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Pathways to Low Fertility: European Perspectives

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PREFACE

The Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat organized an Expert Group Meeting on "Fertility, Changing Population Trends and Development: Challenges and Opportunities for the Future" at the United Nations Headquarters in New York on 21 and 22 October 2013. The meeting was convened to inform substantive preparations for the forty-seventh session of the Commission on Population and Development in April 2014. In light of the twentieth anniversary of the 1994 International Conference on Population and Development (ICPD), the Commission's theme for 2014 is an "Assessment of the status of implementation of the Programme of Action of the International Conference on Population and Development".

The meeting brought together experts from different regions of the world to address key questions about the future pace of fertility change, implications for age structure changes and other population trends and effective policy responses. A selection of the papers prepared by experts participating in the meeting is being issued under the Expert Paper Series published on the website of the Population Division (www.unpopulation.org).

This paper discusses recent fertility trends in Europe and their determinants, focusing on the period since 1990 with both political and demographic upheavals, and highlights old and newly emerging regional divides. The paper shows that the delay of childbearing to older ages accounts for much of the extremely low period fertility witnessed in Europe, especially in Eastern and Southern Europe. Cohort fertility developments and differences in parity-specific patterns of family building, including the persistence of two-child family ideals and intentions across Europe, are discussed. The policy responses to low fertility are also analysed, varying from policies which focus on gender equality and balancing labour force participation and childbearing, with higher fertility seen as a beneficial secondary effect, to those policies which explicitly provide monetary incentives that are often parity-specific. Finally, the author argues that the impact of migration, both in terms of the fertility of migrants in the receiving country and the impact of the migration of women of reproductive age in the country of origin, is sufficiently significant that the analysis of fertility and migration trends should be integrated.

The Expert Paper series aims at providing access to government officials, the research community, non-governmental organizations, international organizations and the general public to overviews by experts on key demographic issues. The papers included in the series will mainly be those presented at Expert Group Meetings organized by the Population Division on the different areas of its competence, including fertility, mortality, migration, urbanization and population distribution, population estimates and projections, population and development, and population policy.

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A. INTRODUCTION

In Europe, concerns about low birth rates have been recurrent for over the last century. Many European countries have also experienced a long history of government involvement in stimulating birth rates and supporting families with children. The situation is not much different today; some experts, many politicians, as well as the general public, think Europe is facing an unprecedented demographic crisis caused by low birth rates and the resulting population imbalance leading to ever more "sclerotic" societies that lose dynamism and are becoming irrelevant in the global arena. Jacques Chirac, who later became the President of France, remarked in 1984 that "in demographic terms, Europe is vanishing. Twenty years or so from now, our countries will be empty" (Teitelbaum, 2000). More recently, Pritchett and Viarengo (2012) likened current below-replacement fertility in Europe to a slow "demographic suicide".

Are European fertility trends really so negative? Both alarming and reassuring news can be found. European fertility trends have undergone two turnarounds in the last 15 years: the first started since the beginning of the new century and ended the spell of record-low period fertility rates. The global economic recession beginning in 2008 largely ended this recent spell of increasing fertility. However, on balance, Europe is far from "getting empty". This paper aims to provide a concise account of European fertility trends and their determinants, highlighting old and newly emerging regional divides. It focuses on the period since 1990, when the political division of Europe into the East and the West came to an end and the European demographic landscape has been redrawn. First, the study gives a broad-brush account of major fertility changes and some of the driving forces behind them. Then it discusses in more detail the continuing trend towards later timing of childbearing, which has had a strong negative influence on conventional period fertility rates in the last four decades. To overcome these distortions in period fertility, the paper also inspects cohort fertility developments and the main differences in parity-specific patterns of family building in Europe. Subsequently, the strong persistence of two-child family ideals and intentions across Europe is discussed. Next the paper gives a brief review of recent trends in family policies in European countries and discusses their impact on fertility. Moving towards the future prospects, the study then highlights main results of a survey of population experts on the future of fertility. The conclusion sketches out the current fertility divisions in Europe and argues that fertility should be analysed alongside with migration.

B. DATA, DATA QUALITY AND GEOGRAPHICAL DIVISIONS

Most of the data on fertility rates come from the Eurostat database, Human Fertility Database and official data from national statistical offices, including National Center for Health Statistics for the United States of America, ISTAT for Italy, ONS for England and Wales and United Kingdom, Goskomstat for Russia, and Statistics Lithuania. Historical fertility data for the period 1960-2005 also originate from the Council of Europe (2006) publication. Although the majority of European countries have sophisticated systems of collecting vital statistics data with almost 100 per cent coverage of live births, countries with high rates of international migration often have difficulties estimating the population by age and sex, which also affects computations of fertility rates. In November 2013 Eurostat published for many European countries revised statistics of population by age and sex in 2001-13, which retrospectively incorporated the results of the censuses conducted around 2011. This paper reflects these latest updates and, when available, features fertility rates computed using these latest population estimates. This often resulted in revisions of fertility rates (especially in 2005-2011), including upward revisions in the period total fertility (TF) in the order of 0.05-0.21 in Bulgaria, Estonia, Latvia, Lithuania, and Romania, and downward revisions up to 0.05 in Ireland and United Kingdom. Minor (<0.05) upward revisions also occurred in Italy, Hungary, and Slovakia. Some countries have provided only provisional revisions of population by age and sex between the censuses of 2001 and 2011 and many countries have not produced yet any retrospective recalculations. Moreover, census data also suffer deficiencies such as undercounts or, in some countries, partly registering population that resides abroad. In addition, many European

countries record births that took place abroad to mothers who are still registered as residents in the country and include these births in their vital statistics (Eurostat 2003). This is most problematic in countries with high emigration, where many long-term emigrants are still registered as residing in the country while the official estimates of the resident female population by age and sex, based on international standards of population statistics, exclude these emigrants. For these reasons, data and computations of fertility rates presented in this paper, especially in countries with sizeable migration which is often poorly documented (mostly in Central, South-eastern, and Eastern Europe, possibly also Southern Europe) should be treated with caution and interpreted as best available estimates subject to additional future revisions rather than precise and certain data.[1] Future population adjustments will lead to additional revisions of fertility data.

This paper distinguishes between seven broad European regions that follow major historical, demographic, economic, and geographic divisions across the continent. For their cultural distinctiveness, the study excludes Turkey and the Caucasus countries (Armenia, Azerbaijan, Georgia) from the analysis.

Western Europe: Belgium, France, Ireland, Luxembourg, the Netherlands and the United Kingdom;
Northern Europe: Denmark, Finland, Iceland, Norway and Sweden;
"*German-speaking*" countries of Central Europe: Austria, Germany and Switzerland;
Southern Europe: Cyprus, Greece, Malta, Italy, Portugal and Spain;
Central Europe: Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia;
Eastern Europe: Belarus, Moldova, Russian Federation and Ukraine;
South-eastern Europe: Bulgaria, Macedonia, Montenegro, Romania and Serbia (little reliable recent data are available for Albania, Kosovo, and Bosnia-Herzegovina, which are therefore left out of the analyses).

All countries from the first five groups—except Iceland, Norway and Switzerland—plus Bulgaria and Romania from South-eastern Europe now belong to the European Union (EU), which is comprised of 28 countries as of 1 July 2013 when Croatia became the latest member to join. Central Europe, South-eastern Europe and Eastern Europe comprise countries that had the state-socialist political system until it collapsed around 1990.

C. Changes in European fertility since 1990

In more than two decades since 1990, European fertility trends have followed two turning points: first, around 2000, when the long-standing decline in period fertility came to an end and fertility rates bottomed out, and then in 2008 when a gradual increase in period fertility was interrupted in all regions except Eastern Europe, arguably due to the global economic recession. This section provides a brief description of period fertility trends as delineated by these turning points; it also highlights selected explanations, underlying factors and broader institutional conditions that shaped fertility in each analysed period.

1. *The 1990s: fertility rates falling to record-low levels*

The 1990s saw a Europe-wide fall in period fertility rates, especially in Southern Europe and in post-communist Central and Eastern Europe. The latter region witnessed a potent mixture of new economic and lifestyle opportunities, tertiary education expansion and rapid value change, as well as painful economic transformation, bringing in most countries deteriorating living standards, massive employment uncertainty and a surge in income inequality (Sobotka, 2011; Frejka, 2008). In all parts of Europe women were putting off parenthood to later ages, which further depressed period fertility rates (section D below; Goldstein et al., 2009a). By the late 1990s, the phenomenon of lowest-low fertility, with a period total fertility (TF) falling below 1.3 births per woman, affected countries with close to a half

of Europe's population (Kohler et al., 2002; Billari and Kohler, 2004; Goldstein et al., 2009a). Large parts of Southern, Central and Eastern Europe, including Italy, Russian Federation, Spain and Ukraine, experienced at least a brief fall to TF levels of 1.1-1.2 children per woman. The Europe-wide period total fertility bottomed out at 1.37; in the European Union (EU) it reached a low of 1.44 in 1998-99. Only a few larger countries outside of Europe (Canada, Japan and the Republic of Korea) recorded similarly low fertility. The analyses of cohort fertility (Lesthaeghe and Wilems, 1999) and of the newly emerging indicators of tempo-adjusted period fertility (Bongaarts, 2002; Sobotka, 2004) showed that fertility rates fell to such low levels because of the shift to later childbearing. For the first time in post-war history, no European country had a period TF above 2 births per woman (excluding Turkey and the region of Kosovo). Also, some rather peripheral countries that had until the 1980s period total fertility surpassing 2.5, such as Albania, Ireland and Moldova, recorded a TF below 2 by the late 1990s.

Important regional differences observed today crystallized during the 1990s. The fertility map of Europe has been divided into a higher-fertility belt spanning Northern and Western Europe, with a TF above 1.5 births per woman and the completed fertility close to the replacement level and all the other regions, including three predominantly German-speaking countries of Central Europe (Austria, Germany and Switzerland) that had reached by the turn of the century a period TF below 1.5 births per woman (figure I).

2. *Institutional conditions in the 1990s: changing families, rising economic uncertainty*

The 1990s saw a progressive decoupling of marriage and fertility, heralding a new era of family behavior where reproduction increasingly takes place within cohabiting unions, but also in part in non-residential partnerships and in single-parent families. In the late 1990s, the proportion of births outside marriage surpassed a quarter in the EU and marriages were delayed or foregone to a larger extent than births. Remarkably, the erosion of marriage—one of the classic proximate determinants of fertility—did not seem to have a negative impact on period fertility trends. Cross-country correlation between marriage rates, divorce and the spread of new family forms on the one side and fertility on the other side suggested a newly emerging positive association between the demise of the traditional family and fertility (Billari and Kohler, 2004; Sobotka and Toulemon, 2008). High divorce rates, especially in Central-Eastern and Western Europe, implied that there were more women entering a second or a third partnership, potentially increasing the chances of having another child with a new partner. However, the empirical studies show that, on balance, partnership instability leads to lower fertility at both individual and aggregate level (van Bavel, et al., 2012; Thomson et al. 2012).

The debate on fertility change in the 1990s also emphasized the role of rising economic uncertainty, especially among young adults (Mills et al., 2005; Adsera, 2005a). The need for younger people to stay longer in education to qualify for better-paid jobs, together with a rising share of unstable and temporary employment and declining relative incomes, contributed to both postponement of family formation and the decline in fertility (Adsera, 2005b). These changes were particularly pronounced in Central and Eastern Europe, where the economic transition had been accompanied by a sharp rise in income inequality, cutting-back on social spending and deteriorating living standards in many countries (Billingsley, 2010; Sobotka, 2011; Heyns, 2005).

3. *The 2000s: Gradual fertility recovery*

The seemingly unstoppable fall in period fertility in Europe had run its course by the turn of the century. Measured by conventional period TF, in the 2000s Europe saw the first continent-wide upswing in period fertility since the baby boom era of the 1960s (Goldstein et al., 2009a). To some observers, this upturn was surprising. As recently as in 2006, McDonald (p. 487) suggested that waiting for the tempo effect to go away (and the TF to rise) is "beginning to look like waiting for Godot." A few years later,

however, things looked different and *Nature* featured an invited article labeled "Babies make a comeback" (Tuljapurkar, 2009; see also Hoorens et al., 2011).

How did this comeback look like and why did it occur? In many countries the increase in the period TF was relatively modest, in the order of up to 0.2 births per woman in absolute terms. The period TF for the European Union rose from 1.44 in the late 1990s to 1.61 in 2008; the whole continent saw a TF increase from 1.37 in 1999 to 1.58 in 2010. But this increase was unevenly spread, with 13 countries, including France, Russian Federation, Sweden, Ukraine, and United Kingdom, experiencing a TF increase in the order of 0.3 or more between the late 1990s or early 2000s and 2008-10. Some of these shifts were remarkable: in Estonia, the period TF rose from 1.21 to 1.71 in the decade since 1998; in the Czech Republic it recovered from 1.13 in 1998 to 1.50 in 2008; in Bulgaria, the increase was estimated from a low of 1.09 in 1997 to 1.66 in 2009 and in Sweden the TF recovered from a postwar low of 1.50 in 1999 to 1.98 in 2010. Such increases indicate that there is nothing inevitable about period fertility in high-income countries falling to ever lower levels. Fertility can go up almost as unexpectedly as it can keep falling. In particular, the phenomenon of "lowest-low fertility," whose spread seemed unstoppable in the late 1990s, all but disappeared by 2008, when only one European country, Moldova, reported a TF below 1.3—down from 16 countries in 2002 (figure II; Goldstein et al., 2009a). In 13 countries, including Belarus, Bulgaria, Estonia, Lithuania, Russian Federation, Slovenia and Switzerland, and Ukraine the TF bounced back—at least temporarily—above 1.5, the level suggested earlier by McDonald as a threshold below which policy action to support fertility becomes both more urgent and more difficult to enact effectively (McDonald, 2006). Moreover, the higher-fertility countries in Europe saw at least a brief return to fertility close to the replacement threshold, with the TF in France, Iceland, Ireland, Norway, Sweden, and the United Kingdom rising above 1.9 births per woman.

