The impact of union formation dynamics on first births
in West Germany and Italy: Are there signs of convergence?

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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, thus investigating whether the varying spread of non-marital childbearing is gaining
relevance as we would expect from a Second Demographic Transition pespective. The
findings from these analyses allow us to make a first assessment the convergence of
demographic behaviour from a cohort perspective.

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

1. Introduction

The issue of whether demographic behaviour in Europe will converge towards a homogenous pattern is to a large extent an open question. Some authors (e.g. Roussel, 1992) have hypothesised a broad convergence in Western Europe of primary demographic indicators, and this view is also in the spirit of the Second Demographic Transition framework (van de Kaa, 1987). Others have argued from a theoretical viewpoint 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 sort of cultural "path-dependence", in the sense of Arthur (1990). In this second perspective, a convergence of demographic indicators across Europe is not to be expected in the near future. Comparative studies in a dynamic life course perspective are necessary in order 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 two countries, Italy and Germany, which exhibit a strikingly different pattern 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). One central point of divergence in the family formation behaviour in different European countries is therefore 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, like Italy and Spain, continue to exhibit a common union formation pattern, that 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 marriage (Billari *et al.*, 2000). This pattern is not consistent with the predictions of the Second Demographic Transition theory. This theory suggests an increasing individualism and modernisation over time, a decreasing connection of 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 in fertility, but exhibit a remarkably different pattern of union formation. In these countries a high prevalence of unmarried cohabitation, combined with delayed marriage, 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 synchronisation between leaving home and marriage. In a sense, these countries seem to gain an intermediate score in an "ideal Second Demographic Transition scale".

On the other hand, Scandinavian countries and France seem to attain the highest level on such a scale. These countries progressed very far along the developments outlined in the Second Demographic Transition theory, 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 marriage. 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 territories 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 denomination of "West Germany" in what follows to denote the territories of the Federal Republic of Germany prior to the re-unification.

We start from the idea that a North-South divide is, even if not the only important issue, a crucial division when dealing with Italian demography (Santini, 1995). This view has fully supported by findings with 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 less economically well off than Northern and Central Italy). The North-South divide has been considered less important in West German FFS studies, where the focus (also given the very high differences) is on East-West differentials. 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 Italian regional differences, these studies nevertheless argue that both regional socioeconomic differentials and localised cultural and religious patterns constitute relevant sources of heterogeneity in demographic behaviour across Germany.

In view of the distinct developments of West Germany and Italy in terms of their progression along the Second Demographic Transition, and in light of the marked regional differences in demographic behaviour, we investigate in this paper the within-country and across-country differences in the transition to parenthood using Italian and German FFS data. Before we continue, we briefly examine some interesting results on the North-South divide in both countries (table 1)[1]. The strength of marriage as an institution is evident when looking at Italy (as it was also underlined by Angeli *et al.*, 1999). With respect to this, there does not seem to be a North-South divide. On the contrary, while the vast majority of Italian men and women declare themselves as being catholic, Northern Italy has a substantive share of people who do not belong to any religion, and this result is in line with the results of specialised surveys (Cesareo *et al.*, 1995). The same, even if more attenuated, differences appear 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 agrees with the statement to discard of marriage as an institution. Less traditional attitudes in the North can also be noticed in the prevailing religious denominations: protestants are clearly more prevalent in the North, as are people belonging to no religion. Similar differences

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[1] In the table, the values reports answers to the 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 "Are you adhering 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 is your religious affiliation?" and "How often do you attend religious services (apart from weddings, funerals, baptisms, and the like)?".

are also revealed by church attendance. Compared to Italy, however, the north-south differences are considerably less pronounces in Germany, and the latter country seems to be more homogeneous than Italy.

The remainder of this paper is structured as follows. After introducing the data (Section 2), we illustrate the cohort dynamics in union formation, marriage and the transition to parenthood for Italian and West German women and men (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 transition to motherhood using with an event history model. We discuss the 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 program 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 6030 men and women born between 1946 and 1975. The German survey was held in 1992 with 10012 interviews to 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 respectively in Italy and West Germany. We consider the area where the respondents spent the first 15 years of their life as the reference area. We divide Italy in 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 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, 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 reported 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 first discuss the experiences of these different cohorts with respect to union formation, marriage and the transition to parenthood. For this purpose, we use Kaplan-Meier survivor functions estimates[4].

