Low Fertility in Europe: Causes, Implications and Policy Options

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1 Introduction

The global population is at a turning point. At the end of 2004, the majority of the world's population is believed to live in countries or regions below-replacement fertility, and the earlier distinct fertility regimes, 'developed' and 'developing', are increasingly disappearing in global comparisons of fertility levels (Wilson 2001, 2004). Several aspects of this convergence towards low fertility are particularly striking. First, the spread of below-replacement fertility to formerly high fertility countries has occurred at a remarkably rapid pace and implied a global convergence of fertility indicators that has been quicker than the convergence of many other socioeconomic characteristics. Second, earlier notions that fertility levels may naturally stabilize close to replacement level—that is fertility levels with slightly more than two children per women—have been shattered. Sustained below-replacement fertility has become commonplace, and Europe has been a leader in the trend towards low and very low fertility. Europe also witnessed in the last 15 years the emergence of unprecedented low fertility levels with a total fertility rate (*TFR*) at or below 1.3 children per woman. Kohler et al. (2002) have labeled these patterns as *lowest-low fertility* to emphasize the dramatic implications of these unprecedentedly low levels of fertility: for instance, if they persist over a long time in a contemporary low-mortality context, *TFR* levels at or below 1.3 imply a reduction of the annual number of births by 50% and a halving of the population size in less than 45 years. There have been no cases of sustained lowest-low fertility prior to 1990 (Figure 1). In the early 1990s, Italy and Spain were the first countries to attain and sustain *lowest-low fertility levels*, and in 2002 there were 17 lowest-low fertility countries in Southern, Central and Eastern Europe with a total population of over 278 million persons. As a matter of fact, the median total fertility rate, i.e., the *TFR* level below which 50% of the populations in Europe live, is currently with 1.31 only slightly above lowest-low fertility. Third, recent fertility trends have been accompanied by a remarkable divergence of European countries in terms of their fertility levels and

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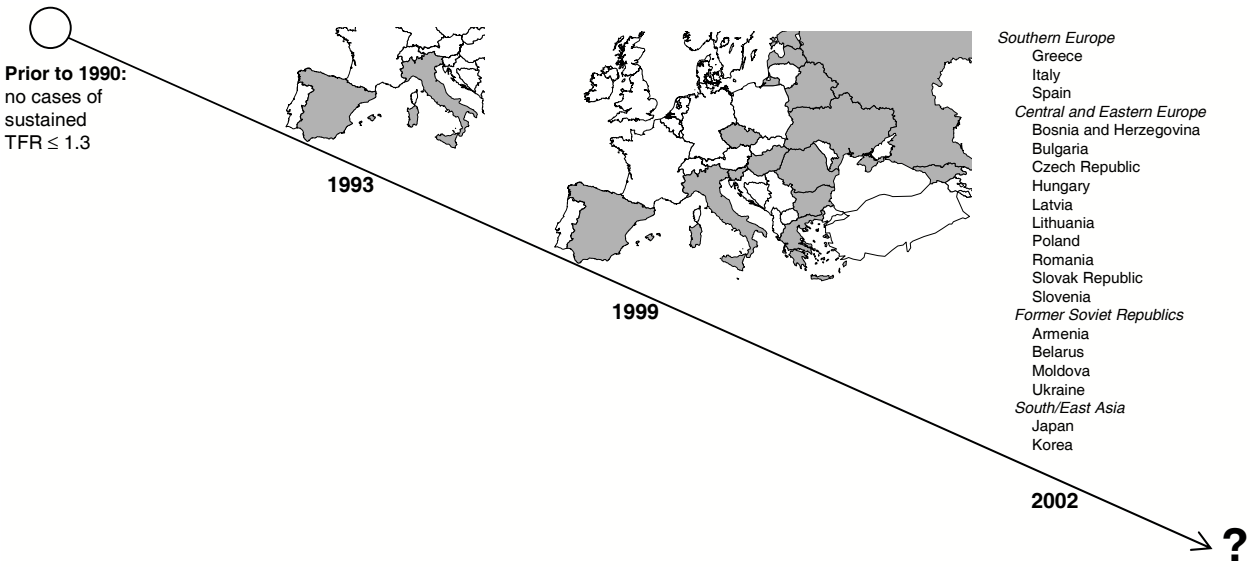


Figure 1: The emergence and spread of lowest-low fertility in Europe during 1990–2002

future population trends, with current patterns ranging from countries that stabilized at moderately below-replacement fertility levels to lowest-low fertility countries with *TFR* declines below 1.3 (Figure 2). For instance, several European countries that were among the first to experience sustained below-replacement fertility in the late 1960s and early 1970s, including Denmark, France, the Netherlands and the United Kingdom, exhibit relatively high fertility in 2002. Moreover, the Dutch, Danish and French *TFR*s have *increased* during the last decade to levels of 1.72 (The Netherlands), 1.77 (Denmark), and 1.89 (France) (Council of Europe 2003), and several other European countries exhibit even higher *TFR*s. These trends are in sharp contrast to the pervasive *TFR* declines in Southern, Central and Eastern Europe to levels below 1.3, leading to pronounced differences across European countries in their future demographic trajectories. Fourth, as a consequence of below-replacement fertility that has prevailed for several decades starting since the 1960s and 1970s, low birthrates in Europe have begun to generate negative population momentum, that is, a new force for population shrinkage over the coming decades due to the fact that past below-replacement fertility will soon result in declining numbers of potential parents (Lutz et al. 2003). A continuation of this trend could substantially exacerbate the future aging of the population, reinforce a future decline in the population size and constrain the effectiveness of policy interventions aimed at increasing the number of births.

In this paper we investigate the emergence and persistence of low and particularly lowest-low fertility in Europe, analyze its demographic patterns and socioeconomic determinants, and address the factors that underlie the divergence of fertility levels in Europe and developed countries more generally. The central thrust of our argument is that the emergence of lowest-low fertility in Europe is due to the combination of four distinct demographic and behavioral factors. First, *economic and social changes* have made the postponement of fertility a rational response for individuals. Second, *social interaction processes* affecting the timing of fertility have rendered the population response to these new socioeconomic conditions substantially larger than the direct individual responses. As a consequence, modest socioeconomic changes can explain the rapid and persistent *postponement transitions* from early to late age-patterns of fertility that have been associated with recent trends towards low and lowest-low fertility. Third, *demographic distortions*

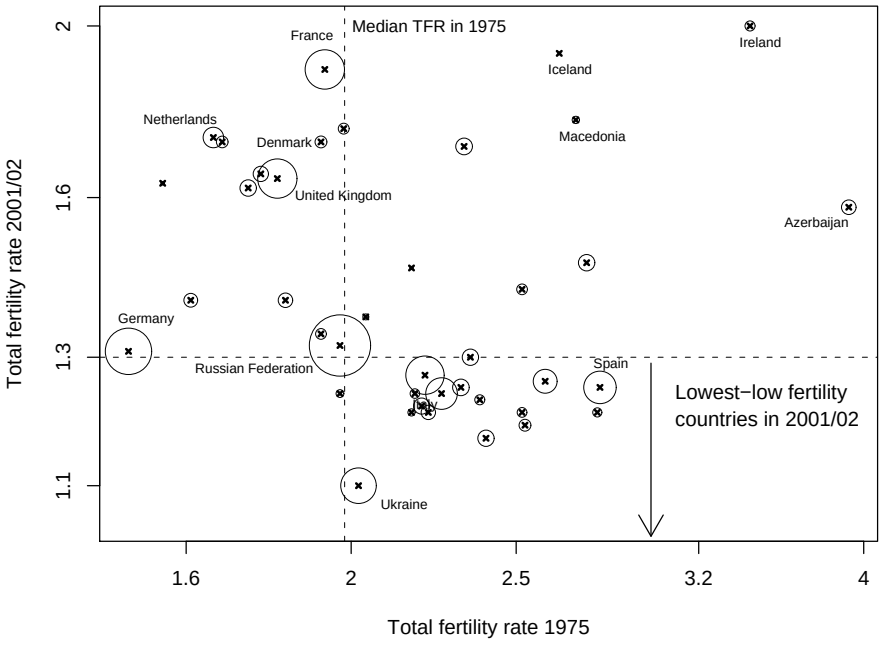


Figure 2: Comparison of the total fertility rate in Europe in 1975 and 2002
The '×' mark gives the exact position of a country, while the area of circle is proportional to the country's population size in 1990. *Source for data:* Council of Europe (2003); see Table A.1 for list of countries and data.

of period fertility measures, caused by the postponement of fertility and changes in the parity-composition of the population, have reduced the level of period fertility indicators below the associated level of cohort fertility (for discussion of this technical aspect, see Bongaarts and Feeney 1998; Kohler and Ortega 2002). Fourth, *institutional settings* in Southern, Central and Eastern European countries have favored an overall low quantum of fertility. Moreover, this institutional setting has caused particularly large reductions in completed fertility in lowest-low fertility countries due to the delay of childbearing.

2 Patterns of low and lowest-low fertility in Europe

Against the background of these recent changes in the demographic landscape in Europe and other developed countries, there is little doubt that the emergence and persistence of lowest-low fertility entails profound consequences for virtually all aspects of society. Some of these implications of Europe's low and lowest-low fertility pattern on the population size and structure are illustrated in Figure 3 using the UN medium population forecasts for Europe, Bulgaria, Denmark, France, Germany, Italy and the Russian Federation (see http://www.un.org/esa/population/unpop.htm). The different countries included in these analyses are representative for the major fertility patterns and welfare regimes in contemporary Europe. The United States is also included in these analyses for comparison. Figure 3 shows that, while the U.S. and a small number of European countries are projected to grow in the next decades, Europe as a whole is projected to decline. Some countries such as Bulgaria, Russia and Italy are likely to experience a substantial declines in their population size. This different trends in population size in Europe are mostly due to fertility trends

that differ drastically across European countries. France and Denmark, for instance, are expected to have moderately high fertility with *TFR*s above 1.7 children per woman, continuing their most recent experiences. Most other European countries are projected to have lower—and often much lower—fertility in the next decades, and Europe as a whole is projected to experience a *TFR* of below 1.5 until about 2020. These fertility trends in combination with increases in longevity imply that population aging—as measured for instance by the increase in the median age of the population and the old-age dependency ratio—will occur across Europe. Europe's median age, for instance, is projected to increase from 37.7 years in 2000 to 47.9 in 2040. The old-age dependency ratio is projected to increase from 22 persons aged 65 years and older per 100 persons aged 15–64 (2000) to 44 persons aged 65+ per 100 persons aged 15–64 (2040). However, there is likely to be considerable heterogeneity in this population aging across Europe. The median age in 2040 in Figure 3 ranges from 44.4 years (France) to 52.7 years (Italy), and the old-age dependency ratio ranges from 37 (Russia) to 63 (Italy). Demographically speaking, therefore, European countries are pulled apart by a differential extent of population aging. In addition, the above trends in Europe are in striking contrast to those in the United States. While the U.S. population is also aging in the next decades, this process occurs in the context of a growing population, a relatively high level of fertility and substantial immigration. In comparison with Europe, therefore, the increases in the median age or the old-age dependency ratio during the next decades are rather modest.

The implications of population aging, and the societal changes associated with this trend, are going to be most pronounced in countries with very low fertility. These countries are likely to experience a dramatic transformation of their age pyramids (Figures 4–5), and the social and economic organization of individuals and families in these highly-aged societies is an unchartered territory in demographic history. The implications of this changes will reach across all aspects of society and individual lives. Lowest-low fertility, for instance, is going to substantially alter the structure and age-composition of the labor force as well as of the young and old population, and female—and probably also male—labor supply patterns will change due to the combination of low and late fertility. Lowest-low fertility will also transform a wide range of social relations, which are frequently taken for granted, due to the fact that low fertility, fewer siblings and increases in childlessness diminish the potential of family networks to provide social, psychological and economic support. The increased diversity in living arrangements and the changes in the timing of fertility have also important consequences for the income distribution, the well-fare of small children, and the life-chances across individuals and households.

Despite this ample need for information and evaluation of these developments, the *demography of lowest-low fertility* is still in its infancy. The emergence of sustained lowest-low fertility first occurs in Southern, Central and Eastern European countries. Based on Council of Europe (2003), seventeen countries attained lowest-low fertility levels by 2002 (Table 1): three in Southern Europe (Greece, Italy and Spain), ten in Central and Eastern Europe (Bosnia and Herzegovina, Bulgaria, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia) and four in the former Soviet Union (Armenia, Belarus, Moldova, Ukraine). The first countries to reach lowest-low fertility levels were Spain and Italy in 1993. They were then joined by Bulgaria, the Czech Republic, Latvia and Slovenia in 1995, and by the remaining lowest-low fertility countries between 1996 and 2002. In addition, several other countries in Central and Eastern Europe and the Balkans have very low *TFR* levels, and Croatia (1.34), Estonia (1.37), Russia (1.32) will possibly join—or re-join, such as Russia—the group of lowest-low fertility countries. More-

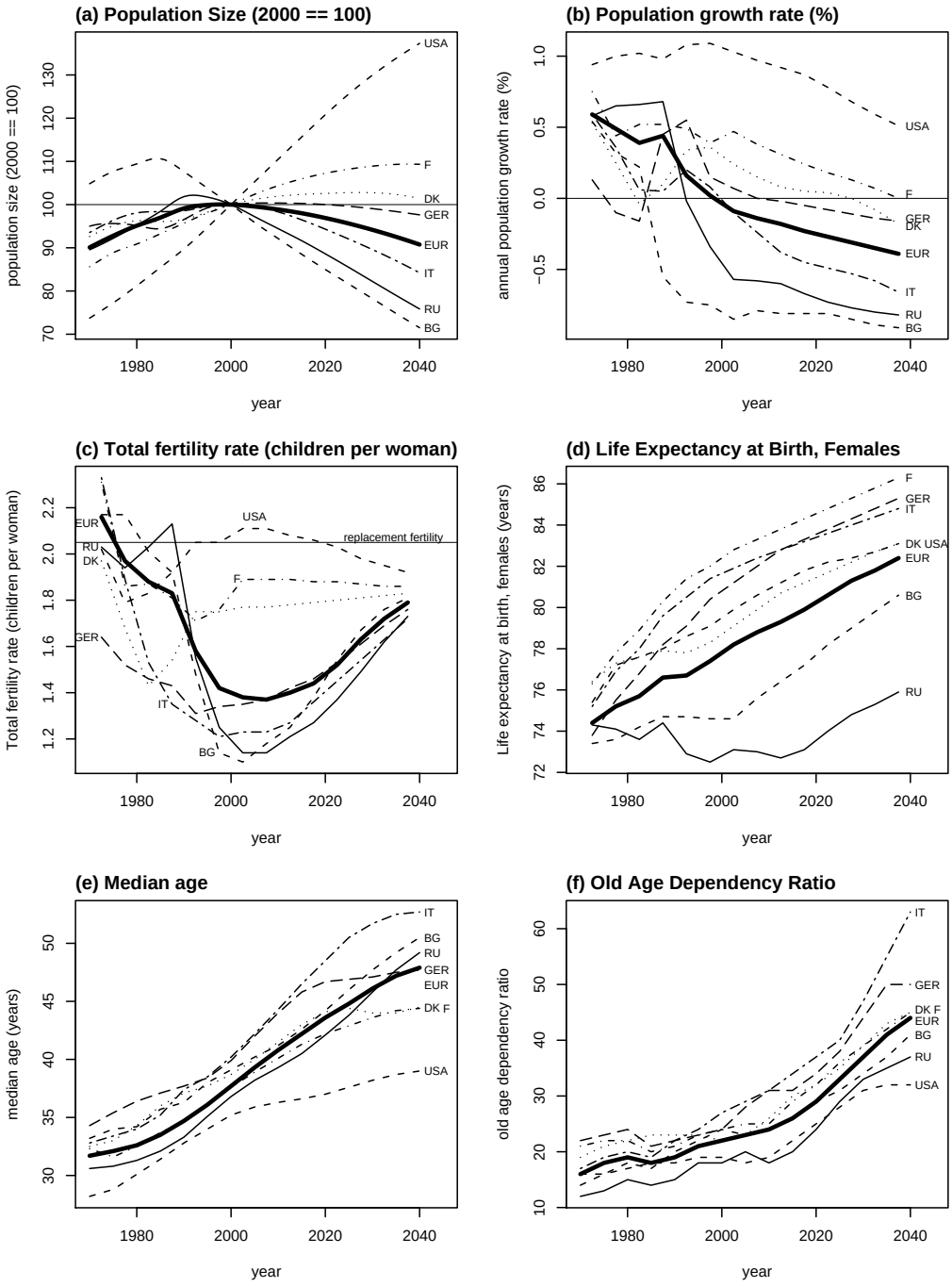


Figure 3: UN projections (medium variant) for Europe, USA, Bulgaria, Denmark, France, Germany, Italy and the Russian Federation

Notes: The different demographic measures are defined as follows: *Population size*: De facto population in a country, area or region as of 1 July of the year indicated. *Population growth rate*: annual average exponential rate of growth of the population. *Total fertility rate* (*TFR*): The average number of children a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates of a given period and if they were not subject to mortality. It is expressed as children per woman. *Life expectancy*: The average number of years of life expected by a hypothetical cohort of individuals who would be subject during all their lives to the mortality rates of a given period. It is expressed as years. *Median age*: Age that divides the population in two parts of equal size, that is, there are as many persons with ages above the median are there are with ages below the median. *Old age dependency ratio*: the ratio of the population aged 65 years or over to the population aged 15–64.

