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

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Summary

The authors of the Second Demographic Transition scheme refer to the postponement of the age at first childbearing as the main effect of the change in habits of young adults associated with this transition. This postponement is accompanied by an increase of the length of the initial period of life in partnership when people have 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 the first childbearing. This 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 in order to extend the period in 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. First we try to quantify the magnitude of the increase of this initial period of life in partnership when the couple is not planning to have a first child yet. 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 for studies and working and the transition from cohabitation to marriage.

We use data from Fertility and Families Surveys for 16 countries and apply life table techniques and proportional hazard modelling.

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Introduction

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. According to Lesthaeghe, 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 there 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 before a measure of contraception use based on the 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. Generally speaking, 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 depended on marriage duration, with a high level during the first two years and a steep fall after 2 or 3 years of union. Fertility depended also on parity, with a strong decrease mainly for births at order third or more. In comparison, reproductive changes during the SDT are a function of age (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 a new initial stage of the union life cycle, characterized by the 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 consequence of these changes in family formation norms is what Lesthaeghe calls the 'de-standardisation of life courses': the traditional sequence 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 that new initial stage could be 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.

We use data from the Family and Fertility Surveys (FFS) conducted in about 20 European 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. The principal interest 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). We work 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 the women (for example regarding studies after the start of union and the increase in activity rates).

Before we start with the description of the methodology and the results of the study, it is convenient to talk about an important aspect of the measurement of the length of the couple life cycle stage before parenthood. We want to measure the length of an interval between two ages, at the start of the union and at the moment when the couple has decided to have a first child. The first age can be observed with reasonable accuracy, because the FFS have questions asked on the date of the beginning of partnerships. 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 had a series of questions on the contraception use spells that could have been used to estimate the 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 child. These two ages will coincide in approximately 20% of the cases, that is the value of the probability of a fecundation in a menstrual cycle for women aged between 20 and 35 years (the technical term for that is 'fecundability'). 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. So 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 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 technically the couples in that situation will be included with all the cases of 'truncated data', which will include also the cases of couples which really doesn't want to have children.

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 1). Even if the difference between these two ages cannot be interpreted as the duration of the interval between these two events, the analysis of their compared evolution will be useful. It is appropriate to say that the first conceptions we consider in this work include all the pregnancies, less the ones interrupted by induced abortion. In the case of the median age shown on the graphs, all the first conceptions are considered, without taking into account whether they occur before or after the union.

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 Mediterranean countries. On the contrary these two ages remain very close for the Eastern and Central European countries. It is worth noting that the postponement of the age at first conception occurred in Finland and Norway when the 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 Mediterranean 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, or what is the same, of the existence of this initial stage in the life cycle of the unions, something that is not observed for the older birth cohorts, which formed their unions before the start of the SDT (with the exception of Belgium, where the distance between these two ages is much the same for all the birth cohorts, and with a relatively high level, of nearly 3 years).

Another noteworthy observation is that the distance between these two ages is very low for the Eastern and Central European countries. It is even negative in some cases, notably in some birth cohorts of Poland and Slovenia. The explanation here is the importance of first conceptions before the first union, what we are going to analyze now in more details.

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. We are going to analyze the relationship between union formation and first conception using the technique of 'mirrored survival function' invented by Billari and Kohler (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 allows us to measure, for each duration until (or from) the start of the first union, the proportion of women who experimented a first conception before (and the proportion who experimented one after). We can then observe (Figure 2) that in most Eastern

and Central European countries, more than 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, nearly or above 50%, in Austria and Germany. The proportion is much lower in the remainder of the Western and Northern European countries as well as the three Mediterranean countries, with a minimum value of about 20% for women in Italy and Spain. We also observe that:

- There is a reduction in the younger birth cohorts of this proportion of women who start their reproductive life before entering their first union, except for the case of Austria and Germany. 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. But the drop of this proportion is not massive, so it is wiser to consider that we have at least two groups of women (and men), in straight terms those that cannot wait and those that want to wait. This is something that we need to take into account in this study.

- The greatest part of the first conceptions that took place before the first union formation are separated by less than one year, which can be interpreted as a manifestation of an anticipatory behaviour. This is especially the case for the Eastern and Central 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 Germany are two exceptions to the general rule, and for example we observe that, for German birth cohorts, more than half of the women who had their first conception before forming their first partnership, experimented a duration between the two events that exceeded one year.

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 the Western and Northern European as well as the Mediterranean countries, albeit with a variable degree. For example time to conception in union clearly slowed down for younger birth cohorts in Austria, Finland, Norway, France, Italy and Spain. This is also true, but is less clear, for Belgium, Germany and Portugal. On the contrary there is no lengthening of the childless phase at the beginning of life in partnership in the Eastern and Central European countries.

The union life cycle stage before parenthood

In the remainder of this study, we are going to focus exclusively on the characteristics of the union first life cycle stage, before the couple decide to have children. This choice forces us to restrain considerably 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. This restriction is clearly a problem, as we exclude a great number of first conceptions, around 50% of the total in the case of Austria, Germany and the Eastern and Central European countries. The type of evolution we want to analyze corresponds to the curves plotted in Figure 3. 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 birth cohort (women aged 45 years and more at the time of the survey) and the other one to the youngest Finnish birth cohort (less than 30 years). They are compared to equivalent curves obtained from a microsimulation model based on a hypothesis of natural fertility, that is for couples which 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 birth 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. On the contrary the Finnish curve level and form is very far from the model one. So the history that tells us 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 birth cohorts in the Western and Northern European and the Mediterranean countries, in which it is usual to use contraception in order to postpone parenthood. The consequence is a considerable increase in the median time before the first conception, from around 5 months for the Spanish birth 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 birth cohort their reproductive life started at the beginning of the union, when there is a very large interval of time between the two events for the Finnish birth cohort, of more than 3 years and half of life temporarily without children, or childfree.

