Contemporary childbearing trends in low-fertility countries: A long-term perspective

Tomas Frejka, Independent consultant, US
Jean-Paul Sardon, INED, Paris

During the first decade of the 21st century fertility measured by the total period fertility rate (TPFR) increased in most low-fertility countries of Europe, North America, Oceania and East Asia (Tables 1 and 2). This contrasts with the long-term fertility decline since the "baby-boom" of the 1950s and early 1960s (Figure 1). The goal of this paper is to summarize the demographic mechanisms affecting these trends. In principle, changes in fertility quanta combined with changes in the timing of childbearing generated the period fertility trends.

In 2007-08 the average period total fertility rate ranged from 1.2 in East Asian countries to 1.4 in Southern Europe and Central and Eastern Europe to 1.8 in western and Northern Europe to 2.0 in non-European English-speaking countries. In the western countries a long-term fertility decline from the baby-boom years through the end of the 20th century had occurred which was caused by a decline in fertility quantum and reinforced to some extent by changes in life-time fertility patterns. Childbearing postponement had been extensive throughout the western world and the countervailing force of fertility recuperation was reasonably strong in Northern and Western Europe, but less so in the German-speaking countries and in Southern Europe. In the formerly socialist countries of Central and Eastern Europe a marked decline in fertility quantum got under way in the 1990s and this was substantially reinforced by changes in lifetime childbearing patterns, in particular by fertility delays. In the early years of the 21st century the modest rise in period fertility rates was the result of continuing but relatively weak childbearing postponement of young birth cohorts of the late 1970s and the 1980s combined with relatively strong fertility recuperation of older cohorts born in the late 1960s and the 1970s. It also appears that the two-child family model which became dominant during the 20th century was fading away. It is being replaced by one-child families and/or by relatively large proportions of couples or women deciding not to have any children at all. There was, however, a significant diversity among countries. In some the parity distribution has been stable among recent cohorts and in a number of these the proportions of two-child families have not been declining.

For the 38 countries for which sufficiently detailed data are available, we will present and analyze long-term trends in total cohort fertility rates (Tables 3 and 4; Figure 2) as well as trends in first, second and third order cohort birth rates and childlessness rates (Figures 3-6). Further, we will explore the principal changes in parity distributions, i.e. changes in family size (Table 5; Figure 7). Following that we will analyze long-term changes in the postponement and recuperation of childbearing (Tables 6 and 7; Appendices 3 and 4). Finally, we will summarize the demographic mechanisms which generated the most recent period fertility increases in the early 21st century (Table 8; Figure 8).

Data and methods

At the beginning of the 21st century, more specifically in the period 2000 – 2008, there were 60 countries with over 1 million inhabitants whose TPFR for most of those years was at or below the replacement level of 2.1 births per woman (PRB 2009). These are the countries labeled as "low-fertility." For 38 of these countries (Tables 1 and 2) sufficiently detailed data about births by single year of age of mothers were available from registration so that age-specific cohort fertility rates (ASCFRs) and thus total cohort fertility rates (TCFRs) and cumulated cohort fertility rates (CCFRs) of specified ages could be assembled and used for analysis. Birth order data were available for about three-quarters of these countries, at times only for a limited number of cohorts. Such detailed data were not available for most of the low fertility countries of Central and South America, for some Asian countries, and a few East European ones, such as Costa Rica, Cuba, Jamaica, Chile, Armenia, Georgia, Lebanon, United Arab Emirates, Iran, Singapore, Thailand, Vietnam, China, North Korea, Belarus, Moldova, and Ukraine. Consequently, the analysis in this paper is conducted with the detailed data available for the former 38 countries.

Countries were classified into 10 regions primarily on a geographic basis. In most of the regions countries have some common economic, political, or social, and frequently also shared linguistic, cultural, ethnic, and other characteristics. Some regions are more homogeneous than other. The classification is not perfect and the titles of some regions might seem awkward (Cf. Table 1 for the region names and the countries included). In the interest of simplifying results and presentation, for some of the analyses countries were combined into larger groups, of which there are five. The Nordic region, Western Europe and West Central Europe comprise the group "Western countries," and East Central Europe, Eastern Europe, the West Balkan region and the Baltic region comprise the group "Central and East European countries." The regions "Southern Europe," "Non-European English-speaking countries," and "East Asia countries" are comprised of the same countries in both classifications.

The *Observatoire Démographique Européen*[1] obtained the original data from colleagues and institutions in the respective countries and prepared the series of cohort fertility measures. All series are based on an identical definition of age irrespective of the original classification of national statistical offices. To obtain cohort fertility measures for the youngest cohorts of the mid- to late 1960s it was necessary to estimate the age-specific rates of women above age 40. The procedure never involved estimating more than five percent of the respective total cohort fertility rate; for practically all cohorts less than two percent of the total value are estimated.

Much of the analysis is done with cumulated single-year-of-age-specific-cohort-fertility- rates up to a certain age[2] or with such cumulated rates for sections between certain ages of mothers, namely using sections of successive cohorts of different ages. The following procedures were applied:

---

[1] odeurope@wanadoo.fr

[2] Age is defined as completed age as of December 31 of year of observation.

1. To measure fertility advancement and postponement cumulated age specific cohort fertility rates up to age 26 included[3] were used. The cutoff point of the 27th birthday was established based on a technical consideration, but there is also a substantive justification. The technical point is the fact that for the youngest cohort for which data were available in most countries, namely for the 1980 birth cohort, data were those up to the 27th birthday. At the same time, in most of the low-fertility countries *approximately* the age of 27 is the turning point after which a recuperation of delayed fertility tends to occur.

2. To measure childbearing recuperation the cumulated age specific cohort fertility rates between the 27th and the 40th birthdays were employed. For the justification of the 27th birthday see the previous paragraph. The cutoff point of the 40th birthday was selected so that the 1965 birth cohort could be included in the series and is justified by the fact that only a small proportion of births, typically 1 to 2 percent of the total number, occur after that birthday.

.

3. Two rather complex indicators were constructed to measure the cohort impact on the trend of period fertility rates of a certain period, specifically the 2001-2006 period[4].

(i) The sum of the differences in the age specific single year fertility rates between successive birth cohorts, i.e. differences are computed taking moving base cohorts, of that proportion of the cohort fertility behavior experienced during the period under investigation (see Appendices 1 and 2); Appendix 1 illustrates the areas in the Lexis diagram of fertility behavior that are referred to in this investigation; Appendix 2 (*too large for reproduction-for details consult authors*) demonstrates in detail how indicator (i) is computed. The logic and justification for this procedure is to establish the quantity (positive or negative) that the respective cohort contributed to the period fertility trend of the specific period. The total sum of the differences does not provide any critical information. It is merely a check whether the computations have been done correctly, because this indicator equals exactly the difference between the total period fertility rates at the beginning and at the end of the period. The reason why these two indicators equal each other is that they are based exactly on the same area in the Lexis diagram (ABCD in Appendix 1). The difference is that the cohort analysis is performed along diagonal lines, whereas any period analysis is conducted vertically. The useful information is in the details of how much each cohort's contribution differs from zero, i.e. this measures the amount of the positive or negative quantitative effect on the trend of the PTFR of the period. This can be demonstrated in a tabular[5] or graphic form (Figure 9). The latter

[3] This is six months before the 27th birthday, but we will use the terms 27th (and 40th) birthday for the sake of convenience.

[4] The definitions of these indicators germinated while Frejka was working at the *Vienna Institute for Demography* with Sobotka, Zeman and Lesthaeghe in May 2009 on a project to expand and improve cohort fertility analysis methods. These definitions were subsequently refined in subsequent work with Sardon at the *Institut National d'Études Démographiques* in June 2009.

[5] In tabular form see row 81 or row 84 for the Czech Repuiblic and rows 85, 86 and 87 for Hungary, Poland and Slovakia, respectively.

provides a clearer illustration. For instance, the comparison of the curves for the Czech Republic and Poland in the figure for East Central Europe provide a good illustration (Figure 9, panel E). Both curves are almost identical for the birth cohorts of the late 1970s and the 1980s; these cohorts had a similar negative effect in both populations. The curves for these two populations differ significantly for the early to mid-1970s birth cohorts. The positive impact of these cohorts in the Czech Republic is much larger than in Poland. Consequently, the net impact of cohort fertility behavior during the period 2001 to 2006 raised the TPFR by 15.9 percent in the Czech Republic, but the TPFR in Poland experienced a decline of 1.7 percent.

(ii) The second measure indicating the cohort impact on the period fertility rate trend takes into account the full past childbearing experience of the respective cohorts (ABCE in Appendix 1). It takes cumulated cohort age specific fertility rates from the beginning of the reproductive period through the end of the latest year and then analyzes the difference of the cumulated rates during the past five years (ABCD in Appendix 1)[6]. In contrast, the previous indicator takes only the childbearing patterns experienced during the respective period into account. The indicator using the full past cohort experience into account is valuable in that it can be compared to the net impact of the past five years only. The relative size of indicator (i) compared to (ii) demonstrates the importance of what has occurred in the recent past. The larger indicator (i) is compared to indicator (ii), the more important the recent childbearing behavior will have been.

Period fertility trends

Major changes in fertility behavior occurred during the second half of the 20th century throughout the world. Around 1950 the world's total fertility rate was over five births per woman which was cut in half by the beginning of the 21st century (United Nations, 2009). Forty four percent of the world's population was living in countries with fertility at or, for the most part, below the replacement level by the early 2000s (PRB 2009). The 38 countries whose fertility trends are investigated in this paper can be compiled into five broad categories (Tables 1 and 2, Figure 1). The paths to low fertility differ and there was a wide range of total period fertility rates between countries in the 2000s. The lowest TPFR, 0.90, was recorded in Hong Kong for 2003 (Census and Statistics Department. 2007). The highest TPFR, 2.17, was recorded in New Zealand for 2008, up from 1.89 in 2002.

In numerous countries period fertility has been increasing in the 2000s following a long-term decline or stability for several decades (Table 1 and Figure 1). That is reflected in the average numbers for the regions (Table 2). The reversal in fertility trends for the most part is modest and the increase tends to be from low levels. The average TPFR around 2007-2008 compared to 2000 was higher by seven percent in West European countries, by six percent in Southern Europe, by four percent in Central and Eastern Europe and by eight percent in the overseas English-speaking countries (Table

[6] Note that the area ABCD is the same in (i) and (ii), however, the values differ, because (i) reflects ONLY childbearing patterns during the 5-year period whereas (ii) reflects lifetime childbearing patterns prior to and during the 5-year period.

2). The respective annual rates of growth were 0.9, 0.8, 0.5 and 1.0 percent per year during the early years of the 21st century. This compares to negative average annual rates of change for the entire second half of the 20th century.

Among the Central and East European countries it appears as though the average increase was the lowest (Table 2). There was, however, quite a difference between countries as relatively large increases were counterbalanced by very low growth rates or even declines in other countries. The annual fertility growth rate was, for instance, 3.3 percent in the Czech Republic and 2.8 in Estonia. On the other hand, period fertility declined slightly in Romania and Lithuania and by an average of -4.2 percent in Macedonia. Also, in a number of these countries the lowest TPFR was in 2002 or 2003, not in 2000. Consequently, the rate of change between 2000 and 2006 is misleading. For instance, the annual rate of TPFR change in Lithuania between 2000 and 2007 was -0.5, however, the annual rate of increase between the trough in 2002 and the year 2007 was 2.5 percent.

The period fertility decline continued in the East Asian countries in the 2000s. On average, the TPFR declined from 1.39 in 2000 to 1.17 in 2006-2008. Period fertility did decline during this period in Japan, South Korea and Taiwan. In Hong Kong, however, the period fertility trough was in 2003, namely a TPFR of 0.90, and by 2008 it reached a value of 1.06, an annual rate of increase of 0.6 percent. It is of note that the East Asia countries had the lowest TPFRs among all the low-fertility countries early in the 21st century (Cf. Jones et al. 2009; Frejka 2009).

What were the demographic mechanisms generating the long-term period fertility declines as well as the recent upswings? What was the role of quantum, i.e. cohort, fertility trends? And how important were trends in the postponement and recuperation of childbearing? How did lifetime patterns of fertility change? How did parity distributions and family sizes change? These questions will be explored in the following sections.

Cohort fertility trends

In almost all low-fertility countries total cohort fertility rates (TCFRs) were declining for the past half century, however rates of decline were uneven over time (Tables 3 and 4; Figure 2). In virtually all countries total cohort fertility rates were declining even among the youngest cohorts, i.e. the birth cohorts of the 1960s (Tables 3 and 4; Figure 2). This is not surprising as the 1960s birth cohorts were in their prime childbearing years during the 1990s. The declines were relatively weak, namely below one percent per year between successive birth cohorts among the youngest birth cohorts, in the overseas English-speaking countries and in Western countries, except for the German-speaking countries. Denmark and the United States experienced modest increases in completed cohort fertility among the 1960s cohorts.

The TCFR declines were notable in Southern Europe and particularly strong in East European and in Asian countries (Table 3). The lowest TCFR, 1.2, was reached in Hong Kong among the mid-1960s cohorts.

A brief analysis of cohort birth-order trends provides a better understanding of the total cohort fertility trends.

Cohort birth-order trends

First birth order total cohort fertility rates

The proportions of women having first order births in the West European countries declined from a high of around 90 percent among the 1930s and early 1940s birth cohorts to around 80 percent among the 1960s cohorts (Figure 3). Apparently the rates were stabilizing at this level among the cohorts of the 1960s. In the Scandinavian countries, with the exception of Finland, the first birth TCFRs have been quite stable and remained around 90 percent among the cohorts of the 1950s and 1960s. In the United States the first birth order TCFRs declined from above 0.90 among the 1930s cohorts to around 0.85 among the cohorts of the 1950s. Among the 1960s cohorts these rates were increasing modestly.

In Southern Europe first birth TCFRs showed a tendency to decline among the 1960s cohorts (Figure 3). Nonetheless, these remained at or above 0.80. The unusually high first birth TCFRs in Portugal were in part an expression of the fact that some Portuguese women residing abroad come "home" to give birth. The births are then registered in the country, even though the women are officially residing abroad.

Throughout Central and Eastern Europe proportions of women having first births tended to be between 90 and 95 percent from the birth cohorts of the 1930s through those of the early 1960s (Figure 3). In most of these countries a decline in first birth TCFRs started among the late 1960s birth cohorts and this trend appeared to be continuing among the cohorts of the early 1970s.

In the three countries of East Asia for those birth cohorts for which first birth TCFRs could be obtained, i.e. those of the 1950s and 1960s, there was a continuous decline (Figure 3). In Japan the first birth TCFRs declined to almost 0.70 and in Hong Kong to around 0.65. In Taiwan first birth TCFRs were still above 0.80 among the birth cohorts of around 1970, but these were clearly on a declining trend.

Childlessness

Women who do not have a first birth remain childless. Thus the trends in childlessness are the mirror image of the first birth TCFRs (Figure 4). Among the cohorts of the late 1960s in the Scandinavian countries and in the US between 10 and 13 percent of women remained childless. Between 15 and 20 percent of women remained childless in Southern Europe among the late 1960s cohorts. A similar percentage of women were childless in the cohorts born around 1970 in the Central and East European countries, although in Poland and Croatia this proportion was inching above 20 percent. And in

Japan and Hong Kong around a third of all women were remaining childless in the youngest cohorts born around 1970.

Second birth order total cohort fertility rates

In Western Europe and the United States second order cohort fertility rates were declining from their highs of around 0.80 of the baby boom birth cohorts of the 1930s and early 1940s to between 0.65 and 0.70 among the cohorts of the 1950s (Figure 5). These rates remained stable among the 1960s birth cohorts. Women of these cohorts in Norway and Sweden exceeded that level slightly, 72 to 73 percent were having second births. On the other hand, in Austria only about 56 to 57 percent of women were having second children among the mid- to late-1960s cohorts.

In Southern Europe second order fertility rates were declining moderately but continuously among the birth cohorts of the 1950s and 1960s (Figure 5). Only around 60 percent of women were having second births among the late-1960s birth cohorts.

In Central and Eastern Europe there was a wide range of second birth order TCFRs between countries (Figure 5). With the exception of Macedonia, second order birth rates started to decline quite rapidly among the late-1950s birth cohorts. The decline continued among the cohorts of the 1960s. In most countries between 60 and 70 percent of women were having second births. In Romania only about half of all women were having second births.

In the three East Asian countries there was a steep decline in second order birth rates among the 1950s and 1960s cohorts (Figure 5). Among the late-1960s cohorts only slightly over 40 percent of women in Hong Kong were having second births. Also Japan's second order birth rate was low, about 0.55 among women of the late-1960s cohorts.

Third birth order total cohort fertility rates

Third birth cohort fertility rates declined from the highs of the 1930s cohorts to between 0.20 and 0.30 in most Western countries among the 1950s cohorts and stabilized at that level (Figure 6). The rates were slightly higher in Norway and the United States; around a third of all women were having third children in the late 1960s birth cohorts.

In Southern Europe there was a steady decline in third order birth rates among the cohorts of the 1940s, 1950s and 1960s (Figure 6). Less than 20 percent of all women were having third children among the cohorts of the late-1960s.

There was a range of differences in trends and levels of third order birth rates among countries of Central and Eastern Europe (Figure 6). In most of these countries about one quarter of all women were having third children among the cohorts of the late 1960s. There were exceptions. In the Czech Republic this proportion was below 20 percent and in Romania it was almost as low as 10 percent.

The decline of third order birth rates in East Asia countries was notable among the 1950s and 1960s birth cohorts (Figure 6). Hong Kong had the distinction of less than 10 percent of women of the late-1960s birth cohorts having third births. This proportion was also low in Japan, less than 20 percent.

Parity distribution trends

The differential levels and trends in cohort birth order fertility rates are reflected in trends of parity distribution. Reliable data are available for countries from different "regions," and thus provide some degree of representativeness. Because the respective birth cohorts had concluded their childbearing by the early 2000s, the levels and trends contained in Table 5 and Figure 7 provide information about the recent past, but in most countries parity distributions are probably continuing to change. Although there are trend differentials in parity distribution between countries, there are certain developments which are common for a number of them. In the ensuing analysis the concepts of parity distribution and family composition are treated as interchangeable even though this is a gross simplification. Given the many forms of family and partnership behavior and the increasing rates of divorce and separations (Cf. Sobotka and Toulemon 2008) these two concepts are far from interchangeable in reality, but it provides a "broad brush" idea of how family compositions are changing.

