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ABSTRACT

In this paper we investigate the changing impact of union formation on the transition to parenthood in West Germany and Italy using FFS data. We first draw attention to overall cohort patterns in union formation and first births and then describe the mutual relationships between union formation, first marriage, and first births. On the basis of event-history models, we then evaluate the impact of union formation behaviour on the transition to motherhood. In particular, we test whether the impact of union status has been changing for younger and older cohorts, thereby investigating whether the heterogeneous spread of non-marital childbearing is gaining relevance as we would expect from the perspective of the Second Demographic Transition. The findings from these analyses allow us to conclude that demographic behaviour is not converging from a cohort perspective.

Keywords: first births, Italy, Germany, cohabitation, marriage, Second Demographic Transition, Fertility and Family Surveys.

Disclaimer: the views expressed in this paper are our own. They do not necessarily reflect the views of the Max Planck Institute for Demographic Research.

1. Introduction

The issue of whether demographic behaviour in Europe will converge towards a homogenous pattern is an open question. Some authors (e.g. Roussel, 1992) have hypothesised a broad convergence of primary demographic indicators in Western Europe, a view which is also in the spirit of the framework of the Second Demographic Transition (van de Kaa, 1987). Others have argued from a theoretical standpoint that distinct historical and contemporary patterns are likely to persist in the future (Hobcraft and Kiernan, 1995; Micheli, 1998; Reher, 1998), and these studies propose the existence of a cultural "path-dependence" in the sense of Arthur (1990). From this latter perspective, a convergence of demographic indicators across Europe is not to be expected in the near future. Comparative studies conducted from the perspective of a dynamic life course are needed to disentangle the different hypotheses on the future of demographic behaviour in Europe. In this paper we therefore investigate the changing impact of union formation on the transition to parenthood in Italy and Germany. These two countries exhibit strikingly different patterns with respect to these two processes.

   With the noteworthy exception of Great Britain, where lone motherhood reaches significant levels, childbearing in Western Europe takes place almost completely within either marital or consensual unions (Kiernan, 1999b). Thus, a central point of divergence in family formation behaviour in different European countries is the pattern of union formation (Kiernan, 1999a) and its relation to entry in into parenthood. For instance, some of the "lowest low" fertility countries in Western Europe, such as Italy and Spain, continue to exhibit a common union formation pattern which has changed remarkably little in recent decades. In particular, they have a low prevalence of unmarried cohabitation and out-of-wedlock births, delayed marriage, and a high

synchronisation of leaving the parental home and getting married (Billari et al., 2000). This pattern is not consistent with the predictions of the Second Demographic Transition theory, which assumes increasing individualism and modernisation over time, a decreasing connection between home-leaving and marriage, and a decreasing importance of marital status, especially in connection with first childbirth.

Other "lowest low" fertility countries (Germany, Austria, and the Netherlands) reach slightly higher levels of fertility while exhibiting a remarkably different pattern of union formation. In these countries there is a high prevalence of unmarried cohabitation combined with delayed marriage, which coincides with a low share of out-of-wedlock births (with the exception of the area belonging to the former German Democratic Republic) and a low level of synchronisation between leaving home and getting married. In a sense, these countries achieve an intermediate score in an "ideal Second Demographic Transition scale".

The Scandinavian countries and France, on the other hand, attain the highest level on such a scale. These countries have progressed very far along the lines of development outlined in theory of the Second Demographic Transition, and they exhibit a high prevalence of unmarried cohabitation, a high share of out-of-wedlock births, delayed marriage, and low synchronisation between leaving home and getting married. Quite surprisingly, this pattern is associated with higher overall fertility levels.

In this paper we focus our attention on the transition to parenthood, which constitutes an important determinant of the observed differences in the overall fertility levels. In particular, we compare two of the lowest-low fertility countries, Germany (excluding the area of the former German Democratic Republic) and Italy, with respect to their patterns of first union formation and first birth. For the sake of simplicity, we will use

the term "West Germany" in what follows to denote the territory of the Federal Republic of Germany prior to re-unification.

We start from the idea that there is a crucial North-South demographic divide in Italy (Santini 1995), although it is not the only important factor. This view is fully supported by findings based on the Italian FFS data (De Sandre et al., 1997; De Sandre et al., 1999), where geographical area is connected with both cultural and economic differences (in short, Southern Italy is more traditional and economically less developed than Northern and Central Italy). The North-South divide has been considered less important in West German FFS studies, where the focus is on East-West differentials, given the very high level of differences. Nevertheless, several other studies have found relevant North-South differences in demographic behaviour also within West Germany (Bertram, 1995; Hank, 2000; Kemper, 1991). Although these differences are less pronounced than the regional differences in Italy, these studies argue that both regional socioeconomic differentials and localised cultural and religious patterns constitute relevant sources of heterogeneity in demographic behaviour across Germany.

West Germany and Italy have experienced different progression towards the Second Demographic Transition, with marked regional differences in demographic behaviour. We investigate in this paper within-country and between-country differences in the transition to parenthood using Italian and German FFS data. First, we briefly examine some interesting results on the North-South divide in both countries (table 1)[1]. The

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[1] The table refers to answers to the following questions. For Italy: "Do you agree or disagree with the following statement. 'Marriage is an outdated institution'?". Religious behaviour in Italy is filtered by a question "Do you adhere to a religion"; if the answer is "yes" or "somewhat", then the questions are "Which religion do you adhere to?" and "How often do you attend religious services (apart from weddings, funerals, baptisms, and the like)?". For Germany, "In recent years attitudes towards marriage and the family have changed drastically. I am going to read you several different statements. Please tell me whether you tend to agree or disagree with each of them: 'Marriage is an outdated institution'; 'What

strength of marriage as an institution is evident when looking at Italy (as was also stressed by Angeli et al., 1999). There does not seem to be a North-South divide in this regard. As far as religious affiliation is concerned, while the vast majority of Italians declare themselves to be Catholic, Northern Italy has a substantive share of the population that does not belong to any religion, and this result is in line with the results of specialised surveys (Cesareo et al., 1995). The same differences, albeit more attenuated, exist with respect to church attendance.

The North-South divide in West Germany reveals some cultural differences which are in a sense parallel to those observed in Italy. West Germans in general do not see marriage as an outdated institution. In the North, however, a slightly higher percentage of respondents in the FFS agree with the statement that marriage is an outdated institution. Less traditional attitudes in the North are also evident in the prevailing religious denominations: Protestants are clearly more prevalent in the North, as are people with no religious affiliation. There are similar differences as regards church attendance. However, the North-South differences are considerably less pronounced in Germany than in Italy.

The remainder of this paper is structured as follows. After introducing the data (Section 2), we illustrate the cohort dynamics of union formation, marriage, and the transition to parenthood for Italian and West German men and women (Section 3). In Section 4 we outline the trends in the mutual relationships between unions, marriages, and first births. In Section 5 we study the changing impact of first unions on the

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is your religious affiliation?'; and "How often do you attend religious services (apart from weddings, funerals, baptisms, and the like)?'".

transition to motherhood using an event history model. We discuss our results and future research needs in section 6.

[TABLE 1 ABOUT HERE]

2. The data

We use data from the Italian Fertility and Family Survey (De Sandre et al., 1997) and from the German Fertility and Family Survey (Pohl, 1995). Both surveys were conducted within a comparative programme organised by the Population Activities Unit of the Economic Commission for Europe (United Nations). The Italian survey was held between 1995 and 1996 with a representative sample of 6,030 men and women born between 1946 and 1975. The German survey was held in 1992 with 10,012 interviews with men and women born between 1952 and 1972.

