The post-recession fertility puzzle: fertility declines, cross-overs and convergence after the "Great Recession"

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Extended Abstract

Background: Recent fertility declines and reversals (2008-18)

In line with historical evidence, fertility rates across the highly developed countries stagnated or declined during the "Great Recession" around 2008-2012 (Goldstein et al. 2013; Schneider 2015; Comolli 2017; Matysiak et al. 2018; Comolli et al. 2019). However, the post-recession period of economic recovery since 2013 has not brought about any tangible recovery in period fertility rates in most of the low-fertility countries. Rather, fertility map in low-fertility countries has been redrawn, with the period fertility rates becoming less differentiated between countries and regions. This development, if extended in the future, seemingly challenges some of the major narratives and explanations of recent cross-country differences in fertility.

Especially the group of countries with initially "moderate" fertility levels (i.e., with period total fertility rates, TFR, close to or around 2 births per woman) experienced sustained fertility declines in in 2013-2018 (Figure 1). As a result, period TFRs have fallen substantially in countries in Northern and Western Europe, North America, Australia and New Zealand, which ranked as the highest-fertility countries in the developed world around 2010. In Australia, Iceland, Ireland, United States, New Zealand, Finland and Norway, the TFR fell by 0.3-0.5 in absolute terms since peaking in 2007-10, reaching historically low levels. In New Zealand, the TFR fell from 2.19 in 2008 to 1.71 in 2018; an almost identical decline was observed in Iceland.

In contrast, some countries with low or very low fertility rates, especially in Central and Eastern Europe, but also Austria, Germany and Switzerland, experienced stable or increasing period fertility rates during the last decade. In Germany, period TFR recovered to 1.59 in 2016, the highest level recorded since 1972. During the 2010s, period total fertility in Belarus, Bulgaria, Czechia, Russia, Slovenia, and Ukraine and the three Baltic countries recovered to the levels of 1.5-1.8, well above the lows around 1.1-1.3 seen in the late 1990s and early 2000s (Figure 1). At the same time, fertility rates remained unstable in the region, with sizeable dips in Belarus, Russia and Ukraine reported since 2015. In contrast, period fertility rates remained very low in Southern Europe and they plummeted further to extreme low levels in several countries and regions in East and South-East Asia: in 2018, period TFR in Hong Kong, Taiwan and Singapore was down to 1.1, while it fell to 0.98 in South Korea, a lowest level globally.

Period fertility declines in the 2010s went hand in hand with a further shift to delayed family formation. Almost all countries with a declining TFR saw a continuous, and often accelerating postponement of first birth. Fertility rates fell fastest among young women below age 25, even in countries where early fertility had remained relatively high until the 2000s. Impressive fertility

declines took place after 2007 among teenage women in English-speaking countries—Australia, Canada, Ireland, New Zealand, United Kingdom and the United States. Except in Australia, their fertility plummeted by 2018 to less than a half of its 2008 level. This continuous fall in early childbearing has brought to an end the exceptionally high teenage fertility rates in New Zealand, United Kingdom and the United States (Figure 2). The shift in childbearing to later reproductive ages continued across all low-fertility regions. In South Korea the mean age at first birth among mothers reached 31.9 years in 2018 (KOSIS 2019); in Singapore, Japan, Hong Kong, Taiwan and several European countries including Italy, Netherlands, Spain and Switzerland, the mean age of first-time mothers surpassed 30. This development contrasted with a broader expectation among demographers that the shift to delayed parenthood should slow down and period fertility rates recover once the economic recession ended (e.g., Goldstein et al. 2009).

In sum, post-recession period fertility trends have been marked by protracted fertility declines and sustained postponement of first births in many highly developed countries, especially in those with initially higher fertility. This trend resulted in a broader convergence in period TFRs, illustrated for 31 European countries in Figure 3: the gap between the lower (25%) and upper (75%) quartiles of the TFR distribution narrowed rapidly. Many countries now have a TFR level in the range between 1.50 and 1.75 (Figure 4), with only one larger country, France, reporting a higher TFR level.[1] This clearly contrasts with the patterns observed a decade ago. In 2008, five highly developed countries (United States, New Zealand, Iceland, Ireland, and Australia) had a TFR above 2 and the top ten countries had a TFR between 1.89 and 2.19. By 2018, the highest ranking country, France, had a TFR below that range (1.87) and the next, Ireland, reached a TFR of 1.75 (Figure 5).[2] It is remarkable how quickly the group of countries with near-replacement level TFRs vanished and how uniformly the TFR fell in most of them, typically to levels around 1.7-1.75 in 2018 (Figure 6).

This trend has not only changed the fertility rankings in the analysed countries, but also resulted in curious cross-overs in fertility rates in countries and regions which used to be set wide apart in their fertility levels. For instance, by 2018 the TFR in “higher-fertility” Finland and Norway plummeted below the TFRs in Czechia, Germany and Russia that had recorded very low fertility rates 10-15 years ago. More important, the new fertility map has eroded, at least temporarily, the widely discussed “bifurcation” in low-fertility world between countries with moderately high fertility rates and those with very low fertility (e.g., McDonald 2006; Rindfuss et al. 2016), with the dividing line often suggested at the TFR of 1.5. This “Great divergence” in fertility (Billari 2018) appears weakened and reshuffled today, as many countries have approached or crossed the 1.5 threshold on the way down and quite many crossed it in the opposite direction while experiencing TFR upturns (Figure 1). The end of this divergence is also clearly manifested in the TFRs for broader regions, with Central Europe, South-eastern Europe, Eastern Europe, the three German-speaking countries in Europe and Canada occupying the previously empty space around the TFR of 1.5 (Figure 7).