As section D illustrates, these increases in period fertility were partly driven by changes in the timing of childbearing, specifically, by a weakening in the pace of the postponement of births. In a global perspective, European fertility ceased to be exceptionally low, as many middle-income countries such as Brazil, Iran, Thailand, Turkey and Viet Nam experienced fertility declines below the replacement threshold and much of East Asia became characterized by persistent "ultra-low" fertility rates (Jones et al., 2009). In effect, East Asia has replaced Europe in becoming a global hotspot of low fertility, with Japan, Republic of Korea, Singapore, and the regions of Hong Kong and Taiwan, and, probably also China, recording a period TF in the range of 0.9-1.4 children per woman between 2000 and 2010 (Jones et al., 2009; Basten et al., 2013; Zhao and Zhang, 2010; Cai, 2013).

4. *Explaining period fertility upturns*

Which factors were responsible for the rebounds in period TF in Europe after the year 2000? The period until 2008 was characterized by stable economic conditions and declining unemployment rates, especially in Central and Eastern Europe where massive economic shocks took place in the preceding decade. Increased economic security and improved compatibility between employment and having children, partly resulting from new family policies (see section G), helped the observed period fertility recovery (OECD, 2011). Perhaps for the first time in modern history, women's labour force participation and period fertility rates increased in tandem.

Three other broad factors entered prominently in the debates on European fertility in the 2000s: migration, gender equality, and the link between development and fertility. In the 1990s and 2000s, Europe attracted sizeable immigration flows (Coleman, 2006). Richer parts of Europe, including the South, experienced an influx of migrants from non-European countries and from poorer parts of Europe, especially from the East and South-east of Europe. As migrants in most rich countries have elevated fertility rates, increasing fertility rates were occasionally attributed to immigrants. Available data show that in most high-immigration countries, migrants had a growing share in the number of births, but their

net contribution to fertility rates was stable or declining, owing to the gradual convergence in fertility between migrant and "native" women (Sobotka, 2008a; Tromans et al., 2008; Basten et al., 2013).

The increased focus on gender equality was motivated by findings that having children still considerably restricts women's opportunities for a career, which has a detrimental effect on fertility and leads to childbearing postponement (McDonald 2013; Mills, 2010; Mills et al., 2011).[2] Both institutional and domestic gender inequality matter in combination, although research studying both levels is rare. Esping-Andersen (2009) has argued that only societies that successfully adapt themselves to a "gender revolution" in women's roles, achievements and ambitions, can eventually experience recovery in fertility rates. The possibility that gender inequality has a negative effect on fertility is also related to the reversals identified between institutional factors and fertility rates. Initial discussions focused on the positive association between women's labour force participation and fertility in high-income countries since the 1990s (Brewster and Rindfuss, 2000; Engelhardt and Prskawetz, 2004). More recently, other aggregate-level reversals between institutional conditions and fertility have been identified, including gender equality, share of children in early childcare, and the prevalence of "postmodern" values typical of the second demographic transition. A most interesting debate ensued on the possible reversal of the relationship between economic and social development and fertility, fuelled by studies suggesting that at advanced levels of development (as measured by the GDP level or by the Human Development Index (HDI)) fertility decline stops or even reverses. These studies (Myrskylä et al., 2009; OECD, 2011; Luci and Thévenon, 2011) have turned upside down the widely accepted notion that more development equals lower fertility. Myrskylä et al. (2011) suggested, however, that the observed reversals are conditioned by the level of gender equity in the society.

5. *The recent economic recession: fertility trends after 2008*

The global economic recession that started in the autumn of 2007 in the United States has hit almost all European countries, with many experiencing plummeting GDP and rising unemployment for most of the period of 2008-2012. A review of past research has shown that economic recession usually leads to fertility declines and stimulates fertility postponement (Sobotka et al., 2011). Besides experiencing unemployment, employment instability, or lower income, people may also limit their fertility because they have a general perception that the situation in their country, region, or social group is worsening and that they might be negatively affected in the future. In particular, rising unemployment rates are associated with fertility declines that often take place with a time lag of one to two years.

Most of the evidence on fertility changes after 2008 supports the view that economic recession is not conducive to childbearing (Sobotka et al., 2011; Goldstein et al., 2013; Lanzieri, 2013; Basten et al., 2013). The increase in the period TF that started around the turn of the century had run out of steam by 2010; 26 out of 37 countries experienced a TF decline of 0.02 or more in 2011. In the European Union, the TF peaked at 1.60-61 in 2008-10 before declining slightly to 1.57 in 2011-2012 (figure I). This recent decline strongly contrasts with the situation before the onset of the recession: in 2008, 35 out of 37 countries experienced rising fertility by at least 0.02 births per woman. Also marriages were delayed or foregone during the recession, while young adults delayed moving from the parental home or even returned back temporarily (see Morgan et al., 2012 for the United States).

Some regions recorded stronger fertility declines—these were most visible in Southern Europe, Northern Europe, Central Europe and South-eastern Europe (figure I). Western Europe and German-speaking countries saw their fertility rates stabilising in 2008-12, while Eastern European countries saw a counter-cyclical trend of continuing fertility upswings in that period, possibly linked to recently enacted pronatalist policies (section G). The reversal in the previous increase in period fertility has been more pronounced in countries that experienced stronger economic downturns and faster increases in unemployment (Lanzieri, 2013). However, some countries have bucked this trend, showing relatively

stable fertility rates despite experiencing increasing economic strains. In Italy, period TF showed only a tiny decline after peaking at 1.46 in 2010; in Ireland which has been hit very hard by the financial crisis, the TF declined slightly from 2.06 to 2.00 between 2008 and 2012. Other countries with both moderate and low fertility have seen their TFs declining by 0.1 or more since peaking in 2008-9; these included the recession-hit countries such as Cyprus, Denmark, Greece, Hungary, Iceland, Latvia (until 2011), Portugal, and Spain as well as less-affected countries such as Norway and Poland. Outside Europe, the United States saw its period TF falling from 2.12 in 2007 to 1.88 in 2012 (figure III). As a result of these declines the phenomenon of "lowest-low fertility" re-emerged in Europe. In 2011, Hungary, Moldova, and Poland reported a TF in the range of 1.25-1.30. In contrast, the TF in France has stabilised just around the level of 2.0. Period fertility remained stable in Austria, Germany, and Switzerland—where the economic downturn was relatively mild—at a much lower level around 1.4-1.5. Three Eastern European countries with rising fertility rates—Belarus, Russian Federation and Ukraine—constitute the main exception to Europe-wide trend of stabilising or declining fertility after 2008. Following the lows of 1.1-1.2 reached around 2000, all the three countries have experienced a sustained fertility increase, uninterrupted by the recession. As of 2012, period TF surpassed 1.5 in Ukraine, 1.6 in Belarus and reached 1.69 in Russia (Goskomstat 2013, see also Section G). On balance, recent fertility declines during the recession were so far relatively modest in most countries and they have not yet wiped out fertility gains achieved in the decade prior to 2008. As of 2011, period TF was above the lows of the late 1990s and early 2000s almost everywhere except for a few countries, namely, Macedonia, Portugal, and Serbia. Some population groups were affected more; available data for migrants suggest that their fertility fell rapidly after 2008 in Germany, Italy, Spain and some other countries (Lanzieri, 2013; Basten et al., 2013).

One of the key explanations of fertility change during the recession is a new acceleration of the shift towards later childbearing, in particular, postponement of first births (Goldstein et al., 2013). In most countries, fertility change in 2008-2011 displayed a strong age gradient, as illustrated in figure IV for all EU countries and Spain: the younger the age, the stronger the fertility decline. Below age 30, fertility tended to decline in most countries and the decline was particularly pronounced among teenagers (by 15 per cent in the EU) and women in their early 20s (by 10 per cent in the EU) for whom fertility rates were relatively stable in the last three years prior to the onset of the recession. Above age 30 fertility rates were stable or further increasing (especially after age 35) in most countries, but the rise was weaker than in the pre-recession period. In some recession-hit countries, including Spain, this age gradient was particularly strong, and most likely linked to the emergence of very high unemployment among young adults. In the past, high teenage fertility was seen as a reason for concern. Economic recession, possibly assisted by the increasing availability of emergency contraception, has helped to make it a rare phenomenon.

6. *Continuing shift of childbearing away from marriage*

Recent fertility ups and downs continued in an environment where the family is undergoing continuous change. Marriages, especially at younger ages, have become ever less common since 2008. In the richer parts of Europe, fewer than one in four women are married by age 26, down from around one in two in 1990. The rise of cohabitation, the increased frequency of divorce, but also the spread of less conventional relationship forms have fuelled a continuous shift of childbearing away from marriage. In 2011, 40 per cent of births in the EU took place outside marriage; in nine European countries including Belgium, France, Norway and Sweden more than a half of all births were extra-marital in 2012. The decoupling of marriage and childbearing is particularly strong in European countries with relatively high fertility rates. In Western and Northern Europe the share of births outside marriage is positively correlated with period TF (figure V).

Two contrasting perspectives have been employed to explain the shifts in the family context of childbearing. The "second demographic transition" (SDT) view sees the rise of new family forms primarily as an outcome of a far-reaching value change towards "reflexive" values stressing individual

self-fulfilment rather than following established norms and obligations (Lesthaeghe 1995, 2010). In contrast, the "pattern of disadvantage" view stresses the social status gradient observed in most countries in non-marital childbearing, with lower-educated women having the highest likelihood of having children outside marriage, in particular as single mothers (Perelli-Harris et al., 2012). In this view, the shift in childbearing away from marriage might be seen as a "by-product" of increased unemployment and economic uncertainty which is concentrated especially among people with lower social status. The empirical findings are mixed. In some parts of Europe the frequency of non-marital births appears to have stabilised in the 2000s, at a high level between 40 and 65 per cent in the Nordic countries and at lower levels between 10 and 30 per cent in parts of South-eastern Europe. In several Eastern European countries (Belarus, Moldova and Russian Federation), the share of births outside marriage declined after 2005, suggesting the importance of a stable economic environment for marriage in this region. Nonetheless, the shift towards non-marital births progressed without interruption in most regions in Europe in both economically prosperous times in the early 2000s and in the recession period since 2008. Also the strong link between religiosity, country of origin and non-marital childbearing lends support to the SDT view (Sobotka, 2008b).

D. THE ONGOING TREND TOWARDS LATER CHILDBEARING

Many ups and downs in the period TF during the last three decades were largely caused by the shifts in the timing of births rather than by genuine falls and increases in fertility "quantum" (Bongaarts, 2002; Sobotka, 2004; Goldstein et al., 2009a; Bongaarts and Sobotka, 2012). Since the early 1970s, women in Western and Northern Europe started postponing motherhood to later ages. This trend began about a decade later in Southern Europe, and in the early 1990s in Central and Eastern Europe. The shift to delayed childbearing was losing momentum in the 2000s (Bongaarts and Sobotka, 2012), but picked up again since the beginning of the economic recession after 2008. The expansion of higher education, especially among women, the increased career involvement of women, the spread of effective contraception as well as the rise of economic uncertainty in young adulthood are among the key factors contributing to this trend (Sobotka, 2004a; Schmidt et al., 2012; Mills et al., 2011). By 2011, most European countries were characterized by a high age at first birth, which for women reached the ages of 27 to 30 years, an increase of 4 to 5 years when compared with the early 1970s. Only countries of Eastern and South-eastern Europe have retained earlier first birth pattern with the lowest age at first birth between 24 and 25 years recorded in Belarus, Moldova, Russian Federation and Ukraine (figure VI). In contrast, first-time mothers in Spain and Switzerland have surpassed age 30 on average.

The long-lasting transformation in the timing of childbearing is manifested in trends in age-specific fertility rates averaged for 11 countries of the European Union between 1975 and 2011 (figures VII and VIII). The continuous fall in fertility of women below age 25 is remarkable; between 1975 and 2011 their fertility rates fell by two-thirds on average across the analysed EU countries, and their share of total fertility dropped from 42 to 19 per cent. Since the mid-1990s the fall in early childbearing has been increasingly compensated by a "recovery" of fertility at ages above 30, with the largest relative gains after age 35. Between 1990 and 2011, fertility rates at later childbearing ages above age 35 doubled, while the rates among young women below age 25 were halved. Fertility rates are also rising rapidly at very late childbearing ages above 40 and even above 45, partly fuelled by an increased use of assisted reproduction, including donor oocytes (Sobotka, 2013).

The increase in age at childbearing has had a continued negative influence on period total fertility, which fell far deeper than the corresponding cohort fertility rates of women who were in prime childbearing ages in the 1980s-2000s. This is illustrated by new measures which adjust period fertility for distortions caused by the changing timing of childbearing (Bongaarts and Feeney, 1998; Kohler and Ortega, 2002; Bongaarts and Sobotka, 2012). Figure IX compares conventional period TF with tempo- and parity-adjusted index of total fertility, TFp* (Bongaarts and Sobotka, 2012) in four European

countries with distinct fertility developments. In each country, falls and increases in the period TFs since the 1980s were closely linked to accelerations and decelerations in first birth postponement, as measured by the mean age at first birth. Consequently, the TFp* displays a considerably less bumpy trend, without the sharp reversals and deep troughs typical of the TF. The TFp* never fell to such low levels as the conventional TF: except in Spain, it stayed above 1.7, suggesting that very low TF levels were entirely "caused" by delayed childbearing. This is particularly the case for the Czech Republic, where the conventional TF fell from 1.89 to a low of 1.13 between 1990 and 1999 before recovering in the subsequent decade. The TFp*, however, fell only slightly to the levels around 1.8, suggesting a negative tempo effect in the TF in the order of 0.7 around 1999. In contrast, the tempo-adjusted TFp* in Spain closely followed trend in the TF with a time lag of a few years. In each country, the TF rise in the early 2000s was largely fuelled by diminishing childbearing postponement, arguably linked to positive economic development in that period.

Table 1 and Figure X show changes in the conventional and tempo-adjusted TF between the second half of the 1990s and 2007-9 in major European regions. While the conventional period TF increased or was relatively stable in all analysed regions except in South-eastern Europe, the tempo-adjusted TF* declined slightly in Southern Europe and in the former state-socialist countries of Central-Eastern and South-eastern Europe. In most regions, the negative tempo effect declined in this period; the three predominantly German-speaking countries (Austria, Germany, and Switzerland) constitute the main exception. Even when tempo adjustment is taken into account, Europe remains broadly divided into two regions: the North and West with higher fertility close to replacement and the rest of Europe with lower fertility in the range of 1.5-1.7 when tempo-adjusted indicators are used. Southern and South-eastern Europe form a belt with the lowest fertility with the adjusted TF* close to 1.5 around 2008.

