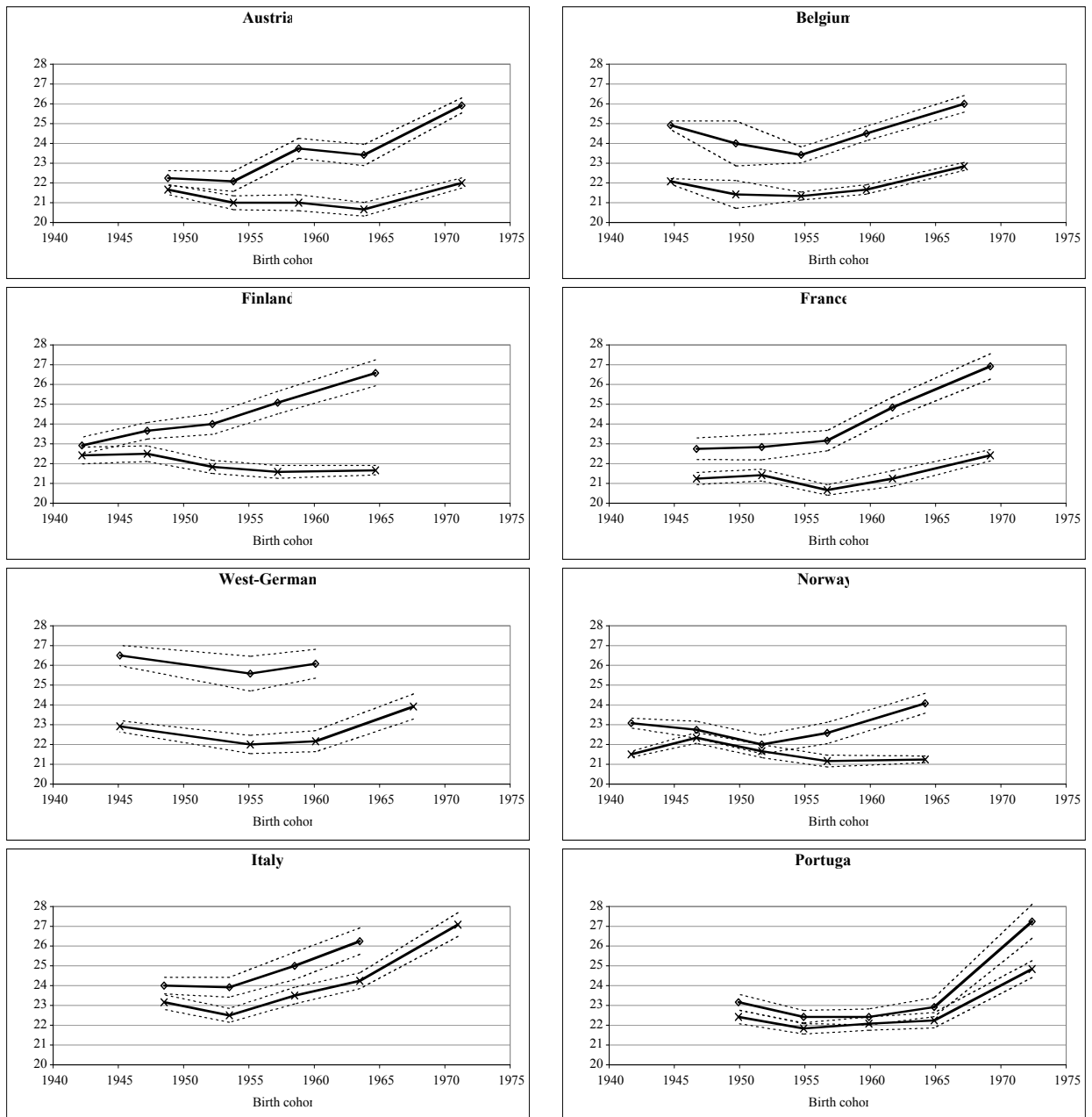
### **3.- Age of women at first union formation and at first conception**

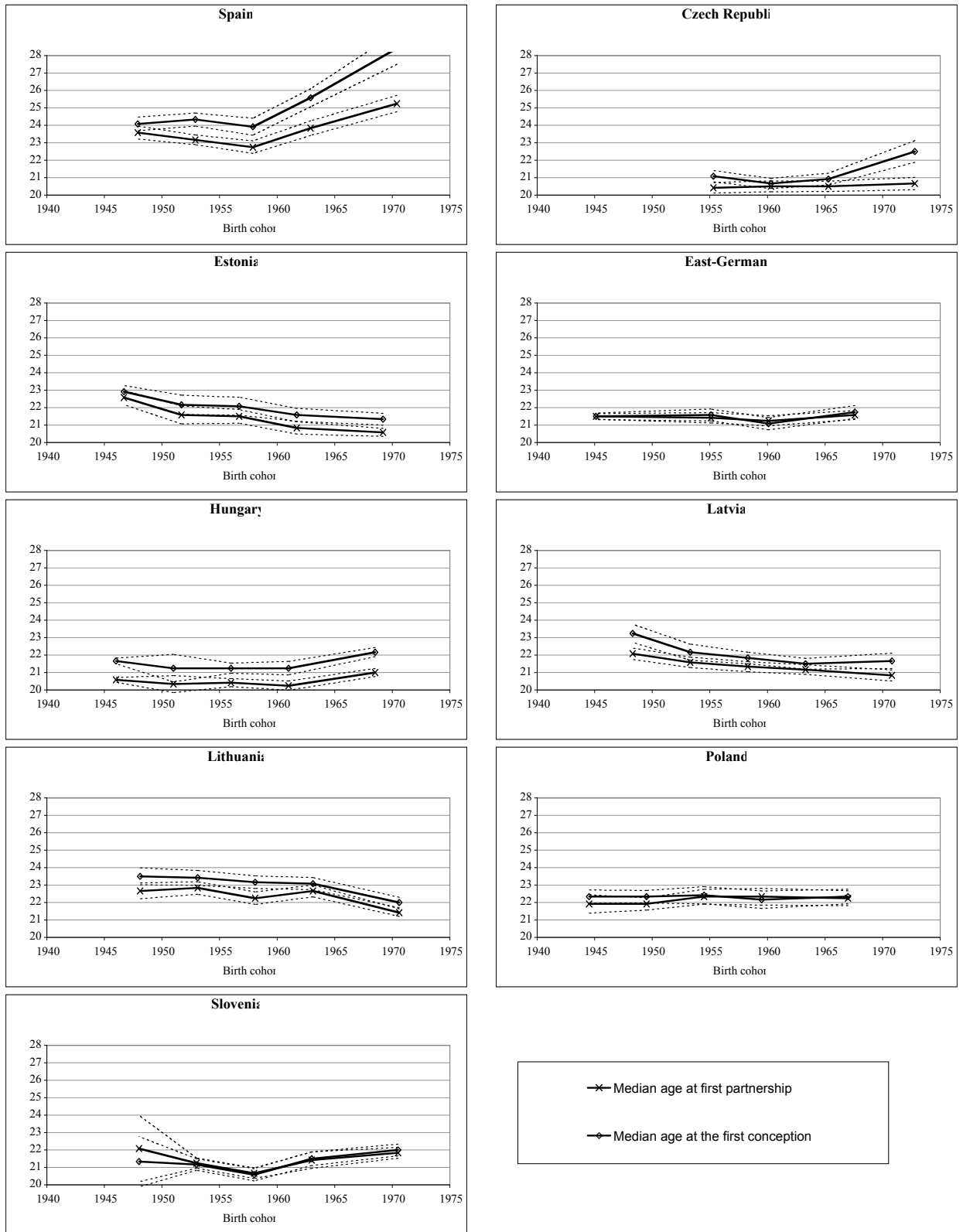
A first glimpse of the phenomenon we will study is offered by the curves of the evolution of median ages at first union formation and at first conception, by birth cohort (Figure 2). The median age is computed for all the first conceptions, without taking into account whether or when the women enter into a union. So the difference between these two ages cannot be interpreted as the duration of the interval between these two events, which forces us to be careful in the analysis of these results.

