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The demographic transition revisited: A cohort perspective

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Abstract

The principal focus of this paper is to analyze the *fertility* transition of the 19th to early 21st centuries with cohort fertility measures, and a discussion of key societal conditions shaping the transition. This new approach and procedure reveals that there were four different fertility transition pathways. Arguably equally important is the finding that thus far the demographic transition has not resulted in an equilibrium of relatively stable low mortality and stable low fertility. Early in the 21st century mortality is continuing to decline steadily, fertility is generally below replacement, and fertility trends are in a flux with a tendency towards further declines. The four types of fertility transition patterns were: a. The *"Western"* distinguished by major cohort total fertility rate (CTFR) fluctuations; b. The *Central and East European* characterized by a stable CTFR band around 2.0 births per woman in the 1920s to 1950s birth cohorts; c. The *Southern European* characterized by a relatively stable secular CTFR decline; d. The *East and South-East Asian* characterized by rapidly declining CTFRs starting as late as in the middle of the 20th century. In all four fertility transition pathways almost all CTFRs were below replacement in the youngest cohorts born in the 1960s and early 1970s ending their childbearing early in the 21st century. The higher CTFRs, mostly between 1.7 and 2.0 births per woman, were in the "Western" populations, the lowest of 1.2 to 1.6 in East and South-East Asia. The exploration of societal conditions shaping mortality and fertility trends confirm Notestein's conclusions formulated 70 years ago (Notestein 1945 and 1953). This investigation has shown that it was a complex combination of "technological, social, economic, and political developments," and also of cultural and ideational effects – revealed by subsequent research, especially of Coale (1973) as well as of Lesthaeghe and van de Kaa (1986) – which shape mortality and fertility trends. Furthermore, Notestein observed that it is "impossible to be precise about the various causal factors" generating mortality and fertility trends. Primary causal factors alternated between economic, social, political, policy and other factors.

Keywords: Demographic transition – Pathways of the fertility transition – International comparative analysis – Cohort fertility -- Causes of the demographic transition

The demographic transition revisited: A cohort perspective[1]

1. Introduction

Over 70 years have passed since the demographic transition theory was elaborated at the *Office of Population Research* (OPR) of *Princeton University*. In the words of Dudley Kirk, "by convention, Frank Notestein's article published in 1945 (Notestein 1945) is regarded as its first definition" (Kirk 1996:361). This was complemented by another, lesser known but arguably equally important paper (Notestein 1953), in which he examined the causes of the demographic transition and spelled out the implications for research, policy development, and actions. This was at a time when the demographic transition had been taking place only in Europe and the overseas countries with populations of European origin, at a time when 70 percent of the world's 2.5 billion population was in the pre-transitional stage of high mortality and high fertility. Yet Notestein foresaw the demographic transition would spread to the remainder of the World, including the need for "speeding the processes of social change in directions that yield falling birth-rates, which in turn will permit more rapid increases in per capita income" (Notestein 1953:25).

Three scholars had described and discussed the principal contours of modern mortality and fertility trends before Notestein. Adolphe Landry (1909) published the first crude formulation of the demographic transition in an article which he later developed extensively in his book *La révolution démographique* (1934). Warren Thompson (1929) elaborated an early version of the demographic transition in an article entitled "Population." These two authors apparently were not aware of each other's publications or, according to Kirk (1996:363), was Notestein. He was, however, intimately familiar with the work of the British demographer Alexander Carr-Saunders, *World Population: Past Growth and Present Trends* (1936), "a massive … compendium of materials relating to population size and demographic change in many countries." (Kirk 1996:363).

It was the wealth of data compiled by Carr-Saunders together with research conducted at the Princeton OPR in the early1940s and published in several volumes dealing with European populations and their prospective growth (Notestein et al. 1944, Moore 1945, Kirk 1946, Lorimer 1946) that provided the empirical base for Notestein's development of the theory of the demographic transition.

The contemporary world is very different from what it was 70 years ago. Innumerable changes have occurred. The size of the world's population is approaching 7.5 billion with very diverse rates of growth in its various parts. Populations are shrinking in a number of European countries and Japan, and increasing by over 3 percent per year in some countries in Africa and the Middle East. Life expectancy ranges from around 50 to over 80 years. The total fertility rate ranges from one to two births per woman to six and over.

Unimaginable developments have occurred in science and technology, in public health and living standards, political regimes have undergone many changes, levels of education have been increasing, major advancements have been developed in methods of birth regulation, and gender relationships have

[1] Thoughtful comments on earlier drafts from Andrew Cherlin, Michaela Kreyenfeld, Zdeněk Pavlík, John Ross, Tomáš Sobotka and Charles Westoff are gratefully acknowledged.

been changing. All of these developments have had their repercussions for demographic behavior and trends, which in turn have influenced societal trends. This is no different from how Notestein perceived the interconnectedness of population and societal developments: "… population growth itself is a dependent variable, to be affected in large degree by the technological, social, economic, and political developments of the future. The nature of population growth will affect, and in turn be affected by, coming events. We often fail to consider the response of population to the changing setting." (Notestein 1945:36).

At the same time, significant progress has been made in vital data registration and data collection, in the development of the science of demography and in statistical analysis, notably in developing and applying cohort fertility measures (Ryder 1951 and 1964). Thus we can describe and examine mortality and fertility trends not only over the 70 years since Notestein's formulation of the demographic transition, but it might also be possible to arrive at an improved understanding of the mortality and especially of fertility trends during the past two centuries, i.e. during the entire course of the demographic transition.

2. The demographic transition: Definition, causes and description

At the micro level the essence of the demographic transition[2] consists of a transformation from an extensive nature of human reproduction where many children are born yet few survive, a transformation from generally unplanned to planned parenthood. At the macro level, taking the demographic realities of the 1940s, Notestein (1945:41) defined three phases of the demographic transition:

- populations with a "high growth potential," i.e. high mortality as well as high fertility which have not shown any evidence of a downward trend, but are poised for rapid growth as soon as societal and technical developments enable a decline in mortality;
- populations experiencing "transitional growth," i.e. mortality is declining as is fertility, however with a time lag; and
- populations approaching "incipient decline," i.e. mortality is low and fertility is below the replacement level or is approaching that level.

Even though Notestein himself never formulated it thus, it was understood that "the pretransition and posttransition regimes are assumed to be essentially in long-term equilibrium with transitional regimes acting as a bridge between the two." (Casterline 2003:211)

Notestein (1945:41) observed that "[T]he reduction of mortality is a universally acceptable goal and faces no substantial social obstacles. But the reduction of fertility requires a shift in social goals from those directed toward survival of the group to those directed toward the welfare and development of the individual." That is the root cause of the delay in fertility decline and relatively rapid population growth in the second phase, the "transitional growth" phase, of the demographic transition. It is also the reason why it is so difficult to understand conditions of fertility behavior and trends.

The experience of European populations and of those of European origin in the 1920s and 1930s led Notestein to conclude that these populations are likely to decline in size due to fertility being below the replacement level in numerous populations. Has a similar status developed in the past 30 years? Is that not one of the principal characteristics of the original theory of the Second Demographic Transition formulated some 40 years later?

The principal causes of the declines in mortality and fertility are outlined in Notestein's 1945 article (pp. 39-40). The long-term *mortality* decline in Europe was enabled by relative international political stability and domestic order, by agricultural innovations leading to an increase in food supply, by industrial

[2] In some languages the term "demographic revolution" is used and is considered more appropriate.

innovations that led to "spectacular increases in product," and by medical and public health advances. "In short, the whole process of modernization in Europe and Europe overseas brought rising levels of living, new controls over disease, and reduced mortality." *Fertility* was much less responsive to the processes of modernization. Nonetheless, abundant evidence attests to the fact that the decline came about primarily through rational control, largely by means of contraceptive practices which was generated as a "response to drastic changes in the social and economic setting that radically altered the motives and aims of people with respect to family size."

Subsequently Notestein (1953: 17) condensed his understanding of the circumstances that generated the demographic transition as follows:

> The new ideal of the small family arose typically in the urban industrial society. It is impossible to be precise about the various causal factors, but apparently many were important. Urban life stripped the family of many functions in production, consumption, recreation, and education. In factory employment the individual stood on his own accomplishments. The new mobility of young people and the anonymity of city life reduced the pressures toward traditional behaviour exerted by the family and community. In a period of rapidly developing technology new skills were needed, and new opportunities for individual advancement arose. Education and a rational point of view became increasingly important. As a consequence the cost of child-rearing grew and the possibilities for economic contributions by children declined. Falling death-rates at once increased the size of the family to be supported and lowered the inducements to have many births. Women, moreover, found new independence from household obligations and new economic roles less compatible with child-rearing.

The principal circumstances and motivations for people to want, have and be able to have small families are valid to this day. Increasing shares of people are living in urban areas, technologies are undergoing continuous improvements, productivity is increasing, the need for education is never-ending, availability and use of contraceptive means as well as legal induced abortions has been increasing, the mobility of people has continued, and gender relationships are continuing to change with the status of women and men shifting.

