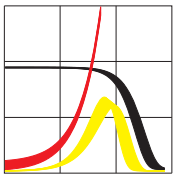

Max-Planck-Institut für demografische Forschung
Max Planck Institute for Demographic Research
Konrad-Zuse-Strasse 1 · D-18057 Rostock · GERMANY
Tel +49 (0) 3 81 20 81 - 0; Fax +49 (0) 3 81 20 81 - 202;
http://www.demogr.mpg.de

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Cohort overlays of evolving childbearing patterns: How postponement and recuperation are reflected in period fertility trends

Tomas Frejka (Tfrejka@aol.com)

This working paper has been approved for release by: Jan M. Hoem (hoem@demogr.mpg.de), Dean of the Laboratory of Contemporary European Fertility and Family Dynamics.

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Tomas Frejka

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Abstract

Combining cohort and period perspectives a method is developed that follows the process of childbearing postponement and recuperation and its reflection in total period fertility levels and trends in low fertility populations. It is complementary to methods pioneered by Bongaarts and Feeney (1998) estimating tempo-adjusted period total fertility rates. The method can be characterized as revealing the internal structural mechanism of the postponement and recuperation process. It is applied to analyzing the fertility history of Western countries, Southern Europe, Central and Eastern Europe, and East Asia during the past half century. Our research concludes that period fertility descents and troughs, for instance, "lowest-low" fertility, as well as increases and peaks are a reflection of changing cohort childbearing patterns due to fertility postponement and recuperation combined with overlays of successive birth cohorts. Period fertility troughs occurred in Western countries during the 1980s, in Central and Eastern Europe around 2000.

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The motivation to delve into the present research has its origins in the observation that the structural reason for "lowest-low" fertility in formerly socialist countries of Central and Eastern Europe in the late 1990s and early 2000s was based on the fact that 1950s birth cohorts with young childbearing patterns and thus few births when women were in their thirties and forties were overlapping with 1970s birth cohorts which had old childbearing patterns and thus few births when in their teens and early to mid twenties[1]. Actually this observation is an updated version of ideas developed by Hajnal (1947). In a path-breaking paper Hajnal reviewed issues of measuring fertility applied at the time, examined their inadequacies and proposed methods of analysis that facilitate an improved understanding of childbearing levels and trends. Hajnal demonstrated that the increase in fertility rates – crude birth rates as well as net and gross reproduction rates -- in the mid-1940s in a number of western countries and the rapid rise in fertility in the 1930s in Germany was "due to the making up of postponed births." Hajnal demonstrated theoretically and empirically the apparent dilemma of period rates increasing (or declining) considerably at the same time as cohort rates remained stable.

In a similar vein, the goal of this study is two-fold:

1. To formulate a method that follows the process of childbearing postponement and recuperation and its reflection in total period fertility levels and trends in low fertility populations. A cohort and period perspective are combined, namely lifetime cohort childbearing patterns are translated into period measures and the principal focus is on analyzing the postponement and recuperation process from a period perspective. The method is complementary to methods pioneered by Bongaarts and Feeney (1998) which estimate tempo-adjusted period total fertility rates. The method described in this paper

[1] Frejka (2008:157) briefly discussed the role of birth cohort overlay in generating "lowest-low" fertility. In the context of analyzing family formation and childbearing during the 1990s societal transition in Central and Eastern Europe he noted:

> "The varying childbearing behaviour of the respective cohorts is a crucial circumstance contributing to the very low fertility rates of the mid- to late 1990s and early 2000s. The birth cohorts of the 1950s and early 1960s had essentially completed their childbearing by that time. Almost all of their children had been born by the early 1990s. On the other hand, many potential parents of the cohorts born during the 1970s and early 1980s were delaying childbearing until their late twenties or early thirties, and thus were not bearing many children during the mid- to late 1990s. Because the former cohorts were no longer having children in the mid- to late 1990s, and the latter cohorts were just gradually starting their childbearing, period fertility was at its lowest."

provides different insights than the TFR adjustment methods. It demonstrates paths of childbearing postponement among young women and childbearing recuperation paths of older women, and how these are reflected in trends of total period fertility rates. The method could be characterized as revealing the internal mechanism of the postponement and recuperation process.

2. The method is then applied to explore actual developments in 36 low fertility societies during the second half of the 20th century and the first years of the 21st century.

The massive postponement and recuperation of childbearing in low-fertility societies have been important sociological and demographic developments during the past half century[2]. Changing childbearing age patterns have been integral components in the evolution of family formation, the diversity of marriage and cohabitation forms and trends, and the "Second Demographic Transition" (Billari 2008; Billari and Kohler 2004; Bongaarts and Feeney 1998; Castles 2003; Frejka et al. (eds.) 2008; Frejka et al. 2010; Frejka and Sardon 2004; Goldstein et al. 2003; Goldstein et al. 2009; Jones et al. 2009; Kohler at al. 2002; Konietzka and Kreyenfeld (eds.) 2007; Lesthaeghe 1995 and 2001; Lesthaeghe and Neidert 2006; Lesthaeghe and van de Kaa 1986; Lutz and Skirbekk 2005; McDonald 2002, 2006 a and b; Sobotka 2003, 2004 a and b; Sobotka and Toulemon 2008).

Concurrently also changes in the level of childbearing, predominantly declines in fertility quantum have been occurring during the past half century. These trends are discussed in innumerable publications (for instance, Bongaarts 2001; Bourgeois-Pichat 1987; Calot and Blayo 1982; Chasteland and Chesnais 1997; Chesnais 1998; Frejka and Ross 2001; Frejka and Sardon 2004; Hobcraft 1996; Lesthaeghe 2001; Ryder 1986; Sardon 2004; Teitelbaum and Winter 1985; Westoff 1983). When depicting fertility trends with completed cohort fertility rates a clear picture of quantum changes over time is communicated. Because such a portrayal has the unavoidable shortcoming that this can be done only after the youngest birth cohorts have completed their childbearing and thus it fails to provide up-to-date information, fertility trends are frequently depicted by employing total period fertility rates (TPFRs). The latter approach has the less obvious shortcoming that TPFRs contain and reflect not only quantum fertility changes but also changes in the timing of childbearing. Increasingly, over a period of several decades demographers have demonstrated that changes in the timing of births "distort" TPFRs (see, for instance, Hajnal 1947; Ryder 1964). When births are being postponed there are less of them per year, i.e. TPFRs are deflated, and vice versa, when births are advanced there are more of them per year, i.e. TPFRs are inflated.

Bongaarts and Feeney (1998) initiated efforts to devise methods of developing tempo-adjusted total fertility rates that remove temporary depressing effects of changes in childbearing timing. These endeavors have been thoroughly discussed in the literature and a number of

[2] An approximate indication of the considerable progression of the postponement and recuperation process is documented by the following. On average in all low fertility countries the cumulative cohort fertility rate up to age 27 was 1.3 births per woman in the 1940 birth cohort. It declined to 0.5 births per woman in the 1980 birth cohort (Frejka and Sardon 2009: Table 6 and Appendix 3). In most countries the postponement and recuperation process has not yet run its course and is still under way.

researchers have strived to further advance and improve these methods (for instance, Bongaarts and Feeney 2006; Bongaarts and Sobotka 2010; Goldstein et al. 2009; Kohler et al. 2002; Lesthaeghe 2001; Lesthaeghe and Willems 1999; Lutz and Skirbekk 2005; Ortega and Kohler 2002; Philipov and Kohler 2001; Schoen 2004; Sobotka 2003 and 2004a and b; Sobotka and Lutz 2009). Various forms of the adjusted total fertility rates have been widely used during the past decade.

The present paper explores a complementary approach to explaining and understanding total period fertility rate levels and trends. It is a combined cohort and period perspective based on the fact that during the postponement and recuperation process successive birth cohorts with changing age patterns of childbearing overlap. These overlapping age patterns of cohort childbearing can be translated into period fertility trends of young women postponing childbearing which interact with fertility trends of older women who are recuperating births and their interplay is reflected in levels and trends of TPFRs.

Thus far the repercussions of the overlay of childbearing age patterns of successive cohorts as well as the duration of the postponement and recuperation process on trends of total period fertility rates have rarely been analyzed, demonstrated and documented[3].

Research reported on in this paper explores the detailed age-specific mechanism, the interaction of fertility trends of young and older women of overlapping birth cohorts, which underlie trends in total period fertility rates in 36 low fertility countries. In the present context the term "mechanism" is not meant to imply any causation, but is used to describe the structural fertility dynamics from a cohort perspective translated into period rates. At the same time, there is no intention to discuss whether fertility changes are period or cohort driven, but simply to demonstrate the structural effects of overlapping and changing cohort childbearing patterns on period fertility trends of age groups and on total period fertility rate trends. Thus it reveals another aspect of the importance of changing childbearing patterns during the past half century.

By elaborating on the mechanisms of interacting fertility trends of age groups of overlapping birth cohorts over time these empirical investigations are thus an extension and a complement to the findings and conclusions of Bongaarts and Feeney (1998, 2006 and Bongaarts 2002) and the voluminous other literature dealing with period tempo effects (see references in the paragraphs above). Moreover, this type of analysis proves to be a genuine complement to the methods adjusting period fertility rates because it reveals additional features which are concealed when using the period fertility adjustment methods. For instance, they demonstrate the usual time lag of recuperation vis-à-vis postponement, i.e. the total period fertility rate tends to continue to rise even after childbearing postponement has ceased because recuperation has not yet run its course. They can also reveal the effect of possible childbearing advancement, albeit rare during the past several decades, if and when it intervenes in the long-term process of childbearing postponement, which is concealed when using any period fertility adjustment method.[4]

[3] See footnote 1 above.

[4] This happened, for instance, in the United States in the late 1980s and is discussed in detail below.

The present time is suitable and favorable for a detailed empirical investigation of the postponement and recuperation process in low fertility countries. This process has been in progress in many of these countries over the past 40 to 50 years and data to conduct the research are available. The process first started in the United States during the 1960s, its beginnings spread to other Western countries and Japan in the 1970s, in the 1980s it started in countries of Southern Europe, and the countries of Central and Eastern Europe have experienced this process since the 1980s and early 1990s. For various reasons it is difficult to assess when childbearing postponement started in low fertility East Asian countries however clearly it has been in progress for at least two decades or so. The availability of sufficiently long series of detailed single-year age-specific fertility rates in the data banks of the Observatoire Démographique Europeén[5] and of the Human Fertility Database[6] make it possible to analyze the fertility postponement and recuperation process[7]. As of the late 2000s, this process has been concluded in a few Western countries, is nearing the end in other ones and is in progress in all the other low fertility countries.

The paper begins with outlining the theory and methods applied. It continues with an analysis of the interaction of changing childbearing patterns with the overlay of birth cohorts in modifying total period fertility declines and troughs as well as increases in 36 low fertility countries. The paper subsequently deals with a few corollary issues before ending with a summary and conclusions.

Theory and methods

A principal issue of fertility analysis is to attain information about trends of fertility levels not distorted by timing. Time series of total cohort fertility rates achieve this goal. Such time series are useful, but lack information about the "present time." Bongaarts and Feeney (1998), followed by other researchers, formulated methods to remove timing distortions from trends of total period fertility rates (see references in the Introduction).

This study provides a complementary exposition and analysis of the internal mechanism of total period fertility rate trends based on the process of cohort childbearing postponement and recuperation translated into period postponement and recuperation [8]. The gist of this investigation is based on the fact that women of individual cohorts when young may postpone and subsequently, in part or in full, recuperate the postponed births when older. Sequentially over time successive changing cohort childbearing age patterns overlap and because each total period fertility rate (TPFR) consists of individual age-specific fertility rates (ASFR) of the respective overlapping birth cohorts, i.e. the TPFRs are a cross-section of the individual cohort ASFRs, the

[5] Jean-Paul Sardon, Director (odeurope@wanadoo.fr)
[6] The Human Fertility Database (http://www.humanfertility.org/cgi-bin/main.php) located at the Max Planck Institute for Demographic Research.
[7] The data bank of the Observatoire Démographique Europeén will gradually be replaced by the Human Fertility Database (HFD). Work on the HFD began in 2007 as a collaborative project involving research teams at the Max Planck Institute for Demographic Research (MPIDR) in Rostock (Germany) and the Vienna Institute of Demography (VID) in Vienna (Austria). The HFD is directed by J. R. Goldstein, V. Shkolnikov and T. Sobotka.
[8] As stated in the previous section this is merely a description of interrelations underlying fertility dynamics. It is not meant to imply any causation or to discuss whether fertility changes are period or cohort driven.

cohort rates can be translated into period ASFRs. Because fertility trends of younger women on the one hand, and older ones, on the other, tend to go in similar directions, the respective ASFRs can be cumulated for young as well as for older women. Consequently, the TPFRs can be analyzed based on childbearing behavior and trends of young and older women and the interaction of these trends reflecting childbearing postponement and recuperation. As will be demonstrated, this includes the childbearing behavior of all cohorts, including those that have not yet concluded their reproductive periods, and is thus up-to-date. This rather complicated procedure will now be described in detail.

Fertility dynamics: Individual birth cohorts

The process of postponement and recuperation can be defined as women of a specific birth cohort bearing children at a later age compared to an older, base cohort. Typically during this process age-specific fertility rates (ASFRs) while women are in their teens and early as well as mid-twenties are lower in the younger birth cohort, whereas when these women reach their late twenties, thirties and forties, the ASFRs are higher than in the base cohort. This process can be depicted and measured by comparing the age-specific childbearing pattern of the cohort in question with the age-specific childbearing pattern of a base cohort in various ways (Figure 1, panels A & B, and Table 1).

[Figure 1 and Table 1 about here]

In Figure 1 the 1957 age-specific childbearing pattern of Denmark's population is compared with the 1947 ASFRs. The latter is selected because it is approximately the birth cohort after which postponement and recuperation started during the late 1960s in Denmark. This is a typical example of the beginning of the postponement and recuperation process in Western countries.

In Figure 1, panel A the two age-specific childbearing patterns are juxtaposed. The 1957 curve is lower to the right of the 1947 curve up to age 28 illustrating the degree of postponement. Starting with age 29 the curve of the 1957 birth cohort is higher than the 1947 curve illustrating the extent of recuperation. The exact differences of each age-specific fertility rate is shown in Table 1 (panel A); the cumulative value of lesser childbearing of the 1957 cohort up to age 28 included was minus 0.41 births per woman and the cumulated value of excess childbearing of the 1957 cohort above age 28 was plus 0.27 births per woman. The difference between these two values, minus 0.14 births per woman, is also the difference between the total cohort fertility rates of the two birth cohorts.

Figure 1, panel B is another way of depicting the process of postponement and recuperation of the 1957 birth cohort compared to the 1947 cohort. The base age-specific values of the 1947 cohort are defined as equal to zero and the cumulated values of the 1957 cohort are compared to this base. The downward slope of the 1957 curve up to a trough at age 28 depicts the postponement phase of childbearing. The trough of the 1957 curve at age 28 has the familiar value of minus 0.41 births per woman. Following the trough the 1957 curve slopes upward depicting the recuperation phase. The final value of the curve at age 49 is minus 0.14 births per

woman (Table 1, panel B), which is the outcome of the postponement and recuperation process in the 1957 compared to the 1947 cohort.

Another indication that the postponement and recuperation process has begun is to compare the proportions of childbearing of the respective cohorts prior to and after the trough age. In the 1947 birth cohort 74 percent of births were born up to age 28 included compared to only 57 percent of all births of the 1957 cohort up to the same age.

Fertility dynamics: Overlapping successive birth cohorts and translation to period rates

Once the process of childbearing postponement and recuperation gets under way, it tends to progress from one birth cohort to the next quite systematically, although not necessarily at an even pace. In Figure 1 and Table 1 the difference between the childbearing age patterns of two birth cohorts ten years apart are highlighted and compared. Figure 2 illustrates how the childbearing patterns changed from one *cohort* to the next over time, in this case between the 1947 and the 1957 birth cohorts, as well as before and afterwards. As was demonstrated above, the fertility age pattern change was quite substantial; the cumulated difference between the two cohorts was 0.41 births per woman by age 28. However, the difference between the 1947 and the 1957 total cohort fertility rates was relatively minor, only 0.14 births per woman.

[Figure 2 about here]

Figure 2 also illustrates the fact that each total *period* fertility rate (TPFR) consists of individual age-specific fertility rates (ASFRs) of the respective overlapping birth cohorts, i.e. the TPFRs are a cross-section of the individual cohort ASFRs. For instance, the respective ASFRs at ages 15 to 49 of the 1924 through the 1958 birth cohorts constituted the 1973 TPFR which was 1.92 births per woman. The 1983 TPFR which is composed of the respective ASFRs from the 1934 through the 1968 birth cohorts equaled 1.38 births per woman.

Why did the TPFR decline by as much as 0.54 births per woman, i.e. by 28 percent, in the ten years between 1973 and 1983? *The main structural reason was that rapidly changing cohort childbearing age patterns were overlapping*. In addition, the Danish population was also experiencing some fertility quantum decline at the same time. The quantum decline between the roughly corresponding 1947 and the 1957 TCFRs, the two cohorts, who experienced their highest ages of childbearing in 1973 and 1983, respectively, was 0.14 births per woman, i.e. seven percent. The difference between the two values was the approximate contribution of changing childbearing age patterns to the TPFR decline between 1973 and 1983: 0.54 minus 0.14 equals 0.40 births per woman, i.e. about three-quarters of the TPFR change between 1973 and 1983 was due to changing cohort childbearing patterns.

As childbearing postponement in Denmark had started and was progressing between 1973 and 1983, ASFRs of successive cohorts among young women were progressively lower. In order to be able to analyze the impact of the changing cohort childbearing patterns on the total period fertility rates, the cohort ASFRs have to be translated into period ASFRs. These are shown in Figure 3 for the period 1970 to 1990, separately for young women up to age 28 in panel

A and for older women ages 29 to 39 in panel B. They depict in detail the postponement and recuperation process from a period perspective.

[Figure 3 about here]

The trends in the shaded areas illustrate the initial stage of postponement between 1973 and 1983 (Figure 3). The ASFRs were lower at all ages with substantial declines among young women (Figure 3, Panel A). More specifically, for example, the period ASFRs for age 20 were lower in 1983 compared to 1973 by 49 percent, at age 25 by 30 percent, and at ages 29 to 31 by about 11 percent. There was some decline even among older women presumably reflecting the overall fertility quantum decline (Figure 3, panel B).

Starting approximately in 1983 the curves for all ASFRs above ages 26-27 turned upward. Many of the young women who did not bear children between 1973 and 1983, i.e. who were then "postponing" their childbearing, were catching up on their childbearing, they were recuperating a proportion of the births they did not have earlier, *after* 1983. For instance, period ASFRs in 1990 were higher than in 1983 by 36, 71 and 81 percent for ages 29, 35 and 39, respectively (Figure 3, panel B).

Fertility dynamics: Overlapping successive birth cohorts and their role in shaping total period fertility rates

The next step is to devise a procedure to explain and analyze the interrelations between childbearing postponement and recuperation and trends of total period fertility rates.

