

SF2.1. Fertility rates

Definitions and methodology

This indicator presents information on levels and trends in fertility rates and the distribution of births by birth order. Fertility rates are captured through two measures:

- **The Total Fertility Rate (TFR)**, or the average number of children born per woman over a lifetime given current age-specific fertility rates and assuming no female mortality during reproductive years. TFRs are computed as the sum of age-specific fertility rates defined over five-year intervals. Data on the TFR come mostly from national statistical offices and other international organisations (e.g. Eurostat and the World Bank). Assuming no migration and unchanging mortality rates, a TFR of 2.1 children per woman is generally sufficient to generate a stable size of the population within a given country. A TFR above or below this 'population replacement rate' is likely to lead to population growth or population decline, respectively.
- **Completed Cohort Fertility (CCF)**, or the average number of children born to women belonging to certain cohort over the whole of their reproductive lives. Data on completed cohort fertility come from the Human Fertility Database (HFD), which calculates completed cohort fertility for a given cohort if data are available for that cohort at age 44 or above and by using data for the highest available age up to age 50.
- **The tempo adjusted fertility rate** is computed as the sum of TFRs at different birth orders divided by a factor that controls for any changes in the mean age of mothers at birth at the respective birth order compared to the previous year. This calculation aims to control for birth postponement and can help provide a more nuanced understanding of fertility trends, particularly in societies where the timing of childbearing is changing.

The distribution of births by birth order is measured through the distribution of births by the rank of the birth from the perspective of the biological mother. Three rank groups are used here – first births, second births, and third or higher births.

Key findings

Across almost all of the OECD, current fertility rates are well below those needed for population replacement (Chart SF2.1.A). In most OECD countries, the total fertility rate sits at somewhere between 1.2 and 1.8 children per woman, but in 2021 the TFR was as low as 0.81 in Korea. In 2021, only one OECD country (Israel) had a TFR above the 2.1 children per woman needed for population replacement: at 3.0, Israel has the highest TFR in the OECD.

Over the past decades, fertility declined markedly across OECD countries, falling on average from 2.84 children per woman of childbearing age in 1970 to 1.58 in 2021. The decline was particularly pronounced – by at least three children per woman on average – in Colombia, Korea, Mexico and Türkiye. Catching up with birth postponement in prior years, there was a moderate recovery in TFRs between 2000 and 2008, but this rebound stalled in many OECD countries in 2009. In 2019 and in 2020 (year of the start of the global COVID-19 pandemic), TFRs declined in more than two-thirds of OECD countries. Then in 2021, TFRs increased in two-thirds of OECD countries, but from a historically low base in 2020.

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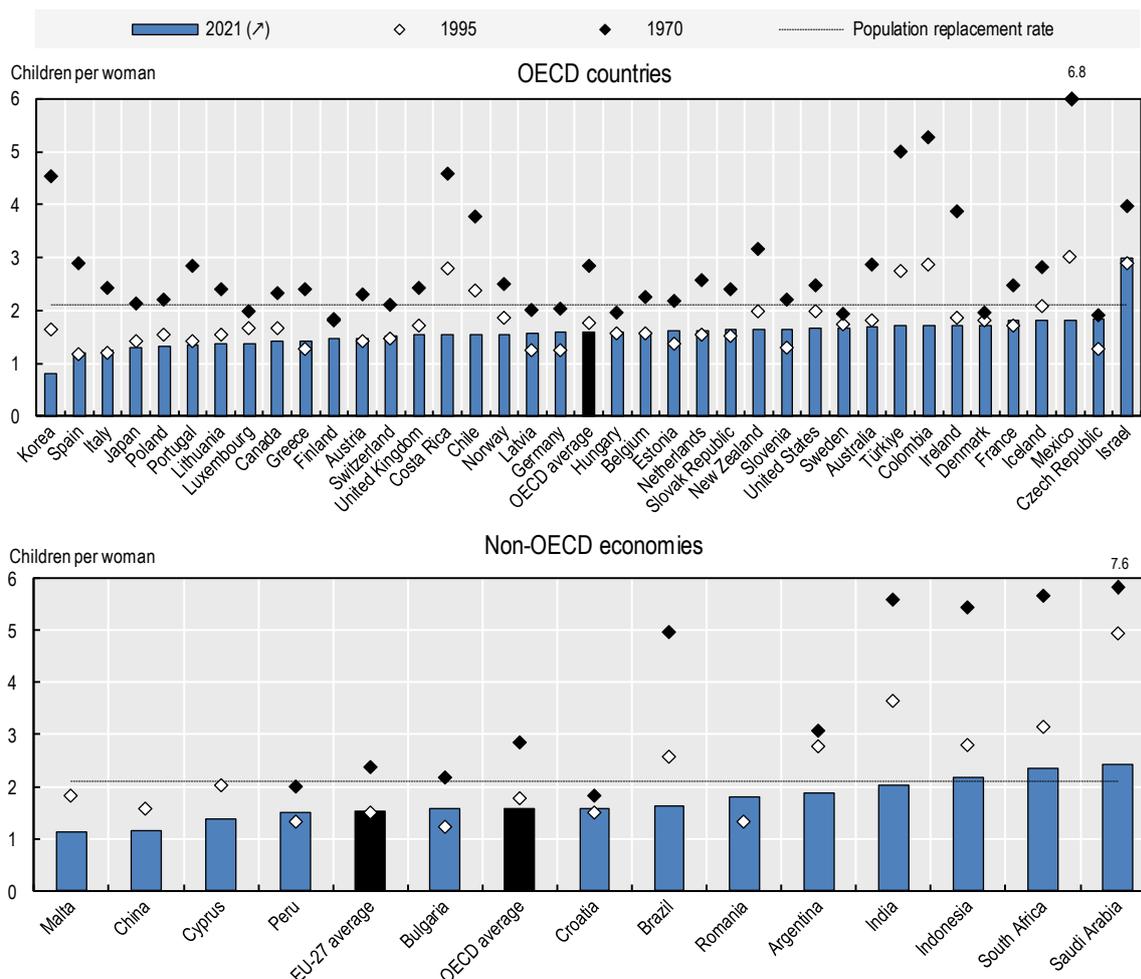
The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Other relevant indicators: Family size and composition (SF1.1); Age of mothers at childbirth (SF2.3); Share of births outside marriage (SF2.4); Childlessness (SF2.5); and, Marriage and divorce rates (SF3.1).