In recent years the changing gender relationships, the gender revolution, as an important factor modifying childbearing behavior has increasingly become a focus of discussion (McDonald 2000, Esping-Andersen and Billari 2015, Goldscheider et al. 2015, Anderson and Kohler 2015). As the findings of the present research are directly relevant in this context, I will elaborate on this topic below (see end of section 6.2.3).

At the same time, there is no doubt that many demographic characteristics pertaining to unions, fertility and societal background have been changing over time and were significantly different in the last third of the 20th and in the early 21st century compared to the 19th century and to the first two-thirds of the 20th century. These realities have been eloquently described, discussed, developed and advanced as the Second Demographic Transition (SDT) in papers by Lesthaeghe, van de Kaa and other scholars (Lesthaeghe & van de Kaa 1986; Lesthaeghe 2010).

The findings of this paper substantiate the view that the causes of the demographic transition as outlined by Notestein (1945 and 1953) have been operating continuously throughout the past two centuries to this day. Many specific characteristics pertaining to marital and informal unions, fertility and societal background have changed particularly in the recent past as outlined by the theory of the Second Demographic Transition (Lesthaeghe 2010). In such a perception of basic demographic developments of the past two centuries the SDT and the Demographic Transition as described and developed by Notestein are not two contrasting systems, but the SDT is a natural detailed component of Notesteins's understanding of the demographic transition. Mortality has been continuing to decline and at a macro level the basic fertility trends depicted in the long-term trends of cohort fertility measures have been fluctuating shaped by, in Notestein's words, "technological, social, economic, and political developments" of the past 70 years.

Thanks to improvements in data collection and methodological approaches, basic contemporary and past fertility trends can be described and followed in a manner more closely expressing what actually transpired in cohort rather than period terms. Rather than analyzing crude birth rates or period total fertility rates, long-term cohort fertility series have been assembled for 36 populations and these will be scrutinized and analyzed in the remainder of this paper. It turns out that the analysis of the demographic, and especially of the fertility, transition reveals characteristics that cannot be observed when using period measures.

The topic of the paper has been introduced in section 1. Section 2 defines and discusses how the demographic transition has been dealt with in the past, in particular by Notestein. Data used and methods applied in this paper are presented in section 3. Section 4 provides a summary of the mortality and life expectancy transition. Section 5 provides an overview of the dynamics of four types of the fertility transition as revealed by using cohort rather than period measures. In section 6 basic societal conditions shaping mortality and fertility trends of the past two centuries are discussed. The findings of this research are summarized in section 7.

3. Data and methods

The data assembled and analyzed in this paper come from the following sources:

Festy (1979), archives of the Observatiore Démographique Européen (2012), Sardon (1991), the Human Fertility Database (2016), the Human Mortality Database (2016), Shkolnikov et al. (2011), Heuser (1976), Hamilton and Cosgrove (2010 and 2012), Myrskylä et al. (2013), Sobotka (2016), Spéder (2016), Frejka et al. (2010) and personal communications from Puur (2016), Stankuniene (2016), Zeman (2016), and Zakharov (2008 and 2016).

Only cohort total fertility rates (CTFRs) are dealt with in this paper, although the fertility transition involves also changes in cohort parity distributions and cohort parity progression ratios. The latter are not dealt with in this paper.

Two methods were applied in the listed sources to derive cohort fertility data:

- Age-specific cohort fertility rates are computed using original *birth registration* statistics compiled by single year of age and single year birth cohort of mother. The age-specific cohort fertility rates are subsequently applied to compute cohort total fertility rates, cohort fertility rates by birth order, cohort fertility progression rates and cohort parity distributions.

- Cohort total fertility rates are derived from *children ever born* (CEB) in population censuses. The average numbers of CEB are computed for single-year birth cohorts of women usually aged 40 (or 45) to 80 (or 85) years at the time of the census. Several censuses tend to be used and averages for the respective birth cohorts from available censuses are applied. This method is less reliable than the one based on registration data if for no other reason than that only data for women surviving to the census date enter the computations. Even though inaccurate, these data are sufficiently reliable to delineate trends.

While it is preferable to use single year data, averages for several year periods or cohorts, most often for five-year periods or cohorts, were also used. This tends to be dictated by data availability. As a rule, single-year data were used in 20th and 21st century analyses, broader year groupings for earlier ones.

Geographic groupings are not strictly uniform for different time periods. They follow accepted and usual conventions and will be familiar and acceptable. For 19th and early 20th century analysis the classification

used by Festy (1979) is followed. For the remainder the classifications are similar to what is usual in contemporary professional literature (for instance, Lutz et al. 2014). Specifically, the following classification of the 36 populations for which it was possible to assemble long-term series of cohort fertility measures into regions and sub-regions is used:

The "Western" region consists of the following sub-regions:
- Northern Europe: Denmark, Finland, Norway, and Sweden;
- Western Europe: Belgium, England & Wales, France, and Netherlands;
- Overseas English-speaking countries: Australia, Canada, New Zealand, and United States;
- German-speaking countries: Austria, Switzerland, and West Germany.

The Central and East European region consists of the following sub-regions:
- Central Europe: Czech Republic[3], Hungary, Poland, and Slovakia;
- South-Eastern Europe: Bulgaria, Romania, and Serbia;
- Eastern Europe: Belarus, Russia, and Ukraine;
- Baltic countries: Estonia, and Lithuania.

Southern Europe: Greece, Italy, Portugal, and Spain.
East and South-East Asia: Hong-Kong, Japan, Singapore, South Korea, and Taiwan.

Using cohort fertility data has advantages and limitations.

An important advantage of cohort fertility measures, especially of the *cohort* total fertility rate (CTFR), is the fact that it reflects and summarizes the real life experiences of the women born in a particular year. For instance, the CTFR of the 1935 birth cohort in the United States equaled 3.18 births per woman, which implies that the average woman born in the US in 1935 really had over 3 births; the 1950 CTFR was equal to 2.05 births per woman which means that on average women born in 1950 actually had about 2 births. On the other hand, the period total fertility rate (PTFR) at any given time is the average number of children a woman *would* bear in her life if she experienced the age-specific fertility rates prevailing at that time. The PTFR is used much more frequently than the CTFR, because it can be computed easily from contemporary statistical data. Nonetheless, it is a hypothetical construct based on the experiences of the cross-section of women from 35 different single-year birth cohorts. For instance, the 1950 PTFR (usually referred to simply as the TFR) equaled 3.03 births per woman which is a useful indication of the fertility level at that time, but it is only an imprecise indication.

A second advantage of CTFRs is that their trends reflect changes only in the quantum of fertility which can be perceived as real childbearing trends. CTFR trends are not affected by the timing of births, by the tempo effect. Almost always the timing of births differs from one cohort to another. Births are either advanced, i.e. compressed into shorter periods of time, or postponed, i.e. spread out over longer periods of time (Bongaarts and Feeney 1998). PTFR trends are modified by the tempo effect. During times of childbearing advancement PTFR trends are faster than CTFR trends, and vice versa, during times of birth postponement PTFR trends are relatively slow. Because the timing of births within cohorts is not known until birth cohorts have experienced most of their childbearing, it is not known what contemporary PTFR trends are actually reflecting.

A third advantage of CTFRs is that their trends tend to be smooth in contrast to PTFR trends which tend to be uneven.

[3] As will be shown below the Czech Republic is a special case. Its cohort total fertility trends are typical for the "Western" region approximately up to the 1920 birth cohort and fit the Central and East European pathway from thereon.

The principal limitation of using CTFRs is that one has to wait till the end of the reproductive period to obtain the respective CTFR. This also means that the CTFR trend curves are delayed. For instance, not until ± 2015 can one obtain the CTFR trend curve from the 1960 to the 1970 cohort, which reflects approximately the fertility trend during the 1990s when the 1960s birth cohorts were at the peak of their childbearing. It is however too early in 2015 to obtain the CTFRs for the cohorts born between 1980 and 1990, which would provide an indication of the real childbearing trend in the 2010s.

Paradoxically, this disadvantage turns into a valuable tool for exploring the fertility transition. CTFR trends are suitable for historical purposes, i.e. for following fertility trends during long-term historical periods. These trends reflect real fertility trends, i.e. trends unaffected by childbearing timing, whereas period TFRs are inflated when childbearing is being advanced, and deflated when childbearing is being postponed (Ryder 1951 and 1964; Bongaarts, Feeney 1998). Most importantly with regard to the present research, CTFR trends reveal the reality of varying types of fertility transitions (Cf. section 5) which are not revealed when period TFRs are used.

4. The mortality and life expectancy transition

The generally accepted perception that mortality decline would reach a limit was disproven by Oeppen and Vaupel (2002). They revealed that "best-performance life expectancy," namely the highest life expectancy observed among populations[4], increased steadily between 1840 and 2000 by a quarter of a year per year. Mortality was continuously declining and life expectancy increasing throughout the 20th century and apparently even in the 21st century (Meslé and Vallin 2006, Christensen et al. 2009).