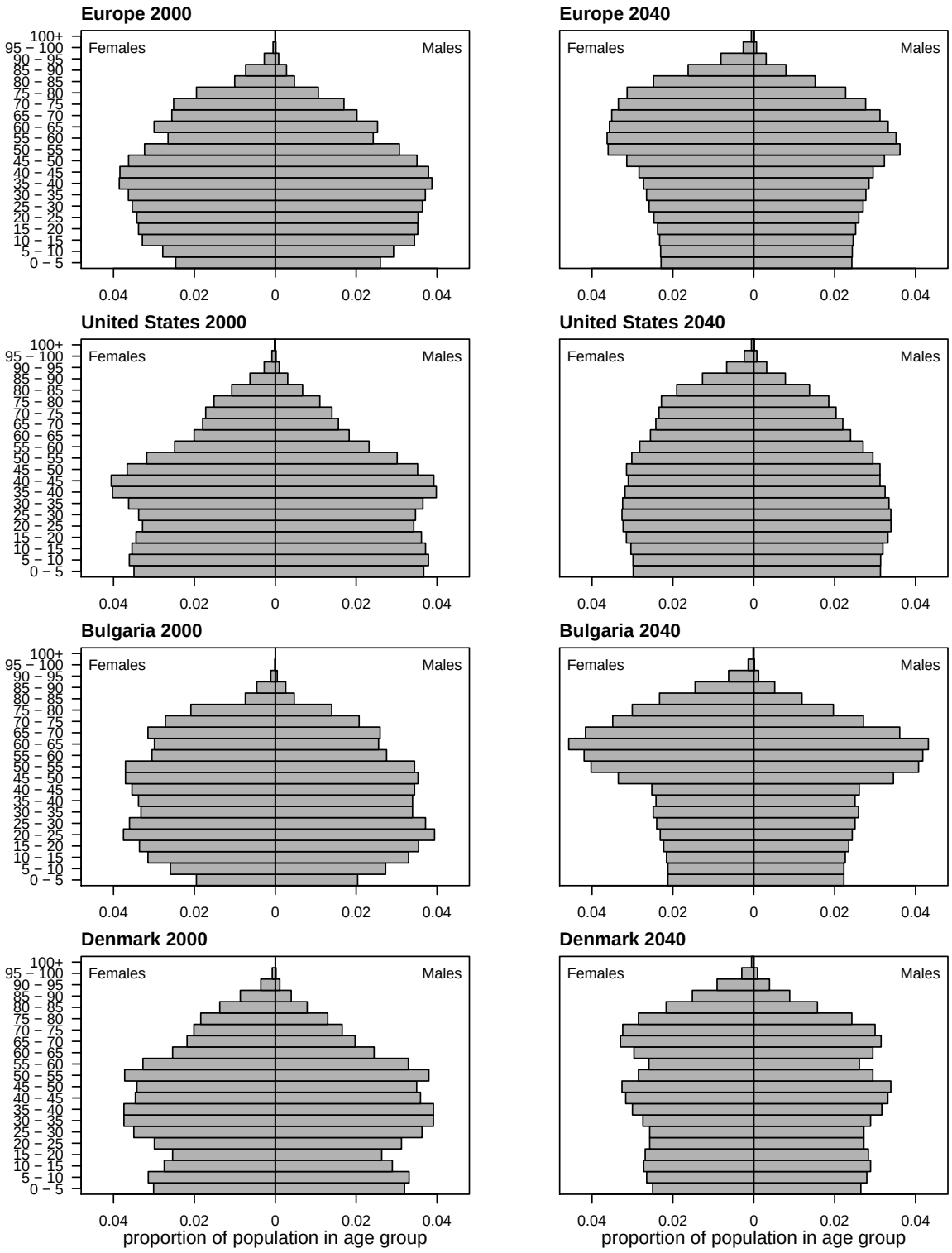


Figure 4: Population age pyramids based on the UN medium projections: Europe, United States, Bulgaria and Denmark

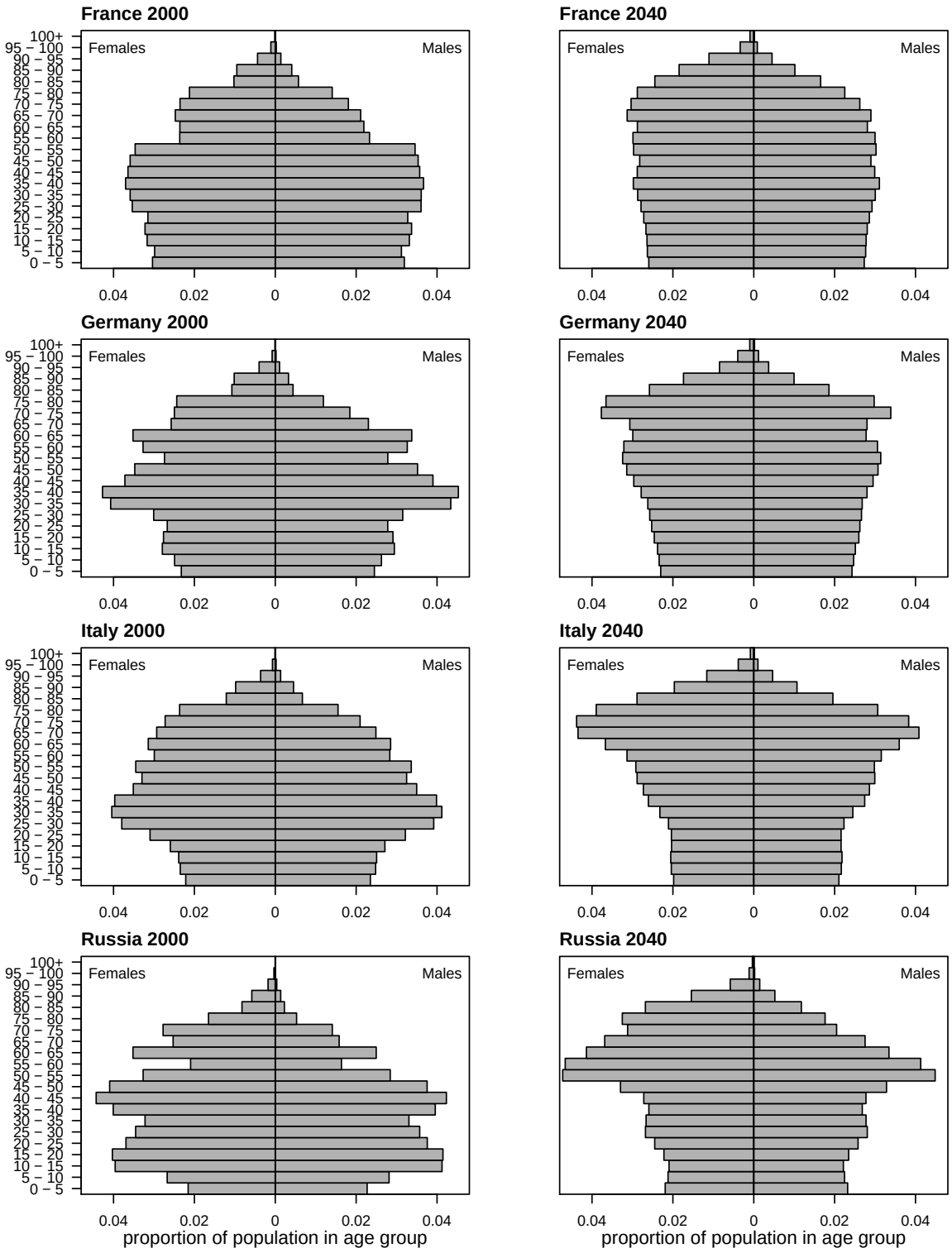


Figure 5: Population age pyramids based on the UN medium projections: France, Germany, Italy and Russia

over, other European countries with traditionally low fertility, such as Austria (1.34), Switzerland (1.4), and Germany (1.31), are candidates that may soon join the group of lowest-low fertility countries.

Despite these very low levels of fertility, demographic analyses suggest that the decline in the desire to have at least one child has *not* been a primary driving force in the emergence of lowest-low fertility in the Southern, Central and Eastern European countries (Kohler et al. 2002). While childlessness is likely to rise, it is projected to remain at relatively modest levels. Calculations by Kohler et al. (2002), for instance, suggest that a cohort experiencing the fertility pattern observed during the mid/late 1990s attains a childlessness of 16–19% in Italy and Spain and of 13–19% in Bulgaria, Czech Republic and Hungary (for related calculations, see also Sobotka 2004a,b). These levels of childlessness are comparable to the corresponding estimates for Sweden and the Netherlands in the late 1990s, and these levels quite are modest in a historical 20th-century perspective or when compared to the childlessness observed in some other countries, as for instance Germany, where more than quarter of the women in the 1965 cohort are estimated to have remained childless (Sobotka 2004b).

These findings on childlessness therefore suggest that even in lowest-low fertility contexts, the biological, social and economic incentives for children are sufficiently strong that most women (or couples) desire to have at least one child (e.g., Foster 2000; Kohler and Behrman 2003; Morgan and King 2001). Nevertheless, while first births are not necessarily foregone in lowest-low fertility countries, they are delayed to an increasingly late age. For instance, the mean age at first birth in all lowest-low fertility countries is higher in 2000-02 than in 1990 (Table 2). In the Southern European countries, postponement has been very intense with annual increases in the mean age exceeding 0.2 per year. Combined with a relatively high initial mean age, this postponement has lead to some of the highest mean ages at first birth worldwide. In the Central and Eastern European (CEE) countries, the patterns are not so uniform. Extremely fast postponement has occurred in Slovenia, the Czech Republic and Hungary. Other countries, like Bulgaria, Estonia, Latvia and Romania, have experienced moderate postponement with increases in the mean age at first birth around 0.1 per year, and these countries continue to have a very young mean age. Similar patterns also prevail in other countries of the former Soviet Union like Russia, Belarus and Armenia.

2.1 Fertility-Related Patterns of Household and Union Dynamics

The trend toward delayed childbearing—especially for first births—has occurred not only in lowest-low fertility countries, but in almost all countries across Europe. This almost universal transition towards a late pattern of childbearing, however, implies that the extent to which specific socioeconomic and institutional contexts in different European countries accommodate late childbearing has become an essential determinant of cross-country variation in fertility levels. To better understand this interrelation between institutional contexts and patterns of childbearing, we begin our analyses in this paper with a series of descriptive aggregate analyses to revisit the relation between low and lowest-low period fertility on the one, and key fertility-related behaviors—such as leaving the parental home, marriage and women's labor force participation—on the other side. These analyses can improve our understanding of the demographic, socioeconomic and institutional context that is associated with the emergence—or non-emergence—of lowest-low fertility in European countries, and it characterizes the basic demographic and socioeconomic patterns that are associated with low and lowest-low fertility in contemporary Europe.

Table 1: Total fertility rate (*TFR*) in lowest-low fertility countries, candidate countries, and selected other countries

	TFR				**Most recent year *TFR* fell**	
	1980	**1990**	**2000**	**2002**	≤ 2	≤ 1.3
Lowest-low fertility countries						
Southern Europe						
Greece	2.23	1.39	1.29	1.25[a]	1983	1998
Italy	1.64	1.33	1.24	1.27	1977	1993
Spain	2.20	1.36	1.24	1.25	1982	1993
Central and Eastern Europe						
Bosnia and Herzegovina	1.93	1.71	1.34	1.23	1984	2002
Bulgaria	2.05	1.82	1.30	1.21	1987	2001
Czech Republic	2.10	1.90	1.14	1.17	1983	1995
Hungary	1.91	1.87	1.32	1.30	1980	1999
Latvia	1.90	2.01	1.24	1.24	1991	1995
Lithuania	1.99	2.03	1.39	1.24	1992	2001
Poland	2.26	2.05	1.34	1.24	1992	2001
Romania	2.43	1.84	1.31	1.26	1990	2001
Slovak Republic	2.31	2.09	1.30	1.19	1992	2000
Slovenia	2.10	1.46	1.26	1.21	1981	1995
Former Soviet Republics						
Armenia	2.33	2.63	1.11	1.21	1993	1999
Belarus	2.04	1.90	1.31	1.22	1990	2001
Moldova	2.41	2.39	1.30	1.21	1994	2000
Ukraine	1.95	1.89	1.09	1.10	1989	1997
South/East Asia						
Japan				1.29[b]	1975	2003
Korea	2.83	1.59	1.47	1.19[b]	1984	2001
Lowest-low fertility candidates in Europe						
Andorra	–	–	1.32	1.36	–	–
Austria	1.65	1.46	1.36	1.40	1973	–
Croatia	1.92	1.67	1.40	1.34	1968	–
Estonia	2.02	2.04	1.34	1.37	1991	1997‡
Germany	1.56	1.45	1.38	1.31	1971	1992‡
Russian Federation	1.86	1.90	1.21	1.32	1990	1996‡
Switzerland	1.55	1.58	1.50	1.40	1972	–
Selected other countries						
Denmark	1.55	1.67	1.77	1.72	1973	–
France	1.95	1.78	1.88	1.89	1975	–
Netherlands	1.60	1.62	1.72	1.73	1973	–
United Kingdom	1.89	1.83	1.64	1.64	1974	–
United States	1.81	2.08	2.06	2.01	1995†	–

Notes: $a = 2001$, $b = 2003$; †= fertility has increased to levels above 2.0 by 2002; ‡= fertility has increased to levels above 1.3 by 2002; *Sources:* Council of Europe (2003); Martin et al. (2003); Mathews and Hamilton (2002).

Table 2: Mean age at first birth (*MAFB*) in lowest-low fertility countries, candidate countries, and selected other countries

	Mean age at first birth (*MAFB*)				**Annual increase in *MAFB***		
	1980	**1990**	**2000**	**2002**	**1980 1990**	**1990– 2000**	**Year of onset**
Lowest-low fertility countries							
Southern Europe							
Greece	24.1	25.5	27.3[c]	–	0.14	0.20	1983
Italy	25.0	26.9	28.7[b]	–	0.19	0.26	1978
Spain	25.0	26.8	29.1	–	0.18	0.23	1979
Central and Eastern Europe							
Bosnia and Herzegovina	23.3	23.6	–	–	0.03	–	–
Bulgaria	21.9	22.2	23.5	23.9	0.03	0.13	1992
Czech Republic	22.4	22.5	25.0	25.6	0.01	0.25	1991
Hungary	22.4	23.1	25.1	25.6	0.07	0.20	1980
Latvia	22.9	23.0	24.4	24.9	0.01	0.14	1992
Lithuania	23.8	23.2	23.9	24.3	-0.06	0.07	1994
Poland	23.4	23.3	24.5	25.0	-0.01	0.12	1991
Romania	22.5	22.7	23.6	24.1	0.02	0.09	1991
Slovak Republic	22.7	22.6	24.2	24.7	-0.01	0.16	1991
Slovenia	22.9	23.7	26.5	27.2	0.08	0.28	1985
Former Soviet Republics							
Armenia	22.1	22.8	23.0	–	0.07	0.02	1994
Belarus	–	22.9	23.4	23.5	–	0.05	1997
Moldova	–	–	–	23.0	–	–	–
Ukraine	–	–	–	–	–	–	–
South/East Asia							
Japan	26.4	27.0	28.0	28.3	0.06	0.1	
Korea	–	–	–	–	–	–	–
Lowest-low fertility candidates in Europe							
Andorra	–	–	–	–	–	–	–
Austria	–	25.0	26.4	26.7	–	0.14	1984
Croatia	23.4	24.1	25.5	25.9	0.07	0.14	1978
Estonia	23.2	22.9	24.0	24.6	-0.03	0.11	1991
Germany†	25.0	26.6	28.2	28.4[d]	0.16	0.16	1972
Russian Federation	23.0	22.6	23.0[b]	–	-0.04	0.06	1994
Switzerland†	26.3	27.6	28.7	28.9	0.13	0.11	1971
Selected other countries							
Denmark	24.6	26.4	27.5[a]	–	0.18	0.18	1967
France	25.0	27.0	27.9	28.0[d]	0.20	0.09	1973
Netherlands	25.7	27.6	28.6	28.7	0.19	0.10	1972
United Kingdom†	–	27.3	29.1	–	–	0.18	–
United States	22.7	24.2	24.9	–	0.15	0.07	1974

Notes: $a = 1996$, $b = 1997$, $c = 1999$, $d = 2001$; †= birth-order within current marriage; *Sources:* Council of Europe (2003); Martin et al. (2003); Mathews and Hamilton (2002).