We observe that the distance between these two ages increases for younger birth cohorts in all the Western and Northern European countries, and also, but less so, for the Southern European countries. On the contrary these two ages remain very close for all the East European countries. It is worth noting that the postponement of the age at first conception occurred in Finland and Norway when age at first union formation remained constant. More generally age at first union formation increased at a slower rate in the Western and Northern European countries compared with the three Southern European countries. So this first analysis gives us a confirming clue about the reality of the postponement of first conception by couples of the younger birth cohorts, in relation with older birth cohorts for which most of the couples formed their unions before the start of the SDT. But this general

observation needs to be modified in the case of Belgium and West Germany, where the distance between these two ages remained almost constant and relatively high, around 3 years, for all the birth cohorts. So in the case of these two countries, we don't observe a postponement across cohorts, probably because it had already taken place for past cohorts.

**Figure 2.- Evolution of the median age at first partnership and at first conception for women, by birth cohort. Based on FFS data for 17 European countries**





Note: Median ages are estimated from Kaplan and Meier survival tables computed on weighted data. Dashed lines give the confidence interval at a 95% level around the value of these ages (based on standard errors for unweighted data). The selected cohorts are the women aged less than 30 years, 30-34 years, 35-39 years, 40-44 years and 45 years and more at the time of survey.

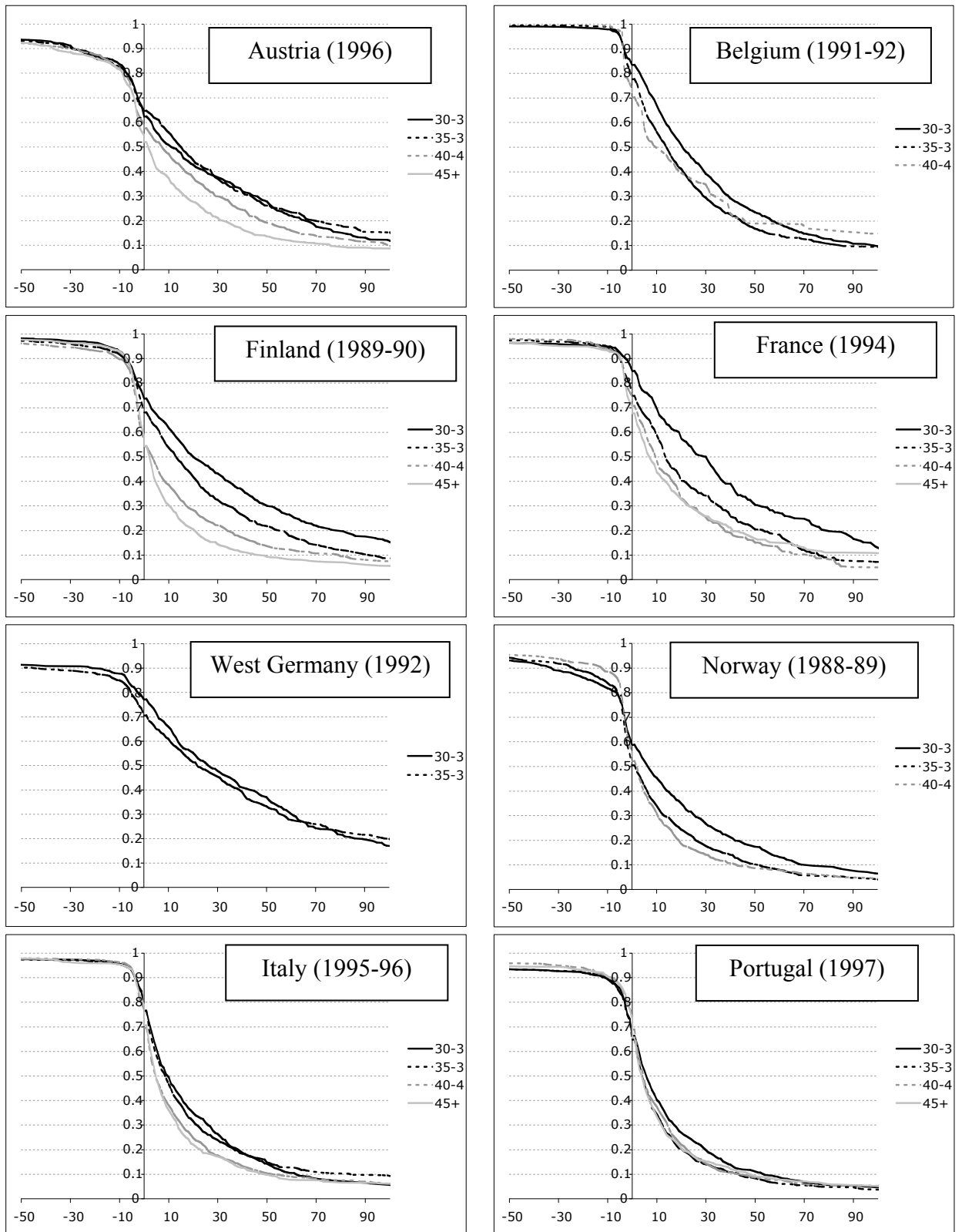
Another noteworthy observation is that the distance between these two ages is very low for the East European countries. It is even negative in some cases, notably in some birth cohorts of Poland and Slovenia. This in turn can be explained by the importance of conceptions before the first union, what we are going to analyze now in more details.