Most recently, Shkolnikov et al (2011) extended the research of Oeppen and Vaupel (2002) and found that best-practice female life expectancy increased linearly from the 1870 through the 1920 *cohorts* by an average of 0.43 years annually. Based on observed data combined with a projection, best-practice life expectancy continued to grow through the 1950 cohort at an identical pace. Thus cohort best-practice life expectancy has increased from 54 years for the 1870 birth cohort to 84 years in the 1950 cohort, an increase of 30 years.

Shkolnikov et al (2011) also demonstrated that best-practice *period* life expectancy increased by 0.28 years annually between 1870 and 2008. Period life expectancy at birth thus increased from 53 years in 1870 to 86 years in 2008. Period life expectancy at birth is projected to grow to about 95 years by 2050. This is a somewhat slower pace than the rate of increase between 1870 and 2008, namely 0.28 annually, because the rate of growth has decreased in recent years; it was only 0.23 years annually between 1960 and 2008.

In sum, as of the late 20th and early 21st centuries, human mortality trends constituting an inherent part of the demographic transition have continued to decline, although the rate of decline might be diminishing.

The mortality transition is merely summarized. It is not dealt with extensively as this has been done satisfactorily and in great detail by the scholars cited above. It was however indispensable to include this brief summarizing section as an ingredient for conclusions regarding the demographic transition reached in this paper.

5. The fertility transition

[4] "These record values set the potential aspiration levels of longevity for non-leading countries. The shape of trends in best-practice life expectancy shows to what extent developed countries as a group are able to achieve low mortality." (Shkolnikov et al. 2011: 419)

As the fertility transition transpired in individual countries and world regions at different times and with varying features, the following discussion will be subdivided accordingly.

5.1. The "Western" World

Patrick Festy (1979:58-65) assembled cohort total fertility rate series from numerous sources for women born during most of the 19th century and in the early 20th century for 15 advanced European countries and for overseas populations of European origin (Figure 1).

Cohort total fertility rates (CTFRs) were generally between four and five births per woman born in the 1830s-1840s (Figure 1). Compared to typical traditional societies where women usually had six to seven life-time births, fertility was relatively low. This was in large part due to the "distinctive marks" of the European marriage pattern with a high age at marriage and where a large proportion of people never married at all (Hajnal 1965:101).

Fertility started to decline towards the end of the 19th century among women born in the 1850s and 1860s in a majority of these countries (Figure 1). Essentially this descent occurred between about 1880 and 1930. In Norway, for instance, the CTFR declined from 4.4 births per woman in the 1855-1859 cohorts to 2.0 births per woman in the 1905-1910 birth cohorts. Similar cohort fertility declines occurred in most North, West, Central and South European countries during this 50 year period. The CTFR declined from between 4-5 births per woman in the generations born in the middle of the 19th century to 1.8-2.4 births per woman born early in the 20th century[5].

The CTFRs of women born early in the 20th century did not remain this low, i.e. in the vicinity of about two births per woman, but started to increase to reach high points among women born in the early1930s (Figure 2, Panels A-D). They created the baby-boom of the late 1950s/early 1960s virtually throughout the Western World. The zeniths ranged from CTFRs of 2.2 births per woman in Sweden to 3.6 in New Zealand.

On the one hand, there was a great deal of variation in the CTFR trends for most of the 20th century. On the other, it is remarkable that these trends unfolded along similar paths. The CTFRs increased considerably starting with women born around 1910 through those born around 1930 in Northern and Western Europe, in the German-speaking countries and in the overseas populations of European origin (Figure 2, Panels A-D). This was followed by an equally notable CTFR decline which levelled off among the 1950s and 1960s birth cohorts at between 1.8 and 2.2 births per woman in Northern and Western Europe and in the United States. The decline continued in the 1950s and 1960s generations in Australia, New Zealand and Canada. In the German-speaking countries the CTFRs also continued to fall among the 1950s and 1960s cohorts to reach levels around 1.6 births per woman (Figure 2, Panel D).

5.2. South European populations

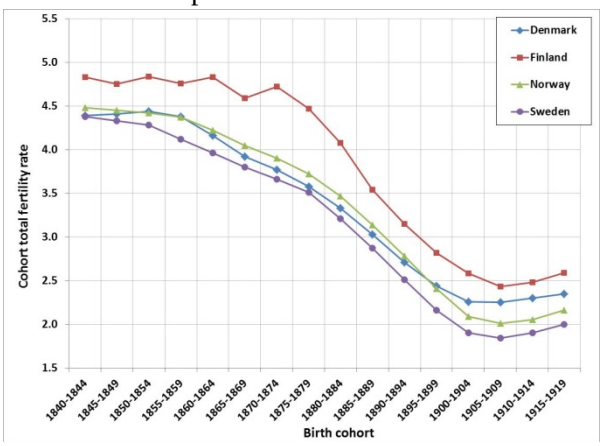
South European populations experienced a slower cohort fertility decline compared to the other countries among women born in the 19th century (Figure 1, Panel C). This CTFR decline continued among South European women born in the 20th century albeit with a plateau among the 1920s and 1930s cohorts to

[5] There were two exceptions where fertility began to fall earlier, France and the United States. Notestein (1945:40) provided the following elucidations: "In France the secularizing influence of the French Revolution was undoubtedly important. In the United States the birth rate has been dropping since the beginning of the nineteenth century, but the rates have moved down from exceptionally high levels which characterized a frontier society that was unusually favorable to high fertility."

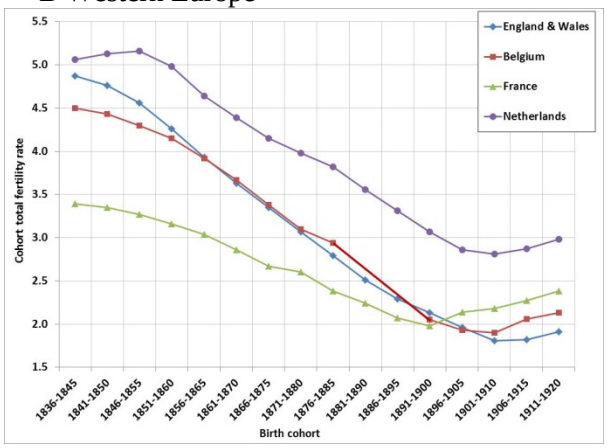
reach a low around 1.6 births per woman among the cohorts of the mid 1960s (Figure 2, Panel E). Apparently CTFRs continued to decline even further among the 1970s birth cohorts. In Spain the women born in the mid-1970s had an estimated CTFR around 1.4 births per woman.

Figure 1: Cohort total fertility rates, selected countries, Northern, Western, Central & Southern Europe, Overseas English-speaking countries, birth cohorts 1835-1920