During the second half of the 20th century the two-child family became the dominant pattern with between 35 to 55 percent of the total (Table 5 and Figure 7). Among the birth cohorts of the 1950s and 1960s the proportions of large families of three or more children had shrunk to 30 percent or less of all families (Cf. Frejka 2008).

A recent trend of a decline in the proportions of women with two children started in western countries, such as the Netherlands and England & Wales among the cohorts of the late 1940s. This decline was moderate in most cases, however, for instance in Hungary, Croatia and especially in Japan the downward trend was steep (Figure 7). There were countries where proportions of two-child families were stable, such as Sweden, Spain and the United States.

On the other hand, in most countries there was an increase in the proportions of women who had remained childless and of those who had had only one child (Table 5 and Figure 7). The increase in childlessness was notable in Greece, Croatia and Japan. The rise in the proportions of one child families was notable in the Netherlands, Italy, Spain, the Czech Republic, Hungary, Slovakia and especially in Romania where over a third of all women had had only one child.

The proportions of combined childless and parity one women were increasing virtually in all countries among the 1960s birth cohorts. The only exceptions were Sweden and the United States, where this combined proportion was around 30 percent. The combined proportion of childless and parity one women reached over 40 percent in

Spain and Japan, and around 50 percent in Romania in the cohorts of the late 1960s (Table 5 and Figure 7).

There were also countries with only moderate changes in their parity distributions, such as Denmark and Sweden (Table 5 and Figure 7). In the United States family compositions had become reasonably stable among the younger birth cohorts of the 1950s and the 1960s, having undergone major changes in older cohorts.

The postponement of childbearing

The postponement of childbearing is another essential aspect of fertility trends in low-fertility countries of the past half century. The delays in family formation and childbearing have been extraordinarily important sociological and demographic developments during recent decades and have deservedly attracted major attention (Billari 2008; Billari, Kohler 2004; Bongaarts, Feeney 1998; Castles 2003; Frejka, Sardon 2004; Frejka et al. 2008; Jones et al. 2009; Goldstein et al. 2003; Iwasawa, Kaneko 2007; Kohler et al. 2002, 2006; Konietzka, Kreyenfeld 2007; Lutz, Skirbekk 2005; McDonald 2002; Retherford, Ogawa 2006; Sobotka 2004 a and b). We are presenting and analyzing a long-term overview, including the latest available data, on levels and trends in childbearing delay[7] by comparing cumulated cohort ASFRs up to age 26 included (Table 6, Appendix 3).

Taking the data from all countries in the sample, and realizing that these represent a vast range of socio-economic and political conditions, among the 1945 birth cohorts the average number of children born by the 27th birthday was 1.3 which declined to 1.0 by the cohorts of 1960 and stands at 0.5 as the average for the 1980 birth cohorts (Table 6). The minimum value in the 1945 birth cohort was 1.0 in Switzerland and Spain; the maximum value was 1.7 in New Zealand (Appendix 3). Among the 1980 birth cohorts the range from the minimum to a maximum of births per woman by age 26 was from 0.2 in Hong Kong to 0.9 in Macedonia. The trends in fertility delay differed from one country to another.

In general, childbearing postponement started among the cohorts of the 1940s in Northern and Western Europe, in the German-speaking countries and in the overseas English-speaking countries (Table 6 and Appendix 3). It was among the cohorts of the 1950s that childbearing delay got under way in Southern Europe and in the birth cohorts of the 1960s in the formerly socialist countries of Central and Eastern Europe. This is in line with what has been documented in many publications, namely that fertility behavior during the second half of the 20th century was substantially different in the western countries compared to the formerly socialist countries.

Table 6 summarizes the data for the five main country groupings. In Western Europe and in the Non-European English-speaking countries, fertility delay was fully under way among the birth cohorts of the late 1940s. It was in intensive progress among

[7] There are other ways of presenting and analyzing fertility postponement (see Kohler et al. 2006, pp. 80-82)

the cohorts of the 1950s and 1960s and slowed down among the 1970s cohorts. On average, absolute declines of early childbearing became quite small among the cohorts of the late 1970s. The average rate of fertility delay in Western Europe, 1.5 percent of annual decline among the cohorts born during the late 1970s, points to a slowdown. This average percentage, however, is the result of a considerable diversity in country trends. On the one hand, there was no childbearing delay in France, the Netherlands, and England & Wales, whereas fertility postponement was continuing quite intensively in the German-speaking countries, and even in Denmark (Appendix 3).

In Southern Europe childbearing postponement proceeded rapidly among about 20 cohorts, beginning with those of the late 1950s through those of the early 1970s (Table 6). There was a notable slowdown in fertility postponement in this region, although the average annual rate of decline of -1.0 percent was again the result of considerable differences between countries. Childbearing postponement was continuing robustly in Greece and Portugal among the cohorts of the late 1970s, whereas it had come to a standstill in Spain (Appendix 3).

In the Central and East European countries fertility delay did not become widespread prior to the birth cohorts of the late-1960s and has been very strong among the cohorts of the 1970s (Table 6).

In sum, childbearing delay has slowed down among the birth cohorts of the 1970s in absolute and relative terms in Western countries. In a few countries, namely France, England & Wales, the Netherlands and Spain, there was no longer any fertility postponement. Childbearing delay was of considerable magnitude in the formerly socialist countries of Central and Eastern Europe among the 1970s birth cohorts.

Childbearing recuperation

Patterns of childbearing recuperation differ between countries just as much as patterns of postponement. Some populations have a strong, others a weak propensity for childbearing to recuperate (Figure 8). Considerably less attention has been paid to childbearing recuperation in the literature than to postponement, although the former is just as important in terms of the effects on cohort and on period fertility rates. There is no equivalent to the Bongaarts and Feeney (1998) paper on postponement which deals with the relevant issues regarding recuperation and its interaction with postponement. It was Lesthaeghe (2001), Frejka and Calot (2000; 2001 a, b and c) and Frejka and Sardon (2004) that dealt with postponement and recuperation or "catching up" with a wealth of empirical analyses. Lesthaeghe (2001) also designed a formal model of postponement and recuperation.

By definition the series of data in the long-term overview of recuperation are shorter than those for postponement, because the complete data for the cohort age groups in the birth cohorts of the late 1960s and 1970s beyond the 27^{th} birthday are not yet known. As will become obvious below, it is the amount of recuperation at the ages of prime childbearing around age 30 that are crucial, particularly for the purpose of the

focus of our research. Be that as it may, Table 7 and Appendix 4 do provide valuable information.

Among the cohorts of the 1930s and the early 1940s the absolute numbers of children born to women over the age of 26 were declining in practically all the low fertility countries. This was not only due to the advancement of childbearing into earlier years, but also because the size of families was declining and fewer high order children were being born (Table 7, Appendix 4). This trend was reversed in the birth cohorts of the late 1940s, the 1950s and the early 1960s in Western Europe and in the Non-European English-speaking countries when the numbers of children borne by women over the age of 26 were increasing on average by around one to three percent per year (Table 7), in the Nordic countries the annual rates of increase of births to older women were around three to four percent (Appendix 4). This was an expression of a robust recuperation of childbearing at older ages.

In the formerly socialist countries of Central and Eastern Europe on average the numbers of births of older women continued to decline even among the birth cohorts of the 1950s and early 1960s (Table 7). There were some exceptions, for instance, in Hungary and Slovenia, a modest recuperation of births was taking place among the cohorts of the late 1950s and the early 1960s (Appendix 4).

To the extent that data are available, births of older women continued to decline even among the birth cohorts of the 1950s and early 1960s also in the East Asian countries (Table 7 and Appendix 4).

This brief section, albeit useful, fails to inform about factors contributing to the understanding of current events or those of the immediate past. No matter how strongly birth cohorts of the early 1960s were recuperating the main effect was on period fertility of the 1990s, because that was when these cohorts were in their thirties. As alluded to above the next and last section of this paper will rectify this shortcoming.

Fertility trends in the first years of the 21st century

We now proceed to explain trends in the total period fertility rates (TPFR) of low-fertility countries in the period 2001 to 2006 by the help of cohort fertility methods.

The basic theoretical idea is that the TPFR trend is the result of cohort fertility behavior of 5-year segments of the reproductive period experienced by all successive birth cohorts during 2001-2006. For instance, the 1960 birth cohort will have been 42 to 46 years old during 2001-2006, the 1970 birth cohort 32 to 36 years old and the 1980 birth cohort 22 to 26 years old. It is the sum of the experiences of the respective segments of their reproductive periods always compared to the previous cohort which generates the specific period fertility trend. Each of the birth cohorts makes a contribution to the period trend (Appendix 1). This can be positive or negative. The sum of the contributions of each cohort will determine the overall trend of the period fertility rate. This sum is the net cohort impact of all the birth cohorts involved and it also equals the actual increase or

decline of the total period fertility rate during the 2001-2006 period. By definition, if the sum of the positive individual birth cohort contributions is larger than the sum of the negative ones, the outcome is an increase in the TPFR. Contrariwise, the TPFR shows a decline if the sum of the positive individual birth cohort contributions is smaller than the sum of the negative ones. The results for all the 38 populations are depicted in Figure 9 and summarized in Table 8.

This analysis is a hybrid of period and cohort fertility approaches. From a pure cohort perspective the analysis is flawed, because fertility patterns of successive cohorts are taken into account for the total impact. Furthermore, the impact of only a proportion of each cohort's fertility pattern on the period fertility rate trend is demonstrated. Nonetheless, this approach provides insights of how fertility patterns of cohorts that were in their childbearing phases in the most recent past were shaping period fertility trends. This is in addition to the trends of childbearing postponement and recuperation analyzed for older cohorts in preceding sections of this paper.

The graphs show that the impact of the cohorts that were at the beginning or at the end of their reproductive periods during 2001-2006 were relatively small, whereas the impact of the cohorts that were closer to their prime childbearing phases tend to be larger. In the majority of countries the net cohort impact of the last five years was positive (col. 3, Table 8). Typically this was the outcome of a relatively small negative impact of the younger cohorts, namely the birth cohorts of the late 1970s and the 1980s, combined with a relatively large impact of the older birth cohorts of the early 1970s and the 1960s (Figure 9). In most countries the younger cohorts were continuing to postpone childbearing, although, for instance, there was no such fertility delay in the Netherlands and in Italy. On the other hand, the older cohorts were catching up on the childbearing they had earlier delayed. The recuperation among the older cohorts was relatively strong, for instance, in England & Wales which signified a large positive impact of the latest 5 years of cohort childbearing and simultaneously a 13.7 percent increase in the TPFR during 2001-2006.

At the same time there were a few populations in which the net cohort impact of the last five years was negative. Childbearing postponement of many young birth cohorts of the 1970s and 1980s was, for instance, strong in Portugal and Macedonia and this was combined with weak recuperation in the older birth cohorts of the 1960s. Thus there was a negative impact of the latest 5 years of cohort fertility patterns on period fertility, a 6.7 percent decline in the PTFR between 2001 and 2006 of Portugal and a 15.4 percent decline in Macedonia.

Another useful piece of information is to obtain an indication of how large the impact of the last 5 years of cohort fertility behavior was as part of the lifetime cohort fertility experience by the end of 2006 for the respective cohorts (col. 7 [last but one] in Table 8)[8]. In Denmark the cohort fertility experience of the last 5 years represented about three-quarters of the total fertility experience; in Finland the former was more than twice

[8] The negative signs should be disregarded – it is the absolute value in col. 7 of Table 8 that indicates the importance of the last 5 years of fertility behavior relative to the lifetime experience.

of the latter. In sum, in the majority of the 38 populations the fertility behavior during the early years of the 21st century was decisive in affecting the trends of the PTFRs. Only in 10 of the 38 populations was the impact of the last 5 years of cohort fertility experience less than 50 percent of the lifetime childbearing behavior. On the other hand, in a third of the populations the fertility experience of the latest 5 years was more important than the impact of lifetime cohort fertility experience.

Summary and conclusions

This paper has focused on demographic mechanisms that were instrumental in generating fertility trends in low-fertility countries during the past five to six decades. Societal mechanisms are equally important and there are numerous publications that have analyzed these; among them one recent comprehensive project on *Childbearing Trends and Policies in Europe* (Frejka et al. 2008) and a volume on *Ultra-low Fertility in Pacific Asia: Trends, causes and policy issues* (Jones et al. 2009). Even though this paper was limited to demographic issues, it is longer than is customary for a conference paper. Many of the findings would have required more qualifications than were brought to bear, but that would have made the paper even longer. This observation should also be kept in mind with respect to the following summary statements.

In almost all low fertility countries total period fertility rates increased early in the 21st century. This was in contrast to long-term declines since the baby-boom years of the 1950s and early 1960s. Whatever increase did occur, was modest in comparison to the declines of the past half century. In most countries only a small proportion of the difference between the 2000 TPFR and replacement fertility was made up.

Total cohort fertility rates were declining in virtually all low-fertility countries throughout the past half century. The declines continued among the youngest cohorts, i.e. those of the 1960s, in almost all countries. The rates of cohort fertility decline were notably fast in Southern and Eastern Europe and in the Asian countries.

Following a decline, first order births in western countries were relatively stable among the 1960s birth cohorts. Around 80 percent of women were having first births. In the Nordic countries it was closer to 90 percent and stable. In Southern Europe and in Central and Eastern Europe first order fertility rates were declining among the 1960s cohorts. Nonetheless, still around 80 percent of women were having first births. In the Asian countries there was a steep decline of first order fertility rates to very low levels among the 1960s cohorts. In Japan around 70 percent and in Hong Kong 65 percent of women were having first births.

Rates of childlessness were the lowest and relatively stable in the western countries among the 1960s cohorts. In Southern Europe and in the Central and East European countries childlessness was on the increase with between 15 and 20 percent of women among the 1960s cohorts remaining childless. In the Asian countries childlessness was increasing rapidly and had reached high levels among the 1960s cohorts: almost 30 percent in Japan and 35 percent in Hong Kong.

Second order cohort fertility rates settled generally at between 0.65 and 0.70 among the 1960s cohorts in the western countries. Everywhere else the proportions of women having second births were declining, steeply in Central and Eastern Europe and even more so in the East Asia countries, where they were as low as close to 40 percent in Hong Kong and 55 percent in Japan.

Third birth order fertility rates ranged from 0.10 in Hong Kong and Bulgaria to around 0.30 in the Nordic countries, England & Wales and the United States among the cohorts of the 1960s.

There is some indication that the two-child family model which became dominant during the 20th century is fading away. Proportions of women remaining childless or with only one child are increasing in most countries. The combined proportions of childless and parity one women have reached 40 percent in Spain and Japan and even 50 percent in Romania.

Childbearing postponement started in the Western countries among the 1940s birth cohorts. It continued vigorously among the birth cohorts of the 1950s and 1960s and gradually slowed down among the 1970s cohorts. The deceleration appears to be continuing among the 1980s cohorts. In the formerly socialist countries of Central and Eastern Europe, fertility postponement got under way considerably later, among the birth cohorts of the mid- to late-1960s. It was still intensive among the 1970s birth cohorts and was apparently continuing among those of the 1980s.

Childbearing recuperation of completed cohort fertility can be explored only up to the birth cohorts of the first half of the 1960s, as these were completing their childbearing early in the 21st century. In most countries recuperation among the latest birth cohorts, i.e. those of the 1950s and early 1960s, was minimal or weak. This included not only the formerly socialist countries of Central and Eastern Europe, but also to some extent those of Southern Europe and the German-speaking countries of West Central Europe. Childbearing recuperation of the 1950s and early 1960s birth cohorts was strong in the Nordic countries and in Western Europe.

The most revealing conclusions of this research pertain to the analysis of the structural demographic reasons for the fertility increase in most of the low-fertility countries early in the 21st century applying the specific methodology designed for this project. The fertility increase was the result of relatively low levels of childbearing postponement which were more than offset by relatively vigorous fertility recuperation among the birth cohorts of the late 1960s and early 1970s, cohorts that were in their prime childbearing ages early in the 21st century. This was the case across the board not only for Northern and West European countries, but also the German-speaking countries and those of Southern Europe as well as the formerly socialist ones of Central and Eastern Europe. In a few countries the reverse was the case, including three in East Asia. These experienced a fertility decline.

This research has also demonstrated that the childbearing behavior of the respective birth cohorts during the 2001 to 2006 period was very important in view of the overall lifetime fertility experience prior to and including this period.

This analysis reveals an aspect of the approach to the analysis of recent fertility trends that is not sufficiently dealt with in the literature. A great deal of attention has been devoted to the tempo effect of fertility postponement and not enough attention to the fact that fertility levels and trends are the outcome of interaction between postponement and recuperation.

Finally, it goes without saying that whatever fertility trends prevailed in the beginning of the 21st century, these need not continue in the years to come. Even if these trends were to continue at the same pace, it would take several decades for fertility in these countries to return to the replacement level, because the average fertility increase in recent years was relatively small.

Acknowledgements

The authors are grateful to the following colleagues who kindly assisted in assembling the data for this international comparative analysis:

Tsang Tat-shing, Hong Kong Census and Statistics Department; Rikiya Matsukura and Naohiro Ogawa, Nihon University, Tokyo, Japan; Robert Retherford and Minja Kim Choe, East-West Center, Honolulu, Hawaii; Peter McDonald and Rebecca Kippen, Australian National University, Canberra; Grant Browne; Robert Didham; Denise McGregor and Anne Howard, Statistics New Zealand, Wellington, New Zealand; Yu-hua Chen, National Taiwan University, Taipei, Taiwan; Stephanie Ventura and Paul Sutton, National Center for Health Statistics, Washington, D.C., United States.

References

Billari, F.C. 2008. "Lowest-low fertility in Europe: Exploring the causes and finding some surprises," *Japanese Journal of Population* 6(1): 2-18.

Billari, F. C. and H.-P. Kohler. 2004. "Patterns of low and very low fertility in Europe," *Population Studies* 58 (2): 161-176.

