

**TFR trends since 2000: a decade up, a decade down – but why?**

Around the year 2000 the ongoing decline in the TFR of European countries (and also seen more broadly) halted and an upturn was seen. For many countries this rise continued for around a decade but then another turning point was reached. For the past decade fertility rates have again been declining across much of the western world, as summarised in Table 1. This study examines the demographic reasons for the rise and fall in TFR over the past two decades.

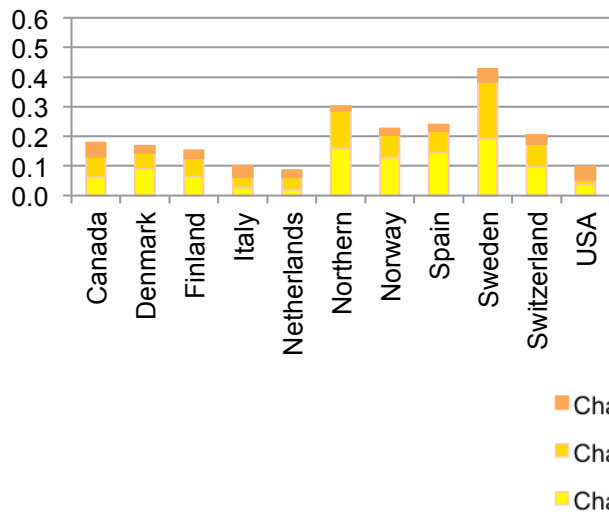
**Table 1:** Summary of years of minimum, maximum and most recent TFR data

	Year min TFR	Min TFR	Year max TFR	Max TFR	Most recent year	TFR most recent
Canada	2000	1.51	2008	1.68	2018	1.50
Denmark	2002	1.72	2008	1.89	2020	1.68
Finland	2002	1.72	2010	1.87	2019	1.35
Italy	2005	1.34	2010	1.44	2018	1.31
Netherlands	2001	1.71	2010	1.80	2019	1.57
Northern Ireland	2000	1.75	2008	2.06	2018	1.85
Norway	2003	1.75	2010	1.98	2020	1.53
Spain	2000	1.21	2008	1.45	2018	1.26
Sweden	2000	1.56	2010	1.99	2019	1.71
Switzerland	2002	1.22	2010	1.42	2019	1.37
USA	2002	2.02	2007	2.12	2019	1.71
Mean	2002	1.59	2009	1.79	2019	1.53

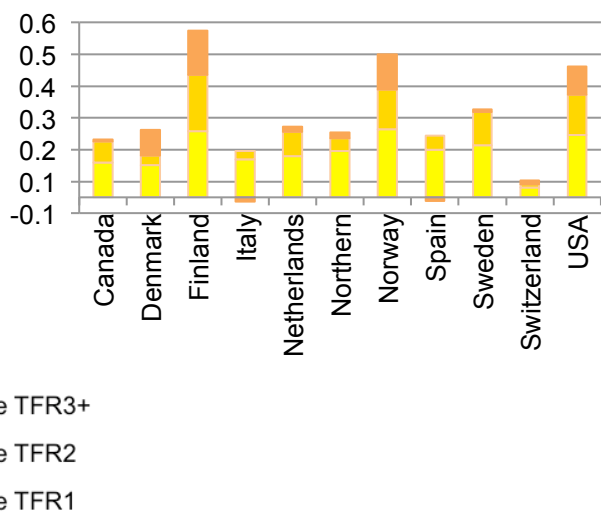
The inflection point after the TFR declines of the 1990s was caused by a stabilisation in ‘early’ (pre-modal age) fertility rates and a rise in ‘later’ (post-modal age) fertility rates, causing the fertility curve to widen but without a rise in peak rates (Burkimsher, 2015). This study focuses on the evolution of fertility rates since 2000, primarily using data in the Human Fertility Database (<https://www.humanfertility.org>). For Switzerland we use data supplied from the Swiss Federal Statistical Office relating solely to the population holding Swiss nationality, as the significant size of the foreign population potentially distorts the overall TFR of Switzerland (Burkimsher, 2020).