[1] The latest available period TFR is also above this threshold in Montenegro. In addition, several smaller countries in South-Eastern and Eastern Europe with lower reliability of population estimates due to intensive outmigration might have attained period TFR above 1.75; these include Albania, Bosnia and Herzegovina, Kosovo and Moldova.

[2] This statistics excludes Israel, which has a unique position of being a highly developed economy with stable and high fertility rate, where the period TFR has stabilised around 3.0 in the last decades.

Furthermore, the redrawn fertility landscape has weakened the correlations between fertility rates and the indicators of economic development, gender equality and women's labour force participation, which were widely discussed as important factors explaining cross-country differences in the past (e.g., Rindfuss et al. 2003; Billari and Kohler 2004; Myrskylä et al. 2009 and 2011; Luci-Greulich and Thévenon 2014; Arpino et al. 2015; Esping-Andersen and Billari 2015). This is illustrated in Figure 8 for the Human Development Index in Europe, where most of the positive correlation with the TFR, which emerged around the turn of the century, has vanished since 2010.

These unexpected and seemingly contradictory trends in period fertility are puzzling. However, the key question is whether these are temporary shifts, possibly linked to differential pace of fertility postponement between countries, or whether they herald a more permanent redrawing of the fertility map in the highly developed countries. In any case, the post-recession period fertility declines and reversals and the resulting changes in regional and cross-country differences in period TFR cannot be easily explained with the most prominent theories and explanations pursued during the last two decades. Factors such as economic uncertainty, family policies, gender equality, economic development, the precarious position of young adults and compositional changes in the population could illuminate fertility changes in individual countries, but seem unable to explain why fertility rates fell especially fast in the countries that provide the most supportive conditions for families, such as Finland, Norway, Belgium, or New Zealand.

Research questions and main aims of the study

This study aims to analyse the recent fertility shifts and reversals in Europe, North America, East Asia, Australia and New Zealand and discuss the main narratives and explanations pertaining to these shifts. We will address especially the following questions:

1. *Analysing recent fertility trends*
   How did the map of low fertility change during the last decade? Which countries experienced the largest fertility changes? Is period fertility converging to more similar levels across countries and regions?
2. *Identifying population groups whose fertility behaviour changed most*
   Whose fertility behaviour changed the most? We will investigate fertility changes by age, birth order, and social status, focusing especially on education, employment and country of birth
3. *Studying the role of tempo effect in period TFR declines*
   Are recent fertility declines mostly linked to a renewed or accelerating postponement of first birth or do they signify a more permanent shift to a smaller family size? What were the trends in tempo-adjusted indicators of period fertility rates?
4. *Analysing changing links between fertility and selected socio-economic factors*
   Have cross-country correlations between fertility rates and indicators of socio-economic development as well as gender equality weakened during the last decade?
5. *Reviewing the explanations of recent fertility declines and reversals*
   What are the key explanations of recent fertility shifts and reversals and which of them appear most plausible?

Our review of the plausible factors and explanations will be brief and often inconclusive. We will not be able to put all the pieces of puzzle together. Rather, our analysis and discussion is intended to lay a ground for further and deeper research into recent fertility changes and their determinants.

Data and countries covered

Our analysis covers most European countries including Russia, several highly developed East Asian countries and territories (i.e., Republic of Korea [referred to as South Korea], Hong Kong, Japan, Taiwan), Singapore, Canada, United States, Australia and New Zealand. Among European countries, we do not cover countries with population below 100 thousand and provide limited or no coverage for countries with missing or problematic data in fertility rates, especially Bosnia and Herzegovina, Albania, Kosovo, and Moldova. Turkey and the Caucasus countries (Armenia, Azerbaijan and Georgia) are also excluded. Our main focus is on the countries and regions that had relatively high fertility rates until recently and experienced extended fertility declines since 2008. This includes all the Nordic and Western European countries (except for Austria, Germany and Switzerland), Australia, Canada, New Zealand, and the United States.

Our analysis focuses especially on the period of 2008-18, but we also cover longer time periods since 1980. The prime source of fertility data is the Human Fertility Database (HFD, 2019), complemented with Eurostat (2019), Human Fertility Collection (2019) and national statistical offices (CDC/NCHS for the United States), especially for non-European countries and for the most recent years that are often not covered in the HFD. For some countries, the latest data pertain to 2017 rather than 2018.

Most of our research relies on conventional measures and indicators, including period Total Fertility Rates (TFR), age-specific fertility rates (ASFRs) and the mean age at childbearing (MAC). These indicators are further specified by birth order and analysed for selected subpopulations (by education, country of origin, etc.).