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[2] The regions in South-Islands are Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna. All others regions belong to the North-Center.

[3] The "Bundesländer" considered to be in the South of West Germany are Baden-Württenberg and Bavaria. All other regions belong to the North.

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

Table 3 reveals a strong postponement of the transition into the first union for all four areas and both genders. Despite this common trend, the dynamic is 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 cohort of the early fifties. 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 (greater than about 30 years). Even if the direction of change is similar in both north and south, the analysis of first union suggests a rising difference -- rather than a convergence -- between these regions within Italy. In Germany, on the other and, our explorative analyses suggest parallel developments in the north and south.

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 ever entered a union becomes very similar between north Germany and north Italy, along with a clear North-South divide in both countries.

For women we observe a similar pattern as for men. The postponement of first union has been rather modest for the cohorts born 1952-65, while the youngest cohort born 1966 and after reveals 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 subsequently declines at almost the same pace in the four areas.

The same direction of change – towards a postponement – is evident when we look at first marriage (tab. 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 ones with respect to this indicator.

For women, Southern Italy appears as going towards a different direction regarding the timing of first marriage. Despite this difference, the proportion ever married at 30 is similar within Italy (around 75%) for the 61-65 cohort, and also within West Germany (around 60%) for the same cohort. Marriage as an institution is clearly stronger in Italy as it is in West Germany, as we already observed when looking at opinions, while the differences were not sharp when first unions were concerned.

Let us now take into account first births (tab. 5). Again, postponement is the primary pattern when one looks at the figures in 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 father: only 25% of the men of the 61-65 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 quite modest in Southern Italy, which represents a unique pattern with more than a quarter of fathers more by age 30. When we analyse the data for women, Southern Italy stands again on its own, with a median age that is about 2.5-3.5 years younger than Northern Italy and West Germany.

In summary, therefore, while both regions and Germany as well as northern Italy seem to follow a common trend, southern Italy represents a special case in the transition to first union and especially first birth.

[TABLES 3-5 ABOUT HERE]

4. Mutual relationships between unions, marriages and first birth

We now move to a different perspective and take into account the temporal relationship between first unions and first marriage, and between first marriage and first birth. The theoretical framework that motivates the analysis is the Second Demographic Transition framework. 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 one, the transition from first union to marriage the becomes faster because cohabitation becomes increasingly "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 happen before the first marriage as the second demographic transition progresses. 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 be a shorter length of time because unions are already formed without marriage, and marriage becomes a stronger commitment towards stability (Blossfeld *et al*., 1996).

Initially we investigate 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 the expected one: the share of unions that start directly with marriages is evidently decreasing (with some exception for the very young cohort, for which the share of unions experienced, however, is much smaller). Although the trend is similar for the two countries, both the level and the speed are completely different. In West Germany, both in North and South, direct marriages have become the experience of a minority of people in the youngest cohorts, and the share of direct marriages has more than halved between the cohorts 52--55 and 61--72 in both parts of Germany. On the other hand, in Italy the great majority of people still experience a direct transition to marriage, and the transformation of this pattern is much slower. Within Italy there are marked differences between the North and the South, and marriage remains the dominating avenue of entering unions in northern and southern Italy.

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

[TABLE 6 ABOUT HERE]

We now study 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 a one focus of our study. For this reasons, we make use of mirrored survivor functions (we refer the reader to the Appendix for an explanation of their construction). We leave out from the analyses the youngest cohort because these cohorts have not yet experienced a sufficient number of events. We first consider men (figures 1 and 2). The big difference between Italy and West Germany is immediately noticeable: 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 the event marking the exposure to the risk