In this study we look first at how changes in each birth order (TFR1, TFR2 and TFR3+) have contributed first to the rise, and then to the fall in the overall TFR for each country. The rise from minimum to maximum TFR in the period after 2000 across these 11 countries averaged 0.2 children/woman; 47% of this rise came from a rise in first birth rates, 38% from second births and 15% from third and higher order births. The average fall after around 2010 was larger than the rise in the previous decade, averaging 0.26, and the impact from decline in first birth rates was higher: 55%, compared to 29% from second birth rates and 16% from higher order births. However, there is considerable variation between the countries.

**Figure 1a:** Change in TFR from year of minimum to year of maximum by birth order

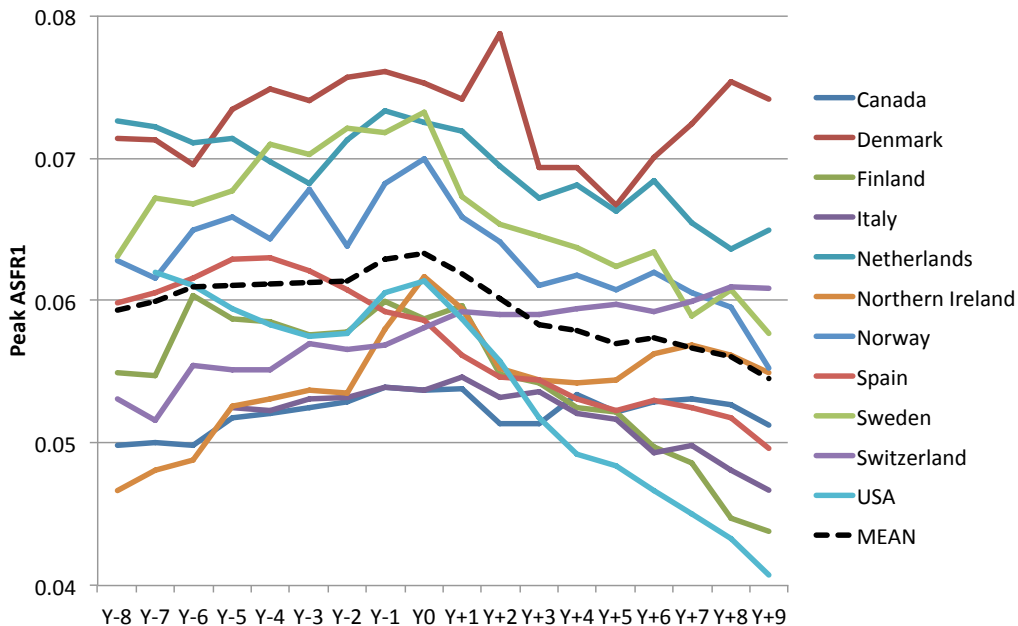


**Figure 1b:** Change in TFR from year of maximum to latest year of data available (2018-2020)



As trends in first birth rates are the main driving force on the overall TFR then we now focus on the TFR1. Trends in second and higher order births tend to follow sequentially after changes in the TFR1, as could be expected. Examining the evolution of the fertility curve is important for understanding the rise and subsequent fall in fertility rates: its height, width and the pre- and post-modal age portions of the graph.