Bongaarts, J. and G. Feeney. 1998. "On the quantum and tempo of fertility," *Population and Development Review* 24 (2): 271-291.

Castles, F.G. 2003. "The world turned upside down: below replacement fertility, changing preferences and family-friendly public policy in 21 OECD countries," *Journal of European Social Policy* 13 (3): 209–227.

Census and Statistics Department. 2007. "The Fertility Trend in Hong Kong, 1981 to 2006." *Hong Kong Monthly Digest of Statistics*. September.

Frejka T. 2008. "Parity distribution and completed family size in Europe: Incipient decline of the two-child family model." Overview Chapter 2 in: T. Frejka et al.

(eds.) *Childbearing trends and policies in Europe*. *Demographic Research, Special Collection* 7, Vol. 19(3): 47-71

----------. 2009. Book Review of Jones G., P.T.Straughan and A.Chan (eds.). 2009. *Ultra-low Fertility in Pacific Asia: Trends, causes and policy issues. Population and Development Review* 35(2): 423-425.

Frejka, T. et al. (eds.) 2008. *Childbearing trends and policies in Europe*. *Demographic Research, Special Collection* 7, Vol. 19(1-29): 1-1178.

Frejka T. and G. Calot. 2000. "The Cohort Fertility Story: Industrialized Countries in the Second Half of the 20th and in the Early 21st Century." paper presented at *Annual Meeting. Population Association of America*. Los Angeles.

----------. 2001a. "Childbearing age patterns in low-fertility countries in the late 20th century: Is the postponement of births an inherent element?" IUSSP Seminar on *International Perspectives on Low Fertility: Trends, Theories and Policies*. Tokyo, 2001.

----------. 2001b. "Cohort Reproductive Patterns in Low-Fertility Countries." *Population and Development Review* 27 (1): 103-132.

----------. 2001c. "L'évolution du calendrier des naissances par génération dans les pays à basse fécondité à la fin du XXe siècle." *Population*. 56 (3): 397-420.

Frejka, T. and J.-P. Sardon. 2004. *Childbearing trends and prospects in low-fertility countries*. Volume 13, European Studies of Population, Kluwer Academic Publishers, Dordrecht

Frejka, T. and T. Sobotka. 2008. "Fertility in Europe: Diverse, delayed and below Replacement," Overview Chapter 1 in: T. Frejka et al. (eds.) *Childbearing trends and policies in Europe*. *Demographic Research, Special Collection* 7, Vol. 19(3): 15-46.

Goldstein J., W. Lutz and M. R.Testa. 2003. "The emergence of sub-replacement family size ideals in Europe." *Population Research and Policy Review* 22: 479–496.

Goldstein, J. R., T. Sobotka and A. Jasilione. 2009. "The end of 'Lowest-Low' Fertility?" Paper presented at the 2009 Population Association of America Annual Meeting, Detroit

Hajnal, J. 1947. "The analysis of birth statistics in the light of the recent international recovery of the birth-rate," *Population Studies* 1 (2): 137–164.

Iwasawa, M and R. Kaneko. 2007. "Trends in partnership behaviours in Japan from the cohort perspective." Paper presented at the joint Eurostat/UNECE Work Session on Demographic Projections, Bucharest, 10-12 October 2007. Accessed at <http://www.unece.org/stats/documents/ece/ces/ge.11/2007/wp.11.e.pdf>.

Jones G., P.T.Straughan and A.Chan (eds.). 2009. *Ultra-low Fertility in Pacific Asia: Trends, causes and policy issues.* Routledge, Taylor & Francis Group, London and New York.

Kohler, H.-P., F. C. Billari and J. A. Ortega. 2002. "The emergence of lowest-low fertility in Europe during the 1990s." *Population and Development Review* 28(4): 641-680.

----------. 2006. "Low fertility in Europe: Causes, implications and policy options," In F.R. Harris (Ed.) *The Baby Bust: Who Will Do theWork? Who Will Pay the Taxes*? Lanham, MD: Rowman & Littlefield Publishers, pp. 48-109.

Konietzka, D. and M. Kreyenfeld (eds.). 2007. *Ein Leben Ohne Kinder: Kinderlosigkeit in Deutschland*, Wiesbaden: Verlag für Sozialwissenschaften.

Lesthaeghe, R. 2001. "Postponement and recuperation: Recent fertility trends and forecasts in six Western European countries," IPD Working Paper 2001-1, Interface Demography, VUB, Brussels.

Lutz W. and Skirbekk V. 2005. "Policies Addressing the Tempo Effect in Low-Fertility Countries." *Population and Development Review* 31(4): 703-725.

McDonald, P. 2002. "Sustaining fertility through public policy: The range of options." *Population-E* 57 (3): 417-446.

Population Reference Bureau (PRB). 2009. *2008 World Population Data Sheet.* http://www.prb.org/pdf08/08WPDS_Eng.pd.

Retherford, R. and N. Ogawa. 2006. "Japan's baby bust: Causes, implications, and policy responses." Chapter 1 in: F.R. Harris (ed.) *The baby bust. Who will do the work? Who will pay the taxes?* Lanham (Maryland): Rowman & Littlefield Publishers, pp. 5-47.

Schoen, R. 2004. "Timing effects and the interpretation of period fertility," *Demography* 41(4): 801-819.

Sobotka, T. 2003. "Tempo-quantum and period-cohort interplay in fertility changes in Europe. Evidence from the Czech Republic, Italy, the Netherlands and Sweden," *Demographic Research* 8(6): 151-213.

Sobotka, T. 2004a. "Is lowest-low fertility explained by the postponement of childbearing?" *Population and Development Review* 30(2): 195-220.

Sobotka, T. 2004b. *Postponement of childbearing and low fertility in Europe*. PhD Thesis, University of Groningen. Amsterdam: Dutch University Press.

Sobotka T. and L. Toulemon. 2008. "Changing family and partnership behaviour: Common trends and persistent diversity across Europe." Overview Chapter 4 in: T. Frejka et al. (eds.) *Childbearing trends and policies in Europe*. *Demographic Research, Special Collection* 7, Vol. 19(3): 85-138.

United Nations Population Division. 2009. *World Population Prospects: The 2008 Revision*. http://esa.un.org/unpp/.

.

Table 1 – Total period fertility rates and annual rates of change, 38 low-fertility countries, 1950, 1980, 2000 and 2006-2008

Year	Nordic Region				Western Europe				West Central Europe		
	Denmark	Finland	Norway	Sweden	Belgium	England & Wales	France	Netherlands	Austria	Germany	Switzerland
1950	2.57	3.15	2.51	2.28	2.39	2.18	2.93	3.10	2.10	2.15	2.40
1980	1.55	1.63	1.72	1.68	1.68	1.88	1.95	1.60	1.65	1.56	1.55
2000	1.77	1.73	1.85	1.54	1.66	1.65	1.88	1.72	1.36	1.38	1.50
2006	1.85	1.84	1.90	1.85	1.78	1.86	1.98	1.72	1.41	1.33	1.44
2007	1.85	1.83	1.90	1.88		1.92	1.96	1.72	1.38	1.36	1.46
2008	1.89	1.85	1.96	1.91		1.95	2.00	1.77	1.41		1.48
Annual rate of change											
1950 to 1980	-1.7	-2.2	-1.3	-1.0	-1.2	-0.5	-1.4	-2.2	-0.8	-1.1	-1.5
1980 to 2000	0.7	0.3	0.4	-0.4	-0.1	-0.7	-0.2	0.4	-1.0	-0.6	-0.2
2000 to Latest year	0.8	0.8	0.7	2.7	1.2	2.1	0.8	0.4	0.5	-0.2	-0.2

Year	Southern Europe				East Central Europe				Eastern Europe		
	Greece	Italy	Portugal	Spain	Czech Republic	Hungary	Poland	Slovak Republic	Bulgaria	Romania	Russia
1950	2.39 (a)	2.50	3.12	2.47	2.79	2.60	2.98 (b)	3.58	2.96	3.06 (a)	2.63 ©
1980	2.23	1.64	2.25	2.20	2.10	1.91	2.26	2.31	2.05	2.43	1.86
2000	1.27	1.26	1.55	1.24	1.15	1.32	1.34	1.30	1.30	1.31	1.21
2006	1.39	1.35	1.36	1.38	1.33	1.34	1.27	1.24	1.38	1.32	1.30
2007	1.41	1.38	1.37	1.38	1.44	1.31	1.31	1.25	1.38	1.29	1.41
2008		1.41	1.37	1.46	1.50	1.35	1.39	1.32	1.48		
Annual rate of change											
1950 to 1980	-0.3	-1.4	-1.1	-0.4	-0.9	-1.0	-1.4	-1.5	-1.2	-0.9	-1.6
1980 to 2000	-2.8	-1.3	-1.9	-2.9	-3.0	-1.8	-2.6	-2.9	-2.3	-3.1	-2.1
2000 to Latest year	1.5	1.4	-1.5	2.0	3.3	0.3	0.5	0.2	1.6	-0.2	2.2

Table 1 (cont.)– Total period fertility rates and annual rates of change, 38 low-fertility countries, 1950, 1980, 2000 and 2006-2008

Year	West Balkan Region					Baltic Region			Non European Countries			
	Bosnia & Herzegovina	Croatia	Macedonia	Slovenia	Yugoslavia	Estonia	Latvia	Lithuania	Australia	Canada	New Zealand	United States
1950	5.23	2.91	5.82	2.98	3.58	1.96 (b)	2.27 (d)	2.59 (b)	3.05	3.35	3.56	3.01
1980	1.93	1.92	2.47	2.10	2.29	2.02	1.90	1.99	1.89	1.64	2.01	1.82
2000	1.28	1.40	1.88	1.26	1.66	1.33	1.24	1.39	1.76	1.49	1.96	2.05
2006		1.38	1.46	1.31	1.43*	1.55	1.35	1.31	1.82	1.59	2.01	2.12
2007		1.40	1.46	1.38	1.38*	1.64	1.41	1.34	1.93		2.17	2.12
2008						1.66	1.45				2.20	
Annual rate of change												
1950 to 1980	-3.3	-1.4	-2.9	-1.2	-1.5	0.2	-0.6	-1.3	-1.6	-2.4	-1.9	-1.7
1980 to 2000	-2.1	-1.6	-1.4	-2.6	-1.6	-2.1	-2.1	-1.8	-0.4	-0.5	-0.1	0.6
2000 to Latest year		0.0	-3.6	1.3	-2.6	2.8	2.0	-0.5	-0.5	-0.9	1.0	2.2

Year	Eastern Asian Countries			
	Hong Kong	Japan	Korea	Taiwan
1950	3.46 (e)	3.61		3.06 (f)
1980	2.04	1.75	2.88	2.48
2000	1.01	1.33	1.53	1.67
2006	0.99	1.29	1.17	1.11
2007	1.02		1.29	1.09
2008	1.06			1.05
Annual rate of change				
1950 to 1980	-5.9	-2.4		-5.3
1980 to 2000	-3.5	-1.4	-3.2	-2.0
2000 to Latest year	0.6	-0.5	-2.4	-5.8

Notes: a-1955; b-1960; c-1958; d-1951; e-1971; f-1976; *Serbia

Table 2 – Average total period fertility rates and average rates of change, five major groupings of low-fertility countries, 1950, 1980, 2000 and latest year

	Western countries	*Southern Europe*	*Central and East European countries*	*Non-European English-speaking countries*	*East Asia countries*
Average total period fertility rates					
1950	2.52	2.62	3.05	3.24	3.38
1980	1.68	2.08	2.12	1.84	2.29
2000	1.64	1.33	1.36	1.82	1.39
Latest year	1.76	1.41	1.42	1.96	1.17
Average annual rate of change in respective periods					
1950-1980	-1.3	-0.8	-1.2	-1.9	-4.5
1980-2000	-0.1	-2.2	-2.2	-0.1	-2.5
2000 to latest year	0.9	0.8	0.5	1.0	-2.0
Relative size of TPFR in percent					
1980 vis-à-vis 1950	67	79	70	57	68
2000 vis-à-vis 1980	98	64	64	99	61
2000 vis-à-vis 1950	65	51	45	56	41
Latest year vis-à-vis 2000	107	106	104	108	84

Table 3 – Total cohort fertility rates and annual rates of change, 38 low-fertility countries, birth cohorts 1932, 1946, 1960 and 1966-71

Birth cohort	Nordic Region				Western Europe				West Central Europe		
	Denmark	Finland	Norway	Sweden	Belgium	England & Wales	France	Netherlands	Austria	Germany	Switzerland
1932	2.38	2.39	2.56	2.15	2.30	2.36	2.62	2.62	2.41	2.23	2.19
1946	2.03	1.87	2.18	1.98	1.89	2.13	2.17	1.95	1.96	1.79	1.84
1960	1.90	1.96	2.09	2.04	1.86	1.97	2.11	1.85	1.70	1.65	1.77
1966	1.93	1.90	2.07	1.99		1.91	2.02	1.78	1.64	1.52	1.66
1967	1.94	1.89	2.07	1.98		1.91	2.01	1.77	1.62	1.49	1.65
1968	1.95		2.06				2.01	1.76	1.60	1.48	
1969											
1970											
1971											
Annual rate of change											
1932-1946	-1.1	-1.8	-1.1	-0.6	-1.4	-0.7	-1.3	-2.1	-1.5	-1.6	-1.2
1946-1960	-0.5	0.3	-0.3	0.2	-0.1	-0.6	-0.2	-0.4	-1.0	-0.6	-0.3
1960-latest	0.3	-0.5	-0.2	-0.4		-0.4	-0.6	-0.6	-0.8	-1.4	-1.0

Birth cohort	Southern Europe				East Central Europe				Eastern Europe		
	Greece	Italy	Portugal	Spain	Czech Republic	Hungary	Poland	Slovak Republic	Bulgaria	Romania	Russia
1932	2.10 (a)	2.30	2.94	2.66	2.14	2.05		2.81	2.08	2.39 (c)	1.96 (d)
1946	2.01	2.04	2.34	2.38	2.04	1.90	2.18 (b)	2.36	2.06	2.41	1.81
1960	1.93	1.67	1.89	1.76	2.03	2.02	2.18	2.18	1.95	2.16	1.83
1966	1.76		1.82	1.59	1.92	1.97	1.98	2.02	1.80	1.81	1.62
1967			1.79	1.57	1.91	1.94	1.96	2.00	1.79	1.72	1.59
1968			1.75		1.89	1.92	1.92	1.98	1.74	1.66	1.56
1969					1.87	1.88	1.86	1.94	1.69	1.64	1.54
1970					1.84			1.89	1.64	1.64	1.50
1971									1.61		
Annual rate of change											
1932-1946	-0.7	-0.9	-1.6	-0.8	-0.3	-0.5	n.a.	-1.2	-0.1	0.1	-1.1
1946-1960	-0.3	-1.4	-1.5	-2.2	0.0	0.4	0.0	-0.6	-0.4	-0.8	0.1
1960-latest	-1.5		-1.0	-1.6	-1.0	-0.8	-1.8	-1.4	-1.7	-2.8	-2.0

Table 3 (cont.) – TCFRs and annual rates of change, 38 low-fertility countries, birth cohorts 1932, 1946, 1960 and 1966-71

Birth cohort	West Balkan Region					Baltic Region			Non-European Countries			
	Bosnia & Herzegovina	Croatia	Macedonia	Slovenia	Yugoslavia	Estonia	Latvia	Lithuania	Australia	Canada	New Zealand	United States
1932	3.36	2.10	3.50	2.08	2.39			1.99 (a)	3.14	3.23	3.56	3.22
1946	2.35	1.83	2.59	1.88	2.30	1.95 (b)	1.87 (b)	1.98	2.43	2.06	2.67	2.20
1960	1.97 (e)	1.98	2.29	1.86	2.28	2.01	1.94	1.89	2.15	1.80	2.37	2.02
1966		1.84	2.19	1.76	2.10	1.87	1.77	1.73	2.05		2.25	2.10
1967		1.80	2.18	1.75	2.06	1.86	1.77	1.72	2.04		2.25	2.11
1968		1.76	2.17	1.73		1.85	1.76	1.74	2.03		2.24	2.11
1969		1.71	2.14	1.71			1.73	1.74				
1970			2.12					1.72				
1971			2.12									
Annual rate of change												
1932-1946	-2.6	-1.0	-2.2	-0.7	-0.3			-0.1	-1.8	-3.2	-2.1	-2.7
1946-1960	-2.2	0.6	-0.9	-0.1	-0.1	0.3	0.4	-0.3	-0.9	-1.0	-0.9	-0.6
1960-latest		-1.6	-0.7	-0.9	-1.4	-1.0	-1.3	-0.9	-0.7	-0.8	-0.7	0.5

Birth cohort	Eastern Asian Countries			
	Hong Kong	Japan	Korea	Taiwan
1932		2.05		
1946	1.84 (f)	1.89		2.34 (g)
1960	1.58	1.81	2.08	2.22
1966	1.19	1.49	1.97	1.9
1967	1.17	1.46	1.97	1.86
1968	1.16	1.46	1.96	1.81
1969			1.9	1.75
1970			1.81	
1971			1.74	
Annual rate of change				
1932-1946		-0.6		
1946-1960	-3.8	-0.3		-1.8
1960-latest	-3.9	-2.7	-1.6	-2.6

Notes: a-1940; b-1951; c-1937; d-1939; e-1945; f-1956; g-1957

Table 4 – Average total cohort fertility rates and average rates of change, five major groupings of low-fertility countries, birth cohorts 1932, 1946, 1960 and youngest cohort

Birth cohort	*Western countries*	*Southern Europe*	*Central and East European countries*	*Non-European English-speaking countries*	*East Asia countries*
Average total cohort fertility rates					
1932	2.38	2.50	2.40	3.29	
1946	1.98	2.19	2.10	2.34	
1960	1.90	1.81	2.04	2.09	1.92
Youngest cohort	1.83	1.72	1.80	2.03	1.55
Average annual rate of change in respective periods					
1932 to 1946	-1.3	-1.0	-0.8	-2.5	
1946 to 1960	-0.3	-1.4	-0.2	-0.8	
1960 to youngest cohort	-0.6	-1.4	-1.4	-0.4	-2.7
Relative size of TCFR in percent					
1946 vis-à-vis 1932	83	88	87	71	
1960 vis-à-vis 1946	96	83	97	89	
1960 vis-à-vis 1932	80	73	85	63	
Youngest cohort vis-à-vis 1960	96	95	88	97	80