Table 1 gives the value of the median duration of life in union before the first conception, by birth cohorts and for all the countries we studied. We can observe that:

- This median duration is higher for Western and Northern European countries, with values that exceed 30 months for younger women, and lower for all the birth cohorts of Eastern and Central European countries.
- There is a general increase in this median duration in almost all the Western and Northern European as well as the Mediterranean countries, except for Austria, Belgium and Germany where the value was already high for the older birth cohorts.

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 birth cohorts, for the majority of Western and Northern European and Mediterranean 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 been 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 are going to 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 happen 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 2 presents the result of this modelization in the case of Finland.

The simplified model

The first model is a simplified one, whose objectives are to allow us to measure in an exact 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 birth 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 birth cohort take into account two different dimensions of the cohort change. This is visualized in Figure 4, which shows:

- The effect of *postponement* of first conception in union life cycle for younger birth 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 of postponement, couples try to regain the time lost, and the probability of a first conception increases, its level surpassing the one of the oldest birth cohorts after a few years of duration.

The interplay of these two parameters is shown in Figure 5. We compare women in the youngest birth cohort, aged less than 30 years at the time of survey, to the women in the oldest birth cohort, aged 45 years and more. The curve for each country gives the difference between the youngest and the oldest birth cohort in the level of the proportion of women with a first conception in their first union, by duration of the union. We can observe that the young generation starts its reproductive life later than the old one: after a duration of union of 15 to 20 months, the proportion of women with a first conception is up to 47% lower for the young birth 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 birth cohorts.

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 posterior studies spells. We do so because the FFS give information for studies for all the 16 countries (less Portugal), but in 5 countries there is no information on studies spells, but only on the end of principal 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 a compositional effect. Indeed, if we show that the difference between generations in the duration of that period can be explained by younger birth cohorts tendency to cohabit more, study up to a higher age, or have a higher activity rate for women, than older birth cohorts, then we will not be able to say that this childless initial period is a consequence of the will to have a childfree time of life in couple before parenthood. On the contrary, we will have to argue that this childless period is a consequence of the necessary adjustment between reproductive life and the new forms of life in union, consequences of what Lesthaeghe calls the de-standardization of life courses.

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 we have introduced in the complete model, 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 6). 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, Germany and Lithuania, so the direction is not so clear-cut. Germany is also a unique case in the way that women with the highest level are those that tend to have the lowest period of life in union before parenthood, again even after controlling for the age at union formation and at the end of main studies.

- The effect of marriage is always positive, and increases the risk of having a first conception in union, compared with cohabitation (Figure 7). The magnitude of this effect is greater in Western and Northern European or Mediterranean countries than in Eastern and Central European one, with the exception of Portugal. The case of this last country points out that the results we obtain here are difficult to interpret, because we don't take into account the differences between countries in the level of cohabitation, or whether the proportion of couples which never marry is high.

- 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 8), or for all the studies spells (Figure 9). 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 10). But we should note that 3 of the 5 cases of a (surprising) positive effect vanish 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 Hungary and Slovenia have a positive effect associated with women's work activity. So the direction of this effect is predominantly negative on the risk of first conception, again what we should have expected.

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 effect between model 1 and model 2 (Figure 11). 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 in their first union than women in older birth cohorts in all the Western and Northern Europeans or

Mediterranean countries less Germany, as well as a few Eastern and Central one, like the Czech Republic and Latvia. The difference between the youngest and the oldest birth 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 almost halved. On the contrary the major part of the cohort effect remains in the 3 Mediterranean countries as well as in the Czech Republic. The explanation for this pattern of change is to be found in the role of cohabitation: the cohort effect vanishes in the four countries where it is more extended, and remains in the countries where it is less. This is a conclusion we reached from the results of an intermediate model where the only included life style covariate is 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).

Limitation of the models

The principal limitations of the models we use here are the following, by order of importance:

- We have excluded the couples with a first conception before their first union, which creates numerous problems: first this lower 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 leads 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 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 that 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.

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 parenthood in all the Western European countries studied here using FFS data. The median duration of this initial childless period exceeds 30 months for the youngest birth 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 Germany it remains almost constant, as it was already large for the older cohorts. The case of the Eastern 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 birth cohorts studied here.

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.