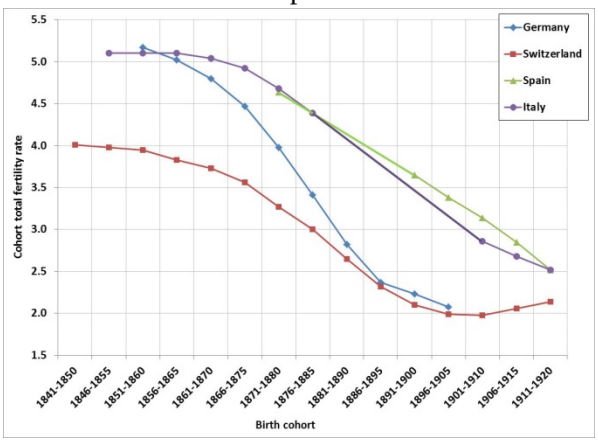
A Northern Europe



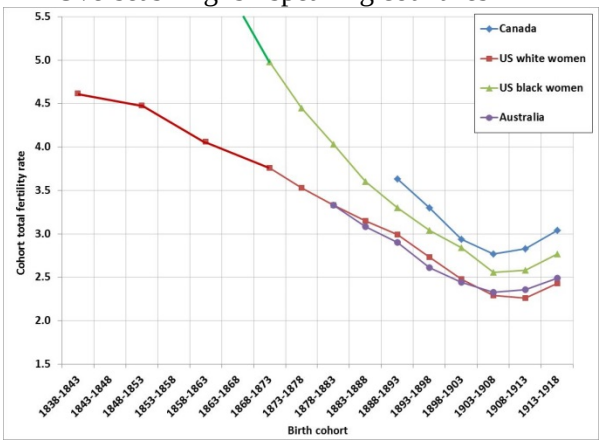
B Western Europe



C Central & Southern Europe



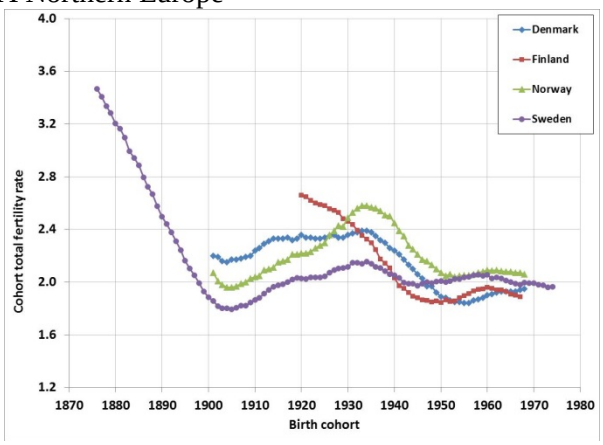
D Overseas English-speaking countries



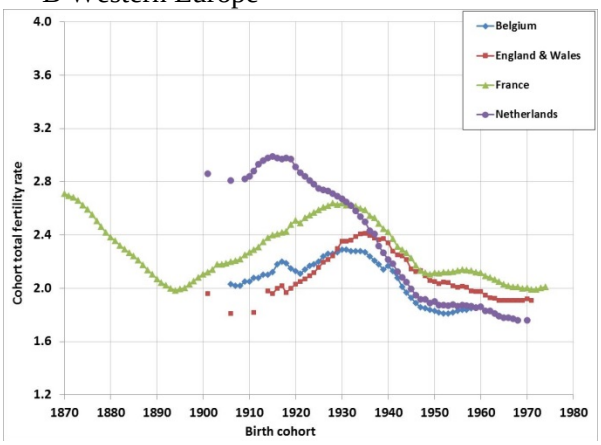
Source: Festy 1979: 58-65

Figure 2: Cohort total fertility rates, selected countries, Northern, Western, Southern Europe, German-speaking countries, Overseas English-speaking countries, birth cohorts 1870-1968, projections 1969-1979

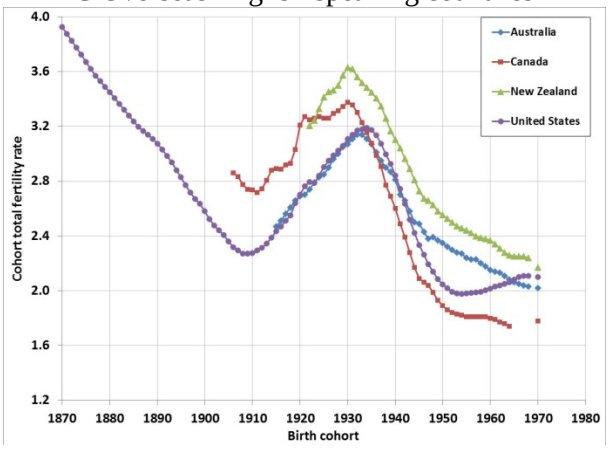
A Northern Europe



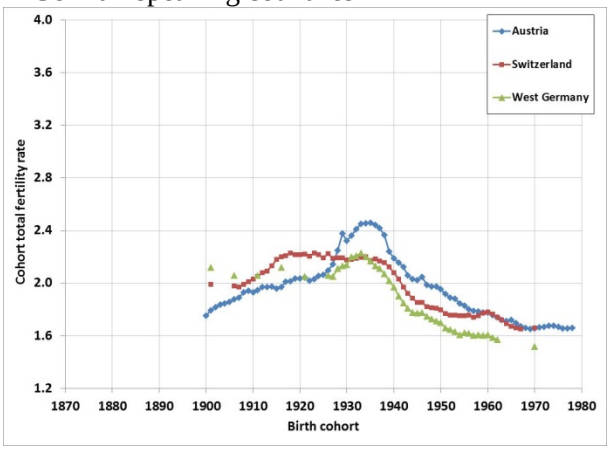
B Western Europe



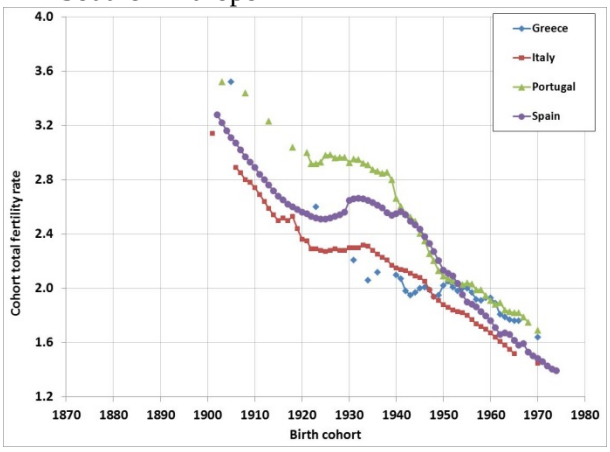
C Overseas English-speaking countries



D German-speaking countries



E Southern Europe



Sources: Hamilton and Cosgrove 2010 and 2012; Heuser 1976; Human Fertility Database; Myrskylä et al. 2013; ODE 2012; Sardon 1991; Sobotka, 2016a

5.3. Central and Eastern Europe (CEE)

Considerably fewer cohort fertility data are available for Central and Eastern Europe.

For the 19th and early 20th centuries data are available for Russian, Czech and Slovak women (Figure 3). Zakharov (2008:910 and 955, and personal communication 2016) assembled cohort total fertility rates for Russia starting with the 1841 birth cohort with projections for cohorts born in the late 1960s and the 1970s (Figure 3, Panels C and D[6]). For a considerable part of the 19th century, i.e. for the women born between 1840 and 1880, CTFRs were around seven births per woman (Figure 3, Panel C). In Russia fertility started to decline among women born around 1880, however the CTFR was still above four births per woman among those born early in the 20th century, considerably higher than in West European populations (Figure 3, Panels C and D).

The trends in cohort total fertility rates vaguely resembled those of Western countries among Slovak and certainly among Czech women. For instance, the CTFR trends of Czech and Swedish women of the birth cohorts of the 1870s through those of the 1910s were close to each other. The Swedish 1880 CTFR = 3.2, the Czech 1880 CTFR = 3.1 births per woman; both declined to approximately 1.8 for the 1902 CTFR and thereafter increased moderately; Sweden's 1915 CTFR = 2.0, the Czech 1915 CTFR = 2.2 births per woman[7].

Starting with women born in the late 1920s and the 1930s through those born in the 1950s, i.e. those bearing children predominantly during the state-socialist period, CTFR trends in Central and Eastern Europe differed substantially from Western countries (Figure 3). CTFR trends were relatively stable proceeding in a quite narrow band around two births per woman (Frejka 2008b; Sobotka 2004, 2011; Frejka and Gietel-Basten 2016).

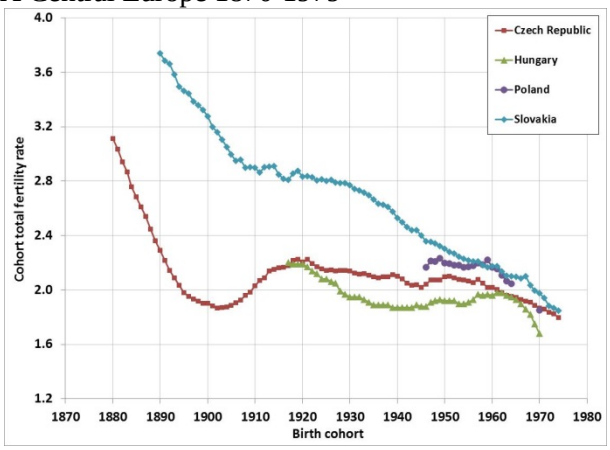
Cohort total fertility rates throughout CEE started to decline with women born around 1960 (Figure 3). This was apparently engendered by the collapse of the state socialist systems and the onset of the transition to contemporary capitalism (Frejka 2008b; Sobotka 2004, 2011; Frejka and Gietel-Basten 2016). Thus far, CTFRs of the late 1960s and the 1970s birth cohorts center around 1.6 births per woman (Figure 3).

[6] In Figure 3, Panel D, the vertical and horizontal scales are identical to all other graphs, but different scales are used in Panel C to show the levels of the CTFRs in Russia for cohorts born in the 19th and early 20th centuries.

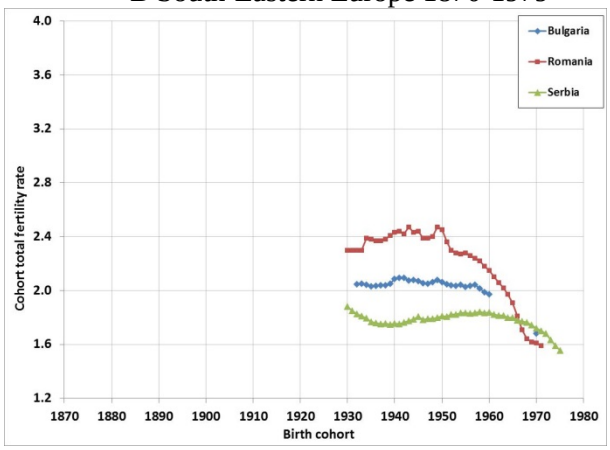
[7] Differences between crude birth rates (CBRs) for Czech and Russian women provide additional justification for believing Czech fertility during the 19th century resembled West European patterns. The Czech CBR declined from 43 births per thousand inhabitants around 1800 to 35 around 1900. Russia's CBR was around 50 births per thousand inhabitants throughout the second half of the 19th century (Pavlík 1964:94 and 134).