To analyse the impact of changes in fertility timing on period fertility (*tempo effect*), we use Tempo- and Parity-adjusted Total Fertility (TFRp*; see Bongaarts and Sobotka 2012). This indicator aims to estimate period fertility level that would be reached in the absence of shifts in fertility timing. Unlike other indicators of tempo-adjusted fertility, it does not suffer large year-to-year fluctuations. The computation of the TFRp*requires detailed data on births by age and birth order as well as the reconstruction of the female population of reproductive age by age and parity. These datasets are available in the HFD, but only for some countries and often for limited periods of time. This in turn limits our coverage of countries and periods for which we could compute the TFRp*.

The role of tempo effect in period fertility declines

Were falling period Total Fertility Rates past 2008 mainly fuelled by a renewed postponement of childbearing? To answer this question, we compare changes in period TFR and Tempo- and Parity-adjusted Total Fertility (TFRp*) in eight countries that experienced a TFR decline by at least 0.1 between 2008 and 2016 and for which we could compute the TFRp* for most of the period since 2008—Belgium, Denmark, Ireland, the Netherlands, Norway, Spain, Sweden, and the United States.

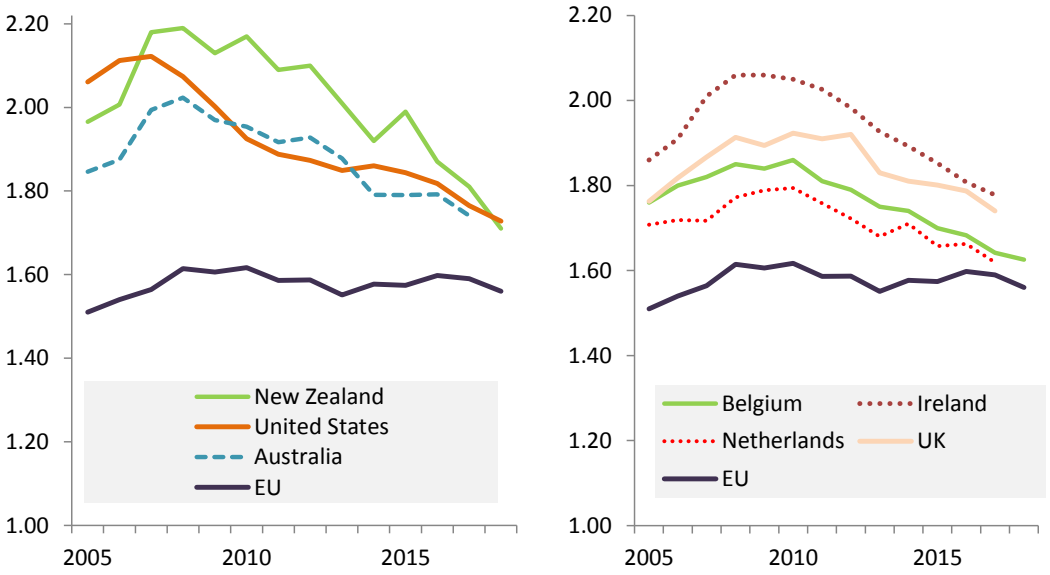
A first look at the changes in the TFR and TFRp* (Figure 9) reveals that tempo effect was the main driving force of the TFR declines, both during the period of the *Great Recession* and in the subsequent years. Except for Ireland, tempo effect accounts for most of the declining TFR until 2013-16, with practically all the TFR fall in Belgium, Netherlands, Norway and Sweden explained by a renewed or accelerating postponement of childbearing (Figure 10). Around 2008, tempo effect in most countries was minor and the TFR and TFRp* were almost equal, suggesting that the earlier trend towards later childbearing had temporarily slowed down or ceased. However, by 2013, the trend to delayed childbearing was in full swing again in the analysed countries, with the average tempo effect in the TFR tripling from -0.06 in 2008 to -0.18. Strongest tempo effect, surpassing -0.3 in 2013-16, was observed in Norway and the United States, where the conventional TFR fell most rapidly. However, our data do not allow yet investigating the role of tempo effect in the ongoing fertility declines in the most recent period—it is possible that the role of genuine change towards smaller family size (or the declining ”quantum” of fertility) has increased.