2.1.1 Leaving the Parental Home

Leaving the parental home is one of the crucial nodes of the life-course and a central event in early adulthood. First, it generally implies the formation of a new household and greater autonomy for young people in all aspects of social life and personal decision-making, including also many fertility-related decisions. Second, and most important for our context, childbearing in developed countries almost invariably takes place after young adults have left their parental home, and home-leaving constitutes a central correlate of fertility and union formation in Europe and other industrialized countries.

In a pioneering study, Kiernan (1986) investigates home-leaving in six Western European countries in 1982. The study identifies Denmark as the country with the earliest home-leaving, followed by West Germany, France, the Netherlands, Ireland and the UK. In a follow-up investigation, Fernández Cordón (1997) examined the living arrangements of young adults over time in Spain, Greece, Italy, France, Germany and the UK between 1986 and 1994. These longitudinal analyses revealed that Italy had the highest share of young people co-residing with their parents during early adulthood, while the UK had the smallest share. Moreover, Corijn (1999) found that cohorts in most European countries born around 1950 and 1960 were postponing the transition out of the parental home. This common trend towards delayed home-leaving, however, co-exists with substantial variation in the timing of this event across countries: Italy and Spain are among the countries with a late separation from the parental home, while Austria, the Netherlands and Sweden were among the countries with an early pattern.

Despite this overall heterogeneity in patterns of home-leaving, however, there is an important regularity with respect to the relation of home-leaving and lowest-low fertility. In particular, retrospective survey data—which are the only available data source for this purpose—reveal that the timing of home-leaving is quite homogeneously concentrated at relatively late ages among lowest-low fertility countries. In an international comparison of the timing of home-leaving for cohorts born around 1960, for instance, Italy, which is the first country experiencing lowest-low fertility in the early nineties, has the highest age both for men and for women with 26.7 years and 23.6 years respectively. Some Central and Eastern European countries, including those with lowest-low fertility, are not distant from the latest-late pattern of Southern European countries. On the other hand, Sweden represents the opposite side of the ranking with 20.2 years for men and 18.6 for women, resulting in a difference of more than 6.5 years (males) and 5 years (females) in the timing of home-leaving across European countries (see Billari et al. 2001).

2.1.2 Fertility and Marriage: A Shifting Relationship?

In a well-known study, Hajnal (1965) traces an East-West divide in historical family systems in Europe, the so-called Hajnal line, that connects the cities of Trieste in North-Eastern Italy and St. Petersburg in Western Russia. To the West of this line, the family formation pattern is dominated by a neo-local nuclear family with relatively late marriage and a significant proportion of individuals who never marry. To the east of Hajnal's line, marriage has been early and universal, and the family is often extended. This divergence of marriage pattern along Hajnal's like also prevails after WWII and persists until the present time. It is particularly pronounced between Central and Eastern Europe on the one and Southern Europe on the other side (Monnier and Rychtarikova 1992). Countries to the west of Hajnal's line reveal greater heterogeneity and diversity in contemporary marriage behaviors that do not easily cluster into a single pattern (Reher 1998).

Even if historical patterns are an important aspect shaping present marriage behaviors and family organizations, the emergence of lowest-low fertility is associated with an important shift of the relationship between marriage and fertility between the mid 1970s and the beginning of this decade. In particular, it has traditionally been argued that cumulated fertility is inversely related to age at marriage, and variations in the age at marriage have often been an important explanatory factor of aggregate fertility differences across countries. For instance, a linear relationship between total fertility and the age at first marriage has been shown to be a surprisingly good approximation, and Billari et al. (2000) estimate that a one-year increase in the age at marriage would bring down the number of female children ever born by about 0.08 in Italian cohorts born around 1950.

In contrast to this positive association between marriage and fertility, the recent emergence of lowest-low fertility, especially in Southern Europe, is associated with a situation in which long-term partnership commitments—symbolized by a high prevalence of legal marriage and low prevalence of divorce—apparently represent an obstacle for the progression to (relatively) high fertility levels. To illustrate this association, we compare on the left-hand side of Figure 6 the level of period total fertility with the period total first marriage rate (*TFMR*) (see Appendix Table A.1 for the list of included countries and the underlying data). In order to indicate the relevance of individual countries for the relationships in Figure 6, the data points are surrounded by circles that have an area proportional to a country's population size. In 1975, Figure 6a shows that marriage and fertility were still closely intertwined and there has been a positive correlation between the total fertility and the total first marriage rate. The correlation radically changes at the end of the 1990s. In particularly, after lowest-low fertility has emerged, the positive correlation between the total fertility and the *TFMR* is has vanished, and countries with high fertility levels no longer exhibit high marriage propensities (Figure 6b). A similarly shifting relation occurs also with respect to fertility and divorce (Figures 6c,d). In 1975, a higher level of divorce in European countries was associated with lower levels of fertility in cross-sectional comparisons, and the period total divorce rate (*TDR*) exhibits a negative correlation with the level of total fertility (Figure 6c). This correlation reverses in 2001–02: countries with high *TDR* levels exhibit higher fertility levels than countries with a low total divorce rate (Figure 6d). In Figure 7 we additionally illustrate that the relationship between the extent of out-of-wedlock childbearing and the level of fertility has reversed along with the shifting centrality of marriage. In particular, a cross-sectional comparison on European countries in 1975 reveals a negative correlation between the level of extra-marital fertility and total fertility. In 2001–02, this correlation has become positive, and along with this reversal, the Southern European countries, Italy and Spain, stand out as combining both lowest-low fertility and the lowest prevalence of non-marital fertility.

In summary, the above analyses reinforce the argument that the emergence of lowest-low fertility during the 1990s has been associated with fundamental shifts in the relationships between fertility and marriage. In particular, there has been an increasing disconnection between marriage patterns and fertility levels after the emergence of lowest-low fertility in the 1990s in cross-sectional analyses of European countries, and marriage formation and dissolution are no longer important predictors of national fertility levels in cross-sectional analyses of European countries during the late 1990s (see also Heuveline et al. 2003). Moreover, the above analyses show that the aggregate cross-country relationship between partnership formation/dissolution and levels of fertility has become quite indeterminate in the late 1990s, which is strikingly different from the strong relations between fertility and union formation and dissolution that prevailed 20

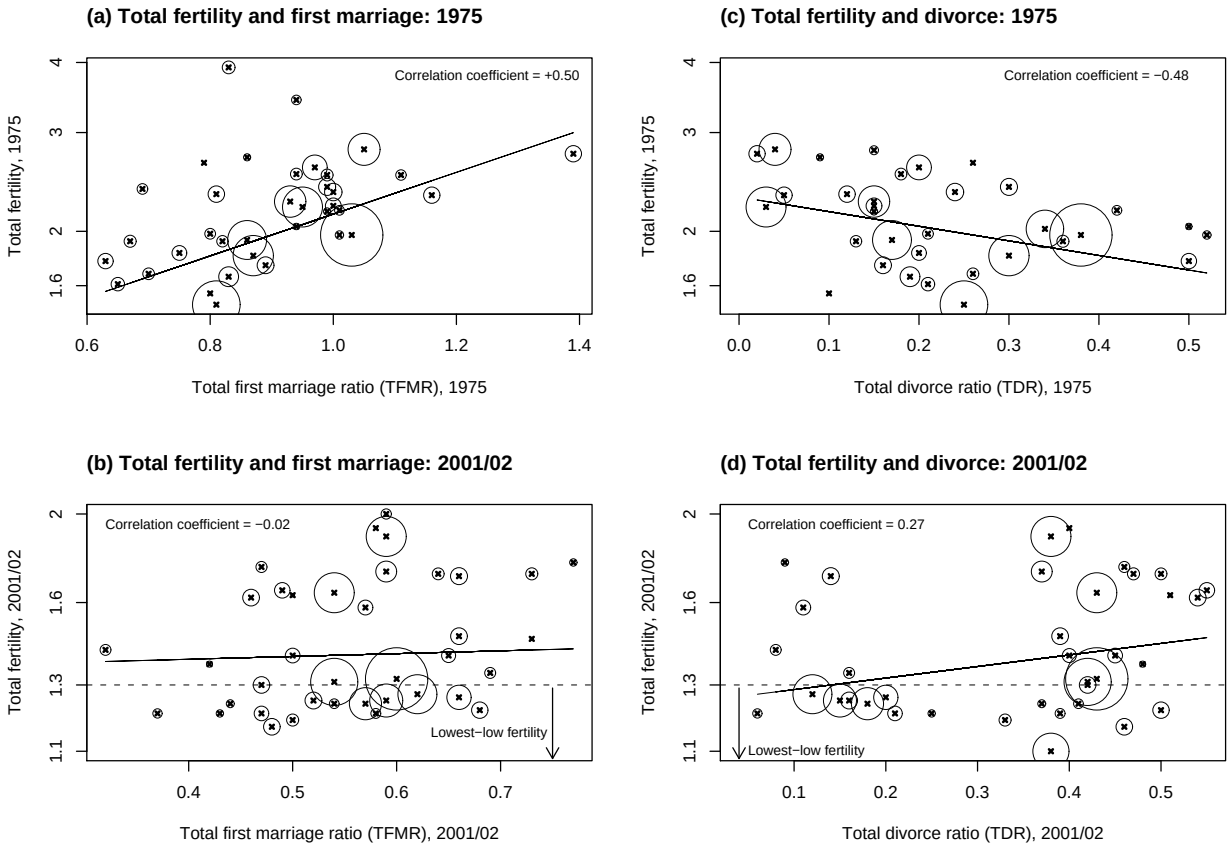


Figure 6: Relationship between total fertility, marriage and divorce in 1975 and 2001/02

Notes: See Table A.1 for the data and list of countries. The '×' mark gives the exact position of a country, while the area of circle is proportional to the country's population size in 1975 or 2002. The regression line included in the figures is obtained from a weighted regression with weights equal to the population size. *Source for data:* Council of Europe (2003).

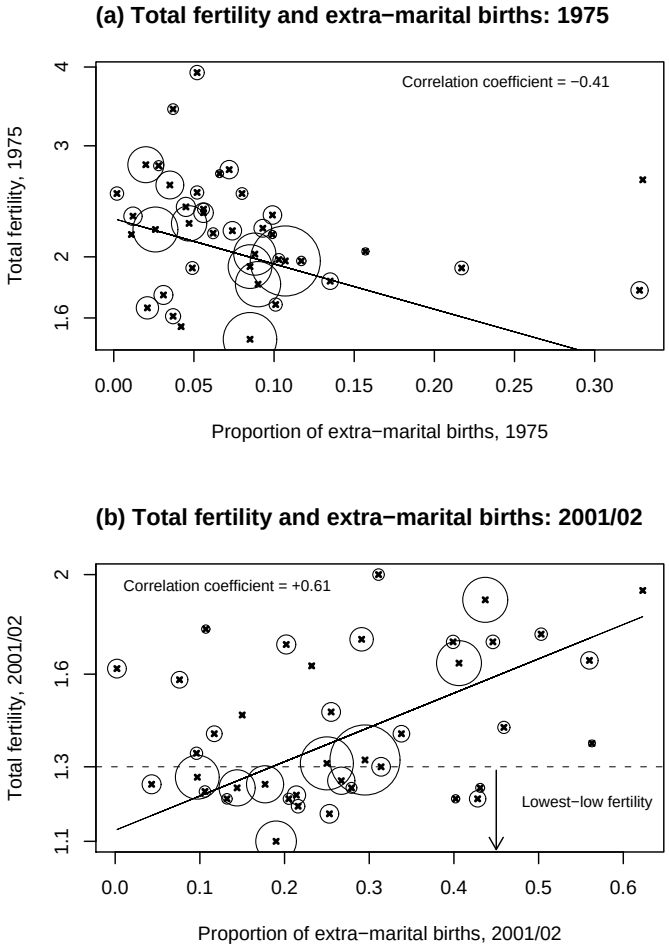


Figure 7: Relationship between the proportion of extra-marital births and total fertility in 1975 and 2001/02
See Notes to Figure 6. *Source for data:* Council of Europe (2003).

years earlier. In addition, further analyses—not reported here in detail—reveal important differences in home-leaving, union formation and dissolution between lowest-low fertility countries (see also Billari et al. 2001). On the one hand, the Southern European pattern is characterized by late separation from the parental household, a low prevalence of cohabitation and extra-marital fertility, and a high centrality of marriage with long-term commitments and low rates of divorce. On the other hand, the Central and Eastern European pattern is more diverse and characterized earlier home-leaving, lower rates of marriage and higher rates of divorce and extra-marital fertility than the Southern European pattern.

2.2 Fertility-related Patterns of Labor Force Participation

In addition to witnessing a changing relation between fertility and marriage or divorce, the 1990s have also challenged the conventional wisdom about the aggregate-level relation between total fertility and women's labor force participation. In particular, conventional economic theory predicts that increases in the wage rate of women lead to increases in women's labor force participation on the one side, and decreases of fertility on the other side due to increased opportunity costs of children in combination with a low income elasticity of the number of children (Becker 1981; Cigno 1991; Willis 1973). At the macro level, this relation has been

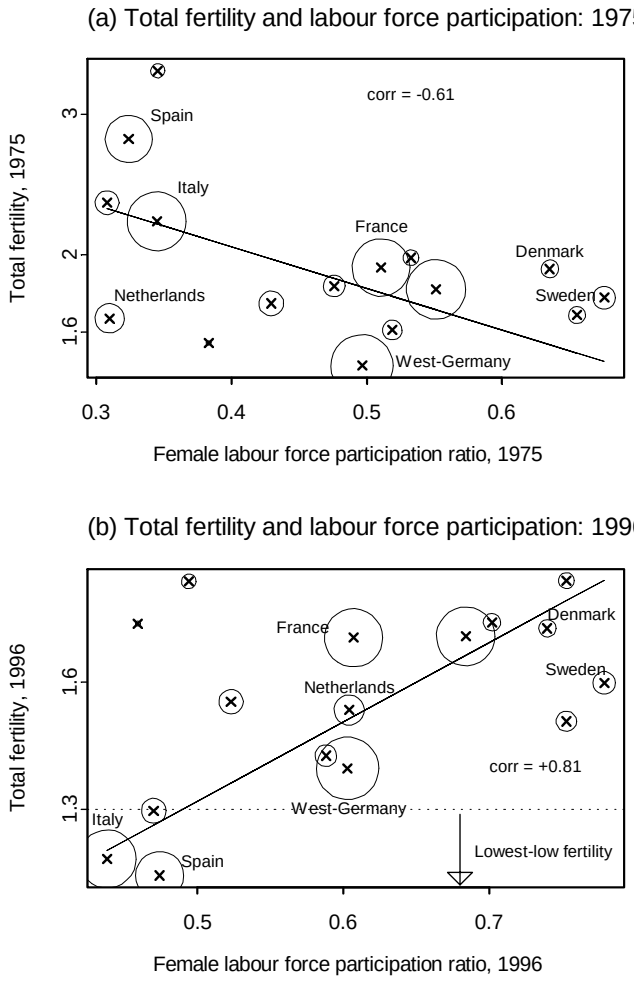


Figure 8: Relationship between the labor force participation of women and total fertility in 1975 and 1996
See Notes to Figure 6. *Source for data:* Kögel (2004).

translated into the hypothesis that total fertility and female labor force participation rate (*FLFPR*) should be inversely related in cross-country studies.

In this section we investigate the empirical evidence for this hypothesis as part of our overall attempt in this paper to portrait the socioeconomic context of lowest-low fertility trends. In particular, several recent studies have documented that the cross-country correlation between the total fertility level and women's labor force participation (*FLFPR*) has changed its sign in OECD countries during the mid 1980s and early 1990s (Ahn and Mira 2002; Engelhardt et al. 2004; Kögel 2004; Rindfuss et al. 2003). This finding is also confirmed in regression-based analyses (Brewster and Rindfuss 2000; Esping-Andersen 1999), where the labor force participation of women has a *positive* (and significant) influence on the total fertility in cross-sectional analyses of OECD countries in the 1990s, while comparable analyses for the 1970s reveal a negative influence.

This reversal is depicted in Figure 8 that plots total fertility levels against female labor force participation rate (*FLFPR*) for 1975 and 1996. We focus in Figure 8 on Western Europe, where the labor force participation of women has traditionally been very different between countries (the countries included in Figure 8 include Austria, Belgium, Denmark, Finland, France, West-Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom, Greece and Spain). In 1975, countries with a

high *FLFPR*, such as Sweden or Denmark, exhibited low fertility in a European comparison, while countries with low *FLFPR*, such as Italy or Spain, had relatively high fertility. In 1996, high *FLFPR* is associated with high fertility, such as in Denmark and Sweden, while lowest-low fertility countries such as Italy and Spain are characterized by a quite modest participation of women in the labor market. It is also important to note that changes in fertility levels—rather than changes in the labor force participation of women—have been more prevalent in the countries in Figure 8, and the relative country positions with respect to female labor force participation rates have been remarkably constant during the period 1975–96 (e.g., see the labeled points in the figure).