Figure 3: Cohort total fertility rates, selected countries, Central, South Eastern, Eastern Europe, Baltic countries, birth cohorts 1870-1968, projections 1969-1979

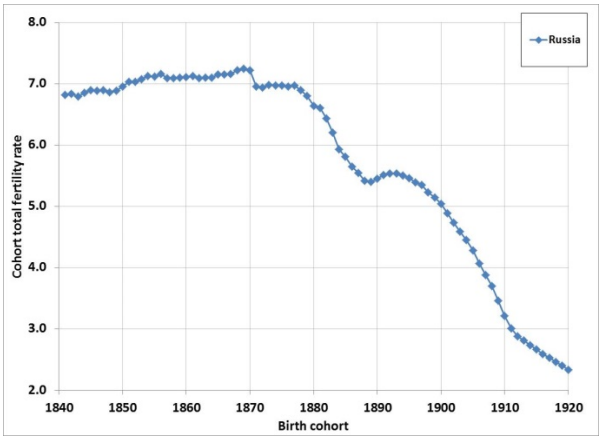
A Central Europe 1870-1979



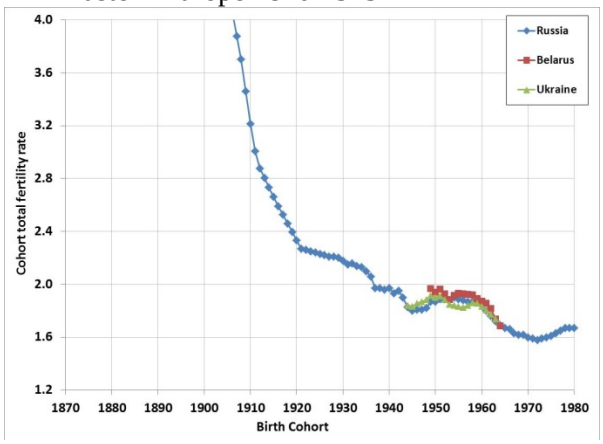
B South-Eastern Europe 1870-1979



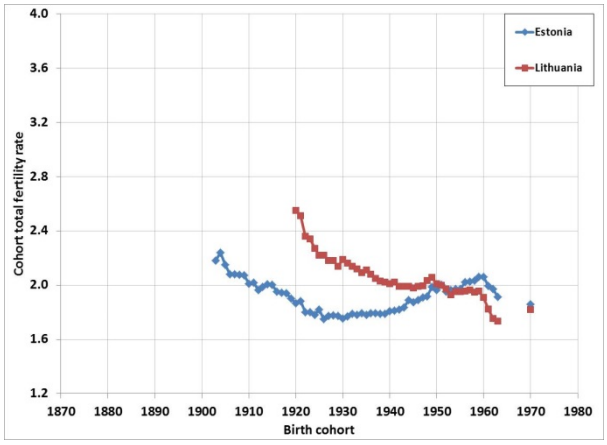
C Russia **1840-1920**



D Eastern Europe 1870-1979

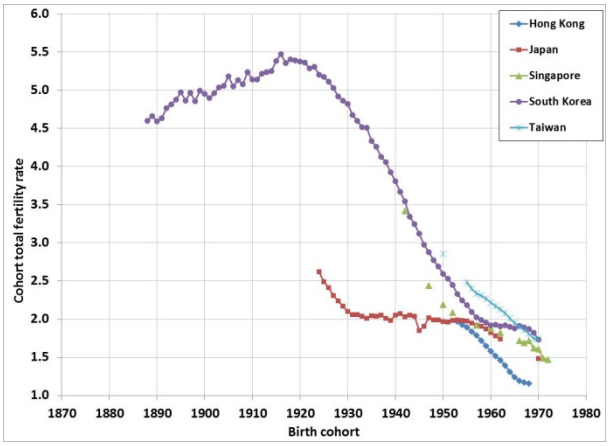


E Baltic countries



Sources: Human Fertility Database; Puur 2016; Myrskylä et al. 2013; Sobotka 2016; Stankuniene 2016; Spéder 2016; Zakharov 2016

Figure 4: Cohort total fertility rates, selected countries, East and South-East Asia, birth cohorts 1870-1968, projections 1969-1979



Sources: Frejka et al 2010; Myrskylä et al. 2013; Zeman 2016

5.4. East and South-East Asia

Judging from the relatively sparse cohort fertility data available for East and South-East Asia it appears that the fertility transition got under way in the middle of the 20th century with birth cohorts of the 1920s (Frejka et al. 2010; Figure 4). It must have started earlier in Japan, but CTFRs of older generations are not available for any meaningful analysis.

It is obvious that a steep cohort fertility decline was occurring among women born during the 1940s and beyond, i.e. in the last two to three decades of the 20th and in the early 21st century.

5.5. Global overview

Using completed *cohort* fertility rates I have identified four types of fertility transition patterns during the late 19th and the 20th centuries (Figure 5). Figure 6 illustrates these four fertility transition patterns in a stylized form.

- The ***"Western" fertility transition*** distinguishes itself with fertility fluctuations (Figures 1 and 2, Figure 5, panel A and Figure 6). A steep CTFR decline starting among cohorts born in the middle of the 19th century to a low among women born early in the 20th century of around 1.9 births per woman which was followed by a notable increase to cohorts born in the early to mid-1930s. Next came a noticeable decline among the late 1930s and the 1940s birth cohorts which resulted in a band of 1.8 to 2.1 births per woman among early 1950s birth cohorts. Subsequently fertility has been reasonably stable among the late 1950s and 1960s cohorts, with an ever so slight tendency towards further declines.

- Hardly any cohort fertility data are available for ***Central and Eastern Europe*** for women born in the 19th and early in the 20th centuries (Figure 3, Figure 5, panel B). A wealth of cohort fertility data has, however, become available for women born in the 1920s and for subsequent birth cohorts. Fertility among the 1930s to the 1950s birth cohorts has coalesced in a band between 1.8

and 2.0 births per woman. In virtually all the populations of Central and Eastern Europe a pronounced CTFR decline began with women born around 1960. It appears that the CTFRs in all CEE populations of women born in the early1970s will be at 1.8 births per woman or lower (Figure 3, Figure 5, panel B and Figure 6).

- A cohort fertility decline from about five births per woman started in ***Southern Europe*** towards the end of the 19th century (Figure 1, panel C). This CTFR decline has continued ever since, albeit with a mild pause among the 1920s and 1930s birth cohorts (Figure 5, panel C). Completed cohort fertility of between 1.4-1.7 births per woman among those born during the late 1960s and early 1970s was still declining (Figure 5, panel C and Figure 6).

- The known cohort fertility data for South Korea indicate that CTFRs in ***East and South-East Asia*** did not start to decline before the middle of the 20th century with women born in the 1920s (Figure 4 and Figure 5, panel D). The CTFR trends of the other populations for the 1940s and 1950s birth cohorts reinforce this assumption. Japan constitutes an exception; there the cohort fertility transition must have been under way earlier. Throughout East and South-East Asia the 1950s and 1960s CTFRs were declining rapidly. Women completing their childbearing early in the 21st century are winding up with CTFRs below 1.6 births per woman, in particular in Hong Kong where the late 1960s CTFRs are around 1.2 births per woman (Figure 4, Figure5 panel D and Figure 6).

Overall, in the majority of low-fertility countries CTFRs were at their lowest levels ever among women born in the late 1960s and early 1970s. Such was the case in Central and Eastern Europe (CTFRs = 1.6-1.8 births per woman), in Southern Europe (CTFRs = 1.4-1.7 births per woman), and in East and South East Asia (CTFRs = 1.2-1.6 births per woman). In the "Western" populations the 1960s CTFRs were comparable to those of the 1900s. They were relatively stable at between 1.8 and 2.0 births per woman in the 1950s and 1960s cohorts, with the exception of the German-speaking countries, where CTFRs were around 1.7 births per woman.

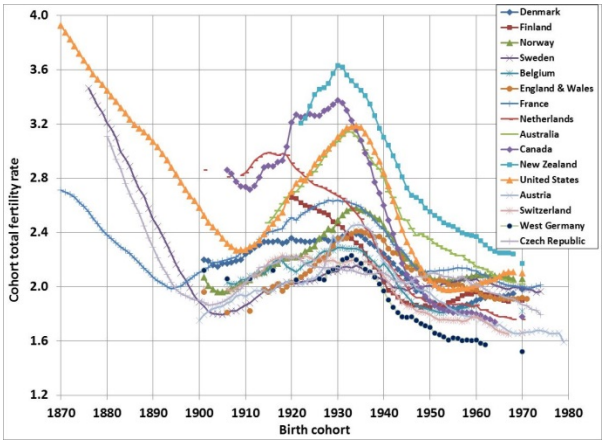
In sum, the range of cohort total fertility rates among women born in the late 1960s and early 1970s in the populations with available cohort fertility data of Europe, the overseas populations of European origin and East and South-East Asia was between 1.2 and 2.0 births per woman. There were three populations with CTFRs of the 1968 cohort above this range: Norway = 2.06, United States = 2.11 and New Zealand = 2.24 births per woman.