#### **4.- The relationship between age at union formation and age at first conception in the life cycle of women**

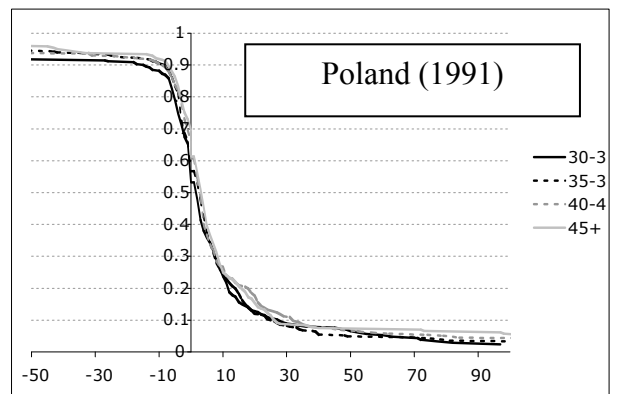
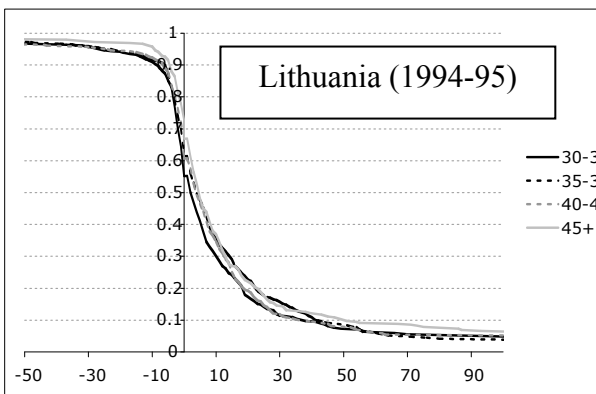
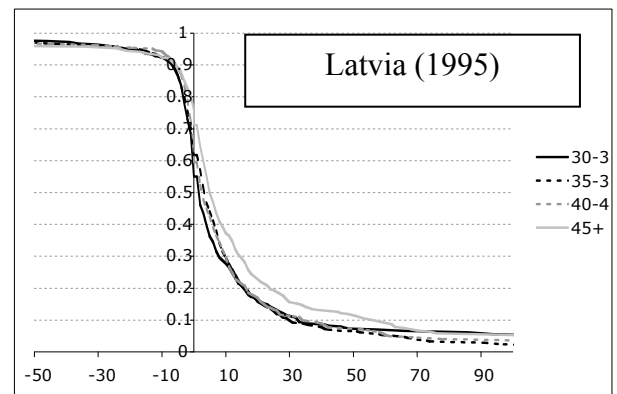
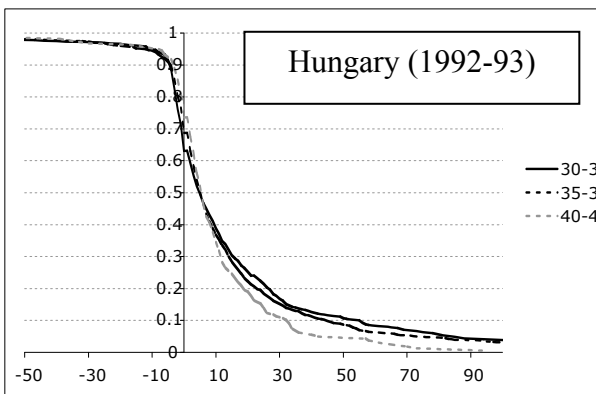
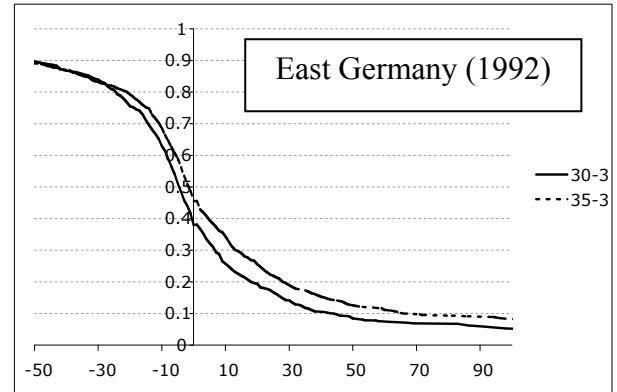
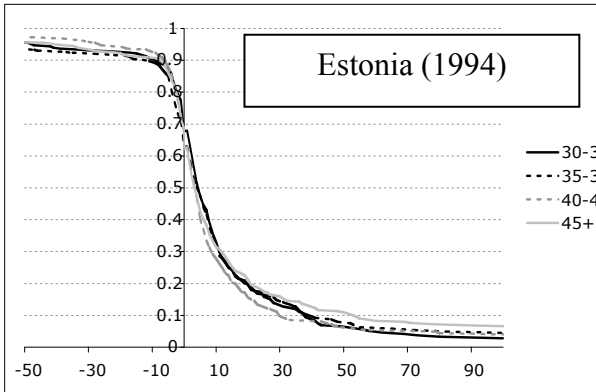
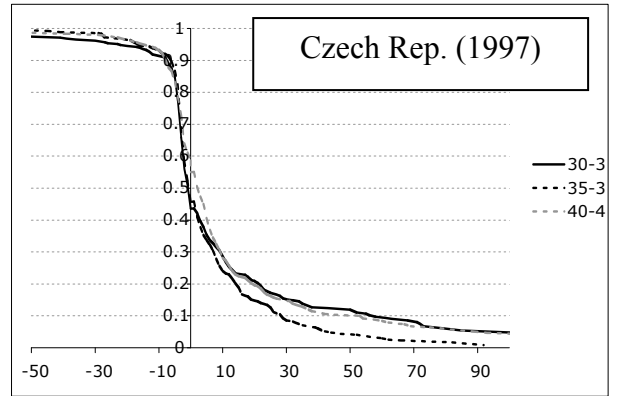
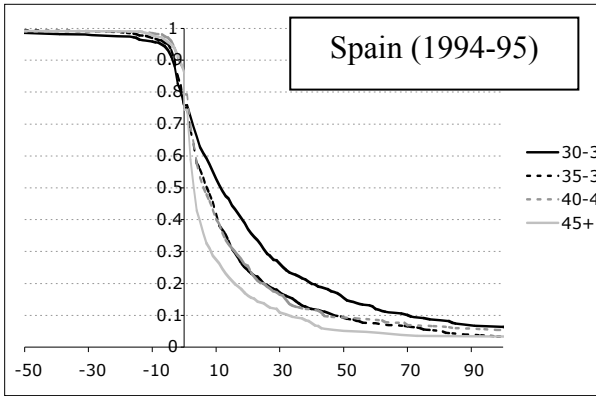
Numerous studies of the historical demography of Europe have shown that prenuptial conceptions were quite habitual in the past. So it is no surprise to observe the same phenomenon today in all in the European countries studied here, as we already saw with Figure 1. In order to analyze the relationship between union formation and first conception in more details, we use the technique of 'mirrored survival function' invented by Billari (2001), which allows to obtain a unique survival table from two different sequences of events: for the time from a first conception until the first union and for the time from a first union until a first conception. This provides a measure, for each duration until (or from) the start of the first union, of the proportion of women who experimented a first conception before (and the proportion who experimented one after). We can then observe (Figure 3) that for East European countries like the Czech Republic, East Germany and Slovenia, nearly half of the women had their first conception (plotted at negative durations) before entering their first partnership (which corresponds on the graphs to the vertical line at duration 0). This proportion is also very high for some age cohorts in Austria, Finland and Norway. This proportion is much lower in the rest of the countries, with a minimum value of less than 15% for women of some age cohorts in Belgium, France, Italy and Spain. We also observe that:

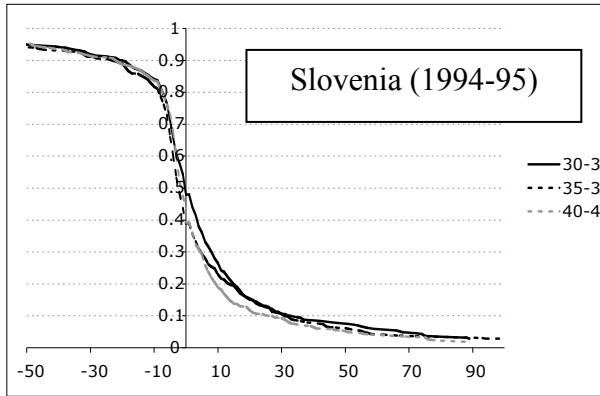
- There is a general reduction of this proportion of women who start their reproductive life before entering their first union for younger age cohorts in West European countries. The fall in this proportion is what we would expect, according to the hypothesis we try to verify, because if the contrary were true, it would mean that for a growing number of women there is no place for an initial stage of life in union without children. This contrast with a general increase of this proportion of 'pre-partnership' conceptions for cohorts of the East European countries. So there were two opposite process taking place in the distribution of family formation sequences in these two groups of countries, before the end of the socialist economies.

**Figure 3.- Mirrored survival function between first conception and first partnership (duration until or since the union formation), for women, by age cohorts**









The year between brackets is the survey year. Each curve is based on two Kaplan and Meier survival tables computed from weighted data. The first one, with negative duration values, is for women who had a first conception before their first partnership. The proportion on the graph is the one's complement of the survival function. For example, duration  $-i$  corresponds to women who had their first conception  $i$  months before their first union (the cases of women with a first conception but without a first union before the survey are considered as truncated observations). The second Kaplan and Meier table, with positive duration values correspond to first partnerships before woman first conception. The survival proportions at each negative duration are multiplied by  $C / (C + U)$  and by  $U / (C + U)$  for positive durations where  $C$  is the number of women with a first conception before the first union and  $U$  is the number for the inverse sequence (we follow the methodology described by Billari, 2001).

- 73% of the 'pre-partnership' first conceptions occurred at less than 10 months of the first union formation, which can be interpreted as the manifestation of anticipatory or triggering behaviours, as previously commented. This proportion is even higher for the East European countries for which more women had their first conception before entering their first partnership, but less than 10% of these women waited more than one year from the conception to the union formation. Again Austria and East Germany are two exceptions to the general rule: for more than half of the women who had their first conception before forming their first partnership, the duration between the two events exceeded 10 months.

If we focus now on the right part of the curves, from the start of the union, the phenomenon we want to study is clearly observable in all the West European countries, albeit with a variable degree. For example time to conception in union clearly slowed down for younger age cohorts in Austria, Finland, Norway, France, Italy and Spain. This is also true, but is less clear, for Belgium, West Germany and Portugal. On the contrary there is no apparent lengthening of the childless phase at the beginning of life in partnership in the Eastern and Central European countries, with the possible exception of the Czech Republic.

### 5.- The union life cycle stage before parenthood

In the remainder of this study, we are going to focus exclusively on the characteristics of the first stage in the union life cycle, before the couple decide to have children. We will use only data for first partnerships, because they regroup most of the first conceptions (see table 1). But this choice forces us to restrain significantly the number of cases, as we have to exclude the women who had a first conception before the first union formation. We have to do so because we want to measure an interval in the life of the partnership, when the couple is living together and has no plan to have children. Also this is the only way to measure time to conception, as we don't know what is the number of women exposed to the risk of conception before they enter a partnership. This restriction is clearly a problem, as we exclude a great number of first conceptions, around 50% of the total in the case of some countries.