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 birth 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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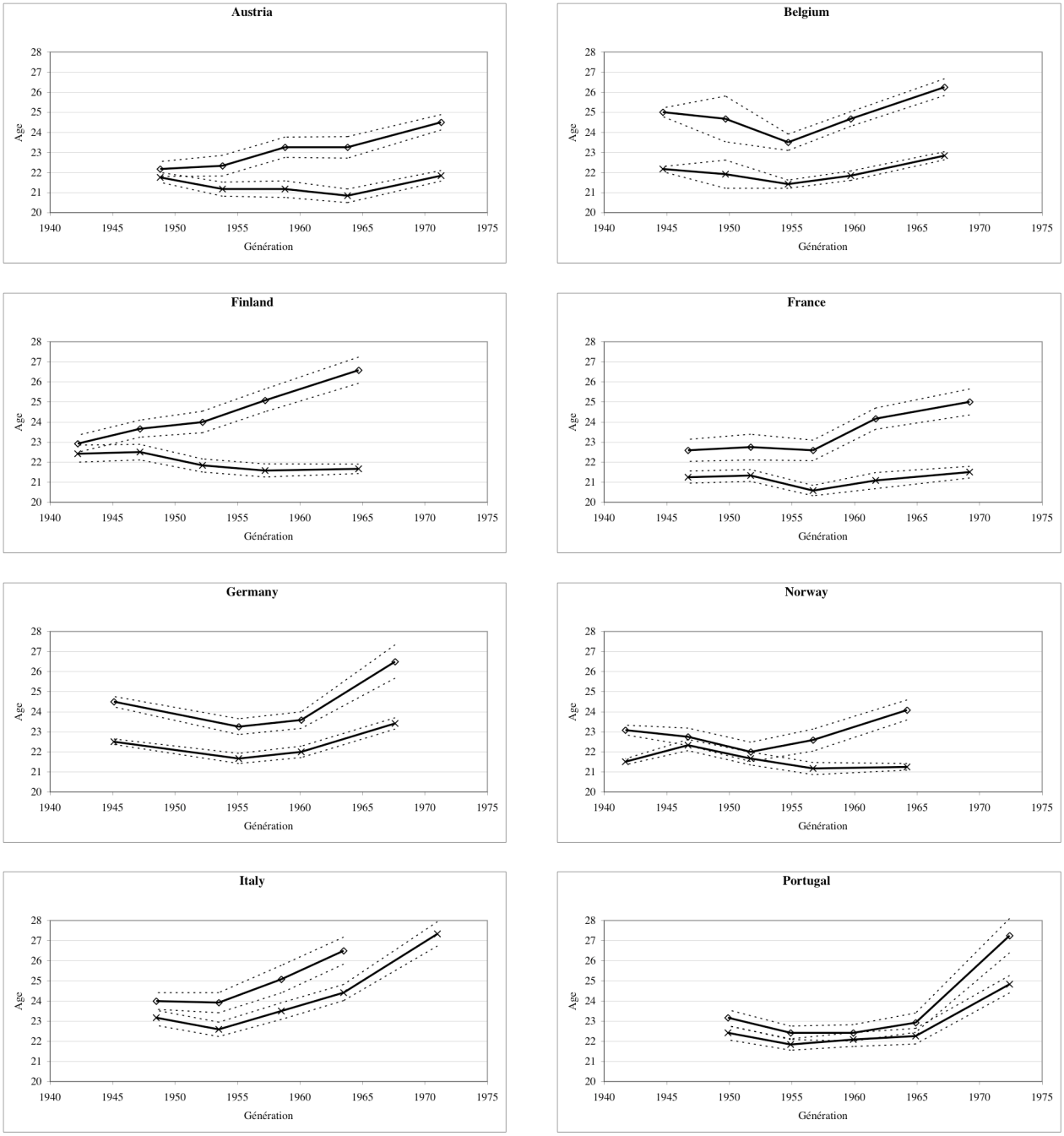