**Figure 2:** Trends in peak first birth age-specific fertility rates (ASFR1)



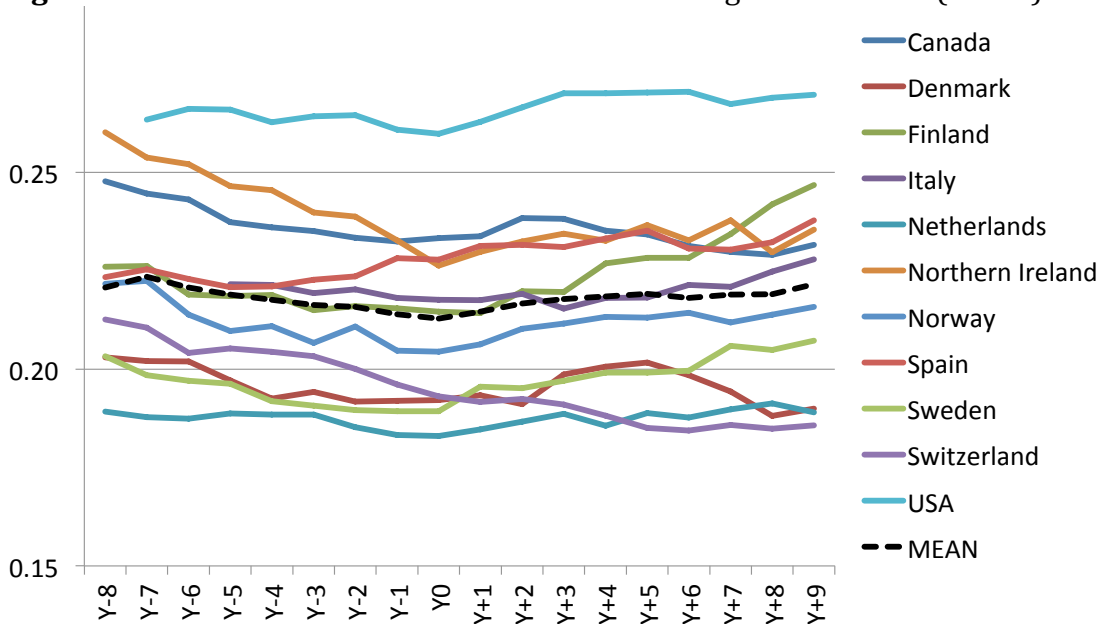
Note: Y0 is the year of maximum TFR1 in the period 2000-2020 and is country-specific

Figure 2 shows that, for most of these countries, there was a modest rise in peak rates up to the year of maximum TFR1 followed by a more substantial fall in recent years. This indicates that the 'intensity' of entry into motherhood around the modal age has been declining.

Figure 3 shows the changes in our measure of the width of the fertility curve; the coefficient of variation in mean age at first birth (standard deviation divided by the mean, a measure indicating the extent of variability in relation to the mean). We see that this measure

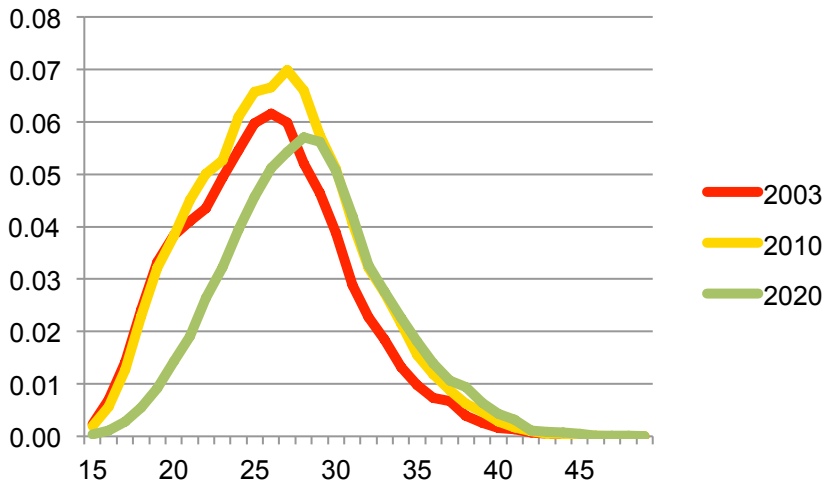
remained fairly stable for most countries across the time period, although some countries have seen a fall (Northern Ireland from 2000-2008) and others a noticeable rise (Finland 2010-2018).

**Figure 3:** Trends in coefficient of variation in mean age at first birth (MAB1)



As mean age at first birth has been rising almost continuously over the past decades the shape of the fertility curve has evolved from being left-skewed to being much closer to a 'normal curve'. The curve for Norway shows a fairly typical example of the fertility curve at the year of minimum TFR1, year of maximum TFR1 and most recent year with data.