It is a matter of course that childbearing postponement occurs among young women and recuperation among older women. The period ASFRs which have been transposed from cohort ASFRs of young women as well as those of older women can be cumulated. The cumulated measures represent undistorted trends because the period ASFRs which have been transposed from the cohort ASFRs of young women as well as those of older women tend to go in the same direction (see, for instance, Figure 3). The cumulated measures hardly ever contain offsetting ASFR trends of individual ages. Thus these cumulated measures express real childbearing trends of young and of older women. A decline in the cumulated fertility rate of young women illustrates a trend of postponement; stability or even an increase means that postponement has ceased. And vice versa for older women, an increase in the cumulated fertility rate of older women illustrates the trend of recuperation; stability or even a decline means that recuperation has ceased. By definition the sum of the cumulated period ASFRs for young and for older women for each year equals the total period fertility rate.

The clincher is to identify the true age which divides young women from older ones. This age varies slightly over time in a population and varies between populations, albeit within a narrow range. This age is usually in the mid to late twenties, i.e. between the ages of 24 to 30; often at age 28 (see, for instance, Figure 1, panel B, and Table 1). For purposes of long-term analyses it is acceptable to select one age for all cohorts which divides young women from older ones, even though it might be off by a year or two for some individual cohorts. Any distortions

tend to be small because ASFR trends at ages below and above the dividing age tend go in opposite directions or tend to be relatively stable (Figure 3).

Fertility dynamics: Postponement and recuperation models

Based on the experience of those populations that have completed, or have gone through a considerable part of the path towards the end of the postponement and recuperation process, two models have been constructed, a "simple" and an "extended" model[9] (Figure 4). Both models start with a "declining period fertility" phase during which childbearing postponement is not offset by any recuperation and by the end of which the TPFR reaches its lowest point below the corresponding TCFR, a TPFR trough. The two models are distinguished by:

1. The length of time of postponement and recuperation interplay after recuperation starts; this interplay tends to last much longer in the extended model; and
2. The degree of complexity of postponement and recuperation interplay and its reflection in the TPFR trend back to the corresponding TCFR level.

A real period of years is used in the models with the postponement and recuperation process starting in the mid 1970s, when the total period and the total cohort fertility rates were approximately equal in individual western countries. The beginning of the postponement and recuperation process is preceded by the end of a quantum fertility decline (Figure 4).

[Figure 4 about here]

The *simple* model consists of three phases:

1. *Declining period fertility*: Childbearing is being postponed among young women for close to 10 years thus their fertility is declining. The fertility trend of older women remains stable because these are the women of the older cohorts that do not yet have any births to recuperate. At the end of this phase the TPFR is at its lowest level with its largest degree of distortion which is also the largest distance from the "corresponding" TCFR lagged by the average age of childbearing. This lowest point represents a TPFR trough which is generated at the end of phase 1 and beginning of phase 2 when the extent of fertility decline due to childbearing postponement of young women is offset by the emerging extent of recuperation of older women. The trough is usually only one year, occasionally it lasts for a few years.
2. *Rising period fertility*. Young women have stopped to postpone births, their childbearing is at a relatively low level and their fertility trend is stable. Older women are recuperating births they had postponed when they were younger and their fertility rate is rising. Thus the TPFR is increasing. This phase tends to last for about 10 years.
3. *Stabilized period fertility*. Childbearing recuperation has come to an end and there is no childbearing postponement among young women. The total period and cohort fertility rates settle at roughly the same level.

The *extended* model consists of five phases:

[9] This is not meant to imply that there will be no changes in the age patterns of fertility in the future. For the time being, childbearing postponement is slowing down, even ceasing, in many countries during the 2000s. This is what is reflected in the models.

1. *Declining period fertility*: This phase is identical to the first one of the simple model. Childbearing is being postponed among young women for close to 10 years thus their fertility is declining. The fertility trend of older women remains stable because these are the women of the older cohorts that do not yet have any births to recuperate. At the end of this phase the TPFR is at its lowest level with its largest degree of distortion which is also the largest distance from the "corresponding" TCFR lagged by the average age of childbearing. This lowest point represents a TPFR trough which is generated at the end of phase 1 and beginning of phase 2 when the extent of fertility decline due to childbearing postponement of young women is offset by the emerging extent of recuperation of older women. The trough is usually only one year, occasionally it lasts for a few years.
2. *Initial period fertility increase*. Childbearing postponement of young women continues, possibly at a slower rate. Older women are recuperating births they had postponed when they were younger and their fertility rate is rising. The childbearing postponement and recuperation interplay is reflected in a partial TPFR increase.
3. *Interim stabilization of period fertility*. Childbearing postponement and recuperation are continuing at approximately similar rates of decline or decrease, respectively, thus offsetting each other and the TPFR stabilizes temporarily. The TPFR continues to be distorted and remains below the corresponding TCFR.
4. *Final period fertility increase.* Young women have stopped to postpone births and their fertility trend is stable. Older women are continuing to recuperate births they had postponed when they were younger and their fertility rate is rising. Thus the TPFR is increasing.
5. *Stabilized period fertility*. Childbearing recuperation has come to an end and there is no childbearing postponement among young women. The total period and cohort fertility rates settle at roughly the same level.

These models provide a standard for assessing the status of the postponement and recuperation process in individual populations (Figure 4).

As will be demonstrated, many Western countries have passed through most of the five phases of the extended model. Some have gone through the entire progression of the extended model. A majority of populations has not completed the cycle and is at a certain point in the progression of events. An approximation of phase 5 appears to be the endpoint for the foreseeable future, but new patterns may emerge. In reality the way in which populations pass through the phases differs from one country to another.

To construct the models and for purposes of international comparison two simplifying assumptions were adopted. These are inherent in the models and they are applied when following childbearing postponement and recuperation in individual populations.

(a) Total cohort fertility rates are lagged by 30 years, which is a generalization based on the fact that the mean age of childbearing is increasing in all low-fertility populations, and in some has reached the age of 30[10];
(b) The end of age 28 is taken as the dividing point between young women postponing their births and older women recuperating births. This division might not apply in some populations, however in all of them birth postponement or recuperation tend to be relatively moderate around that age so that any distortions are likely to be minimal.

In both models the trends start at the tail end of the "baby boom" in Western countries presumably in the early 1970s and with the birth cohorts of the early to mid 1940s. As overall fertility is still declining, there is a continued decline in childbearing in the 15-28 age group as well as in the 29-49 age group of women. It was during the 1970s when in the western countries the average age of childbearing started to increase[11] and the postponement of fertility commenced. That is expressed in the continuing decline of fertility among the 15-28 years old women. During the late 1970s and early 1980s childbearing among women 29-49 years old levels off in both models. This implies the lack of any fertility recuperation. As childbearing postponement has been in progress for some time, birth recuperation gets under way in the mid 1980s.

The structural mechanism shaping the trend of total period fertility rates is the interaction between childbearing postponements of younger cohorts with childbearing recuperation of older cohorts. Consequently, the overlay of changing childbearing patterns of relevant birth cohorts at a time when fertility is being delayed and recuperated is reflected in the TPFR trends in low fertility countries since the early 1970s. The overlay of changing cohort childbearing patterns of successive cohorts was reflected in:

(a) TPFR declines;
(b) TPFR troughs, including years of "lowest-low" fertility; and
(c) TPFR increases, including the period fertility increases early in the 21st century when postponement was abating or ceasing. Each of the 36 low fertility populations for which sufficient data are available has been analyzed. The populations have been classified into four groups, two of them with sub-groups, which share similar basic features in the postponement and recuperation process. The main criteria for this classification were (i) the birth cohorts in which childbearing postponement started and the period when this occurred; and (ii) closely correlated to this tends to be the year of the TPFR trough. The groups largely overlap with geographical regions and sub-regions. To a large extent the kindred basic features in the postponement and recuperation process are due to the fact that in most of the regions and sub-regions countries have common economic, political, social, and frequently also shared linguistic, cultural, ethnic, and other characteristics. The classification is not perfect and the titles of some regions might seem awkward. Some regions are more homogeneous than other. These are as follows[12]:

A. Western countries

[10] For evidence on levels and trends in cohort and period average ages of childbearing in the respective populations see Frejka and Sardon (2004) Table CO-12 on pp. 366-367 and graphs on pp. 50, 84, 116, 146, 176, 238-239, 308-309.
[11] Same as footnote 10.
[12] This classification is similar to the one applied in Frejka and Sardon (2004:pp. 21-22).

   a. Nordic countries: Denmark, Finland, Norway, Sweden.
   b. Western Europe: Belgium, England & Wales, France, Netherlands.
   c. West Central Europe: Austria, West Germany, Switzerland.
   d. Non-European countries (English-speaking): Australia, Canada, New Zealand, United States.
B. Southern Europe: Greece, Italy, Portugal, Spain.
C. Central and Eastern Europe
   a. East Central Europe: Czech Republic, East Germany, Hungary, Poland, Slovak Republic.
   b. Eastern Europe: Bulgaria, Romania, Russian Federation.
   c. West Balkan Region: Bosnia & Herzegovina, Croatia, Macedonia, Slovenia, Yugoslavia.
D. East Asia: Hong Kong, Japan, South Korea, Taiwan.

Illustrations and analysis

Each region will be dealt with separately in the order listed above. For each country an assessment has been made of the main features of the childbearing postponement and recuperation process taking the simple and more frequently the extended model as the standard. These assessments have been compiled in tables 2, 3, 4 and 5 for the regions. In addition graphs of selected countries will illustrate real developments. Occasionally the extent to which the standard can be applied is somewhat ambiguous.

Western countries

As a rule the childbearing postponement in the Western countries started among the birth cohorts of the 1940s, usually during the 1970s (Table 2). The initiation of childbearing recuperation was not quite as uniform. In some populations it began almost simultaneously with postponement, elsewhere it started as much as a decade or so later. The TPFR troughs occurred in a range between 1976 and 1987, mostly in the early to mid 1980s. Thereafter the country cases described in the table and illustrated in the selected figures demonstrate the degree of considerable variation between countries and sub-regions.

[Figure 5 about here]
[Table 2 about here]

The experience of the *Nordic countries,* especially Denmark (Figure 5, panel A), was reasonably close to the standard model.

Phase 1 – *Declining period fertility* - started in Denmark around 1975 with a considerable fertility decline, i.e. childbearing postponement, among young women through 1983 at a time when fertility of older women was essentially stable. This is reflected in a notable decline of the TPFR. The TPFR trough in 1983 was 1.38 down from 1.92 births per woman in 1975. The 1983 TPFR was about 0.5 births per woman below the roughly corresponding TCFR which indicates the degree of distortion at that time (Figure 5, panel A, Table 2).

Phase 2 – *Initial period fertility increase* – started around 1983 with a strong wave of childbearing recuperation among older women while fertility delays paused. Thus the TPFR increased to 1.80 in 1994.

In phase 3 – *Interim stabilization of period fertility* - young women resumed fertility delays at a moderate pace around 1992 through about the year 2000 while older women continued to recuperate births. From the early 1990s through the early 2000s the pace of postponement was roughly equal to the pace of recuperation thus offsetting each other which was reflected in a stable TPFR. The TPFR in 2002 was 1.72 only slightly below the 1994 TPFR of 1.80. During the mid to late 1990s the difference between the corresponding TCFR and the TPFR was fluctuating between 0.1 to 0.2 births per woman. The TPFR distortion was relatively minor.

In phase 4 – *Final period fertility increase* - it appears that young women in Denmark stopped delaying their births, i.e. childbearing postponement stabilized, while childbearing recuperation was progressing at a respectable pace.

The Danish population had not reached phase 5 - *Stabilized period fertility* – by 2006. That will happen if and when childbearing postponement stabilizes for a longer period in the foreseeable future and if also childbearing recuperation stabilizes at that time.

The childbearing postponement and recuperation process and its reflection in the TPFR of all Western countries are schematically described in rough terms in Table 2. Although it is too early to tell, in Sweden phase 5, in which not only postponement but also recuperation comes to an end, might have started in 2006. In Finland the overall path of the process might have been somewhat irregular with difficult to detect phases 1 and 2, and a prolonged phase 3, nevertheless postponement apparently ceased in 2002, implying the start of phase 4 with stabilized childbearing postponement, a continued rise of recuperation and an increase of the TPFR after 2002 (Table 2). In Norway the postponement and recuperation process progressed along the lines of the standard model with a TPFR trough in 1983-1984, phase 3 started in 1992 and phase 4 in 2002, but it had not yet reached phase 5 by 2006 (Table 2).

Among the countries of *Western Europe*, the Netherlands closely resembled the standard five phases of the extended model (Figure 5, panel B, Table 2). This population is the only one that has clearly concluded the entire cycle. Note that the TPFR and the TCFR have converged at the same level around the year 2000 (Figure 5, panel B). Belgium followed suite, however, without phase 5. Childbearing postponement has also come to an end in England & Wales and France, but the first two phases were irregular followed by relatively long durations of phase 3. The final phase 5 might have started in France, but not in England & Wales where recuperation was still continuing as of 2006 (Table 2).

The German-speaking populations of *West Central Europe,* Austria, West Germany and Switzerland, present a totally different picture (Figure 6, panel A; Table 2). Essentially they all bypassed phase 2 and went directly into long stretches of phase 3 with childbearing postponement still continuing in the mid 2000s. This is being offset by steady but slow

recuperation thus leading to relatively stable trends of TPFRs. Such trends are not likely to continue for much longer as fertility of young women was already very low in the mid 2000s.

[Figure 6 about here]

Among the English-speaking *non-European countries* the New Zealand population closely resembles the extended model, but it has not yet entered phase 5 (Figure 6, panel B). Australia and Canada have gone through prolonged phases 3. Close to 30 birth cohorts experienced continuing childbearing postponements being offset by steady fertility recuperations from the early 1980s through the mid 2000s. A fertility uptick among women of all ages materialized in Australia in 2007 as a result of policy interventions (Table 2).

The childbearing postponement and recuperation process and how it unfolded in period measures in the *United States* population has been exceptional in several ways (Figure 7).

[Figure 7 about here]

(i) The US population has been a precursor. Childbearing delays started in the US as one of the first during the 1960s and proceeded at a rapid pace during the early 1970s. The beginning of phase 1 is difficult to establish with any precision because it overlapped with the tail-end of the post-Second World War baby-boom.

(ii) Childbearing postponement came to an abrupt halt in the mid 1970s reflected in an indistinct TPFR trough of 1.74 births per woman in 1976. Thereafter fertility of young women remained stable at a comparatively high level of 1.2 births per woman through the late 1980s. Recuperation started its modest stable long-term increase in the mid 1970s. This combination resulted in a very slow TPFR increase to 1.83 in 1986 (Figure 7). In terms of the extended model such a development is characteristic of phase 4.

(iii) An unusual childbearing advancement, i.e. an increase in fertility mainly of teenage women occurred between about 1986 and 1990 (Figure 8). The cumulated period fertility rate (CPFR) of women 15-19 years old increased by 22 percent and the CPFR of women age 20-28 by 7 percent. This fertility increase of young women was combined with a continuing modest childbearing recuperation, a fertility increase among older women and it thus led to a peak in the TPFR of 2.06 births per woman in 1990 (Figure 7). Such a "phase" of TPFR increase engendered by a temporary childbearing advancement was a unique episode in the postponement and recuperation process in low fertility countries. Interestingly, the fertility advancement, a fertility increase among young women, occurred simultaneously with increasing childbearing among older women. This is documented from a period perspective (Figure 8), and even more notably, from a cohort perspective (Figure 9). Age-specific fertility rates of women up to age 22 included, and above age 28, were higher in the 1972 birth cohort than in the 1962 cohort. In contrast, fertility was relatively low among women 23–28 years old in the 1972 birth cohort.

(iv) From 1992 through 2006 childbearing postponement proceeded at a moderate pace as did recuperation. Their respective trends roughly offset each other, which is

characteristic of phase 3 in the extended model. Thus the TPFR was quite stable around 2.0 births per woman throughout most of the 1990s and 2000s (Figure 7).

Childbearing trends, especially of young women, do not stand out clearly in Figure 7, however, these become more obvious in Figure 8 in which fertility trends of individual ages are depicted. The fertility increases among women up to age 20 between 1986 and 1990-91 and their subsequent childbearing decline till the mid 2000s are conspicuous in Figure 8. Trends of young women up to age 28 are muted in Figure 7 because trends among women in their early to mid twenties are almost stable from the mid 1970 to the mid 2000s with only moderate fluctuations.

In sum, the big picture of the postponement and recuperation process in the United States is one of modest childbearing postponement and moderate recuperation. This might be due to the multi-ethnic composition of the US population and possible offsetting trends between the major ethnic groups having different childbearing patterns. Each of the ethnic groups (Whites, African Americans, Hispanic Americans and those of Asian descent) would require separate analyses to determine the differences in the childbearing postponement and recuperation process between these ethnic groups, but thus far data were not available for such an exploration.

Southern Europe

The postponement of childbearing started in South European populations among the 1950s birth cohorts during the 1980s (Table 3). The main developments in these populations were a considerable childbearing postponement among young women combined with no or negligible recuperation during the 1980s and most of the 1990s (Figure 10). The outcome was very low, "lowest-low", period fertility in Spain (TPFR=1.16 in 1996), Italy (TPFR=1.19 in 1995), and Greece (TPFR=1.24 in 1999), and low fertility in Portugal (TPFR=1.41 in 1995). The declining fertility among young women of the mid to late 1970s birth cohorts overlapped with relatively low fertility of older women of the 1960s birth cohorts.

[Table 3 about here]
[Figure 10 about here]

In Greece and Italy the TPFR troughs were barely detectable, because these were followed by very modest and gradual TPFR increases during the late 1990s and early 2000s. In Greece childbearing recuperations of older women in older cohorts were barely larger than continuing birth delays of young women (Figure 10, panel A). The Greek population did not experience a phase 2 of the extended model and went directly to phase 3. In Italy fertility delays ceased altogether, there was however a continued modest increase in fertility of older women (Table 3). Thus the Italian population bypassed phases 2 and 3 of the model. In Portugal and Spain recuperations were more pronounced in the late 1990s which was reflected in TPFR rises (Figure 10, panel B). The TPFR continued its increase in Spain in the 2000s; childbearing postponement had ceased and fertility continued to rise among older women. As in Italy, Spain bypassed phases 2 and 3 of the extended model, which means that the postponement and recuperation process in these two populations was proceeding as outlined in the simple model. Portugal experienced a modest TPFR decline in the 2000s, because fertility was continuing to

decline among young women, whereas there was hardly any increase in childbearing among older women (Figure 10, panel B).

The process of postponement and recuperation had not yet been concluded in the South European countries by the mid 2000 even though fertility of young women was already very low, especially in Italy and Spain. Apparently childbearing postponement among young women was reaching its floor during the mid to late 2000s. Recuperation among older women was still under way and is likely to continue for some years to come, which is and will be reflected in a continued TPFR increase. Italy and Spain had reached phase 4 of the extended model, Greece and Portugal were heading in that direction.

Central and Eastern Europe

There was a great deal of variation between sub-regions and populations in this large region. In general, childbearing postponement started with the birth cohorts of the 1950s and 1960s for the most part during the 1980s and in several countries not until the early 1990s (Table 4)[13]. No matter when postponement started, it was considerable and proceeded at a rapid pace from one birth cohort to the next. The developments in these populations are a notable illustration of the effects of overlapping birth cohorts with rapidly changing childbearing age patterns on trends of total period fertility rates. In most countries of Central and Eastern Europe TPFRs declined to unusually low levels labeled as "lowest-low" fertility (Kohler et al. 2002).