Chart SF2.1.A also shows that by 1995, most countries already had fertility rates well below replacement level. In many OECD countries TFRs actually increased slightly since the mid-1990s. In Germany, for example, the 2020 TFR was about 0.3 points higher than in 1995; in the Czech Republic and Latvia, the 2020 TFR was over 0.4 points higher than the 1995 rate. Nonetheless, in most cases, any such increases were relatively small and are far from what is required in order to raise fertility to the 2.1 children per woman needed for a stable size of the population.

Chart SF2.1.A. Total fertility rate, 1970, 1995 and 2021

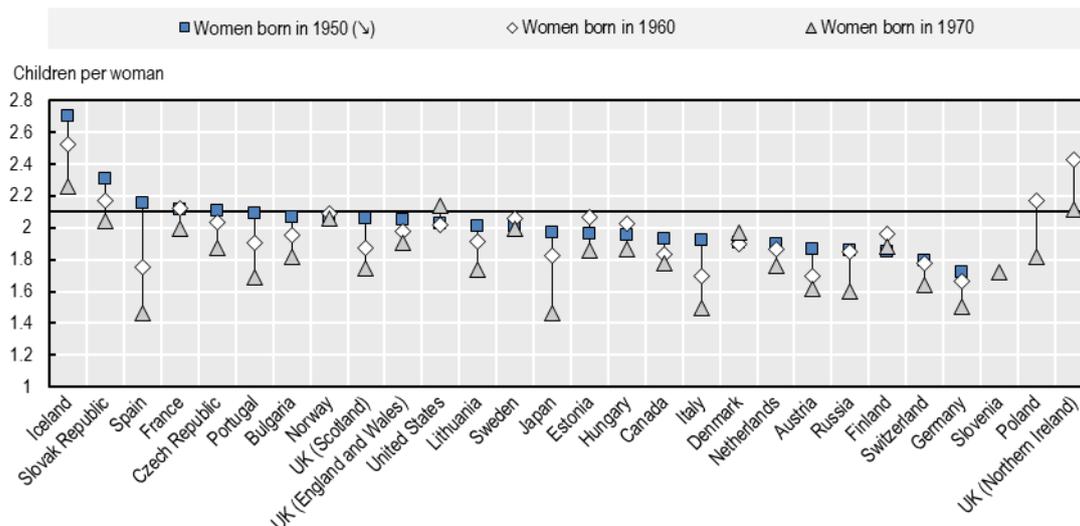
Average number of children born per woman over a lifetime given current age-specific fertility rates and assuming no female mortality during reproductive years



Source: Eurostat Database, <https://ec.europa.eu/eurostat/data/database>; World Bank World Development Indicators, <https://databank.worldbank.org/>; and national statistical offices. See the accompanying data file ([here](#)) for detailed sources.

Data on *completed* fertility paint a largely similar picture. Chart SF2.1.B shows CCF for women born in 1950, in 1960, and in 1970. For all three birth cohorts, completed fertility is in most countries well below the 2.1 children per woman needed for population replacement. For the 1950 cohort, only Iceland, the Slovak Republic and Spain have CCF levels above 2.1. For the 1970 cohort, this only concerns Iceland. Indeed, most OECD countries recorded a decline in CCF for the 1950 and 1970 cohorts of women: – only in Denmark, Finland and the United States was CCF higher for the 1970 cohort than for the 1950 cohort. The decreases in CCF in Japan (0.5 children per woman) and Spain (0.7 children per woman) were particularly large.