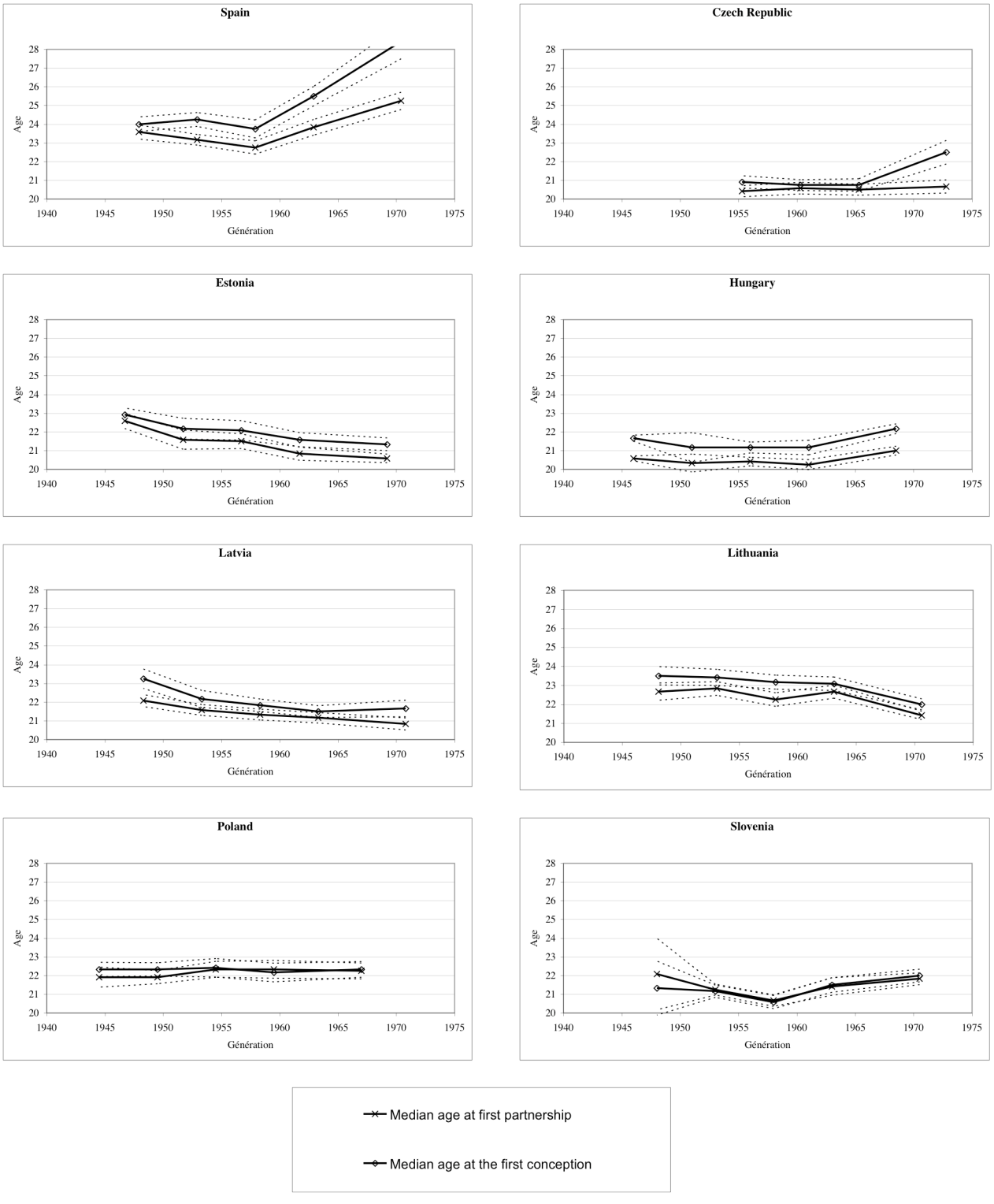
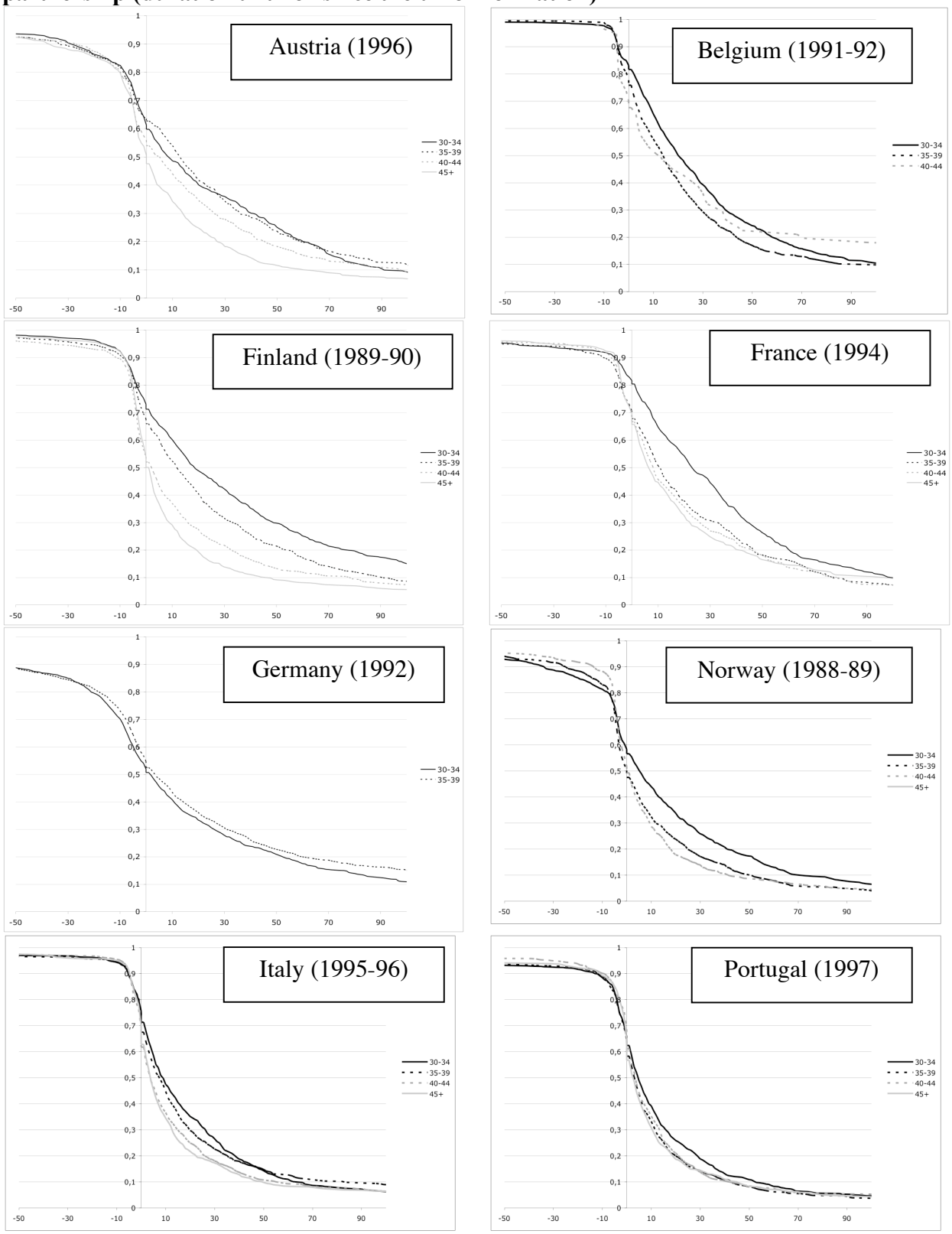
Figure 1. Evolution of the median age at first partnership and at first conception for women, by generation. Based on FFS data for 16 countries.