[Table 4 about here]

The rapid childbearing postponement was reflected in the TPFRs troughs of the countries of *East Central Europe* around the year 2000: 1.13 in 1999 in the Czech Republic, 1.18 in 2002 in Slovakia, 1.22 in 2003 in Poland, and 1.27 also in 2003 in Hungary (Figure 11).

[Figure 11 about here]

A detailed analysis of the underlying changes in cohort childbearing patterns and their overlap using data from the Czech Republic will demonstrate why TPFRs declined at an unprecedented rapid pace during phase 1 and why they reached such low levels.

1. During the mid to late 1990s, women of the cohorts born in the late 1950s and early 1960s had very low fertility when they were in their thirties and forties because they had borne most of their children when they were young (Figure 12, panels A and B). Typically their lifetime childbearing age patterns were young, usually peaking around the ages of 21 and 22 with a high concentration of childbearing in their late teens and early to mid twenties. In the 1958 birth cohort 82 percent of all children had been born by mother's age 28.

[Figure 12 about here]

[13] The structure of tables 4 and 5 differs slightly from tables 2 and 3 which reflects the fact that the populations of Central and Eastern Europe and East Asia started fertility later than the other ones.

2. A gradual decline in fertility started among the late 1950s and early 1960s birth cohorts, even though these were hardly postponing any of their births (Figure 12, panels A and B).

3. The shift of childbearing into higher ages started among the late 1960s and early 1970s birth cohorts and then accelerated among the mid-1970s cohorts (Figure 12). Note the considerable difference in the slope of the 1958 and the 1978 cohorts up to age 21 (Figure 12, panels A and B). Fertility was declining rapidly among young women of successive cohorts of the early to mid 1970s (Figure 12, panel A) and this was reflected in rapid declines of period fertility among young women age 15-28 (CPFR 15-28) during the 1990s and in the rapid decline of the TPFR (Figure 11, panel A).

In sum, the overlay of the low fertility of older women of the late 1950s early 1960s birth cohorts with the rapidly declining and relatively low fertility of young women of the mid to late 1970s birth cohorts resulted in the period fertility trough of a TPFR equal to 1.13 in 1999 in the Czech Republic (Figures 11 panel A and 12 panel B). It was the rapid pace of the childbearing age pattern shifts that were an important factor in generating the period fertility trough. While the total cohort fertility rates of the corresponding birth cohorts were declining only moderately (Figure 11, panel A), the rapid fertility decline among young women due to the fast pace of postponement was driving the rapid rate of TPFR decline in the years prior to 1999.

A significant proportion of the births that were being delayed among the 1970s birth cohorts during the 1990s eventually emerged as childbearing recuperation during the late 1990s and 2000s. In 1999, the amount of childbearing recuperation, i.e. the marginal increase in fertility of older women, equaled the moderating postponement among young women and thereafter, during the 2000s more than counterbalanced postponement. The changing relationship between childbearing recuperation and delays, i.e. the pace of recuperation became faster than that of postponement, generated the TPFR 1999 trough and the TPFR increase during the 2000s in the Czech Republic (Figure 11, panel A).

The process of sizable and rapid childbearing postponement among the 1970s birth cohorts was similar in the other *Central East European* populations. The extent of fertility recuperation in those countries was however lesser than in the Czech Republic. That is the reason why they experienced very little, if any, TPFR growth in the early to mid 2000s. In Hungary, for instance, childbearing recuperation did pick up during the 2000s in the form of an increase in fertility of older women (CPFR 29-49), but this was counterbalanced by continued fertility postponement among young women (CPFR 15-28). Consequently the TPFR increase was slow (Figure 11, panel B).

In sum, compared to most western countries childbearing postponement in *Central East European* countries started about two decades later, i.e. around 1990 compared to the 1970s, and proceeded at a much faster pace during phase 1. “Lowest-low” TPFR troughs around 1.2 births per woman were reached around the year 2000, down from about 2.0 in 1990. Childbearing recuperation among older women got under way around the year 2000. For most of these populations it is difficult to assess what was happening once the TPFR troughs were reached as only a few years have transpired since then. The Czech Republic was an exception. It clearly set

out on phase 2 TPFR increases due to notable childbearing recuperation among older women in the 2000s.

The basic nature of the beginning of the postponement and recuperation process, phase 1, was similar in *Eastern Europe*. In Bulgaria pronounced childbearing postponement started around 1990 and progressed rapidly through 1997. As fertility of older women during the 1990s was stable, the fertility decline of younger women was reflected in a considerable TPFR decline which resulted in a trough of 1.09 in 1997 (Figure 13, panel A). During the late 1990s postponement ceased and was quite stable during the 2000s. On the other hand, childbearing recuperation started at the end of the 1990s and increased during the 2000s resulting in a TPFR of 1.38 births per woman in 2006, 27 percent above the trough of 1997 (Figure 13, panel A). For the time being, Bulgaria bypassed phases 2 and 3 of the extended model and appears to be proceeding along the lines of the simple model.

[Figure 13 about here]

Russia's period fertility trends were influenced by a number of policy interventions since the 1980s (Zakharov 2008). The effect of the 1980s Soviet pronatalist policies and their aftermath make it difficult to pinpoint when childbearing postponement started, most probably around 1990. The end of phase 1 -- a rapid fertility decline among young women during the 1990s and stable fertility among older women through the late 1990s -- was reached in 1999 with a TPFR trough of 1.16 births per woman. Similar to Bulgaria's population, Russia's population bypassed phases 2 and 3 of the extended model of the postponement and recuperation process and thus far was apparently proceeding according to the simple model during the 2000s (Figure 13, panel B). In 2008 the TPFR was at 1.49 births per woman, an increase of 28 percent over the 1999 trough. In part that was influenced by another policy intervention, the Putin childbearing incentives of 2006 which had a positive impact on fertility at all ages, even in 2009 (Frejka 2009).

The exact beginning of the postponement and recuperation process in Romania is also difficult to assess due to the effects of the Ceauşescu regime policies severely restricting the use of contraceptives and induced abortion during the 1980s. Apparently childbearing postponement started around 1990 and a TPFR trough of 1.30 was reached in 1996, down from 2.20 in 1989. Thereafter Romania's TPFR trend was genuinely stable within a very narrow range around 1.30 through the mid 2000s reflecting a moderate fertility decline among young women and a moderate recuperation among older women; a typical phase 3 of the extended model (Table 4).

In sum, the postponement and recuperation process in *Eastern Europe* started as late as in *Central Eastern Europe* around 1990. During the 1990s typically fertility declined rapidly among young women which was reflected in a fast TPFR decline. "Lowest-low" TPFR troughs of 1.1 to 1.3 births per woman were reached in the mid to late 1990s. TPFR trends during the 2000s were reasonably clear: stable in Romania (phase 3) and increases in Bulgaria and the Russian Federation (phase 4 of extended model equals phase 2 of the simple model). Even though these trends were obvious, the postponement and recuperation process was only in the midst of its second decade. It is far from clear what will transpire even in the near future.

The *West Balkan region* is demographically unusually diverse (cf. Frejka and Sardon 2004: 211-251). Only a few decades ago Bosnia & Herzegovina and even more so Macedonia still had extremely high fertility and mortality. On the other hand, Slovenia was demographically and otherwise an advanced country. Moreover, the extremely unstable political situation during past decades played a role. Even before the wars of the 1990s, the former Yugoslavia was not a typical "East" European country as it was relatively independent with more ties to Western countries than other East European ones. The wars affected demographic trends significantly in Bosnia & Herzegovina, Croatia and Yugoslavia, less so in Slovenia and in Macedonia. The childbearing postponement and recuperation process started earlier than in other countries of Central and Eastern Europe, predominantly in the early to mid 1980s, except for Macedonia where it probably started in the 1990s (Table 4).

In Slovenia there was a notable childbearing postponement which proceeded at an even pace from 1979 through the mid 2000s (Fig14, panel A). The cumulative period fertility rate of women between the ages of 15 to 28 was 1.66 in 1979 and declined to 0.54 births per woman by 2006, a decline of 67 percent. Through 1992 considerable postponement coincided with a very modest fertility decline among older women which was reflected in a steep TPFR decline from 1979 through 1992 (Fig14, panel A). One can argue that the TPFR trough, and thus the end of phase 1, occurred in 1992, with a TPFR of 1.33, although the lowest TPFR value, 1.21 births per woman, was reached in 1999. This assertion is corroborated by the fertility trends between 1992 and 2006, which resemble a phase 3 evolution. Childbearing recuperation was proceeding at a notable pace from 1992 onward and just about offset the continuing postponement of childbearing among young women so that the TPFR was fluctuating between 1.21 and 1.33 births per woman in 1992-2006 (Fig14, panel A).

[Figure 14 about here]

The decline of fertility among Croatia's young women was moderate during its phase 1 between the mid 1980s and 1992 (Figure 14, panel B). After 1992 and through the mid 2000s fertility trends followed a phase 3 pattern, albeit interrupted by a "post-war mini baby boom." Except for the increase in fertility during the late 1990s, the postponement trend was offset by a recuperation trend. The TPFR was 1.39 in 1992 and 1.38 births per woman in 2006 (Figure 14, panel B). The start of childbearing postponement in Macedonia's population is overlapping with its secular fertility decline. Nonetheless, judging also from an increase in the average age of childbearing (Frejka and Sardon 2004:238), it appears that phase 1 started during the early to mid 1990s. As of the mid 2000s there were no signs of any childbearing recuperation nor had a TPFR trough been reached (Table 4). One can speculate that that was happening during the mid 2000s, but only the future will confirm or refute this speculation.

For Yugoslavia data are available only through 2003. Those indicate unusual developments. Apparently childbearing postponement started in the late 1980s and continued at a moderate pace through the early 2000s. The cumulated period fertility rate was 1.55 in 1988 and declined to 0.97 births per woman by 2003. Fertility rates of older women have been stable at around 0.6 births per woman for decades. In terms of the models, thus far the postponement and recuperation process in Yugoslavia was in phase 1 (Table 4).

In Bosnia & Herzegovina the complex political events as well as the war impacted demographic trends and the availability of reliable statistics. Data for a detailed analysis are available only through 1990. These show that throughout the second half of the 20th century the B & H population experienced a secular fertility decline (Observatoire 2010). From 1950 to 1990 the TPFR declined from 5.23 to 1.71 births per woman. Scanty data of the 1990s indicate a further decline and in the 2000s the TPFR was apparently in the order of 1.2 to 1.3 births per woman. Such a low TPFR implies childbearing postponement, but the data for analysis are lacking.

East Asia

The long-term demographic history of Japan is very different than that of Hong Kong, South Korea and Taiwan. At the time when Japan had reached replacement fertility in the mid-1950s, the other countries of East Asia still had total period fertility rates of five to seven births per woman. During the following decades fertility declined rapidly in Hong Kong, South Korea, and Taiwan reaching replacement fertility in the 1980s. The fertility decline in all four populations continued during the 1980s, 1990s, and into the 2000s. By the mid to late 2000s period fertility rates in these countries were among the lowest in the world, termed "ultra-low fertility" by Jones, Straughan, and Chan (2009). In 2005 the TPFR was 0.97 in Hong Kong, 1.11 in Taiwan, 1.12 in South Korea, and 1.23 in Japan (Frejka et al. 2010).

Since the mid 1970s the basic feature of the process of childbearing postponement and recuperation has been reasonably uniform in these four populations (Figure 15; Table 5). Childbearing delays had been continuing at least for over two decades prior to the mid to late 2000s and childbearing recuperation was considerably weaker than birth postponement.

[Table 5 about here]
[Figure 15 about here]

Except for Japan, it is difficult to pinpoint when exactly childbearing postponements got under way because detailed data are not available for analysis prior to the late 1970s. Apparently the beginning of childbearing delays in Hong Kong, South Korea and Taiwan overlapped with the final stages of their secular fertility decline during the 1970s and early 1980s.

In Japan childbearing postponement has been under way since the mid 1970s and proceeded quite consistently through the mid 2000s (Figure 15, panel A). The proportion of births borne by young women declined from 66 percent in 1976 to 37 percent in 2006 (Observatoire 2010), and the average age of childbearing increased from 27.5 in 1975 to 29.6 in 2000 (Frejka and Sardon 1974: 308). The fertility trend of older women so far is different from other low-fertility countries. It has been almost stable for the past several decades (Figure 14, panel A). The cumulated fertility rate of older women was about 0.80 births per woman during the early 1970s and almost identical in the mid 2000s, although there was one deviation, namely a slight fertility decline during the mid 1970s. The combination of steadily declining fertility of young women and stable fertility of older women resulted in a continuously declining TPFR, especially following the brief upswing of childbearing recovery in the late 1970s. The fertility trends from the mid 1970s through 2005 can be interpreted as a protracted phase 1. In 2006 the

fertility trend of young women was stable, fertility of older women increased which was reflected in a moderate TPFR increase (Figure 15, panel A). This might be the beginning of a phase 4 of the extended model or phase 2 of the simple one, although conclusions in Frejka et al (2010) imply continued low fertility in the foreseeable future.

It is difficult to decipher when childbearing postponement actually started in South Korea because its population was experiencing a secular fertility decline since the 1950s (Frejka et al 2010:581-2). Reasonably reliable data for a detailed analysis are available from 1980 (Figure 15, panel B). The downward trend of the cumulated fertility rate of young women during the 1980s implies that postponement might have already been in progress. In the early 1990s childbearing postponement briefly stalled but then continued at an even pace through 2005. In 2006 and 2007 there were no further childbearing delays (Figure 15, panel B).

Older women in South Korea were at the tail-end of their secular fertility decline in the early 1980s. Their childbearing stabilized during the mid 1980s and then apparently turned into childbearing recuperation in the late 1980s. This recuperation continued throughout the 1990s and stabilized during the early 2000s. A notable increase in the fertility of older women occurred between 2006 and 2007. Altogether, childbearing postponement as well as childbearing recuperation was notable between the mid 1980s and the mid 2000s (Figure 15, panel B). The detailed trends were however uneven. This was reflected in an uneven trend of the total period fertility rate. By 1987 the TPFR had declined to 1.54 births per woman. The stalling postponement of the early 1990s combined with continuing recuperation was reflected in a temporary TPFR increase, but by the year 2000 the TPFR was again at a low of 1.53 births per woman (Figure 15, panel B). During the early 2000s the TPFR declined further to its lowest point of 1.12 births per woman in 2005. Between 2005 and 2007 the TPFR increased to 1.29 reflecting a stable postponement and an increase in recuperation (Figure 15, panel B). It is, however, too early to tell whether these trends will be continuing.

Two interpretations of the complex uneven postponement and recuperation trends in South Korea can be entertained. It can be regarded as a protracted phase 1 reaching the TPFR trough in 2005 with a potential start of phase 4 in 2005 (Figure 15, panel B, Table 5). Another interpretation is a phase 1 interrupted by a phase 3 type of development from 1991 to 1999 followed by a continuation of phase 1 from 1999 to 2005, a TPFR trough in 2005, succeeded by the potential start of phase 4 in 2005 (Figure 15, panel B).

In Hong Kong childbearing postponement was progressing during the 1980s and 1990s. In 1980 young women had a fertility rate of 1.07 births per woman which declined to 0.39 by the year 2000. This decline was combined with basically stable fertility of older women. As a result the TPFR decreased from 2.04 in 1980 to 1.01 births per woman in 2000. The TPFR trough, 0.90 births per woman, occurred in 2003 (Table 5). Similarly as in South Korea, actual fertility trends were uneven so that two interpretations can be considered to describe them. The TPFR decline from over 2.0 in the late 1970s to 0.90 in 2003 can be considered a protracted phase 1. The other interpretation is that phase 1 was interrupted by a phase 3 type of development from 1987 to 1994 followed by a continuation of phase 1 from 1994 to 2003, a TPFR trough in 2003, succeeded by the potential start of phase 4 in 2004 (Hong Kong figure not included).

Similar fertility trends of young and older women and of the TPFR took place in Taiwan from the late 1970s through the mid 2000s, although there were some fluctuations (Table 5). There was however a notable distinction. Even though the TPFR in Taiwan was as low as 1.05 births per woman in 2008, it had not yet reached a trough, i.e. even in 2008 phase 1 was still in progress in Taiwan (Table 5).

The structural background of TPFR trends

The above exposition illustrates the utility of analyzing the structural background of TPFR trends. Two TPFR trends which on the surface might appear similar may have different underlying mechanisms, i.e. different levels and trends of interaction between childbearing postponement and recuperation that resulted in the respective TPFR trends. For example, the Dutch population between 1996 and 2000 (Figure 16, panel A), and the Czech population between 2001 and 2006 (Figure 16, panel B), both experienced a TPFR increase of approximately 0.2 births per woman, but the underlying mechanisms were different.

[Figure 16 about here]

In the Netherlands the TPFR increase occurred in phase 4 towards the end of the childbearing postponement and recuperation cycle. Postponement had already run its course and had come to a standstill. Recuperation was winding down. The TPFR was coming close to the respective TCFR level (Figure 16, panel A). In contrast, in the Czech Republic the TPFR was in phase 2, i.e. in an early stage of the postponement and recuperation cycle. The TPFR had only just passed the TPFR trough. Childbearing postponement was still on a downward slope and poised to continue. Childbearing recuperation had only just started; it was on an upward slope and also poised to continue. The TPFR had a considerable path ahead of it before it would reach the TCFR level (Figure 16, panel B).

This example also illustrates that the increases of the TPFRs in the late 1990s and the 2000s had different backgrounds in different countries. In most of the Western countries TPFR increases occurred because phase 4 had been reached (Table 2; Figure 5, panels A and B; Figure 6, panel B). The German-speaking countries, West Central Europe (Table 2; Figure 6, panel A), experienced a minimum of TPFR growth in phase 3. Similarly in Southern Europe, Greece was in phase 3 with a rising, albeit slowly, TPFR because recuperation was outpacing postponement (Table 3; Figure 10, panel A). In East Central Europe, all populations were in phase 2. In the Czech Republic it was well under way, but in Hungary, Poland and Slovakia it had barely started (Table 4; Figure 11, panels A and B). In Eastern Europe, Bulgaria and Russia were apparently progressing along the lines of the simple model in phase 2 (phase 4 of the extended model) with stabilized postponement and continuing recuperation (Table 4; Figure 13, panels A and B). In the Balkan region, Slovenia was in phase 3 (Table 4; Figure 14, panel A).

Applying methods of this paper to possibly re-evaluate some previous studies on causes of fertility trends

There are numerous factors that have triggered and sustained the childbearing postponement and recuperation process. With considerable success these factors have been analyzed, discussed and

clarified in the literature (see references in Introduction). The research elaborated in this study demonstrates that the structural mechanism of the childbearing postponement and recuperation process is reflected in distortions of total period fertility rates. By extension the factors driving the childbearing postponement and recuperation process are essential to understanding distortions in total period fertility rates.