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

of becoming father, without important loss of information. It is also interesting to notice that there is no difference with respect to this pattern between North and South: although the North exhibits a higher share of individuals who experience cohabitation before marriage, childbearing takes place almost completely within marriage. In addition, the cohort dynamics of this pattern are interesting: the Italian situation is fairly stable, with the primary exception that births are postponed in the 56-60 and 61-65 cohorts after first marriage, 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 increases at which individuals enter unions and thus start to be "at risk" of entering parenthood, 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 cohorts experience out-of wedlock fatherhood.[6] Consistently with the expectations arising from the Second Demographic Transition perspective, the percentage of out-of-wedlock first births is increasing. However, it is interesting to notice that this happens almost only in the North, and the South has only a slightly higher increased rate of out-of-wedlock childbearing for the youngest cohort. After marriage, however, there is no indication of a similarly big postponement of first births which we observed in Italy. One can also notice 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 males above (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 from women's perspectives is slightly different: the difference between cohorts appear to be more homogeneous 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]

5. The changing impact of first unions on first births: a transition rate model
We now use event history analysis in order 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 progressively acquires a greater importance for the transition to parenthood, as predicted by the Second Demographic Transition framework. Moreover, we would like to investigate whether there are differences between Italy and West Germany, as well as within these countries. In our studies we control for educational enrolment, because the educational aspirations and attainment of women has changed substantially in both in West Germany (Hullen, 1998) and in Italy (Billari, 1998) for the cohorts in our study.

In the analyses in this section we focus on women in the three oldest cohorts. The choice of focusing on women and of dropping the youngest cohort are mainly dictated by sample sizes,

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

given that in Italy the very low propensity to give births before marriage (and also to conceive before marriage) renders more difficult to estimate models where cohabitation is used as a covariate.

Since we are studying partnership behaviour in first union and first births as interdependent process, we have to select a modelling approach that takes into account this potential interdependence. We focus only on the transition to first birth, with a slightly modified specification as compared to our earlier analyses above: the dependent variable is the time at the conception leading to the first birth, that is, by approximation, the time of birth minus 9 months. This modification is useful in order to eliminate distortions by marriages and cohabitation that are the outcome of conceptions. In our analysis we are thus following 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 at 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 for specifying cohort effects for each of the cohorts we study. The observation is considered as 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 interrupting full-time education[7]. For marriage and cohabitation, we use first simple time-varying covariates describing 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 post-cohabitation marriages.

We include in our analyses impact of the duration of cohabitation and marriage, that is, we investigate the so-called "effect shape" whose importance has been advocated by Blossfeld *et al*. (1996). For this purpose we build an additional time varying covariate that reveals whether a marriage/cohabitation is in its first 3 years (which we call M3 and C3). In order to analyse possible effects of a short union duration, we include a similar time-varying covariate for the first year of marriage/cohabitation (M1 and C1). Figure 5 reports an example with respect to marriage.

Our main focus in our analyses is on the interaction between variables related to marriage/cohabitation and cohort. Nevertheless, we will also discuss the interaction between the former 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 notice that in both countries, even after controlling for prolonged educational periods, the transition to motherhood has been postponed significantly. After controlling for changes in education, West

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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 return to education, while this is not the case for the Italian.

Germany has a slightly stronger postponement with respect to Italy (the 61-65 West German cohort has a relative risk of 73% with respect to the oldest one, while in Italy this is about 81%). The prolonged permanence in education thus 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 becomes about 14 times higher than before), and it is sensibly higher than the impact of cohabitation (that is, about 7 times higher). It is however interesting to focus on the changing impact 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 (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 the married).

The picture is different in West Germany. First of all, the baseline impact of being married versus cohabiting is much less different than in the Italian case. Then, the impact of being in a union rises for younger cohorts, as it is the case in Italy, but the increase is much faster within marriage than within 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 61-65 cohort than for the oldest one. Marriage is postponed but it seems to become more important when people decide that the 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 higher score on the Second Demographic Transition scale across cohorts, while in West Germany the meaning of being married becomes more important.

In order to see whether accounting for the timing of motherhood within first unions accounts for that difference we introduce the timing variables in model 3 (table 8). In Italy, one observes that the baseline impact of entering a union (both marital and non-marital) is decreasing with union duration. The transition rate reaches its highest level in the first year (row 10 and 12). Also when we account for such difference, cohabitation has an impact on the transition to motherhood which 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 cohabitations. 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 becomes less shaped by union duration.