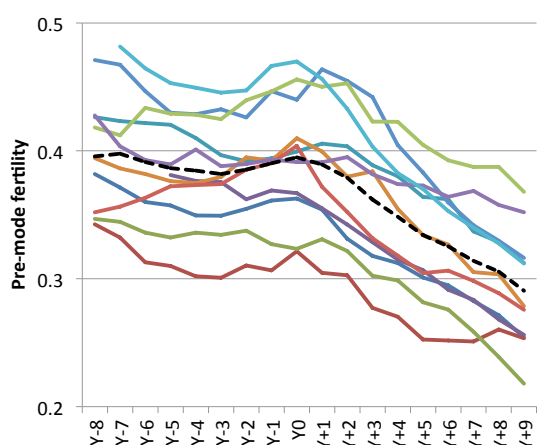
**Figure 4:** Fertility curves Norway: age-specific fertility rates, first births



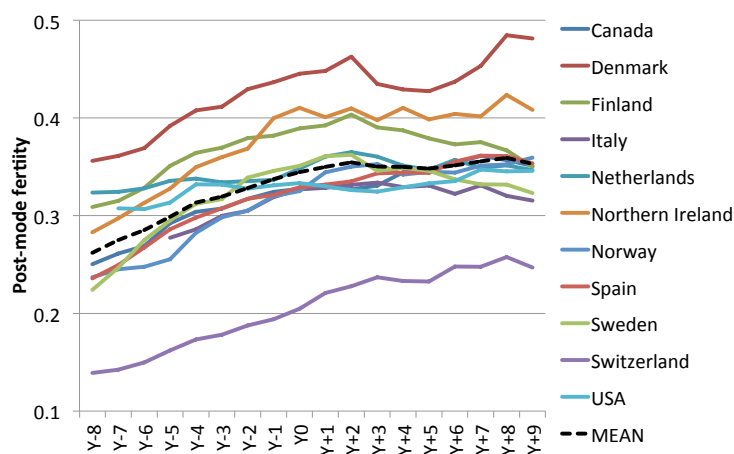
What we see across the countries studied is that in the first decade of the millennium the 'early' part of the curve stayed stable but the 'post-modal' part moved later, thus widening the curve. In contrast, in the years since the TFR1 maximum, the 'early' fertility moved later but the 'later' fertility part of the curve stayed stable. In the first decade the younger ASFR1s tracked closely year-on-year, whereas in the second decade it was the older ASFR1s that traced a similar curve year-on-year. For Norway the modal age moved from age 26 in 2003 to 27 in 2010 to 28 in 2020 (this is younger than in many of the other countries studied here).

So how has 'early' and 'late' fertility changed since 2000 for the countries studied?

**Figure 5a: 'Early' fertility rates**



**Figure 5b: 'Late' fertility rate**



Note: Figure 5a: These are the sum of the ASFR1s for all ages up to (but not including) the ASFR1 for the modal age of first births in the year when the TFR1 reached its maximum (specific to each country), e.g. for Norway this was  $\Sigma$  ASFR1 ages 12-26 for years 2002-2019

Figure 5b: These are the sum of the ASFR1s for all ages greater than (but not including) the ASFR1 for the modal age of first births, e.g. for Norway this was  $\Sigma$  ASFR1 ages 28-55 for years 2002-2019

The fertility curve for the USA has an unusual bi-modal shape with an early peak at age 20 and a later peak at age 29. In order to make the USA more comparable to the other countries studied than age 26 was used to define 'early' and 'late' fertility.

The conclusions we can draw from Figure 5 are quite clear. The rise in TFR1 in the years up to its maximum was caused by a stabilisation of 'early' fertility and a rise in 'late' (post-modal age) fertility. The decline in the TFR1 over the past decade has been caused by a stabilisation of 'late' fertility and a steep decline in 'early' fertility.

This study confirms and expands on previous work on recent fertility trends in Europe. The recent decline in fertility in the Nordic countries has been attributed the decline in first birth rates at younger ages without corresponding recuperation at older ages (Hellstrand et al, 2021). It would appear that with rising age at first birth an upper limit of TFR could be hit, either because of natural fertility limitations at older ages or cultural constraints (Goldstein, 2006). Of the countries examined in this study, the modal age at first birth has already reached 32 for Swiss (nationality) women, is at 31 in Spain and at 30 in France, the Netherlands and Northern Ireland. The mean age at childbearing (including all birth orders) is over 29 for all countries in this study, even including the USA which has the youngest age profile.

Finally it should be mentioned that not all European countries have followed the same trajectory as the ones presented here. Austria has seen rising fertility across most of the period, whereas in Portugal it was falling until 2014. The Eastern European countries generally had rising TFRs in the early years of the new millennium (from very low levels): in some these rises have continued whilst others stabilised. None saw the significant falls post-2010 seen in the western countries.

## References

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