References

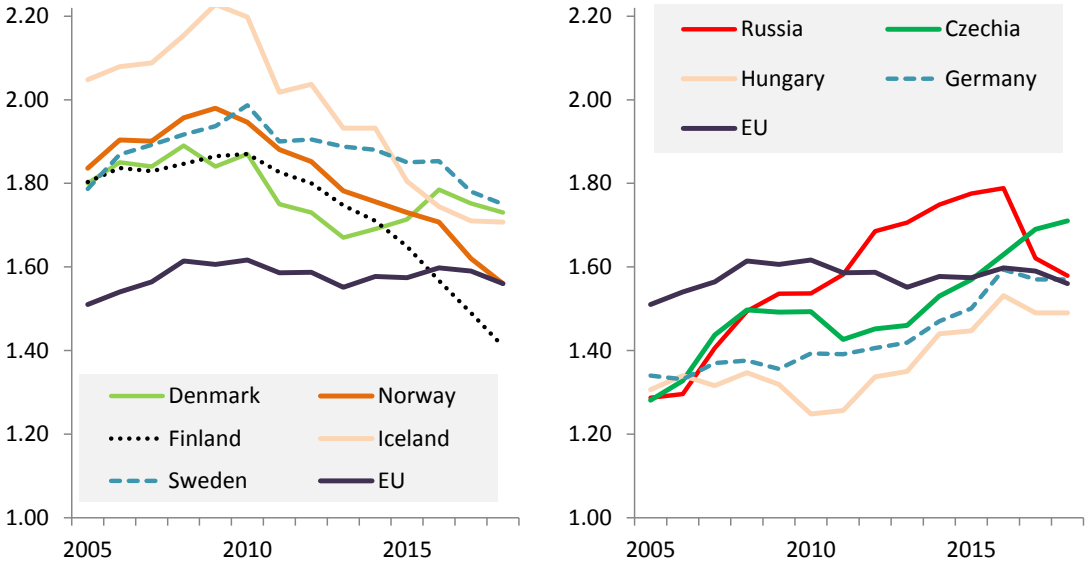
This part to be completed later

Figure 1: Period TFR in selected countries with initially higher fertility (panels a-c) and in selected countries with initially low fertility (panel d), compared to the European Union (EU28), 2005-2018

a) Australia, New Zealand and the United States
b) Selected Western European countries

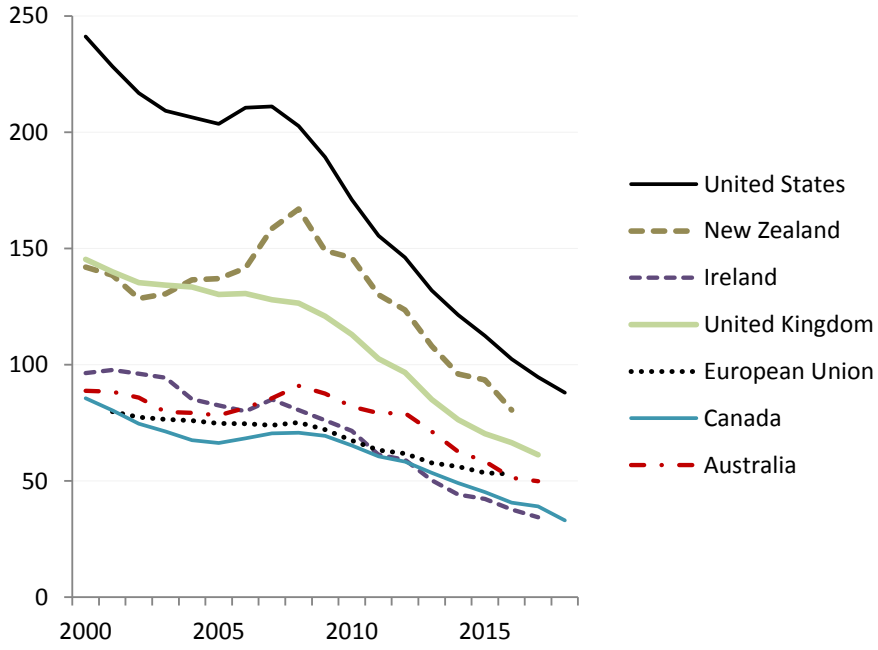


c) Nordic countries
d) Czechia, Germany, Hungary, and Russia



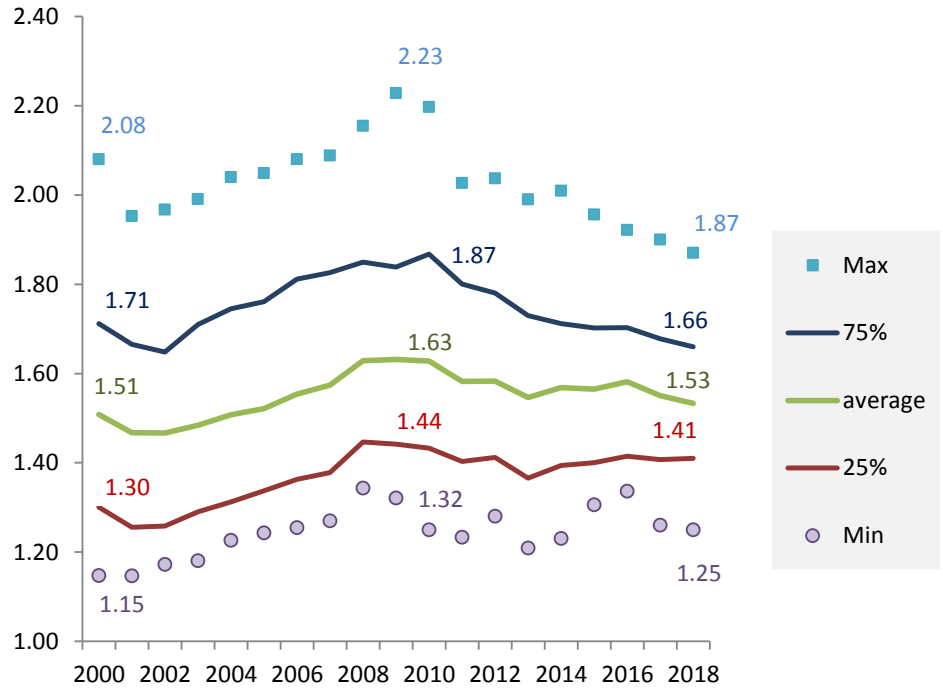
Sources: Human Fertility Database (2019), Eurostat (2019) and national statistical offices