For this paper we select only those individuals who spent the first 15 years of their life in Italy and West Germany, respectively. We consider the area where the respondents spent the first 15 years of their life as the reference area. We divide Italy into two parts (according to Santini's definition North-Centre and South-Islands)[2], and we similarly split West Germany into a Northern and Southern part[3]. We shall simply speak of North and South in both countries.

In our investigations we adopt a cohort perspective and select a set of five cohorts that are both interesting for comparison and also provide a sufficient number of events for the analyses. For Italy, we select four five-year-wide cohorts: 1951-55, 1956-60,

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[2] The South-Islands consist of the regions Campania, Puglia, Basilicata, Calabria, Sicilia, and Sardegna. All others regions belong to the North-Centre.
[3] The "Bundesländer" considered to be in the South of West Germany are Baden-Württenberg and

1961-65, 1966-70. For West Germany, the first cohort is slightly different because individuals born before 1952 were not included in the survey. Moreover, we also include individuals born in 1971 and 1972 in the last cohort. In Table 2 we report the sample sizes for each country, area, cohort, and gender.

[TABLE 2 ABOUT HERE]

3. Union formation, marriage, and the transition to parenthood: cohort dynamics

We start with a discussion of the experiences of the different cohorts with respect to union formation, marriage and the transition to parenthood. For this purpose, we use Kaplan-Meier survivor functions estimates[4].

Table 3 reveals a clear postponement of the transition into the first union for all four areas and both genders. Despite this common trend, the dynamics are heterogeneous in the different regions. Let us first consider men. Southern Italian men exhibit the highest median age at first union (26.7 years) for the early 1950s cohorts. This is due to the high proportion of individuals in these cohorts who postponed unions because of emigration. For the youngest cohort, Northern Italian men will presumably have the highest median age (above 30). Even if the direction of change is similar in both Northern and Southern Italy, an analysis of first union formation suggests that the difference is rising rather than decreasing. In Germany, on the other and, our explorative analyses suggest parallel developments in the North and South.

Bavaria. All other regions belong to the North.

[4] We the software TDA (Rohwer and Pötter, 1999) to compute the survivor function and the subsequent transition rate models.

What is also noticeable is the very strong postponement of early unions in the Northern parts of the two countries. The proportion of men who have ever entered a union is becoming very similar between North Germany and North Italy. And both countries exhibit a clear North-South divide.

For women we observe a pattern similar to that of men. The postponement of first union was rather modest for the cohorts born 1952-65, while the youngest cohorts (born 1966 and after) reveal a strong postponement across all four regions of our study. Moreover, the proportion of women having ever entered a union by age 30 is quite similar for the oldest cohort, and it then declines at almost the same pace in the four areas.

The same direction of change – towards postponement – is evident when we look at first marriage (Table 4). For males, the median age at marriage is postponed significantly beyond the 30th birthday. It is interesting to notice that in the youngest cohorts, the figures for Northern Italy and Southern Germany are the closest of all with respect to this indicator.

For women, Southern Italy appears to be going in a different direction regarding the timing of first marriage. Despite this difference, the proportion of ever married women at 30 is similar within Italy (around 75%) for the 1961-1965 cohort and also within West Germany (around 60%) for the same cohort. Marriage as an institution is clearly stronger in Italy than it is in West Germany, as we already observed when looking at people's opinions, whereas the differences were not great as far as first unions are concerned.

Let us now consider first births (Table 5). Again, postponement is the primary pattern when one looks at the figures from a cohort perspective. For men, Northern Italy –

where the "lowest-low" fertility regions are concentrated – overtakes Northern Germany with respect to the proportion of men who never become a father: only 25% of the men of the 1961-1965 cohorts are fathers at the age of 30, and the figure is most likely to be lower for the younger cohort. Compared to these trends, the magnitude of the postponement of fatherhood is quite modest in Southern Italy, which represents a unique pattern, with more than 25 per cent more fathers by age 30 than in the North. When we analyse the data for women, Southern Italy stands on its own once again, with a median age that is about 2.5-3.5 years younger than in Northern Italy and West Germany.

In summary, while Northern Italy and all of Germany seem to be following a common trend, Southern Italy represents a special case in the transition to first union and, even more so, first birth.

[TABLES 3-5 ABOUT HERE]

4. Mutual relationships between unions, marriages, and first births

We now move to a different perspective and consider the temporal relationship between first unions and first marriage, and between first marriage and first birth. The theoretical framework motivating our analysis is that of the Second Demographic Transition. In that framework, the first marriage should be progressively postponed after the first union, and eventually not even experienced by a significant share of people. It might however also happen that, even if the first union is increasingly less a marital union, the transition from first union to marriage is speeded up because cohabitation increasingly becomes "a strategy to move into unions gradually" (Manting, 1996).

The Second Demographic Transition framework also provides a clear prediction regarding the relationship between first birth and first marriage. In particular, first births should increasingly occur before the first marriage. It is not clear, however, whether the interval from first marriage to first birth should change in a specific direction. There might be a trend towards prolonging a period as married couple without children, but also there might also be a shorter length of time because unions are already formed before marriage and marriage becomes a stronger commitment towards stability (Blossfeld et al., 1996).

We start with an investigation of union formation and the transition to marriage[5]. In Table 6 we analyse the share of first unions that are direct marriages in the four areas for both genders. The direction of change is as expected: the share of unions that start directly with marriage is evidently decreasing (with some exception for the very young cohort, for which the share of unions experienced is much smaller, however). Although the trend is similar for the two countries, both the level and the speed are radically different. In all of West Germany only a minority of people in the youngest cohorts have experienced direct marriages, and the share of direct marriages has more than halved between the cohorts 1952-1955 and 1961-1972. The great majority of people in Italy, on the other hand, still experience a direct transition to marriage, and the transformation of this pattern has been much slower. Within Italy there are marked differences between the North and the South, although marriage remains the dominating avenue of entering unions in both.

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[5] Actually, what we consider is the transition from the first union to first marriage, which might also be with a different person with respect to the first union.

For West Germany it is also possible to analyse the transition from first non-marital union to marriage. Here, there is a shift towards postponing marriage after the beginning of non-marital unions, especially for women, without evident North-South differentials.

[TABLE 6 ABOUT HERE]

We now turn to first marriage and first childbirth. The order between these two events cannot be given a priori as in the case of first union and first marriage. In fact, the order itself is one focus of our study. For this reason, we make use of mirrored survivor functions (we refer the reader to the Appendix for an explanation of how they are constructed). We leave out of the analyses the youngest cohort because they have not yet experienced a sufficient number of events. We first consider men (Figures 1 and 2). A big difference between Italy and West Germany is immediately evident: the share of men who become fathers after marriage (that is, the value of the function at the intersection with the vertical axis) is almost 100% in Italy. First marriage can therefore be taken as the event marking the exposure to the risk of becoming a father, without the loss of any important information. It is also interesting to note that there is no difference between North and South with respect to this pattern. Although the North exhibits a higher share of individuals who experience cohabitation before marriage, childbearing takes place almost completely within marriage. The cohort dynamics of this pattern are interesting. The Italian situation is fairly stable, with the primary exception that births are postponed after first marriage in the 1956-1960 and 1961-1965 cohorts, especially in the North. This is of course consistent with the later age at first birth observed in the aggregate data. Moreover, postponed marriage and postponed first births within marriage have a double impact on fertility in Italy. First, the age at which individuals

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enter unions and thus start to be "at risk" of entering parenthood increases and, second, the time between entering a union and first birth is prolonged.