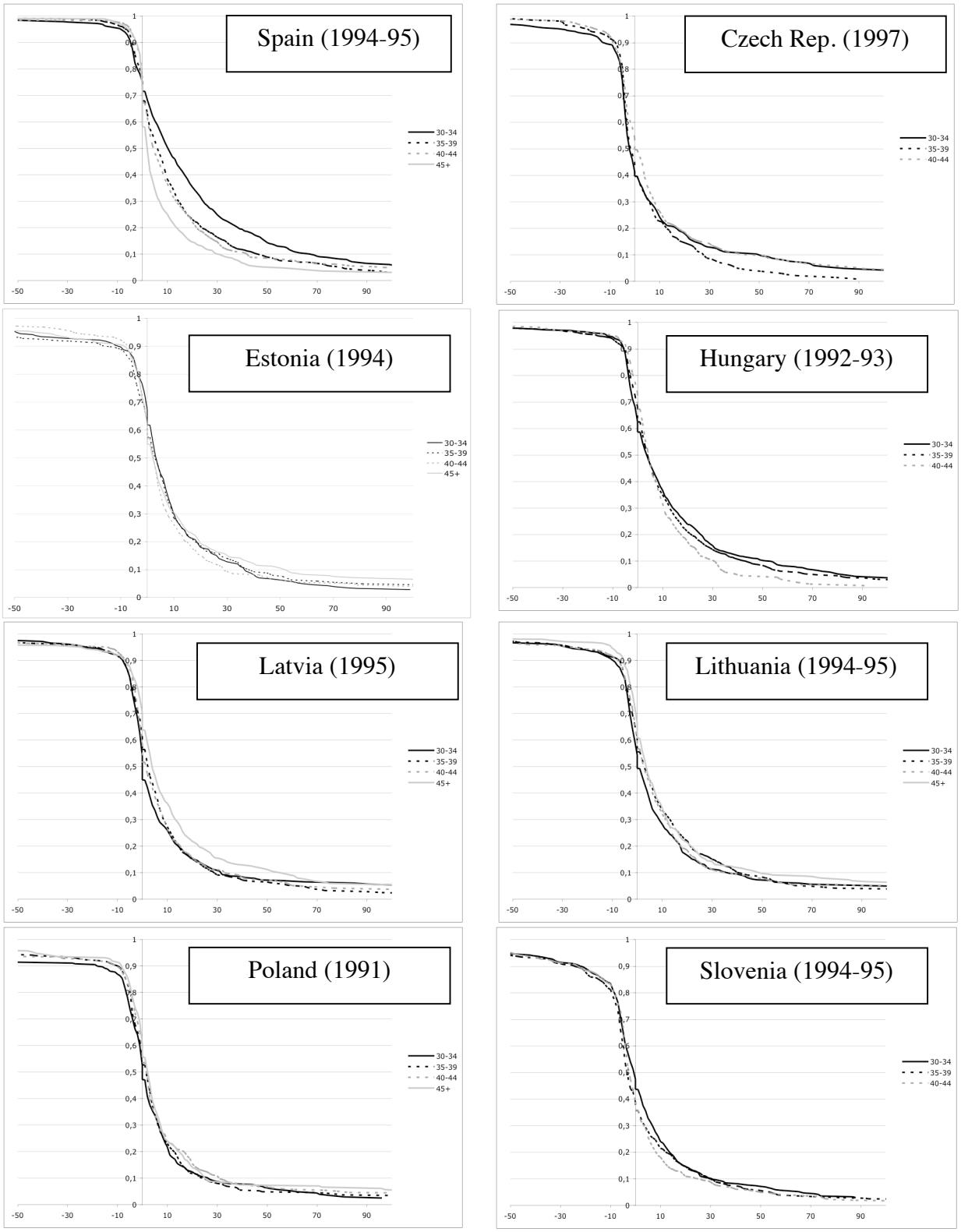




Note: Median ages are estimated from Kaplan and Meier survival tables. Dashed lines give the confidence interval at a 95% level around the value of these ages. The age at the first conception is equal to the minimum age either of the first live birth, of the first spontaneous abortion, of the first stillbirth, or of the age at pregnancy for women pregnant at the time of the survey. We then subtract the corresponding duration of the pregnancy plus one month. 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 the survey.

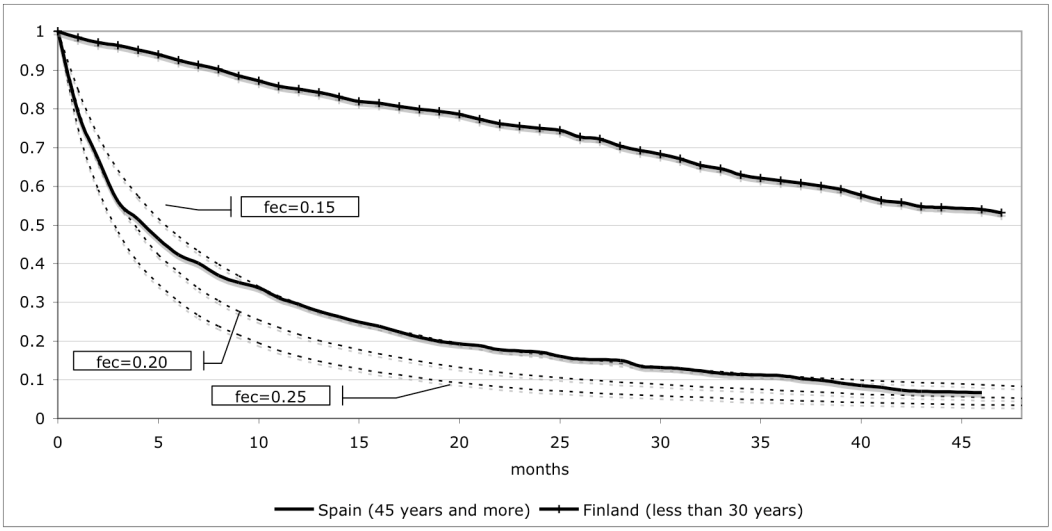
Figure 2. Mirrored survival function between women first conception and women first partnership (duration until or since the union formation)





The year between brackets is the survey year. Each curves is based on two Kaplan and Meier survival tables. The first one, with negative duration values, is for women who experimented 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 detailed by Billari and Kohler, 2001).

Figure 3. Comparison of two survival curves for the first partnership until women first conception with a natural fertility model



Note: Kaplan and Meier survival curves for Spanish women aged more than 45 years and Finish women aged less than 30 years at the time of the FFS survey. 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.

Table 1. 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	38	38	33	30	19*
Belgium	35	27*	21*	30	
Finland	49	38*	27*	20*	11*
France	37	33	22*	20*	17*
Germany	39	34*	38*		
Norway	38	25*	18*	12*	
Italy	18	17	14	11*	9*
Portugal	16	13	10*	10*	9*
Spain	25	18*	10*	8*	4*
Czech Rep.	20	15	10*	9*	9*
Estonia	9	8	9	6	9
Hungary	14	13	10*	8*	
Latvia	15	9*	8*	9*	10
Lithuania	11	10	12	11	10
Poland	6	7	6	6	7
Slovenia	14	10	13	8*	8

Note: Median duration is estimated from Kaplan and Meier survival tables. The asterisk sign indicate 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.