Figure 2: Cumulated age-specific fertility rates among teenage women (aged 12-19, per thousand) in English-speaking countries compared with the European Union (EU 28), 2000-2018



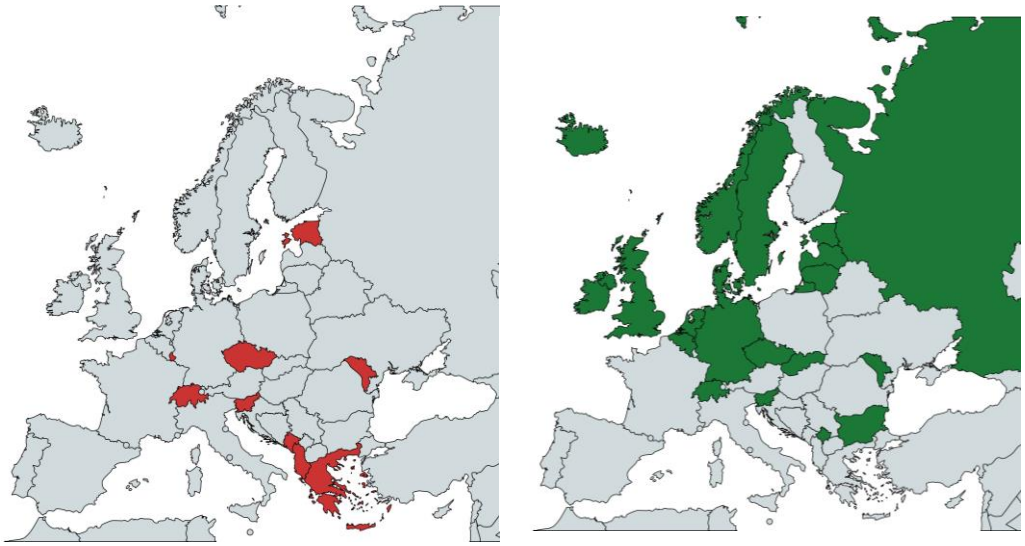
Sources: Human Fertility Database (2019), Eurostat (2019) and national statistical offices

Figure 3: Maximum and minimum TFR values, upper (75%) and lower (25%) quartiles of the TFR distribution and average TFR level, 28 EU countries, Iceland, Norway and Switzerland, 2000-2018



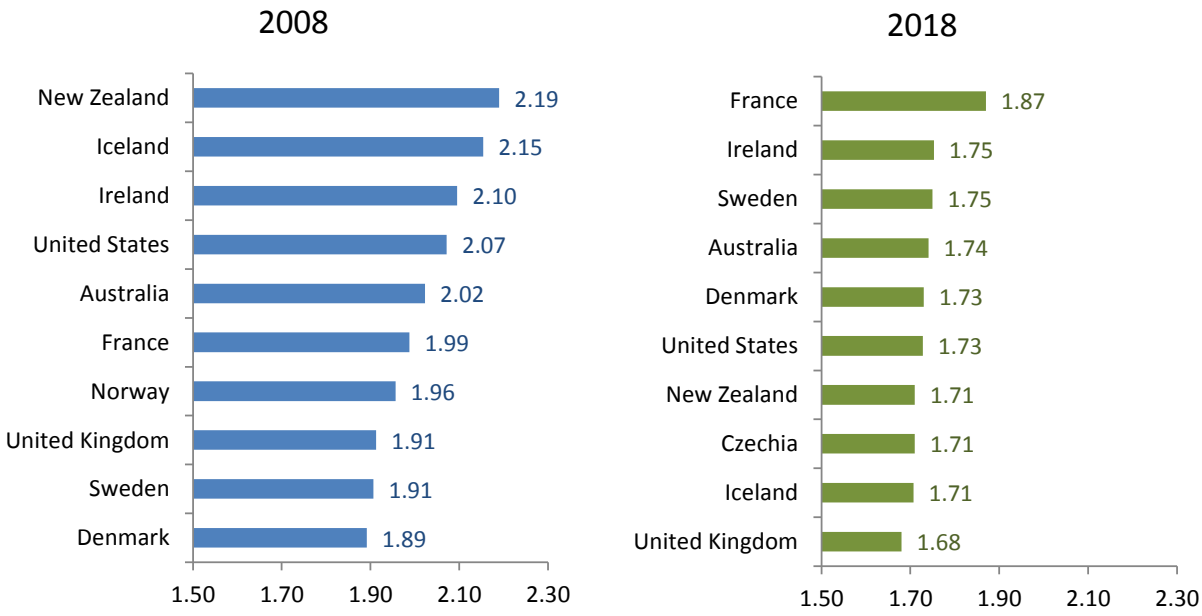
Sources: Human Fertility Database (2019), Eurostat (2019) and national statistical offices