In West Germany a significant – though still a minority – share of the men experience out-of wedlock fatherhood.[6] Consistent with the expectations arising from perspective of the Second Demographic Transition, the percentage of out-of-wedlock first births is increasing. It is interesting to note, however, that this is occurring almost exclusively in the North. The South has only a slightly higher increase in the rate of out-of-wedlock childbearing for the youngest cohort. After marriage, however, there is no indication of a similarly significant postponement of first births such as we observed in Italy. One can also see that the transition from first marriage to first birth in Germany takes place faster than the transition from first birth to marriage.

In both countries the pattern for women mirrors that of men (Figures 3 and 4). Becoming a mother before marriage is a very rare situation for the Italian cohorts in our analysis, even if there seem to be some timid changes. The postponement of childbirth after marriage is also visible for females and the extent is comparable to the postponement for males.

In West Germany the evolution for women is slightly different: the changes between cohorts appears to be more similar in the North and the South, and there is a clear difference between the oldest cohort and the two younger ones.

[FIGURES 1-4 ABOUT HERE]

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[6] It is interesting to note that the proportion of out-of-wedlock births is substantially higher in East Germany, both prior to unification as well as afterwards (Huinink 1998).

5. The changing impact of first unions on first births: a transition rate model

We now use event history analysis to study the dynamics of the impact of marriage and cohabitation on the transition to parenthood. In particular, we would like to test whether cohabitation is progressively becoming more importance for the transition to parenthood, as predicted in the framework of the Second Demographic Transition. Moreover, we would like to investigate whether there are differences between Italy and West Germany, as well as within these countries. We control for educational enrolment, because the educational aspirations and attainment of women have changed substantially both in West Germany (Hullen, 1998) and Italy (Billari, 1998) for the cohorts in our study.

In the analyses in this section we focus on women in the three oldest cohorts. Our decision to focus on women and to neglect the youngest cohort was dictated mainly by sample sizes, given that the very low propensity in Italy to give births (and also to conceive) before marriage makes it more difficult to estimate models in which cohabitation is used as a covariate.

Since we are studying partnership behaviour in first union and first births as interdependent process, we had to select a modelling approach that takes this potential interdependence into account. We focus only on the transition to first birth, with a slightly modified specification compared to our earlier analyses above: the dependent variable is the time of the conception leading to the first birth, that is, by approximation, the time of birth minus 9 months. This modification serves to eliminate distortions caused by marriages and cohabitation that are the outcome of conceptions. We are thus using a "causal approach" (see Blossfeld and Rohwer, 1995) based on the principle of

conditional independence (Pötter, 1993), which allows us to focus on the transition rates

for one process at a time.

The model underlying our analyses is a proportional hazard model with a piecewise-

constant baseline hazard and both time-constant and time-varying covariates (Blossfeld

and Rohwer, 1995). The period at which individuals are at risk starts on the 16th

birthday, and the pieceswise-constant baseline hazard has age intervals of 4-years'

length (thus, 16-20, 20-24, 24-28, 28 and more years). These age intervals allow us to

specify cohort effects for each of the cohorts we study. The observation is considered

censored when (a) the individual has not had a first birth at the time of interview, or (b)

the first union is broken, in which case censoring occurs at the time of breaking the

partnership.

Cohort and area are the only time-constant covariates. Educational enrolment is

treated as a time varying covariate which changes irreversibly when full-time education

is interrupted[7]. For marriage and cohabitation, we first use simple time-varying

covariates that describe whether the respondent is married or cohabiting (M and C). This

analysis allows us to investigate the transition from cohabitation to marriage even if our

marriage variable does not distinguish between direct and post-cohabitation marriages.

We include in our analyses the impact of the duration of cohabitation and marriage,

i.e., we investigate the so-called "effect shape", the importance of which has been

advocated by Blossfeld et al. (1996). For this purpose we build an additional time-

varying covariate that reveals whether or not a marriage/cohabitation is in its first 3

years (which we call M3 and C3). To analyse possible effects of a short union duration,

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[7] This is necessary because we do not have data on full educational histories. In addition, there may be problems because the West German educational system favours a return to education, while this is not the case for the Italian system.

we include a similar time-varying covariate for the first year of marriage/cohabitation (M1 and C1). Figure 5 reports an example of this with respect to marriage.

The main focus of our analyses is on the interaction between variables related to marriage/cohabitation and cohort. Nevertheless, we will also discuss the interaction between these variables and areas within countries.

[FIGURE 5 ABOUT HERE]

The results of the estimation are reported in Tables 7-9. In Model 1 (Table 7), we can see that the transition to motherhood has been postponed significantly in both countries, even after controlling for prolonged educational periods. After controlling for changes in education, West Germany exhibits a slightly stronger postponement than Italy (the 1961-1965 West German cohort has a relative risk of 73% with respect to the oldest one, while in Italy this is about 81%). Thus, the longer period spent in education cannot fully account for the lower transition rates to motherhood.

In Model 2, we introduce cohabitation and marriage as time-varying statuses, and we also consider the interaction between marriage/cohabitation and cohort. In Italy, as expected, being married has a very high impact on the transition to motherhood (the relative risk increases by about 14-fold), and it is noticeably higher than the impact of cohabitation (about 7 times higher). It is interesting, however, to focus on how the impact changes with cohorts[8]. The impact of both cohabitation and marriage increases for the younger cohorts (rows 10-13); this is a result that does not come as unexpected, as pre-union conception should diminish across cohorts. What is particularly interesting for us is that the impact of cohabiting increases faster than the impact of being married

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[8] We will focus more on the actual estimate than on its statistical significance, which of course is strongly influenced by the sample size.

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(the relative risk for cohabiting people in the youngest cohort is about 225% with respect to the oldest cohort, while the same figure is about 150% for those married).

The picture is different in West Germany. First of all, the baseline impact of being married versus cohabiting exhibits much less contrast than in the Italian case. Then, the impact of being in a union rises for younger cohorts, as is the case in Italy, but the increase is much faster within marriage than within a cohabiting union (rows 10-13). This effect might be explained by looking back at Fig. 4: the transition to first childbirth after marriage happens faster for the 1961-1965 cohort than for the oldest cohort. Marriage is postponed, but it seems to become more important when people decide that they want to settle and have a child. In Italy we thus notice the increasing impact of cohabitation that we expect as a sign of convergence towards countries with a higher score on the Second Demographic Transition scale across cohorts, while in West Germany the meaning of being married increases in importance.

In order to see whether accounting for the timing of motherhood within first unions accounts for this difference we introduce the timing variables in Model 3 (Table 8). In Italy, one can observe that the baseline impact of entering a union (both marital and non-marital) decreases with union duration. The transition rate reaches its highest level in the first year (rows 10 and 12). Furthermore, when we account for this, cohabitation has an impact on the transition to motherhood that is increasing faster than the impact of marriage (rows 20 and 23 *vs*. rows 14 and 17). There are also some changes in the timing of motherhood within marriage and cohabitation. In the younger cohorts, the impact of the first three years of marriage and of the first year of cohabitation is lower (rows 16 and 19, 21 and 24). That is, while union status is becoming increasingly more

important, the transition rate to motherhood is becoming less shaped determined by union duration.

In West Germany, as in Italy, the first year of a union is the one with the highest transition rates to motherhood. If we take into account the modifications of this shape, the overall impact of cohabitation for younger cohorts becomes more important than in Model 2 (rows 20 and 23): there is a clear diminishing impact of union duration for younger cohorts in the first three years (rows 22 and 25). However, in contrast to Italy, we cannot detect an increasing impact of cohabitation versus marriage even after controlling for the duration of the union.