The above findings about the changing association between total fertility levels and women's labor force participation has spurred several additional analyses that investigate this issue further. Ahn and Mira (2002), for instance, emphasize the relevance of Mediterranean countries in the above pattern because the emergence of lowest-low fertility is an important factor contributing to the reversal of the correlation. Brewster and Rindfuss (2000) also emphasize the role of institutional arrangements, e.g., different family policies, child-care systems or welfare state typologies, and they stress the altered social norms regarding the combination between childrearing and labor force participation of women. Specifically, lowest-low fertility in Southern Europe has occurred in a context with a very low compatibility of childbearing with woman's labor market participation, which is due to the difficulties in entering and re-entering the labor market and the limited flexibility of working hours (Bettio and Villa 1998; Del Boca 2002).

3 Explaining the emergence of lowest-low fertility: Incentives, social interactions and institutional factors

After characterizing the basic patterns of European low fertility and their relation to marriage, divorce and labor force participation, we explore in this section the socioeconomic conditions and individual-level determinants that underlie this transformation of the demographic landscape in Europe. We initially focus on the delay of childbearing that we have emphasized in our earlier analyses as one of the central demographic aspects in understanding lowest-low fertility. The basic starting point of our discussion is the observation that fertility is a dynamic process over the life-course. When individuals progress through their life-course and make plans for the future, they can decide—possibly sequentially—how many children they have in total, which is denoted as the *quantum of fertility*, and they can also decide when they have these children, which is denoted as the *timing* or *tempo of fertility*. Individuals have considerable control over the timing of fertility. Specifically, due to the widespread availability of reliable contraception in most lowest-low fertility countries, we can assume that births are looked for, or at least, not intentionally avoided. In such a context, there are different reasons why individuals may not have an extra child for the moment: one may plan to have a child at a later time, or one may plan not to have a child at all, or one might not have a clear idea about these future plans. It is important that this decision to postpone childbearing can be revised afterwards. There is no irreversible commitment associated with plans to delay fertility, at least within the biological and medical limits that determine the ages of childbearing. This flexibility is in sharp contrast to the transition into parenthood, which is generally irreversible once a child is born. This asymmetry between the irreversibility of childbirth and the reversibility of future plans about the timing of fertility provides an incentive to postpone the decision of having children. A postponement can reduce the uncertainty about

Table 3: Economic indicators and gross university enrollment ratios for lowest-low fertility countries

Country	Economic Indicators				Gross University Enrollment[c]			
					Women		Men	
	GNI per capita[a] 1999	GDP average growth[b] 1990–99	GDP growth[b] 1999	Average inflation 1990–99	1989	1999–2000	1989	1999–2000
Greece	12.1	2.2	3.4	6.2	25.3	56.2	24.4	53.2
Italy	20.2	1.4	1.4	3.4	29.1	52.8	30.3	40.7
Spain	14.8	2.2	3.7	3.1	33.8	62.3	36.3	53.0
Bulgaria	1.4	-2.7	2.4	116.5	28.2	50.1	24.4	35.7
Czech R.	5.0	0.8	-0.2	7.7	13.9	29.1	17.7	28.2
Estonia	3.4	-1.3	-1.1	15.5	26.5	62.6	25.7	43.3
Hungary	4.6	1.0	4.5	17.4	14.9	40.5	13.7	33.1
Latvia	2.4	-4.8	0.1	9.2	29.0	62.4‡	20.4	37.9‡
Romania	1.5	-0.8	-3.2	61.4	8.4	24.3†	8.6	20.8†
Slovenia	10.0	2.4	4.9	9.9	27.8	61.3‡	22.3	45.7‡
Armenia	0.5	-3.2	3.3	32.5	23.8[d]	14.0†	23.8[d]	10.5†
Belarus	2.6	-3.0	3.4	169.6	50.3	56.2	45.5	43.7
Russia	2.3	-6.1	3.2	52.0	58.9	73.0	48.4	57.4
Ukraine	0.8	-10.7	-0.4	69.8	45.8[d]	46.0‡	45.8[d]	40.4‡

Notes: (*a*) GNI per capita = gross national income per capita in thousand US$; (*b*) GDP = gross national product; (*c*) gross university enrollment ratio is the total enrollment in university education, regardless of age, divided by the population of the age group which officially corresponds to university education; (*d*) enrollment ratio pertains to males and females combined. *Calendar year:* (†) 1996; (‡) 1998–99. *Sources:* The World Bank, Data & Statistics (available at http://www.worldbank.org); UNESCO, Institute for Statistics (online available at http://www.unesco.org)

the costs and benefits of children, and also the uncertainty associated with the economic situation and the stability of partnerships in early adulthood.

3.1 The socioeconomic background of delayed childbearing in lowest-low fertility countries

The socioeconomic context of decisions about timing of parenthood varies substantially across lowest-low fertility countries, and there is a striking difference between Southern European and Central/Eastern European (CEE) countries. In Southern European countries, per capita income levels are at medium to high levels with steady growth, and these countries have also experienced low inflation (Table 3). At the same time, the entry into the labor market for young adults is extremely difficult (Table 4). The three lowest-low fertility countries in Southern Europe have the highest youth unemployment rates in the European Union in 1999, and this situation has been essentially unchanged since 1989. Unemployment rates are also higher for females than for males, in contrast to Northern European countries. The link between unemployment and low fertility is also supported by the observation that the only Southern European country with relatively high fertility is Portugal, with considerably lower unemployment rates than its Mediterranean counterparts.

The chronic high unemployment situation in Southern Europe has discouraged young adults from entering the labor market and made higher education more attractive, and it has deteriorated working conditions

Table 4: Youth unemployment rates (under 25) in Southern Europe

Country	Women 1989	Women 1999	Men 1989	Men 1999
Italy	38.5	38.3	25.9	28.6
Greece	34	39.3	17	21.4
Spain	42.6	37.3	24.4	21.7
Portugal	15.8	11.1	8.3	7.5
EU (15)	19.6	19.2	14.4	16.7

Source: OECD, Employment Statistics (available at http://www.oecd.org)

to sometimes precarious situations with mostly low-paid temporary jobs. In addition, there is a crowding-out process in which more educated young people are displacing less educated people from their traditional positions (e.g., Dolado et al. 2000). The labor market uncertainty and poor economic prospects in early adulthood also facilitate the commonly observed behavior of prolonging the stay in the parents' household until relatively late ages. In both Italy and Spain, for instance, the successful entry into the labor force tends to accelerate household and union formation (Billari et al. 2002).

There is also considerable heterogeneity in the determinants of low fertility and postponement among Eastern Europe countries and former Soviet Republics. While all of these countries share the common experience of the transition from a planned to a market economy, the success of this transition and the economic hardship during the transformation have varied considerably. Some of these tremendous differences in income levels and economic outcome during the transition period are documented in Table 3. Most of the CEE countries with lowest-low fertility, and in particular those in the former Soviet Union, have experienced a decline in output over the transition period. Many countries have also experienced a substantial surge in inflationary pressures during the economic crisis. This is especially the case in the former Soviet Union, and countries such as Bulgaria or Romania. In addition, income levels have been very volatile in all transition countries in Table 3, and the median income fluctuated from year to year by as much as 25 per cent (Forster and Toth 1997; Lokshin and Ravallion 2000). Similarly, labor turnover has been very frequent and lead to common spells of unemployment. For instance, 57 per cent of Russian women during 1994–1998 were very concerned about the possibility of not being able to provide themselves with the bare essentials in the following year (Kohlmann and Zuev 2001; see also Kohler and Kohler 2002).

The structure of wages and employment has also been transformed in Central and Eastern European transition countries. The returns to human capital have considerably increased as compared to the pre-transition period, and young cohorts can expect reward levels for skills that approach—or are comparable to—the returns in western European countries (e.g., Munich et al. 1999; Newell and Reilly 2000; Orazem and Vodopivec 1995; Rutkowski 1996). In contrast, there has been a decline in the returns to experience for low educated people. As a result, poverty is particularly common among the low educated and those having more than two children (Grootaert and Braithwaite 1998; Milanovic 1998).

3.2 Postponement as a rational response to socioeconomic incentives

Based on the above sketch of the socioeconomic background, we can investigate the individual-level determinants of delayed childbearing in lowest-low fertility countries. In particular, an important commonality of the socioeconomic context in lowest-low fertility countries is a high level of economic uncertainty in early adulthood. This uncertainty provides an incentive to delay decisions that imply long-term commitments, such as the decision to have children, and it provides an incentive to invest in education and human capital.

In the Southern European countries, the uncertainty is basically due to youth unemployment and/or job instability. High unemployment risks simultaneously lower the opportunity costs of pursuing higher education and create incentives for education due to the increased employment opportunities. Higher education has thus become the primary pathway for individuals to increase their chances of finding a stable job with a sufficient wage (Lassibille et al. 2001; Sá and Portela 1999). In the CEE countries, the uncertainty is due to the overall economic insecurity and hardship caused by the transition. Moreover, the economic transition has increased the returns to education. The combination of these factors has rendered human capital investments very attractive since these investments provide insurance against poverty and enable access to more stable employment with relatively high salaries. The main problem in attaining education faced by individuals in Eastern Europe is that the opportunity costs may be too high in some of the poorest countries. Parents may have problems financing higher education of their children since they are also affected by the transition, and credit constraints may preclude access to loans in order to cover tuition and consumption during studies.

The university enrollment ratios in Table 3 reflect the drastic increase in higher education in Southern European countries where half of the women pursue university studies in the late 1990s. Central and Eastern European countries share this general trend towards increased enrollment ratios, particularly for women. Estonia, Slovenia, Latvia and Bulgaria, have strongly increased their enrollment ratios to levels comparable to western countries. The levels in the Czech Republic, Hungary and Romania have also increased, but since these countries started at much lower levels they are still lagging behind. The only deviations from the trend towards increased higher education are among the former Soviet Republics.

The comparison of the evolution of university enrollment with the mean age at childbearing is very illuminating. The countries with marked increases in higher education tend to be identical to the countries with the most pronounced delays in the mean age at first birth. This association between delays in childbearing and increases in individuals' human capital investments is consistent with our hypothesis: increasing returns to education induce young adults—and particularly young women—to study for a longer time in the expectation that this improves their ability to cope with the economic uncertainty and to take advantage of the new opportunities created during the transition period. Exceptions to this general pattern seem to be concentrated among countries where the economic situation is worst, and where the coping strategy of higher education and human capital investments is not accessible for important fractions of the population. In addition to the human capital motive for delaying childbirth, the very unstable standards of living in Eastern Europe also lead to a strategic postponement in which children—and similar decisions implying long-term commitments—are deferred in the expectation that the uncertainty about future prospects is reduced over time.

Changes in social policy are an important additional factor in the former socialist countries. In the socialist period many countries had developed a system of incentives that rewarded early childbearing, for

instance via easier access to housing and paid maternity leave. These incentives resulted in a reduced age at motherhood, especially during the 1980s (Frejka 1980; Zakharov and Ivanova 1996). During the 1990s many of these benefit structures have ended, or eroded due to inflation, or were modified, and this fact has also contributed to the postponement of motherhood in the last decade.

A further determinant of the postponement–low-fertility nexus is the delay of childbearing in association with investments in housing and durables. This is especially relevant in Italy and Spain, where the interference of childbearing with educational investments has been much reduced due to the delay of parenthood to very late ages. In these countries, the preponderance of own property in the housing market and the restricted rental market induces young people to stay at home with their parents until their financial resources are adequate for paying the mortgage (Duce Tello 1995). Since this can take several years after entry in the labor market, this process can lead to delays of childbearing substantially beyond the completion of higher education.

3.3 Social feedback effects on the timing of fertility

The previous section has primarily focused on individuals' incentives that render delayed childbearing more advantageous. The discussion of these individual-level determinants of timing decisions, however, is not sufficient to understand the fertility change in contemporary Europe and other developed countries. In particular, we believe that important *social feedback mechanisms* reinforce individuals' behavior changes to socioeconomic conditions, particularly with respect to changes in the timing of fertility. Social feedback exert important influences on the dynamics of the fertility postponement for at least three reasons (Kohler et al. 2000; Montgomery and Casterline 1996):

Social learning about the optimal timing of fertility: The optimal timing of fertility is a highly complicated problem for women or couples, especially in the context of uncertainty and changing socioeconomic environments. Social learning provides a possibility to simplify and augment decision-making in this context. Childbearing and career experiences of friends are therefore likely to influence women's and couples' decisions about the timing of fertility. For instance, the interaction with others can provide information about questions like "How did classmates, who had their first child relatively early, fare in terms of career and partnership?" and "What is the divergence in social and economic attainment between those who had their children early as compared to those who had them later?" In addition to this possibility to learn from others, social learning also implies an aggregate-level feedback mechanism. In particular, in a population that delays childbearing, social learning from others implies that the experience of friends having children is revealed at an increasingly later age. A woman at some given age, say age 25, therefore faces more uncertainty about the advantages and disadvantages of childbearing in a population that exhibits a late pattern of childbearing as compared to an identical woman in a population with early childbearing. Higher uncertainty in turn implies a further incentive to delay childbearing. Social learning therefore implies a multiplier effect that reinforces the impact of socioeconomic changes that lead to delayed patterns of childbearing.

Social feedbacks mediated through the marriage market: In many lowest-low fertility countries, partnership formation and marriage are inherently connected with the transition into parenthood. This is particularly the case in Italy and Spain, where out-of-wedlock childbearing is still relatively rare, pre-marital cohabitation is not wide-spread, and the trend towards late childbearing is associated with late home-leaving and late union-formation (De Sandre 2000; Delgado and Castro Martín 1998). An important demographic

implication of this trend towards late union-formation is the induced shift in the composition of potential mates in the marriage market. While the traditional literature on marriage squeezes emphasizes the effect of differential cohort sizes (e.g., Goldman et al. 1984; Grossbard-Shechtman 1985), similar implications are caused by changes in the age-distribution of union formation. In particular, a general delay of partnership formation in the population reduces the marriage market 'costs' encountered by individuals who delay marriage/cohabitation: first, it increases the probability of finding a partner at later ages, for instance after finishing more extended education, and second, it increases the expected 'quality' of marriageable partners at older ages because the marriage market will be 'thicker' and contain more potential mates at any given age. Socioeconomic changes that provide incentives for delayed childbearing, for instance higher returns to female education or technological innovations facilitating fertility control, therefore affect the timing of marriage in a twofold manner: on the one hand, via a direct effect on individual's incentives to delay, and on the other hand, via an indirect effect through the reduction in the costs of delaying marriage/cohabitation for individuals. The latter aspect gives again rise to a social multiplier effect (for a formal analysis and application to the U.S., see Goldin and Katz 2002).

Social feedbacks through competition in the labor market: A further potentially relevant mechanism of social interaction is competition in the labor market that is caused by the presence of high unemployment. In this situation, the labor market can give rise to a social multiplier effect, quite similar to the mechanism operating through the marriage market above (for a related formal model, see Kohler 2001, Chapter 6). In particular, social interaction reinforces the effect of unemployment and economic uncertainty towards delayed childbearing. This social multiplier effect arises because women with children tend to have lower labor supply than women without children, especially in those low and lowest-low fertility countries with inflexible labor markets and insufficient supply of day-care. In this situation, a delay of childbearing in the population increases the level of childlessness among women at the primary ages of entering the labor market. This increased childlessness leads to an increased female labor supply, which in turn increases the competition and unemployment risks during early adulthood. The postponement of fertility caused by unemployment during early adulthood is therefore exacerbated through a feedback process that increases the overall female labor supply in the age groups that are most affected by economic stress.

We argue in this section that, as a result of these social feedback mechanisms, the delay of childbearing follows a *postponement transition* that shares many characteristics of the fertility transition in Europe or contemporary developing countries (e.g., see Bongaarts and Watkins 1996). This notion of a postponement transition is substantiated in Figure 9. In this figure we define the *year of onset of the postponement transition* as the first in a group of three years during which the mean age at first birth increases by more than .3 years. Within lowest-low fertility countries, this year of onset ranges from 1978 (Italy) to 1994 (Lithuania, Armenia) and 1997 (Belarus) (Table 2). The horizontal axis in Figure 9 plots the years since the onset of the postponement transition, and the vertical axis depicts the change in the mean age at first birth since this onset. In order to avoid a cluttering of the graph, we display some CEE countries with a very recent onset in a sub-graph. In addition we include several other European countries for comparison. Particularly interesting in this context are the Netherlands that are representative for a Western European country with an early onset of the postponement transition (1972) and a moderately high total fertility rate (1.73 in 2002).