Table 2. Cox model for the survival in the first union before women first conception: case of Finland

	Model 1	Model 2	Model 3
Woman age at start of the union	-0.035 (0.965)**	-0.023 (0.977)**	-0.026 (0.974)**
Differences between cohorts			
Postponement effect (value at the start of the union)			
< 30 years (reference category)			
30-34 years	0.419 (1.521)**	0.273 (1.314)*	0.293 (1.34)*
35-39 years	0.764 (2.146)**	0.428 (1.534)*	0.447 (1.564)**
40-44 years	1.154 (3.171)**	0.568 (1.765)**	0.566 (1.761)**
45 years and more	1.676 (5.344)**	0.984 (2.676)**	0.971 (2.641)**
Recuperation effect (dynamic variable)			
< 30 years (reference category)			
30-34 years X time	-0.006 (0.994)*	-0.005	-0.005
35-39 years X time	-0.008 (0.992)**	-0.007 (0.993)*	-0.007 (0.993)*
40-44 years X time	-0.017 (0.983)**	-0.013 (0.987)**	-0.013 (0.987)**
45 years and more X time	-0.028 (0.973)**	-0.023 (0.977)**	-0.023 (0.978)**
Educational attainment level			
Low (reference category)			
Median		-0.079	-0.046
High		-0.1	0.03
Marriage (dynamic)		0.868 (2.381)**	0.857 (2.355)**
Studies (dynamic)		-0.017	-0.564 (0.569)**
Work (dynamic)		0.172 (1.188)**	-0.092

Notes: * Significant at the 5% level. ** Significant at 1% level. When the coefficient β is significant, we give the value of the relative risk, which is equal to exp (β). 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 to do so is that not all the 16 countries have data for all the studies spells.

Figure 4. The postponement and recuperation effects between cohorts in the proportion of women who have not experimented a first conception since the start of their first union (case of Finland)

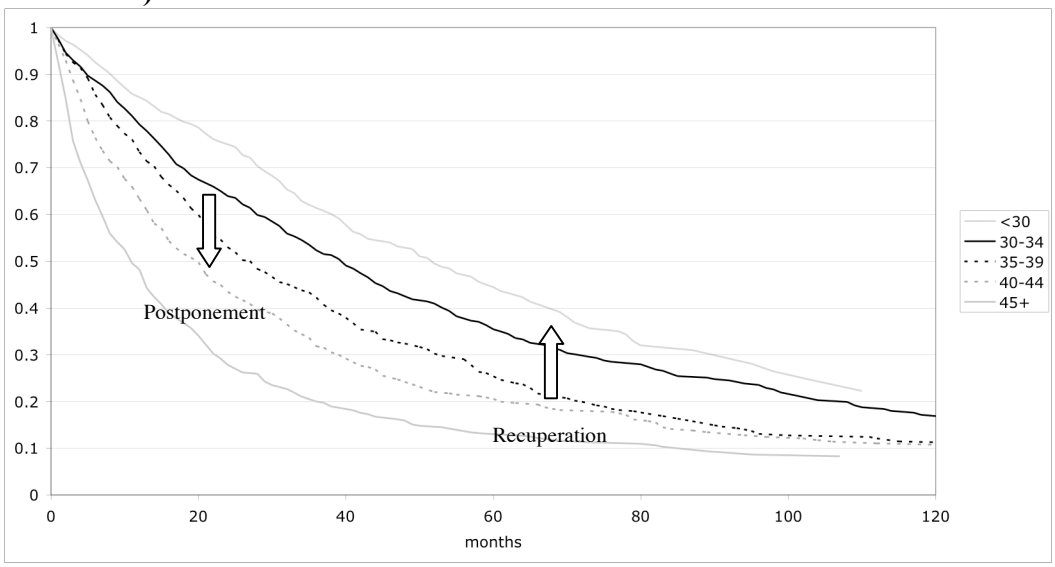
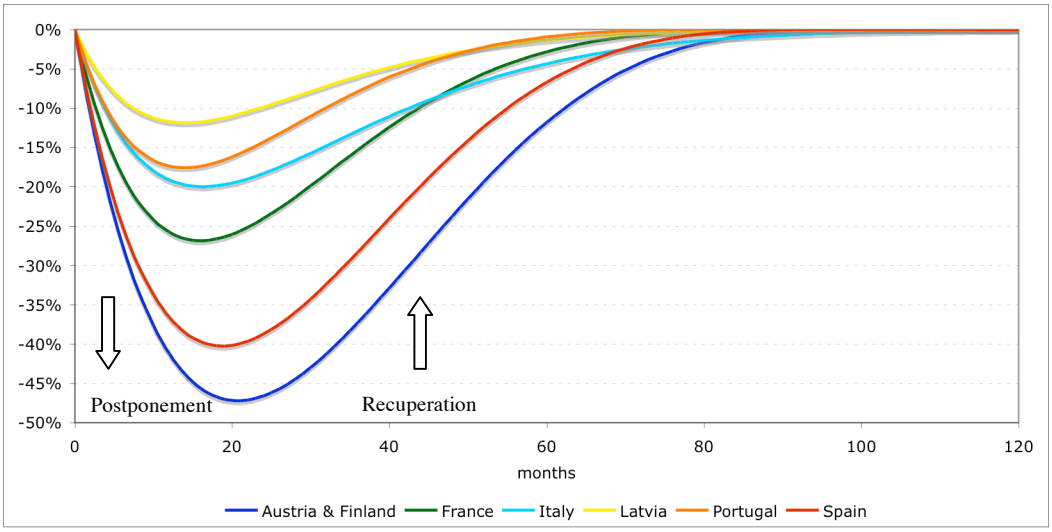
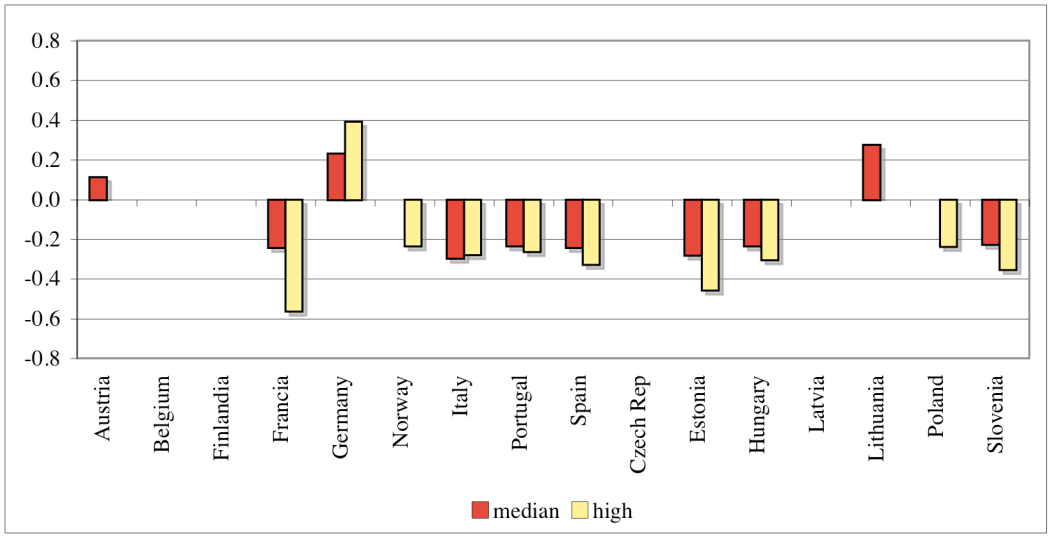