In Model 4 (Table 9) we study the changing impact of cohabitation and marriage in the two geographical areas, without taking into account the shape effects. In Italy we notice that controlling for the area effect does not modify the results of other models (Model 2). Union status is more important in the South than in the North. This is an expected effect, at least as far as marriage is concerned (the relative risk of being married in the South is 190% with respect to the North), both because of the higher focus on marriage in Southern Italian culture and the higher overall fertility. It is important to note, however, that the difference between North and South does not change for the younger cohorts: the greater importance of marriage in Southern Italy persists. It is difficult to interpret the relative impact of cohabitation in Southern Italy, as it has a U-shaped effect and the prevalence of cohabitation in the South is very low. In West Germany, marriage had a less important impact in the South for the oldest cohort (with a relative risk of about 63% compared to the North). The difference vanishes, however, for the two younger cohorts, for which the effect converges to the values of

the North. For cohabitation, the differences are not significant although it is interesting to note that they go in the opposite direction with respect to marriage.

[TABLES 7-9 ABOUT HERE]

5. Discussion

In a nutshell, the results of this paper suggest that Italy and West Germany are experiencing "divergent postponements" of first union and first births. Moreover, the same divergence occurs within Italy, where the North-South divide appears to be more important than in West German. The South of Italy exhibits a substantially smaller extent of postponement in marriage and fertility.

The major features of demographic behaviour leading to the fist birth are the continuing central role of marriage in procreative behaviour, which is partially reduced in West Germany only, and a postponement of first births. In Italy, this development leads to a double impact because of the delay in entering unions and the delay in the transition to parenthood within unions. The trend to the higher "Second Demographic Transition" score is therefore faster for West Germany – and mainly for the decreasing share of direct marriages. Italy, on the other hand, seems to be retaining its own pattern, with only very slight signs of convergence.

The findings of this paper are relevant in several respects. First, our study provides further evidence that a convergence in patterns of union formation and first births may not occur, and Europe is likely to be characterised by distinct national and regional pattern in the near and intermediate future. Although union formation and first birth behaviour have clearly changed in both countries, with clearly existing parallel patterns

regarding, e.g., the importance of postponement, our study does not indicate the presence of an ongoing convergence across the regions investigated in our study.

The second important finding of our study pertains to the implications of childbearing occurring almost exclusively within marriage in countries such as Italy. In this situation, the postponement of entering marriage and the postponement of childbearing within marriage have an additive effect that emphasises fertility-reducing effects. Whereas in Germany, and most strikingly of course in Scandinavian countries, the delay in entering marriages is in part offset by an increase in pre-marital childbearing, this is absent in Italy and similar countries. Thus, one reason for the very low Italian fertility level is the strong connection between leaving the parental home, entering marriage, and childbearing. In countries where this link is less strong, the effect of postponing marriages has a lesser effect on fertility, since it is in part offset by increases in out-of-wedlock childbearing.

Appendix

We briefly explain here the construction of the "mirrored survivor functions" originally presented in Billari (1998), which we use in Section 3. This proposal constitutes a generalisation of the traditional concept "survivor functions" in order to visualise temporal relationships between events.

Consider two non-repeatable events F and S which may occur simultaneously. Both events are measured on the same time axis (say, age), and some observations might be right-censored. Let t_{Fi} be the time of occurrence, or censoring, of F and t_{Si} the time of occurrence, or censoring, of S, for individual i (i=1,2,3...n), where n is the number of

cases with the occurrence of at least one of the events. Let us define

$$n_F = \sum_{i=1}^{n} \nu\left(t_{Si}, t_{Fi}\right) \quad n_S = \sum_{i=1}^{n} \nu\left(t_{Fi}, t_{Si}\right) \quad n_{FS} = n - n_F - n_S$$

where

$$\nu(a,b) = \begin{cases} 1 & \text{if } a < b \\ 0 & \text{otherwise} \end{cases}$$

Thus, n_{FS} is the number of people experiencing simultaneous events, n_F the number of people experiencing S before F, and n_S the number of people experiencing F before S. Let us call $G_F(t)$ the survivor function at t for F, with the time of occurrence of S taken as the origin ($t=t_F-t_S>0$); $G_S(t)$ is the survivor function at t for S, with the time of occurrence of F taken as the origin ($t=t_S-t_F>0$). Both functions can be estimated with ordinary Kaplan-Meier procedures. The mirrored survivor function for both events is defined as:

$$M(t) = \begin{cases} 1 - \dfrac{n_F}{n} \cdot G_F(-t) & t < 0 \\ \dfrac{n_S}{n} \cdot G_S(t) & t \geq 0 \end{cases}$$

The function $M(t)$ is right-continuous for $t \geq 0$ and left-continuous for $t < 0$. Its interpretation is comparable to that normally given for ordinary survivor functions. $M(t)$ indicates the share of people experiencing S at least t periods after having experienced F for $t>0$ and the share of people experiencing F at least t periods after having experienced S for $t<0$. A jump at zero indicates the share of people simultaneously experiencing F and S and of those experiencing at least one event; this might be interpreted as a first measure of the share of synchronisation:

$$\lim_{t \to 0^-} \left[M(t) - M(0) \right] = \frac{n_{FS}}{n}$$

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Ordinary survivor functions are obtained as a special case, when $n_S=n$. The measure of synchronisation for other time intervals can also be used, for instance a one-time unit interval $M(1)$-$M(-1)$.

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Tables

Table 1. North and South Italy and West Germany. Answers to some questions on marriage and religion (percentage distribution).

a. Men

Italy - North

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
51-55	19	79	2	88	1	2	9	41	59
56-60	19	80	2	78	0	2	20	32	68
61-65	22	74	4	83	1	0	16	26	74
66-70	19	78	3	84	1	0	16	28	72

Italy - South

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
51-55	17	83	0	97	2	0	1	42	58
56-60	20	76	4	99	0	0	1	28	72
61-65	20	80	1	94	0	1	5	28	72
66-70	18	73	9	88	0	0	12	33	67

West Germany – North

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
52-55	25	65	10	35	46	3	15	23	78
56-60	24	67	10	31	50	2	17	14	86
61-65	32	53	14	39	44	1	17	15	85
66-72	29	55	16	38	49	4	10	16	84

West Germany – South

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
52-55	22	71	7	46	38	5	11	38	62
56-60	21	65	15	50	38	3	10	26	74
61-65	25	60	16	57	32	3	9	26	74
66-72	22	64	14	56	38	1	5	18	82

Table 1 (continued).

b. Women

Italy - North

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
51-55	16	82	1	89	1	0	10	50	50
56-60	15	83	2	85	1	1	13	45	55
61-65	16	82	2	88	0	1	11	49	51
66-70	12	86	1	88	0	1	11	47	53

Italy - South

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
51-55	14	84	2	94	0	1	5	57	43
56-60	15	82	3	96	2	0	2	56	44
61-65	18	80	1	94	1	2	3	51	49
66-72	14	85	2	96	0	1	2	52	48

West Germany – North

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
52-55	19	75	8	36	54	2	8	25	76
56-60	21	70	9	44	45	2	9	26	74
61-65	25	64	12	38	50	3	9	22	78
66-70	29	60	11	39	50	3	8	20	80

West Germany – South

	Marriage is an outdated institution			Religion				Church attendance	
	Agree	Disagree	Don't know	Catholic	Protestant	Others	None	Once a month or more	Less than once a month
52-55	19	74	7	57	30	4	9	34	66
56-60	22	70	8	57	33	2	8	35	66
61-65	26	62	11	56	37	3	4	29	71
66-72	23	64	14	57	37	3	3	26	74

Table 2. Sample sizes by gender, cohort and area.