Table 5 - Parity distribution (in percent), selected low fertility countries, birth cohorts 1930 - 1965

Country	*Cohort*	*Parity*					*Total cohort fertility rate*
		0	*1*	*2*	*3*	*4 and more*	
Denmark	1950	11.1	18.3	47.6	17.8	5.2	1.90
	1955	12.5	19.1	46.0	17.1	5.3	1.84
	1960	10.1	22.0	43.5	18.3	6.1	1.90
Sweden	1955	12.8	15.6	40.7	22.1	8.8	2.03
	1960	13.1	14.7	40.8	22.0	9.4	2.04
	1965	12.7	15.2	43.4	20.4	8.3	2
England & Wales	1930	13.5	18.1	29.7	19.0	19.7	2.34
	1935	11.6	15.1	32.1	21.5	19.7	2.41
	1940	11.0	12.8	36.5	22.4	17.3	2.35
	1945	10.4	13.8	43.2	20.7	11.9	2.16
	1950	13.9	12.8	43.5	19.4	10.4	2.06
	1955	16.3	12.6	41.0	19.4	10.7	2.02
	1960	19.2	12.1	38.1	20.1	10.5	1.97
	1965	20.0	13.6	37.8	18.6	10.0	1.91
Netherlands	1930	14.3	10.4	26.2	21.7	27.4	2.67
	1935	12.1	10.0	32.6	24.3	21.0	2.49

	1940	11.2	10.6	42.5	23.8	11.9	2.22
	1945	11.3	13.9	49.8	18.2	6.8	2.00
	1950	14.6	15.2	47.4	16.5	6.3	1.89
	1955	16.9	15.2	42.9	18.3	6.7	1.87
	1960	17.6	15.5	41.8	19.9	5.2	1.85
Austria	1930	14.4	21.5	26.7	16.8	20.6	2.32
	1935	12.1	17.7	28.1	19.3	22.8	2.45
	1940	11.9	21.0	31.8	18.9	16.4	2.12
	1945	12.4	23.3	34.8	17.3	12.2	1.96
	1950	12.6	23.0	37.1	17.1	10.2	1.87
	1955	15.0	23.1	37.6	16.4	7.9	1.77
	1960	16.6	23.2	38.8	14.9	6.5	1.70
	1965	21.0	21.6	37.4	14.5	5.5	1.65
Greece	1940	11.3	10.9	49.4	19.7	8.7	2.1
	1945	12.4	11.4	50.3	19.0	6.9	1.98
	1950	9.6	13.9	51.1	18.9	6.5	2.03
	1955	8.3	15.6	53.2	16.9	6.0	2.01
	1960	10.5	15.9	52.3	15.7	5.6	1.93
	1965	16.3	16.3	48.4	13.9	5.1	1.76
Italy	1935	15.2	15.9	32.8	19.3	16.8	2.28
	1940	14.6	16.0	37.2	19.3	12.9	2.14
	1945	11.7	18.6	41.1	18.5	10.1	2.07
	1950	13.0	21.8	42.0	16.4	6.8	1.89
	1955	12.7	24.1	42.6	15.4	5.2	1.80
Spain	1955	9.0	23.2	44.4	16.8	6.6	1.9
	1960	10.0	26.0	47.3	12.9	3.8	1.76
	1965	12.9	27.7	46.8	10.1	2.5	1.63

Country	***Cohort***	***Parity***					***Total cohort fertility rate***
		0	***1***	***2***	***3***	***4 and more***	
Czech Republic	1935	6.5	19.7	45.2	19.5	9.1	2.12
	1940	7.7	17.9	47.7	18.9	7.8	2.06
	1945	7.9	16.1	50.5	19.1	6.4	2.03
	1950	6.6	13.5	52.9	20.7	6.3	2.10
	1955	6.2	14.3	54.6	19.2	5.7	2.06
	1960	6.4	15.3	55.4	17.5	5.4	2.03
	1965	7.1	18.6	54.9	14.7	4.7	1.94
Hungary	1935	9.1	26.8	41	13.8	9.3	1.99
	1940	9.1	26.3	44.2	13.0	7.4	1.92
	1945	9.6	22.6	48.1	13.6	6.1	1.9
	1950	9.1	19.0	50.9	14.9	6.1	1.95
	1955	8.5	19.8	51.2	14.7	5.8	1.94
	1960	7.5	20.0	48.8	16.3	7.4	2.02
	1965	9.5	21.3	44.9	16.7	7.6	1.98

Slovak Republic	1935	9.0	9.5	33.0	24.7	23.8	2.72
	1940	8.5	10.7	36.5	24.9	19.4	2.55
	1945	10.9	9.7	38.6	25.1	15.7	2.38
	1950	9.8	10.5	41.4	25.1	13.2	2.31
	1955	10.2	11.2	44.2	23.1	11.3	2.22
	1960	9.7	13.1	45.0	21.4	10.8	2.18
	1965	11.1	16.6	45.5	17.9	8.9	2.04
Romania	1950	6.3	21.4	36.2	15.9	20.2	2.48
	1955	9.0	21.7	38.2	14.6	16.5	2.27
	1960	8.1	24.5	38.9	14.2	14.3	2.15
	1965	11.3	30.9	36.0	11.8	10.0	1.91
Croatia	1930	12.8	21.3	33.3	17.3	15.3	2.16
	1935	13.3	22.3	36.5	16.5	11.4	2.00
	1940	8.5	24.6	43.3	15.1	8.5	1.96
	1945	12.1	22.2	46.1	13.5	6.1	1.78
	1950	6.0	24.7	51.4	13.2	4.7	1.86
	1955	7.2	22.2	52.1	13.6	4.9	1.92
	1960	4.7	22.4	51.8	15.3	5.8	1.98
	1965	11.4	22.9	43.4	15.8	6.5	1.88
United States	1930	9.5	9.5	21.8	21.9	37.3	3.21
	1935	6.6	9.8	22.8	23.7	37.1	3.20
	1940	7.5	12.1	28.3	24.6	27.5	2.79
	1945	11.1	16.0	35.0	21.4	16.5	2.29
	1950	15.1	18.2	35.8	19.2	11.7	2.02
	1955	16.3	18.5	34.8	19.2	11.2	1.98
	1960	15.4	18.4	34.6	19.9	11.7	2.02
	1965	13.9	18.5	34.4	20.6	12.6	2.08
Japan	1950	7.5	12.5	53.2	23.0	3.8	2.04
	1955	11.7	11.9	47.6	24.6	4.2	1.99
	1960	17.5	14.0	43.4	21.3	3.8	1.81
	1965	24.2	16.7	39.8	16.2	3.1	1.58

Table 6 – Average cumulated cohort fertility rates up to 27th birthday of mother, five major groupings of low-fertility countries, birth cohorts 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965, 1970, 1975 and 1980

	Cumulated age specific cohort rates up to 27th birthday of mother in birth cohort										
	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980
Western Europe	1.088	1.162	1.235	1.187	1.045	0.910	0.781	0.664	0.575	0.494	0.459
Southern Europe	0.916	0.958	1.008	1.062	1.064	1.075	0.917	0.693	0.494	0.378	0.360
Central and Eastern Europe	1.393	1.383	1.414	1.292	1.333	1.316	1.334	1.264	1.070	0.814	0.616
Non-European English-speaking countries	1.636	1.878	1.798	1.563	1.330	1.116	0.958	0.862	0.788	0.747	0.701
East Asian countries	1.743	1.319	1.304	1.284	1.047	0.795	0.599	0.632	0.522	0.404	0.296
All countries	***1.262***	***1.330***	***1.333***	***1.251***	***1.177***	***1.108***	***1.038***	***0.913***	***0.770***	***0.620***	***0.514***

	Annual rate of change									
	1930-1935	1935-1940	1940-1945	1945-1950	1950-1955	1955-1960	1960-1965	1965-1970	1970-1975	1975-1980
Western Europe	1.3	1.2	-0.8	-2.6	-2.8	-3.1	-3.2	-2.9	-3.0	-1.5
Southern Europe	0.9	1.0	1.1	0.0	0.2	-3.2	-5.6	-6.8	-5.3	-1.0
Central and Eastern Europe	-0.2	0.4	-1.8	0.6	-0.3	0.3	-1.1	-3.3	-5.5	-5.6
Non-European English-speaking countries	2.8	-0.9	-2.8	-3.2	-3.5	-3.1	-2.1	-1.8	-1.1	-1.3
East Asian countries	0.4	-0.6	0.2	-3.1	-5.4	-5.6	-8.1	-3.3	-5.2	-5.9
All countries	***1.1***	***0.0***	***-1.3***	***-1.2***	***-1.2***	***-1.3***	***-2.6***	***-3.4***	***-4.3***	***-3.8***

Table 7 – Average cumulated cohort fertility rates between 27th and 40th birthday of mother, five major groupings of low-fertility countries, birth cohorts 1930, 1935, 1940, 1945, 1950, 1955, 1960 and 1965

	Cumulated age specific cohort rates between 27th and 40th birthday of mother							
	1930	1935	1940	1945	1950	1955	1960	1965
Western Europe	1.232	1.200	0.938	0.802	0.854	0.962	1.102	1.154
Southern Europe	1.754	1.710	1.401	1.138	0.944	0.838	0.865	0.951
Central and Eastern Europe		0.925	0.845	0.785	0.727	0.707	0.680	0.609
Non-European English-speaking countries	1.631	1.340	1.087	0.923	0.953	1.074	1.181	1.217
East Asian countries		1.684	1.498	1.218	1.185	1.149	1.078	0.986
All countries	***1.488***	***1.209***	***1.020***	***0.881***	***0.856***	***0.868***	***0.900***	***0.901***
		Annual rate of change						
		1930-1935	1935-1940	1940-1945	1945-1950	1950-1955	1955-1960	1960-1965
Western Europe		-0.5	-4.9	-3.1	1.3	2.4	2.7	0.9
Southern Europe		-0.5	-4.0	-4.2	-3.7	-2.4	0.6	1.9
Central and Eastern Europe			-1.8	-1.5	-1.5	-0.6	-0.8	-2.2
Non-European English-speaking countries		-3.9	-4.2	-3.3	0.6	2.4	1.9	0.6
East Asian countries			-2.3	-4.1	-0.5	-0.6	-1.3	-1.8
All countries		***-4.2***	***-3.4***	***-2.9***	***-0.6***	***0.3***	***0.7***	***0.0***

Table 8 - Impact of cohort childbearing on 2001-2006 period fertility trends, 38 low-fertility countries

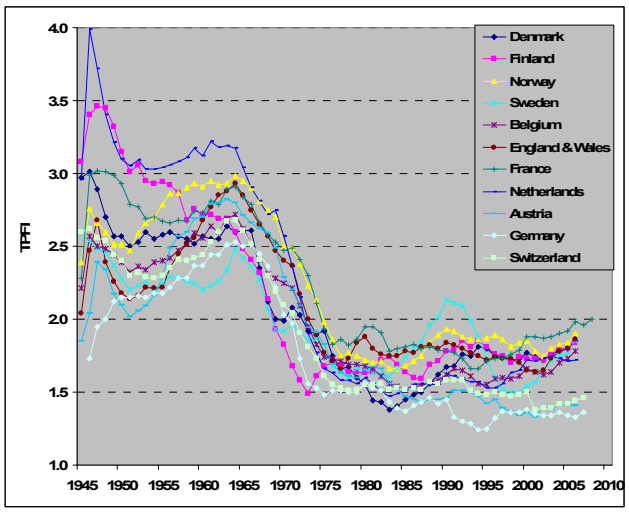
Region/ Country	*TPFR 2001*	*TPFR 2006*	*Net cohort impact of latest 5 years of childbearing*	*Net cohort impact of cumulated childbearing experience through latest year*	*Relative impact of latest 5 years of cohort childbearing (Percent of 2001 TPFR)*	*Relative impact of cumulated childbearing experience through latest year (Percent of 2001 TPFR)*	*Impact of latest 5 years of childbearing as proportion of impact of cumulated childbearing experience through latest year (in %)*	*Net impact of cumulated childbearing experience through latest year compared to cohort impact of latest 5 years of childbearing (in %)*
Nordic countries								
Denmark	1.744	1.847	0.103	0.141	5.9	8.1	73	136
Finland	1.726	1.837	0.111	0.052	6.4	3.0	213	47
Norway	1.783	1.904	0.121	0.141	6.8	7.9	86	116
Sweden	1.566	1.854	0.287	0.051	18.3	3.2	565	18
Western Europe								
Belgium								
England & Wales	1.637	1.861	0.225	0.256	13.7	15.6	88	114
France	1.878	1.982	0.104	0.081	5.5	4.3	128	78
Netherlands	1.709	1.721	0.011	0.022	0.6	1.3	50	199
West Central Europe								
Austria	1.334	1.405	0.071	0.156	5.3	11.7	46	219
Germany	1.349	1.332	-0.017	0.012	-1.3	0.9	-143	-70
Switzerland	1.384	1.438	0.054	0.077	3.9	5.5	71	142
Southern Europe								
Greece	1.252	1.403	0.151	0.215	12.1	17.1	70	142
Italy	1.234	1.313	0.079	0.147	6.4	11.9	54	184
Portugal	1.454	1.357	-0.097	-0.069	-6.7	-4.7	141	71
Spain	1.247	1.379	0.133	0.361	10.6	29.0	37	272
East Central Europe								
Czech Republic	1.145	1.327	0.182	0.216	15.9	18.9	84	119
Hungary	1.311	1.340	0.028	0.005	2.2	0.4	539	19
Poland	1.289	1.267	-0.022	-0.017	-1.7	-1.3	129	78
Slovakia	1.199	1.239	0.040	0.121	3.3	10.1	33	302

Table 8 (continued)

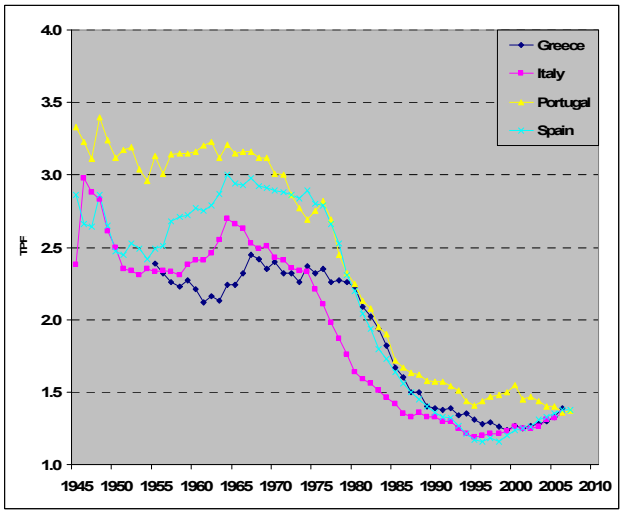
Region/ Country	*TPFR 2001*	*TPFR 2006*	*Net cohort impact of latest 5 years of childbearing*	*Net cohort impact of cumulated childbearing experience through latest year*	*Relative impact of latest 5 years of cohort childbearing (Percent of 2001 TPFR)*	*Relative impact of cumulated childbearing experience through latest year (Percent of 2001 TPFR)*	*Impact of latest 5 years of childbearing as proportion of impact of cumulated childbearing experience through latest year (in %)*	*Net impact of cumulated childbearing experience through latest year compared to cohort impact of latest 5 years of childbearing (in %)*
Eastern Europe								
Bulgaria	1.244	1.378	0.134	0.147	10.7	11.8	91	110
Romania	1.272	1.317	0.046	0.151	3.6	11.9	30	331
Russian Federation	1.256	1.295	0.039	0.048	3.1	3.8	82	122
West Balkan Region								
Bosnia&Herzegovina								
Croatia	1.373	1.379	0.006	-0.086	0.4	-6.2	-7	-1389
Macedonia	1.727	1.460	-0.267	-0.236	-15.4	-13.7	113	89
Slovenia	1.211	1.314	0.104	-0.061	8.5	-5.1	-169	-59
Yugoslavia	1.708	1.588	-0.119	-0.061	-7.0	-3.6	195	51
Baltic Region								
Estonia	1.336	1.546	0.209	0.104	15.7	7.8	201	50
Latvia	1.212	1.348	0.136	0.115	11.2	9.5	119	84
Lithuania	1.298	1.307	0.009	0.090	0.7	6.9	10	1026
Non-European Countries (English-speaking)								
Australia	1.729	1.817	0.087	0.180	5.0	10.4	48	207
Canada								
New Zealand	1.956	2.010	0.054	0.159	2.8	8.1	34	293
United States	2.032	2.115	0.083	0.096	4.1	4.7	86	116
East Asian Countries								
Hong Kong	0.925	0.995	0.070	0.327	7.6	35.4	21	468
Japan	1.304	1.289	-0.015	0.067	-1.1	5.1	-22	-454
South Korea	1.354	1.165	-0.189	0.189	-13.9	13.9	-100	-100
Taiwan	1.396	1.108	-0.288	0.318	-20.6	22.8	-91	-110

Figure 1 – Total period fertility rates, 38 low-fertility countries, 1945 to mid- 2000s