The figure reflects the substantial increases in the mean age at first birth in lowest-low fertility countries that we have emphasized throughout this paper. More importantly, the standardization of the time-scale in

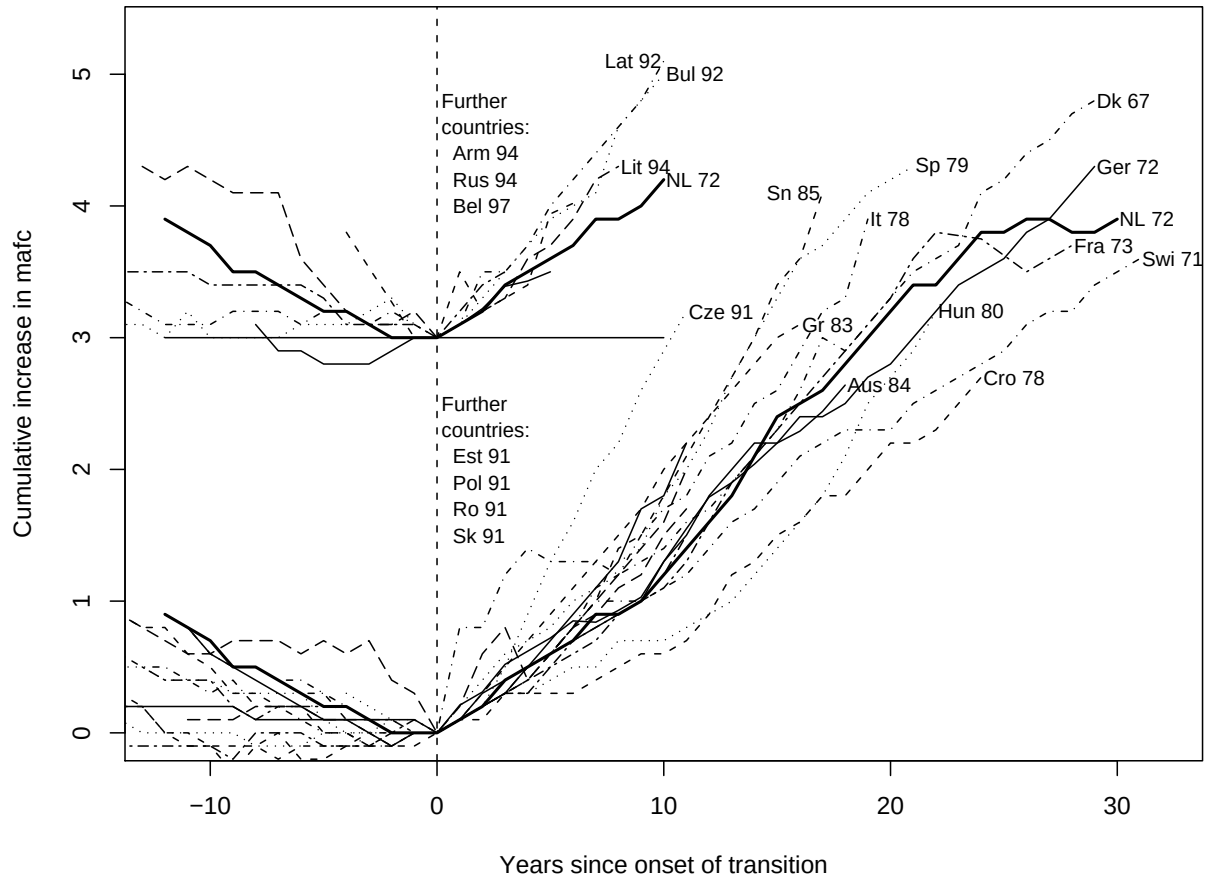


Figure 9: Onset and pace of the postponement transition in European countries

Note: Graph includes all European countries in Tables 1–2, with exception of Andorra, Bosnia and Herzegovina, Moldova, Ukraine, and United Kingdom for which adequate data are missing. For country codes, see Table A.1.
Source for data: Council of Europe (2003).

this figure reveals several key characteristics that seem to be inherent to the postponement of fertility: (*a*) the onset of delayed childbearing in low and lowest-low fertility countries is a break with an earlier regime that is characterized by a relative stability in first-birth timing; (*b*) once initiated, the postponement transitions tend to be persistent and irreversible, leading to large changes in the mean age at first birth; (*c*) the broad characteristics of the postponement transition are similar across a wide range of socioeconomic conditions: for instance, the paths for all countries with an onset of the transition up to 1991—that is, Austria, Croatia, the Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Italy, the Netherlands, Poland, Romania, Slovenia, Slowak Republic, Spain and Switzerland—trace each other closely. This similarity occurs despite the fact that these countries represent very different socioeconomic conditions in Europe, including also very different patterns of post-1990 economic crises in Eastern Europe and very different levels in the mean age at first birth prior to the postponement transition. For countries with an onset of the transition after 1993 it is still very early to make inferences about the path of the postponement transitions, but it seems very likely that they will follow the other lowest-low fertility countries.

The above postponement transition towards late childbearing regimes, which is in our opinion likely to occur in many European and other developed countries, can therefore be been seen as a further step in a long-term transformation of fertility and related behaviors. In particular, the above discussion suggests that the long-term trend towards low and lowest-low fertility in Europe is related to three distinct transition processes: the (first) demographic transition leading to parity-specific stopping behavior within marriage, the second demographic transition resulting in ideational changes and in the rise of non-marital family forms, and most recently, the postponement transition that shifts the timing of fertility towards a late childbearing regime. The postponement transition is therefore a third step that follows the control of marital fertility and the transformation of partnership behaviors, and it implies a delay of parenthood towards later age as the combined result of individual incentives for late childbearing and social interaction effects that reinforce this trend.

It is also clear that the upper age-limit to childbearing prevents substantial future postponement without changing the age-pattern of parity-specific fertility rates. Yet, in many CEE countries with still relatively early childbearing the postponement of birth, even at relatively rapid annual rates such as an annual increase in the mean age at first birth by .2, can continue for at least two to three decades until they reach the late age-patterns of fertility currently observed among Northern and Southern European countries. In Western and Southern European countries with an already very late age-pattern of childbearing, a differential postponement of fertility across age-groups can continue for a considerable time. For instance, borrowing a popular idea on human longevity, one may foresee a rectangularization of fertility patterns. This rectangularization, which needs not be only a feature of lowest-low countries but of all below-replacement fertility countries, is characterized by a concentration of childbearing in an increasingly narrow age-interval. In this scenario, few women will have children prior to, say, age 28 or 29, and childbearing at parity one and two will be concentrated when women are in their thirties. There will be very few higher parity births, especially among women with a late onset of childbearing.

3.4 Determinants of the quantum in lowest-low fertility countries

There is quite widespread agreement in the literature that lowest-low fertility countries share an institutional setting that implicitly favors a relatively low quantum of fertility. For instance, the lowest-low fertility coun-

tries in Southern Europe, Italy and Spain, provide highly insufficient child-care support (Esping-Andersen 1999). In the 1980s, for instance, the share of children below age 3 with day-care coverage in Southern Europe was 4.7%, with respect to 9.2% in Continental Europe (Austria, Belgium, France, Germany and the Netherlands) and 31.0% in the Nordic countries (Denmark, Finland, Norway and Sweden) (Esping-Andersen 1999). The labor market is also relatively inflexible in terms of possibilities for part-time work or re-entering the labor force after an absence due to child-birth (Del Boca 2002; González et al. 2000; Stier et al. 2001). This hinders the combination of female labor force participation and childbearing. In comparison with other Western European countries, Italy and Spain also have among the lowest levels of state support for families with children in terms of tax allowances or direct transfers (Esping-Andersen 1999). While this deficit is partially compensated through strong family networks, as for instance through the provision of child-care or economic resources by grandparents (Reher 1997), this substitution of family support for public support is likely to be insufficient in contemporary industrialized countries. Moreover, the high integration of young adults in their parents' home and extended family may even discourage union formation and fertility (Dalla Zuanna 2001).

Family roles in the Southern European lowest-low fertility countries have also been slow in adapting to the new role of women (Chesnais 1996). Italy and Spain have a highly asymmetric labor divisions within households, which becomes even more asymmetric after the birth of the first child (Palomba and Sabbadini 1993). The countries therefore conform with McDonald's (2000a) argument about gender equity: fertility falls to very low levels when gender equity rises in individual-oriented institutions, like the labor market, while it remains low in family-oriented institutions.

The moderate and very low quantum in Eastern Europe is in part determined by similar institutional factors hindering high parity progression probabilities. In addition, many of the pronatalist—or at least family friendly—policies in CEE countries have discontinued after 1990 (Macura 2000), and the economic crisis has deteriorated particularly the high integration of women in the labor market. Furthermore, Eastern Europe is characterized by a persistence of economic insecurity throughout the life-course. This is in contrast to Southern Europe, where unemployment and economic stress are concentrated during early adulthood years. In Eastern Europe, the uncertain long-term outlook regarding unemployment, the housing situation and economic recovery implies that uncertainty affects not only the timing of the first birth but also the transition to the second child and higher-parity children.

While the above institutional context—at least in Southern Europe—has been relatively constant in recent decades, its effect on the quantum of fertility has not. In particular, the effect of this institutional context needs to be investigated with an explicit attention to the rapid postponement that has transformed the age-pattern of entering parenthood in lowest-low fertility countries. Specifically, the delay of childbearing has been associated with substantially increased investments in higher education for females (Table 3). Similarly, labor market experience prior to marriage and parenthood are likely to be higher for women with late childbearing than for women with early fertility. A direct consequence of these increased levels of female human-capital and labor market experience at the time of childbirth is an increase in the opportunity costs of childbearing in terms of foregone wages.

This relation between the timing of fertility and the wage-level (measured around first childbirth) is depicted by the broken line in Figure 10(a). The wage-level has been standardized so that it equals one for women with an early onset of parenthood. It increases with a later age at first birth because the delay in

childbearing is generally associated with higher levels of human capital and labor-market experience that are rewarded in the labor market. This rise in wages increases the opportunity costs of time spent outside the labor-market, and it increases the costs of time-intensive 'goods' such as children. The opportunity cost, however, is not as high as the wage level since there can be some labor force participation. In particular, women with late childbearing can substitute away from 'own' child-care and into 'purchased' child-care (kindergarten, household help, etc.). This implies that the opportunity costs of children increase less steeply with delayed childbearing than the index of wages (for the moment we ignore other costs of children that may potentially depend on the age at first birth, such as for instance health costs during pregnancy).

The extent of this difference between wages and opportunity costs of children, however, depends on the compatibility of childbearing with female labor force participation. In a country with a low compatibility, the ability to arrange a flexible part-time work, or the ability to find a position that can be combined with institutional day-care, is limited. Hence, the scope for the above substitution from time-at-home to time-in-the-labor-market is restricted. The postponement-induced increase in wages therefore translates into substantial increases in the opportunity costs of children, including also the opportunity costs of additional children after the first child (see line AB in Figure 10a). These higher child-costs will tend to reduce the quantum of fertility and the parity progression probabilities after the first birth.

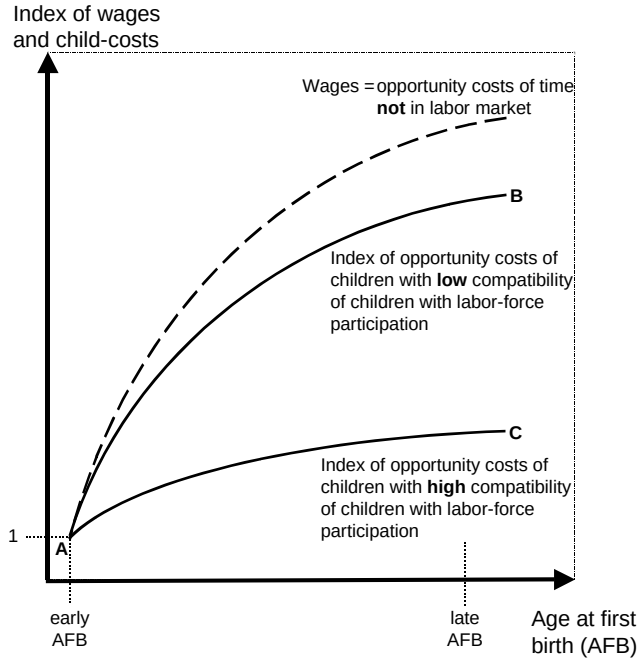
If there is a high compatibility of childbearing and female labor force participation, wage increases associated with late childbearing lead to more modest increases in the opportunity costs of children (see line AC in Figure 10a). In particular, women will be able to shift relatively flexibly their time allocation from time-at-home to time-in-the-labor-market, and this substitution diminishes the effects of increased wages on child-costs. In addition, with high levels of female labor force participation there can also be a positive income effect on the demand for children.

These differences between countries with high and low compatibility of work and children have important implications for the causal effects of delayed childbearing on the quantum of fertility. In particular, the higher human-capital associated with delayed childbearing translates directly into increased opportunity costs of children. This effect is especially relevant when it is combined with the large delays in childbearing that occur during the postponement transition. In this case, the postponement-induced increases in child-costs are likely to imply substantial declines in individual's demand for children of birth-order two and higher.

Socioeconomic conditions that provide incentives for individuals to delay childbearing, such as uncertainty in early adulthood, therefore indirectly increase the costs of children and have an indirect negative impact on the desired number of children. This effect is particularly strong in the context of inflexible labor markets and insufficient availability of day-care that characterizes Southern European lowest-low fertility countries. Moreover, this effect is likely to constitute one of the key reasons why postponement effects, which measure the reduction in completed fertility due to an additional year of delay in parenthood, are particularly strong in Southern Europe (Kohler et al. 2002), and it explains the "falling behind" of cumulated cohort fertility at higher ages in Italy and Spain as compared to countries such as the Netherlands or Denmark that have combined late childbearing without important reductions in cohort and period fertility (Billari and Kohler 2004).

In summary, the above discussion suggests that the postponement of fertility is not neutral with respect to the quantum of fertility. Quite to the contrary, there is a negative association, and the magnitude of this

a) Wages, child-costs, and compatibility of fertility and female labor force participation



b) Postponement effect and compatibility of fertility and female labor force participation

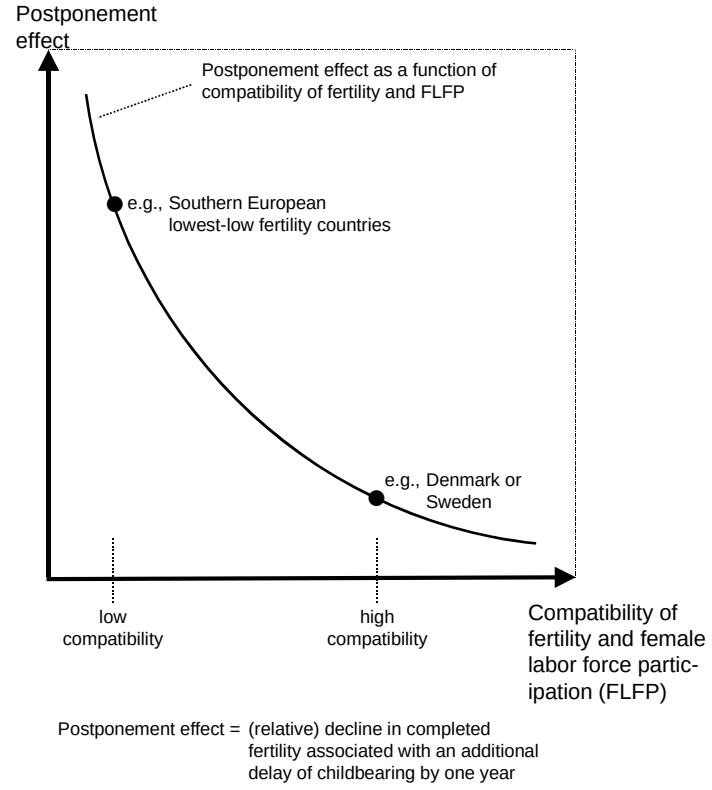


Figure 10: Postponement of fertility, wages and child-costs

negative effect of delayed parenthood on the quantum of fertility depends mainly on the compatibility of work and children (Figure 10b). On the one hand, countries with low compatibility between female labor force participation and childbearing, such as Italy and Spain, are subject to large postponement effects. These countries therefore experience substantial reductions in completed fertility that are causally related to delayed childbearing. On the other hand, in countries with a high compatibility of work and children, as for instance Denmark or Sweden, the increased costs of time-at-home associated with delayed parenthood can be partially accommodated by increasing the labor force participation. These countries are therefore likely to have a smaller postponement effect, and late childbearing in itself does not imply strong reductions in the quantum of fertility. The above analyses also suggest that differential postponement effects—as depicted in Figure 10b—constitute an important determinant of the differential reductions in second and higher order fertility in European countries as a result of delayed childbearing. Differences in these postponement-quantum interactions are therefore likely to be an important factor underlying the divergence of fertility levels between low and lowest-low fertility countries in Europe that we have emphasized in our introductory section.