E. COHORT FERTILITY TRENDS: TOWARDS STABILIZATION?

Cohort fertility trends paint a similar picture as tempo-adjusted indicators analysed above. Available data and published projections of completed fertility (CTF) of women still in their childbearing years (Myrskylä et al., 2013; Prioux and Barbieri, 2012: 537, table A7) suggest that completed fertility in most countries will stabilize among women born in the 1970s. When the cohorts born in 1960-1979 are compared, Nordic countries show a flat completed fertility around 2.0, Western Europe shows a U-shaped trend with a CTF just above 2.0 in the late 1970s cohorts, while other regions display sizeable falls among women born in the 1960s and subsequent stabilization at much lower levels in the late 1970s cohorts (figure XI). Southern Europe emerges as the lowest-fertility region in Europe, with the CTF falling below 1.5 in the late 1970s cohorts. In particular, women in Spain born in the mid-1970s are expected to reach the lowest cohort fertility in Europe, with the CTF at 1.40, followed by Italian women with the CTF around 1.45. Women in Germany, whose CTF fell close to 1.50 already in the 1970 cohort, are projected to see a slight increase in their completed fertility. In contrast, women in France, Iceland, Ireland, Norway, Sweden and the United Kingdom are projected to reach a completed fertility above two in the 1979 cohort (Myrskylä et al., 2013). Outside Europe, the United States has a relatively high cohort fertility, projected to increase gradually to 2.2. In contrast, East Asian countries are expected to experience a continuous downward trend in completed fertility to a very low level above 1.40.

These absolute cohort fertility values hide huge contrasts in parity distribution patterns. Table 2 illustrates these contrasts in the examples of parity distribution in eight European countries among the women born in 1968. Interestingly, lower- and higher-fertility countries do not systematically differ in their childlessness levels; high childlessness at or above 20 per cent is found in both groups of countries (Austria vs. England & Wales), as is low childlessness below 10 per cent (Russian Federation vs. Czech Republic). Large contrasts in childlessness might be partly explained by negative attitudes to voluntary childlessness in the former socialist countries of Central and Eastern Europe (Merz and Liefbroer, 2012). Women in these countries had rarely been childless in the past, but often stopped reproducing after

reaching the minimum socially-accepted threshold of one child. Recently, the share of women with one child has risen fast in the region (Sobotka, 2011). In Russian Federation, one-child families, reached by four out of ten women, have become as common as the families with two children. The lowest-fertility countries have a low share of larger families combined with many women being either childless or having one child only; their share reaches 44-48 per cent in the three analyzed countries with a cohort fertility at 1.6 or lower (Austria, Russian Federation and Spain). Spain represents a Southern European pattern with a very low share of women having more than two children (11 per cent). Two countries, Austria and the United Kingdom (data for England and Wales shown in the table), represent a "polarized" pattern where two-child families are less frequent, childlessness is relatively high, and many women either have larger families (United Kingdom pattern) or one child only (Austrian pattern, also typical for Germany and Switzerland).

Social status is also linked to variability in cohort fertility across Europe (figure XII). In the Nordic countries and Belgium, the cohort fertility differentials by level of education have almost disappeared. Most of Western Europe and Southern Europe show moderate fertility differentials with fertility among women with lower secondary education about 15 per cent above that of the women with upper secondary education. Paradoxically, the sharpest cohort fertility differentials are found in Eastern Europe, where the official government ideology during the period of state socialism stressed equality and the disparities in wages and living standards were low (Sobotka, 2011; Brzozowska, 2013). Despite this, Eastern Europe has a sharper negative education gradient in cohort fertility than the United States, where social status polarization in reproductive behaviour is particularly pronounced (Carlson and England, 2011).

F. Reproductive preferences

In most European societies the use of effective contraception is widespread and reproductive decisions are largely considered a matter of personal preferences. Therefore, fertility intentions and ideals are key for understanding fertility decisions (Bongaarts, 2002; Hagewen and Morgan, 2005). Survey data for European countries provide little evidence on shifts towards a massive preference of one-child families or even childlessness. Rather, they indicate stable preferences centred on a two-child family model among both women and men. These low reproductive preferences can be achieved by most women when starting their first pregnancy attempt in their early to mid-30s. In fact, the variation in intended family size among adults aged 25 to 29 is remarkably low (figure XIII). Women's intended family size averaged 2.18 in the sample of 15 countries with the FFS survey in the 1990s and 2.16 in the ten analysed countries with the GGS survey in the 2000s, with most countries falling into a range of 2.00-2.35. Men in the same age group displayed slightly lower family size intentions, averaging 2.05 in the GGS surveys in the 2000s (Beaujouan et al., 2013). However, surveys of intentions show a rapid increase in the share of childless women at ages above 35 desiring to have a child in the future (e.g., Sobotka, 2013 for Austria; Hagewen and Morgan, 2005 for the United States)—a potentially problematic trend given the rapid increase in infertility, especially after age 40 (Leridon, 2008).

Small shifts can be observed in ideal family size (table 3). Between 1990 and 2011, ideal family size among women of reproductive age (15 to 44) declined slightly in all parts of Europe, with the one-child ideal gradually gaining in importance on account of larger-family size ideals. The downward trend appears more prominent in Italy and Spain and might be partly linked to the impact of economic uncertainty during the recession period (Testa and Basten, 2012). However, the two-child ideal still clearly dominates and, if anything, has become stronger during the last two decades. Also the mean ideal family size remains in most countries above two children. When surveys with a high share of missing responses on fertility ideals are disregarded, there is no convincing evidence of a shift of fertility ideals well below two children, suggested earlier by Goldstein et al. (2003) for Austria and Germany (Sobotka and Beaujouan, 2013). Thus far, European countries have largely resisted a rapid move towards a one-

child family size ideal reported for some East Asian settings, especially urban areas in China (Gu and Basten, 2013).

G. POLICY RESPONSES TO LOW FERTILITY

Persistent low fertility levels in many European countries often stimulate the interest of Governments, policymakers and the general public in policies that may influence fertility. In line with these concerns, public spending in rich OECD countries on family benefits, childcare provision and tax reductions for families gradually increased between 1980 and 2009, with the OECD average rising from 2.6 per cent to 3.6 per cent of GDP (OECD, 2011; Luci-Greulich and Thévenon, 2013; OECD, 2013). According to the regular United Nations survey of national policies, during the last two decades an increasing number of European Governments stated that the aim of their policies is to raise fertility. Out of 40 European countries with populations over 100,000, two-thirds (27 countries) considered their fertility too low in 2011, and in 29 countries the Government intended to increase fertility, up from 16 countries in 1996 (United Nations, 2012). The shift towards seeing low fertility as a policy problem was most prominent in the early 2000s among the countries which experienced a low period TF below 1.4 during the 1990s or early 2000s. As of 2011 only one of these countries, Switzerland, considered its fertility satisfactory and the Government embraced a "no intervention" policy (Figure XIV). This suggests that most European Governments are pronatalist and interventionist. However, the reality is considerably more nuanced.

In the European Union, low fertility combined with population ageing are perceived to be among the key challenges facing European societies (European Commission, 2005). Yet the official EU documents and policy statements are not explicitly focused on increasing birth rates. Rather, they stress the need to support families, the well-being of children, an easier combination of work and family life and to promote gender equality. Emphasis is on the freedom of choice in reproductive decisions and improving the ability of individuals and couples to pursue their reproductive goals. Rather than an explicit goal, higher fertility is seen as a potentially welcome consequence of more couples being able to realize their fertility intentions thanks to improved family policies. In contrast, in countries of South-eastern and Eastern Europe which experienced falling birth rates and population declines, worries about low birth rates are a dominating factor. Belarus, Russian Federation and Ukraine have adopted more direct pronatalist policies that are explicitly focused on increasing fertility rates or the number of births. These policies are primarily based on financial incentives and are often parity-specific, reflecting an implicit view on how many children are desirable per woman or per family.

Family-related policies in Europe are extremely complex and differ greatly by broader welfare regimes (Gauthier, 2002; Thévenon, 2011; OECD, 2011). Countries in Central and Eastern Europe, in particular, have seen frequent changes in their policies, often following election cycles and changing Governments or cuts in public spending.[3] In addition, housing provision, childcare, and some types of family support are often determined at a regional or a local level, especially in countries with strong regional governing bodies such as Austria, Germany, Italy and Switzerland. This section cannot cover European family policies in their complexity; instead, it illustrates selected policy trends during the last two decades and summarizes the evidence on policy influence on fertility levels.

1. Policy trends in the last two decades

Trends in family policies generally supported greater flexibility for parents in their decisions on how to combine work and family life, but also the earlier return of mothers to employment. In some countries, conflicting ideologies about the role of mothers and the importance of home-centred childcare led to inconsistent policy decisions over time. In addition, there has been discussion on strengthening intergenerational solidarity, including the possibility of establishing proxy votes by parents for their

dependent children in Germany[4] or transferring a small part of adult children's income to their parents' retirement pension.

• *Childcare expansion*. Across the European Union, considerable efforts have been made to expand childcare for children below age three. This is seen as a key policy instrument allowing parents, especially mothers, to return to employment and, also, to boost women's employment and support economic growth. An EU Barcelona summit in 2002 set explicit goals of providing a full-day place in formal childcare for at least 33 per cent of children below age 3 and 90 per cent of older children below mandatory school age (European Commission, 2008). While there has been an EU-wide expansion of public childcare for the youngest children[5], the former target has not been met by many countries and extreme differences persist, with early childcare coverage ranging from 3 per cent in Slovakia to 66 per cent in Denmark in 2010 (OECD, 2013). More recently, emphasis has also been placed on the quality of early childcare (European Commission, 2011). Some countries have made a strong policy push to expand childcare facilities. The German Government set a target of childcare availability for 35 per cent of children below the age of three by 2013 as well as establishing a legal right for public childcare for all children above the age of one (Bauernschuster et al., 2013).

• *A trend towards shorter and better-paid parental leave.* Many European countries modified parental leave provisions, making parental leave more flexible, often shorter and better paid, and increasingly linking leave benefits with pre-leave employment income. These shifts have been motivated by a combined goal of facilitating parents' return to employment and providing a stronger support to parents who stay at home with their small children, especially during the first year after the birth. Austria and the Czech Republic, two countries with a long duration of parental leave (up to the age of three in Austria and up to the age of four in the Czech Republic), have established a "multispeed" parental leave policy since 2008 where parents can chose different lengths of parental leave tied with different levels of leave allowance. In Austria, the former system of a flat-rate payment has been scaled by leave duration and supplemented with the possibility to obtain 80 per cent of pre-leave income for the parents who choose the shortest leave option, the so-called 12+2 moths (two extra months are reserved for the other parent only). Similarly, parents in Germany are entitled to 67 per cent of their previous earnings if they opt for the short leave, the 12+2 months variant (OECD, 2013). Estonia has radically expanded parental leave benefits since 2004, when a new "parental benefit" was established, covering 100 per cent of pre-leave average earnings. Subsequent expansions have increased the leave period to 62 weeks, followed by a considerably lower flat-rate payment until the child's third birthday. Similar expansion in parental leave benefits took place in three waves in Lithuania between 2007 and 2008, followed by additional revisions (and some cutbacks in entitlements) in 2010 and 2011 (Aiva Jasilioniene, personal communication). A parent staying at home for one year following the birth of a child now receives 100 per cent of her previous salary during that period.

• *Major policy expansions*. Several countries have undergone major family policy expansions. The United Kingdom, once known for minimalistic family policies reflecting a liberal and market-oriented ideology, experienced a major expansion of family policies between 2003 and 2010 (Sigle-Rushton, 2008; Brewer et al., 2010). These policy reforms have led to the creation of job-protected, paid maternity leave lasting one year, increases in child benefits, expansion of childcare support, establishment of the right of parents to request part-time work, and new tax credits for working families. In Germany, a major policy expansion under way since 2007 introducing income-dependent parental leave benefits and expanding public childcare, pushed the country closer to the Nordic system of family policies (Spiess and Wrohlich, 2008). At the same time, a complicated system of childcare allowances, parental benefits and tax breaks makes German family policies expensive and, arguably, inefficient (Spiegel, 2013).

• *Greater involvement of men*. Concerns about the unequal burden of childcare carried out by mothers led to the development of policies encouraging men to contribute more of their time to childrearing. Most typical of these policies are expansions of paternity leave for fathers after the birth of a child and changes in parental leave which are intended to involve fathers. Specifically, an increased number of countries provide an additional period of parental leave that can be claimed only if both parents participate in the leave. This "daddy quota" policy is now in place in Austria, Finland, Germany, Norway and Sweden and has recently been hotly debated in the United Kingdom. Norway has probably gone furthest in allowing men and women maximum flexibility in combining work and childcare. Parents working part-time are entitled to up to 36 weeks of paid parental leave which they can share simultaneously, for instance, by each of them taking parental leave on selected weekdays only.

• *Birth grants and baby bonuses*. Birth grants and baby bonuses are a favourite policy scheme of politicians who want to implement quick, visible and easy-to-understand monetary schemes, typically intended to boost birth rates. Spain had a short-lived "baby bonus" of 2,500 EUR per newborn child, established in 2007 and terminated since 2011 due to recession-related austerity measures (OECD, 2011: 112). More elaborate schemes established in Russian Federation and Ukraine constitute the backbone of pronatalist government efforts. In Russian Federation, "maternity capital" is provided for every own or adopted child of second or higher birth order. This payment is deposited to the pension fund and can be spent for childcare, housing, child's education and other specified purposes. In 2012, this grant amounted to 387,640 Russian Rubles[6] (around 12,000 US Dollars). In Ukraine, "maternity grants" were revised since 2008, steeply increasing for the second, third and subsequent children. These grants are paid in monthly instalments over the period of 24 (first child) to 72 months (third and subsequent children).[7]

2. *Family policies and fertility in Europe*

Studies analysing policy influences on fertility have to overcome multiple challenges. Policies often form "packages" combining different schemes, benefits and entitlements that cannot be studied in isolation. Rather, it is the entire set of policies that creates a more favourable environment for fertility decisions. Research on the impact of individual policies (typically at a time when an existing policy changes or a new policy is introduced) often finds very small or no effect (Gauthier, 2007). In addition, policies often influence the timing of childbearing rather than the level of fertility: parents may rationally decide to have a child earlier or later than initially planned in response to changing policy incentives. A typical example is a change in birth intervals following the changes in the length of paid parental leave, where some parents try to time their next birth to achieve an uninterrupted transition from one parental leave to the next maternity and parental leave (Andersson et al., 2006; Šťastná and Sobotka, 2009). In addition, fertility rates are influenced by broader economic and institutional conditions, and policy effects are hard to "isolate".