Figure 4: European countries with the period TFR between 1.50 and 1.75 in 2008 (left panel) and 2018 (right panel)



Sources: Human Fertility Database (2019), Eurostat (2019) and national statistical offices; map created with Mapchart.net

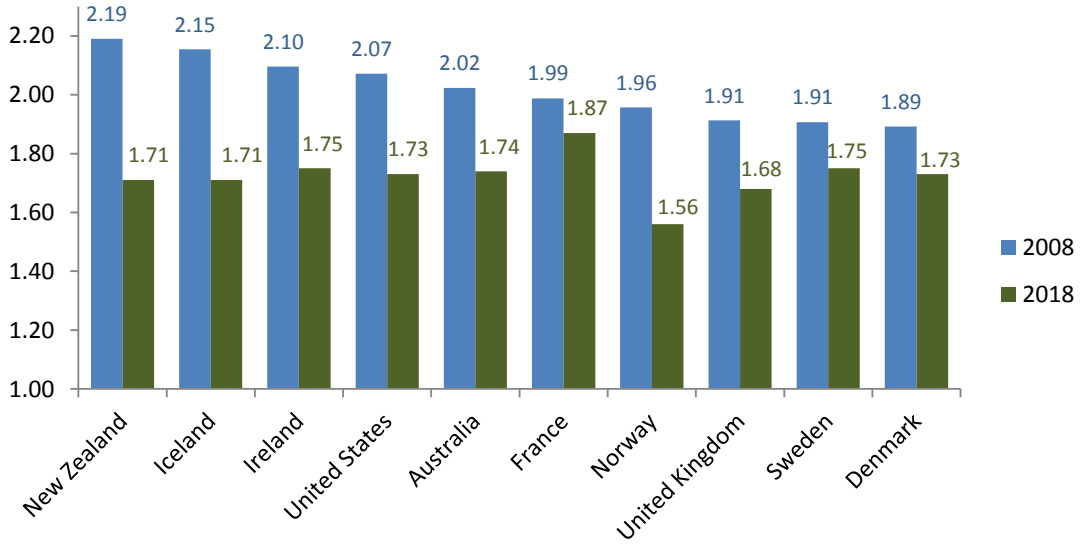
Figure 5: Ten highly developed countries with the highest TFR levels in 2008 and 2018 (out of 50 countries)



Sources: Human Fertility Database (2019), Eurostat (2019) and national statistical offices; latest data for Australia pertain to 2017

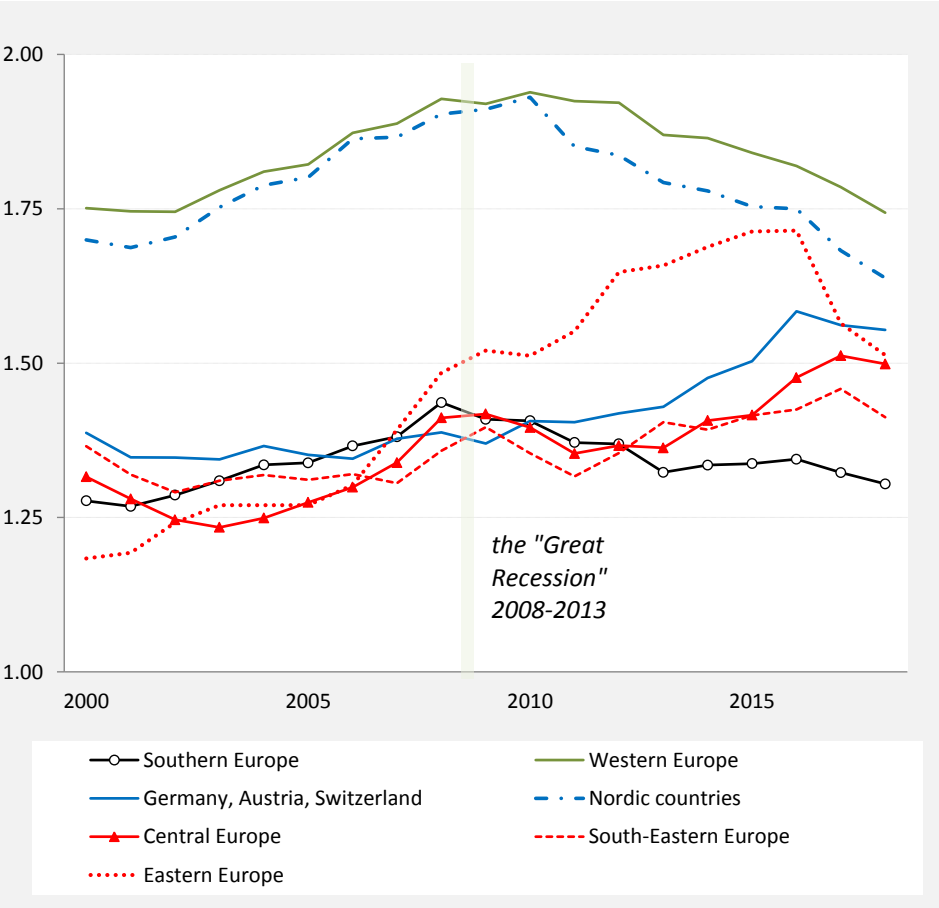
Notes: The ranking include East Asian countries, North America, Australia, New Zealand and all European countries with population above 100 thousand except Kosovo, Turkey, and the Caucasus countries.