3.5 The future of lowest-low fertility—some speculations

Three questions seem to be of central importance in assessing the future of lowest-low fertility. First, is lowest-low fertility a permanent, long-term phenomenon or is it merely a transient phenomenon that will disappear from the demographic landscape in the near future? Second, has lowest-low fertility already reached its lowest levels, or are future declines in fertility likely? Third, is the emergence of lowest-low fertility likely to be a wide-spread phenomenon, or will it remain restricted to regions such as Southern, Central and Eastern Europe, where this pattern is currently concentrated? Our evaluation of the future of lowest-low fertility indicates that this pattern is unlikely to be a short-term phenomenon that will quickly disappear from the demographic landscape. In our opinion, lowest-low fertility is likely to be a persistent pattern, at least for several decades. We expect that it prevails for a considerable period in the CEE countries with a *TFR* below 1.3. In addition, we believe that lowest-low fertility is likely to spread in the near future to several other countries that currently experience a *TFR* between 1.3 and 1.4 (see Tables 1–2). These European 'lowest-low fertility candidates', for instance, include Austria, Germany, Switzerland, and several Central/Eastern European countries like Poland, Lithuania, Slovakia, Russia and Croatia, comprising overall a population of 248 million people. It is also likely that fertility declines further in some countries that have already very low levels of fertility. In particular, several Eastern European countries and former Soviet Republics—have experienced *TFR* levels below 1.3 without a pronounced postponement of fertility (Figure 9). Once the pace of fertility postponement in these countries increases, it is likely to depress fertility levels further, perhaps even to *TFR* levels below 1.0. At the same time, the periods with the most rapid pace of postponement may have already passed in Southern European lowest-low fertility countries. Annual increases of the mean age at first birth may thus start to decline in the next years, resulting in a possible reversal of fertility trends in Italy and Spain. Some first signs of this pattern are already visible. In the last few years, the Italian and Spanish *TFR*s have recovered from their troughs of 1.20 (Italy, 1995–96) and 1.17 (Spain, 1996), and the total fertility rate in both countries *TFR* increased to 1.3 by 2003. This recovery has been associated with a decline in the pace of fertility postponement during the late 1990s (Figure 11). A similar reduction occurred in Western and Northern European countries with very advanced

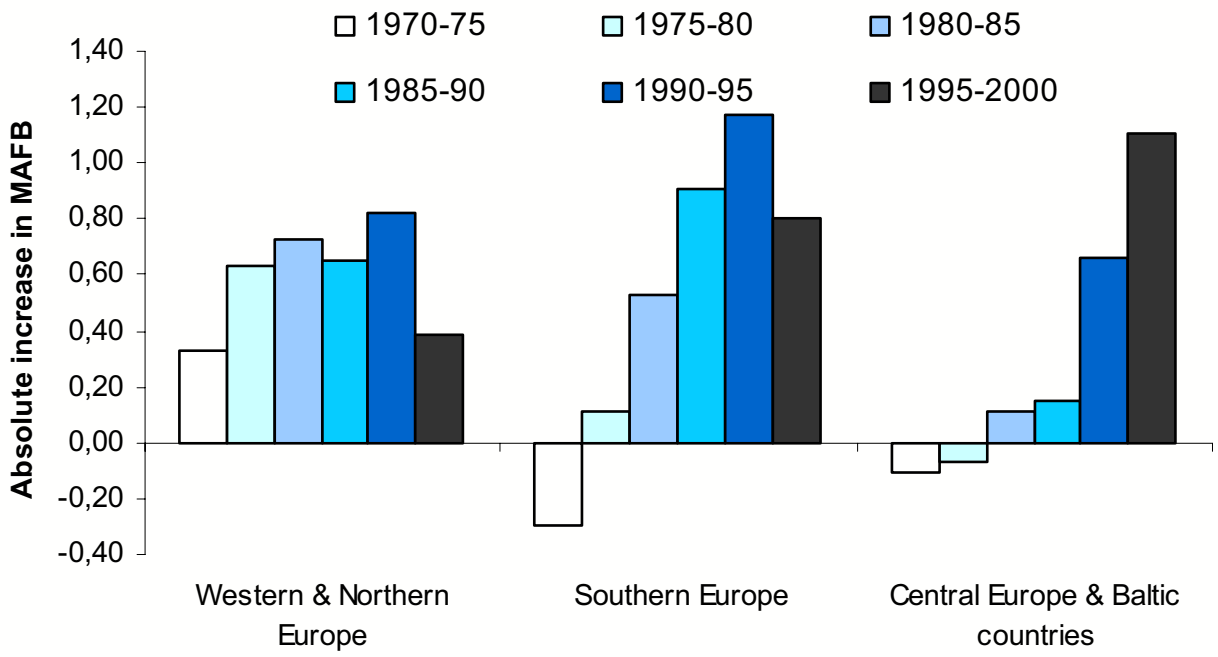


Figure 11: The increase in the mean age at first birth in European regions since 1975
Source: Sobotka (2004b)

ages of childbearing, while Central European and Baltic countries took the lead in the pace of postponement towards the late 1990s—albeit at a younger mean age at first birth than their Western, Northern and Southern European counterparts (Sobotka 2004b; see also Table 2).

In a global perspective it is in our opinion unlikely that lowest-low fertility remains restricted to Europe. Particularly South-East Asian countries might cross the lowest-low barrier. Two important countries, Japan and Korea, have joined the group of lowest-low fertility countries during 2000–03 (Tables 1–2; Suzuki 2003), and regions of Hong-Kong and Macao already experienced lowest-low fertility levels during the 1990s. These countries are potentially forerunners in a spread of very low fertility levels to South-East Asia. A recent study on low fertility in urban China (Zhao 2001) has also shown that the one-child policy reduced the total fertility rate of urban China to a level of 1.15 starting in 1980, and the Chinese urban population may already constitute one of the largest lowest-low fertility populations worldwide.

4 U.S. versus European fertility: what explains the difference?

In striking contrast to the projected population shrinkage due to low fertility and negative population momentum in Europe, the U.S. population continues to be characterized by rapid growth (Figure 3). Almost 33 million people were added to the U.S. population between 1990–2000, corresponding to a growth of 13% during the 1990s, making it the greatest absolute 10-year population increase in U.S. history. The majority of this growth in recent years is attributed to natural increase—that is, an excess of birth over deaths—while net immigration accounted for about 40% (Kent and Mather 2002). Moreover, population growth was concentrated in the South and West of the United States. Slow population growth on the state-level is primarily concentrated in the northern and eastern parts of the United States, and population decline during 1990–2000—mostly as a result of migration losses—occurred almost exclusively in some rural counties

Table 5: Projected Population of the United States, by Race and Hispanic Origin: 2000 to 2050

Population and race or Hispanic origin	2000	2010	2020	2030	2040	2050
TOTAL	282,125	308,936	335,805	363,584	391,946	419,854
White alone	228,548	244,995	260,629	275,731	289,690	302,626
Black alone	35,818	40,454	45,365	50,442	55,876	61,361
Asian Alone	10,684	14,241	17,988	22,580	27,992	33,430
All other races[a]	7,075	9,246	11,822	14,831	18,388	22,437
Hispanic (of any race)	35,622	47,756	59,756	73,055	87,585	102,560
White alone, not Hispanic	195,729	201,112	205,936	209,176	210,331	210,283

Notes: (*a*) Includes American Indian and Alaska Native alone, Native Hawaiian and Other Pacific Islander alone, and Two or More Races. *Source:* U.S. Census Bureau, 2004, "U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin," <http://www.census.gov/ipc/www/usinterimproj/>, Internet Release Date: March 18, 2004

stretching across the Great Plains states from the Mexican border to the Canadian border (U.S. Census Bureau 2001). The U.S. population is also projected to grow by almost 50% in the coming decades (Table 5), including a 7% growth of the white non-Hispanic population, a 188% increase in the Hispanic population and a 213% increase in the Asian population until 2050.

While the divergence of fertility trends between the U.S. and Europe is well-known, resulting also in predictions about a growing "demographic marginalization" of Europe within the global population (e.g., Demeny 2003; *The Economist* 2002a,b), it is somewhat surprising that the U.S. high level of current and projected fertility is not shared with Canada. Although the U.S. and its northern neighbor share a long border, overlapping cultures and similar socioeconomic contexts, Canada's total fertility rate was just 1.5 children per woman in 2000, compared with the United States' rate of 2.1. Canada's fertility is more in line with that of Europe, Japan, and Australia than that of the United States. The most recent divergence in fertility rates between the U.S. and its northern neighbor originates in the mid-1970s, when fertility in both countries declined to about 1.8. In contrast to the U.S., where the total fertility rate edged back up to 2.1, however, the Canadian rate never recovered from the 1970 baby bust. Moreover, while minority populations in the United States—especially Hispanic immigrants—have higher fertility rates than many of the minority groups in Canada, the higher fertility rates of blacks and Hispanics by itself explains only about 40 percent of the differences in total fertility rates (Belanger and Ouellet 2002; Kent and Mather 2002).

A frequently cited explanation for higher American fertility is that the United States is more racially and ethnically diverse than other more developed countries. The largest U.S. minority groups tend to have higher fertility than the white non-Hispanic majority, and foreign-born women tend to have higher fertility than U.S.-born women. Because minorities and immigrants make up an increasing share of the U.S. population, these racial and ethnic differences may keep fertility at the same relatively high level for decades to come. While correct, the racial and ethnic diversity of the U.S. explains just part of the fertility gap between the United States and other more developed countries. The *TFR* for non-Hispanic whites was about 1.8 for most of the 1990s, and inched up to 1.87 in 2000—lower than the *TFR* for Hispanics and blacks, but still higher

than in other more developed countries.

The key to understanding the relatively high U.S. fertility seems to lie in the relatively young age pattern of fertility, the only modest pace of fertility postponement and in the relatively high compatibility of childrearing and labor force participation (Morgan 2003; see also Tables 1–2). In terms of day care for children, the United States provides an example of business and volunteer organizations increasing the availability of child care, and with federal and state government playing a relatively minor role in the provision of child care services (Rindfuss et al. 2003). The use of child care is also viewed positively. Within the United States, for example, the proportion agreeing that "a preschool child suffered if the mother works" declined from 68% in 1977 to 48% in 1991 for the adult population, and declined from 73% in 1970 to 34% in 1991 for married women of childbearing age (Rindfuss et al. 1996). In West Germany in 1996, 76% of the adult population think small children suffer if their mother goes to work (European Commission 1998). The nature of the job market is also an important consideration. One strategy available to parents is to stagger their working hours so that at any given time only one parent is working. In the United States, among dual earner couples with children under 14, in 1997, 31% had at least one parent who worked some schedule other than a fixed daytime, Monday through Friday, schedule (Presser 1999). Related to working hours is the time when grocery and other stores are open. In many countries, there has been a shift towards stores staying open longer hours, thus making it easier for working parents to shop for the necessities of everyday life. In addition, based on a review of available time-use data for developed countries, Joshi (1998) reports that additional hours in paid work for women are counterbalanced by fewer hours spent on home production and, to a lesser extent, by declines in leisure and sleep. This pattern is particularly pronounced for the Nordic countries, the U.K., and the U.S. As a result of this high flexibility of the U.S. labor market, American women exit the labor market after the birth of the first child for much shorter periods than do German women or women in other low fertility countries (Diprete et al. 2003; see also Adsera 2004). Government transfers in countries such as Germany often make up for a substantial part of this difference, but the net costs of children remain tend to remain smaller for American women due to their exists from the labor market. Indeed, the greater cost and longer exits from the labor force are associated with lower rates of first birth in West Germany than in the United States. High unemployment and market rigidities also make the re-entry into the labor market after a maternity leave more difficult in Germany (or Europe) as compared to the U.S., and career-oriented women who are aware about these difficulties may chose not to have children—or have fewer children—rather than risking their careers through child-related disruptions in their labor market participation.

In summary, therefore, why is America different? The United States has a much higher total fertility rate than other developed countries. Recently, the United States has also experienced stronger productivity growth, much higher levels of immigration but lower life-expectancy than European countries. Other important differences are that Americans work more hours per week, take shorter vacations, tend to retire at older ages, and experience a much lower incidence of long-term unemployment. One might argue that the U.S. fertility trends simply trails behind Europe and Japan, and that the *TFR* in the U.S. will fall to historically low levels in future years, as occurred for so many wealthy countries in recent decades. However, the situation of the U.S. compared to most other high-income countries differs in at least two respects (Technical Panel on Assumptions and Methods 2003). First, population composition favors a higher fertility level, since some of the largest immigrant and minority groups within the U.S. have fertility levels that lie above than the national average. For example, the *TFR* among Hispanics in the U.S. was 2.75 in 2001, 35 percent

higher than the national average of 2.03. The *TFR* of 2.10 for non-Hispanic Blacks in the same year was slightly above the national value, while non-Hispanic Whites, Asians/Pacific Islanders, and American Indians had below-average fertility levels. Since Hispanics and non-Hispanic Blacks together comprise roughly a quarter of the U.S. population, their higher fertility levels are an important source of the nation's relatively high *TFR*. Second, fertility in the U.S. is relatively high for the population as a whole. Notably, the *TFR* of non-Hispanic White women, falling in a range from 1.77 to 1.87 during 1990–2001, exceeds the national average for most other high-income countries. While the heterogeneity of the U.S. population is therefore one factor that contributes to the relatively high level of fertility in the United States, it does not constitute the primary explanation. Instead, it appears that an overriding factor is their greater ability to combine work and childbearing, thanks to a variety of institutional factors. In general, women (and couples) are deterred from having children when the economic cost—in the form of lower lifetime wages—is too high. Compared to other high-income countries, this cost is diminished by an American labor market that allows more flexible work hours and makes it easier to leave and then re-enter the labor force. The importance of this situation is reflected in the positive relationship between measures of women's labor force activities and levels of fertility across wealthy countries in recent years (Figure 8). As a result, despite a lack of public financial support for families with children, it appears that the flexibility offered to individuals through the market in the U.S. facilitates integration of work and traditional family life.

5 Homeostatic responses to low fertility

In light of the striking contrast between European and U.S. fertility trends it is essential to ask which processes or policy interventions can revert Europe's low fertility. While policies targeted at increases the number of children born to women and couples are clearly a possibility, and these options are discussed in the next section, we first consider demographic mechanism that implies homeostatic forces and could potentially lead to increased quantum of fertility in the future. That is, is it possible that low fertility reverts itself without policy intervention? The leading economic model suggesting this possibility is the *Easterlin hypothesis* (Easterlin 1980) that predicts an inverse relation between cohort sizes and fertility level. In particular, the theory predicts that—under conditions of restrictive immigration—declining cohort sizes result in higher levels of fertility because young adults in small cohorts experience easier transitions into the labor market due to less competition. This aspect is potentially relevant for the European low fertility context since persistent lowest-low fertility leads not only to a rapid aging of the population with its well-known problems for social security and related transfer programs, but it also leads to substantially reduced relative cohort sizes. For instance, the first lowest-low fertility cohorts born early in the 1990s in Italy and Spain are about 41% smaller than the cohorts born 25 years earlier. In the next 10–20 years, when these small cohorts begin higher education, or begin to enter the labor and housing markets, they are likely to face substantially more favorable conditions than their 25-year older predecessors, who have contributed importantly to the emergence of lowest-low fertility in the 1990s. This positive effect of cohort size, first proposed by Easterlin in the context of the U.S. baby boom (for a summary of these arguments, see Easterlin 1980), seems particularly likely given the limited international migration into lowest-low fertility countries. These positive experiences in the labor and housing market during early adulthood may contribute to an increase in both period and cohort total fertility rates. Despite its speculative character, this effect may nevertheless be

important since it is likely to be one of the few demographic factors with homeostatic implications that can lead to a reversal of lowest-low fertility.

6 Policy responses to low and lowest-low fertility

Government policies are a possible alternative to the—somewhat speculative—self-correcting mechanisms discussed in the previous section. Various terms are used to describe governments' attempts to influence demographic developments such as population aging. Most commonly, these government interventions are referred to as "population policy". Such policy can include measures that are designed to have an impact on the population structure, of which birth rate or fertility rate is the most prominent indicator. Many authors also employ the term "family policy" to emphasize that government policies often do not aim at specific goals in terms of the population size and structure, but are concerned with family well-being and resultant activities that are directed towards families with children. Although the policy objective of both terms seem to differ considerably—family on the one hand and population on the other—the actual definitions of family policy and population policy do not make clear distinctions. Since family policies are an integral part of welfare-state policies, it is also useful to draw on the literature on European welfare-state regimes in reviewing and classifying family-policy set-ups in Europe. According to Esping-Andersen (1999), European countries can be grouped into four distinct welfare-state regimes according to the intentions of their social policies and the principles on which they are based *universalistic welfare states* (the Nordic countries), *conservative welfare states* (continental European countries), *liberal welfare states* (Anglosaxon countries), and—somewhat contested—*Southern-European welfare states* (Mediterranean countries). Universalistic welfare states are characterized by welfare-state policies that are targeted at individual independence and social equality between individuals (not families). Conservative welfare states direct their welfare-state policies towards status maintenance and the preservation of traditional family forms, and they often rely heavily on familialism, that is on the family as a provider of welfare. Liberal welfare states encourage market-based individualism through minimal social benefits and though subsidizing private and marketized welfare schemes, and social benefits are usually means-tested and poverty-related. The Southern European welfare states are often considered part of the conservative welfare-state regimes; but their stronger familialism merits that they are viewed as a separate welfare-state regime (Neyer 2003).