In West Germany, similar to Italy, the first year of a union is the one with 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.

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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.

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 one in the North), both because of the higher focus on marriage of Southern Italian culture and because of the higher overall fertility. It is important to notice, however, that the difference between North and South does not change for the younger cohorts: the higher importance of marriage in Southern Italy is persistent. 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 is however annulled for the two younger cohorts, for which the effect converges to the values of the North. For cohabitation, the differences are not significant, even if it might be interesting to notice 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 there than in West Germany and the South exhibits a substantially smaller extent of postponement in marriage and fertility.

The major features of demographic behaviour leading to the fist birth is a persistent centrality of marriage in procreative behaviour, which is partially reduced only in West Germany, 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 convergence 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 keep its own pattern, with very slight signals of convergence.

The findings of this paper are relevant in several perspectives. 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 are clearly transformed and changed in both countries, with clearly existing parallel patterns as for instance the importance of postponement, our study does not indicate a convergence across the regions investigated in our study.

The second important finding of our study pertains to the implications of childbearing behaviour that occurs almost exclusively within marriage, as for instance in Italy. In this situation, the postponement of entering marriage, and the postponement of fertility within marriage, have an additive effect that emphasises the fertility-reducing effect of this process. 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 offset is

absent in Italy and similar countries. One reasons for the very low Italian fertility level, therefore, is the strong connection of leaving the parental home, entering marriages 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 here briefly explain the construction of the "mirrored survivor functions" originally made by 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 happen 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

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

where

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

n_{FS} is thus 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 the one 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:

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

Ordinary survivor functions are obtained as a special case, when $n_S=n$. The measure of synchronisation for other time intervals may 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

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

	First	North Median	S(30)	First	South 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

	First	North Median	S(30)	First	South 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

	First	North Median	S(30)	First	South 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

	First	North Median	S(30)	First	South 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	—	—