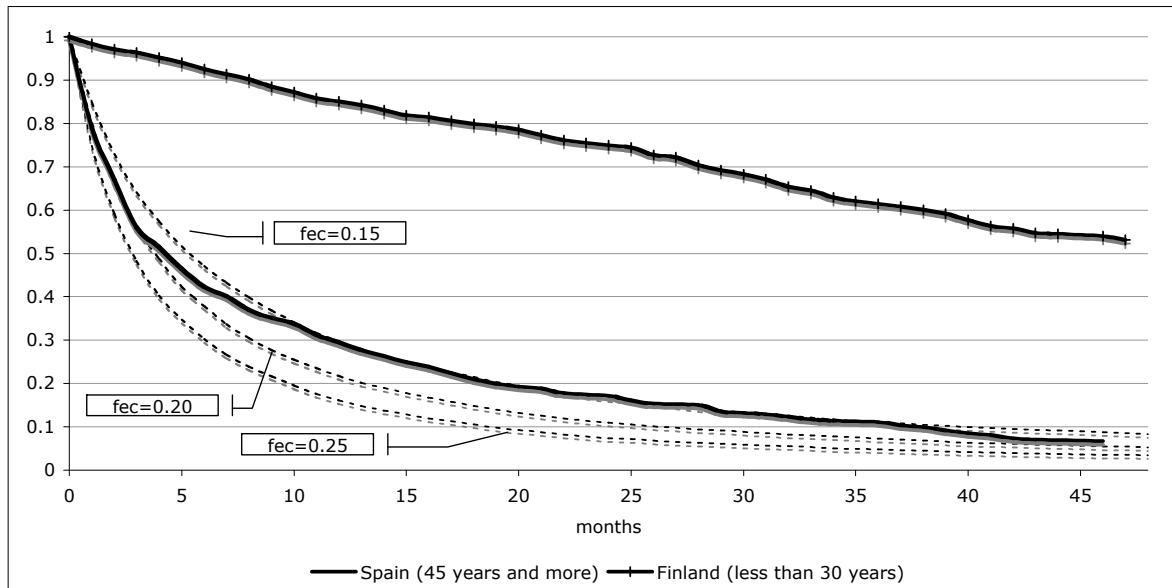
**Table 1.- Distribution of women aged 35 to 44 years at time of survey according to the moment of their first conception, in relation with first partnership (%)**

	No conception	First conception			
		No partnership	Before 1st partnership	During 1st partnership	After 1st partnership
Austria	9	3	32	51	6
Belgium	13	0	17	68	2
Finland	12	1	31	53	4
France	8	3	23	62	4
Norway	6	2	41	48	3
W. Germany	27	7	18	43	6
Italy	14	1	17	66	1
Portugal	10	0	25	65	0
Spain	8	0	15	75	1
Czech	4	0	43	50	3
Estonia	6	3	28	60	2
E. Germany	11	5	43	38	3
Hungary	5	1	24	67	4
Latvia	5	1	30	61	3
Lithuania	10	2	29	57	2
Poland	7	5	32	56	1
Slovenia	3	2	53	40	2

Source: FFS data. First conceptions include miscarriages, stillbirths and ongoing pregnancies at time of survey. Computed on unweighted data.

The type of evolution we want to analyze corresponds to the curves plotted in Figure 4.

**Figure 4.- Comparison of two survival curves for first partnerships until women first conception with a natural fertility model**



Note: Kaplan and Meier survival curves for Spanish women aged more than 45 years and Finnish women aged less than 30 years at the time of the FFS survey. The analysis is restricted to partnerships for which the woman had no conception before the start of the union (excluding pregnancies interrupted by induced abortion). Dashed lines are based on data from a microsimulation model of survival until the first conception for 10.000 fecund couples, with a mean fecundability of 0.15, 0.20 or 0.25. The heterogeneity of the fecundability between women is modelled by a beta function with the alpha coefficient equal to mean fecundability and the beta coefficient equal to 1 less the mean fecundability.

These curves are survival function by duration of first union until the first conception. Two curves correspond to observed data, one for the oldest Spanish age cohort (women aged 45 years and more at the time of the survey) and the other one to the youngest Finnish age cohort (less than 30 years). They are compared to equivalent curves obtained from a microsimulation model based on a hypothesis of natural fertility. In this model we start with 10.000 hypothetical couples that have a normal sexual life and don't use contraceptive means. The three model curves differ only on the level of fecundability, with a probability of conception in the menstrual cycle varying from 0.15 to 0.25, levels that are close to observed one for non-controlling populations. From this comparison it is clear that the Spanish age cohort curve is close to the natural fertility model ones, in its level as well as its curvature, and in this way is also close to Page's duration model of fertility (an exponential function of marriage duration with a constant negative factor). On the contrary the Finnish curve level and form is very far from the model ones. So the history that tells these curves is one of a transition away from a situation where couples didn't use

contraceptive means before the birth of their first child, toward the predominant behaviours for younger age cohorts in the West European countries, in which it is habitual to use contraception in order to postpone parenthood. The consequence is a considerable increase in the median time before the first conception, from around 4 months for the Spanish age cohort to around 4 years for the Finnish one. If we take into account the distribution of time to conception in a non-contraceptive population, we can say that for the Spanish age cohort their reproductive life started at the beginning of the union. On the contrary there is a very large interval of time between the two events for the Finnish age cohort, of more than 3 years and half of life temporarily without children, before the first conception.

Table 2 gives the value of the median duration of life in union before the first conception, by age cohorts and for all the countries we studied. We can observe that:

**Table 2.- Median duration of first union before woman first conception, by cohort and country**

Country	< 30 years	30-34 years	35-39 years	40-44 years	45 years and more
Austria	44	39	36	31*	20*
Belgium	35	27*	20*	26	
Finland	47	37	26*	19*	11*
France	38	34	22*	18*	17*
West Germany	46	45	42		
Norway	36	25*	17*	12*	
Italy	17	15	12*	9*	8*
Portugal	16	13	9*	9*	8*
Spain	25	18*	10*	8*	3*
Czech Rep.	18	13	9*	9*	
Estonia	9	8	9	6	8
East Germany	21	17	21		
Hungary	24	20	22		
Latvia	13	7*	7*	8*	9
Lithuania	11	10	11	10	10
Poland	5	7	6	6	6
Slovenia	15	10*	12	8*	3*

Note: Median duration is estimated from Kaplan and Meier survival tables computed with weighted data. The asterisk symbol indicates that the value for a cohort is significantly different (at a 5% error level) from the median duration for the cohort of women aged less than 30 years at time of the survey (standard errors are computed from unweighted data).

- This median duration is higher for West European countries, with values exceeding 30 months for younger women, and lower for all the age cohorts of East European countries.
- There is a general increase in this median duration in almost all the West European countries, except for Austria, Belgium and West Germany where the value was already high for older age cohorts.

## **6.- A multivariate model of the factors of the lengthening of the union life cycle stage before parenthood**

In the preceding paragraphs we have confirmed the existence of a period of life in union with a conscious postponement of parenthood, and its increase in length for the younger age cohorts, for the majority of West European countries analyzed. We are now going to investigate whether this is the manifestation of a genuine desire of young adults to have a period of time of living in couple, without children, just after the start of the union. Or on the contrary, if this lengthening could be explained by the necessity to adapt the life in union to the new and more complex sequences that correspond to what Lesthaeghe calls the de-standardisation of the life course. In order to determine the importance of these factors, we use a Cox's model which will allow us to study the characteristics of the cohort changes in the survival function of first union before the first conception, and to see what happens when we introduce variables that take into account the effects of the de-standardisation, like the cohabitation and the time spent studying or working. Table 3 presents the result of this modelization in the case of Finland.