While different welfare regimes embrace very different philosophies and fertility-related welfare policies, the different regimes are only weakly associated with differential fertility levels in Europe: the Nordic countries with their universalistic welfare regimes tend to have relatively high fertility in Europe, and the Southern European welfare regime is associated with lowest-low fertility. The Anglosaxon welfare regime is associated with moderately high fertility, while the conservative welfare regimes comprise a wide spectrum of fertility levels including ranging from Germany (*TFR* = 1.31 in 2001) to France (*TFR* = 1.89 in 2002).

The largest pressures to respond with policy changes to low and lowest-low fertility currently exist in the conservative and Southern European welfare regimes. The specific population or family policies that have been proposed in this context can be classified as follows (Grant et al. 2004): (*a*) *preventive policies*, aimed at affecting the demographic behaviors that are believed to lead to adverse outcomes; these preventive policies can be indirect, such as economic policies, gender policies and education policies, or direct, such as migration policy, family support, reproductive health policy and family-friendly employment policies;

and (*b*) *ameliorative policies* aimed at accommodating or ameliorating the consequences of low fertility, population decline and population aging, including for instance social security reform, labor force policy, health care policy or policies towards the elderly.

Various preventive and ameliorative policy responses to low and lowest-low fertility have been widely discussed and are often subject to a heated debate. A detailed discussion of these policies is beyond the scope of this paper. Instead, we focus our discussion on two specific subsets of the overall policy responses to population aging in Europe: immigration and policies directed towards increasing the level of fertility.

6.1 Immigration

European countries have depended on immigrants to supply labor in times of economic prosperity for a long time. In recent years while removing restrictions to mobility within the European Union, however, European governments have tightened controls over immigration from outside the EU. This has lead to various complex and often uncoordinated systems of incentives and disincentives to influence international flows of population. Contemporary immigration policy in Europe is thus aimed at restricting the number of new immigrations and limiting the perceived "social discohesion" that is thought to come with them; such policies usually have no direct population objectives (Grant et al. 2004). The impact of these policies on population dynamics, nonetheless, is relevant and significant and have resulted in quite distinct international migration patterns across European countries.

International migration policies and international migration patterns are almost certain to change in response to population aging and population decline in Europe. At the same time, does increased immigration constitute a policy response that ameliorates the consequences of very low fertility with respect to (1) population growth, (2) working-age population growth and (3) changes in the support ratio? The United Nations in their (2000) report on *replacement migration* concluded that the potential of immigration to substitute for domestic births is rather limited. Replacement migration refers to the international migration that would be needed to offset declines in the size of population, the declines in the population of working age, as well as to offset the overall aging of a population. A key finding of the UN report is that if retirement ages remain essentially where they are today, increasing the size of the working-age population through international migration is the only short- to medium-term option to reduce declines in the support ratio. However, such a policy would not reverse the process of aging.

The first column in Table 6 shows the numbers of migrants assumed in the UN medium variant population projection (see also Figures 3–5). For example, the total number of migrants for the United States for the fifty-year period is 38 million; and the average annual number is 760 thousand. For Europe, the total immigration is 18.8 millions, or 376 thousand annually. Except for the United States, the numbers of migrants needed to maintain the size of the total population (second column in Table 6) are considerably larger than those assumed in the medium variant of the UN projections. In Italy, for example, the total number of migrants is 12.6 million (or 251 thousand per year) versus 0.3 million (or 6 thousand per year) in the medium variant. For the European Union, the respective numbers are 47 million versus 13 million (or 949 thousand per year versus 270 thousand per year). In order to keep the working-age population (15 to 64 years) at a constant size, the numbers of migrants are even larger (third column in Table 6). In Germany, for instance, the total number of migrants is 24 million (or 487 thousand per year) in in order to maintain a constant working age population versus 17 million (or 344 thousand per year) that are necessary for main-

Table 6: Replacement migration in Europe: total immigrants for period 2000–2050 and average annual number of immigrants (in 1,000) for different replacement goals

Scenario	1	2	3	4
	Medium variant	**Constant total population**	**Constant age group 15–64**	**Constant ratio of 15–64 to 65 years or older persons**
A. Total number, in 1,000, for period 2000–2050				
France	325	1,473	5,459	89,584
Germany	10,200	17,187	24,330	181,508
Italy	310	12,569	18,596	113,381
Russian Federation	5,448	24,896	35,756	253,379
United Kingdom	1,000	2,634	6,247	59,722
United States	38,000	6,384	17,967	592,572
Europe	18,779	95,869	161,346	1,356,932
European Union	13,489	47,456	79,375	673,999
B. Average annual number, in 1,000, for period 2000–2050				
France	7	29	109	1,792
Germany	204	344	487	3,630
Italy	6	251	372	2,268
Russian Federation	109	498	715	5,068
United Kingdom	20	53	125	1,194
United States	760	128	359	11,851
Europe	376	1,917	3,227	27,139
European Union	270	949	1,588	13,480

Source: United Nations (2000)

taining a constant population size. Expressed in terms of migrants per million inhabitants in 2000, Italy requires the highest number of immigrants, with 6,500 annual immigrants per million inhabitants, in order to maintain its working-age population, followed by Germany, with 6,000 annual immigrants per million inhabitants; the United States would require the smallest number of immigrants, approximately 1,300 per million inhabitants. Finally, the number of immigrants that are necessary to keep the ratio of of 15–64 to 65 years or older persons (= *support ratio*) constant are extraordinarily large (fourth column in Table 6). For the European Union, the total number of migrants in this scenario is 674 million (or 13 million per year), and for Italy it is 113 million (or 2.3 million per year).

Most analysts consider the levels of immigration that are required to keep the population-size, the size of the labor force or the support ratio at its constant level as unrealistic for Europe. In summary, therefore, immigration to Europe—even if its level increases in future decades—is unlikely to prevent the population decline and rapid population aging. The aging of the total population, and decreases in the number of people of working age, thus cannot be stopped through immigration, particularly in European countries with very low fertility levels. At the same time, it seems likely that increases in immigration levels—even if they do not prevent population aging and decline—are likely to be a widespread response of European countries to low fertility, combined with other measures to increase the level of fertility (see below). Furthermore, internal migration within an enlarging European Union is likely to become more important in this context; in particular, internal EU migration is likely to contribute to population aging and decline in sending countries, as well as ameliorate population aging and decline in receiving countries. While the most important sending countries of migrants within the European Union also experience declines in the population size and are unlikely to be long-term sources of migrants, the potential future joining of Turkey to the European Union is likely to substantially affect these migration streams due to Turkey's relatively young age structure and the substantial projected population growth.

6.2 Policies to influence fertility

The only viable long-term strategy to limit the extent of population aging and the decline of the population size will be an increase in the level of fertility. Several such policies are already in place—although not always with an explicit goal to increase fertility (Grant et al. 2004). In particular, especially in Western Europe, governmental efforts to affect fertility have been generally implicit policy measures to steer family formation decisions with financial incentives (e.g., tax exemptions), or family-friendly facilities (e.g., childcare facilities). Explicit population policies directed at increasing fertility, also called pronatalist policies, are less common in European countries. In the past they were widely implemented as part of a strict procreative policy in the former socialist regimes of Eastern European countries; currently, explicit policies intended to boost fertility (or at least to prevent it from falling) are pursued in some countries such as France.

Despite the small number of countries that pursue explicit pronatalist policies, a growing number of countries in Europe view their low birth rates with the resulting population decline and aging to be a serious crisis, jeopardizing the basic foundations of the nation and threatening its survival (Chamie 2004; Stark and Kohler 2002, 2004). In attempting to raise birth rates, governments are thus increasingly seeking to address the underlying causes of low fertility and adopt polices, programs and incentives to encourage couples, in particular women, to increase their child bearing. Maternity and paternity leave, childcare, after school programs, part-time employment, job security, cash allowances and other financial incentives are

Table 7: Government views on the level of fertility and policies on fertility level

	number of countries	Percentage			
		Too low	Satisfactory	Too high	Total
Government views on the level of fertility					
1976	29	24	76	0	100
1986	29	31	69	0	100
1996	43	42	56	2	100
2003	43	63	37	0	100
Policies on the level of fertility					
		Raise	Maintain	Lower	No intervention
1976	29	24	24	0	52
1986	29	28	21	0	52
1996	43	37	9	2	51
2003	43	47	9	0	44

Source: United Nations (2004)

among the measures adopted or being carefully reviewed by governments. These concerns are illustrated by several magazine and newspaper articles quoting leading national politicians (all quotes are cited in Chamie 2004): (*a*) France offers €800 reward for each new baby: "The French Prime Minister, Jean-Pierre Raffarin, announced last week that a bonus of €800 (£560, $895) will be awarded mothers for each baby born after 1 January 2004. The bonus is part of a series of measures to encourage families to have more children." (*British Medical Journal* 10 May, 2003). (*b*) Italy offers cash to boost its birth rate: "The 2004 budget package includes a one-time 1,000 euros ($1,200) payment to Italians on the birth of their second child, a measure set to run from December 1 until the end of 2004. . . . Mayor Rocco Falivena (of Laviano) digging deep into town coffers is offering couples 10,000 euros ($11,900) for every newborn baby." (*Reuters* 7 December 2003). (*c*) In address to Estonians', President calls on citizens to make more babies: "Worried about a declining population, Estonia's president has urged the country's 1.4 million residents to make more babies. 'Let us remember that in just a couple of decades the number of Estonians seeing the New Year will be one-fifth less than today,' President Arnold Ruutel said in a speech broadcast live on national television Wednesday." (*New York Times* 2 January 2003).

A more detailed look at the perception of national fertility levels is provided in Table 7. Between 1976 and 2003 the proportion of European countries that view their level of fertility as *too low* has increased from 24% to 63%, reflecting a shift from a satisfactory assessment of fertility patterns. The proportion of countries that have a policy to raise fertility levels increased from 21% to 44%. The countries that report having a policy of "no intervention" include Germany, Italy, Norway, Portugal, Spain and Switzerland; these countries, however, do have family or social policies that may lead to higher fertility, although they are not labeled pronatalist. The remaining countries have implemented a broad range of policies and measures to raise fertility levels.

Looking forward, McDonald (2000b) has proposed the following comprehensive "toolbox" of public

policies to impact low and lowest-low fertility:

- Financial incentives
  - *Periodic cash payments*, usually in the form of regular payments to parents for each child.
  - *Lump sum payments or loans*, including payments at the time of birth of a baby (baby bonus, maternity benefit), at the time a child starts school or at some other age.
  - *Tax rebates, credits or deductions* based on the presence of a child.
  - *Free or subsidized services or goods*, including education at all levels, medical and dental services, public transport, and recreation services such as sporting, entertainment, leisure or artistic activities.
  - *Housing subsidies*, including periodic cash payments such as housing benefits, lump sum cash payments as first-time home-buyer grants or mortgage reductions at the birth of each child, tax rebates or deductions for housing costs, or subsidies to housing-related services.
- Work and family initiatives
  - *Maternity and paternity leave*, including the right of return to a position following leave related to the birth of a child.
  - *Child care*, including the provision of free or subsidized child care as part of the family-friendly employment policies, including for those who are not employed.
  - *Flexible working hours* and short-term leave for family-related purposes.
  - *Anti-discrimination legislation* and gender equity in employment practices.
- Broad social change supportive of children and parenting
  - *Employment initiatives that improve the job prospects of young men and women*, especially also in the part-time sector.
  - *Child-friendly environments*, including traffic calming, safe neighborhood policies, public recreational facilities such as playgrounds, provision for children in places of entertainment and in shopping centers in order to build a child-friendly environment.
  - *Gender equity*, including non-gender specific workplace policies, gender-neutral tax-transfer policies in social insurance, support of workers with family responsibilities irrespective of gender, removal of institutional remnants of the male breadwinner model of the family, acceptance of fathers as parents by service providers and more general recognition and support to fathers as parents.
  - *Marriage and relationship supports*, including the provision of greater encouragement in the formation of relationships, relationship education, relationship counseling, and possibly economic incentives to marry (e.g., through housing assistance).
  - *Development of positive social attitudes towards children and parenting*, including a clear and simple message that people desiring children will be supported by society without creating inequities to the childless, voluntary or involuntary.

In addition to these policies, there are many alternative policy suggestions aimed at increasing fertility levels. Policy proposals are abundant, albeit not always realistic in the face of limited government resources. Recent examples that expand beyond the above "toolbox", for instance, include tempo policies that aim at reducing the pace of fertility postponement, or perhaps even reversing the trend (Lutz et al. 2003; Lutz and Skirbekk 2004), a proposal to restructure the Italian system of transfers so that each newborn child becomes

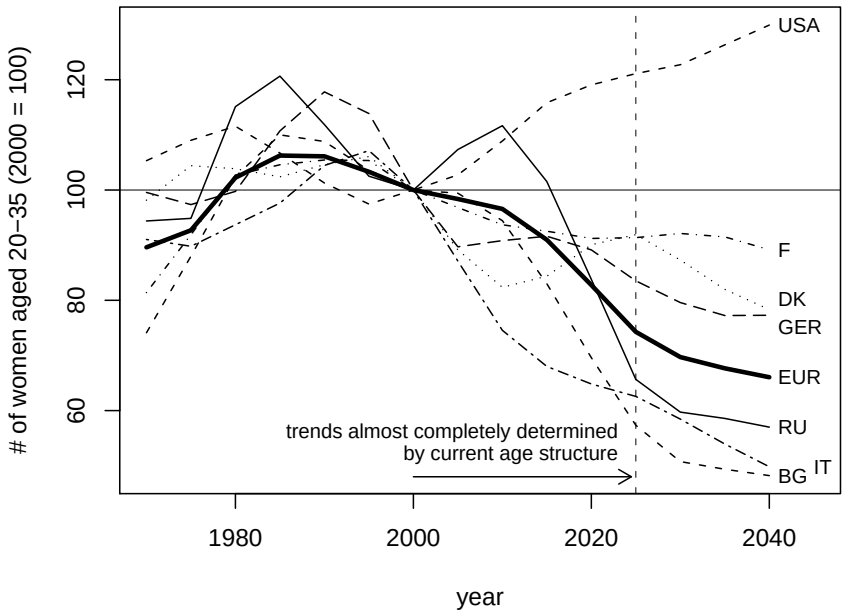


Figure 12: Number of women in primary ages of childbearing (ages 20–35) for Europe, USA, Bulgaria, Denmark, France, Germany, Italy and the Russian Federation (year 2000 = 100, based on UN medium projection)

an "account holder" that receives and gives transfers throughout life (Livi-Bacci 2004), and linking fertility and economic security at old age (Demeny 1987).

The above policy proposals to impact fertility are comprehensive, ambitious and potentially also controversial in terms of a country's welfare state philosophy. Elements of these proposals, however, will almost certainly be implemented, or, if already implemented, extended in European low fertility countries. Nevertheless, when assessing the impact on future trends of population aging and decline, it is important to keep an essential caveat of these policies in mind: even if some of the above policies are effective in terms of increasing individual's and couple's fertility, however, it is important to recognize that future declines in the number of women (and couples) in childbearing ages limit the impact of these population policies on the number of births and population aging (see also Demeny 2003). Figure 12, for instance, shows the number of women in primary ages of childbearing (ages 20–35) for Europe, USA, Bulgaria, Denmark, France, Germany, Italy and the Russian Federation (based on UN medium projection, year 2000 = 100). In Europe, and in all European countries included in Figure 12, the number of women in primary childbearing ages is projected to decline between 2000 and 2040. This decline is close to 35% for Europe, and it exceeds 50% in Italy and Bulgaria. Moreover, the decline until about 2025 is almost completely determined by the current age structure of the population (except for migration). The substantial declines in the number of women in childbearing ages in Europe and in lowest-low fertility countries implies that the annual number of births would continue to decline even if fertility policies resulted in a large increases in the number of children born per women. The *negative population momentum* (Lutz et al. 2003) occurs because low fertility levels result in successively smaller birth cohorts, and past periods of low and lowest-low fertility are already man-

Table 8: Qualitative findings from empirical studies on the impact of policies on fertility

	Total fertility rates	Timing of births	Specific birth order	Age of mothers	Other individual characteristics
Family cash benefits	Small positive effects in most countries		Contradictory results on whether effects of policies are larger for first or subsequent births	Small positive effects, or contradictory results, on the effects of welfare benefits on teenage births (but evidence limited to few countries)	Some evidence that effects of policies differ among ethnic groups
Tax policies	Positive effects in the US and Canada	Larger effects of policies on the timing of births than on completed fertility			
Family-friendly policies	Positive effect of part-time and flex-time work Weak or contradictory effects of maternity leave		Small or no effect on probability of having a first child		
Child care availability	Positive effect, weak in some countries				Some evidence that effects of child-care availability and costs differ according to the employment status of mothers

Source: Sleebos (2003)

ifested in the population age structure in 2000 (see Figures 4–5). Girls that were not born during a period of low fertility in the past will not become mothers 20–35 years later—the negative population momentum thus reinforces the effect of low fertility. As a result of this negative momentum that is already built into the current population age structure, fertility policies—even if effective on the individual level—potentially have only a limited effect on slowing population aging or on reversing the decline of the population size.