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.
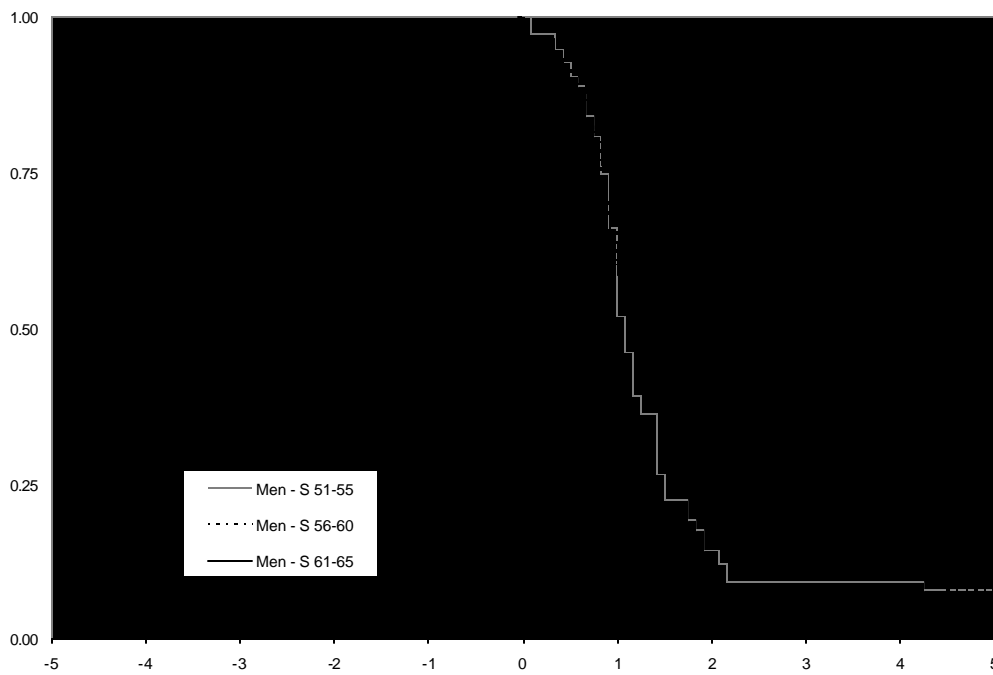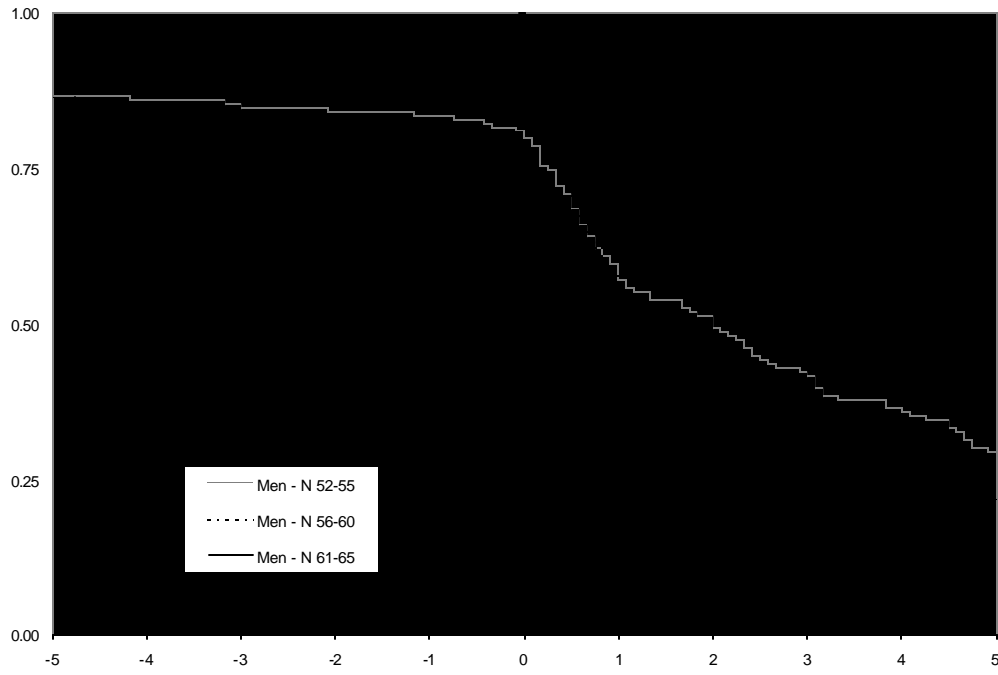