Taking this into consideration, the question can be posed whether it might be profitable to revisit some of the research that investigated causes of fertility trends which would also utilize the methods developed in this study. A comprehensive investigation into the compatibility of the effects of the childbearing postponement and recuperation process on period fertility, on the one hand, with research that has analyzed the effects of behavioral, socio-economic and policy factors on fertility trends is beyond the scope of this paper. It might be useful to explore, for instance, how the research on the appearance and disappearance of lowest-low fertility due to socio-economic and policy factors (Goldstein et al. 2009, Kohler et al. 2002) can be developed further utilizing the methods of the present study. Also, an investigation of whether some of the findings assigning fertility increases early in the 21st century either to changed behavioral attitudes of women and couples, or to social and population policies, or to changing economic conditions (Goldstein et al. 2009, Kocourková 2009, Kohler et al. 2002, Myrskylä et al. 2009) might benefit by applying also methods of this paper.

Summary and conclusions

Over the past 50 to 60 years people in low-fertility societies decided to postpone births for a wide variety of reasons. Once births start being postponed, total period fertility rates decline under their "real undistorted" level, because they are spread out over time. A certain proportion, large or small or none, of the postponed births are sooner or later recuperated.

This study has developed a method that follows the process of childbearing postponement and recuperation and its reflection in total period fertility levels and trends in low fertility populations. A cohort and period perspective are combined, namely lifetime cohort childbearing patterns are translated into period measures and the principal focus is on analyzing the postponement and recuperation process from a period perspective. The method is complementary to methods pioneered by Bongaarts and Feeney (1998) which estimate tempo-adjusted period total fertility rates. The method described in this paper provides different insights than the TFR tempo-adjustment methods. It demonstrates paths of childbearing postponement among young women and childbearing recuperation paths of older women, and how these are reflected in trends of total period fertility rates. The method can be characterized as revealing the internal mechanism of the postponement and recuperation process.

In the present context the term "mechanism" does not imply any causation, but is used to describe the structural fertility dynamics from a cohort perspective translated into period rates. At the same time, there is no intention to discuss whether fertility changes are period or cohort driven, but simply to demonstrate the structural effects of overlapping and changing cohort childbearing patterns on period fertility trends of age groups and on total period fertility rate trends.

As the process of childbearing postponement and recuperation unfolded in low fertility populations during the past half century, the overlay of changing cohort childbearing age patterns in successive birth cohorts were reflected in:

1. *Total period fertility rate declines in the initial years of childbearing postponement*. The TPFR declines occur because in the initial years childbearing postponement consists of fertility declines among young women whereas fertility of older women in overlaying birth cohorts is not yet affected. The speed of the TPFR decline is directly correlated with the speed of the shifts in childbearing age patterns. A more pronounced shift of childbearing into older ages entails a more rapid TPFR decline. The TPFR decline occurs because the size of the fertility decline among young women outweighs any possible initial increase in fertility among older women.

2. *TPFR troughs*. Towards the end of the first phase of childbearing postponement fertility is relatively low among young women of the overlapping younger cohorts as well as low among the older women in the overlapping older cohorts which had a relatively young childbearing age pattern. The combination leads to a period fertility trough.

3. *TPFR increases following the period fertility troughs*. Once childbearing postponement has been taking place for several years, the delayed births are starting to materialize among older women while childbearing may or may not continue to decline among young women in overlapping birth cohorts. For TPFRs to increase the numbers of delayed births materializing, i.e. the number of recuperated births, has to outweigh any continuing decline of fertility among young women.

There were differences in the specific paths of the childbearing postponement and recuperation processes between country populations, nonetheless some basic features tended to be common within regions. The above processes occurred in Western countries predominantly during the 1970s and 1980s. In Central and Eastern Europe they occurred predominantly during the 1990s and 2000s. The typical cycle in Western countries consisted of a TPFR decline in the 1970s and early 1980s, a trough in the early to mid 1980s, and a TPFR increase in the late 1980s. In Central and Eastern Europe typically a rapid TPFR decline occurred during the 1990s, the period fertility trough appeared in the late 1990s or early 2000s, and the TPFR increase took place in the 2000s.

The populations of Southern Europe and East Asia experienced long periods of childbearing postponement usually starting in the 1980s combined with weak or almost non-existing fertility recuperation. Consequently TPFRs were at best stable, but more often declining. In some populations in the 2000s, such as Italy and especially Spain, childbearing postponement approached a floor and a moderate fertility recuperation resulted in TPFR increases.

In Western countries the birth cohort overlay combined with changing childbearing age patterns was reflected in period fertility increases predominantly early in the 21st century. In most countries childbearing postponement was slowing down or ceasing among the 1970s birth cohorts. Thus, as a rule, in the early 21st century fertility was no longer declining among young

women or the decline was moderate, but childbearing was increasing among older women of the overlapping 1960s birth cohorts whose delayed births were materializing. This resulted in TPFR increases.

Total period fertility rates were increasing in almost all European countries early in the 21st century, however, the structural causes of this increase were different in Western countries compared to Central and Eastern Europe. In the latter countries the postponement of childbearing was clearly in progress with fertility of younger women in young cohorts declining, and the first wave of delayed births of relatively older cohorts was materializing. The weight of the delayed births was more than counterbalancing the declining fertility of younger women. In contrast, postponement of childbearing was abating in Western countries and the last wave of delayed births of older cohorts was materializing. In part this point summarizes what is already contained in prior conclusions.

After a cessation in childbearing postponement and recuperation works its way through the main periods of the childbearing ages, total period fertility rates resemble total cohort fertility rates. Any further fertility trends depend on overall quantum trends. This happened early in the 21st century in The Netherlands.

It might be useful to explore whether the findings on how changing childbearing age patterns of overlapping birth cohorts which are reflected in period fertility declines, troughs and subsequent TPFR increases, on the one hand, can be reconciled with research findings attributing the appearance and disappearance of lowest-low fertility as well as increases in period fertility in the 21st century directly to social, economic and other causes.

Acknowlegements

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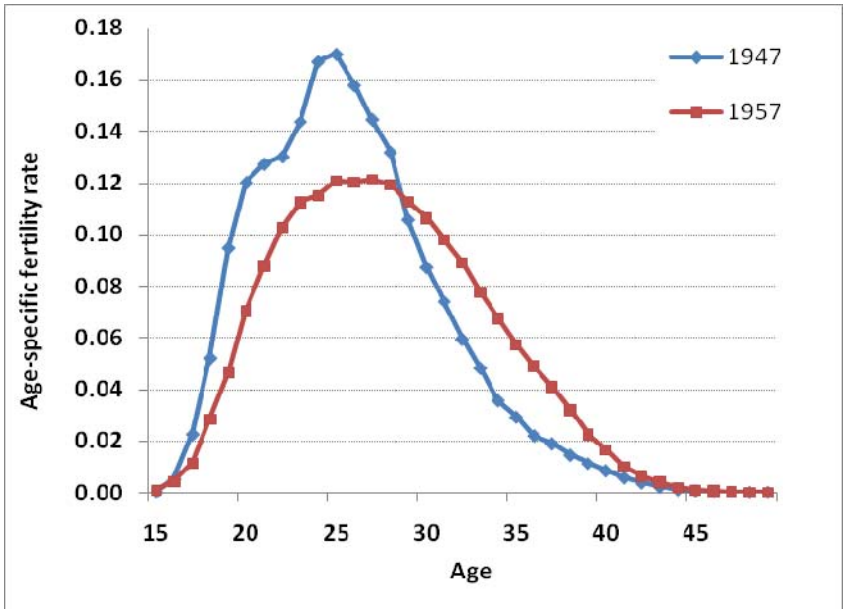
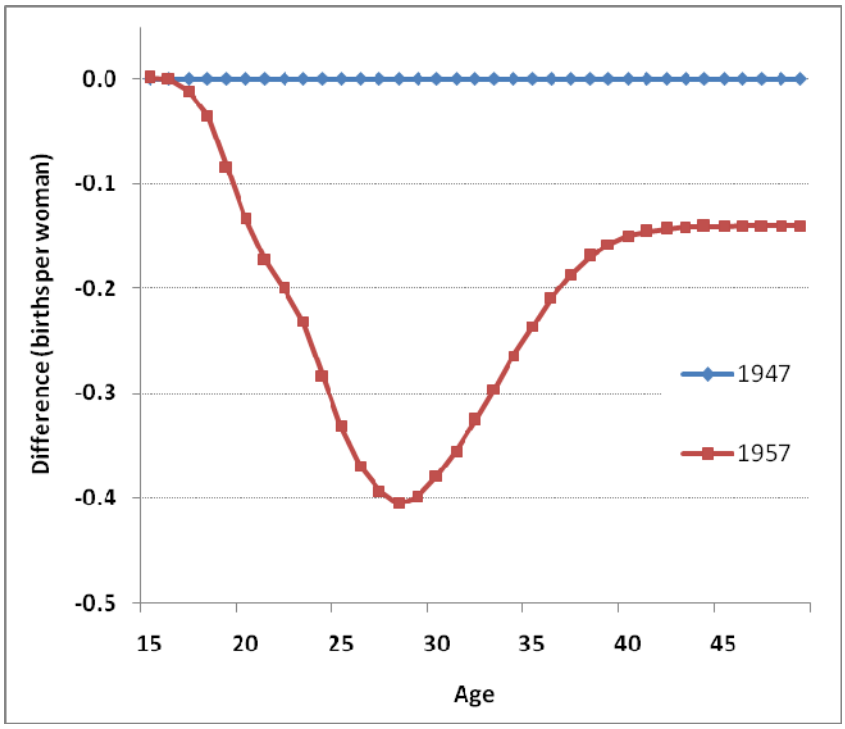
Figure 1 – Age-specific fertility rates, Denmark, birth cohorts 1947 and 1957

A. Age patterns of fertility, birth cohorts 1947 and 1957

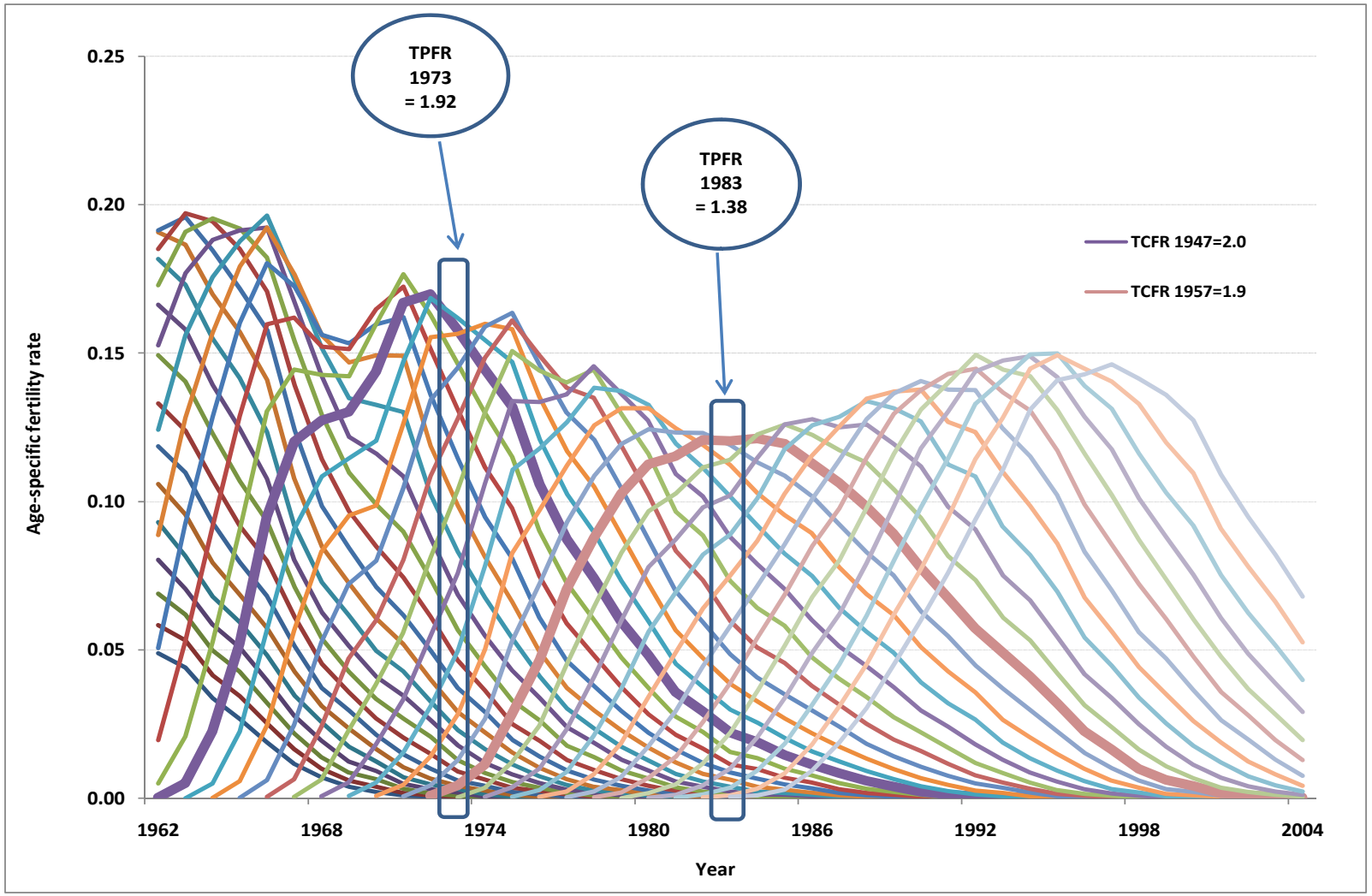


B. Differences in cumulative age-specific cohort fertility rates between 1947 and 1957 birth cohorts



SOURCE: Observatoire Démographique Européen 2010

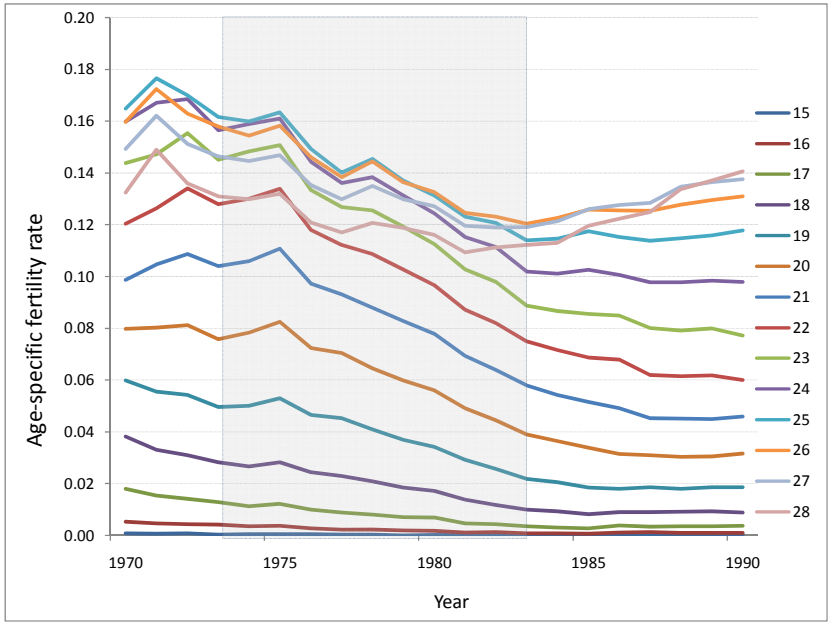
Figure 2 – Age-specific fertility rates, Denmark, birth cohorts 1926 to 1968 during the period 1962 – 2004



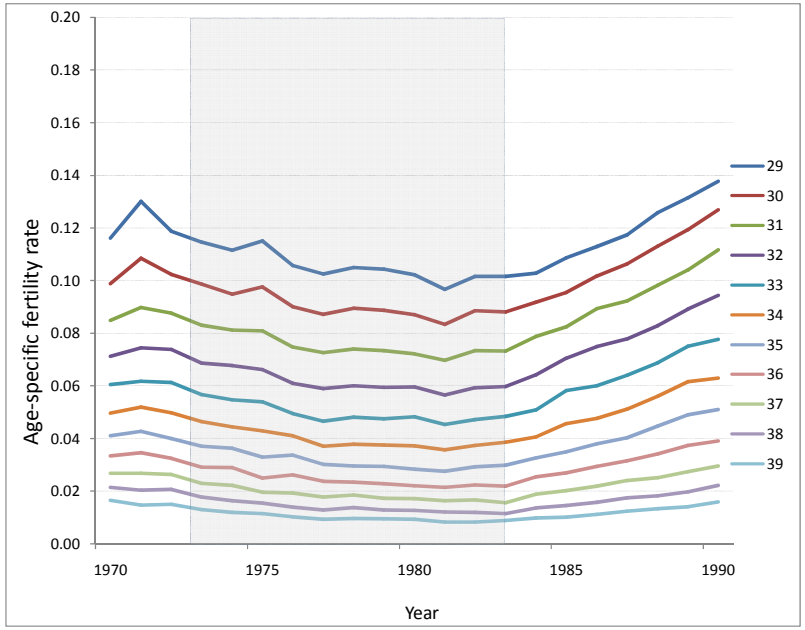
SOURCE: Observatoire Démographique Européen 2010

Figure 3 – Period age-specific fertility rates, Denmark, 1970-1990, ages 15 to 28 and 29 to 39

A. Period ASFRS, ages 15 to 28



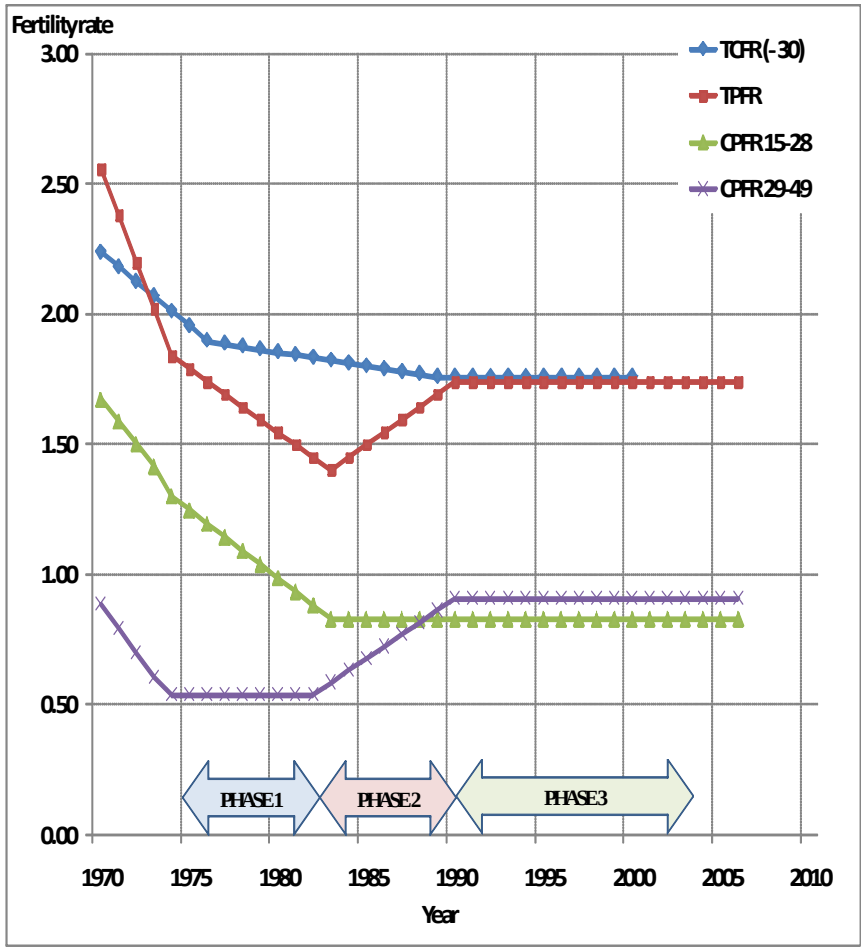
B. Period ASFRs, ages 29 to 39



SOURCE: Observatoire Démographique Européen 2010

Figure 4 – Simple and extended models depicting phases of postponement and recuperation, total cohort fertility rate lagged by 30 years, total period fertility rate, cumulated fertility rate ages 15-28 and cumulated fertility rate ages 29-49