At a very general level, to have an impact, policies should be predictable, relatively stable, consistent and comprehensive (Thévenon and Gauthier, 2011). In some countries, policies are strongly oriented towards one type of family support only (e.g., providing financial benefits to families with children or supporting home care through parental leave schemes) or they are unstable and even inconsistent. This may partly explain why several countries with above-average spending on family policies, such as Austria, Germany, and Hungary, have low fertility rates (figure XV). At the same time, European countries with relatively high fertility close to replacement level share both above-average spending on families (typically around 4 per cent compared with the OECD average of 2.6 per cent in 2009) combined with above-average support for childcare services (above 1 per cent, often around 2 per cent) (OECD, 2013). Only Ireland and the Netherlands do not fully fit this pattern; both display average

spending on childcare and the Netherlands also has average spending on family support. Outside Europe, the United States of America is a notable outlier, having both very low support for families (below any European OECD country) and relatively high fertility.

Luci-Greulich and Thévenon (2013) provide the most recent evidence on the influence of family policies on fertility in OECD countries and compare their results with previous research. They find a positive cumulative effect of all policy instruments analysed (paid leave and its duration, childcare provision, and financial transfers), especially for working parents. This suggests that parents appreciate a mix of in-cash and in-kind support and that policies may be particularly important at the early childhood stage. The study also argues that in light of these findings, an increase in fertility rates observed in Europe in the 2000s was "happening as a by-product of better opportunities to combine work and family" (p. 4). From a different perspective, Kokkonen (2012) finds that generous policies supporting dual-earner families are linked with a higher share of women (and, it would seem, men) living with a partner, which, presumably, has a positive effect on fertility rates.

Thus far there has been little rigorous evaluation of the fertility effect of the new pronatalist incentives in Eastern European countries, especially of the sizeable monetary benefits in Russian Federation and Ukraine. Given that populations in these countries are considerably poorer on average than the inhabitants of most EU countries, worries about material conditions and lack of suitable housing score high on the list of reasons for not having another child. As a result, new monetary incentives may actually have the desired effect on fertility rates, as they help alleviate these economic worries. Based on the period TFs, fertility in both Russian Federation and Ukraine rose by about a quarter between 2006 and 2012, from 1.3 to over 1.6 children per woman. More detailed analysis shows a strong recuperation of fertility rates at higher childbearing ages in Russia, stimulated by considerable increases in second and third birth rates after 2006 (Frejka and Zakharov, 2013; Zakharov, 2013). However, these trends may be linked to relatively stable economic conditions of the period. Moreover, similar fertility increases in the 1980s and, possibly, also the recent ones were by and large caused by an acceleration in the timing of births and not an increase in the number of children women and men were having (Frejka and Zakharov, 2013; Zakharov, 2006). Additional evidence is available through the Generations and Gender Survey (GGS) conducted in Russia in 2004, 2007 and 2011. In a three-year period, 2007-2010, more respondents were successful in achieving their childbearing intentions than in the preceding period, 2004-2007; this increase was most obvious for the respondents who already had two or more children (Zakharov, 2013). In 2011, 10 per cent of women of reproductive age claimed that because of the new policy they had a birth they did not plan and 5 per cent stated they had a planned birth earlier (Sinyavskaya, 2013). Aggregate data also show that fertility rates increased especially fast in rural areas, where the period TF spiked from 1.60 to 2.22 between 2006 and 2012, almost double the increase in urban areas (Goskomstat 2013). If true, this suggests a modest policy effect on the level of fertility, concentrated especially in rural areas and, presumably, among poorer women

H. Future of European fertility: the view of experts

How will fertility in Europe evolve in the future? In 2011, the Wittgenstein Centre for Demography and Global Human Capital (WIC) coordinated a global survey of population experts. One module addressed both quantitative and qualitative aspects of the likely future fertility trends in the next four decades. Altogether 84 assessments were provided for European countries. The experts expected in their main TF estimates for 2030 and 2050 that fertility rates in all assessed countries will remain below the replacement-level threshold. The mean value of their predicted TF in 2050, weighted by the population of 18 analysed countries representing over 80 per cent of Europe's population, reached 1.62, slightly above the 2010 period TF of 1.56 (table 4). Among larger European countries, respondents predicted particularly low fertility in 2050 in Romania (1.38) and Russian Federation (1.48); excluding Russian Federation from the European-wide TF computation yields a projected TF value of 1.68. In 12

out of 18 countries, TF is expected to rise, especially in the Czech Republic, Hungary, Poland, Spain and Switzerland. The experts concluded that future TF trends are quite uncertain: the 80 per cent confidence interval of their TF prediction for Europe in 2050 ranged widely from a low value of 1.25 to an above-replacement level of 2.14.

The experts expected a considerably lower future fertility increase than the main variants of the 2010 and 2012 revisions of the United Nations World Population Prospects (WPP) projections (United Nations 2011, 2013a). For 2050 the United Nations projected a TF of 1.91 in the WPP 2010 revision, about 0.3 above the experts' projection; the difference narrowed to 0.2 in the latest 2012 revision of WPP (TF of 1.80). Among large countries, the United Nations projection envisions considerably higher fertility rates in Russian Federation than what experts expect. A comparison of projected fertility trajectories and uncertainty intervals according to the experts' views and the United Nations projections shows the largest divergences in Southern Europe, German-speaking countries, and Eastern Europe, where the fertility trajectory expected by the experts falls below the United Nations-projected lower boundary of the 80 per cent confidence interval after 2030 (figure XVI).

The qualitative part of the survey suggested immigration is likely to increase fertility in the future in regions which saw considerable migration gains already in the 1990s and 2000s—Western Europe, Nordic countries and Southern Europe. A more equal division of household work between men and women was accentuated as a potentially positive factor in Nordic countries as well as in Southern Europe, improved childcare in Central Europe and the German-speaking countries, and assisted reproduction in Central and Western Europe. Respondents for Eastern Europe emphasized the provision of affordable housing and more flexible work practices, while experts for the German-speaking countries saw a positive impact of the likely future increase in fertility among the better-educated. The ongoing experience of the economic recession has shaped the view of experts on the negative factors influencing future fertility. Across Europe unemployment, economic uncertainty and increased work pressure were cited as key factors pushing period fertility to a lower level. Especially in Southern Europe, the expected impact of unemployment and economic uncertainty was strongly negative. In addition, more years in high education are expected to have a negative impact in the Nordic countries, as well as inability to find a suitable partner in Central Europe and declining support to families in Eastern Europe.

I. CONCLUSIONS

1. *Current European fertility divides*

Period fertility reversals in the last three decades often contrasted with considerably more stable cohort fertility trends which have in most of Europe stabilized and in some countries even slightly increased among women born in the 1970s. Also reproductive preferences are remarkably stable with a majority of men and women reporting an ideal family size of two in all regions. This stability has been achieved despite a broad change in family patterns, with marriage being increasingly postponed and foregone, and partly replaced by cohabitation.

Europe today has reached low fertility rates, which, however, vary by region, as do also the underlying parity-specific fertility behaviours and social status differentials in fertility. Nordic countries, Belgium, France, and the Netherlands form a higher fertility belt in Europe with a completed fertility around two children per woman, alongside Ireland and the United Kingdom. However, Ireland and the United Kingdom have a distinct "polarized" pattern of reproduction with pronounced social status differentials, high childlessness, and higher teenage fertility rates. In contrast, in the Nordic countries and Belgium, educational differentials in fertility have practically disappeared. Southern Europe, especially Italy and Spain, has reached a lowest cohort fertility level in Europe (below 1.5) with rising childlessness and an even faster rise in the share of women with only one child combined with a very low share of

larger families. Austria, Germany and Switzerland also have low cohort fertility around 1.6 children per woman and, similar to the United Kingdom, pronounced social status differentials in fertility and high childlessness. Formerly state-socialist countries in Central and Eastern Europe form an increasingly mixed group with a rapidly rising share of women with only one child. Cohort fertility is lowest, at around 1.6 in the mid-1970s cohorts, in Eastern and South-eastern Europe, including Romania, Russian Federation and Ukraine, where one-child families are most prevalent and social status differentials most pronounced. This is also the region where childbearing occurs earlier than elsewhere in Europe.

These divisions partly mirror broad divisions in family policies, welfare regimes, prevailing family values and economic development across Europe. However, in all European regions a shift to a later timing of births has emerged as a key explanation of the observed ups and downs in period total fertility, which often reached very low levels. Since the late 1970s, both tempo-adjusted period fertility indicators and cohort fertility data paint a less dramatic picture of European fertility than conventional total fertility. In fact, low fertility in Europe is increasingly overshadowed by "ultra-low" fertility in many East Asian settings.

2. *Is low fertility a European-wide problem?*

Low fertility in contemporary Europe should be seen in a broader historical, economic and demographic context. European fertility decline was less steep than in many middle-income countries today. A number of European countries experienced a prolonged period of sub-replacement fertility in the past and were able to accommodate it. Nordic countries and Western European countries have been most successful in adapting to new family trends and gender roles. Austria and Germany are in the midst of their family policy adjustments, expanding childcare availability, making parental leave more flexible, stimulating fathers to share the burden of childcare, and linking shorter-term parental leave allowance to the pre-leave salary of the parent.

Additionally, the long-term consequences of contemporary low fertility crucially depend on migration levels. In Western Europe, Nordic countries and in Southern Europe, most countries with low fertility experience strong migration streams which are "boosting" the size of younger age groups in reproductive ages and partly offsetting the effects of low fertility rates on the number of births, and, eventually, population size (figure XVII; see also Wilson et al., 2013). Switzerland is a particularly interesting case: women born in 1975 are projected to have a low completed fertility at 1.66, 20 per cent below the replacement threshold. However, during the younger reproductive years (ages 15 to 30), this cohort has increased by more than 30 per cent through migration. Such a relationship is absent in the former state-socialist countries of Europe with either minor migration gains (Czech Republic, Slovenia), or—more frequently—sizeable migration losses combined with declining fertility (especially in the Baltic countries, South-eastern Europe and Eastern Europe except Russian Federation).

These are the countries where contemporary low fertility is least sustainable and in combination with the emigration of young people prior to the prime reproductive years will lead to long-term population declines. In Romania, a completed fertility of 1.56 (i.e., 25 per cent below the replacement threshold) is combined with a net migration loss at around 10 per cent at ages 15-30. Thus, differential migration adds a layer to fertility dynamics which accentuates the potentially negative effects of low fertility in East and South-east of Europe and largely offsets low fertility in the West, North and South. Nowhere is this more apparent than in Germany, where similar completed fertility in the western part (former FRG) and eastern part (GDR prior to the 1990 re-unification) is combined with heavy migration losses among young women in the East and strong migration gains (also from international migration) in the West.

3. *Which factors will affect most future fertility trends?*

At present, economic trends, especially employment uncertainties, are the most prominent force affecting family behaviour in Europe. Young adults are the most affected: soaring unemployment, declining wages, and declining opportunities for more stable employment contracts have hit hard the people below age 30, i.e., those in the early stage of family formation. Already in 2011, 13 per cent of young adults in the European Union (and as many as one in five in Italy) were NEETS—not in employment, education or training (European Foundation, 2011). Cuts in government budgets have affected young adults and families with children more than older age groups, including pensioners,[8] strengthening the existing pro-elderly bias in social spending in rich countries (Vanhuysse, 2013).

So far, in most countries the recession has not caused major shifts in fertility; it typically acted to accelerate postponement of first births. Most countries that have been relatively little affected by the recession (including Germany) often did not record any change in their previous fertility trend. Countries that will experience the first economic rebounds are likely to see their fertility stabilize and then rise to 2008 levels or above. In contrast, countries with protracted unemployment and stagnating or declining economic growth are likely to see lasting fertility effects among the "lost generation" of young adults who entered the labour market (or the ranks of unemployed and underemployed) during the recession. These effects will include a further shift to delayed parenthood, rising childlessness, a high share of one-child families, and, ultimately, declining cohort fertility. Southern Europe especially, where fertility rates are already among the lowest in Europe, is on the path to experience the long-lasting reach of the recession on fertility, similar to the effects of the Great Depression in the United States in the 1930s which had a disrupting effect on family formation (Morgan, 1991).

In the long run, many other factors will influence future fertility trends. Given that fertility ideals and intentions remain strongly focused on achieving a two-child family, including among the university-educated, an effective policy approach for Governments is to nurture conditions that support couples and individuals in realizing their goals. As Hagewen and Morgan (2005: 12) observed for the United States, the pervasive desire for two births is conditional on "when and if one can afford them and care for them." Clearly, some European societies perform much better than others in supporting families and family formation.

The host of interrelated aggregate-level factors characterising higher-fertility countries in Europe would certainly surprise many observers from the past. They include early childcare provision and higher rates of women's employment (Sleebos, 2003; OECD, 2011; Luci-Greulich and Thevenon, 2013), high levels of development (Myrskylä et al., 2009; OECD, 2011; Luci and Thevenon, 2011), non-traditional family values and attitudes (Sobotka, 2008b), family instability and a high share of childbearing outside marriage (Billari and Kohler, 2004; Sobotka and Toulemon, 2008), high levels of happiness (Billari, 2009), high societal levels of trust (Aassve, Billari, and Pessin, 2012), and higher levels of gender equality and stronger involvement of men in childcare (Mills, 2010; McDonald, 2013; Myrskylä et al., 2011; Esping-Andersen, 2009). These associations are often the opposite of those reported a few decades ago. It is remarkable that many European countries have undergone such a profound change in family values and behaviors, without experiencing a major shift in the value of children and fertility preferences.