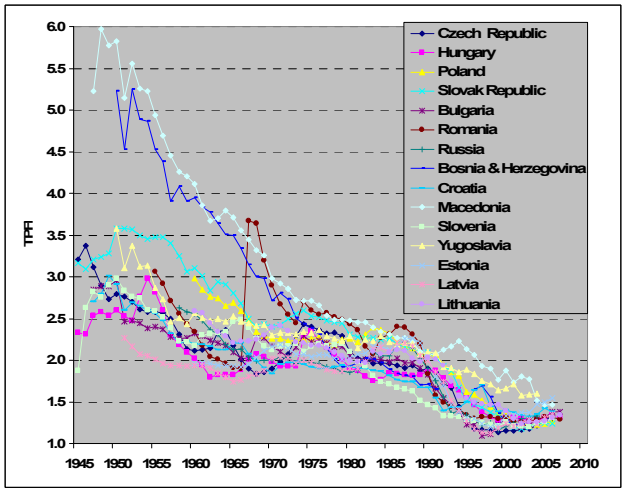
Western Europe



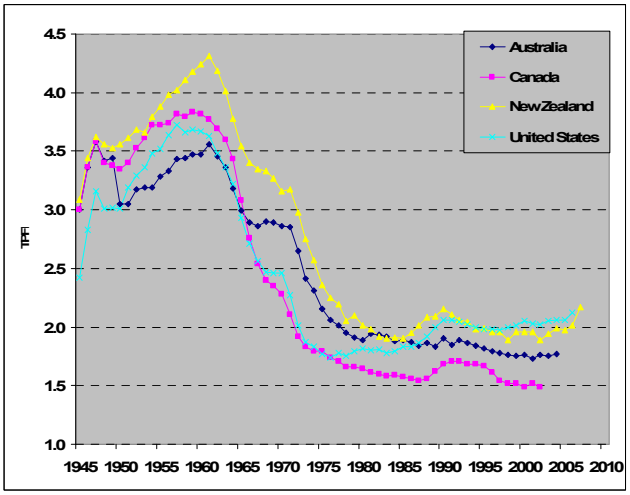
Southern Europe



Central and Eastern Europe



Non-European English-speaking countries



East Asian countries

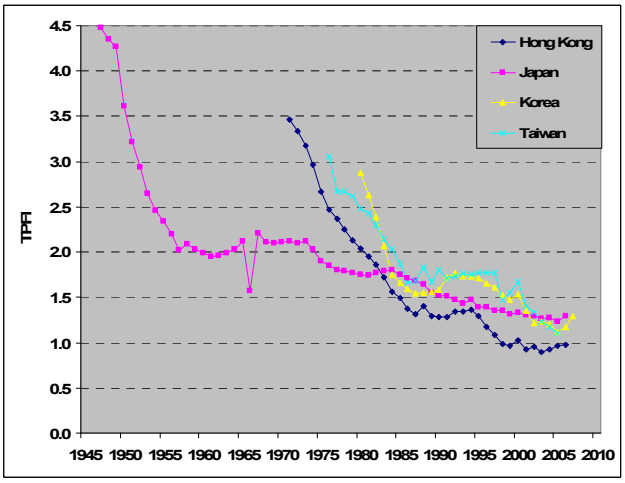
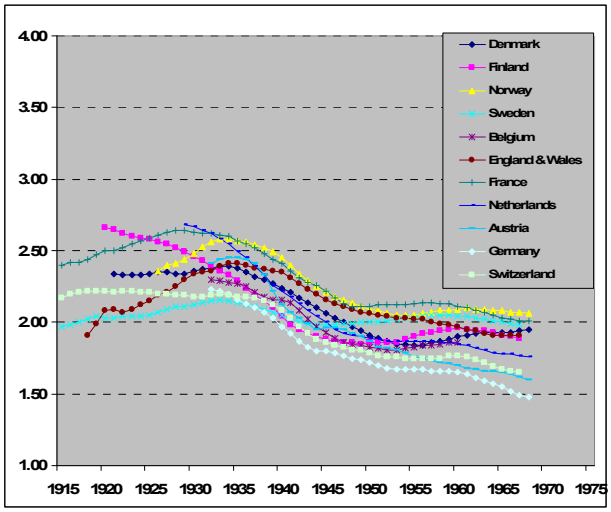
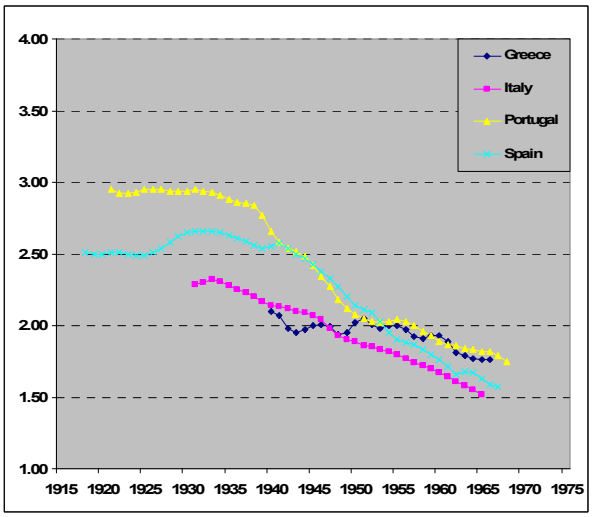


Figure 2 – Total cohort fertility rates, 38 low-fertility countries, birth cohorts 1915 to 1971

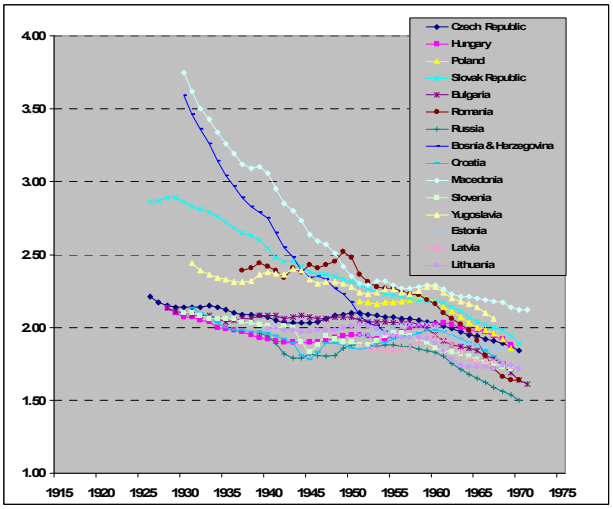
Western Europe



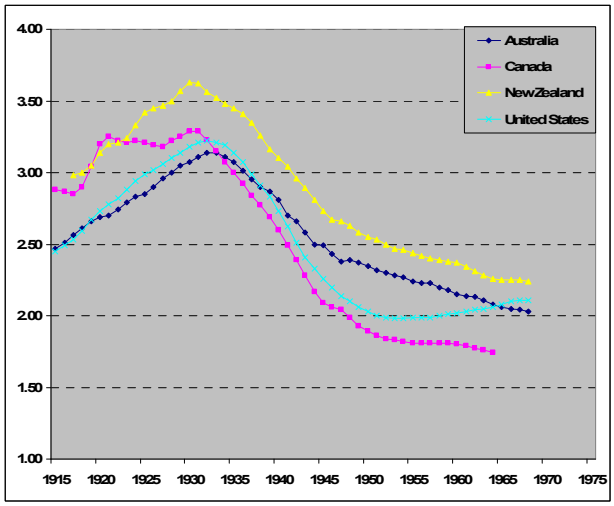
Southern Europe



Central and Eastern Europe



Non-European English-speaking countries



East Asian countries

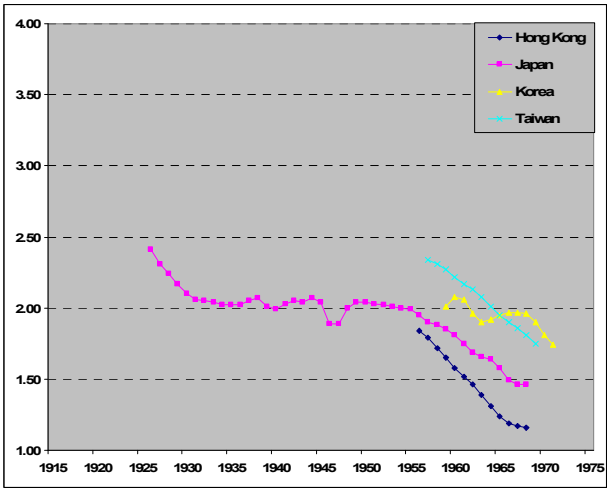
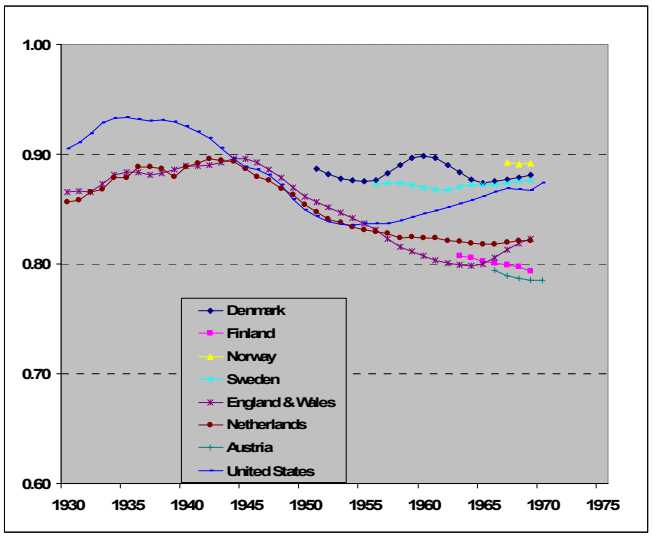
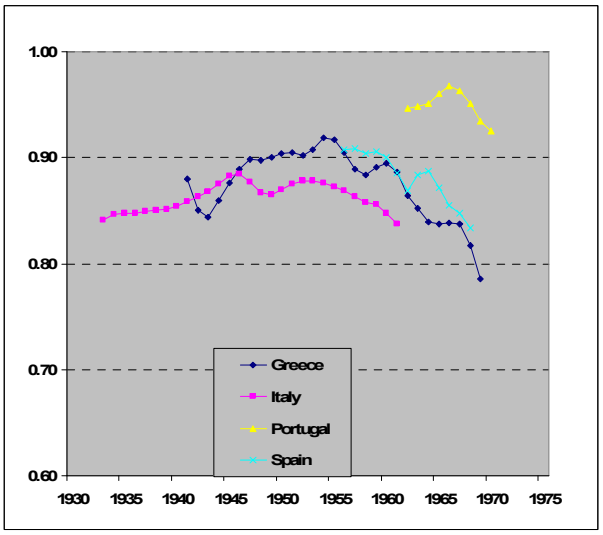


Figure 3 – First order births, total cohort fertility rates, 25 low-fertility countries, birth cohorts 1915 to 1971

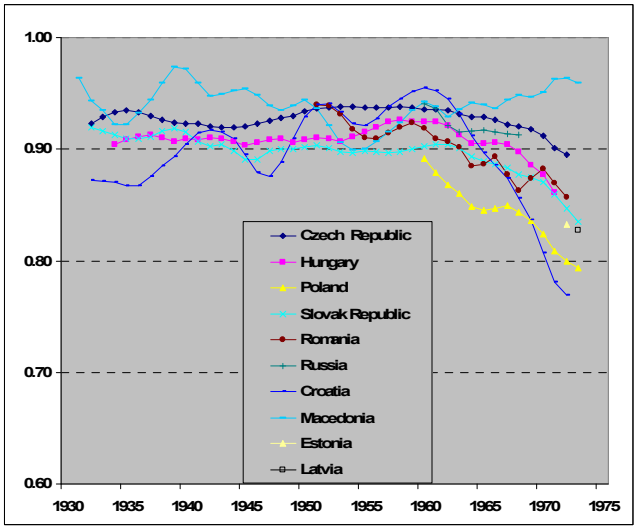
Western Europe and United States



Southern Europe



Central and Eastern Europe



East Asia countries

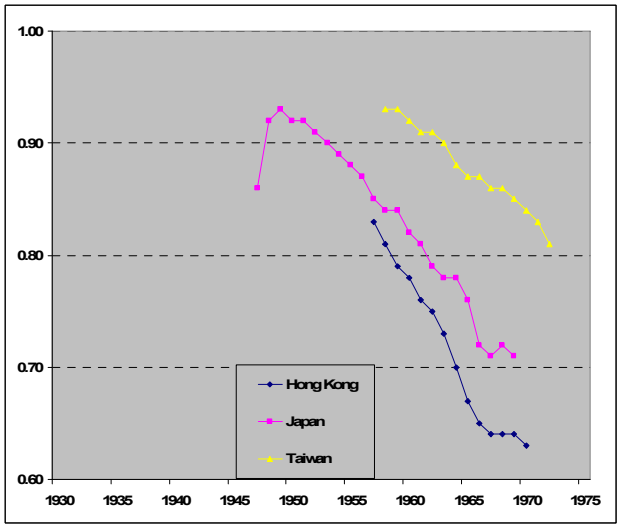
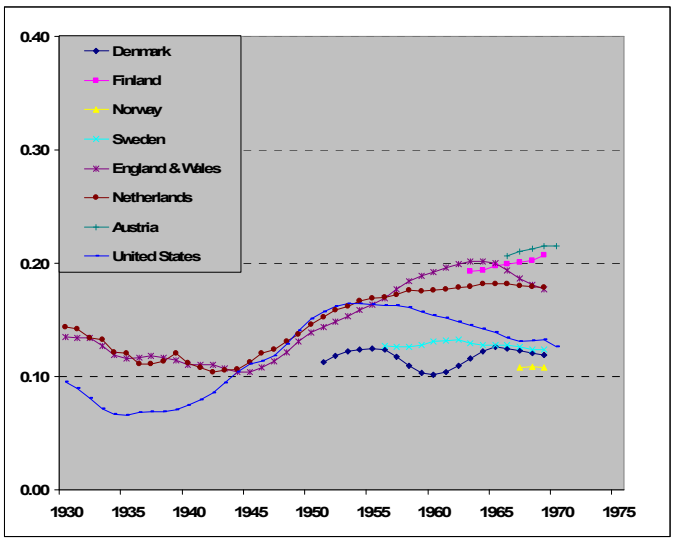
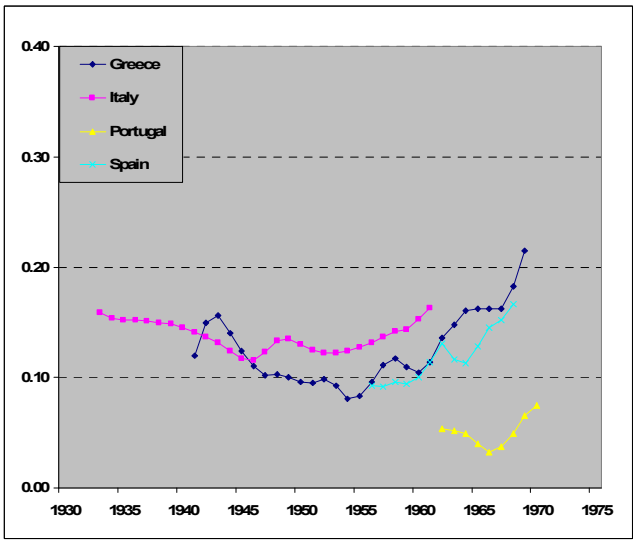


Figure 4 – Proportions of women remaining childless, 25 low-fertility countries, birth cohorts 1915 to 1971

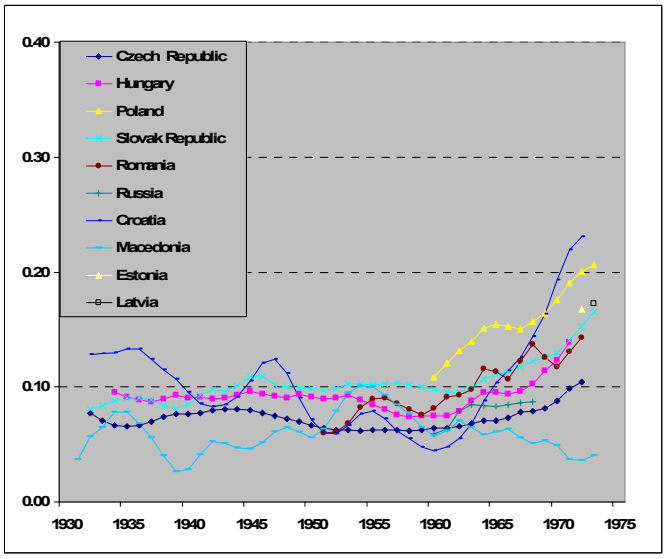
Western Europe and United States



Southern Europe



Central and Eastern Europe



East Asia countries

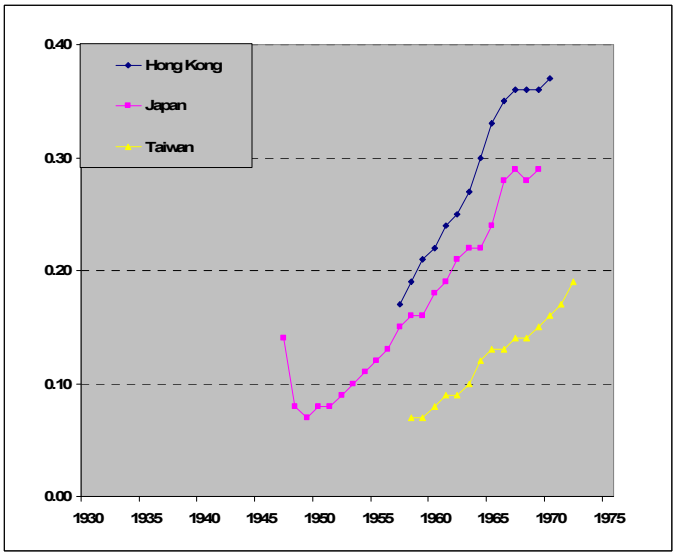
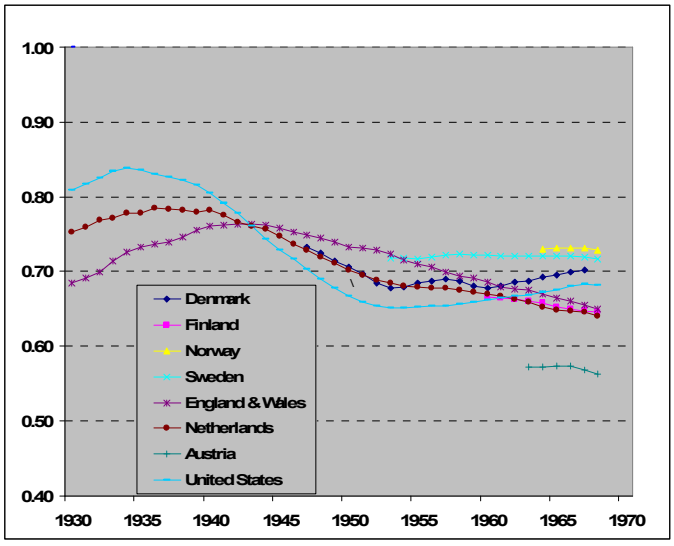
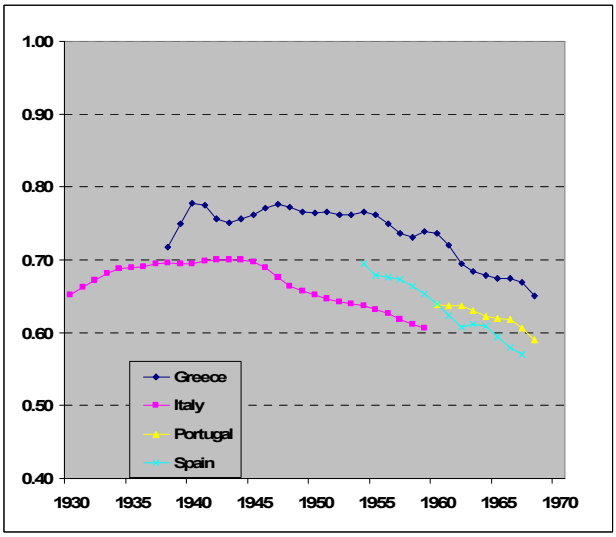