A. Simple model



B. Extended model

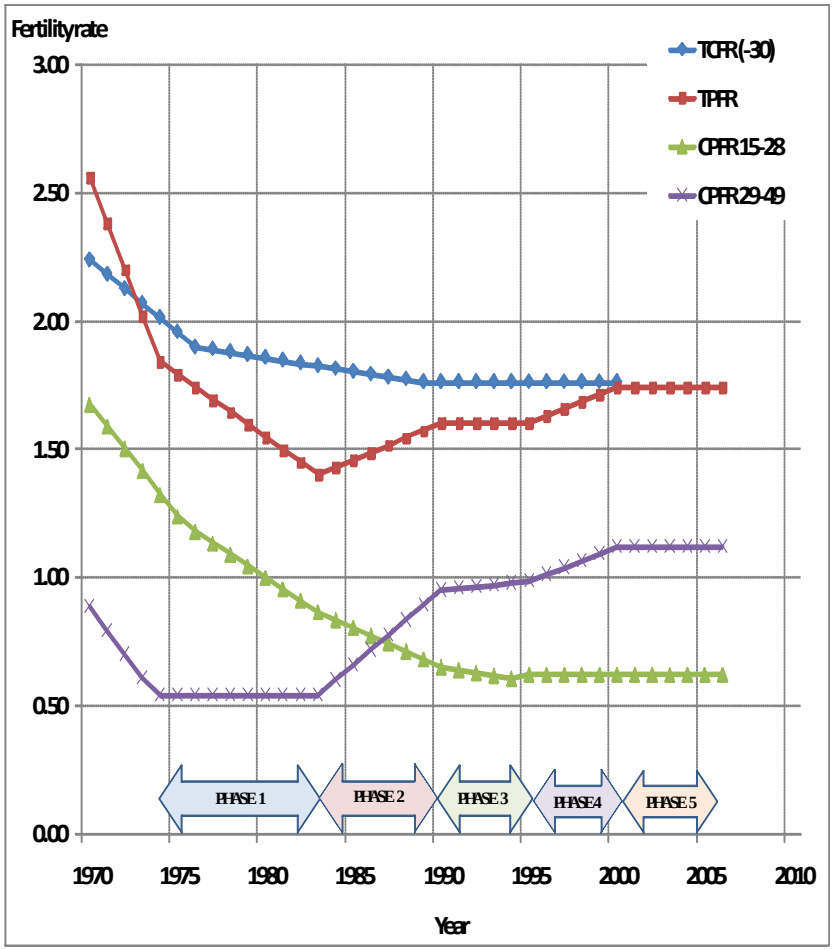
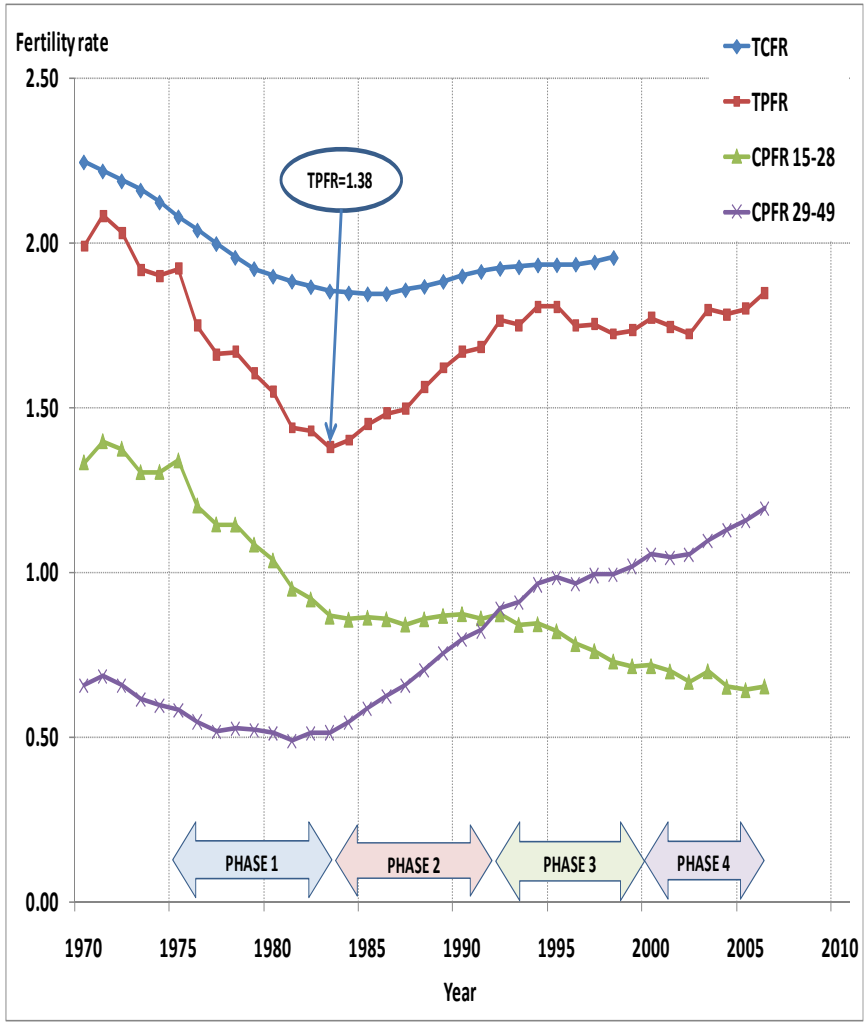
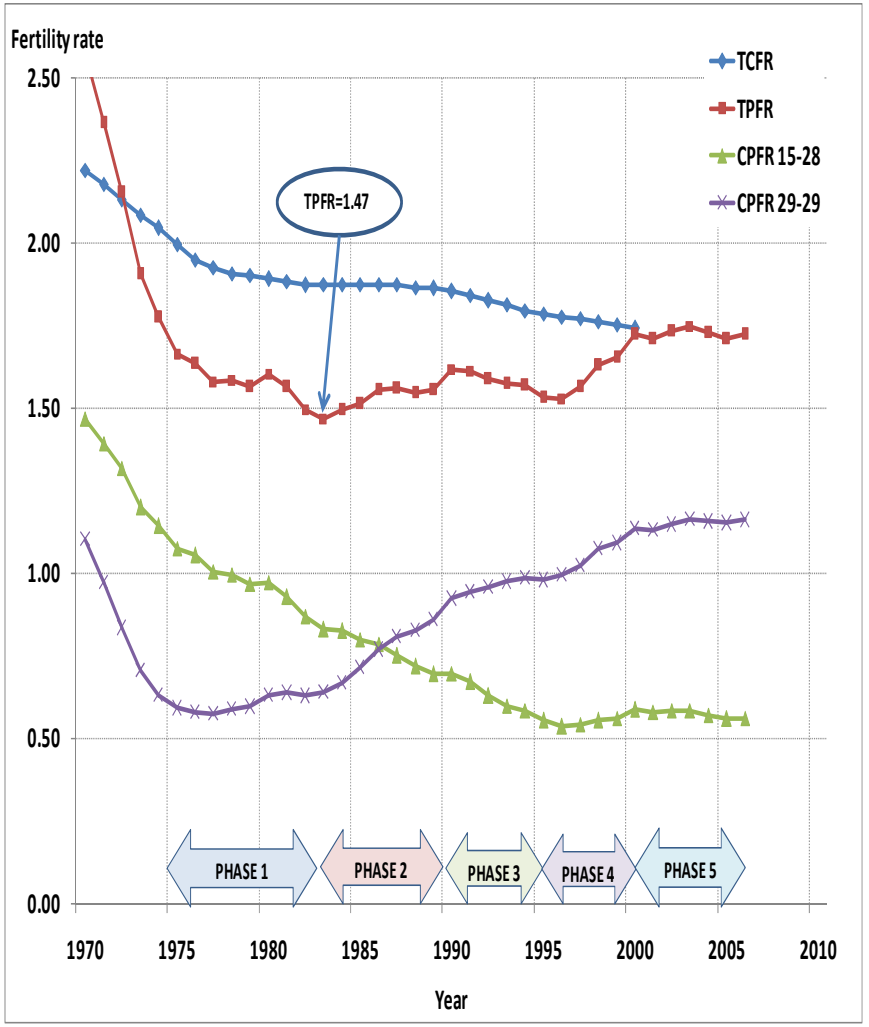


Figure 5 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Denmark and Netherlands, 1970-2006

A. Denmark

B. Netherlands

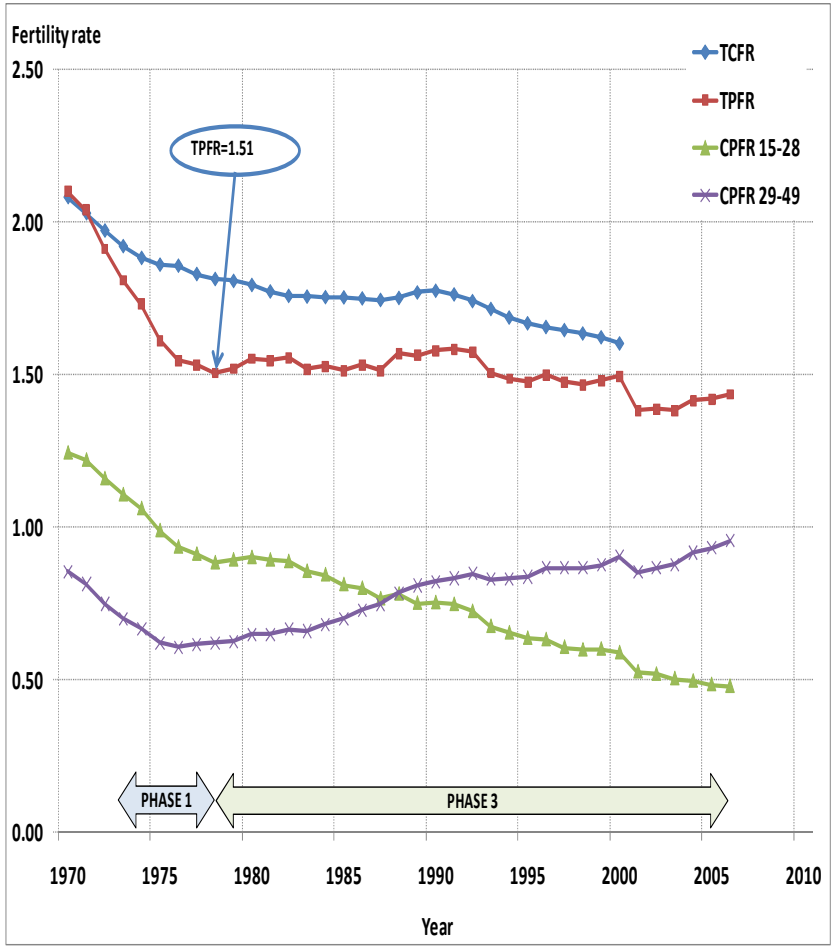




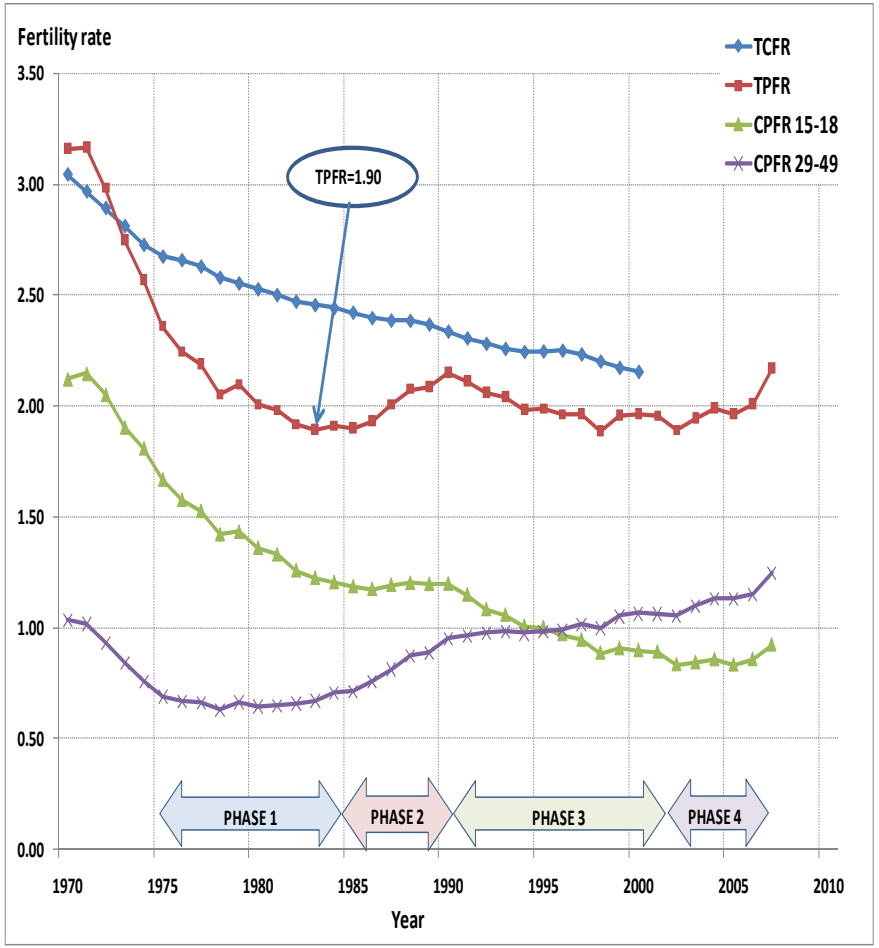
SOURCE: Observatoire Démographique Européen 2010

Figure 6 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Switzerland and New Zealand, 1970-2007

A. Switzerland

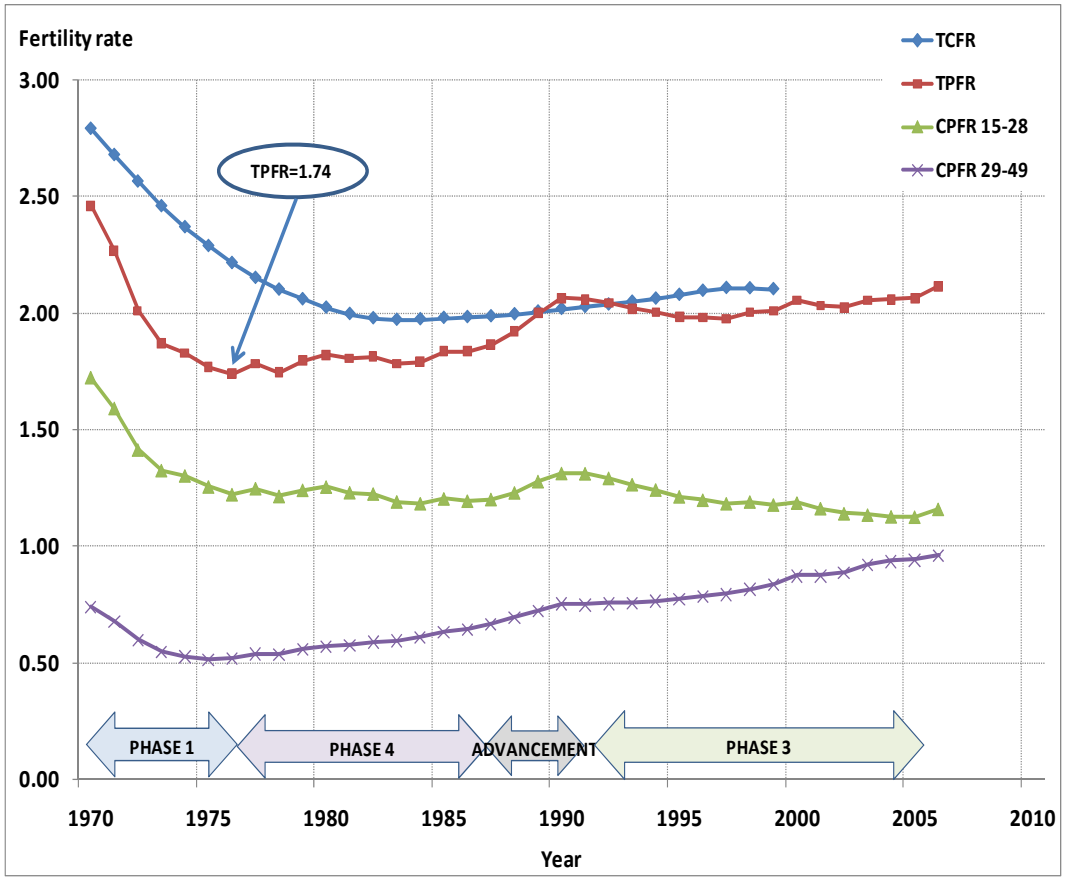


B. New Zealand



SOURCE: Observatoire Démographique Européen 2010

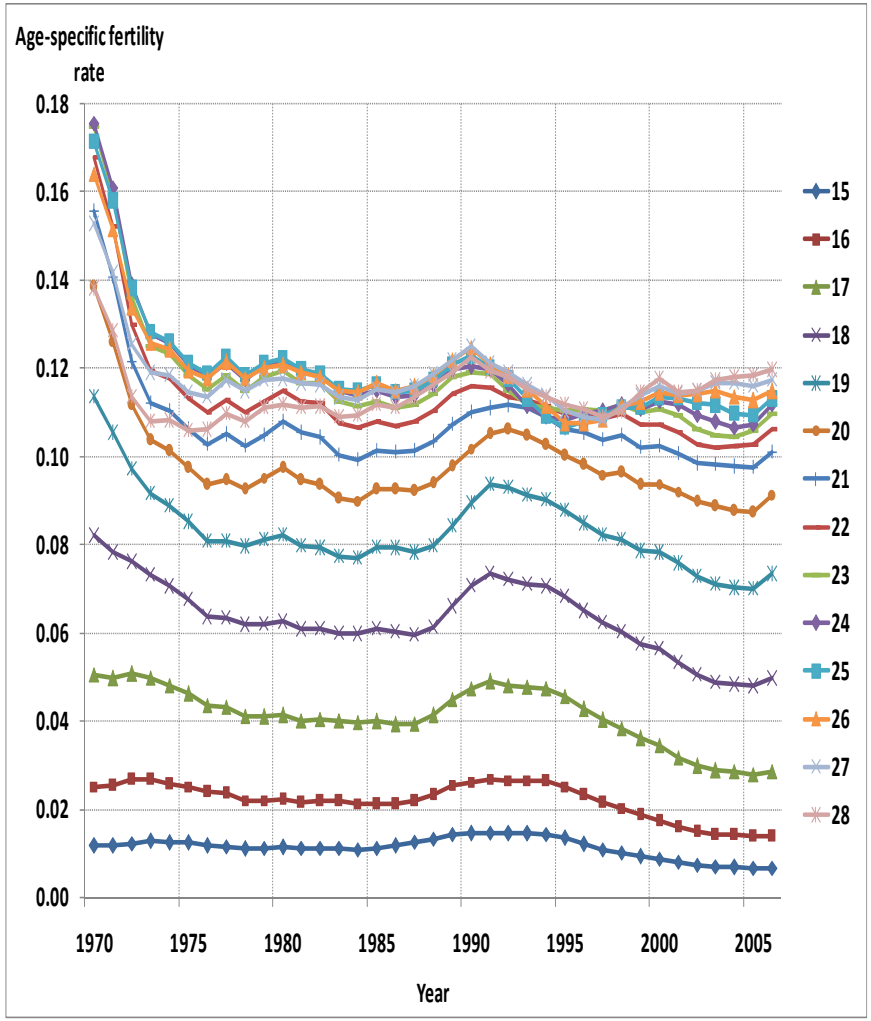
Figure 7 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, United States, 1970-2006