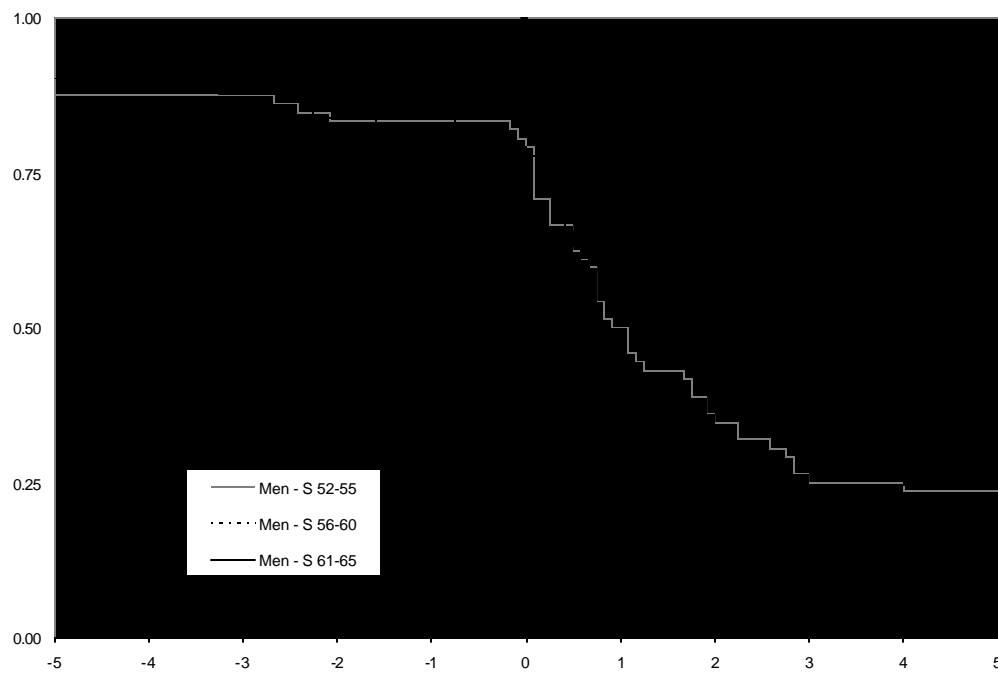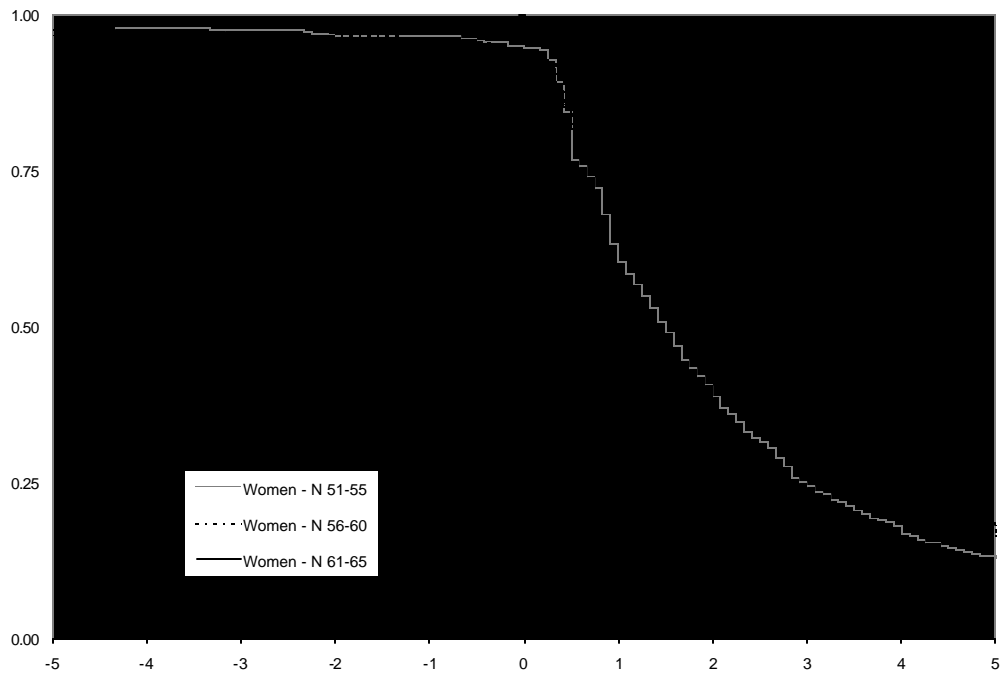*a. Men, North.*
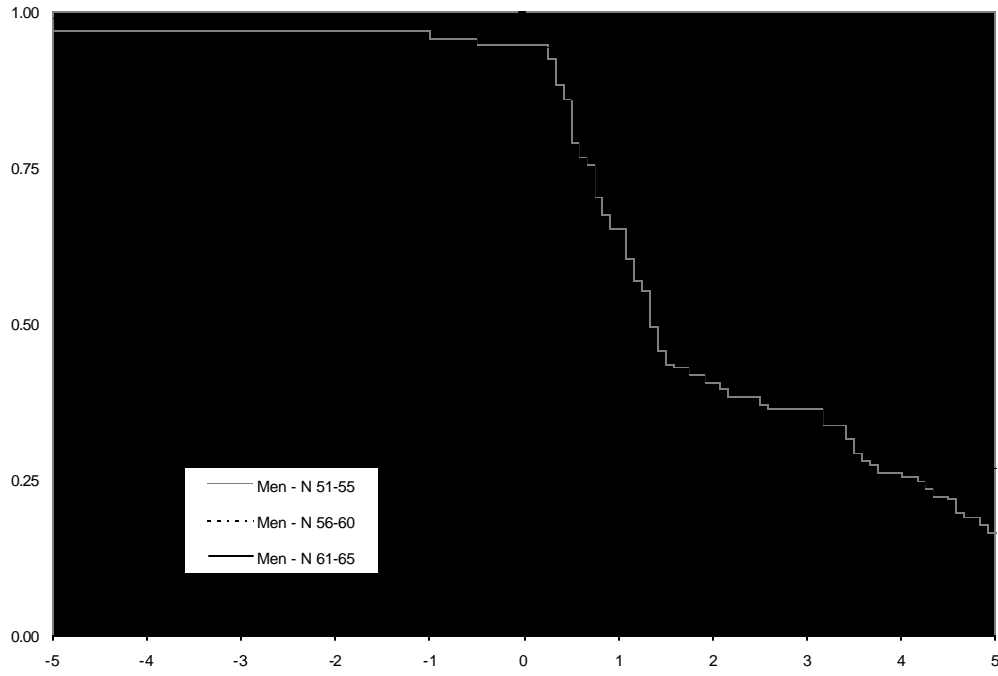
b. Men, South