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NOTES

[1] Previously and currently published fertility statistics by statistical offices and Eurostat show notable breaks and changes in the series for some high out- and in-migration countries such as Latvia, Lithuania, Bulgaria, Romania, UK, and Ireland. For example, in Latvia, period TF computed from the Eurostat data released in 2008-11 plummeted in the wake of the recession from 1.46 in 2008 to a low of 1.17 in 2010. However, post-census downward adjustment in the estimated resident population since 2011 (published by Eurostat on October 31 2013), combined with the practice of adding births to Latvian-origin mothers occurring in other countries retrospectively to Latvian vital statistics, resulted in a sudden upward jump in the estimated TF for 2010 from 1.17 to 1.36. Similarly, the period TFR in 2011 computed by Eurostat for Lithuania jumped from 1.55 to 1.74 following post-Census population adjustment. This estimate was based on a combination of a post-2011 census exclusion of women who migrated from Lithuania from the statistics of the resident population (counting only actual or de facto residents, in line with international statistical standards) and an inclusion of births registered abroad to women who kept their formal (de jure) resident status in Lithuania into Lithuanian vital statistics. As the number of births abroad reached a staggering 16% in 2011, the reported period TF in Lithuania of 1.74 has been inflated by up to 0.28 in absolute terms, assuming all the births registered abroad were to long-term emigrants (Aiva Jasilioniene and Domantas Jasilionis, personal communication). This figure substantially differed from the official figure by Statistics Lithuania (1.55). In the most recent data release published in December 2013, the Eurostat finally replaced the previously published estimate for 2011 using the harmonized official data on births by Statistics Lithuania. However, this illustrates the magnitude of potential errors and uncertainty of fertility statistics. The exclusion or inclusion of children born abroad in the official vital statistics can also affect reported fertility trends. For example, in Slovakia, the fall in the period total fertility between 2011 (1.45) and 2012 (1.34) was entirely caused by a break in the data series since 2012, due to exclusion of most births born abroad to women still officially holding Slovak residence, as the new rules allow including only births of children who are registered as residing in Slovakia. Without the change in definition, the TF would slightly rise to 1.47 in 2012 (Michaela Potančoková, personal communication). It is important to stress that besides the aforementioned six countries potential biases in fertility statistics may also affect other countries showing substantial (and often unaccounted) migration flows such as Cyprus, Greece, Malta, Portugal, and Spain.

[2] McDonald (2013: 983) pursues the term "gender equity" rather than equality as a key concept for explaining differential fertility. Gender equity focuses not on achieving the same behavioural outcomes of men and women but rather on whether "men and women regard the outcomes as fair or at least not grossly unfair and so long as there is equality of opportunity rather than equality of outcome".

[3] Policy instability was particularly pronounced in Hungary, where Governments led by conservative and socialist parties were alternating since 1990. *Conservative* Governments (1990-1994, 1998-2002 and since 2010) generally pursued policy expansions, promoting a more traditional family model with home-centered care for small children, supporting larger families and expanding parental leave. Meanwhile, *socialist G*overnments presided over budget cuts, limiting available family benefits or making those benefits means-tested (Spéder and Kamarás, 2008; Makay and Blaskó, 2013).

[4] This law would require a change in the German constitution and was unsuccessfully proposed by a group of German parliamentarians in 2005 and 2008 (http://www.dw.de/germany-ponders-giving-children-the-right-to-vote/a-3470938-1, accessed 25 November 2013). As this proposal was first formulated by a population scholar Paul Demeny, it is also referred to as "Demeny voting" (see the Wikipedia entry at http://en.wikipedia.org/wiki/Demeny_voting, accessed 25 November 2013).

[5] In the EU countries with available data, the participation rate of children aged 0-2 in childcare institutions rose from 18 per cent in 2003 to 29 per cent in 2010 (OECD, 2013).

[6] http://www.pfrf.ru/ot_en/mother/ ; accessed 25 November 2013.

[7] By the end of 2012, the maternity grants were as follows: UAH (Ukrainian Hryvnas) 28,830 for the first child, UAH 57,660 for the second child and UAH 115,320 for the third and each subsequent child (http://www.ukrinform.ua/eng/news/azarov_says_maternity_grant_to_rise_to_uah_28000_by_end_of_year_283250; accessed 25 November 2013). With the exchange rate around 8 UAH per US Dollar, this constituted around 14,400 US Dollars in for the third and higher-order child in 2013, a staggering amount in a country where the average monthly wage is just over UAH 3,200 (US $ 800; http://www.tradingeconomics.com/ukraine/wages; accessed 25 November 2013). Given such high levels of maternity grants, anecdotal evidence suggests that for some adults "procreating children" is an easy way to achieve decent income (http://en.for-ua.com/analytics/2012/10/26/135428.html; accessed 25 November 2013).

[8] *The Economist* (16 February 2013) succinctly summarized this uneven distribution of budget cuts in Britain: "The working-age poor are being pinched by a cap on welfare payments. Wealthy parents have been stripped of child benefit. University tuition fees have rocketed. Everyone is paying more VAT. But austerity seems much less austere if you are old. Pensioners, who fared notably well in the boom years, have been coddled in the bust."

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TABLES

TABLE 1: PERIOD TF, TEMPO-ADJUSTED TF*, AND ESTIMATED TEMPO EFFECT IN EUROPEAN REGIONS IN 1995-2000 AND AROUND 2008

	Period TF		*Tempo-adjusted TF**		*Tempo effect*	
	1995-2000	*2008*	*1995-2000*	*2007-9*	*1995-2000*	*2008*
Western Europe	1.71	1.93	1.88	2.07	-0.17	-0.14
Northern Europe	1.70	1.90	1.94	1.98	-0.24	-0.08
German-speaking countries	1.35	1.39	1.52	1.68	-0.17	-0.29
Southern Europe	1.23	1.45	1.59	1.54	-0.36	-0.09
Central-eastern Europe	1.40	1.43	1.74	1.67	-0.34	-0.25
South-eastern Europe	1.43	1.51	1.67	1.57	-0.24	-0.06
Eastern Europe	1.25	1.49	1.46	1.65	-0.21	-0.16
European Union (27)	1.45	1.61	1.69	1.79	-0.24	-0.19
Europe	1.40	1.57	1.63	1.73	-0.23	-0.16

Sources: Sobotka 2004 for the period 1995-2000, VID 2012 for the period around 2008

TABLE 2: PARITY DISTRIBUTION PATTERNS AMONG WOMEN BORN AROUND 1968

Fertility pattern	*Country*	*Cohort*	*Share of women with … children*				
			0	1	2	3+	CTFR
Completed fertility around 1.9 or higher							
Nordic: 2 or 3 children model	Norway	1968	11.6	14.6	**42.2**	31.7	2.04
Higher, polarised model	England, Wales	1965	20	14	**38**	28	1.91
Post-socialist, 2-child model	Czech Republic	1968	7.9	19.5	**53.6**	19.0	1.89
Completed fertility 1.70-1.79							
Lower, elevated childlessness	Netherlands	1968	18.4	18.2	**42.3**	21.1	1.74
Post-socialist, 2 or 1 child model	Slovenia	1968	11.1	25.2	**48.0**	15.7	1.72
Completed fertility around 1.6 or lower							
Post-socialist, 1-child model	Russia	1968	7.9	**40.2**	39.4	12.5	1.62
Low, polarised model	Austria	1969	21.5	22.8	**38.0**	17.8	1.59
Mediterranean, few large families	Spain	1968	16.8	28.1	**44.1**	11.0	1.52

Sources: Human Fertility Database 2013; ONS 2013

NOTE: the dominant parity is shown in bold; the second most common number of children is marked in grey

TABLE 3: IDEAL FAMILY SIZE IN EUROPEAN REGIONS (SELECTED COUNTRIES), 1990 AND 2011

	Ideal family size (per cent of respondents)				
	0+1	2	3+	Unknown	Mean
1990 (EVS)					
Western & Northern Europe (5 countries)	4	45	42	8	2.59
Italy & Spain	6	52	37	5	2.43
Central & Eastern Europe (6 countries)	8	59	30	3	2.27
2011 (Eurobarometer)					
Western & Northern Europe (5 countries)	6	52	42	8	2.27
Italy & Spain	15	58	37	10	2.01
Central & Eastern Europe (6 countries)	12	60	30	8	2.11

NOTES: The following countries were included, with the data available from both 1990 and 2001 survey and fewer than 13 per cent of unknown and not reported answers. Western and Northern Europe: Belgium, Denmark, Finland, France, and Sweden; Central and Eastern Europe: Bulgaria, Czech Republic, East Germany, Lithuania, Latvia, and Slovakia. Bulgaria was not included in the 1990 EVS survey; instead the data from the 1994 ISSP survey were used for that year.

Source: Computed by Éva Beaujouan from the EVS 1990 and Eurobarometer 2011 data. Data with more than 12 per cent unknown and not stated responses were filtered out except in Italy in 2011, where results based on 14 per cent share of unknown and non-response were retain to keep the recent data comparable with the earlier records. For more details see Sobotka and Beaujouan 2013.

TABLE 4: OBSERVED PERIOD TF IN 2010 AND PROJECTED TF IN 2050 IN SELECTED EUROPEAN COUNTRIES; EXPERTS' EXPECTATIONS (MAIN ESTIMATES AND 80 PER CENT CONFIDENCE INTERVAL) AND UN (WPP 2010 AND 2012) MEDIUM PROJECTION VARIANT

Country	*N (N giving 80% CI shown in brackets)*	*TF 2010*[2)]	*TF 2050*			
			Experts: mean	*Experts: 80% CI: min-max*[3)]	*UN WPP 2010 main: medium*	*UN WPP 2012*
Germany	9 (4)	1.39	1.58	1.23-2.06	1.89	1.66
Sweden	7 (6)	1.99	1.89	1.47-2.23	2.04	1.99
United Kingdom	4 (4)	1.92	1.92	1.31-2.65	2.02	1.90
Italy	12 (7)	1.46	1.57	1.30-1.92	1.89	1.80
Spain	6 (4)	1.37	1.68	1.34-2.12	1.90	1.81
Russia	4 (2)	1.57	1.48	..	1.91	1.83
EUROPE[1)] (18 countries)	84 (58)	1.56	1.62	1.25-2.14	1.91	1.80
United States	22 (19)	1.93	1.83	1.38-2.30	2.09	1.99
All low fertility countries[1)]	31 countries	1.64	1.57	1.07-2.13	1.84	1.81

Source: WIC Global survey of experts conducted in 2011; data published in Basten et al. (2013: 63, Table 5) and Sobotka et al. (forthcoming); the TFR values have been updated using latest available statistics as of December 2013

NOTES:

1) These data show global mean TF for all the countries with at least two expert evaluations, weighted by population size of these countries in 2010; these computations are based on 163 expert assessments.

2) 2010 TF values are based on own computations from Eurostat (2013), accessed in November and December 2013 and data provided by national statistical offices

3) 80 per cent CI range of the period TFR shown only for countries where at least four respondents provided this range. Global averages are computed for all countries with at least two respondents providing 80 per cent CI range.

TABLE 5: FACTORS EXPECTED TO HAVE STRONGEST POSITIVE (+) AND NEGATIVE (-) IMPACT ON FUTURE FERTILITY IN EUROPEAN REGIONS

Region and number of respondents	*Abbreviated argument*	*Expected impact*
Western Europe (N=8)	+ Immigration from high fertility countries will increase	+
	+ Assisted reproduction will allow routine childbearing at ages 40+	+
	- Employers will put more pressure on their employees	-
	- Economic unpredictability means uncertain life-course planning	--
Nordic countries (N=11)	+ Immigration from high fertility countries will increase	++
	+ Men and women will increasingly share housework and childcare	++
	- Ever more years of life enrolled in education	--
	- Employers will put more pressure on their employees	--
Southern Europe (N=18)	+ Men and women will increasingly share housework and childcare	+++
	+ Immigration from high fertility countries will increase	+++
	- Unemployment and job instability among under-30s will increase	----
	- Economic unpredictability means uncertain life-course planning	----
Austria, Germany, Switzerland (N=18)	+ Government will provide universal nursery / kindergarten access	+++
	+ Better educated women will want more children	+++
	- Employers will put more pressure on their employees	--
	- Economic unpredictability mean uncertain life-course planning	---
Central Europe (N=13)	+ Assisted reproduction will allow routine childbearing at ages 40+	++
	+ Government will provide universal nursery / kindergarten access	++
	- Harder to find the right partner to form a family	--
	- Economic unpredictability means uncertain life-course planning	---
Eastern Europe (N=12)	+ Work practices become more flexible	+
	+ Increased provision of affordable housing for families/young adults	+
	- Retrenchment of family support when economic conditions worsen	--
	- Economic unpredictability means uncertain life-course planning	--

Source: Global survey of experts conducted in 2011; data published in Basten, Sobotka and Zeman (2013, p. 53, Table 2). The factors were selected by the experts from 46 predefined arguments; for full list and complete wording of each argument, see Basten, Sobotka and Zeman (2013, Appendix 4)

FIGURES

Figure I: Period total fertility in main European regions, in the European Union, and the United States, 1985-2012