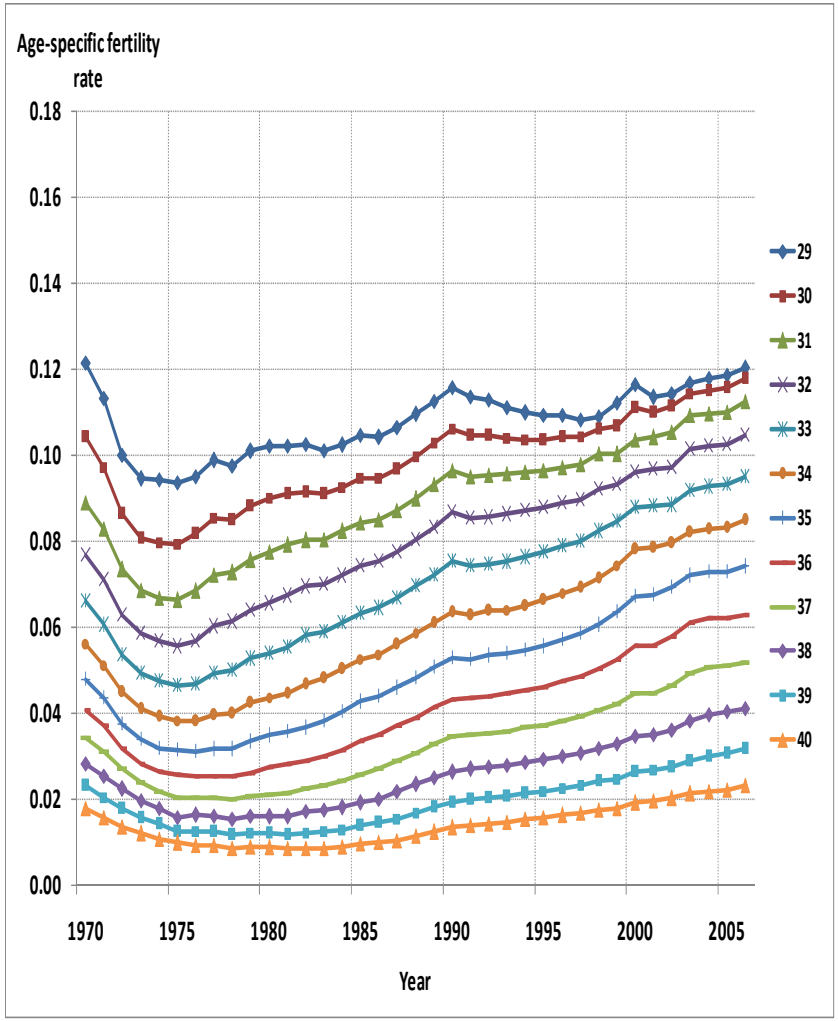
SOURCE: Observatoire Démographique Européen 2010

Figure 8 – Period age-specific fertility rates, United States, ages 15 to 28 and 29 to 40, 1970-2006

A. Age-specific fertility rates 15-28

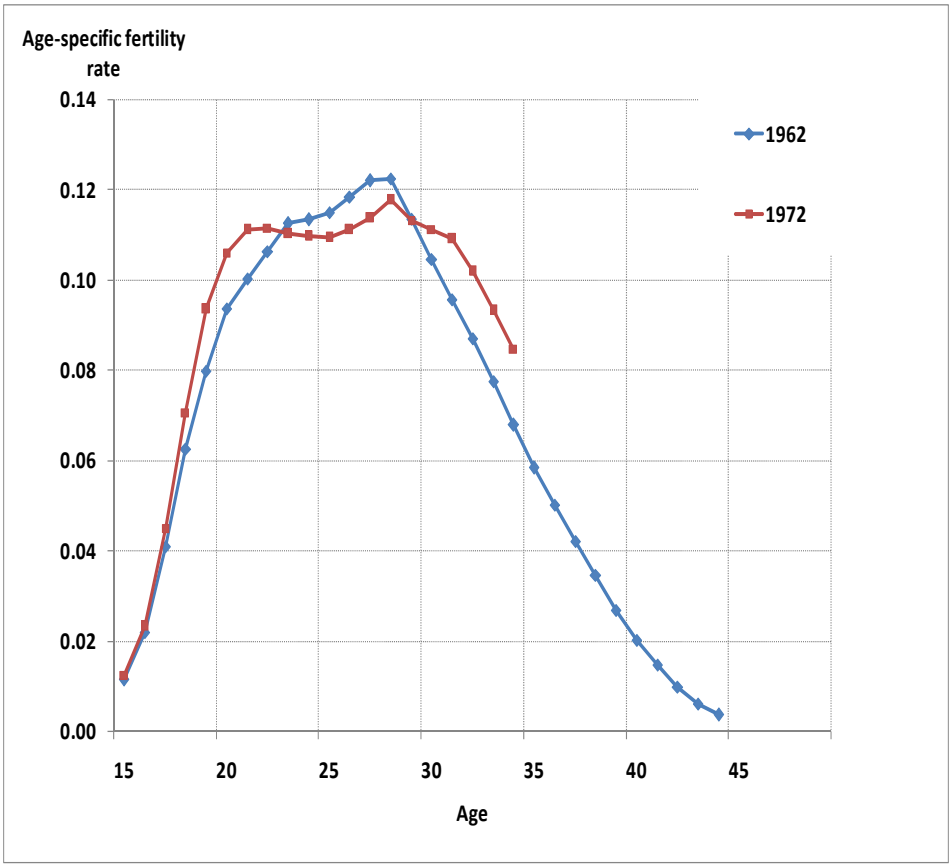


B. Age-specific fertility rates 39-40



SOURCE: Observatoire Démographique Européen 2010

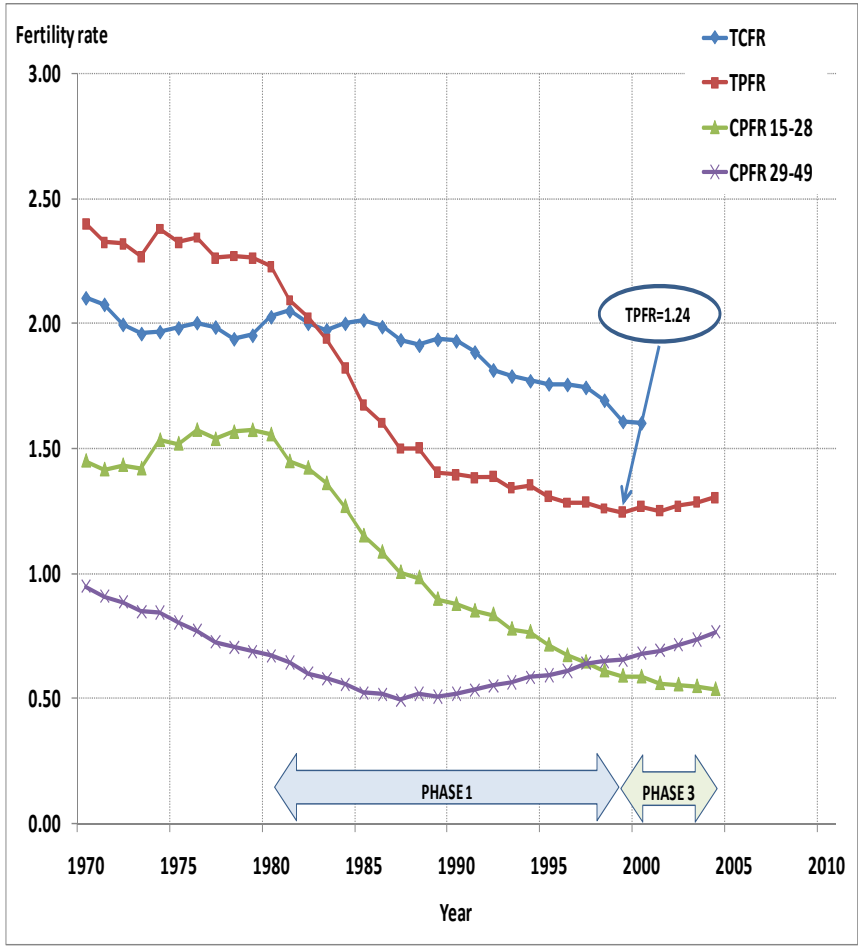
Figure 9 – Cohort age-specific fertility rates, United States, birth cohorts 1962 and 1972



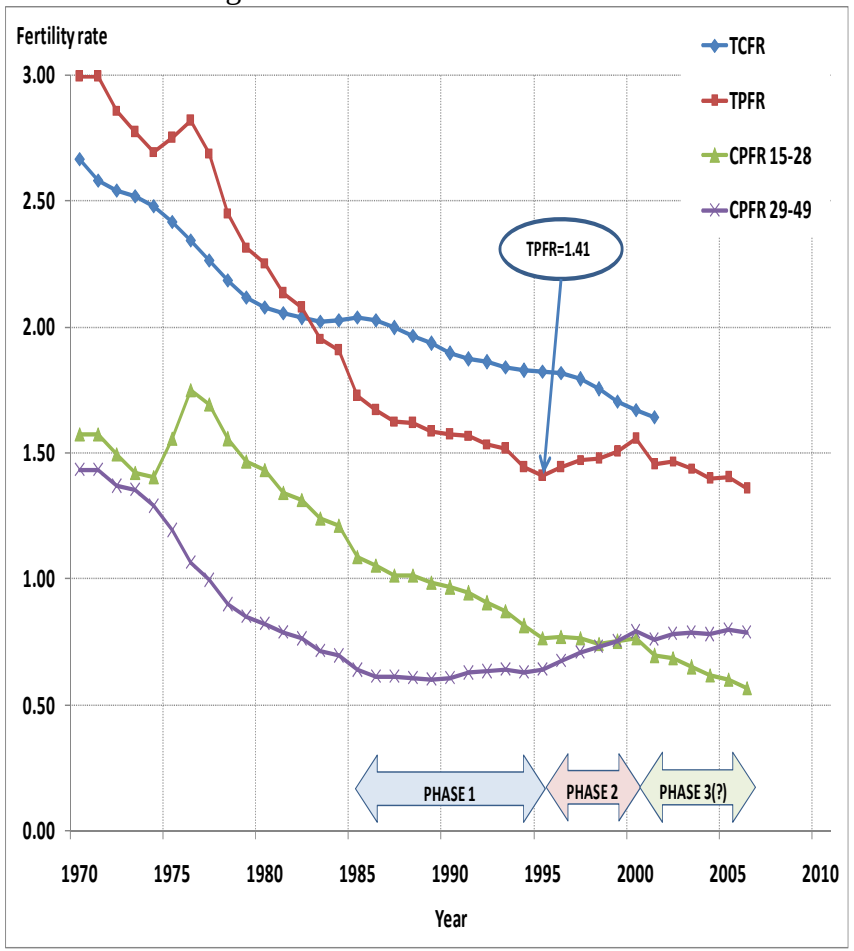
SOURCE: Observatoire Démographique Européen 2010

Figure 10 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Greece 1970-2004, and Portugal 1970-2006

A. Greece



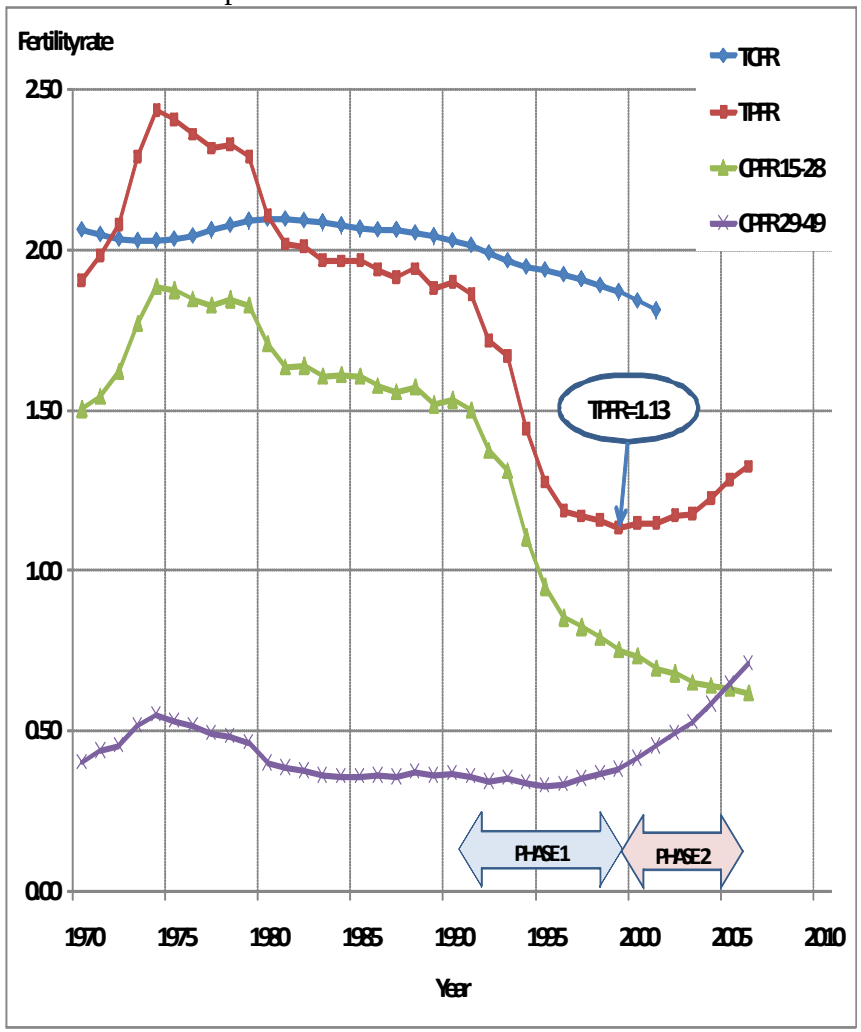
B. Portugal



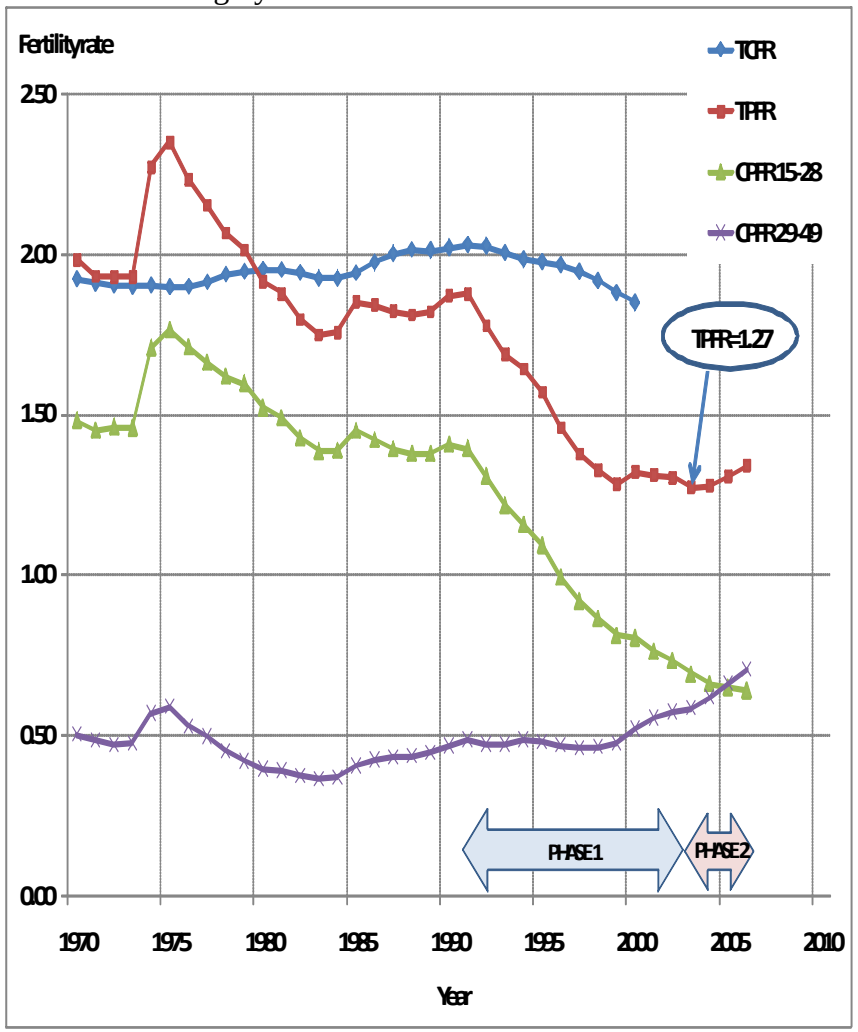
SOURCE: Observatoire Démographique Européen 2010

Figure 11 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Czech Republic and Hungary, 1970-2007