Stylized illustrations of the four types of fertility transitions are outlined in Figure 6. The time frame starts in 1870 and at a value of four births per woman because for most European countries trends of cohort TFRs prior to that date were generally flat between 4 and 5 births per woman (Cf. sections 5.1 - 5.3). A comparison of Figure 5 with Figure 6 shows that the actual CTFR curves for individual countries evolved in bands around the stylized depictions of the four types.

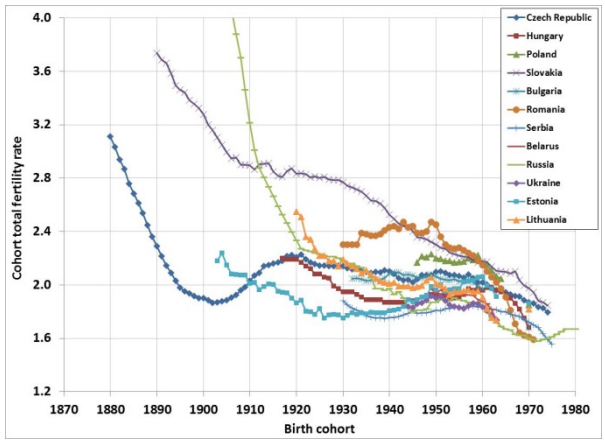
Figure 6 illustrates that significant fertility declines in developed countries started among cohorts born late in the 19th century. It also indicates that fertility transitions in developing countries, represented by the South and South-East Asia type, started about half a century later and are proceeding at a much faster rate of decline than in the advanced countries as first observed they would by D. Kirk (1971).

Figure 5: Cohort total fertility rates, selected countries, "Western" populations, Central and East European populations, South European populations, East and South-East Asia populations, birth cohorts 1870-1968, projections 1969-1979

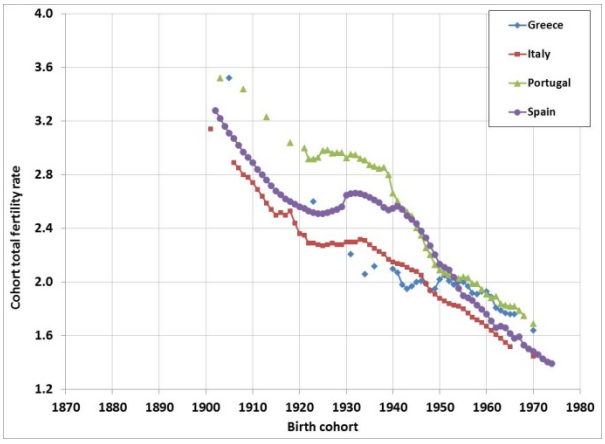
A "Western" populations



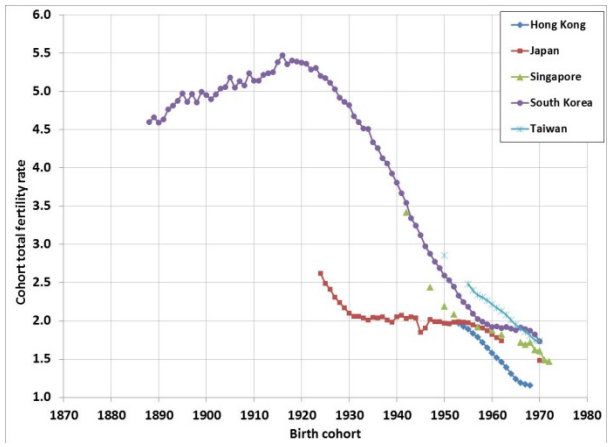
B Central and East European populations



C South European populations

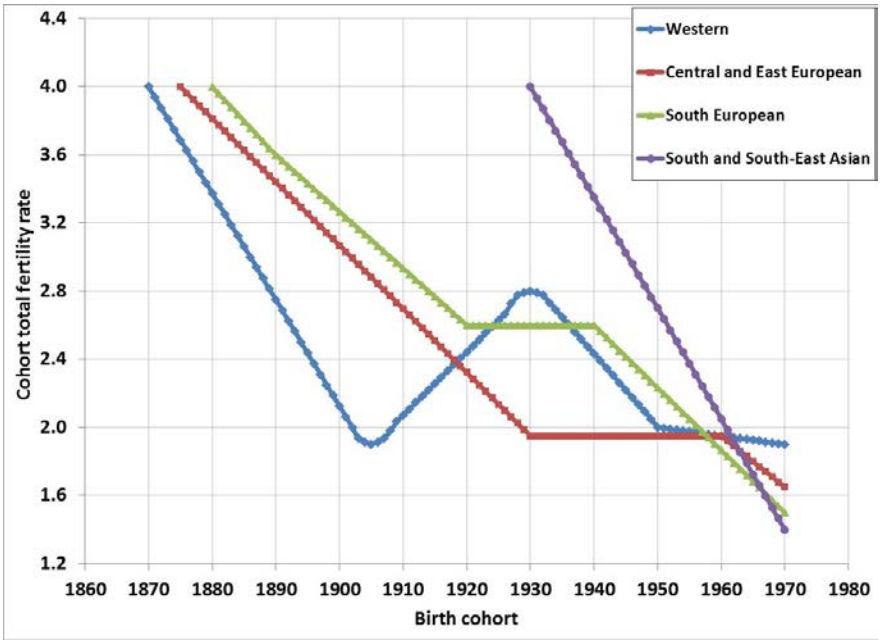


D East and South-East Asia populations



Sources: Same as in Figures 1-4.

Figure 6: Stylized types of fertility transitions, cohort total fertility rates, "Western" populations, Central and East European populations, South European populations, East and South-East Asia populations, birth cohorts 1870-1970



6. Societal conditions shaping mortality and fertility trends of the 19th and 20th centuries

As discussed above in sections 1 and 2, Notestein (1945 and 1953) formulated the theory of the demographic transition based on the premise that mortality and fertility trends are shaped by "technological, social, economic, and political developments." Subsequent research revealed that cultural and ideational effects may be of comparable importance[8] (Coale 1973, Lesthaeghe & van de Kaa 1986; Lesthaeghe 2010). It is in this vein that I shall proceed to discuss the societal conditions shaping mortality and fertility trends of the late 19th and 20th centuries.

6.1. Mortality trends

The continuous mortality decline and rise in life expectancy is based on advances in medicine and public health which in turn were and are enabled by social and economic development and by long-term improvements in living conditions (Frenk et al. 1991, Meslé and Vallin 2006, Oeppen and Vaupel 2002, Shkolnikov et al. 2011). This extremely brief statement is sufficient because the societal conditions of the mortality decline are superbly described and analyzed in great detail in the cited literature and in other publications.

6.2. Fertility trends: "Western" populations

Economic, social, political and policy, as well as many other effects were instrumental in shaping the main fertility fluctuations in Western populations (Figures 2 and 5, panel A).

[8] Notestein also reminded us that "it is impossible to be precise about the various causal factors."

6.2.1. The Great Depression: The principal cause of low completed cohort fertility of women born in the 1900s

In at least nine of the 16 populations for which data are available, CTFRs bottomed out among women born in the 1900s with values of 1.8 – 2.0 births per woman, i.e. considerably below the replacement level given the mortality conditions of that time (Figure 2, panels A – D, and Figure 5, panel A). In Europe as well as in the United States, the Great Depression of the late 1920s and the 1930s was identified as the principal cause of this fertility nadir.

In his recently published book, *Labor's Love lost: The Rise and Fall of the Working-Class Family in America,* Cherlin (2014) describes in great detail changes in American family life over the past two centuries. He characterizes "the Great Depression [as] a cataclysmic event in the United States in its depth and duration" (Cherlin 2014:60). Based on contemporary sociological research of Komarovsky (1940), Cherlin discusses the effect of the Depression on reproductive behavior.

> Their sex lives often deteriorated: in twenty-two out of thirty-eight families for which adequate information was collected, the frequency of sexual relations declined--including four families in which sex stopped altogether. In some cases, however, couples reduced sexual activity not because of emotional strain but in order to lower the chance that the wife would become pregnant. Without modern means of birth control such as the pill or the IUD, financially struggling couples did what they could to avoid having another mouth to feed. One parent said, "It is a crime for children to be born when the parents haven't got enough money to have them properly." (Cherlin 2014:79).