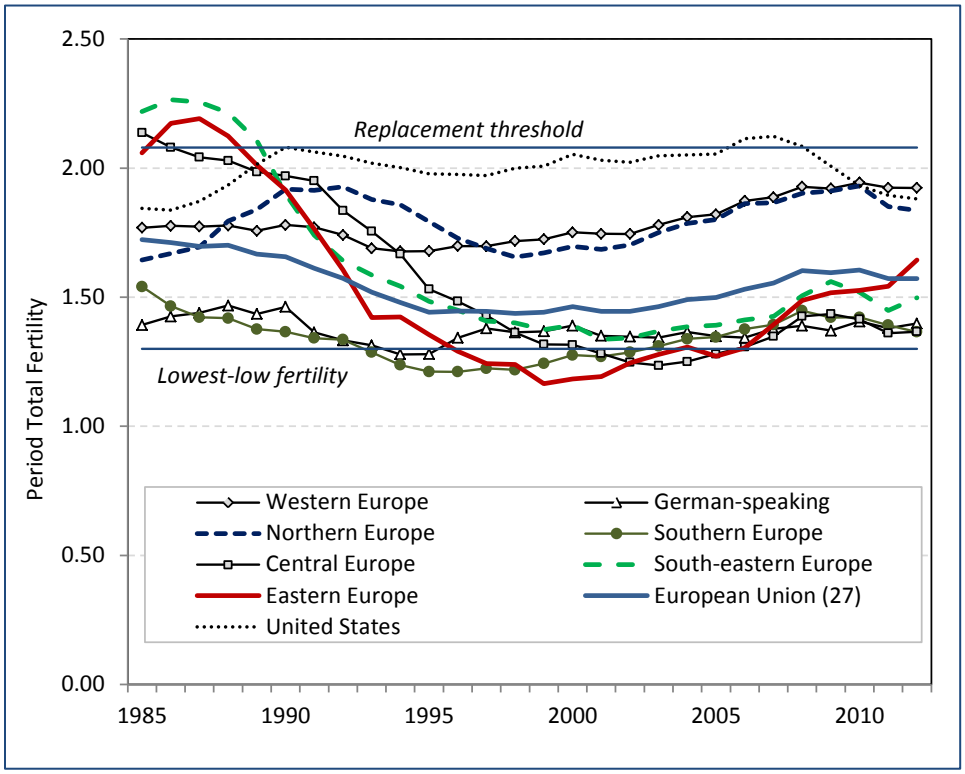


Figure II: Share of European population living in countries with a given range of the period TF, 1970-2012

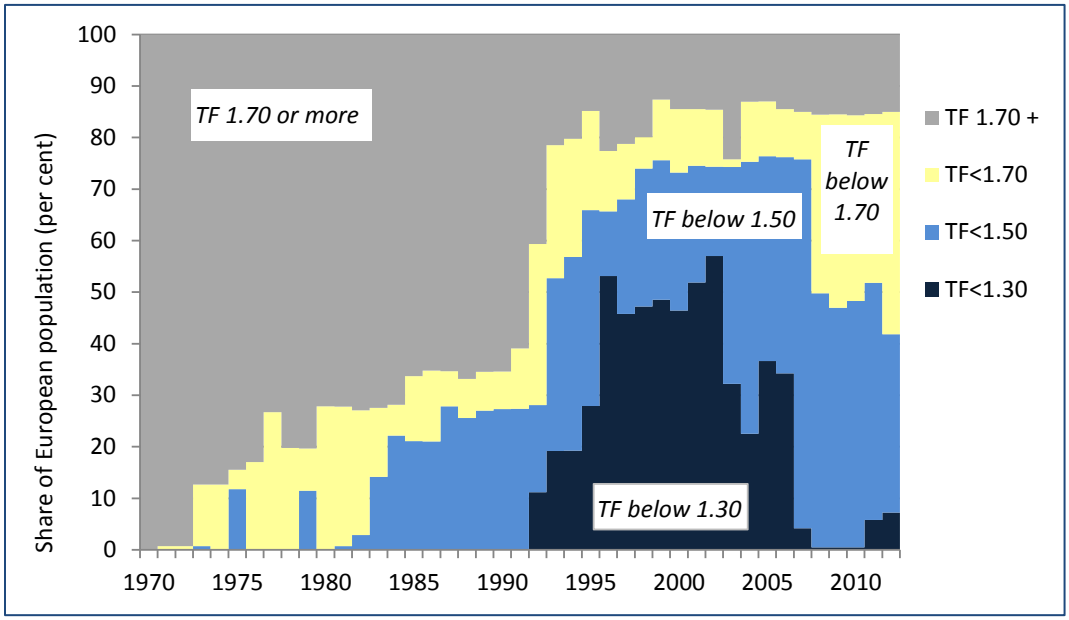


Figure III: Period Total Fertility in selected European countries, European Union and in the United States, 2000-2012

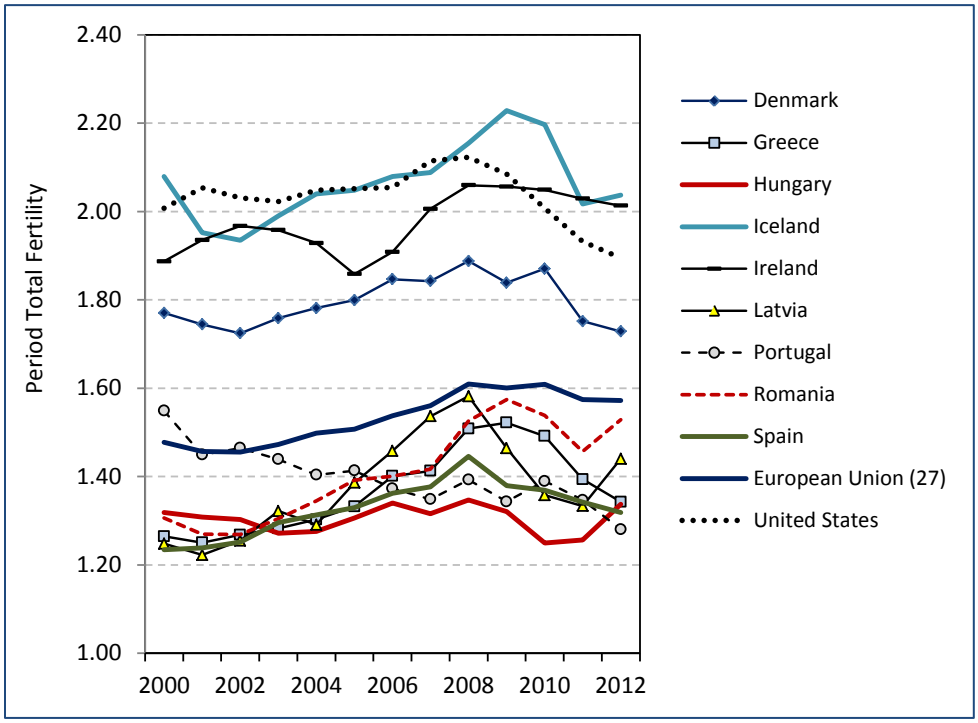


Figure IV: Change in age-specific fertility rates in the EU countries and Spain three years prior to the onset of the recession (2005-8) and three years since the onset of the recession (2008-11)

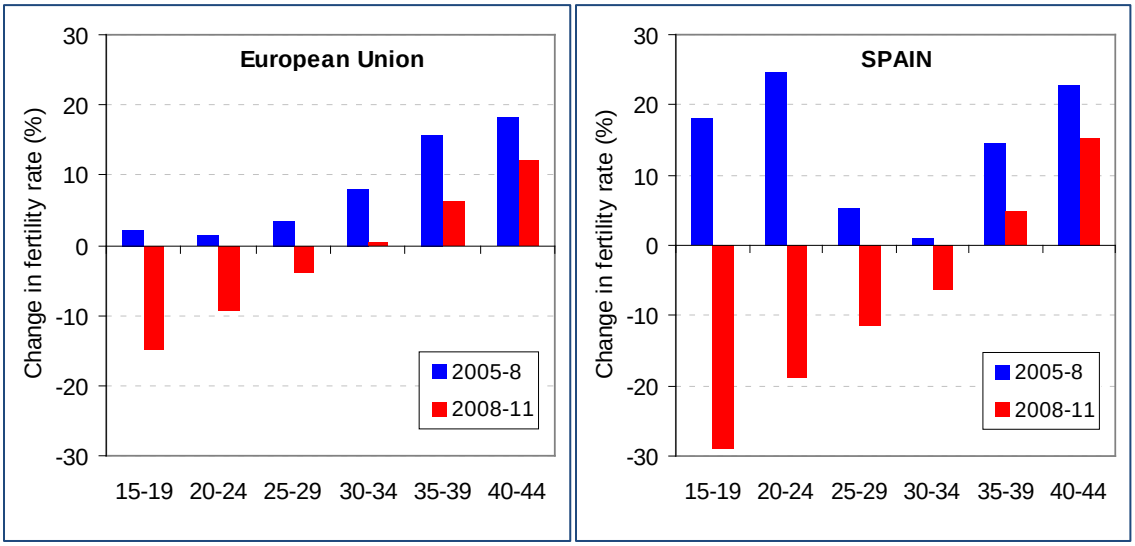
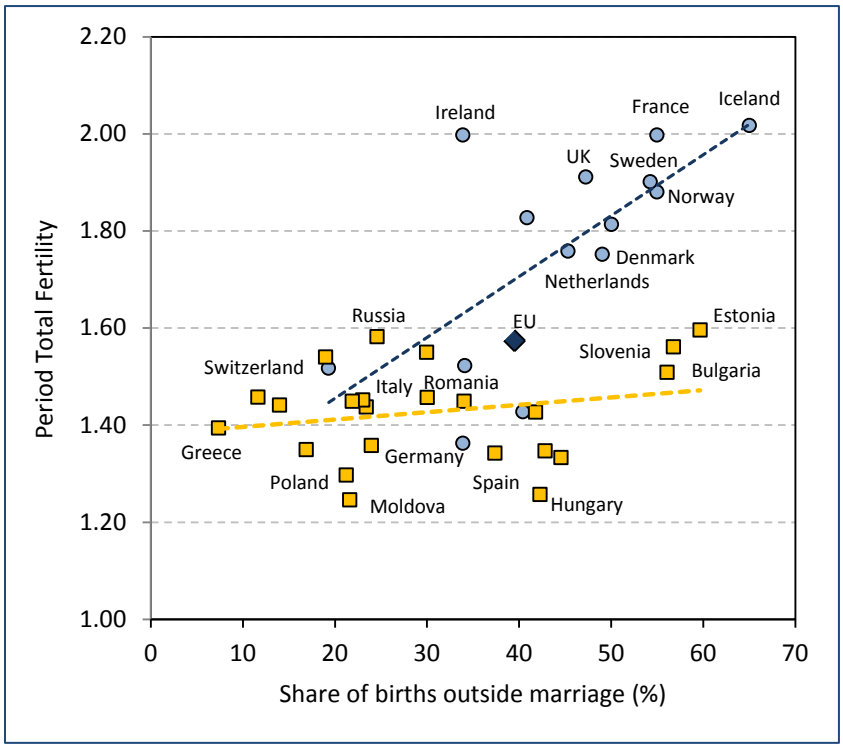
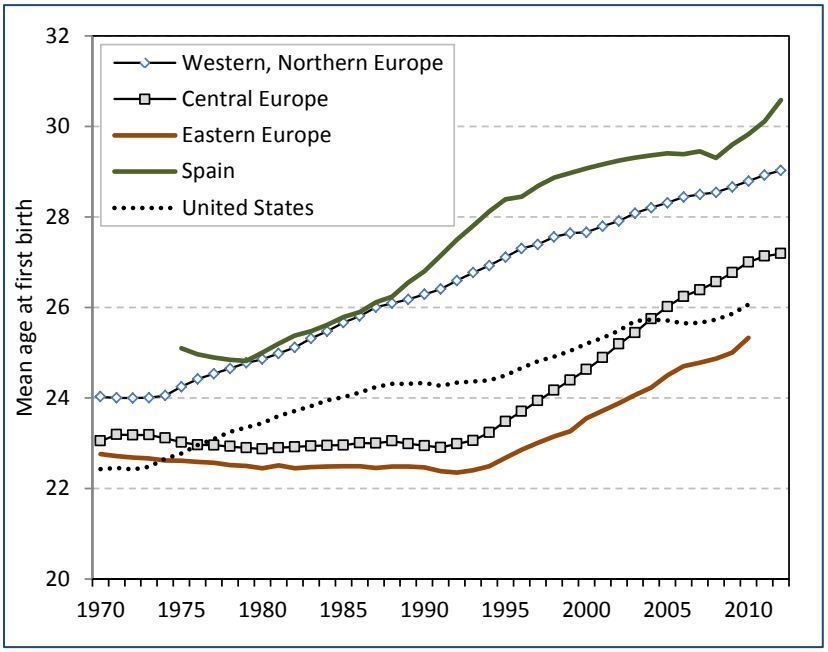


Figure V: Period Total Fertility and the share of births outside marriage in Europe in 2011



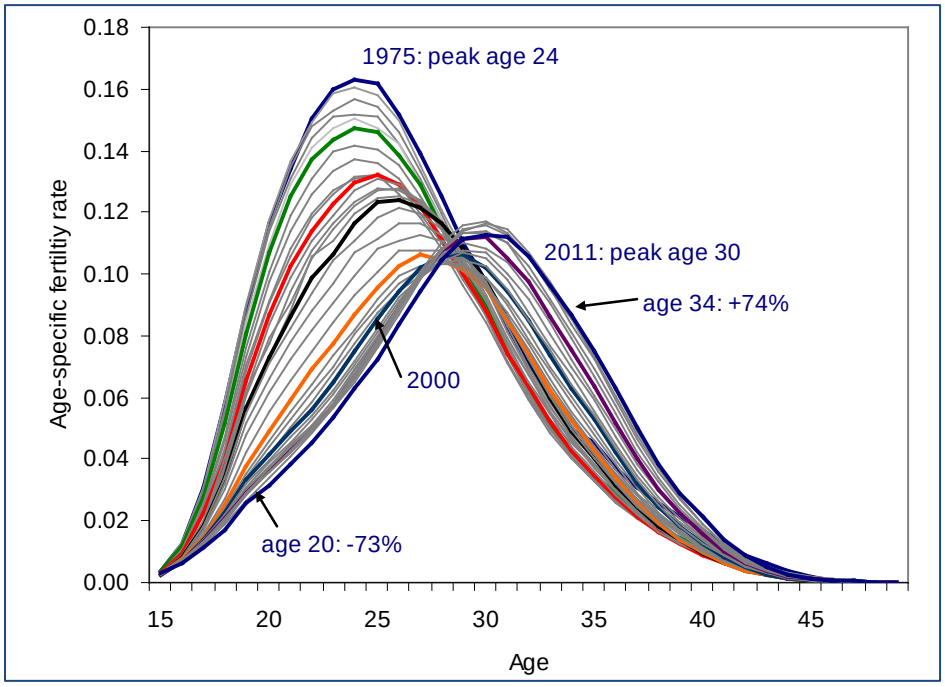
NOTE: Blue circles represent countries of Western and Northern Europe, orange squares represent other European regions.