Figure 6: Period TFR in 2008 and 2018 in ten developed countries with highest TFR levels in 2008



Sources: Human Fertility Database (2019), Eurostat (2019) and national statistical offices; latest data for Australia pertain to 2017

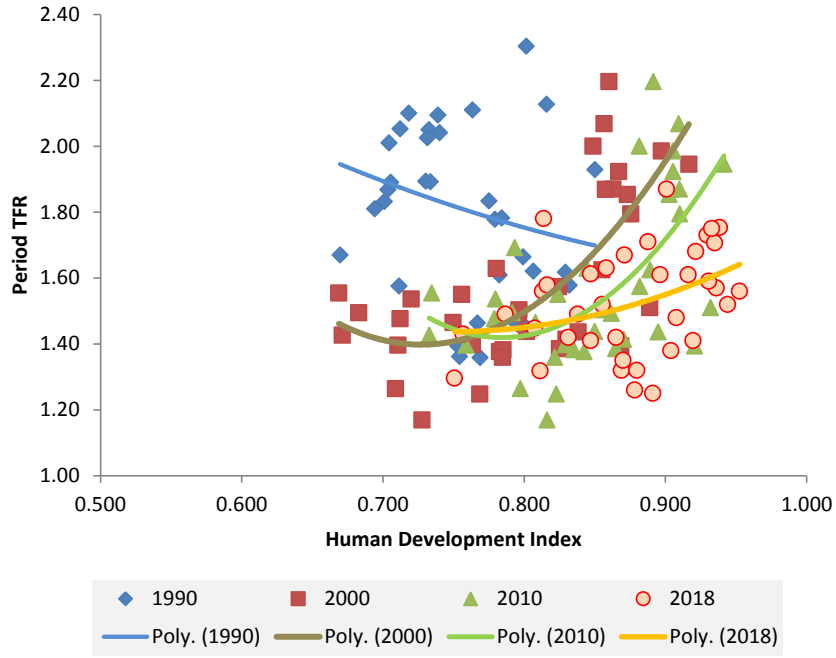
Figure 7: Period TFR in broader European regions (weighted by population size of countries in each region), 2000-2018



Sources: European Demographic Data Sheet 2018; Human Fertility Database (2019), Eurostat (2019), national statistical offices

Countries and regions covered: Nordic countries (Denmark, Finland, Iceland, Norway, Sweden); Western Europe (Belgium, France, Ireland, Luxembourg, Netherlands, United Kingdom); Germany, Austria, Switzerland; Southern Europe (Cyprus, Greece, Italy, Malta, Portugal, Spain); Central Europe (Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia); South-Eastern Europe (Albania, Bosnia and Herzegovina, Bulgaria, Kosovo, North Macedonia, Montenegro, Romania, Serbia); Eastern Europe (Belarus, Moldova, Russia, Ukraine)

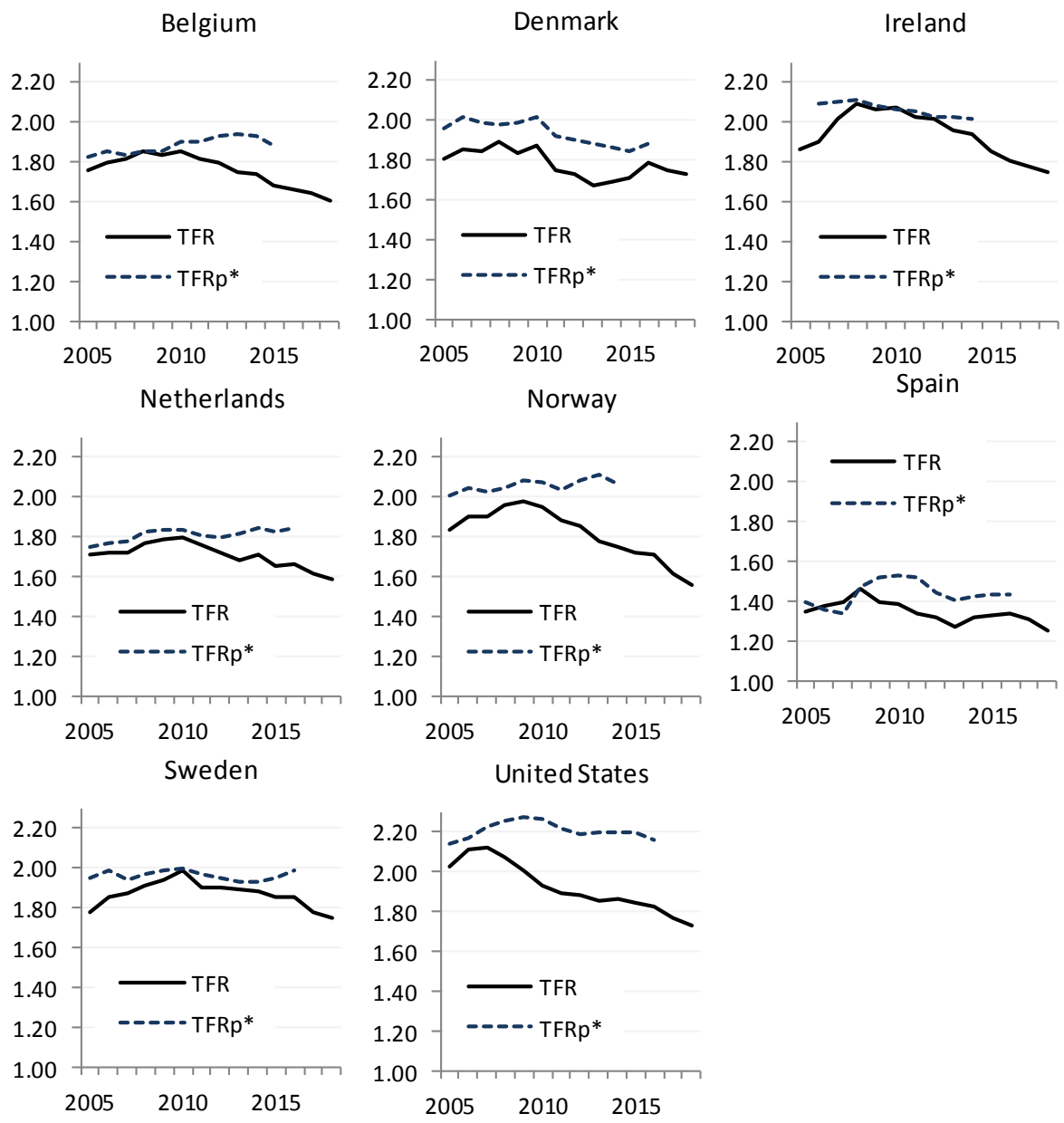
Figure 8: Changing correlation between period TFR and Human Development Index in Europe, 1990-2018