### **6.1.- The simplified model**

The first model is a simplified one, whose objectives are to allow us to measure in a precise way the changes in the survival function of unions, both in its form and its intensity. We use the age at union formation as a control variable, and two more parameters for each age cohort that quantify the importance of the evolution. The effect of age at union formation could be interpreted as a biological component (fecundity decreases and sterility increases with age). The two parameters for each cohort take into account two different dimensions of the cohort change. This is visualized in Figure 5, which shows:

**Table 3.- Cox model for the survival in first union before women first conception: case of Finland**

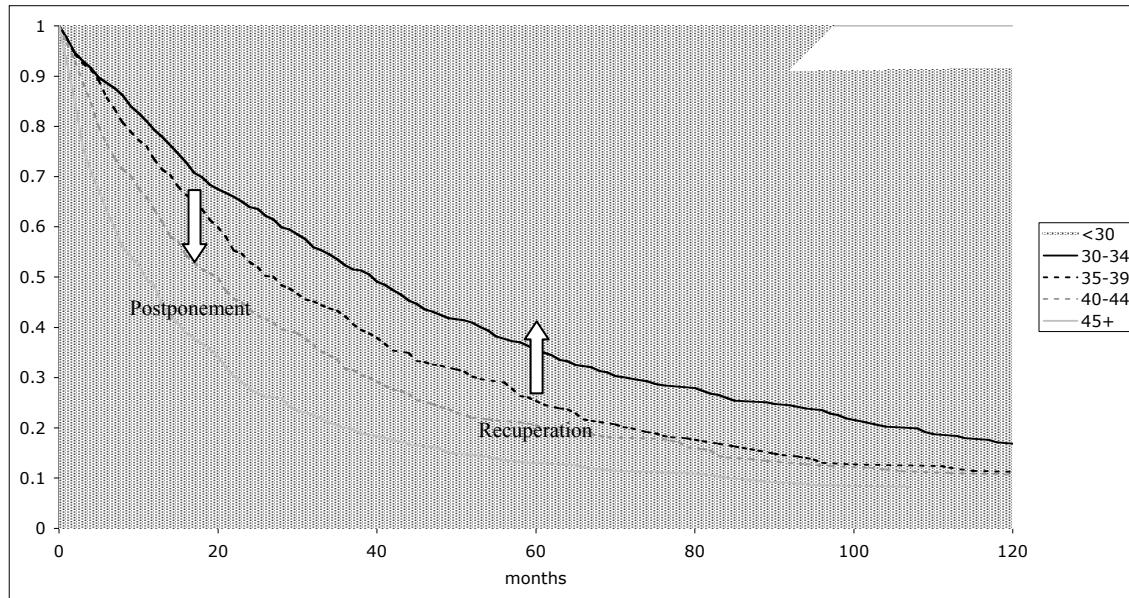
	Model 1	Model 2	Model 3
<b>Woman age at start of the union</b>	-0.035 (0.966)**	-0.021 (0.980)**	-0.024 (0.976)**
<b>Differences between cohorts</b>			
<i>Postponement effect</i> (value at the start of the union)			
< 30 years (reference category)			
30-34 years	0.429 (1.536)**	0.285 (1.330)*	0.307 (1.360)**
35-39 years	0.758 (2.133)**	0.424 (1.528)*	0.444 (1.560)**
40-44 years	1.171 (3.225)**	0.588 (1.800)**	0.584 (1.793)**
45 years and more	1.700 (5.473)**	1.004 (2.730)**	0.987 (2.684)**
<i>Recuperation effect</i> (dynamic variable)			
< 30 years (reference category)			
30-34 years X time	-0.006 (0.994)*	-0.005	-0.005
35-39 years X time	-0.009 (0.991)**	-0.007 (0.993)*	-0.007 (0.993)*
40-44 years X time	-0.018 (0.983)**	-0.013 (0.987)**	-0.014 (0.987)**
45 years and more X time	-0.028 (0.972)**	-0.023 (0.977)**	-0.023 (0.977)**
<b>Educational attainment level</b>			
Low (reference category)			
Median		-0.090	-0.052
High		-0.156 (0.856)*	-0.007
<b>Marriage</b> (dynamic)		0.872 (2.392)**	0.859 (2.361)**
<b>Studies</b> (dynamic)		-0.013	-0.641 (0.527)**
<b>Work</b> (dynamic)		0.141 (1.151)*	-0.147 (0.863)*

Notes: \* Significant at the 5% level. \*\* Significant at 1% level. When the coefficient  $\beta$  is significant, we give the value of the relative risk, which is equal to  $\exp(\beta)$ . The recuperation effect is a dynamic variable measured by an interaction effect between a dummy variable equal to 1 for each cohort and multiplied by the time variable (in months). There are 3 more dynamic variables: the marriage effect, with cohabitation coded by 0 and marriage by 1, the studies spells and the work spells each coded by 1 when the women either studies or works, and 0 otherwise. There are two complete models, which differ by the way studies are taken into account. In model 2, the variable is the time until the end of the main studies. In model 3 we take into account all the studies spells. The reason for doing so is that some of the 17 countries don't have data for all the studies spells.

- The effect of *postponement* of first conception in union life cycle for younger age cohorts, characterized by a lower level of the risk in the first years of life in union.
- The effect of *recuperation*, which is the inverse tendency, the fact that after the period when postponement behaviours predominate, couples try to regain the time lost, and this

leads to a relative increase in the probability of a first conception, which surpasses the level for oldest cohorts after a few years of duration.

**Figure 5.- The postponement and recuperation effects: proportion of women in their first union who had no conception, by age cohorts (case of Finland)**



Note: only for partnerships with women who had no conception before the start of the union (excluding pregnancies interrupted by induced abortion).

The interplay of these two parameters is shown in Figure 6. We compare women in the youngest age cohort, aged less than 30 years at the time of survey, to the women in the oldest cohort, aged 45 years and more. The curve for each country gives the difference between the cumulated proportions of women with a first conception in their first union for the youngest and for the oldest cohort, by duration of the union. This curve is computed at each marriage duration  $d$  from the following formula:

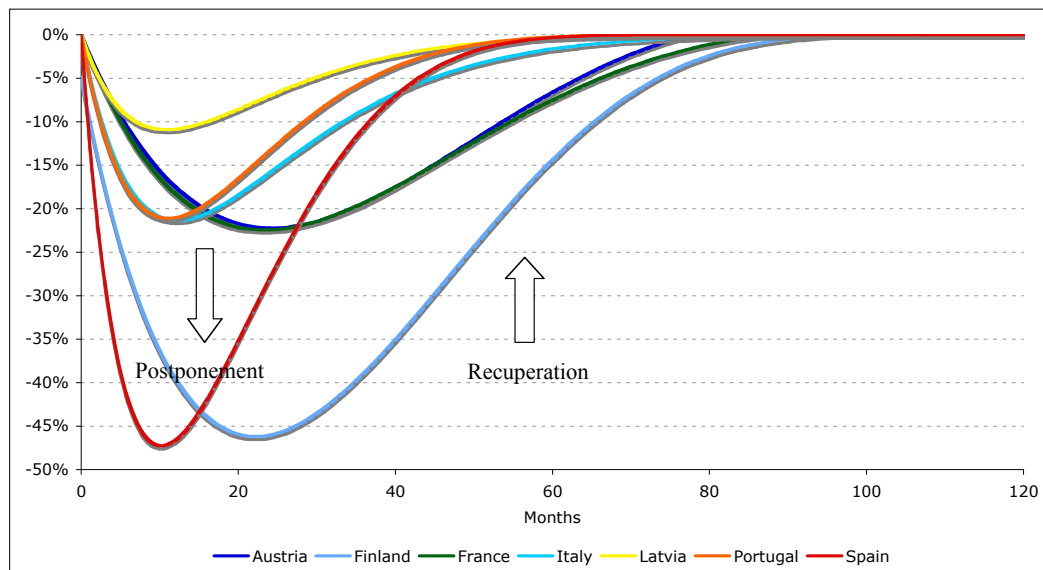
$$\frac{1 - \int_0^d e^{-\lambda x} e^{-\beta_0 - \beta_1 x} dx}{1 - \int_0^d e^{-\lambda x} dx}$$

Where  $\lambda, \beta_0, \beta_1$  are respectively a constant monthly risk of conception, the coefficient of the postponement effect and the coefficient of the recuperation effect for the oldest age cohort, relatively to the youngest one. The value for the risk of conception is different for



each country and is chosen in order to adjust to the median time to conception in Table 2. The value for the coefficient of the two effects is given by model 1, and for example for Finland,  $\beta_0$  is equal to 1.7 and  $\beta_1$  to -0.028 (see Table 3).