Figure VI: Mean age of mother at birth of the first child, selected countries and regions in Europe and the United States, 1970-2012



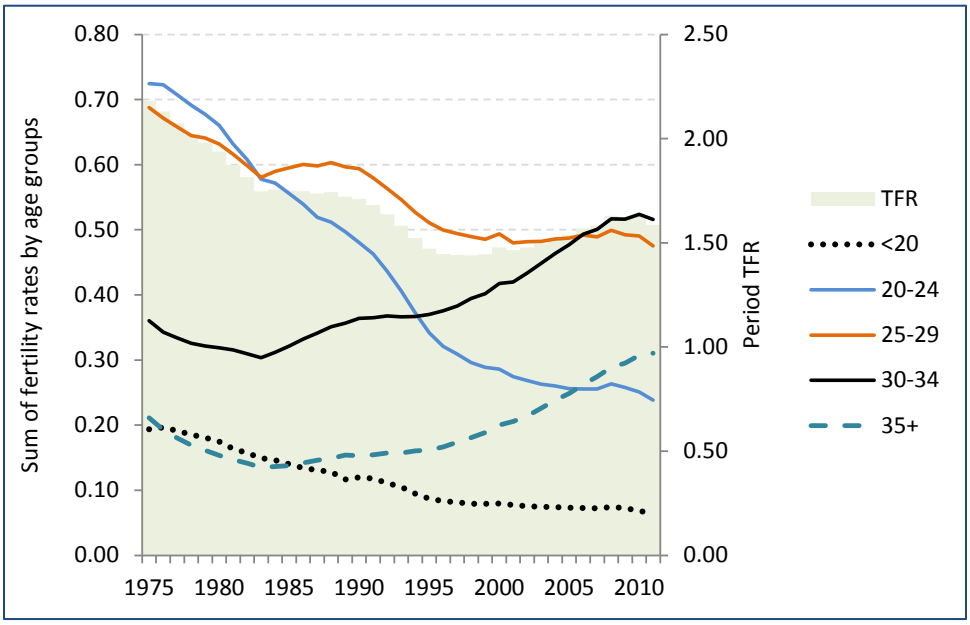
NOTE**:** Regional averages are computed as simple averages for selected countries in each region: Western & Northern Europe: Austria, the Netherlands and Sweden; Central Europe: Czech Republic, Estonia, Hungary and Poland; Eastern Europe: Bulgaria, Romania, and Russia.

Figure VII: Annual changes in age-specific fertility rates, average for 11 EU countries, 1975-2011



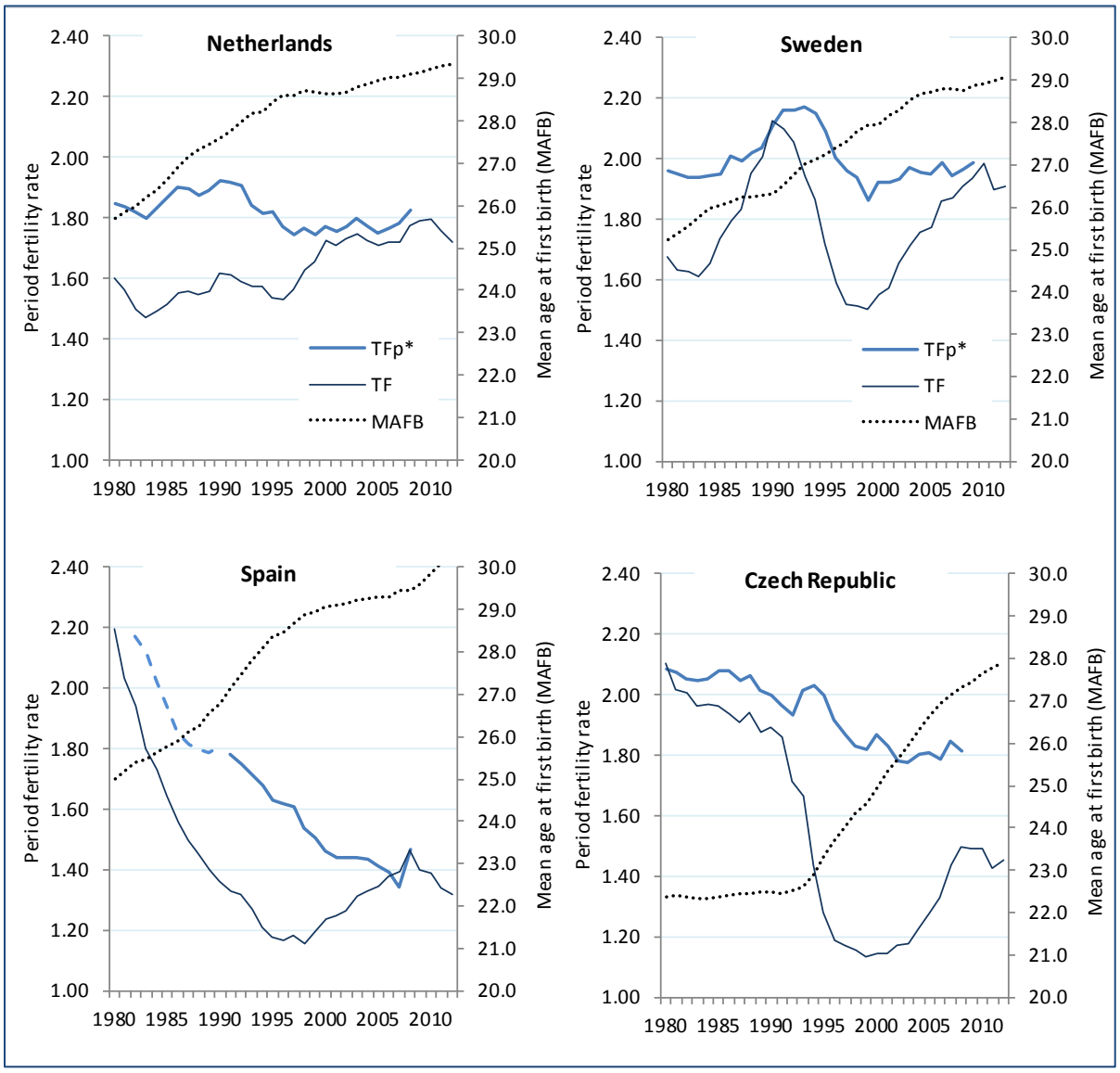
NOTE: The graph plots average values for the following countries: Belgium, Czech Republic, France, Hungary, Italy, Netherlands, Portugal, Romania, Spain, Sweden, and the United Kingdom.

Figure VIII: Age-specific fertility rates (summarized for 5-year age groups) and period Total Fertility; average for 11 EU countries, 1975-2011



NOTE: see note below figure 7.

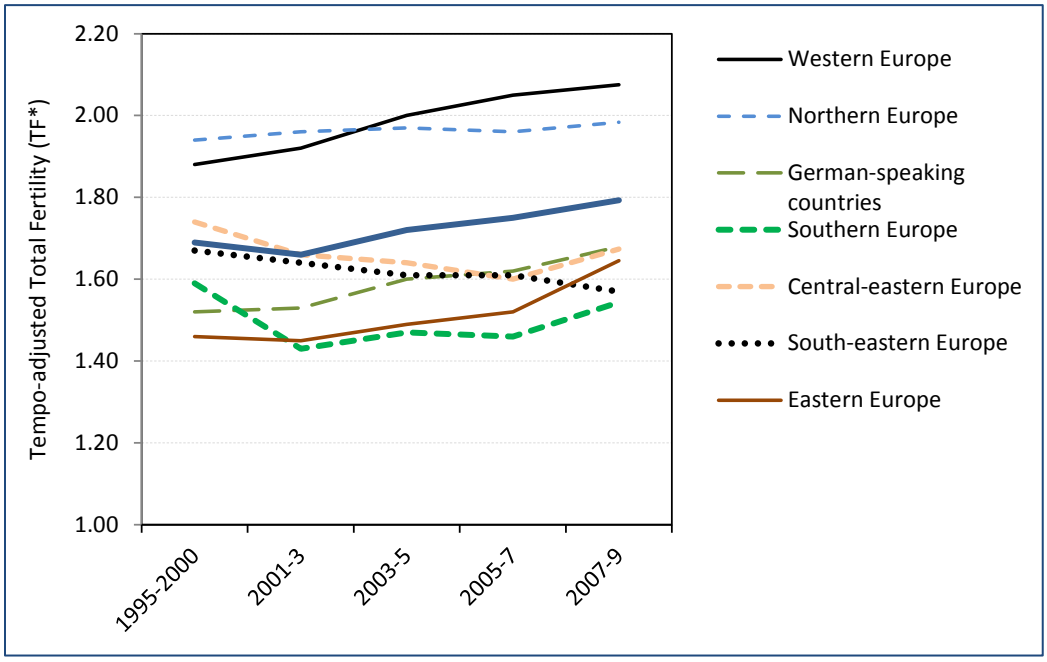
Figure IX: Conventional period Total Fertility, tempo- and parity-adjusted index TFp*, and the mean age of mothers at first birth in four European countries, 1980-2012



NOTE: see note below figure 7

Sources: Computations based on Eurostat (2012, 2013) and Human Fertility Database (2012). TFp* data partly computed by Kryštof Zeman (Vienna Institute of Demography).

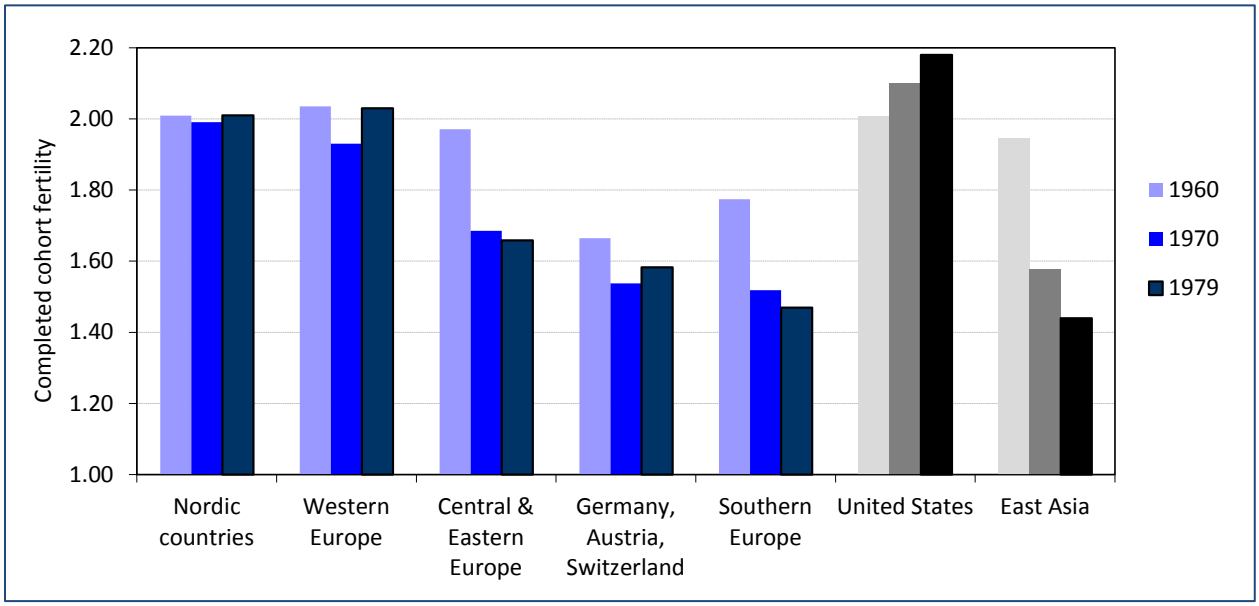
Figure X: Tempo-adjusted period Total Fertility in European regions from 1995-2000 to 2007-9



NOTE: Data are presented for 3-years periods to reduce fluctuations and also due to missing annual data for some countries. For the earliest period data are available only for a broader 6-year time span. No regional data have been computed for the most recent period after 2007-9.

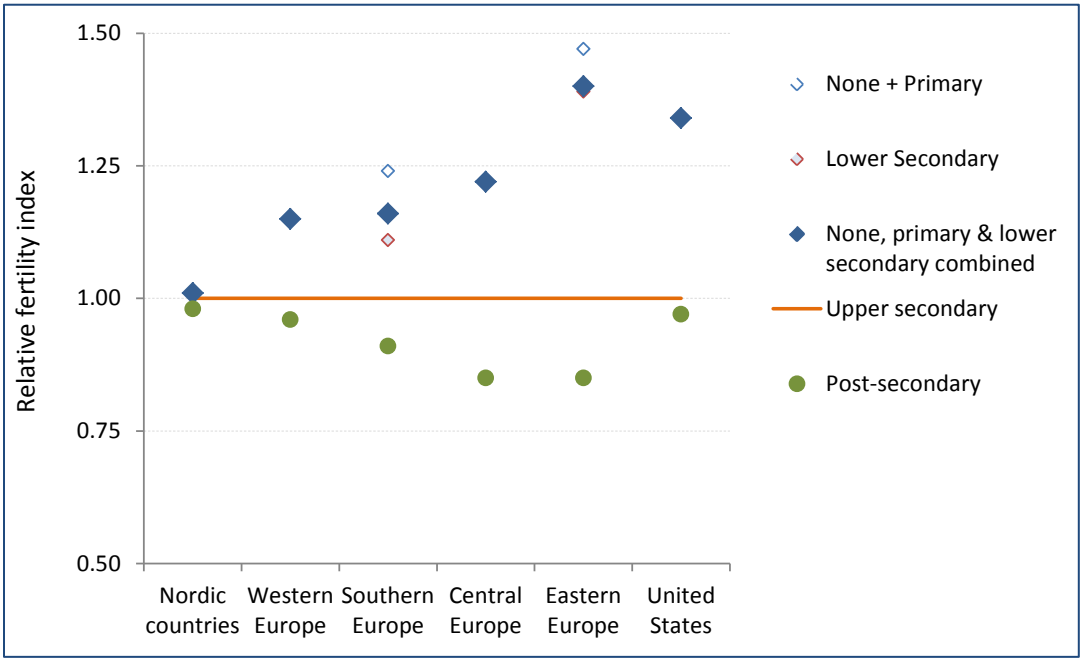
Sources: Sobotka 2004b and computations based on VID 2006, 2008, 2010, and 2012.