Hobcraft and Kiernan (1995:53-54) observed that

> the key element in understanding the low rates of entry into parenthood in several European countries during the 1930s is that times were hard. The prolonged economic depression, with insecurity of employment and often difficulties in obtaining adequate housing, was a critical factor. The insecurities involved in becoming a parent during the 1930s were of course much greater then today, owing to the poor development of the welfare state as a means of ameliorating and smoothing the costs and chance variations in the prolonged process of childrearing. … The low levels of entry into childhood through successful postponement (of conception) of the 1930s are all the more remarkable in the context of the relatively ineffective methods of fertility control available at that time. There must have been many more couples than those who succeeded in avoiding entry into parenthood who experienced accidental pregnancies through inability to control fertility.

6.2.2. Mid-20th century prosperity: The principal cause of high completed cohort fertility of women born in the 1930s

Relatively high childbearing is understandable in light of Cherlin's (2014:115) characterization of the living conditions of American families in the post-World War II years.

> Why did young couples have so many children? One reason lay in the unique life histories of the generation who were in their twenties and thirties. They experienced the Great Depression as children or adolescents and then a world war erupted as they reached adulthood. After enduring these two cataclysmic events, the "great generation," as they are sometimes called, was pleased in peacetime to turn inward toward home and family. ….. Family life was the domain in which they found … security. Raising children provided a sense of purpose to adults who had seen how fragile the social world could be. … Moreover, conditions were favorable for family formation and fertility: unemployment rates were low, wages were rising, and the government had enacted the GI Bill, which offered low-interest home mortgage loans to veterans so that they could buy single-family homes. …. Employers in the rapidly expanding American economy were forced to offer higher wages in order to attract new workers because they were in short supply.

Hobcraft and Kiernan (1995:55-56) portrayed the favorable conditions for family formation and childbearing created by healthy economies and by family policies in the middle of the 20th century in Europe as follows.

> The modern welfare state was established predominantly in the period following the 1939-45 War. This clearly changed the costs of childbearing in substantial ways. The costs of education, health, and welfare of children were

increasingly covered by the state rather than directly by the parents themselves. The provision of a security blanket also considerably reduced the uncertainties surrounding the future ability to provide for children. The 1950s and 1960s were also a period of unprecedented economic growth and real wages increased substantially. The advent of Keynesian macroeconomic policies appeared to have created an era of sustained permanent employment, thereby adding to the anticipated security for parenthood. Moreover, the massive construction of housing following the War ultimately improved quality and access. In the realm of ideas, we would see the widespread continuation of compulsory conscription for males as breaking the nexus of home attachment to their families of origin. This almost certainly played a part in accelerating the establishment of independent living, which usually involved marriage. In turn, this contributed to earlier entry into parenthood.

As demonstrated in section 5, even though there were striking similarities in the fertility trends among countries of the Western type of the fertility transition there was also a significant amount of diversity and variation (Cf. Figures 2 and 5). An analysis by Van Bavel and Reher (2013) of the diversity in the timing, length, magnitude and volume of the baby boom led them to conclude that the conventional explanations appear to be only a limited part of the story. They argue that other demographic and policy factors than the enhanced wellbeing and enlightened policies outlined above might have been instrumental in generating the baby boom, such as a rise in nuptiality, the role played by cultural factors like political and family attitudes and religion, and the possible influence of pronatalist policies.

6.2.3. The complexities surrounding childbearing and family life: The milieu determining low fertility of the 1950s-1970s birth cohorts

In most of the "Western" countries the CTFRs for women born during the 1950s and 1960s were very close to two births per woman. In the historical context of the second half of the 20th century this was a low level for these countries. Nonetheless, this was close to the replacement level. And it was higher than in any of the other regions, the South European, the Central and East European, and the East and South-East Asian populations.

There is an extraordinary wealth of literature dealing with the economic, social, political, policy, cultural, gender relations, normative, attitudinal and assorted other conditions influencing recent and contemporary childbearing and family life (*inter alia*, Bianchi et al. 2006, Frejka et al. eds. 2008, Goldscheider et al. 2015, Kreyenfeld & Konietzka 2016, Lesthaeghe 2010, McDonald 2002 and 2006, McDonald & Moyle 2011, Myrskylä et al. 2013, Neyer 2003, Rindfuss & Choe 2015 and 2016, Sobotka 2004, Sobotka and Beaujouan 2014, Stock et al. eds. 2013, Thévenon 2011).

This literature points to and discusses the numerous circumstances which shaped "Western" childbearing levels. A prominent development of the time was that increasing numbers of women were entering the public sphere. Not only were they working, they were the principal managers of the household, they were taking care of most of childrearing in addition to childbearing. Even though the second part of the gender revolution (men increasingly getting involved with household and childrearing responsibilities), was progressing, the burdens and pressures women were subjected to were apparently having a dampening effect on childbearing.

Although many other circumstances, such as employment insecurity, working conditions, and the need for education and training, etc., were having their effect of fertility, it is the gender revolution that has ecently attracted special attention. Three prominent papers (Esping-Andersen and Billari 2015; Goldscheider et al. 2015; Anderson and Kohler 2015) have focused on this issue. In all of these a reversal of fertility trends, an increase, as a result of the progress in the gender revolution is considered imminent.

Esping-Andersen and Billari "posit a return to 'more family' as gender egalitarianism gains increasingly dominant normative status" (2015:3). Underlying 'more family,' *inter alia*, is a reversal of fertility trends and a "stabilization of the quantum of childbearing" (2015:2). Goldscheider et al. are very careful in their

formulations regarding the relationship between the ongoing gender revolution and fertility. Specifically, "there is growing evidence that men's increasing involvement in homemaking and childcare may potentially increase fertility" (2015:222). And "this approach, which assumes that committed partner and parental relationships are indeed important to most people further implies that men's increased involvement in the home, the second half of the gender revolution, has the promise of increasing both fertility and ….." (2015:229). A number of references listed by Goldscheider et al. indicate an implicit conclusion that a fertility reversal and turnaround (meaning increase) is under way in countries where the gender revolution is advanced. Skepticism is justified regarding such conclusions because the analysis in the above sections as well as data from additional research (Frejka et al. 2016a and 2016b) document that thus far there is no evidence of a fertility reversal in developed countries.

A central conclusion of the Anderson and Kohler (2015) paper is a new portrayal of the "stylized demographic transition extended to show [a] gender equity catch-up" illustrated by a turnaround in the birth rate in Figure 4 on page 394, and ultimately the death rate and the birth rate equal each other resulting in an equilibrium. This depiction appears to be misleading on several counts.

In the first place, the Anderson/Kohler Figure 4 implies that there is only a single pathway or pattern of the fertility transition, whereas the present paper demonstrates that to date there have been four such patterns and that there might be more in the future. The dip in the early 20th century cohort TFRs occurred only in the "Western" fertility transition pattern, but Anderson and Kohler consider it a universal component of the fertility transition in all countries. Secondly, the fertility nadir experienced by women born early in the 20th century in Northern and Western Europe, and in the overseas countries with population mostly of European origin, was mainly caused by the dire economic and social conditions during the Great Depression of the 1930s. Thus to label this fertility depression a "gender equity catch-up" is questionable. Thirdly, the Anderson/Kohler Figure 4 implies that towards the end of the demographic transition (end of their phase 5 and in phase 6) mortality and fertility stabilize in a balanced equilibrium in which these rates equal each other. Section 4 above summarizing existing literature demonstrates that life expectancy has been increasing throughout the 20th century and there is a consensus that mortality will continue to decline for several decades to come. And the future of fertility trends is unclear with a declining tendency up to the present time. In sum, no low mortality and low fertility equilibrium has yet materialized.

6.3. Fertility trends: South European populations

The fundamental reasons why fertility in Southern Europe is so low are analogous to those in the "Western" populations. There are however circumstances powerfully depressing childbearing, and reinforcing the burdens and pressures women are subjected to in Southern Europe (Delgado et al. 2008, De Rose et al. 2008, Rindfuss & Choe 2016). Prominent among them were the following.

- These societies have been intensely patriarchal. Even though gender inequalities have been weakening during the recent past, they continue to operate, especially in the family. According to De Rose et al. (2008: 687-688):

  > In Italy during the last 40 years, the public gender system changed in an even sense: Women now have access to any profession, they achieve a higher educational level than men, and, when employed, they work almost as hard as men, especially before entering motherhood. At the same time, however, the couple's sharing of housework is heavily unbalanced – not only when the woman is a housewife (in the traditional logic of 'job sharing'), but even when she works full-time. Women need to and want to work in order to avoid an income reduction as well as a loss of role and identity. At the same time, spending long hours on household chores, without any significant help from the husband, contributes to making low fertility more than a choice.

- Many facets of the labor market tend to have a depressing impact on childbearing. In general, unemployment is high, particularly young adult unemployment; work hours tend to be long; those who are employed are significantly protected making it difficult for them to be fired and, at the same time, there is scant room for hiring new, young employees; many employees have inferior working conditions with few protections and benefits; there are few possibilities for part-time work.

- High housing costs are making it difficult for young people to buy a flat or a house.

- The persistence of strong ties between parents and children, although apparently counterintuitive, helps to maintain the gap between desired and actual fertility.