Italy

| | Men | | Women | |
	North	South	North	South
51-55	104	76	453	278
56-60	95	59	443	289
61-65	138	82	510	310
66-70	160	71	521	336

West Germany

| | Men | | Women | |
	North	South	North	South
52-55	208	97	330	143
56-60	273	110	448	222
61-65	365	129	507	205
66-72	520	222	708	325

Table 3. Synthetic values from survivor functions. First union.

a. Men

Italy

	First	North Median	S(30)	First	South Median	S(30)
51-55	22.9	25.6	0.18	24.0	26.7	0.20
56-60	24.0	26.0	0.30	23.8	27.4	0.35
61-65	26.6	29.3	0.48	23.7	26.6	0.35
66-70	28.8	>29.8	—	25.5	>29.6	—

West Germany

	First	North Median	S(30)	First	South Median	S(30)
52-55	21.7	24.5	0.24	21.6	24.2	0.24
56-60	22.1	24.9	0.29	21.9	25.5	0.28
61-65	22.8	28.9	0.47	22.7	27.9	0.39
66-72	24.8	>26.7	—	24.9	>26.7	—

b. Women

Italy

	First	North Median	S(30)	First	South Median	S(30)
51-55	20.5	22.3	0.09	20.4	22.5	0.13
56-60	20.4	23.5	0.17	20.3	23.1	0.18
61-65	21.7	24.7	0.20	20.5	23.8	0.23
66-70	23.4	26.6	—	21.8	25.6	—

West Germany

	First	North Median	S(30)	First	South Median	S(30)
52-55	19.2	21.0	0.09	19.3	21.4	0.13
56-60	19.8	22.0	0.15	19.7	22.2	0.14
61-65	20.2	22.9	0.23	20.4	23.4	0.25
66-72	21.8	>26.7	—	22.8	>26.7	—

Table 4. Synthetic values from survivor functions. First marriage.

a. Men

Italy

	North			South		
	First	Median	S(30)	First	Median	S(30)
51-55	23.0	25.8	0.20	24.2	26.8	0.22
56-60	24.6	26.8	0.32	24.3	28.1	0.37
61-65	27.3	31.1	0.54	24.2	27.5	0.36
66-70	>29.8	—	—	26.6	>29.6	—

West Germany

	North			South		
	First	Median	S(30)	First	Median	S(30)
52-55	23.4	27.6	0.39	23.1	26.0	0.35
56-60	24.7	30.1	0.50	24.6	30.6	0.51
61-65	29.0	31.4	0.72	26.0	30.9	0.56
66-72	>26.7	—	—	>26.7	—	—

b. Women

Italy

	North			South		
	First	Median	S(30)	First	Median	S(30)
51-55	20.6	22.4	0.11	20.7	22.9	0.14
56-60	20.7	23.8	0.21	20.3	23.4	0.20
61-65	21.9	24.9	0.24	20.6	23.9	0.26
66-70	23.7	27.2	—	22.0	26.0	—

West Germany

	North			South		
	First	Median	S(30)	First	Median	S(30)
52-55	20.2	23.0	0.23	20.1	24.0	0.30
56-60	21.4	25.1	0.39	21.9	25.1	0.38
61-65	23.0	28.2	0.40	23.2	28.3	0.42
66-72	24.9	26.5	—	>26.7	—	—

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Table 5. Synthetic values from survivor functions. First birth.

a. Men

Italy

	North			South		
	First	Median	S(30)	First	Median	S(30)
51-55	24.4	29.4	0.42	25.4	28.0	0.38
56-60	27.4	30.6	0.56	25.3	30.6	0.51
61-65	30.0	>34.8	0.75	25.6	29.4	0.43
66-70	>29.8	—	—	>29.6	—	—

West Germany

	North			South		
	First	Median	S(30)	First	Median	S(30)
52-55	26.0	31.1	0.53	23.6	28.8	0.41
56-60	26.3	32.2	0.58	26.3	31.6	0.56
61-65	29.4	>31.7	0.72	28.0	>31.5	0.68
66-72	>26.7	—	—	>26.7	—	—

b. Women

Italy

	North			South		
	First	Median	S(30)	First	Median	S(30)
51-55	21.6	25.2	0.22	21.4	24.3	0.20
56-60	22.2	26.8	0.37	21.3	24.8	0.24
61-65	24.3	28.0	0.39	21.9	25.4	0.31
66-70	26.6	>29.5	—	23.4	28.0	—

West Germany

	North			South		
	First	Median	S(30)	First	Median	S(30)
52-55	21.3	26.3	0.34	21.2	26.3	0.35
56-60	23.6	27.8	0.38	22.2	26.3	0.36
61-65	23.9	29.1	0.45	23.6	29.0	0.48
66-72	25.6	>26.7	—	>26.7	—	—

Table 6. First unions and first marriages.
a. Men

Italy

	North			South		
	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married 5 years of cohabitation (survivor function)	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married after 5 years of cohabitation (survivor function)
52-55	88.5			88.6		
56-60	86.2			93.0		
61-65	84.4			87.1		
66-72	71.0			70.4		

West Germany

	North			South		
	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married 5 years of cohabitation (survivor function)	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married after 5 years of cohabitation (survivor function)
52-55	51.5	0.85	0.38	69.0	0.78	0.25
56-60	26.4	0.83	0.42	46.6	0.82	0.45
61-65	18.6	0.89	0.64	30.4	0.81	0.52
66-72	22.3	0.96	0.68	17.1	0.96	—

b. Women

Italy

	North			South		
	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married after 5 years of cohabitation (survivor function)	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married after 5 years of cohabitation (survivor function)
52-55	95.2	—	—	95.2	—	—
56-60	89.8	—	—	94.8	—	—
61-65	89.1	—	—	90.1	—	—
66-72	84.0	—	—	94.8	—	—

West Germany

	North			South		
	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married after 5 years of cohabitation (survivor function)	% of direct marriages	Never married after 1 year of cohabitation (survivor function)	Never married after 5 years of cohabitation (survivor function)
52-55	63.2	0.78	0.39	63.3	0.79	0.37
56-60	44.9	0.80	0.44	48.1	0.89	0.44
61-65	28.9	0.84	0.47	36.0	0.76	0.46
66-72	22.7	0.83	0.43	26.7	0.88	0.35

Table 7. Results of the transition rate model for the timing of conception leading to first birth.