Figure 5. The interplay of the postponement and the recuperation effects: difference between the proportion of couples with no first conception in the cohort aged 30 years at the time of the survey, and the proportion for the cohort of women aged 45 years and more, according to the estimated values of the two effects in the simplified model



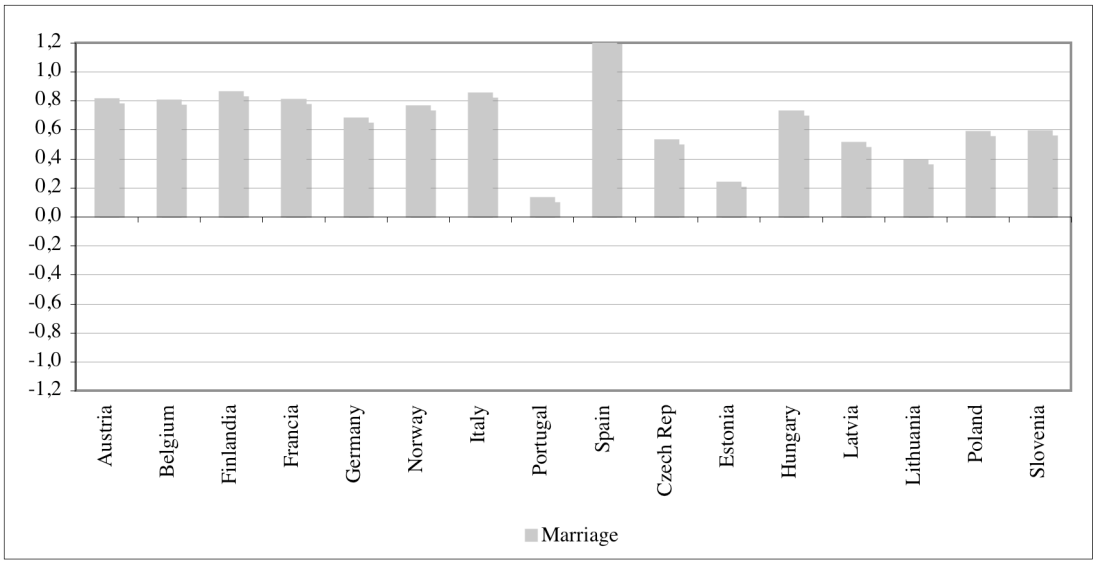
Note: The values represented are the difference between the proportions of women in the youngest cohort who have experimented their first conception, by duration of the union, less the corresponding proportion for the women in the oldest cohort. In order to obtain the value of these proportions, we have supposed that the survival function for the oldest cohort has an exponential form, with a monthly risk of first conception of 0.07. This means that we have supposed that the survival function for these women is *exp (-0.07 . t)* where *t* is the number of months. This corresponds to a median survival time before conception of around 10 months, which is the value generally observed for the oldest cohort. The idea for this figure comes from Frejka and Calot (2001).

Figure 6. Effect of educational attainment level on the risk of first conception in the first union (compared with women with the lowest level)



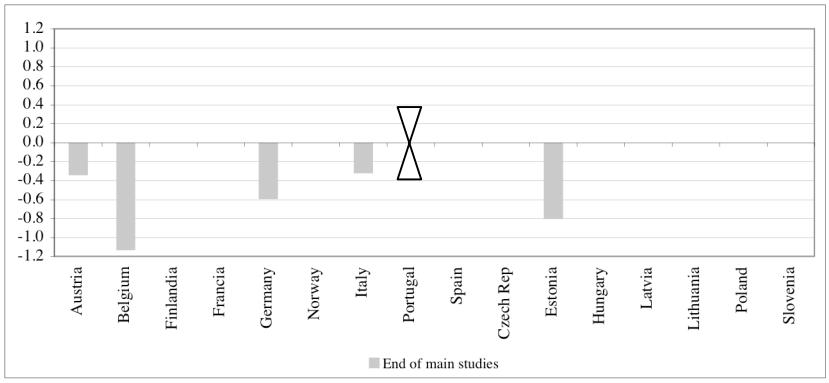
Note: Only effects significant at the 5% level are shown.