Figure 5 – Second order births, total cohort fertility rates, 24 low-fertility countries, birth cohorts 1915 to 1971

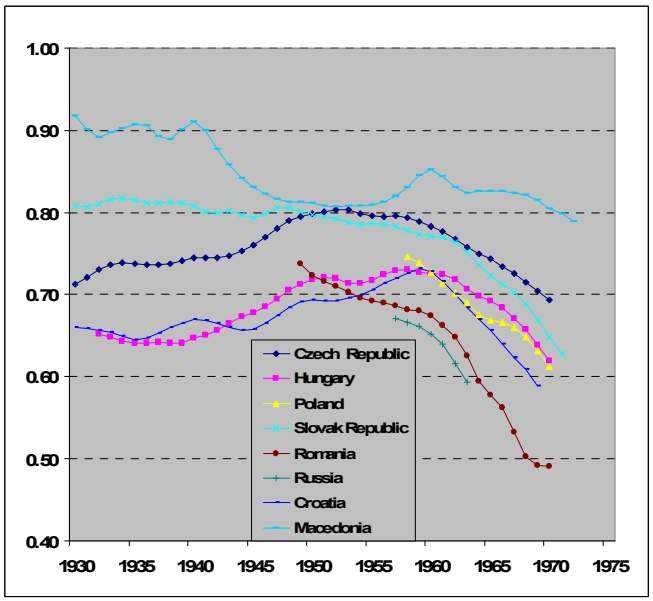
Western Europe and United States



Southern Europe



Central and Eastern Europe



East Asia countries

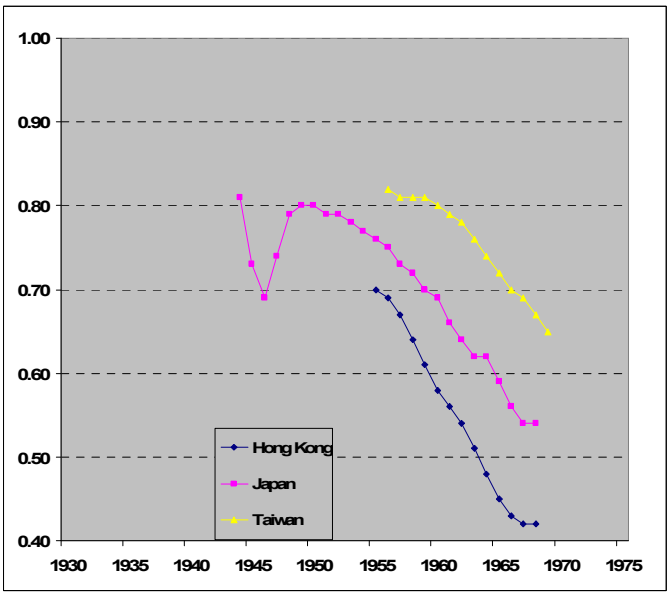
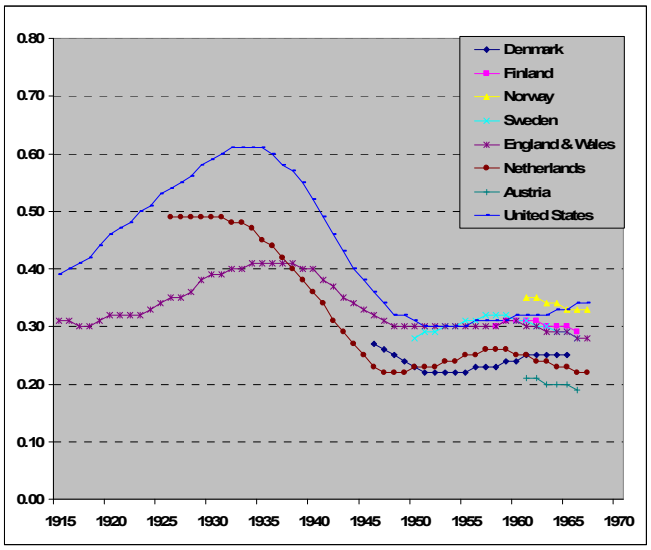
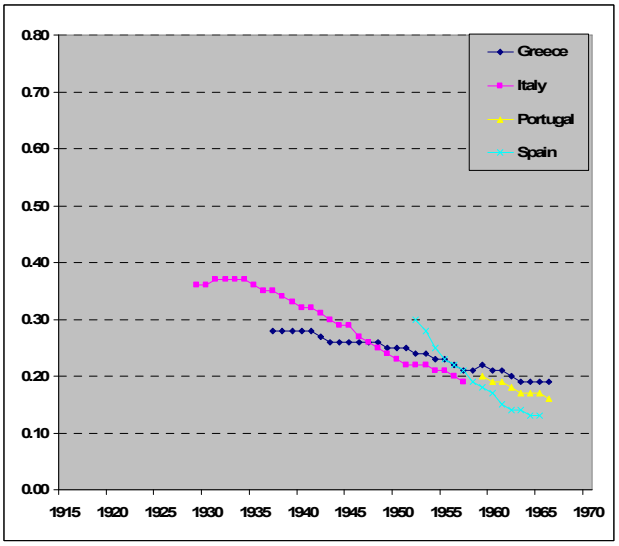


Figure 6 – Third order births, total cohort fertility rates, 23 low-fertility countries, birth cohorts 1915 to 1969

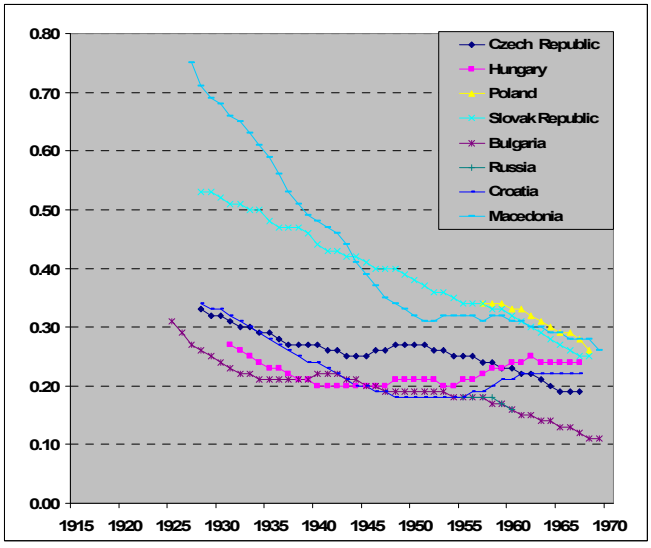
Western Europe and United States



Southern Europe



Central and Eastern Europe



East Asia countries

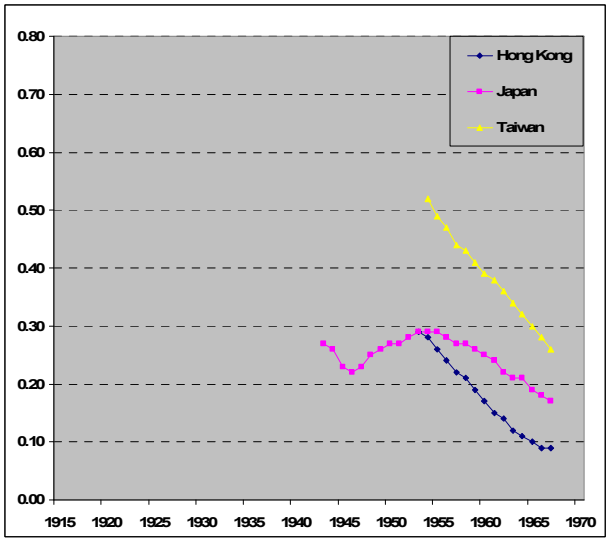


Figure 7. Parity distribution of completed fertility, birth cohorts 1926 to 1970 (in percent)

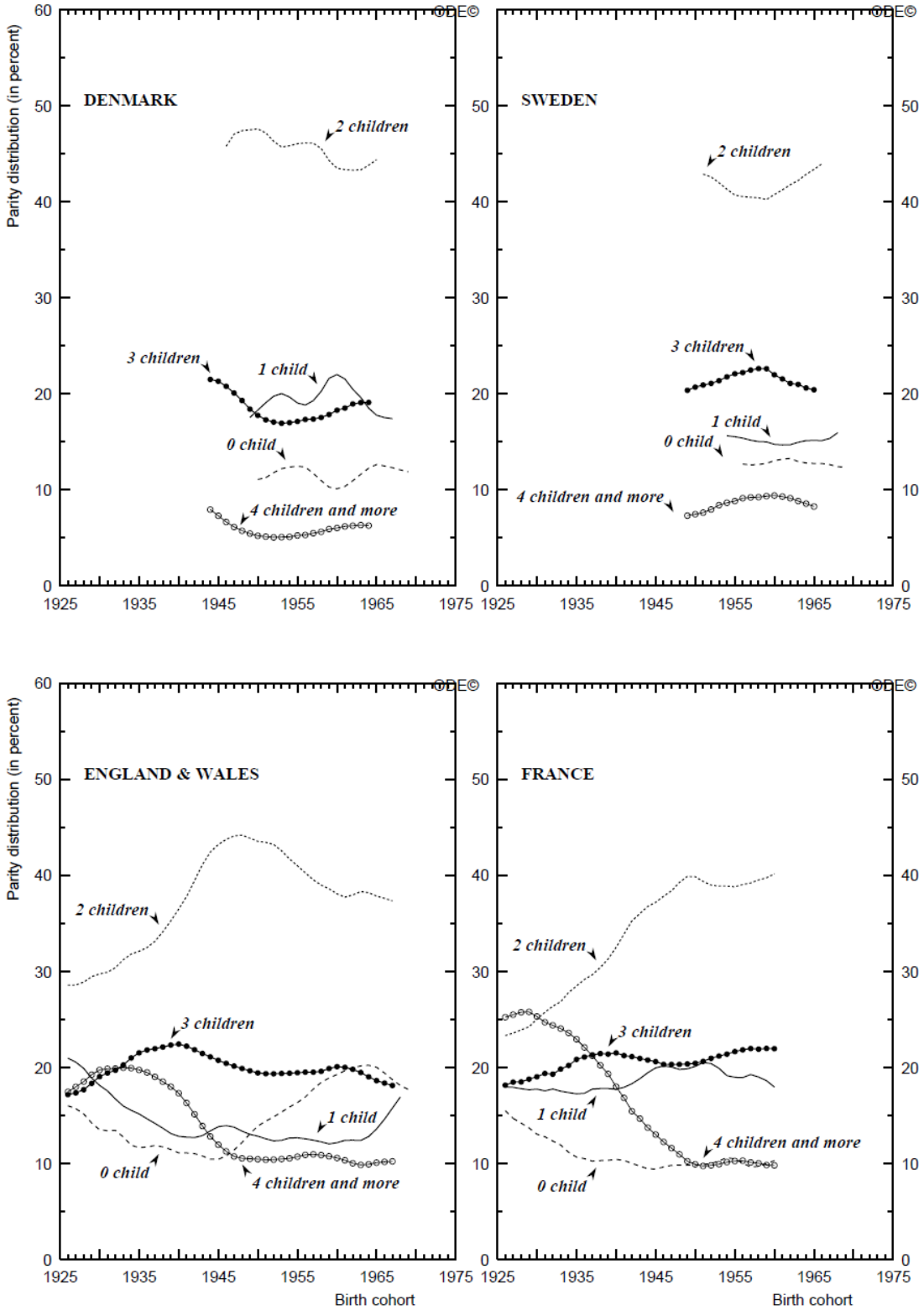


Figure 7 (continued). Parity distribution of completed fertility, birth cohorts 1926 to 1970 (in percent)

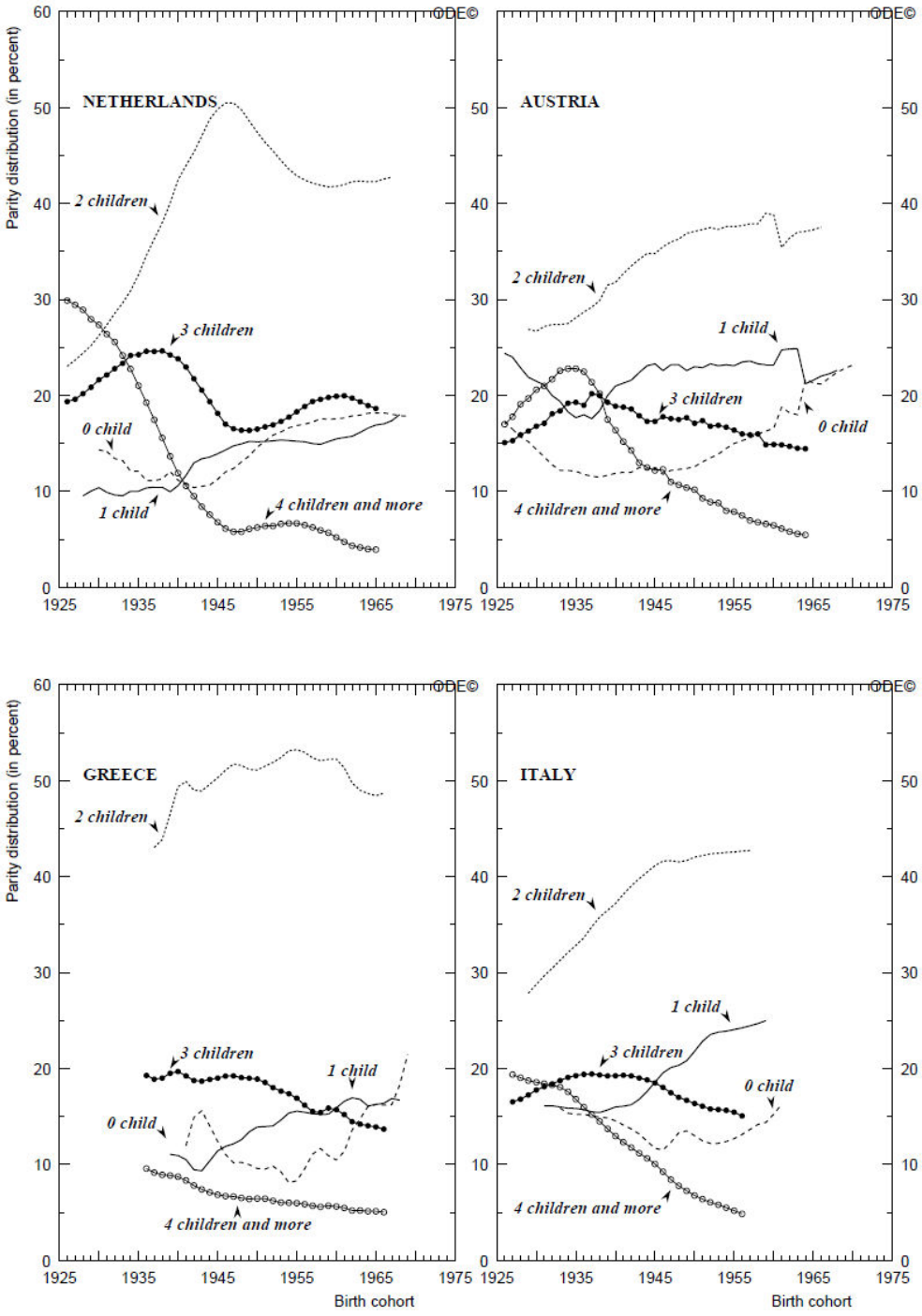


Figure 7 (continued). Parity distribution of completed fertility, birth cohorts 1926 to 1970 (in percent)