6.3 Evaluation of current population policies

Several evaluations of the effect of family and population policies on the level of fertility have been conducted in recent years (e.g., Gauthier 1996, 2002; Gauthier and Hatzius 1997; Grant et al. 2004; Pampel 2001; Sleebos 2003), although virtually all of these studies fall short of a sophisticated policy evaluation based on experimental studies. Keeping this important limitation in mind, there seems to be a consensus among studies that policies have only a moderate and long-term effect. For instance, Sleebos (2003) concludes: (*a*) The impact of any specific policies on women's or couple's reproductive decisions depends on a broad range of factors, and detailed studies are necessary to evaluate these policies. A qualitative assessment, based on the currently available empirical evidence, of the effectiveness of various policies for changing fertility behavior in OECD countries is given in Table 8. (*b*) Some studies have documented that the impact of family policies is more significant on the timing of fertility rather than on the total number of children achieved over a full reproductive cycle (Barmby and Cigno 1990; Ermisch 1988). (*c*) Several of the studies reviewed in Sleebos (2003) investigated the effect of of family cash benefits on the total fertility

rates, suggesting a weak but positive relation. The estimated estimated impact of policies, however, is small. Gauthier and Hatzius (1997), for instance, estimate that a 25% increase in family allowances would increase fertility rate by about 0.6% in the short-run, and by about 0.4% in the long-run—that is, an increase of the total fertility rate of 0.07 children per woman. (*d*) Several studies for Austria, Canada, Hungary, Italy, the Netherlands, Norway, Swedish and the United States all conclude that work/family reconciliation measures, such as maternity or parental leave and childcare subsidies, have a positive impact on fertility. The estimated effect is however also small. Hyatt and Milne (1991), for instance, estimated that 1% increase in the real value of maternity benefit would increase total fertility rate in Canada between 0.09 and 0.26%. In contrast, Gauthier and Hatzius (1997), report that neither the duration nor the benefits provided by maternity leave explain much of the variation in total fertility rates across OECD countries. Availability of jobs suited to the needs of mothers also favors fertility. Castles (2003) reports a positive link between the percentage of employees working flexi-time and total fertility rates across OECD countries. Del Boca (2002) also finds a positive relationship between availability of part-time jobs and fertility rates in Italy, and Adsera (2004) finds that a large share of public employment, by providing employment stability, and generous maternity benefits linked to previous employment, such as those in Scandinavia, boost fertility of the 25–34 year old women. (*e*) Results on the impact of child care on total fertility rates also vary, partly depending on the form of child care. Some studies have documented a strong positive relationship between total fertility rates and formal childcare availability (e.g., Castles 2003; Rindfuss et al. 2004), in particularly for children below the age of three, while other analyses have found no effect of childcare availability on the decision to have a first child (Andersson et al. 2004; Hank and Kreyenfeld 2003). These inconsistent findings about the availability of childcare may in part be due to a lack of control in existing studies for the determinants of childcare provision. In an important recent study that addresses this limitation, Rindfuss et al. (2004) use fixed-effect analyses of child care availability data from 1973 to 1997 for Norway's 435 municipalities, and show a strong, statistically significant, positive effects of child care availability on the transition to motherhood. In addition, utilizing a "natural experiment" provided by the introduction of a policy in Spain that provides working mothers with a monthly childcare benefit amounting to one hundred Euros for each small child, Sánchez-Mangas and Sánchez-Marcos (2004) show that the introduction of this policy resulted in an increase in the labor participation of mothers with small children. For low and medium educated women, for which the policy seems to be most effective, more than 40% of the 3.5 percentage point increase in female labor force participation during 2002–03 can be attributed to the policy change.

In summary, the studies reviewed in Sleebos (2003) provide mixed conclusions as to the effects of various policies on fertility behavior. Similar conclusions were obtained also in other evaluations of family/population policy effectiveness (Gauthier 1996; Grant et al. 2004). On balance, Sleebos (2003) concludes that the evidence supports a weak positive relation between reproductive behavior and a variety of policies. Moreover, an important conclusion from the study is that policy measures which may potentially affect reproductive behavior will manifest their influence only in the long-term. Thus, a consistent application of different measures over time is likely to be more important than abrupt introduction of large pro-natalist measures, which could be reversed at some later stage. Moreover, policies targeted at an increased compatibility between childbearing and labor force participation, as well as policies aimed at reducing uncertainty in early adulthood due to high unemployment and related factors, are most promising in our opinion based on the theoretical framework and empirical evidence provided in this paper (Sections 3 and 6.2–6.3). Finally,

consistent also with our assessment of policy effectiveness and the existence of a negative population momentum, Sleebos (2003) concludes that policy-makers should not expect too much from pronatalist policies, and knowledge about the effects of policies and their complementarities in many areas is still too limited to guide the design of cost-effective interventions.

7 Conclusions

Low and lowest-low fertility is likely to be a considerable challenge for many developed countries in the next decades. The analyses in this paper allow us to draw some first conclusions about the causes and implications of, and potential policy responses to, low and lowest-low fertility in Europe. First, our portrait of contemporary European fertility patterns identifies a systematic pattern of lowest-low fertility that is characterized by a rapid delay of childbearing, a low progression probability after the first child (but not particularly low levels of first-birth childbearing), a "falling behind" in cohort fertility at relatively late ages (in Southern Europe) and a reversal in the relative ranking of lowest-low fertility countries in a European comparison of total fertility levels (Billari and Kohler 2004). At the end of the 1990s, therefore, there emerges a clear clustering of European nations separating them into countries with low fertility levels and countries with lowest-low fertility, and this clustering is mirrored in many fertility-related behaviors such as women's labor force participation, the diffusion of cohabitation or out-of-wedlock childbearing and other dimensions.

Second, lowest-low fertility countries are themselves heterogeneous and cluster into two distinct patterns. On the one hand, Southern European lowest-low fertility countries, including foremost Italy and Spain, exhibit also latest-late home-leaving behavior, a limited spread of non-marital cohabitation, a low share of extramarital births, a limited diffusion of divorce, and a relatively low share of women participating in the labor force. They also exhibit a more marked postponement of first births and a lower recuperation of fertility at higher ages. On the other hand, Central and Eastern European countries exhibit relatively earlier household independence, union formation. They also they have higher non-marital fertility and divorce rates, and first births take place earlier than in Southern European lowest-low fertility countries.

Third, we have argued in the previous sections that lowest-low fertility, defined as a period *TFR* below 1.3, is caused by a combination of the following demographic and socioeconomic factors: (*a*) *Socioeconomic incentives to delay childbearing* that make postponed fertility a rational response to high economic uncertainty in early adulthood, increased returns to education, shortages in the labor market and similar factors. (*b*) *Social feedback effects on the timing of fertility* that reinforce the adjustment of individual's desired fertility to socioeconomic changes. In particular, social feedback effects can give rise to *postponement transitions* that lead to rapid, persistent and generally irreversible delays in childbearing across a wide range of socioeconomic conditions. (*c*) *Institutional settings*, characterized by labor market rigidities, insufficient child-care support and a prevalence of relatively traditional gender roles, favor an overall low quantum of fertility and lead to reductions in completed fertility that are causally related to the delay in childbearing. The postponement of fertility therefore does not only lead to a delayed pattern of childbearing. It also implies important negative effects on the quantum of fertility and on completed fertility, and this effect is particularly strong in the institutional context that is characteristic of lowest-low fertility countries. While the above factors are not necessarily unique to lowest-low fertility countries, we believe that lowest-low fer-

tility countries are characterized by a combination of all four factors in a particularly pronounced fashion. Lowest-low fertility is therefore the outcome of an interaction of demographic and behavioral factors that each in itself would lead to lower fertility. In combination and interaction, however, these factors reinforce each other and lead to lowest-low fertility. It is also noteworthy that substantial childlessness has not been a driving force leading to reduced fertility in the group of countries currently classified as lowest-low fertility countries.

Fourth, the emergence of lowest-low fertility during the 1990s has been accompanied by a disruption or even a reversal of many well-known patterns that have been used to explain cross-country differences in fertility patterns. For instance, the cross-sectional correlations European countries between the total fertility level on the one side, and the total first marriage ratio, the proportion of extramarital births and the female labor force participation ratio on the other side have reversed during the period from 1975 to 2001/02. In 2002, there is also no longer evidence that divorce levels are negatively associated with fertility levels. Hence, there are crucial changes in the relationship between traditional determinants of fertility—such as marriage, divorce, home-leaving and women's labor force participation—and fertility *before* and *after* the emergence of lowest-low fertility, and perhaps most importantly, there is a clear indication that a high prevalence of marriage and institutionalized long-term partnership commitments are no longer associated with higher fertility in cross-sectional comparisons. While the detailed analysis of the determinants of this reversal is beyond the scope of the present paper, one fundamental cause can probably not be disputed: The reversal in cross-sectional associations between fertility and related behaviors is in part due to the different demographic factors driving fertility change. Initially, the decline towards low fertility has been importantly related to stopping behavior, that is, a reduction of higher parity births. More recently, the postponement of fertility—particularly for first births—has emerged as a crucial determinant of differences in fertility levels among developed countries.

Fifth, the United States with its relatively high fertility near replacement levels, its high levels of immigration and its substantial projected population growth. While the high U.S. fertility is commonly attributed to the high fertility of Hispanic and African American sub-populations, these factors can not provide an explanation for the "curiously high" fertility of the U.S. Instead, the key to understanding the relatively high U.S. fertility therefore lies in the relatively young age pattern of fertility and the only modest pace of fertility postponement as well as a relatively high compatibility between childrearing and labor force participation or other opportunities/constraints on fertility. This high compatibility is not achieved through an extensive welfare state targeted at the family and children, but through a market-based system combining a very flexible labor market, flexible work schedules, privately supplied day-care and high female labor force participation.

Sixth, the policy options available to European low and lowest low fertility countries are limited. The existing empirical evidence provides mixed conclusions as to the effects of various policies on fertility behavior. On balance, that the evidence supports a weak positive relation between reproductive behavior and a variety of policies, but policy measures which may potentially affect reproductive behavior will manifest their influence only in the long-term. Policy measures that aim to make women's participation in the formal labor force compatible with childrearing are in our opinion among the most promising alternatives. The effectiveness of such measures, however, is likely to be limited due to a negative population momentum that results from decades of below-replacement fertility in many parts of Europe since the 1960s and 1970s. Even if policies are effective in raising women's or couple's fertility, and even if levels of immigration into

Europe increase, a loss of demographic weight within the global population, a decline in the population size during the coming decades and a substantial aging of the population are therefore safe predictions for the Europe of the twenty-first century (Demeny 2003). It is clear that current social and economic institutions are not sustainable in light of these trends, and individual's life-courses already have been—and will continue to be— transformed in response to reductions in fertility and increases in longevity. Adjusting to the demographic reality of the 21st century will therefore constitute a major challenge for policy makers and companies on the one, and for individuals and families on the other side. Whether the adjustment to these trends can be successful, and whether these trends lead to a reduced well-being of individuals if appropriate policies are implemented, is still an open question.

Table A.1: Total fertility, total first marriage ratio (*TFMR*), total divorce ratio (*TDR*) and proportion of extra-marital births in Europe

	Total fertility		Total first marriage ratio		Total divorce ratio		Proportion of extra-marital births	
	1975	2002	1975	2002	1975	2002	1975	2002
Andorra (And)	–	1.36	–	–	–	–	–	–
Armenia (Arm)	2.79	1.21	–	0.37[i]	0.15	0.06	2.80	13.20
Austria (Aus)	1.83	1.40	0.75	0.50	0.20	0.45	13.50	33.80
Azerbaijan (Az)	3.92	1.58	0.83	0.57	–	0.11	5.20	7.60
Belarus (Bel)	2.20	1.22	–	0.68	–	0.50[i]	7.40	21.40
Belgium (Bel)	1.74	1.62	0.89	0.46	0.16	0.54	3.10	0.21[e]
Bosnia and Herzegovina (Bos/Herz)	2.38	1.23	0.69[b]	–	–	–	5.60	10.60
Bulgaria (Bul)	2.22	1.21	1.00	0.47	0.15	0.21	9.30	42.80
Croatia (Cro)	1.92	1.34	0.82	0.69	0.13	0.16	4.90	9.60
Czech Republic (Cze)	2.40	1.17	0.99	0.48	0.30	0.46	4.50	25.30
Denmark (Dk)	1.92	1.72	0.67	0.73	0.36	0.47	21.70	44.60
Estonia (Est)	2.04	1.37	0.94	0.42	0.50[b]	0.48	15.70	56.30
Finland (Fi)	1.68	1.72	0.70	0.64	0.26	0.50	10.10	39.90
France (Fra)	1.93	1.89	0.86	0.59	0.17	0.38[i]	8.50	43.70[i]
Georgia (Geo)	2.52	1.42	0.99[b]	0.32[i]	–	0.08	0.20	45.90
Germany (Ger)	1.48	1.31	0.81	0.54	0.25	0.42[i]	8.50	25.00[i]
Greece (Gr)	2.32	1.25[i]	1.16	0.52[h]	0.05	0.16[g]	1.20	4.30[i]
Hungary (Hun)	2.35	1.30	1.00	0.47	0.24	0.42	5.60	31.40
Iceland (Ice)	2.65	1.93	0.79	0.58[i]	0.26	0.40[h]	33.00	62.30
Ireland (Ire)	3.43	2.00	0.94	0.59[f]	–	–	3.70	31.10
Italy (It)	2.21	1.27	0.95	0.62	0.03	0.12[i]	2.60	9.70[h]
Latvia (Lat)	1.97	1.24	1.01	0.44	0.52	0.37	11.70	43.10
Lithuania (Lit)	2.18	1.24	1.01	0.54	0.42[a]	0.41[i]	6.20	27.90
Luxembourg (Lux)	1.55	1.63	0.80	0.50	0.10	0.51	4.20	23.20
Macedonia (Mac)	2.71	1.77	0.86	0.77[i]	0.09	0.09	6.60	10.70
Malta (Mal)	2.17	1.46	–	0.73[i]	–	–	1.10[b]	15.00
Moldova (Mol)	2.52	1.21	1.11[b]	0.58	–	0.39	8.00	20.50[h]
Netherlands (NL)	1.66	1.73	0.83	0.59	0.19	0.37	2.10	29.10
Norway (Nor)	1.98	1.75	0.80	0.47	0.21	0.46	10.30	50.30
Poland (Pol)	2.26	1.24	0.93	0.57	0.15	0.18	4.70	14.40
Portugal (Por)	2.75	1.47	1.39	0.66	0.02	0.39	7.20	25.50
Romania (Ro)	2.60	1.26	0.97	0.66	0.20	0.20	3.50	26.70
Russian Federation (Rus)	1.97	1.32	1.03	0.60[d]	0.38	0.43[d]	10.70	29.50
Serbia and Montenegro (Serb/Mont)	2.33	1.71[i]	0.81	0.66[i]	0.12	0.14[i]	9.90	20.20[i]
Slovak Republic (Sk)	2.53	1.19	0.94	0.50	0.18	0.33	5.20	21.60
Slovenia (Sn)	2.17	1.21	0.99	0.43	0.15	0.25	9.90	40.20
Spain (Sp)	2.80	1.25	1.05	0.59[i]	0.04[c]	0.15[e]	2.00	17.70[h]
Sweden (Swe)	1.77	1.65	0.63	0.49	0.50	0.55	32.80	56.00
Switzerland (Swi)	1.61	1.40	0.65	0.65	0.21	0.40	3.70	11.70
Ukraine (Ukr)	2.02	1.10	–	–	0.34	0.38	8.80	19.00
United Kingdom (UK)	1.81	1.64	0.87	0.54[h]	0.30	0.43[f]	9.00	40.60

Notes: *a* = 1970, *b* = 1980, *c* = 1981, *d* = 1996, *e* = 1997, *f* = 1998, *g* = 1999, *h* = 2000, *i* = 2001. *Source:* Council of Europe (2003).

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