**Figure 6.- The interplay of the postponement and the recuperation effects: difference between the proportion of younger women in their first union who had a first conception and the same proportion for older women**



Note: The values represented are the difference in the cumulative proportions of women with a first conception, by duration of the union, between the women in the youngest age cohort (30 years or less at time of survey) and the women in the oldest age cohort (45 years or more). Only women who had no conception before their first partnership are considered. In order to obtain the value of these proportions, we have supposed that the survival function for the oldest cohort has an exponential form, with a constant monthly risk of first conception of  $\lambda$ . So the survival function for these women is  $e^{-\lambda d}$  where  $d$  is the duration in months. The value for  $\lambda$  is different for each country, depending on the median survival time before conception obtained from Table 2: 3.5% for Austria, 6% for Finland, 4% for France, 9.5% for Italy, 9% for Latvia, 9.5% for Portugal and 15% for Spain. The difference between the younger and the oldest age cohort is computed from the postponement and the recuperation effect variables, from Cox's model 1. The idea for this figure comes from Frejka and Calot (2001) who used observed fertility data to compare birth cohorts.

We observe that the young cohort starts its reproductive life later than the old one: after 10 to 20 months of union, the proportion of women with a first conception is up to 48% lower for the young age cohort compared with the old one. Then the recuperation effect offsets the postponement one, and this leads to an estimated duration of around 70 to 90 months for the moment at which the proportion of women with a first conception would be equal for the two cohorts. But the observed data used in order to estimate the coefficient in the model are for women aged less than 30 years at time of survey. So the equality in the final

childlessness level for the two age cohorts is a projection in time that may be will not be verified if we take into account involuntary factors like the risk of sterility and the risk of miscarriage that both increase with women age.

## **6.2.- The complete model**

In models 2 and 3 we add contextual covariates to model 1:

- A static covariate, the educational attainment level.
- Three dynamic covariates, union status (cohabitation or marriage), time spent studying and time spent working by the woman.

The two complete models differ in the way time studying is taken into account. In model 2 we count only the time until the end of main studies, when in model 3 we also take into account all the studies spells taking place during the union. We do so because the FFS give information for studies for all the countries (less Portugal), but in 5 countries there is no information on all the studies spells, but only on the main studies, since childhood.

Our principal objective with the complete model is to know whether the lengthening or the period of life in union before parenthood is due to change in composition. Indeed, if we show that the difference between cohorts in the duration of that period can be explained by younger age cohorts tendency to cohabit more, study up to a higher age, or have a higher activity rate for women, than older age cohorts, then we will have to talk of a diffusion effect: more couples postpone parenthood due to the generalization of a new life style. On the contrary if what Lesthaeghe calls the de-standardization of life courses does not fully explain the differences between cohorts, then we will be able to say that this childless initial period of life in union is a consequence of a change in values: for example the desire to have a childfree time of life in couple before parenthood.

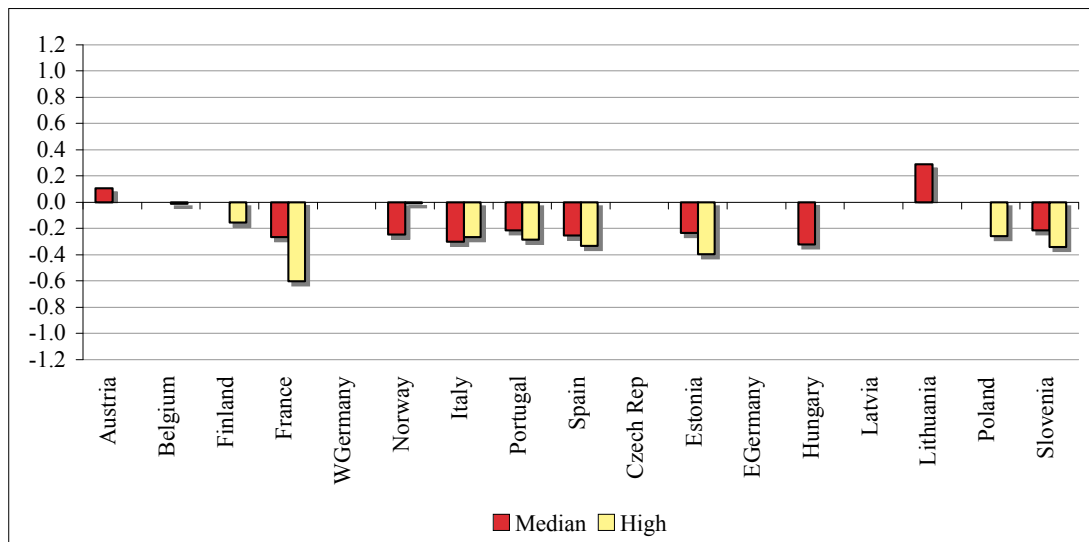
So we will mainly focus on the difference between the simple and the complete model in the magnitude of the postponement effect: if it exists in the simple model and disappears in the complete one, then we will say that the changes in the life cycle sequences are the main factors behind the postponement of the first conception in the first union. On the contrary, if the postponement effect does not vanish and remains strong, then we can say that the

new 'before parenthood' stage in the union life cycle is here to stay, because there is a genuine desire of couples to dispose of that childfree period of time.

But even if this is not our main interest, it is useful to have a look at the direction and the magnitude of the effects of the covariates, introduced in the complete model, which control for composition effects, if only to confirm that there is nothing unexpected with them. We can observe that:

- Women with the highest educational attainment level tend to postpone more their first conception in their first partnership than women with the lowest one (Figure 7). This is not explained by the age at union formation and neither by the age at the end of main studies, because these covariates are included in the complete model. We generally observe the same kind of effect when comparing women with the median educational attainment level with women with the lowest one. However the direction of this last effect is reversed for women in Austria, Belgium and Lithuania, and in these countries women with the lowest level postpone more than women in the middle level.

**Figure 7.- Effect of educational attainment level on the risk of first conception in the first union (compared with women with the lowest level)**

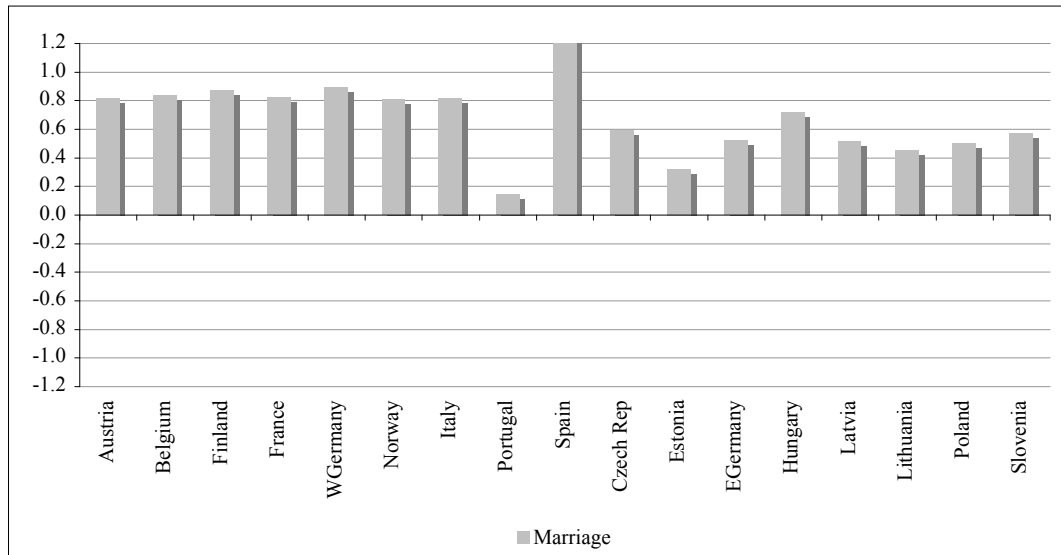


Note: Only effects significant at the 5% level are shown.

- The effect of marriage is always positive, and increases the risk of having a first conception in union, compared with cohabitation (Figure 8). The magnitude of this effect is greater in West European countries than in East European ones, with the exception of Portugal. The case of this last country points out that the results we obtain here should be

interpreted with caution, because we don't take into account the differences between countries in the level and characteristics of cohabitation.