A. Czech Republic



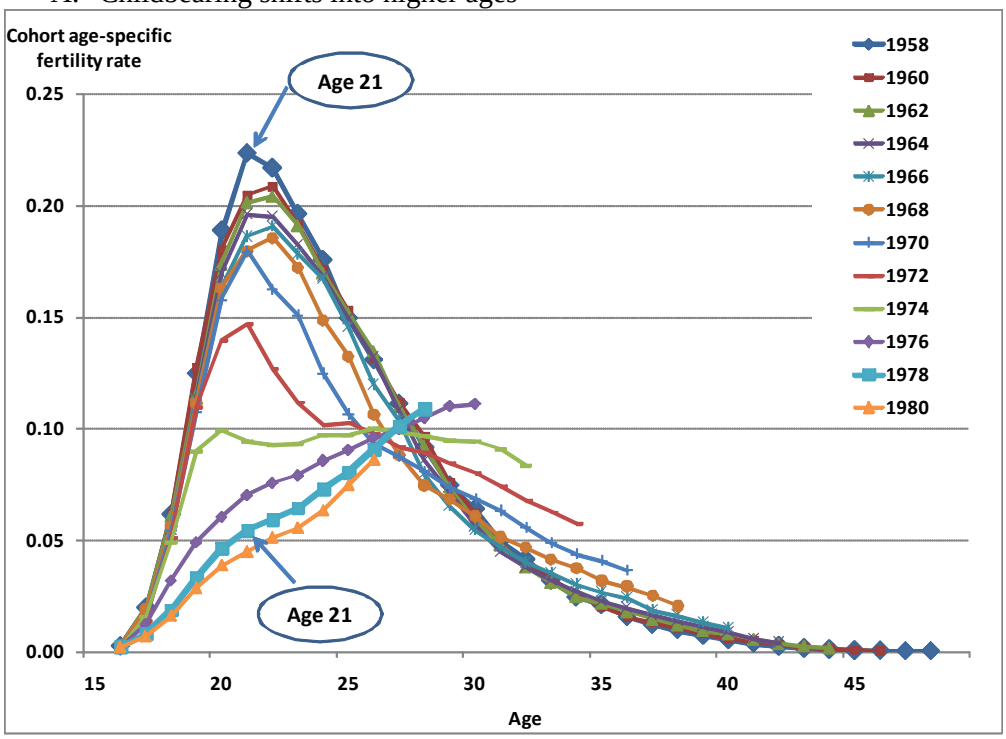
B. Hungary



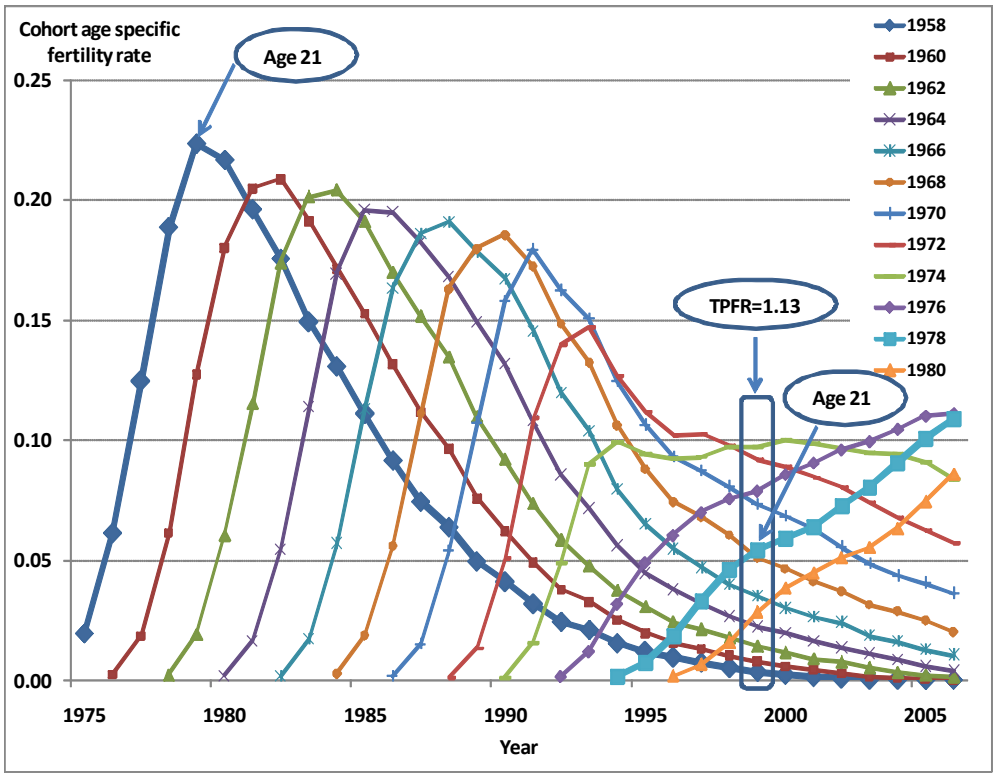
SOURCE: Observatoire Démographique Européen 2010

Figure 12 – Age-specific fertility rates, Czech Republic, birth cohorts 1958 – 1980

A. Childbearing shifts into higher ages



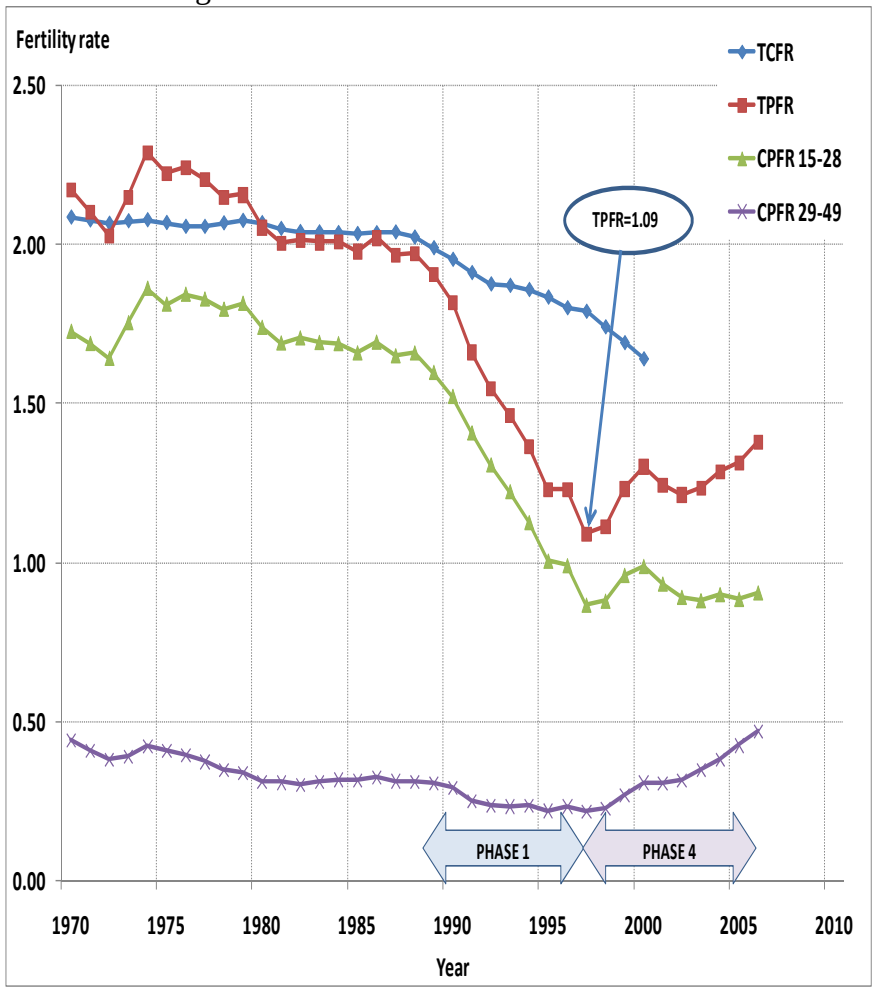
B. Succession of birth cohorts



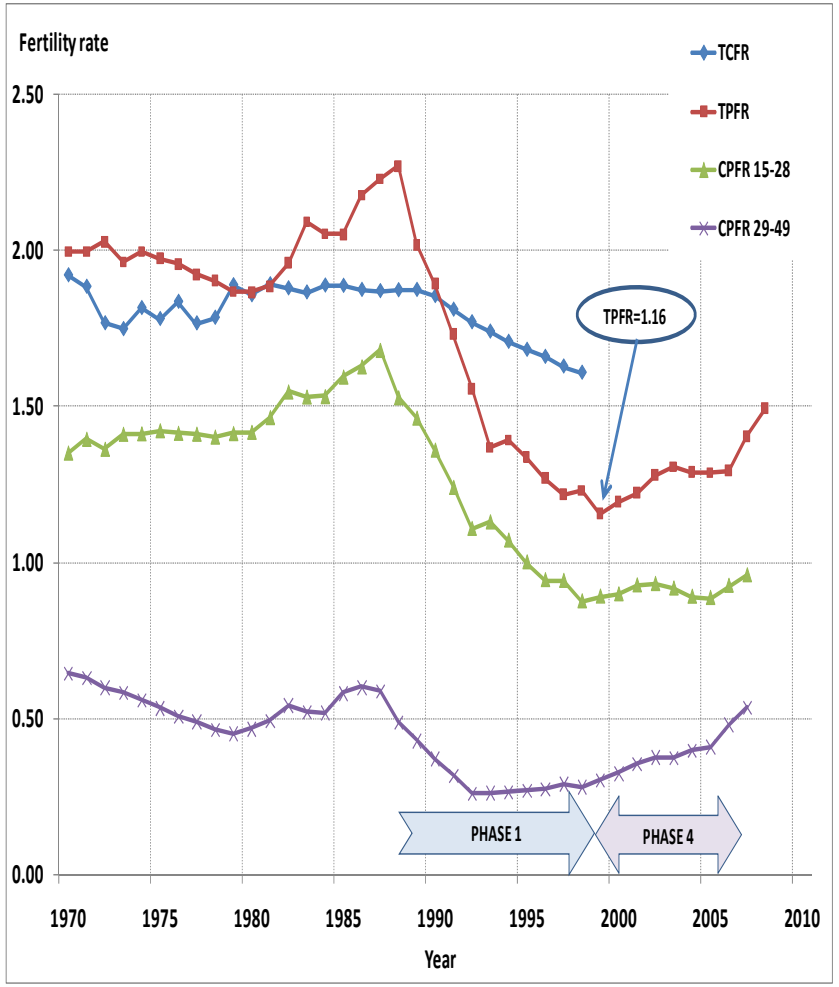
SOURCE: Observatoire Démographique Européen 2010

Figure 13 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Bulgaria and Russian Federation, 1970-2006

A. Bulgaria



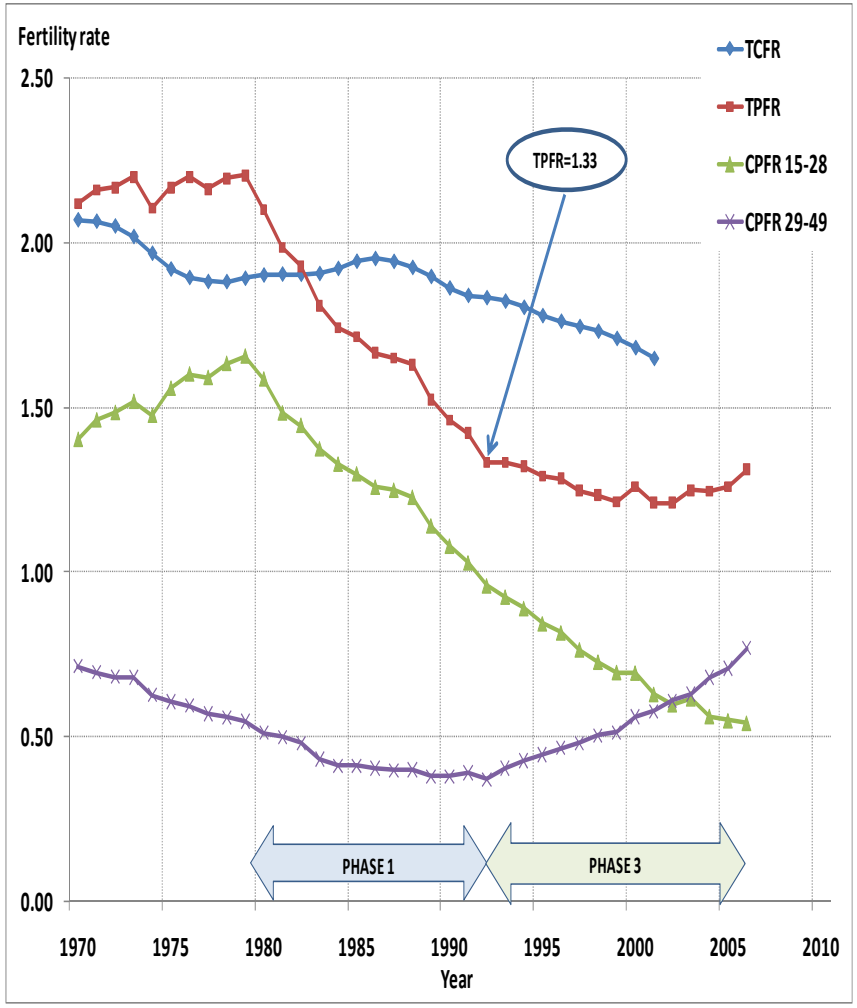
B. Russian Federation



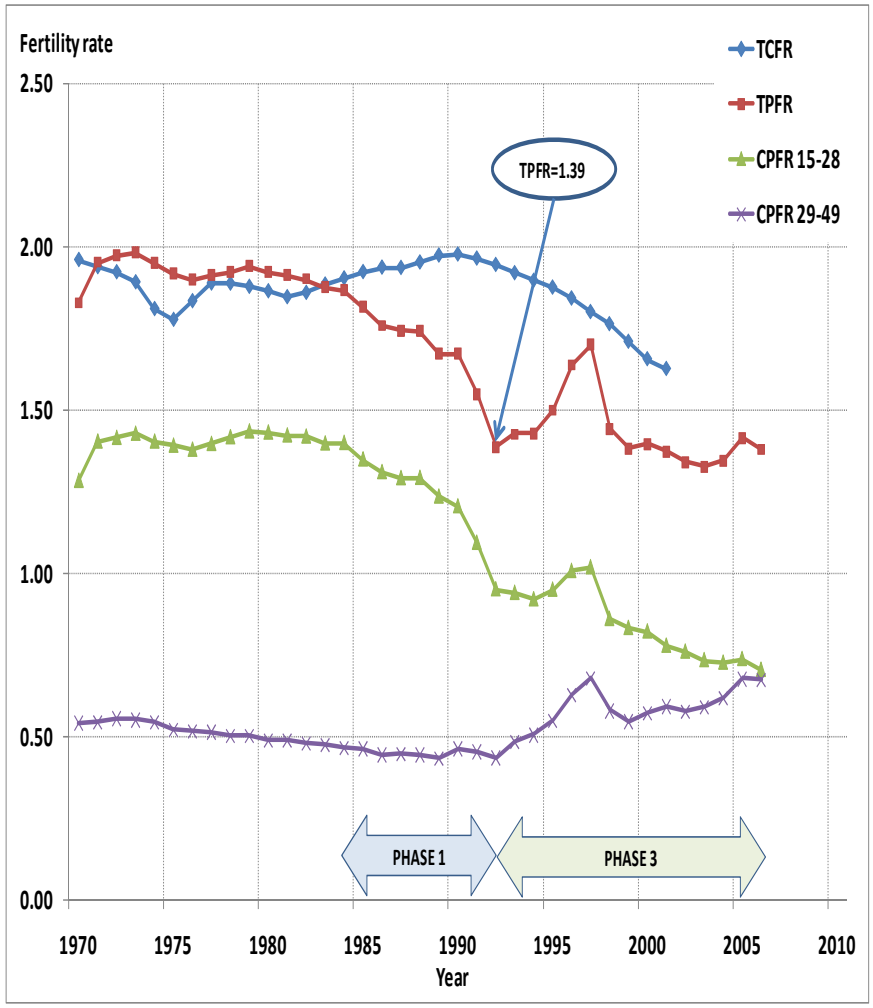
SOURCE: Observatoire Démographique Européen 2010

Figure 14 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Slovenia and Croatia, 1970-2007

A. Slovenia



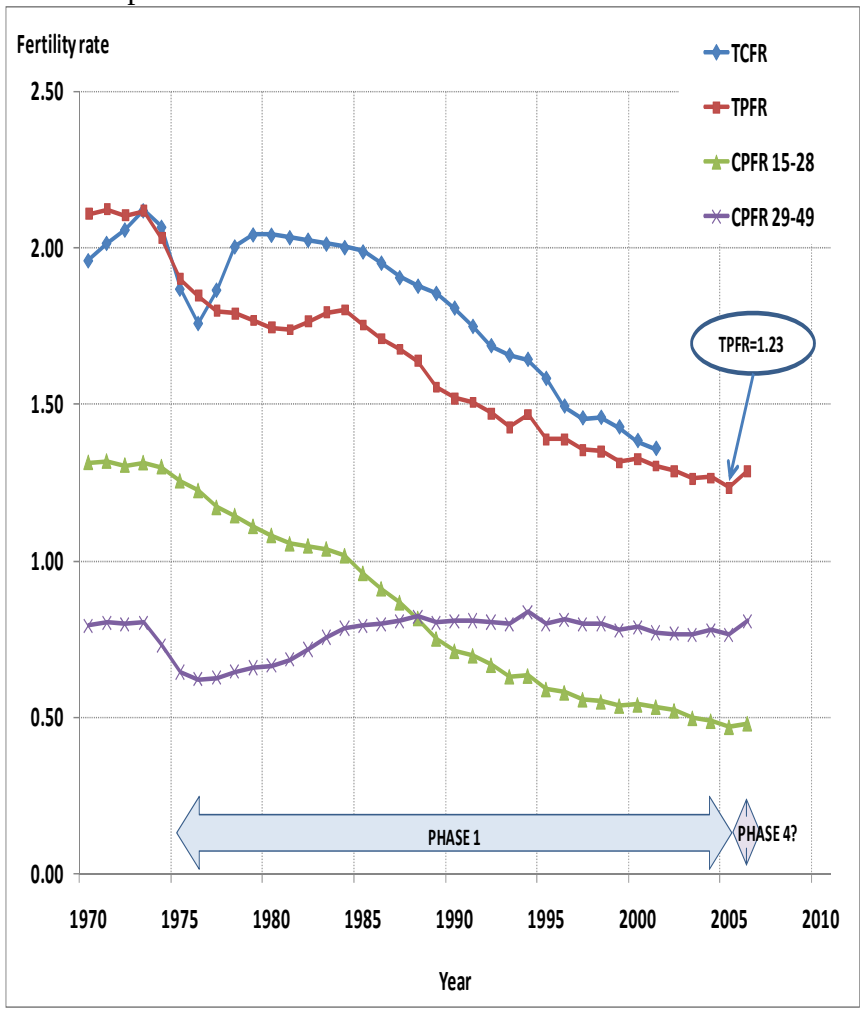
B. Croatia



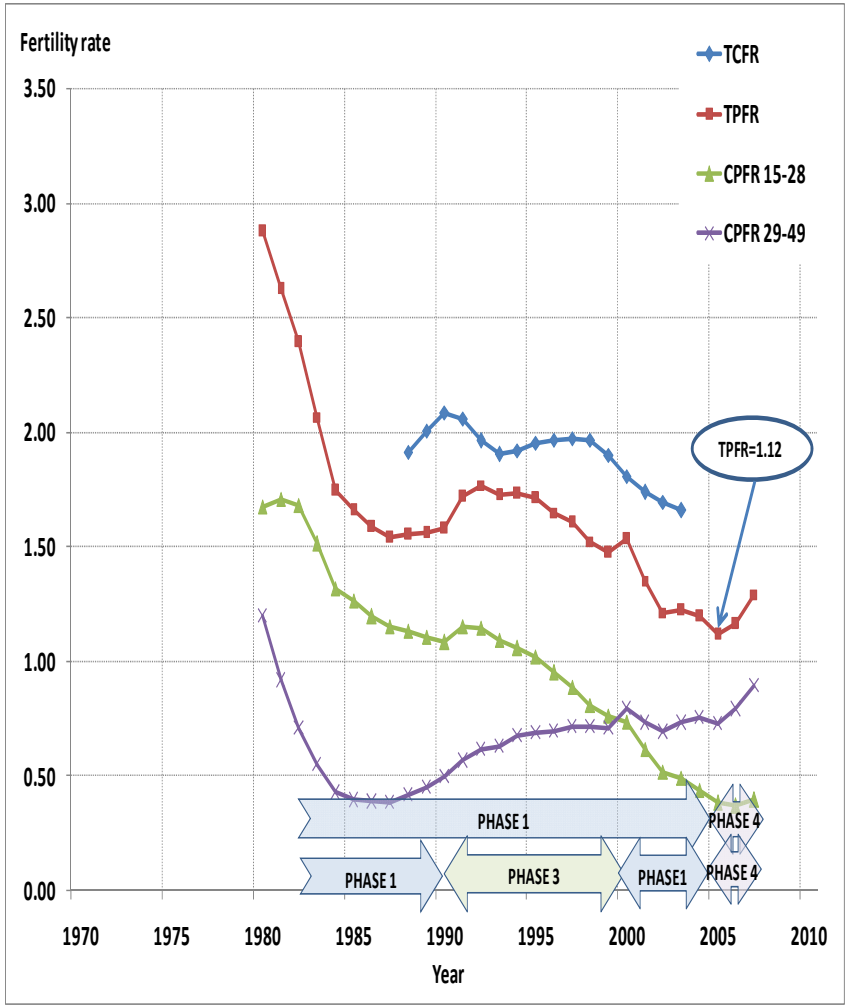
SOURCE: Observatoire Démographique Européen 2010