		Italy Model 1	West Germany Model 1	Italy Model 2	West Germany Model 2
	Age				
1	16-20 years	-5.2052	-4.8286 **	-5.5629	-5.0984 **
2	20-24 years	-4.4806	-4.7551 **	-5.6688	-5.6486 **
3	24-28 years	-4.1827	-4.5093 **	-5.9128	-5.7276 **
4	28 years and over	-4.5108	-4.9696 **	-6.4113	-6.1563 **
	Cohort (reference: 1951(2)-55)				
5	1956-60 cohort	-0.1098 +	-0.1622 *	-0.2651 *	-0.4545 **
6	1961-65 cohort	-0.2164 **	-0.3092 **	-0.4432 **	-0.6794 **
	Education (reference: not in education)				
7	In education	-1.1912 **	-1.353 **	-0.6531 **	-0.9584 **
	Union (reference: not in union)				
8	M Married			2.6392 **	1.4937 **
9	C Cohabiting union			1.9439 **	1.3725 **
	Interaction effects				
10	M*1956-60 cohort			0.2523 *	0.658 **
11	M*1961-65 cohort			0.4222 **	1.2142 **
12	C*1956-60 cohort			0.3950	0.4161 +
13	C*1961-65 cohort			0.8131 **	0.4669 +
	Log-likelihood	-10544.30	-6360.14	-9252.44	-5979.62

Note: ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 8. Results of the transition rate model for the timing of conception leading to first birth (with timing within union).

|		Italy Model 3	West Germany Model 3
	Age		
1	16-20 years	-5.6211	-5.1361 **
2	20-24 years	-5.7147	-5.6677 **
3	24-28 years	-5.8108	-5.6496 **
4	28 years and over	-6.0608	-5.9526 **
	Cohort (reference: 1951(2)-55)		
5	1956-60 cohort	-0.2702 *	-0.4604 **
6	1961-65 cohort	-0.4360 **	-0.6746 **
	Education (reference: not in education)		
7	In education	-0.6560 **	-0.9419 **
	Union (reference: not in union)		
8	M Married	1.6690 **	1.0894 **
9	C Cohabiting union	1.0594 +	0.7498 +
	Within union shape (reference: average level of union rates)		
10	M1 Married (First year—additional to the first 3 years)	0.4292 **	0.1717
11	M3 Married (First three years)	0.9057 **	0.5194 **
12	C1 Cohabiting union (First year—additional to the first 3 years)	0.2794	0.0862
13	C3 Cohabiting union (First three years)	0.8536	0.6913
	Interaction effects		
14	M*1956-60 cohort	0.4828 *	0.7954 **
15	M1*1956-60 cohort	0.0508	-0.0375
16	M3*1956-60 cohort	-0.3646 +	-0.2366
17	M*1961-65 cohort	1.0652 **	1.2415 **
18	M1*1961-65 cohort	-0.1931	-0.0329
19	M3*1961-65 cohort	-0.7468 **	-0.1645
20	C*1956-60 cohort	0.5759	0.9863 *
21	C1*1956-60 cohort	-0.5124	-0.4522
22	C3*1956-60 cohort	-0.0221	-0.5192
23	C*1961-65 cohort	1.8772 *	0.8698 +
24	C1*1961-65 cohort	0.1192	-0.0899
25	C3*1961-65 cohort	-1.4037	-0.4321
	Log-likelihood	-9168.47	-5965.12

Note: ** p<0.01, * p<0.05, + p<0.1

Table 9. Results of the transition rate model for the timing of conception leading to first birth (with differences within country).

		Italy Model 4	West Germany Model 4
	Age		
1	16-20 years	-5.5903	-5.0985 **
2	20-24 years	-5.6590	-5.6498 **
3	24-28 years	-5.8680	-5.7292 **
4	28 years and over	-6.3530	-6.1481 **
	Cohort (reference: 1951(2)-55)		
5	1956-60 cohort	-0.2685 *	-0.4544 **
6	1961-65 cohort	-0.4458 **	-0.6788 **
	Education (reference: not in education)		
7	In education	-0.6458 **	-0.9586 **
	Union (reference: not in union)		
8	M Married	2.4125 **	1.619 **
9	C Cohabiting union	1.1636 *	1.3347 **
	Interaction effects		
10	M*1956-60 cohort	0.2276 +	0.448 *
11	M*1961-65 cohort	0.4497 **	1.0844 **
12	C*1956-60 cohort	1.0863 *	0.4935 +
13	C*1961-65 cohort	1.2089 *	0.5613 *
14	MS Married*South	0.6426 **	-0.4552 **
15	MS*1956-60 cohort	0.0703	0.7547 **
16	MS*1961-65 cohort	-0.1189	0.4722 +
17	CS Cohabiting Union*South	1.8959 **	0.1329
18	CS*1956-60 cohort	-1.5468 +	-0.2469
19	CS*1961-65 cohort	-0.7681	-0.3872
	Log-likelihood	-9187.09	-5973.28