**Figure 8.- Effect of marriage on the risk of first conception in the first union (compared with women cohabiting)**

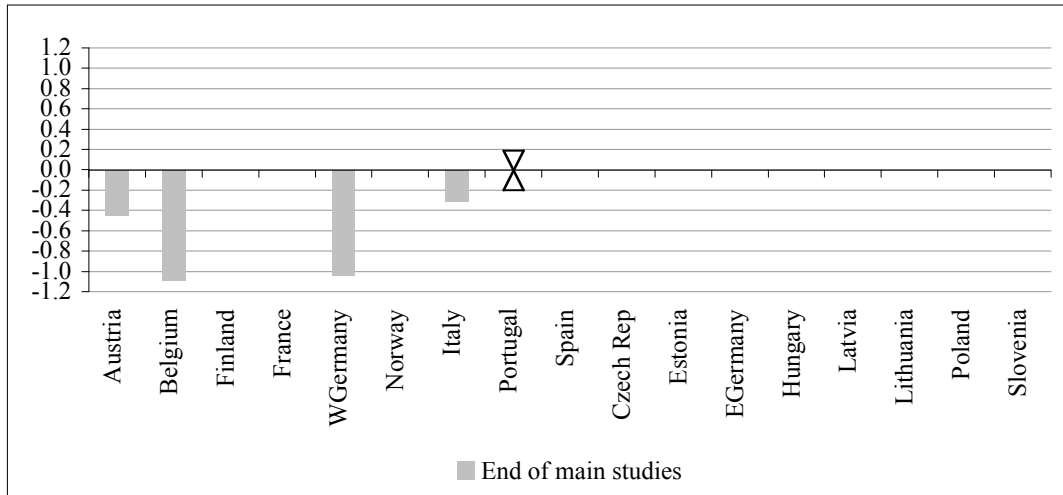


Note: Only effects significant at the 5% level are shown. Dynamic covariate, coded 0 when the couple cohabits and 1 after the marriage.

- The effect of time dedicated to studies is always to reduce the risk of first conception in the first union, or what is the same, to postpone the start of parenthood. This is true for the two kind of covariates used to take studies into account, until the end of main studies (Figure 9), or for all the studies spells (Figure 10). It is interesting to observe that the magnitude of this effect is lower than for the marriage. Again the direction of this effect is not surprising.

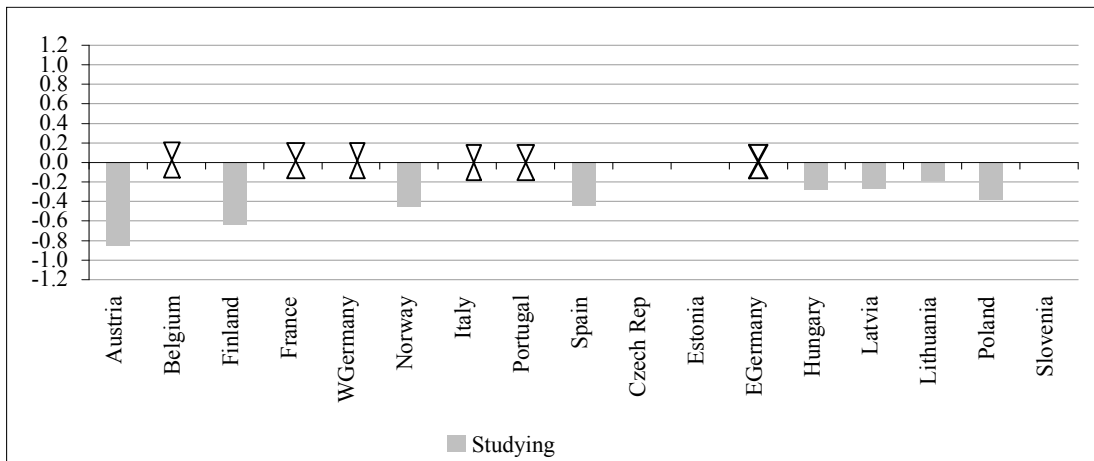
- The effect of women's labour force participation is not so clear, as there are as much countries with a positive effect than countries with a negative one (Figure 11). But we should note that 3 of the 6 cases of a (surprising) positive effect vanish or turn negative with the more complete model 3, which take better into account the effect of studies (results not shown here). In that version of the model, only East Germany, Hungary and Slovenia have a positive effect associated with women's work activity. So the direction of this effect is predominantly negative for the risk of first conception in West European countries, again what we should have expected.

**Figure 9.- Effect of main studies (time spent until the end of principal studies) on the risk of first conception in the first union (compared with periods when women have ended their main studies)**



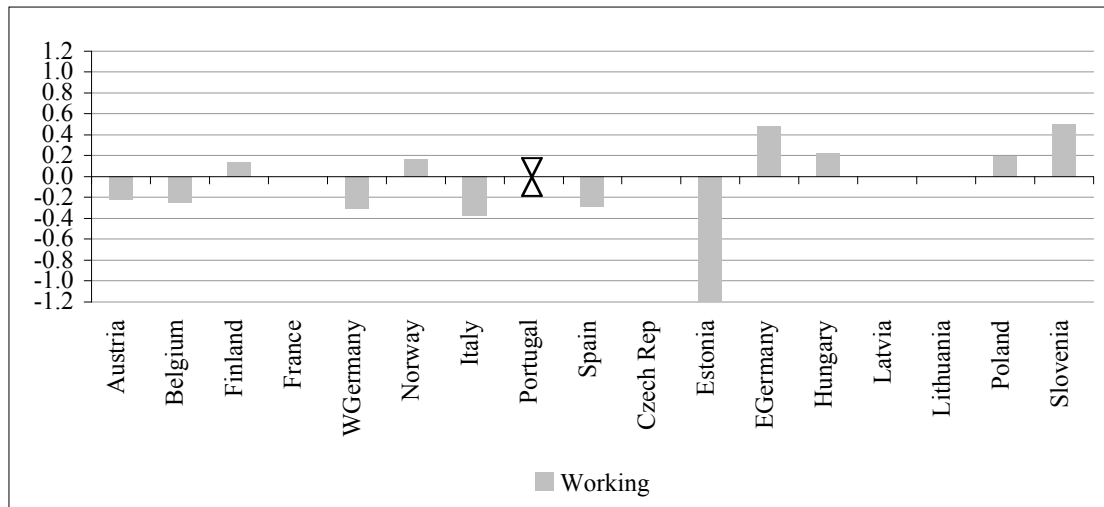
Note: The symbol X is used when the effect cannot be measured for the country, due to lack of data. Only effects significant at the 5% level are shown. This is a dynamic covariate, coded 1 from the start of the partnership until the end of the main studies, and coded 0 after.

**Figure 10.- Effect of studies on the risk of first conception in the first union (compared with periods when women are not studying)**



Note: The symbol X is used when the effect cannot be measured for the country, due to lack of data. Only effects significant at the 5% level are shown. This is a dynamic covariate, coded 1 in period of life in partnership when the woman is studying, and 0 when not.

**Figure 11.- Effect of work on the risk of first conception in the first union (compared with periods when women are not working)**



Note: The symbol X is used when the effect cannot be measured for the country, due to lack of data. Only effects significant at the 5% level are shown. This is a dynamic covariate, coded 1 in period of life in partnership when the woman is working, and 0 when not.