Figure XI: Observed (1960 and 1970) and projected (1979) completed cohort fertility in European regions, United States and East Asia



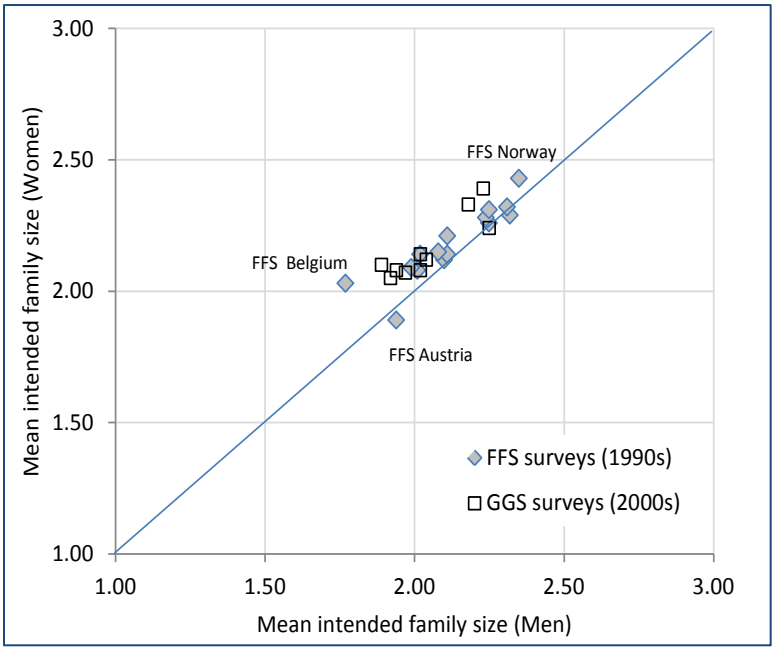
Source: Computed from the data and projections in Myrskylä et al (2013).

Figure XII: Relative fertility by level of education among women in European regions and the United States, cohorts born around 1960 (fertility of women with higher secondary education is indexed at 1



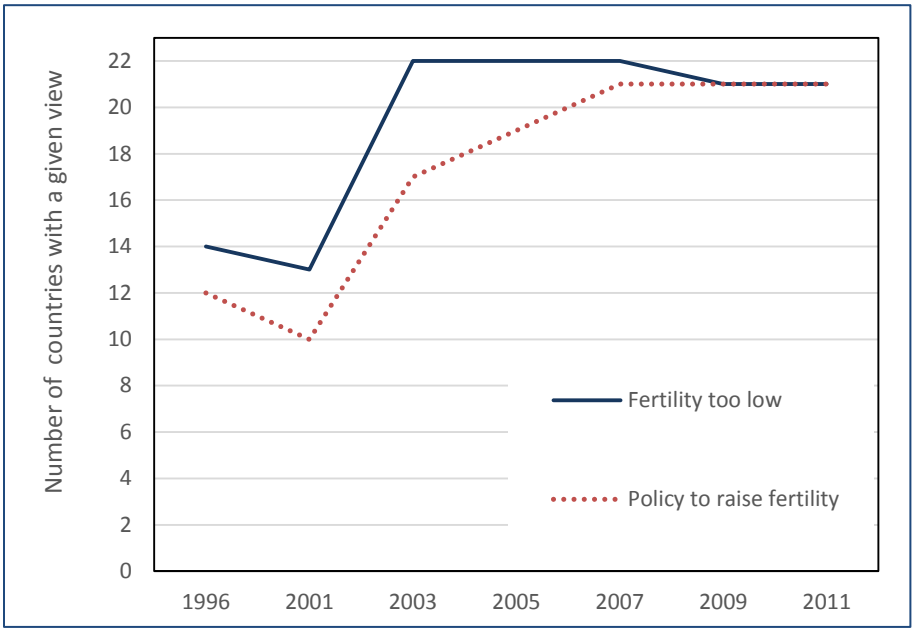
Source: Basten et al. 2013: 77, Table 6; data based on population censuses, large scale surveys and registry data. The complete list of source data is provided in Appendix 6 in Basten et al. (2013).

Figure XIII: Mean intended family size among women and men in selected European countries in the 1990s (FFS surveys) and 2000s (GGS surveys)



Source: Mean intended family size computed by Éva Beaujouan (VID) from individual records in the FFS and GGS surveys; see Beaujouan et al. (2013) for more details.

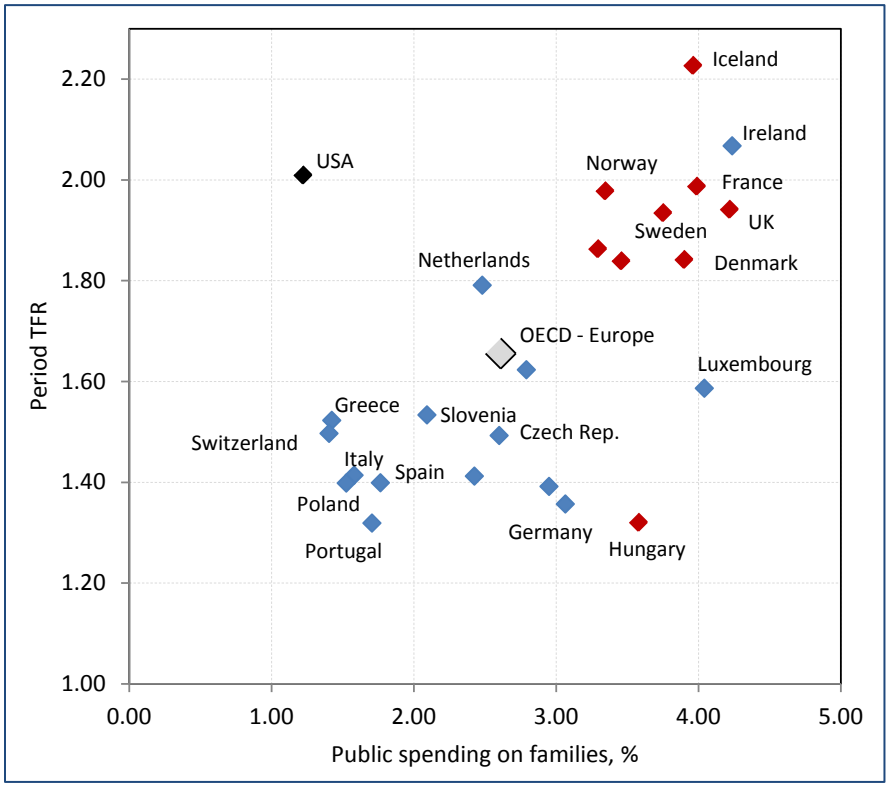
Figure XIV. Number of European Governments stating fertility in their country is too low and their policy is to raise fertility, 1996-2011; 22 countries experiencing a period TF below 1.4 since 1995



Source: United Nations (2012 and 2013b).

NOTE: The following countries were included: Austria, Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Moldova, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Switzerland and Ukraine.

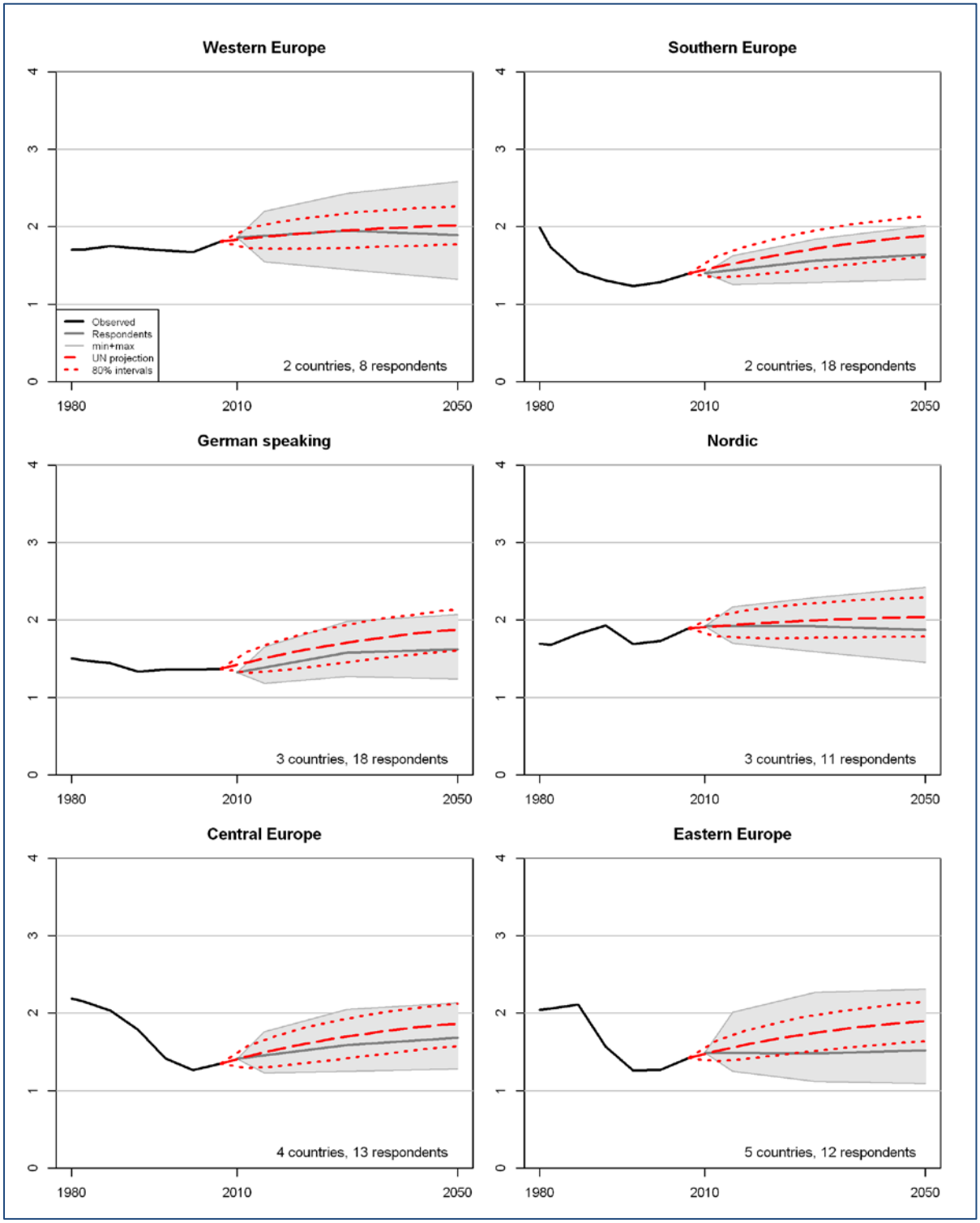
Figure XV: Public spending on families (percentage) and period Total Fertility in 2009; European OECD countries and United States



Source: OECD 2013, Table PF1.1.A (Public spending on family benefits in cash, services and tax measures).

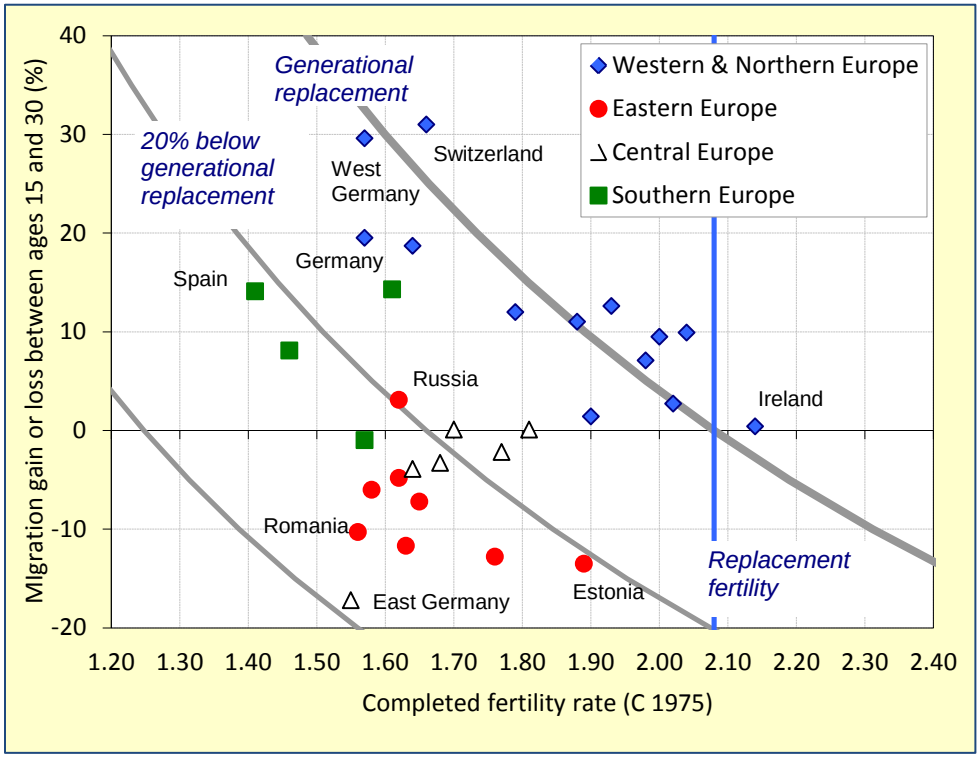
NOTE: Countries represented by blue diamonds have lower spending for childcare services (below 1 percent of their GDP); countries represented by red diamonds have above-average spending for childcare services (at or above 1 percent of their GDP). The USA (black diamond) is the only non-European country shown.

Figure XVI: Regional graphs of expected Total Fertility trends up to 2050: A comparison of the global survey of experts and the 2010 UN projection (probabilistic fertility scenarios)



Source: WIC Global survey of experts conducted in 2011; data published in Basten et al. (2013: 63, Table 5) and Sobotka et al. (forthcoming)

Figure XVII: Completed fertility and net migration gain or loss between ages 15 and 30 in European countries, women born in 1975



Sources: Completed fertility rates based on Myrskylä et al. (2013), Prioux and Barbieri (2012) and own estimates based on Eurostat and Human Fertility Database. Migration gain or loss computed from annual age and sex structure of the population published by Eurostat and Human Mortality Database