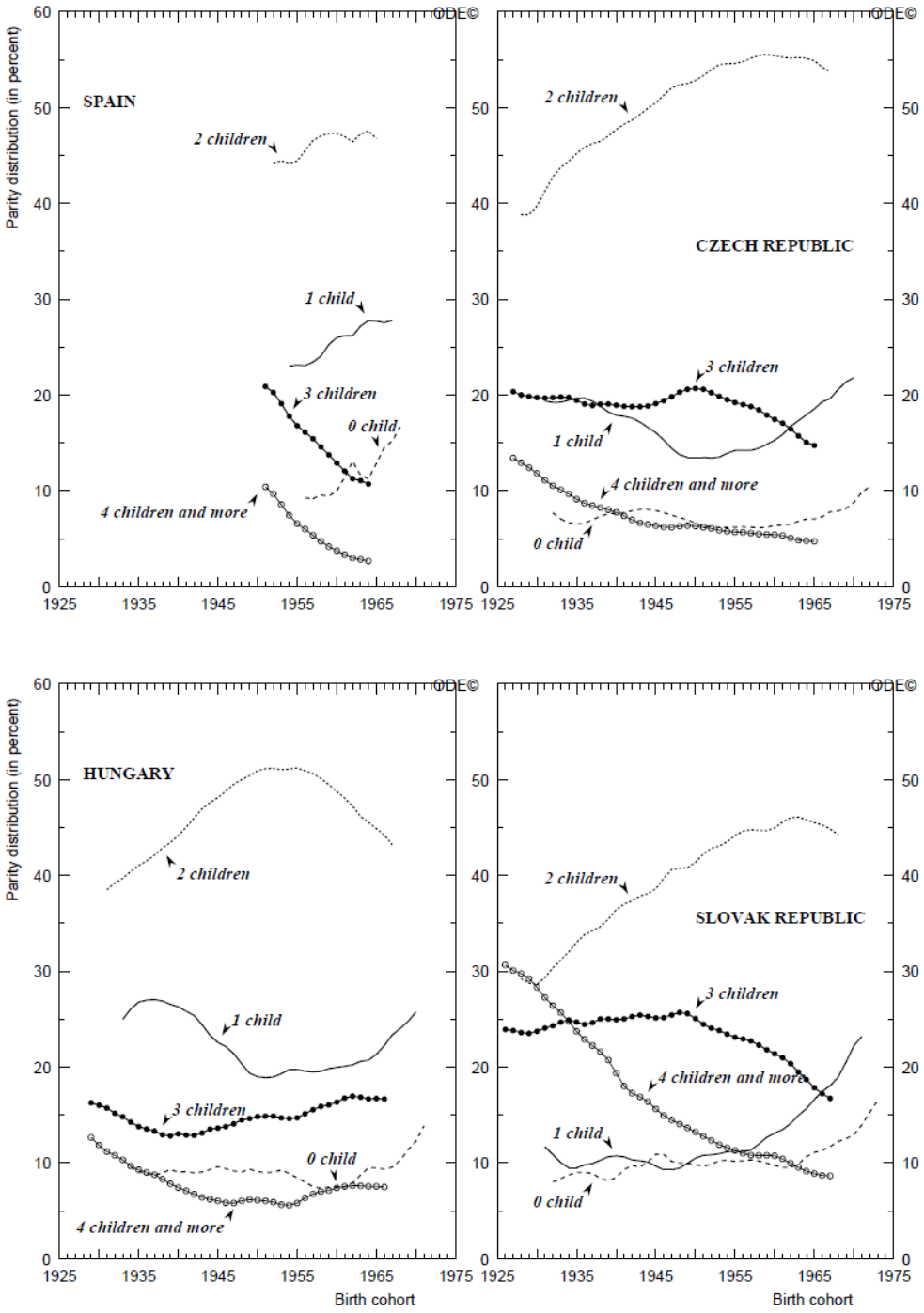


Figure 7 (continued). Parity distribution of completed fertility, birth cohorts 1926 to 1970 (in percent)

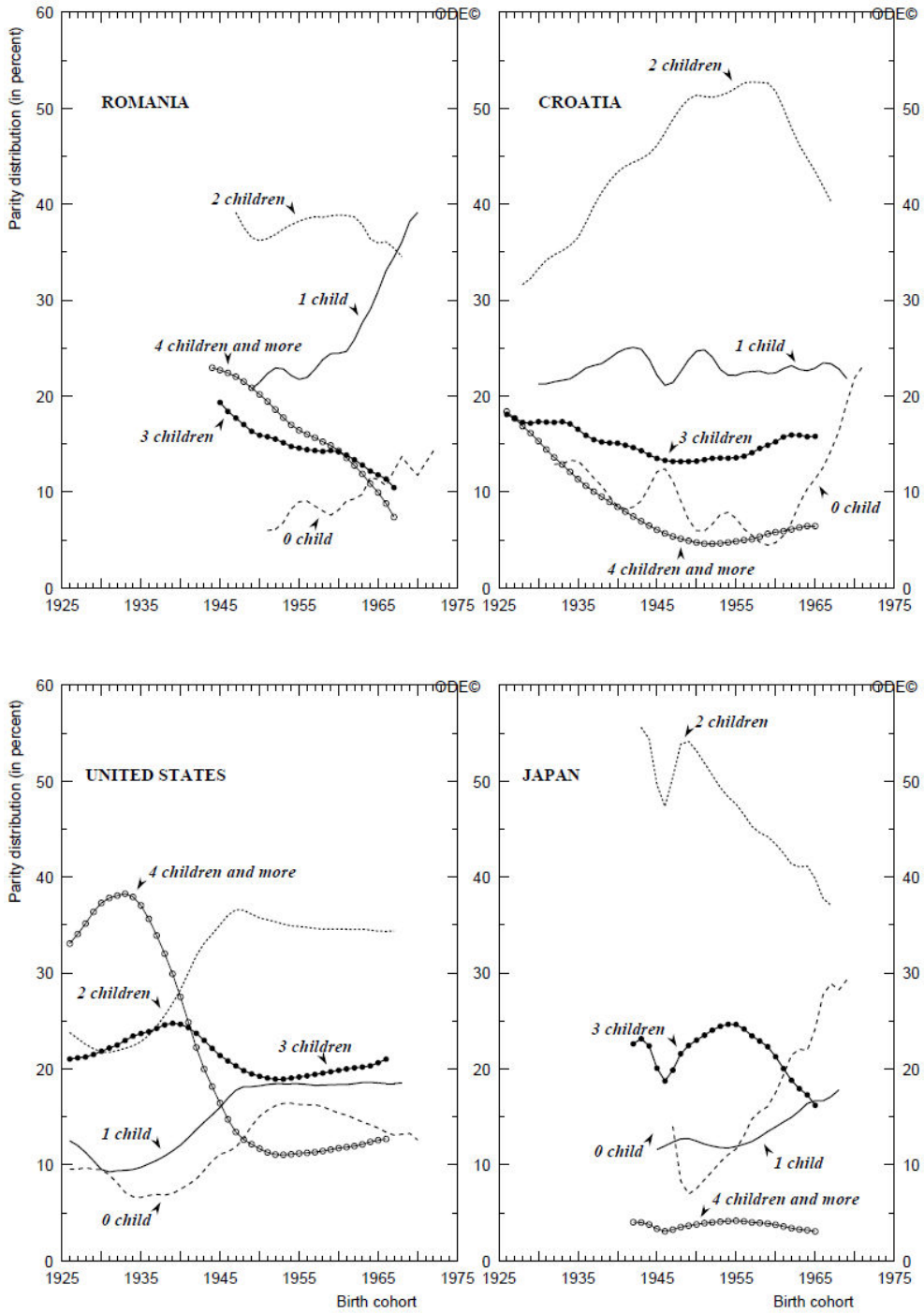
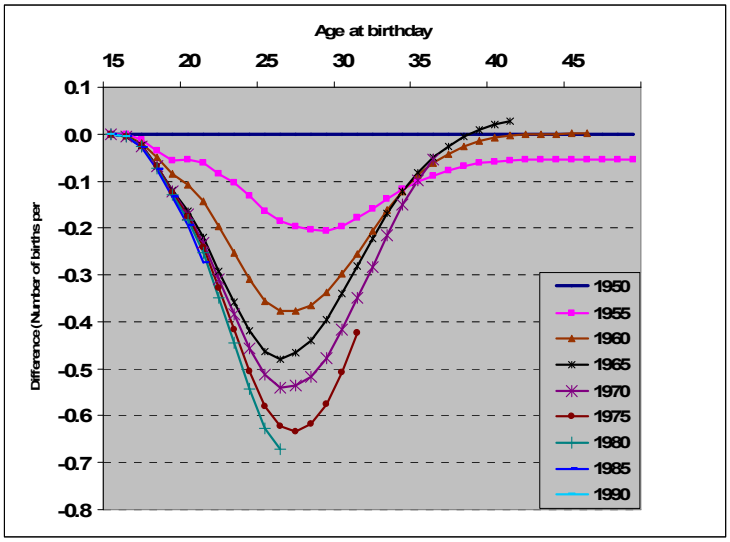


Figure 8 – Differences in cumulative age-specific cohort fertility rates between base and subsequent cohorts, women born in 1950 (base), 1955, 1960, 1965, 1970, 1975, 1980, 1985 and 1990, Denmark and Austria

Denmark



Austria

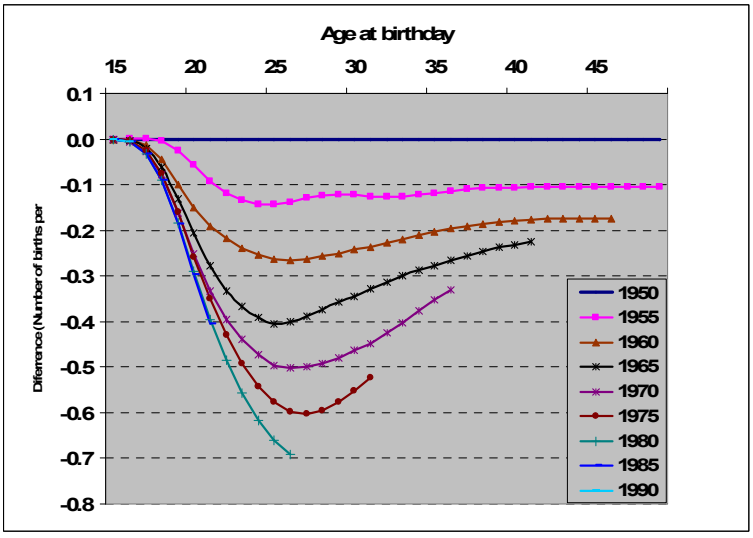
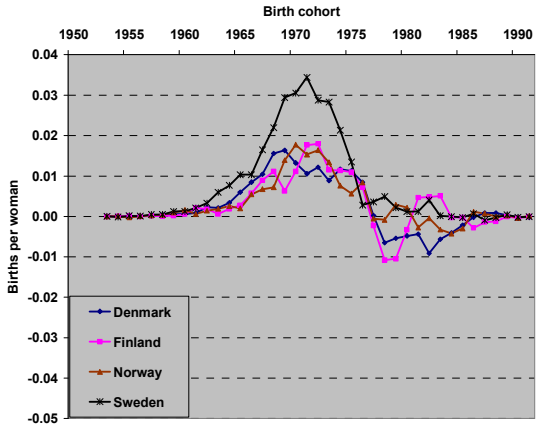
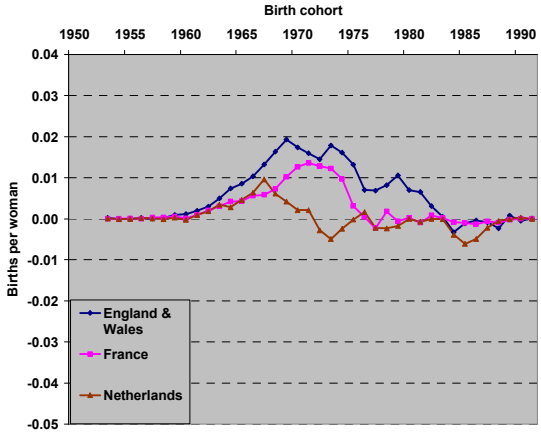


Figure 9 - Impact of childbearing behavior of birth cohorts on 2001 to 2006 total period fertility rate trends, low fertility countries

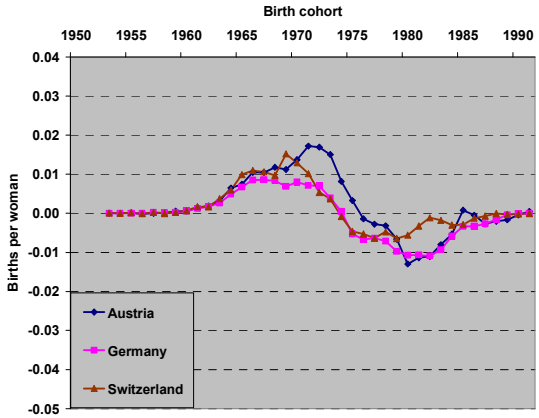
Panel A – Nordic Region



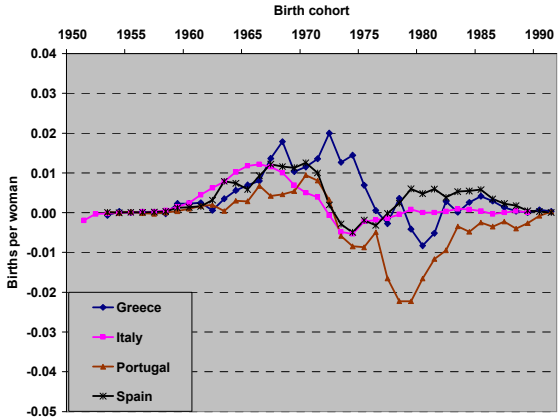
Panel B – Western Europe



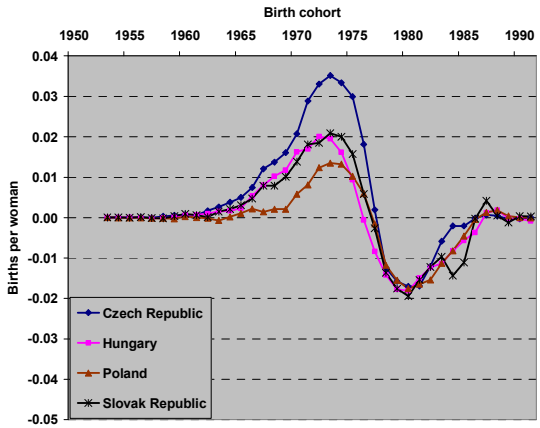
Panel C – West Central Europe



Panel D – Southern Europe



Panel E – East Central Europe



Panel F – Eastern Europe

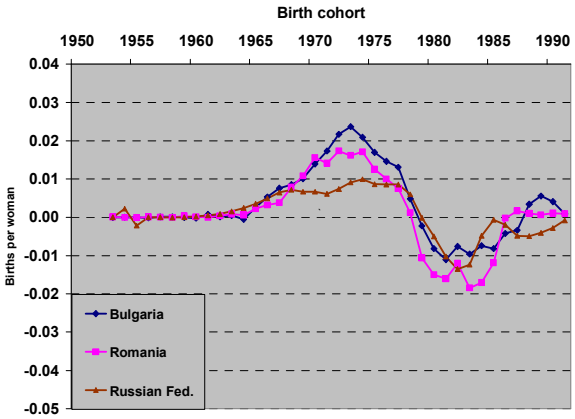
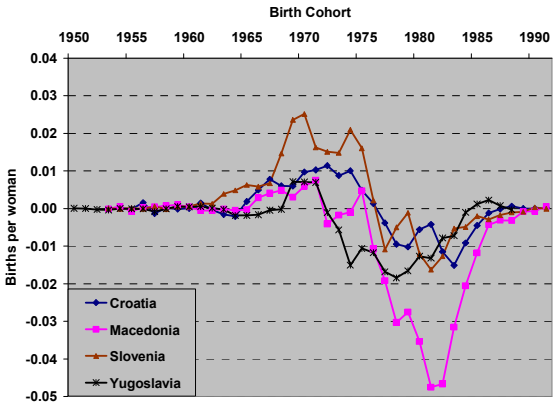
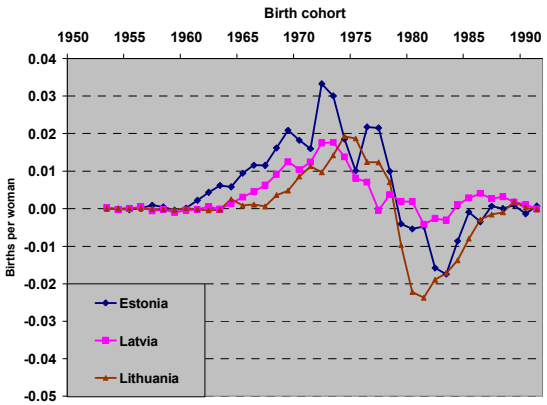


Figure 9 (continued) - Impact of childbearing behavior of birth cohorts on 2001 to 2006 total period fertility rate trends, low fertility countries