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.
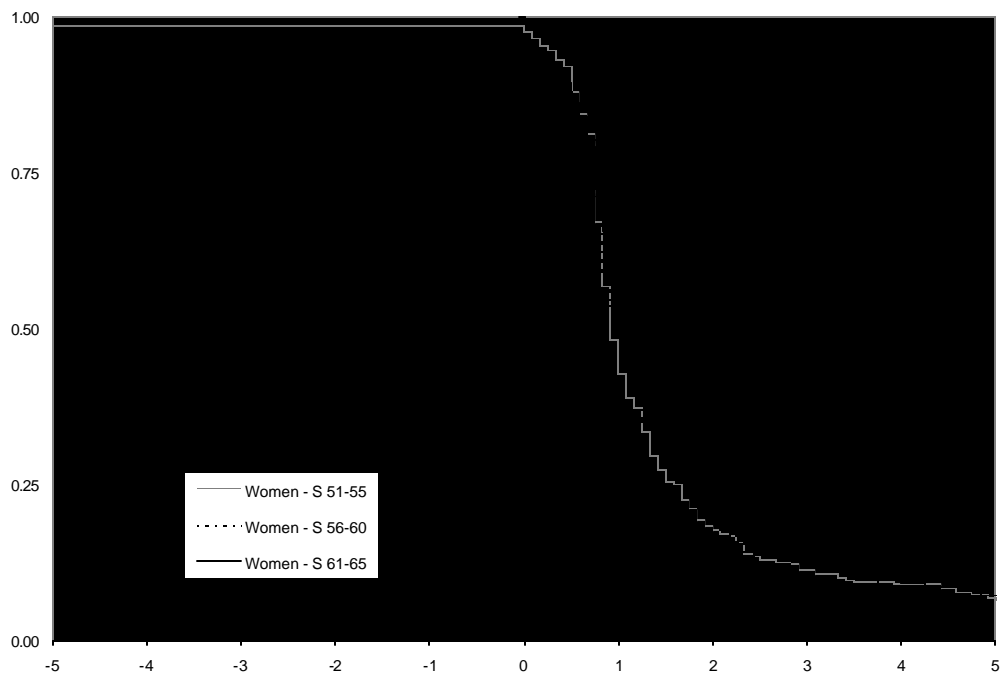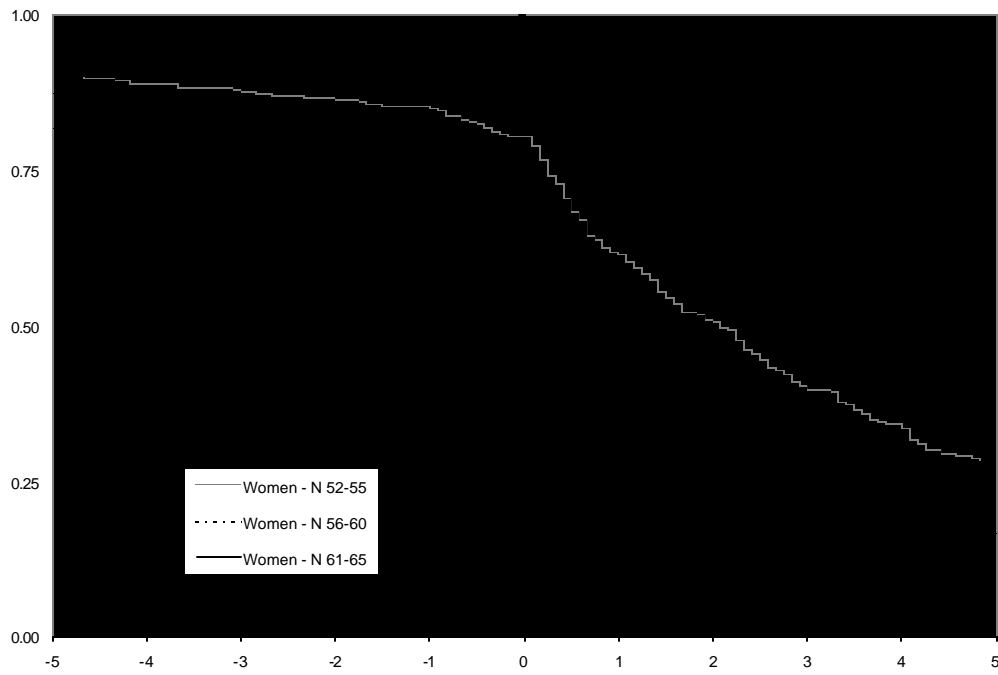*a. Women, North.*