Figure 15 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Japan and South Korea, 1970-2007

A. Japan



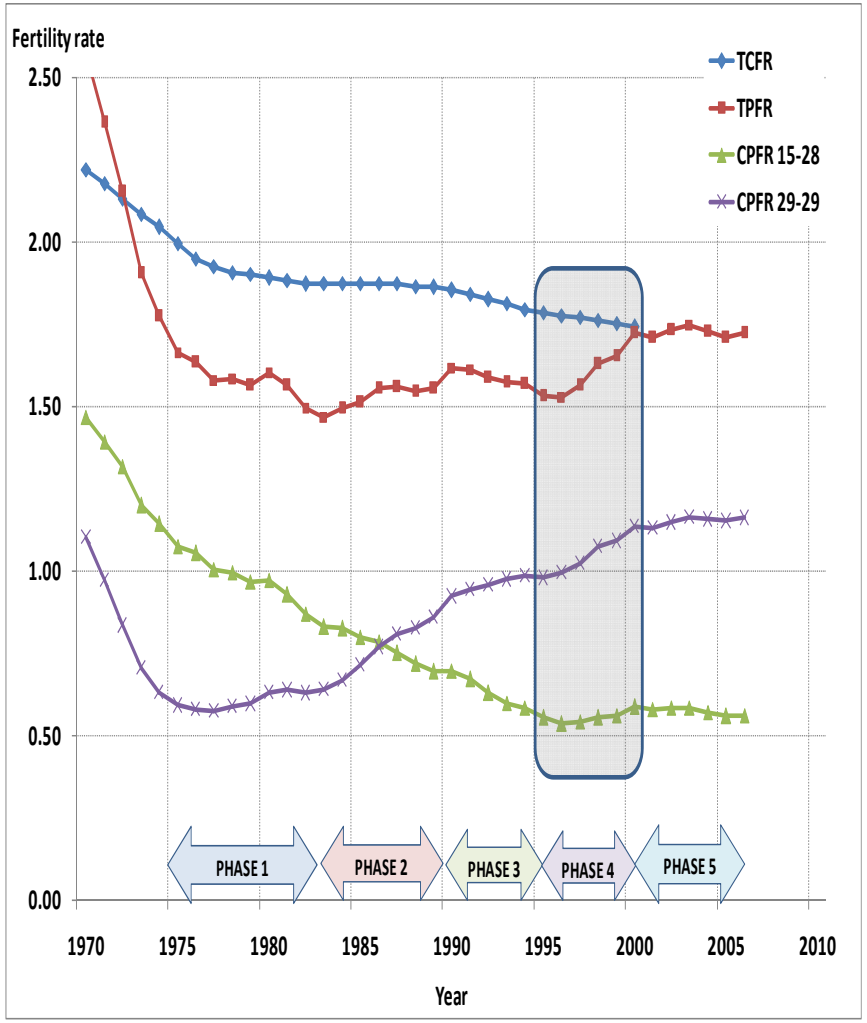
B. South Korea



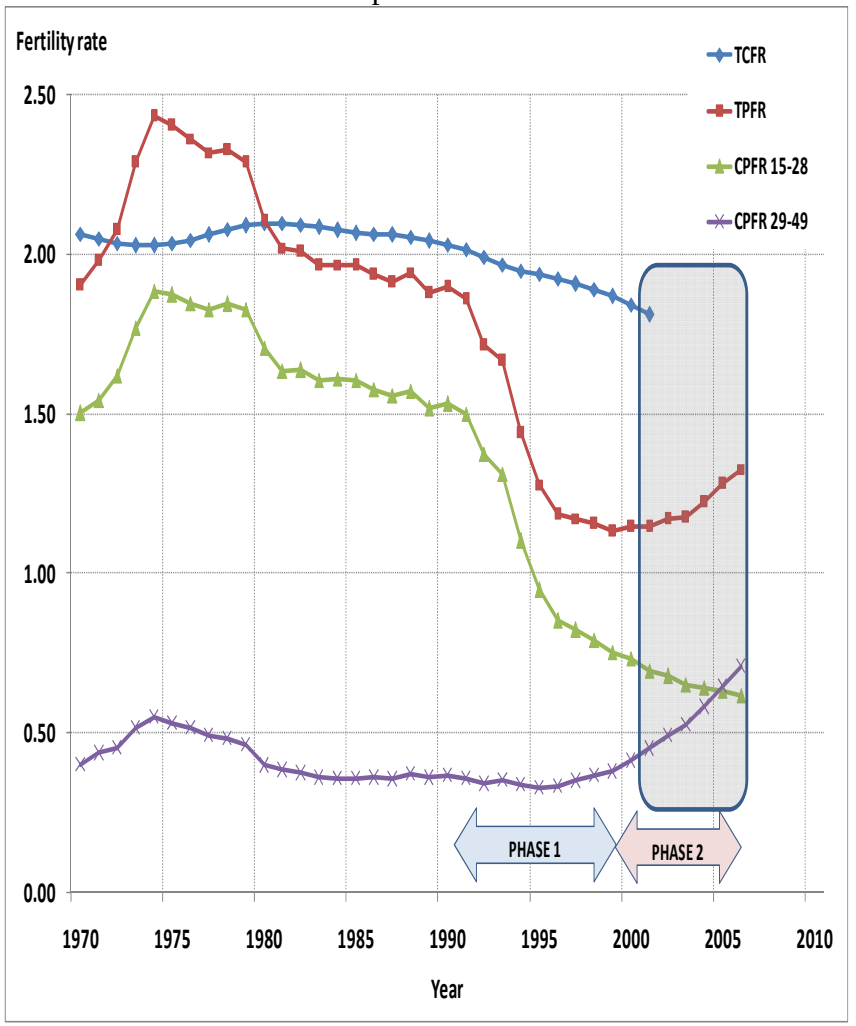
SOURCE: Observatoire Démographique Européen 2010

Figure 5 - Total cohort fertility rate (lagged by 30 years), total period fertility rate, cumulative period fertility rates 15-28 and 29-49, Netherlands and Czech Republic, 1970-2006

A. Netherlands



B. Czech Republic



SOURCE: Observatoire Démographique Européen 2010

Table 1 – Age-specific fertility rates, Denmark, birth cohorts 1947 and 1957

Panel A

Age	Age-specific fertility rates			
	1947 birth cohort	1957 birth cohort	Difference between 1957 and 1947 cohorts	Subtotals of postponement and recuperation
15	0.0001	0.0008	0.0007	
16	0.0051	0.0042	-0.0008	
17	0.0225	0.0113	-0.0112	
18	0.0522	0.0283	-0.0238	
19	0.0948	0.0466	-0.0483	
20	0.1203	0.0705	-0.0498	
21	0.1274	0.0879	-0.0395	
22	0.1303	0.1027	-0.0276	
23	0.1438	0.1126	-0.0312	
24	0.1671	0.1153	-0.0517	
25	0.1700	0.1208	-0.0492	
26	0.1579	0.1204	-0.0375	
27	0.1446	0.1213	-0.0234	
28	0.1319	0.1195	-0.0125	-0.4058
29	0.1058	0.1130	0.0072	0.2655
30	0.0873	0.1064	0.0191	
31	0.0741	0.0982	0.0241	
32	0.0594	0.0891	0.0297	
33	0.0482	0.0777	0.0295	
34	0.0357	0.0676	0.0319	
35	0.0292	0.0574	0.0281	
36	0.0220	0.0490	0.0271	
37	0.0189	0.0410	0.0222	
38	0.0145	0.0321	0.0176	
39	0.0112	0.0225	0.0113	
40	0.0084	0.0164	0.0080	
41	0.0057	0.0099	0.0042	
42	0.0038	0.0062	0.0023	
43	0.0022	0.0040	0.0018	
44	0.0011	0.0017	0.0006	
45	0.0007	0.0010	0.0003	
46	0.0002	0.0006	0.0004	
47	0.0002	0.0002	0.0001	
48	0.0000	0.0001	0.0000	
49	0.0001	0.0001	0.0000	
Total	1.9966	1.8562	-0.1403	-0.1403

Panel B

Age	Cumulated ASFRs		
	1947 birth cohort	1957 birth cohort	Difference of 1957 and 1947 cohorts
15	0.0001	0.0008	0.0007
16	0.0052	0.0051	-0.0001
17	0.0277	0.0164	-0.0114
18	0.0799	0.0447	-0.0352
19	0.1747	0.0913	-0.0835
20	0.2950	0.1617	-0.1333
21	0.4224	0.2496	-0.1728
22	0.5526	0.3523	-0.2003
23	0.6964	0.4649	-0.2316
24	0.8635	0.5802	-0.2833
25	1.0335	0.7010	-0.3325
26	1.1914	0.8214	-0.3700
27	1.3360	0.9426	-0.3934
28	1.4680	1.0621	-0.4058
29	1.5737	1.1751	-0.3986
30	1.6610	1.2815	-0.3795
31	1.7351	1.3797	-0.3554
32	1.7945	1.4689	-0.3257
33	1.8427	1.5466	-0.2962
34	1.8784	1.6141	-0.2643
35	1.9076	1.6715	-0.2361
36	1.9296	1.7205	-0.2091
37	1.9485	1.7615	-0.1869
38	1.9629	1.7936	-0.1694
39	1.9741	1.8161	-0.1581
40	1.9826	1.8325	-0.1501
41	1.9883	1.8424	-0.1459
42	1.9921	1.8486	-0.1436
43	1.9943	1.8526	-0.1417
44	1.9955	1.8543	-0.1411
45	1.9961	1.8553	-0.1408
46	1.9963	1.8559	-0.1404
47	1.9965	1.8561	-0.1404
48	1.9965	1.8562	-0.1403
49	1.9966	1.8562	-0.1403

SOURCE: Observatoire Démographique Européen 2010

Table 2 (part one) – Characteristics of childbearing postponement and recuperation process, Western countries

Region, Country	Start of postponement - cohorts	Start of postponement - period	Start of recuperation and status	Year of trough	Phase 2	Phase 3 started in year	Status of postponement - late 1990s and 2000s	Phase 4 started in year	Phase 5 started in year	Comments
Nordic countries										
Denmark	Late 1940s	Early 1970s	Early 1980s	1983	Y	1992	Ceased around 2000	Around 2000	N	
Finland	Early 1940s	Early 1970s	Early 1970s – steady increase	1987 ?	N	1990	Ceased 2002	2002	N	Phases 1 & 2 unclear; long-term slow postponement and recuperation; prolonged phase 3 from 1990 to 2002
Norway	Early 1940s	Early 1970s	Late 1970s	1983-84	Y	1992	Ceased 2002	2002	N	Moderate trends
Sweden	Late 1940s	Early 1970s	Mid 1970s	1978	Y	N	Ceased 1998	1999	2006	Large swings due to policy intervention
Western Europe										
Belgium	Late 1940s	1970s	Mid 1980s – steady increase	1985	Y	1991	Ceased mid-1990s	1995	N	
England & Wales	Late 1940s	Around 1980	Around 1982 –steady increase, acceleration after 2001	1983-84	N	1985	Ceased 2001-02 and reversed slightly	2001	N	Not typical: No phases 1 & 2, no initial trough; long phase 3
France	Late 1940s	Late 1970s	Around 1983- steady increase	N	N	1983 – decade long	Delays ceased 1993	1993	2006?	Not typical: Weak phases 1 & 2, no initial trough; long phase 4
Netherlands	Late 1940s	Late 1970s	Late 1970s – steady increase till 2003 then flat	1983	Y	1986	Delays ceased 1996 then flat	1996	2000	

Table 2 (continued) – Characteristics of childbearing postponement and recuperation process, Western countries

Region, Country	Start of postponement - cohorts	Start of postponement - period	Start of recuperation and status	Year of trough	Phase 2	Phase 3 started in year	Status of postponement - late 1990s and 2000s	Phase 4 started in year	Phase 5 started in year	Comments
West Central Europe										
Austria	Late 1940s	Early 1980s	Late 1980s – steady increase	1987	N	1987	Steady decline	N	N	± phase 3 1991 - 2006
West Germany	Late 1940s	Early 1970s	Late 1980s – steady increase	1985	N	1985	Flat 1995 - 1999	N	N	Continuous stage 3: 1988 to 1999; data only till 1999!
Switzerland	Mid 1940s	Early 1970s	Late 1970s – steady increase	1978	N	1978	Steady decline	N	N	± continuous phase 3 1978 - 2006
Non European Countries (English-speaking)										
Australia	Late 1940s	Mid 1970s	Early1980s – steady increase	1980	N	1980	Continuous decline till 2006	N	N	Continuous phase 3: 1980 to 2006; policy intervention 2007
Canada	Early 1940s	Early 1970s	Late 1980s – steady increase	1987	N	1991	Continuous delays	N	N	Continuous stage 3: 1991 to 2005; data only till 2005
New Zealand	Late 1940s	Late 1970s	Mid 1980s – steady increase	1983-85	Y	1990	Stable 1998-2005	2002	N	Fertility increase at all ages 2005-2007
United States	Early 1940s	1960s	Mid 1970s – steady increase	1976	N	1990-91	Very modest decline	1976 – see comments	N	Precursor/Exception – Irregular patterns incl. childbearing advancement 1986-1990

Table 3 – Characteristics of childbearing postponement and recuperation process, Southern Europe

Country	Start of delay - cohorts	Start of delay - period	Start of recuperation and status	Year of trough	Phase 2	Phase 3 started in year	Status of delays late 1990s and 2000s	Phase 4 started in year	Phase 5 started in year	Comments
Greece	Mid 1950s	Early 1980s	Late 1980s - modest	1999	N	1999	Continuous decline	N	N	Phase 1 immediately followed by phase 3
Italy	Mid 1950s	Early 1980s	Late 1980s - modest	1995	N	N	Level after 1997	1998	N	Phase 1 immediately followed by phase 4
Portugal	Late 1950s	Late 1980s	Early1990s – Very modest	1995	Y	2000	Continuous decline	N	N	2000 TPFR peak followed by decline
Spain	Late 1950s	Early 1980s	Early1990s – Very modest	1997	N	N	Level after 1998	1998	N	Phase 1 immediately followed by phase 4

Table 4 (part one) – Characteristics of childbearing postponement and recuperation process, Central and Eastern Europe

Region, Country	Start of delay - cohorts	Start of delay - period	Status of delays late 1990s-2000s	Start and status of recuperation	Year of trough	Phase 2	Phase 3	Phase 4	Comments
East Central Europe									
Czech Republic	Early 1960s	Early 1990s	Continuous - weakening delays	Early 2000s - notable	1999	Starting 2000	N	N	
Hungary	Late 1950s	Early 1980s	Continuing delays	Minor early 1980s - Notable 1990s	1999-2003	Starting 2004	N	N	Trough very recent – phase 2 barely started
Poland	?	Early 1990s	Continuing delays	Mid 2000s - modest	2003	Starting 2003	N	N	Trough very recent – phase 2 barely started
Slovak Republic	Late 1960s	Early 1990s	Continuing delays	Early 2000s - moderate	2002	Starting 2003	N	N	Trough very recent – phase 2 barely started
East Germany	Early 1960s	Early 1980s	n.a.	Mid 1990s	1994	Peculiar – All ages rise 1995+	n.a.	n.a.	Data only till 1998
Eastern Europe									
Bulgaria	Late 1960s	Late 1980s	Stable - delays ended	Late 1990s - moderate	1997	N	N	Starting 1998	
Romania	Late 1960s	Early 1990s	Continuing moderate delays	Mid 1990s - moderate	1996	N	Starting 1996	N	Prolonged phase 3: 1996 – 2006 …
Russia	Late 1960s	Late 1980s	Stable - delays ended	Mid 1990s – moderate; 2000s faster	1999	N	N	Starting 2000	Policy intervention 2006

Table 4 (continued) – Characteristics of childbearing postponement and recuperation process, Central and Eastern Europe

Region, Country	Start of delay - cohorts	Start of delay - period	Status of delays late 1990s-2000s	Start and status of recuperation	Year of trough	Phase 2	Phase 3	Phase 4	Comments
West Balkan Region									
Bosnia & Herzegovina	1950s	Mid 1980s	Continuing declines	None by 1990	n. a.	n. a.	n. a.	n. a.	Still in phase 1 in late 1980s - Data only till 1990!!!
Croatia	Late 1950s	Mid 1980s	Continuing moderate delays	Early 1990s-moderate	1992	N	Started 1998? – post war	N	No trough; Equilibrium 1998-2006 affected by war
Macedonia	Mid 1960s ?	Mid 1990s?	Continuing declines	None by 2006	None by 2006	N	N	N	Still in phase 1 in mid 2000s
Slovenia	Late 1950s	Around 1980	Continuing delays	Early 1990s - notable	1992	N	Started 1993	N	Equilibrium of postponement and recuperation 1993-2006
Yugoslavia	Early 1950s	Mid 1980s	Continuing delays	None by 2003	None	N	N	N	Still in phase 1 in early 2000s - Data only till 2003

Table 5 – Characteristics of childbearing postponement and recuperation process, East Asia

Country	Start of delay - cohorts	Start of delay - period	Status of delays late 1990s-2000s	Start and status of recuperation	Year of trough	Phase 2	Phase 3	Phase 4	Comments
Hong Kong	Unknown – data not available	Early 1980s	Continuing modest delays	Fertility of older women was stable throughout the late 1980s through the early 2000s	2003	N	N	Possibly started in 2004	Unusual trends in 1990s and early 2000s – young and older women in identical directions: 1989-1994 stable; 1994-2003 decline; thereafter a modest TPFR increase but insufficient detailed data
Japan	Late 1940s	Mid 1970s	Continuing delays	Around 1980-extremely modest increase	2005?	N	N	Possibly started 2005	Protracted phase 1: Mid 1970s to mid 2000s
South Korea	Unknown – data not available	Early 1980s	Continuing delays till 2005 then leveling	Around 1990 – modest increase	2005	N	1991-1999?	Possibly started 2005	Two interpretations of phases: phase 1-early 1980s to 2005; Phase 1 interrupted by phase 3 from1991 to 1999
Taiwan	Unknown – data not available	Early 1980s	Continuing delays	Late 1980s modest increase till late 1990s then stalled; modest decline! In 2000s	A trough had not been reached by 2008	N	N	N	TPFRs declining in mid 2000s