Figure 7. Effect of marriage on the risk of first conception in the first union (compared with women cohabiting)



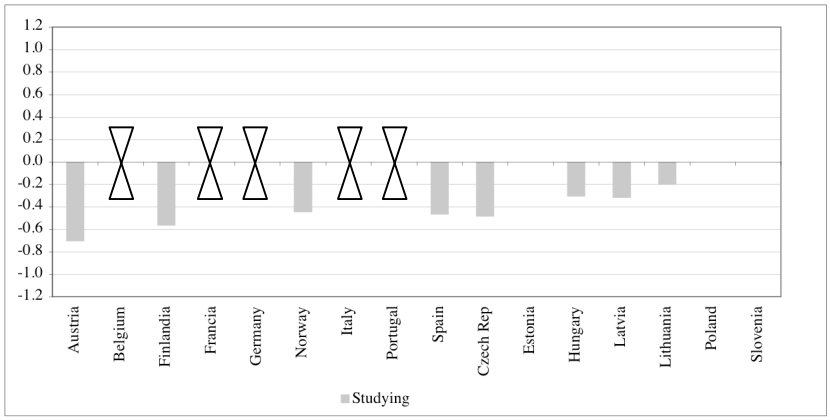
Note: Only effects significant at the 5% level are shown.

Figure 8. 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)



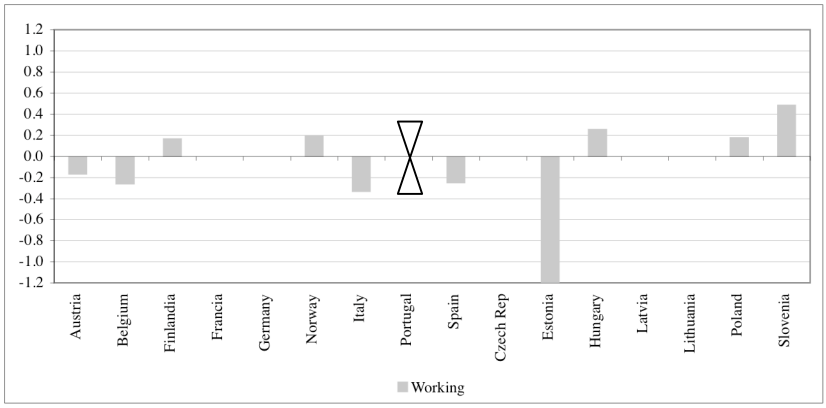
Note: The symbol X is used when the effect cannot be measured for the country, due to lack of data. Only effects significant at the 5% level are shown.

Figure 9. 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.

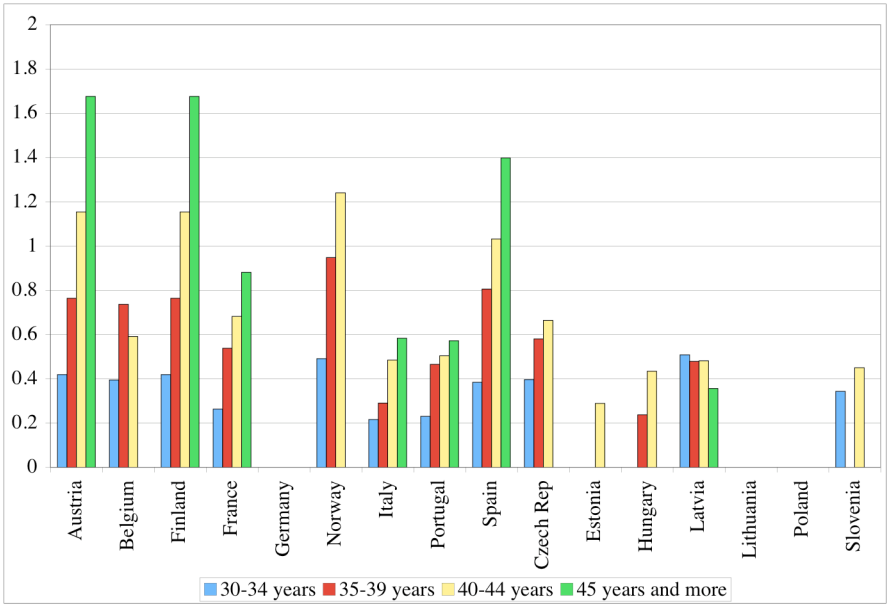
Figure 10. Effect of work on the risk of first conception in the first union (compared with periods when women are not working)



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.

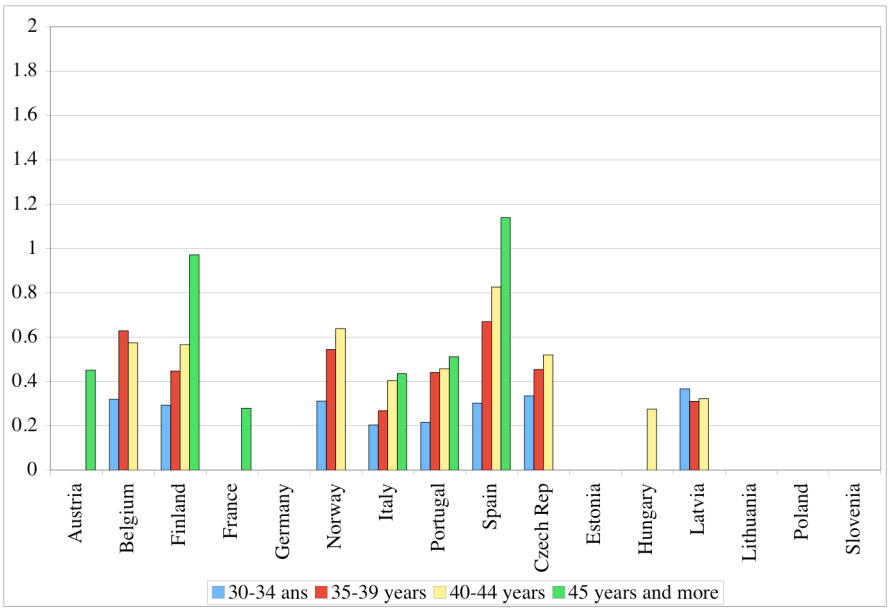
Figure 11. Cohort Effect for women aged more than 30 years at the time of survey, relative to women aged less than 30 years, on the risk of first conception in the first partnership (the effect is measured at the start of the union)

Model 1 (simple)



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

Model 2 (with static and dynamic control variables)



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