Note: ** $p<0.01$, * $p<0.05$, + $p<0.1$

Figures

Figure 1. Italy. Mirrored survivor functions: first child-first marriage.
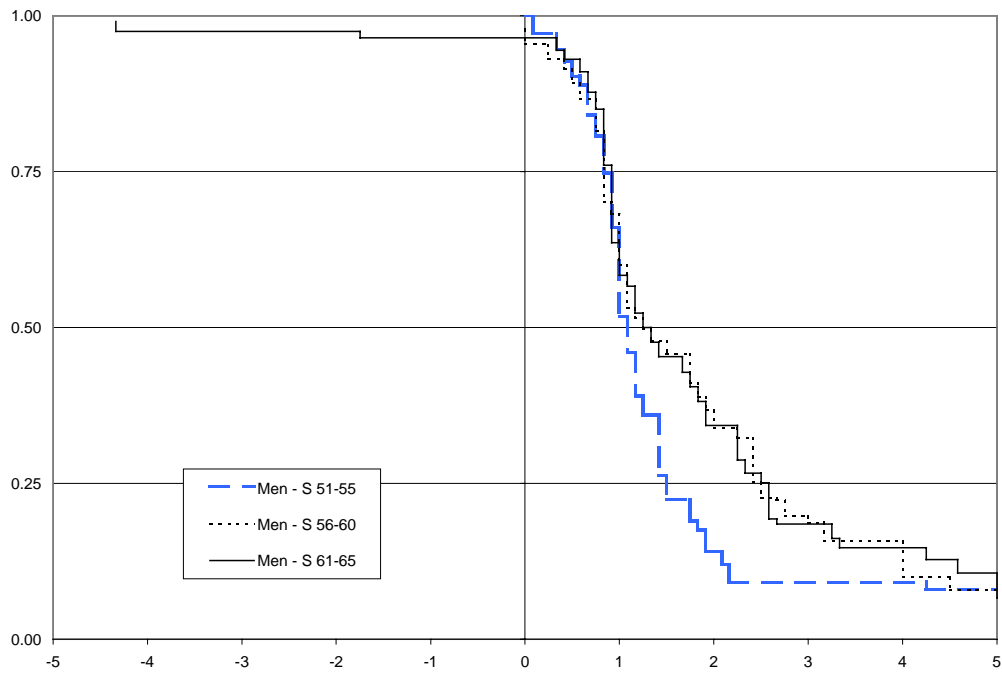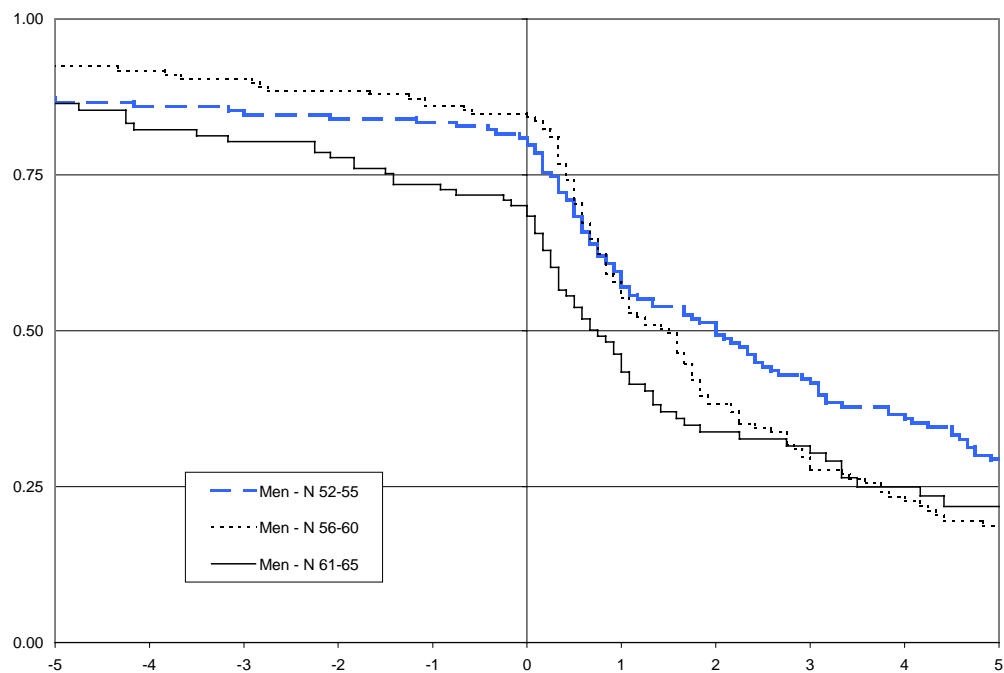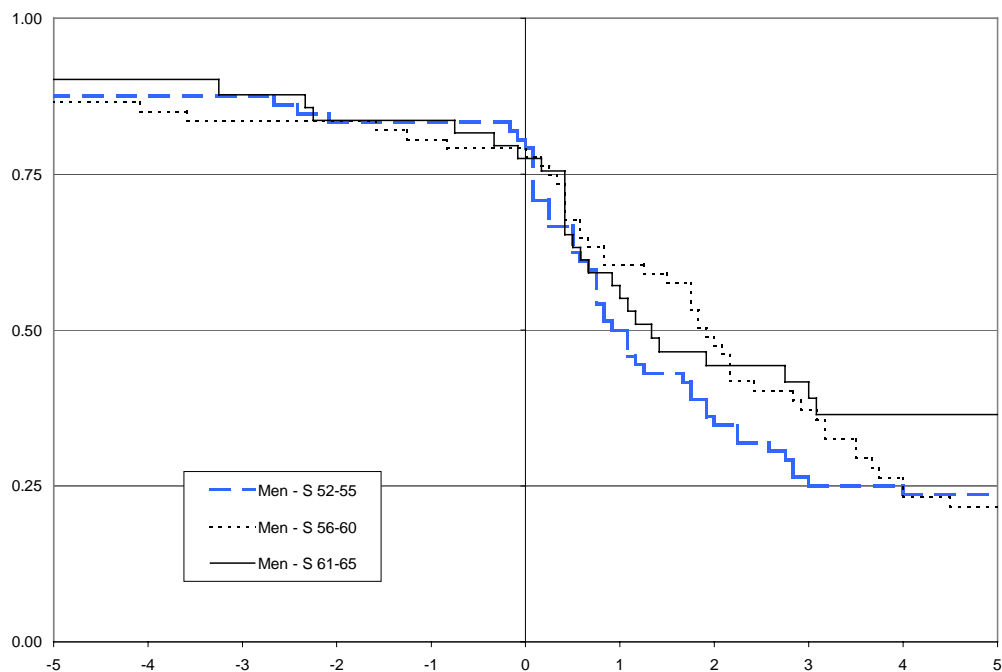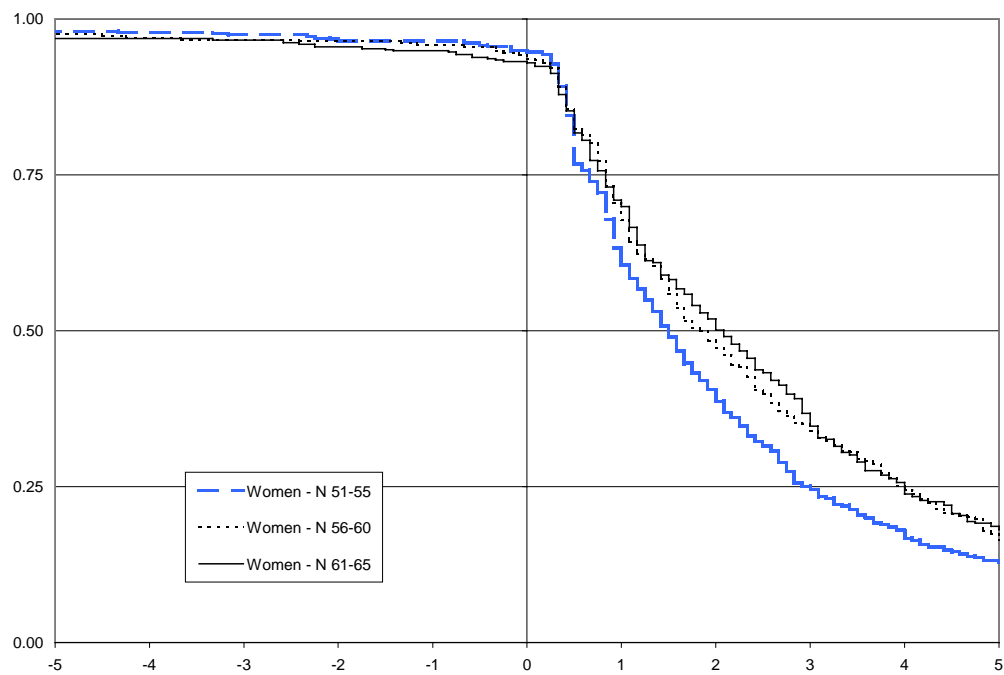*a. Men, North.*
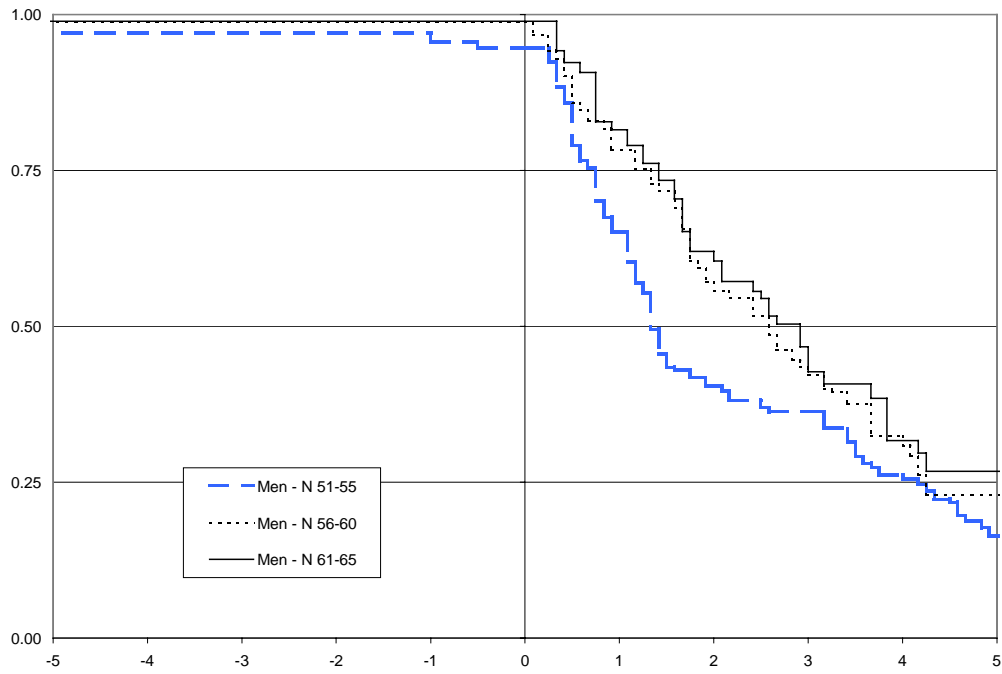
b. Men, South