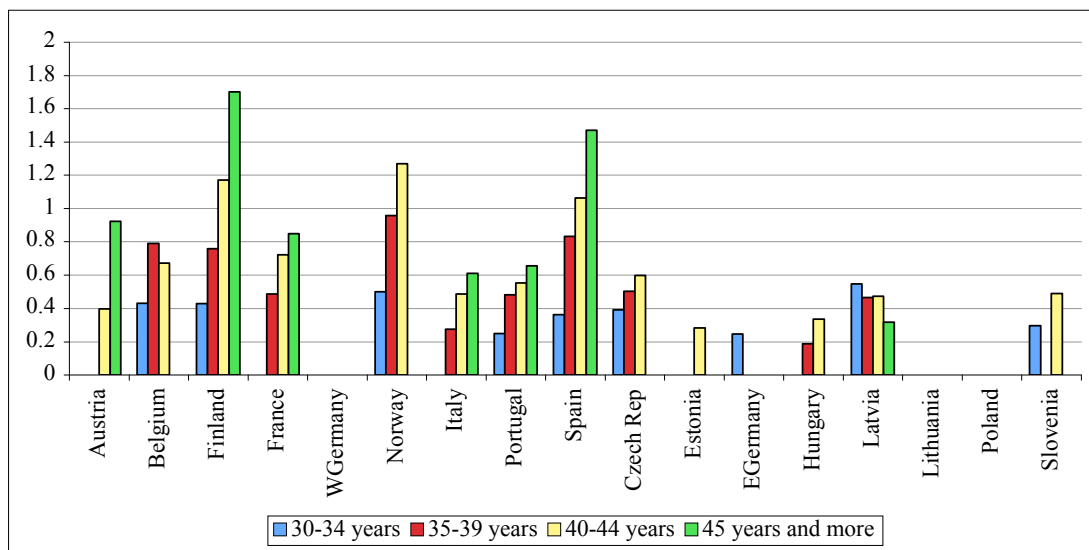
**7.- Is the lengthening of the life cycle stage before parenthood a consequence of de-standardisation?**

We can focus now on our main objective and compare the magnitude of the cohort postponement effect between model 1 and model 2 (Figure 12). Model 1 does not incorporate the covariates associated with the de-standardization of life course and measures the overall magnitude of the cohort effect. Women aged less than 30 years at the moment of the FFS had a much lower risk of first conception at the start of their first union than women in older age cohorts in all the West European countries less West Germany, as well as a few East European one, like the Czech Republic and Latvia. The difference between the youngest and the oldest age cohort is particularly high in Austria, Finland, Norway and Spain. The situation is somewhat different when we introduce the covariates that account for changes in the life style of couples. The most extreme change is observed for Austria and France where the cohort effect almost completely vanishes. It is also greatly reduced in Finland and Norway, where it is halved. On the contrary the major part of the cohort effect remains in the 3 Southern European countries as well as in the Czech Republic. The explanation for this pattern of change is to be found in the role of the transition from cohabitation to marriage: the cohort effect is reduced or vanishes in the four countries where it is more extended (Austria, Finland, France and Norway), and remains in

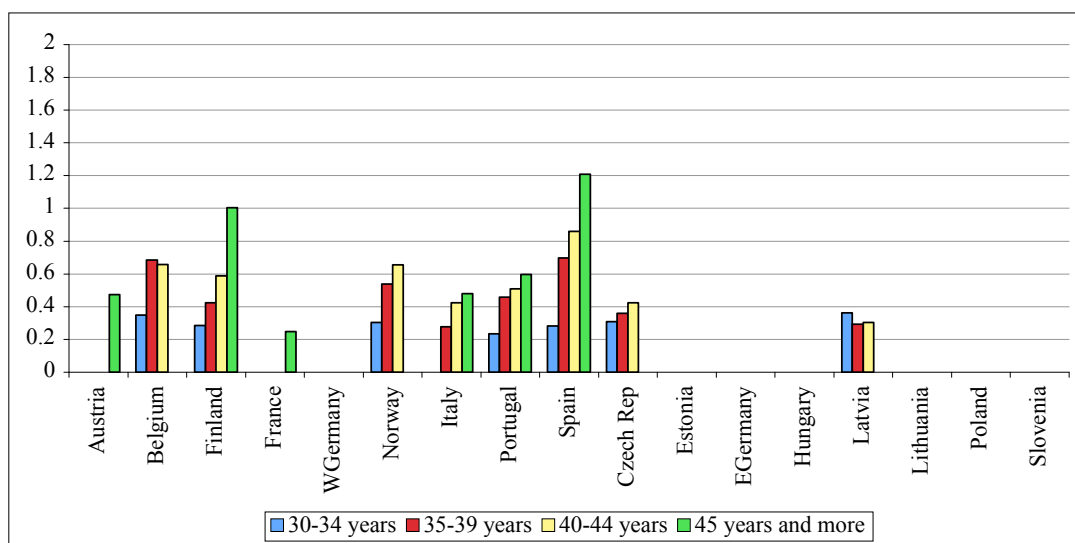
the countries where it is less so (Italy, Portugal and Spain). This is a conclusion we reached from the results of an intermediate model where the only included life style covariate was marriage. In this case we observe that the magnitude of the cohort effect is very similar to the one obtained by model 2 (results not shown here).

**Figure 12.- Cohort effect for women aged more than 30 years at the time of survey, relative to women aged less than 30 years, on the risk of first conception in the first partnership (the effect is measured at the start of the union)**

**Model 1 (simple)<sup>1</sup>**



**Model 2 (with static and dynamic control variables)<sup>2</sup>**



Notes: <sup>1</sup> Only effects significant at the 5% level are shown; <sup>2</sup> Only effects significant at the 5% level are shown. Only the effect of main studies is taken into account.

## **8.- Limitation of the models**

The principal limitations of the models we use are all related to unobserved heterogeneity, which we don't take into account:

- We have excluded the couples with a first conception before their first union, which creates numerous problems: first this lowers the number of cases for the analysis; second we don't take into account the existence of a possible selection effect which could change the results of the modelization, in case the behaviour of the women with the inverse life cycle sequence could be explained by the covariates of our hazard model; finally the women with a first conception before their first union are probably more fecund than the others, which could lead to a decrease of the risk of a first conception in the first union, in relation with the natural fertility model.
- The effect of cohabitation is sufficiently important and universal to justify a more complete and exact modelization of its effects on the risk of first conception: we should for example take into account its level at the beginning of the unions and the relationship between marriage and the moment of the first conception in cohabiting unions (because there are cases when it is the marriage that is explained by the first conception, and not the reverse).
- There are in fact at least two groups of couples: those that postpone the start of their reproductive life in union, and use contraceptive means to do so, and those that don't postpone, and don't use contraception after the start of the union. It may be useful to take account of this heterogeneity in the modelization, because it could change the estimated value of the risk of conception in relation to the union duration.
- The effect of educational attainment in the model should be changed in order to take account of the fact that it is a dynamic and not a static covariate, because in some cases that level changes during the life in union.
- The covariates of time spent studying or working should take into account whether this is partial or complete time.

## **9.- Conclusions**

The preceding analysis confirms our initial hypothesis, based on the SDT scheme, that there is indeed a significant period of life in union before the moment the couple decide to



become parents, in all the West European countries studied here using FFS data. The median duration of this initial voluntary childless period exceeds 30 months for the youngest age cohort, the women aged less than 30 years at the time of the survey. The duration of this period is also generally increasing for the younger cohorts, but in the case of Austria, Belgium and West Germany it remains almost constant, as it was already large for the older cohorts. The case of the East European countries is quite different, because the interval between first conception and first union formation is small and almost constant, and also because the proportion of women with the inverse sequence (a first conception before the first union) is very high, and frequently higher than the former one.

We observe also that it is the lengthening of that period that mainly explains the postponement of the age at first childbearing in Western and Northern European countries, as the age at union formation remained almost constant for the age cohorts studied here. In the Southern European countries, the median age at first partnership is also significantly increasing across cohorts, which compounds the effect of the increase in the duration of the voluntary childless phase of life in union and leads to very high levels of the age at first childbearing for the youngest cohorts.

The use of a microsimulation model, which takes account of biological variables of human reproduction, allows us to determine that the increase in the duration of that initial childless period of life in union is explained by the use of contraceptive means. Using a statistical model, we measure the characteristics of this initial period. We observe that it is the result of two antagonistic forces: on one hand the tendency of couples to postpone the start of their reproductive life and on another hand the propensity to make lost time up after a few years, which leads to the same level of the proportion of women with a first conception after around 80 months from the start of the union. So the postponement of childbearing for couples does not seem to modify the desired level of final fertility, at least for the first child. But delaying childbearing increases the risk that couples will not be able to realize their wishes, and childlessness level may increase for the younger cohorts due to involuntary factors like higher sterility, lower fertility or higher miscarriage risks after 35 years.

The lengthening of this initial period of life in partnership before parenthood is partly explained by the extension of cohabitation, by the overlapping of studies with life in union and by the increase in women labour force participation. But these factors don't explain the whole of the differences between cohorts, or for all the countries. So we cannot exclude

that this new union life cycle stage could be explained by the desire of young adults to have a period of life in union without the commitment and the irreversibility associated with the birth of children.

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