> Parents invest a lot in their (only) child and a very high cost-value is attributed to these children, which in Italy is shouldered entirely by the family. Not having a second or third child seems to be resulting from the fear of lowering the child's quality of life, who is highly protected by its parents. Moreover, as the children's prospects of social mobility have been low or nonexistent for a long time, Italian families show little enthusiasm to push their children 'out of the family nest' (De Rose et al. 2008: 690).

6.4. Fertility trends: Central and East European populations

During the 19th and early 20th centuries, the cluster of the "usual suspects" of social, economic, political, cultural etc. conditions shaped fertility trends in Central and East European populations. The few populations – Czech, Slovak, Russian and Estonian – for which trend curves are available attest to that. The Czech example is particularly interesting; the dip in the cohort total fertility rate trend below two births per woman from the 1895 to the 1909 birth cohorts is a clear case of the impact of the Great Depression on childbearing behavior (Figures 3 and 5, panel B).

After the Second World War political and policy circumstances overwhelmingly affected other societal conditions and engendered the relatively stable fertility trends in the Central and East European populations (Figures 3 and 5, panel B). In the words of Frejka and Gietel-Basten (2016:9):

> Three mutually reinforcing factors -- the technologically lagging and labor intensive inefficient socialist economies which generated a continuous demand for labor; a pro-natalist ideology and policies; and the authoritarian political system restricting personal freedom -- created conditions which were generally conducive for early and universal childbearing. These conditions included job security, low-cost housing, free education, free health care, various entitlements associated with child birth and childrearing, as well as limited career opportunities and leisure activities. The citizenry of the state socialist countries had grown accustomed to a relatively stable and predictable existence, although standard living conditions were worse than in Western countries, and there were numerous disturbing concomitants to this lifestyle, such as curtailed civil liberties and shortages of everyday and long-lasting consumer goods (Frejka 2008, Sobotka 2004 and 2011).

Frejka and Gietel-Basten (2016:10) summarized the rather unique setting since the collapse of state socialism around 1990 as follows:

> Mutually reinforcing features of the transition to contemporary capitalism -- the quest for maximizing profits and productivity, the employment of advanced increasingly complex technologies, competitive labor markets, a propensity for a low priority for social obligations towards workers and society, as well as the spread of modern contraceptives – created considerably more restraining conditions for childbearing. These included job and income insecurity, an increasing pressure to acquire more education, expensive housing, lesser and declining birth and childrearing entitlements, increased uncertainty of spousal relationships as well as expanded personal freedom, the availability of a variety of career opportunities, consumption attractions and leisure activities. All of a sudden, people were exposed to societal conditions which made it more difficult to earn a living, more demanding to reconcile the family-work conflict, and under which various costs previously borne by the paternalistic state became the responsibility of individuals and families (Frejka 2008, Sobotka 2011). All told, the balance shifted from circumstances generally encouraging early marriage and childbearing with a distinct propensity for a two-child family, to circumstances postponing union

formation and childbearing as well as inhibiting family size. The propensity for two-child families started to weaken, shares of one-child families increased everywhere and even became the most prevalent in the Russian Federation and Ukraine.

6.5. Fertility trends: East and South-East Asian populations

The outstanding idiosyncrasy of the conditions influencing fertility in East and South-East Asia is the fact that modern economic and social development started as late as in the middle of the 20th century. Once it did get under way it progressed at an unusually fast pace. Their economies grew at rates in excess of seven per cent per year between the early 1960s and the 1990s. Four of these countries -- Hong Kong, Singapore, South Korea, and Taiwan – deservedly earned the epithet *The Four Asian Tigers*. Japan's economic development got under way much earlier, in the 1860s, and then during the 1920s. Nonetheless, thanks to its post-World War Two economic miracle Japan became the world's second largest economy. Apparently the economic advances were accompanied by other societal developments, including significant declines in mortality and fertility (Figures 4 and 5, panel D).

Social and economic factors depressing fertility in East and South-East Asia might have been more forceful than elsewhere explaining the rapid fertility decline of the past half century resulting in the very low cohort fertility rates of the generations born in the 1960s and early1970s (Frejka et al. 2010, Jones et al. 2009, Rindfuss and Choe eds. 2015 and 2016).

> The economies generated a robust demand for labor and single as well as married young women were eager to satisfy this demand. Large proportions of women acquired an advanced education and joined the labor force. At the same time, patriarchal gender relationships which dominated family life for centuries hardly changed at all. As a rule, men do not participate in housekeeping activities and leave most of the raising of children to their wives. Women are expected not only to run the household, and bear and raise children, but frequently are also expected to care for the elderly. Employers are focused on production and profits. Providing family-friendly work conditions for women is beyond their horizon. Consequently, many women are delaying marriage and childbearing. Social conditions have not kept pace with changing economic realities (Frejka et al. 2010: 602).

7. Summary and conclusions

A. Extensive research has revealed that since the last third of the 19th century cohort and period mortality has declined continuously, and "best-performance life expectancy" has increased. Furthermore, through the mid-21st century mortality is reliably projected to decline further, and life expectancy to increase.

B. Available cohort fertility data for the 19th and 20th centuries of 36 populations in Europe, in the overseas populations of European origin, and in East and South-East Asia have been assembled for this study. The analysis of these data has yielded the following principal findings.

   The analysis of the cohort total fertility rates to date specifies four types of fertility transition patterns during the late 19th and the 20th centuries. When sufficient data will be available for other populations another type of fertility transition might present itself.

   - The ***"Western" fertility transition pattern*** distinguishes itself with major fluctuations. The birth cohorts of the mid-19th century experienced CTFRs around 4-5 births per woman, which declined to a nadir of ±2 births per woman among the early 20th century cohorts. The 1920s and early 1930s CTFRs then increased to a broad range of 2.1-3.6 births per woman followed by another decline to 1.8-2.2 births per woman in the 1950s and 1960s cohorts which remained fairly stable albeit with a moderate propensity to further decline.

- The ***Central and East European fertility transition pattern*** is characterized by a CTFR decline among late 19th century cohorts to a stable band between 1.7-2.2 births per woman in the 1920s to 1950s birth cohorts followed by a CTFR decline to 1.6-1.8 in the 1960s and early 1970s cohorts.

- The ***Southern European fertility transition pattern*** is characterized by a relatively stable CTFR decline from 5 births per woman interrupted by an indistinct plateau among the 1920s – 1930s cohorts all the way to CTFRs of 1.4-1.7 births per woman in the late 1960s and early 1970s cohorts.

- The ***East and South-East Asia fertility transition pattern*** is characterized by starting as late as in the middle of the 20th with rapidly declining CTFRs from about 5 births per woman in the 1920s birth cohorts and reaching CTFRs equal to 1.2-1.6 births per woman in the late 1960s and early 1970s cohorts.

C. In all four fertility transition patterns a majority of cohort total fertility rates were below replacement in the 1960s and early 1970s birth cohorts, and did not indicate a propensity to increase. There were some exceptions, namely Norway, New Zealand and the United States. In some populations CTFRs were close to replacement, i.e. England & Wales, France, Australia, the Czech Republic, Denmark, and Sweden. All in all, the highest CTFRs were found in "Western" populations, the lowest in East and South-East Asia.

D. The exploration of societal conditions shaping mortality and fertility trends of the 19th and 20th centuries confirm Notestein's conclusions that it is a complex combination of "technological, social, economic, and political developments" as well as cultural and ideational effects which shape mortality and fertility trends and that it is "impossible to be precise about the various causal factors." At times the primary factors were economic, such as the Great Depression of the 1930s or the post-war prosperity of the 1960s in Western countries, however these economic factors had numerous political, cultural, policy and other facets that were also important in shaping fertility trends. In other settings the primary factors were the political system and social policies, namely in the era of state socialism in Central and Eastern Europe. In other settings the patriarchal nature of societies were the prime factor shaping fertility trends, namely in Southern Europe and in East and South-East Asia, but again many other factors were in play.

E. Last but arguably of significant importance, thus far the demographic transition has not led to an equilibrium of relatively stable low mortality and stable low fertility. Mortality is continuing to decline steadily and fertility trends are in a flux with unclear prospects. Alternatively, a consensus might be reached by the profession that the contemporary state of low mortality extending into the post-reproduction ages for women and men, and the varied low fertility in the countries included in this study, could be considered as the *posttransition regime of low mortality and low fertility equilibrium.*

The principal finding based on cohort fertility data analysis in this study is the reality that to date there have been four different pathways of fertility decline. These four fertility transition patterns were apparently generated by fundamental differences in conditions of social, economic, political, cultural and ideational developments in societies that already have relatively low mortality and fertility. This study can be considered complementary to the findings based primarily on period fertility data of Basten et al. (2014:39-146) in the volume by Lutz et al. (2014) on *World Population and Human Capital in the Twenty-First Century* which demonstrated the importance of many different factors shaping fertility and furthermore concluded that "…the locus of low fertility is increasingly moving away from 'Old Europe'

and towards the rapidly developing economies of East Asia, Latin America, and the Middle East" and that "… a global convergence of fertility around replacement level appears unlikely."

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