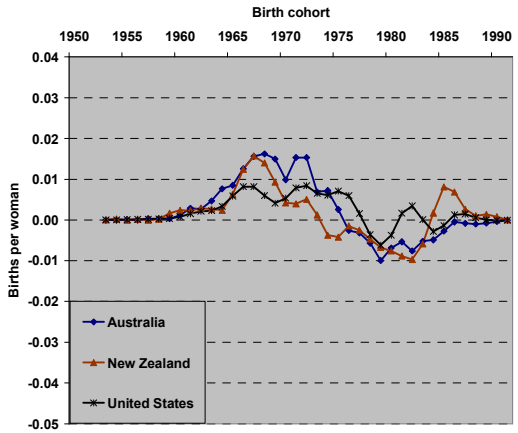
Panel G – West Balkan Region



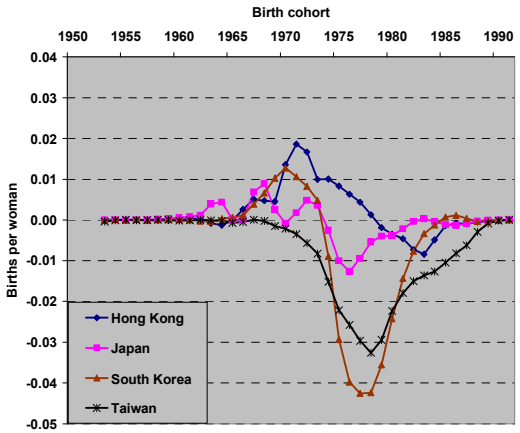
Panel H - Baltic Region



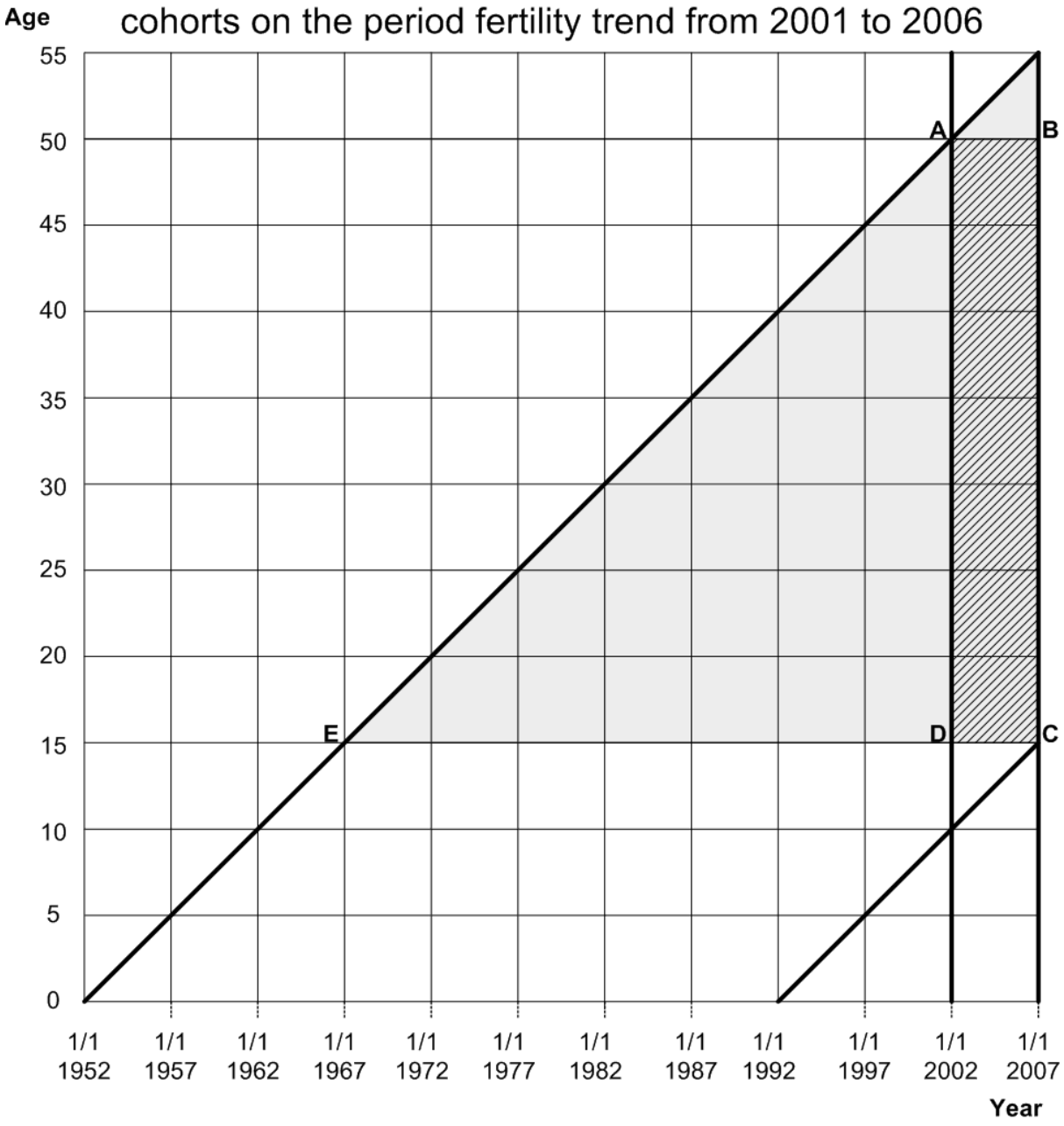
Panel I – Non-European English-Speaking Countries



Panel J – East Asia



Appendix 1 - Effect of the childbearing experience of birth cohorts on the period fertility trend from 2001 to 2006



Appendix 3a. Cumulated age specific cohort rates up to 27th birthday of mother. birth cohorts 1930. 1935. 1940. 1945. 1950. 1955. 1960. 1965. 1970. 1975 and 1980. 38 low-fertility countries

	Cumulated Age specific cohort rates up to 27th birthday of mother in birth cohort										
Region/Country	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980
Nordic Region											
Denmark	1.238	1.340	1.372	1.260	1.087	0.902	0.711	0.608	0.547	0.464	0.416
Finland	1.178	1.226	1.182	1.031	0.893	0.812	0.716	0.612	0.583	0.510	0.471
Norway		1.286	1.397	1.330	1.215	1.014	0.852	0.775	0.690	0.570	0.520
Sweden	1.028	1.095	1.132	1.083	0.999	0.860	0.722	0.723	0.632	0.429	0.396
Western Europe											
Belgium			1.214	1.171	1.050	0.970	0.858	0.695	0.577		
England & Wales	1.017	1.183	1.362	1.299	1.106	0.976	0.856	0.765	0.715	0.642	0.642
France	1.273	1.295	1.354	1.342	1.174	1.086	0.962	0.763	0.603	0.529	0.532
Netherlands		0.965	1.070	1.111	0.914	0.739	0.563	0.442	0.352	0.344	0.355
West Central Europe											
Austria			1.250	1.280	1.181	1.044	0.916	0.781	0.680	0.583	0.490
Germany			1.175	1.170	1.012	0.903	0.808	0.643	0.515	0.488	0.434
Switzerland	0.793	0.905	1.079	0.979	0.860	0.704	0.624	0.498	0.427	0.380	0.329
Southern Europe											
Greece				1.010	1.146	1.232	1.153	0.869	0.605	0.452	0.372
Italy			0.948	1.038	0.992	0.918	0.725	0.515	0.372	0.289	
Portugal	1.075	1.141	1.177	1.218	1.101	1.197	1.033	0.853	0.657	0.542	0.456
Spain	0.756	0.775	0.898	0.983	1.017	0.952	0.757	0.533	0.342	0.230	0.252
East Central Europe											
Czech Republic	1.393	1.405	1.422	1.305	1.467	1.504	1.452	1.364	1.154	0.735	0.466
Hungary		1.303	1.205	1.205	1.336	1.325	1.317	1.242	1.050	0.711	0.519
Poland							1.333	1.235	1.078	0.761	0.550
Slovak Republic		1.647	1.630	1.487	1.511	1.494	1.498	1.419	1.234	0.871	0.580
Eastern Europe											
Bulgaria		1.400	1.451	1.498	1.543	1.543	1.509	1.455	1.171	0.883	0.786
Romania						1.545	1.518	1.435	1.063	0.844	0.722
Russian Federation				1.085	1.119	1.126	1.227	1.209	1.047	0.798	0.589

Appendix 3a. Cumulated age specific cohort rates up to 27th birthday (continued)

West Balkan Region										
BosniaHerzegovina		1.536	1.527	1.414	1.364	1.173	1.148			
Croatia		1.171	1.212	1.101	1.178	1.232	1.231	1.089	0.838	0.712	0.565
Macedonia		1.619	1.664	1.567	1.413	1.413	1.445	1.341	1.285	1.144	0.876
Slovenia		1.045	1.192	1.169	1.218	1.348	1.253	1.082	0.817	0.565	0.391
Yugoslavia		1.317	1.422	1.375	1.389	1.365	1.356	1.257	1.107	0.919	
Baltic Region											
Estonia						1.214	1.315	1.277	1.036	0.790	0.675
Latvia						1.046	1.249	1.201	1.027	0.749	0.604
Lithuania				1.008	1.125	1.096	1.153	1.088	1.070	0.920	0.690
Non-European Countries (English-speaking)											
Australia	1.440	1.663	1.600	1.441	1.283	1.056	0.868	0.722	0.611	0.543	0.493
Canada	1.552	1.708	1.670	1.250	0.995	0.869	0.757	0.659	0.632	0.579	
New Zealand	1.673	1.909	1.867	1.729	1.541	1.253	1.011	0.875	0.776	0.685	0.661
United States	1.795	2.062	1.927	1.518	1.165	1.039	0.995	0.989	0.978	1.014	0.948
East Asian Countries											
Hong Kong	**1.743**	**1.776**	**1.813**	**1.709**	**1.206**	**0.922**	**0.687**	**0.413**	**0.410**	**0.292**	**0.272**
Japan		0.862	0.795	0.858	0.890	0.727	0.594	0.447	0.358	0.322	0.308
South Korea								0.840	0.635	0.423	0.206
Taiwan								**0.885**	**0.725**	**0.609**	**0.427**

Appendix 3b. Annual rate of change of cumulated age specific cohort rates up to 27th birthday of mother. birth cohorts 1930. 1935. 1940. 1945. 1950. 1955. 1960. 1965. 1970. 1975 and 1980. 38 low-fertility countries

	Annual rate of change									
Region/Country	1930-1935	1935-1940	1940-1945	1945-1950	1950-1955	1955-1960	1960-1965	1965-1970	1970-1975	1975-1980
Nordic Region										
Denmark	1.58	0.48	-1.71	-2.95	-3.73	-4.77	-3.14	-2.10	-3.27	-2.22
Finland	0.80	-0.73	-2.75	-2.86	-1.91	-2.51	-3.15	-0.97	-2.66	-1.58
Norway		1.65	-0.98	-1.82	-3.62	-3.47	-1.90	-2.31	-3.82	-1.86
Sweden	1.26	0.66	-0.87	-1.63	-3.00	-3.49	0.04	-2.72	-7.71	-1.61
Western Europe										
Belgium			-0.73	-2.17	-1.59	-2.44	-4.22	-3.71		
England & Wales	3.02	2.82	-0.95	-3.21	-2.51	-2.61	-2.26	-1.36	-2.14	0.01
France	0.35	0.89	-0.18	-2.69	-1.56	-2.43	-4.62	-4.73	-2.60	0.10
Netherlands		2.07	0.75	-3.89	-4.26	-5.44	-4.84	-4.57	-0.44	0.65
West Central Europe										
Austria			0.47	-1.61	-2.47	-2.62	-3.17	-2.79	-3.08	-3.47
Germany			-0.09	-2.90	-2.27	-2.23	-4.54	-4.47	-1.08	-2.31
Switzerland	2.63	3.53	-1.96	-2.60	-4.01	-2.40	-4.52	-3.07	-2.31	-2.90
Southern Europe										
Greece				2.52	1.44	-1.33	-5.65	-7.25	-5.81	-3.91
Italy			1.80	-0.91	-1.53	-4.72	-6.85	-6.48	-5.08	
Portugal	1.19	0.63	0.68	-2.01	1.67	-2.96	-3.83	-5.22	-3.85	-3.46
Spain	0.51	2.93	1.81	0.70	-1.33	-4.58	-7.04	-8.87	-7.94	1.85
East Central Europe										
Czech Republic	0.17	0.24	-1.71	2.33	0.51	-0.72	-1.24	-3.35	-9.02	-9.11
Hungary		-1.56	-0.01	2.07	-0.16	-0.12	-1.18	-3.36	-7.79	-6.30
Poland							-1.53	-2.72	-6.96	-6.51
Slovak Republic		-0.21	-1.83	0.32	-0.23	0.06	-1.09	-2.78	-6.98	-8.14
Eastern Europe										
Bulgaria		0.71	0.64	0.59	0.00	-0.44	-0.73	-4.34	-5.65	-2.33
Romania						-0.34	-1.13	-6.01	-4.62	-3.11
Russian Federation				0.62	0.14	1.71	-0.30	-2.87	-5.44	-6.08

Appendix 3b. Rate of change of cumulated age specific cohort rates up to 27th birthday (continued)

West Balkan Region										
BosniaHerzegovina		-0.12	-1.54	-0.72	-3.01	-0.43				
Croatia		0.69	-1.93	1.36	0.90	-0.02	-2.45	-5.24	-3.25	-4.65
Macedonia		0.55	-1.19	-2.07	0.00	0.45	-1.50	-0.86	-2.31	-5.35
Slovenia		2.63	-0.39	0.83	2.02	-1.46	-2.93	-5.62	-7.37	-7.37
Yugoslavia		1.53	-0.67	0.20	-0.35	-0.13	-1.51	-2.55	-3.73	
Baltic Region										
Estonia						1.59	-0.57	-4.19	-5.41	-3.16
Latvia						3.54	-0.78	-3.12	-6.33	-4.30
Lithuania				2.18	-0.51	1.00	-1.16	-0.33	-3.02	-5.75
Non-European Countries (English-speaking)										
Australia	2.87	-0.77	-2.10	-2.32	-3.88	-3.93	-3.70	-3.32	-2.37	-1.91
Canada	1.91	-0.45	-5.79	-4.56	-2.72	-2.75	-2.79	-0.84	-1.75	
New Zealand	2.63	-0.45	-1.53	-2.30	-4.13	-4.30	-2.88	-2.41	-2.50	-0.71
United States	2.77	-1.35	-4.77	-5.29	-2.29	-0.88	-0.12	-0.22	0.73	-1.35
East Asian Countries										
Hong Kong	0.37	0.42	-1.19	-6.97	-5.37	-5.88	-10.16	-0.16	-6.79	-1.45
Japan		-1.62	1.54	0.73	-4.05	-4.04	-5.67	-4.45	-2.11	-0.88
South Korea								-5.60	-8.11	-14.43
Taiwan								-3.98	-3.49	-7.07

Appendix 4. Cumulated age specific cohort rates between 27th and 40th birthday of mother, birth cohorts 1930, 1935, 1940, 1945, 1950, 1955, 1960 and 1965, 38 low-fertility countries

	Cumulated age specific cohort rates between 27th and 40th birthday of mother								Annual rate of change						
Region/Country	1930	1935	1940	1945	1950	1955	1960	1965	1930-1935	1935-1940	1940-1945	1945-1950	1950-1955	1955-1960	1960-1965
Nordic Region															
Denmark	1.107	1.029	0.863	0.805	0.791	0.918	1.160	1.291	-1.45	-3.53	-1.38	-0.35	2.98	4.67	2.14
Finland	1.254	1.043	0.826	0.819	0.931	1.050	1.199	1.258	-3.69	-4.66	-0.16	2.56	2.40	2.66	0.96
Norway		1.266	1.037	0.866	0.859	1.008	1.210	1.265		-3.99	-3.61	-0.17	3.21	3.65	0.90
Sweden	1.072	1.029	0.900	0.871	0.972	1.140	1.284	1.233	-0.82	-2.69	-0.65	2.21	3.18	2.38	-0.81
Western Europe															
Belgium			0.928	0.745	0.766	0.842					-4.38	0.54	1.91		
England & Wales	1.296	1.209	0.966	0.847	0.927	1.015	1.079	1.099	-1.38	-4.49	-2.63	1.81	1.81	1.22	0.37
France	1.312	1.256	1.036	0.858	0.911	1.018	1.113	1.223	-0.87	-3.86	-3.77	1.20	2.22	1.79	1.89
Netherlands		1.504	1.134	0.870	0.957	1.113	1.262	1.311		-5.65	-5.30	1.90	3.02	2.51	0.76
West Central Europe															
Austria			0.855	0.660	0.673	0.704	0.759	0.842			-5.17	0.38	0.91	1.49	2.07
Germany			0.789	0.614	0.692	0.749	0.826	0.878			-5.02	2.41	1.58	1.96	1.21
Switzerland	1.351	1.261	0.989	0.868	0.916	1.029	1.125	1.137	-1.37	-4.87	-2.60	1.07	2.32	1.78	0.21
Southern Europe															
Greece				0.953	0.861	0.763	0.750	0.860				-2.02	-2.44	-0.33	2.74
Italy			1.173	1.010	0.868	0.850	0.907				-2.99	-3.03	-0.42	1.30	
Portugal	1.727	1.649	1.434	1.167	0.951	0.816	0.831	0.938	-0.92	-2.80	-4.12	-4.09	-3.06	0.37	2.41
Spain	1.780	1.771	1.596	1.420	1.097	0.924	0.973	1.056	-0.11	-2.08	-2.34	-5.16	-3.43	1.03	1.63
East Central Europe															
Czech Republic	0.734	0.704	0.634	0.721	0.622	0.553	0.565	0.557	-0.83	-2.09	2.56	-2.96	-2.33	0.40	-0.27
Hungary		0.669	0.705	0.680	0.603	0.603	0.685	0.714		1.06	-0.72	-2.41	-0.01	2.57	0.83
Poland							0.823	0.744							-2.00
Slovak Republic		1.054	0.906	0.879	0.783	0.712	0.666	0.607		-3.02	-0.62	-2.30	-1.90	-1.33	-1.87
Eastern Europe															
Bulgaria		0.634	0.625	0.562	0.517	0.483	0.436	0.371		-0.26	-2.15	-1.67	-1.33	-2.05	-3.23
Romania						0.716	0.616	0.463						-3.02	-5.69
Russian Federation				0.715	0.753	0.745	0.594	0.426				1.03	-0.22	-4.53	-6.62

Appendix 4. Cumulated age specific cohort rates between 27th and 40th birthdays (continued)

	Cumulated age specific cohort rates between 27th and 40th birthday of mother								Annual rate of change						
Region/Country	1930	1935	1940	1945	1950	1955	1960	1965	1930-1935	1935-1940	1940-1945	1945-1950	1950-1955	1955-1960	1960-1965
West Balkan Region															
Croatia		0.805	0.733	0.664	0.672	0.669	0.728	0.767		-1.87	-1.99	0.25	-0.11	1.70	1.05
Macedonia		1.591	1.365	1.048	0.917	0.860	0.834	0.847		-3.06	-5.29	-2.66	-1.30	-0.61	0.31
Slovenia		1.012	0.858	0.740	0.672	0.585	0.599	0.678		-3.30	-2.95	-1.94	-2.78	0.47	2.51
Yugoslavia		0.933	0.931	0.906	0.867	0.871	0.903			-0.04	-0.53	-0.88	0.09	0.73	
Baltic Region															
Estonia						0.777	0.679	0.579						-2.68	-3.19
Latvia						0.782	0.678	0.545						-2.86	-4.35
Lithuania				0.935	0.865	0.832	0.715	0.622				-1.54	-0.78	-3.04	-2.78
Non-European Countries (English-speaking)															
Australia	1.591	1.384	1.191	1.035	1.039	1.156	1.243	1.286	-2.78	-3.00	-2.82	0.08	2.13	1.45	0.68
Canada	1.701	1.274	0.918	0.827	0.876	0.924	1.019		-5.79	-6.55	-2.08	1.15	1.06	1.96	
New Zealand	1.914	1.514	1.220	0.982	0.987	1.154	1.312	1.316	-4.69	-4.33	-4.34	0.10	3.14	2.55	0.07
United States	1.389	1.121	0.849	0.753	0.834	0.911	0.988	1.050	-4.29	-5.56	-2.42	2.07	1.75	1.63	1.21
East Asian Countries															
Hong Kong	**2.822**	**2.235**	**1.839**	**1.433**	**1.229**	**1.051**	**0.958**	**0.858**	-4.66	-3.90	-4.99	-3.08	-3.12	-1.86	-2.21
Japan		1.133	1.157	1.003	1.141	1.247	1.197	1.114		0.42	-2.87	2.58	1.79	-0.82	-1.44