b. Women, South.

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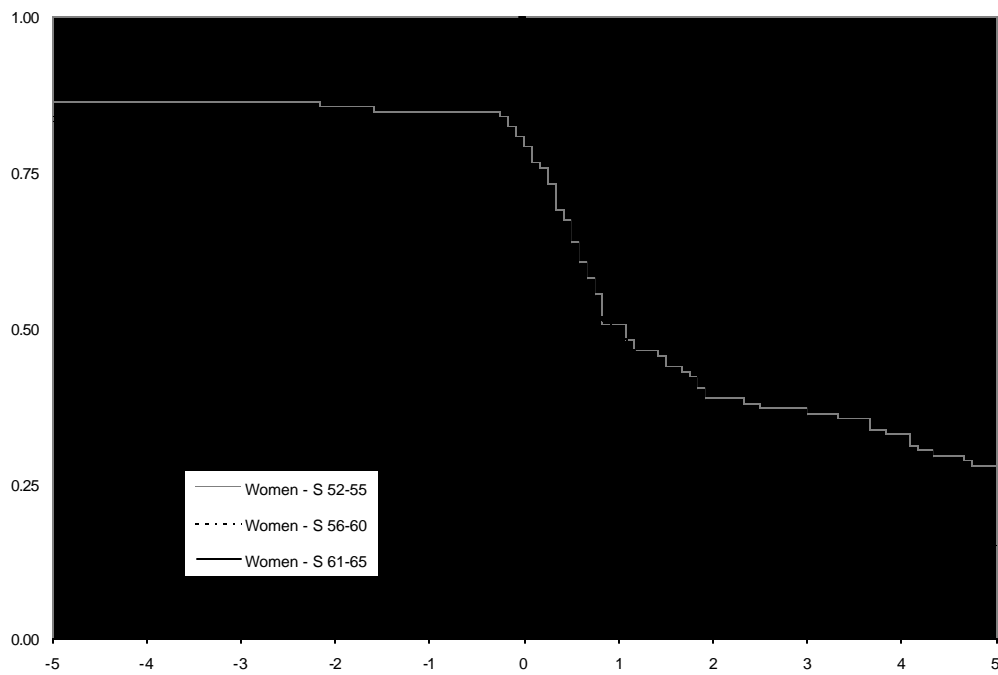*a. Women, North.*

b. Women, South.

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