Sources: TFR: Human Fertility Database (2019), Eurostat (2019) and national statistical offices; HDI: United Nations Human Development Programme (2019); http://hdr.undp.org/en/data

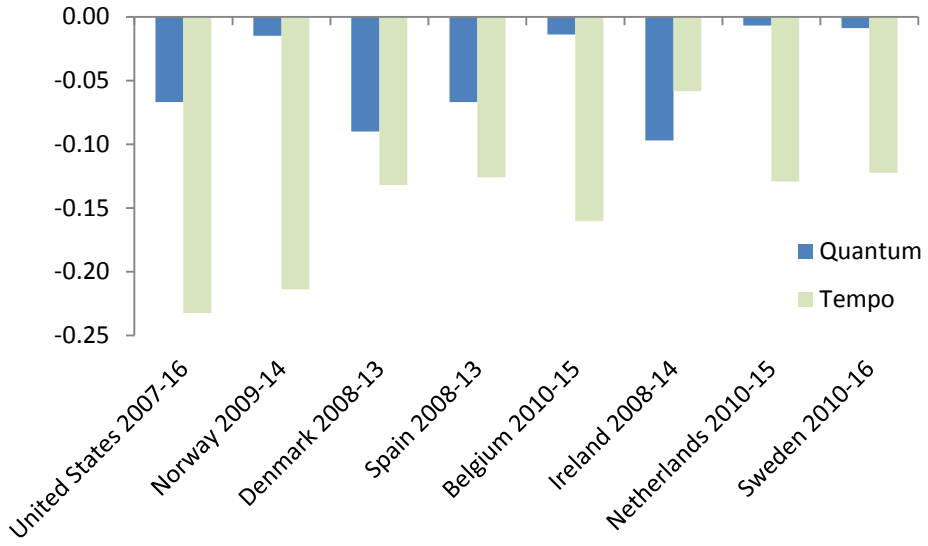
Notes: Latest HDI data pertain to 2017. Latest TFR data pertain to 2018 except for Croatia, Cyprus, Greece, North Macedonia, Malta, Montenegro, Serbia and Slovakia, for which they refer to 2017. List of countries covered: all European Union (28) countries, Belarus, Iceland, North Macedonia, Norway, Montenegro, Russia, Serbia, Switzerland and Ukraine. Data for Belarus, North Macedonia and Montenegro missing for 1990.

Figure 9: Period TFR and Tempo- and Parity-adjusted Total Fertility (TFRp*) in 2005-2018 (or latest year available) in eight countries experiencing TFR decline since 2008



Sources: TFR: Human Fertility Database (2019), Eurostat (2019) and national statistical offices; TFRp*: own computations based on the Human Fertility Database and Human Fertility Collection (2019).

Figure 10: Estimated contribution of quantum change and tempo effect in period TFR declines in eight countries between 2007-10 and 2013-16 (analysed periods differ by country)



Sources: TFR: Human Fertility Database (2019), Eurostat (2019) and national statistical offices; TFRp*: own computations based on the Human Fertility Database and Human Fertility Collection (2019).

Note: The TFRp* data are available for the period through 2015-2016 except for Ireland and Norway (2014). For each country, the analysed period covers the TFR decline between the year the TFR peaked in 2007-10 and the subsequent year of the lowest TFR in 2013-16 (or the latest year available).