Figure 2. West Germany. Mirrored survivor functions: first child-first marriage.
a. Men, North.

b. Men, South

Figure 3. Italy. Mirrored survivor functions: first child-first marriage.
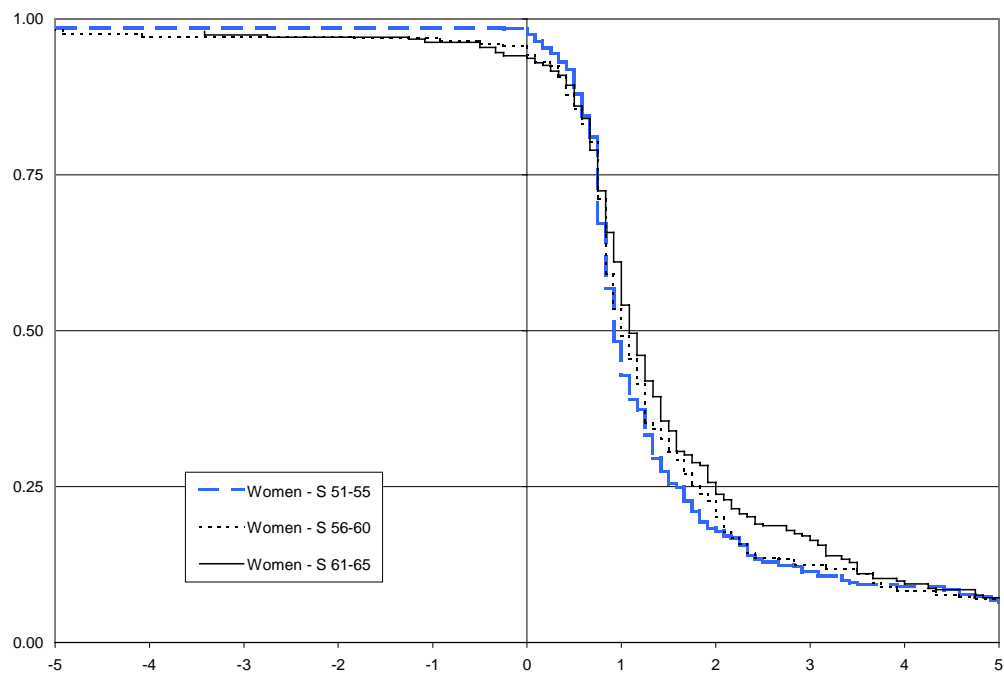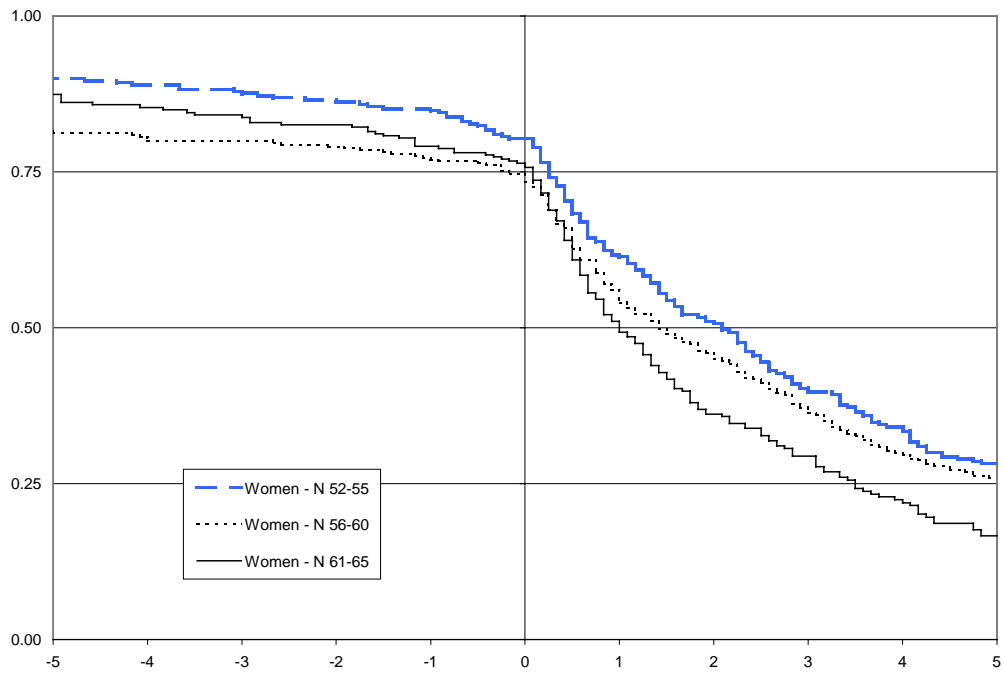*a. Women, North.*

b. Women, South.

Figure 4. West Germany. Mirrored survivor functions: first child-first marriage.
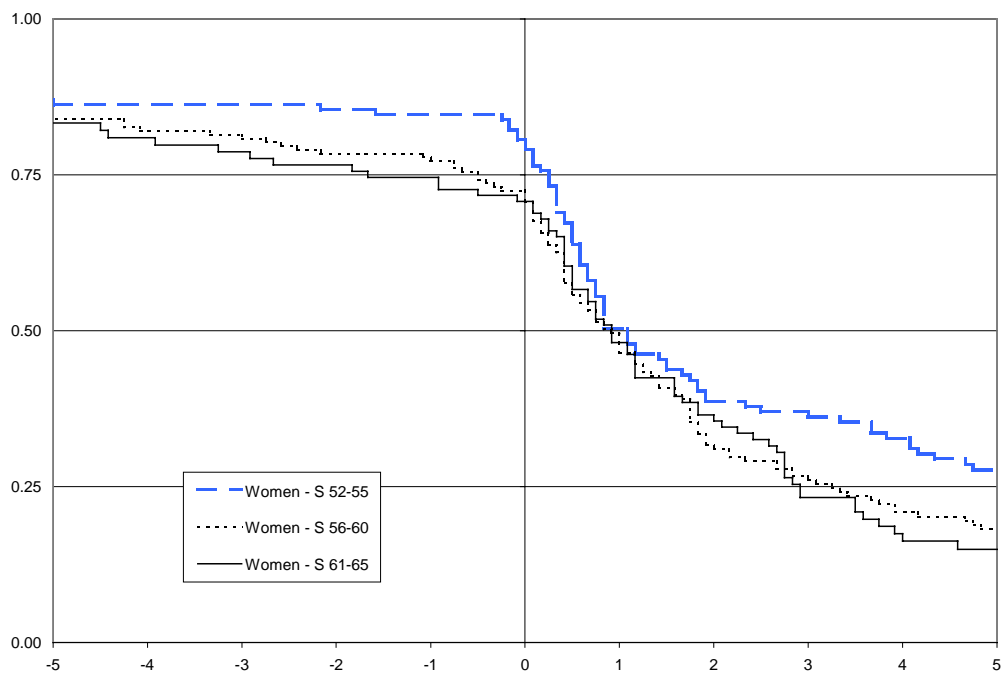*a. Women, North.*

b. Women, South.

Figure 5. Dummy variables used to code the effect of marital status and duration.