Chart SF2.1.B. Completed cohort fertility for women born in 1950, 1960 and 1970 or latest available



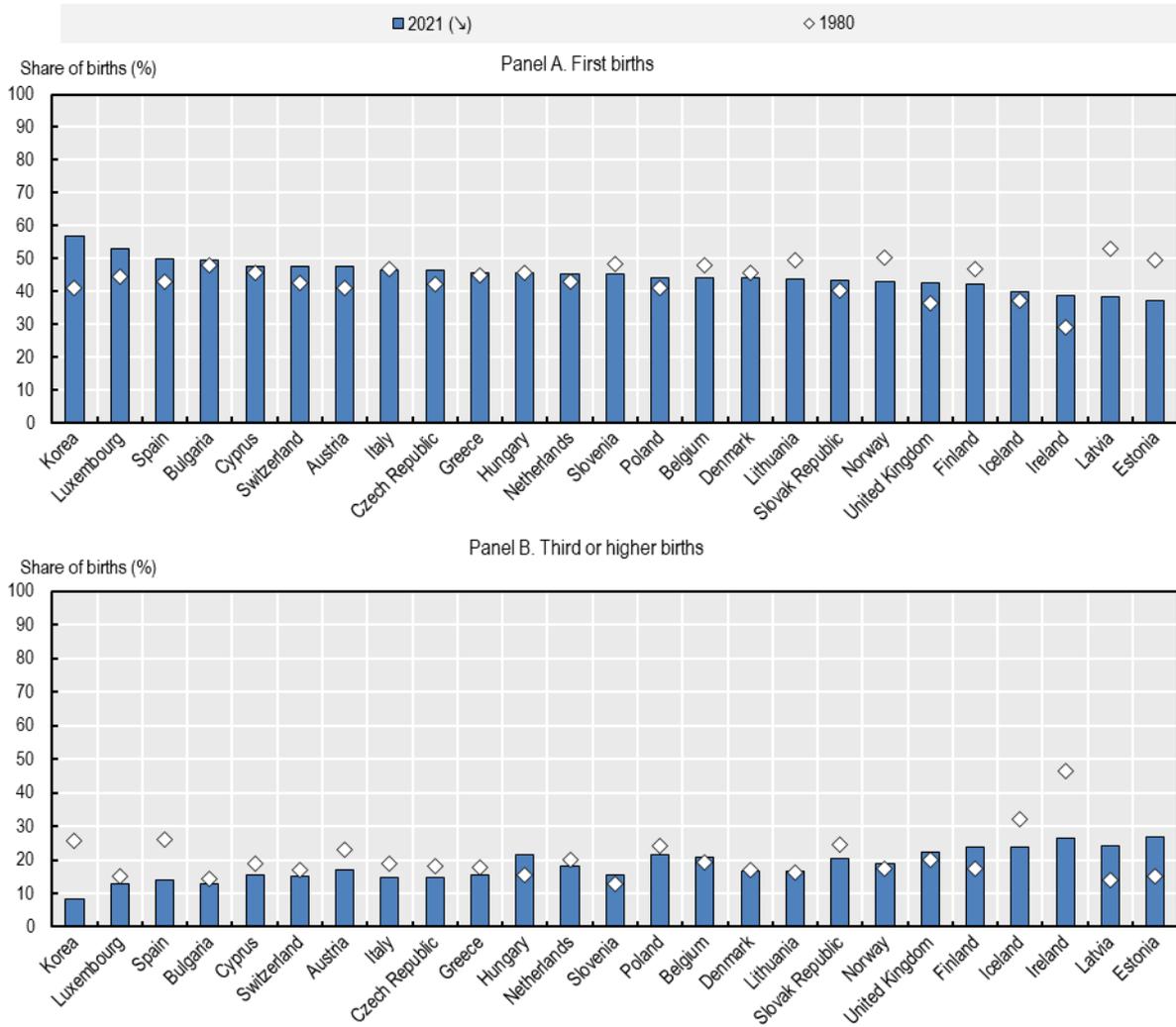
Note: Completed cohort fertility (CCF) is defined as the average number of children born to women belonging to certain cohort over the whole of their reproductive lives. The Human Fertility Database calculates completed cohort fertility for a given cohort if data are available for that cohort at age 44 or above, and by using data for the highest available age up to age 50. See the Human Fertility Database webpage (www.humanfertility.org) for more detail. Data for Bulgaria and the Slovak Republic refer to 1965, for Canada to 1967, for Iceland and Italy to 1968, and for France, Germany, and the United Kingdom (England and Wales, Northern Ireland and Scotland) to 1969.

Source: The Human Fertility Database, <http://www.humanfertility.org>

Fertility declines are reflected in a fall in the proportion of births that are third or higher births and an increase in the share of births that are first births. Chart CF2.1.C shows the share of births that are the mother's first birth (panel A) and third or higher birth (panel B) in 1980 and 2021. In most of the covered countries, the proportion of births that are the mother's first birth has increased since 1980, while the share of births that are a third or higher birth has fallen. There are some exceptions – in both Estonia and Latvia, for example, the proportion of births that are first births has fallen by over ten percentage points since 1980, while the third or higher share has increased by twelve and ten percentage points, respectively. For most countries though, third or higher order births are less common today than in 1980, pointing towards a decrease in the frequency of large families.

Chart SF2.1.C. Distribution of births by birth order, 1980 and 2021

Proportion (%) of births that are first and third or higher births



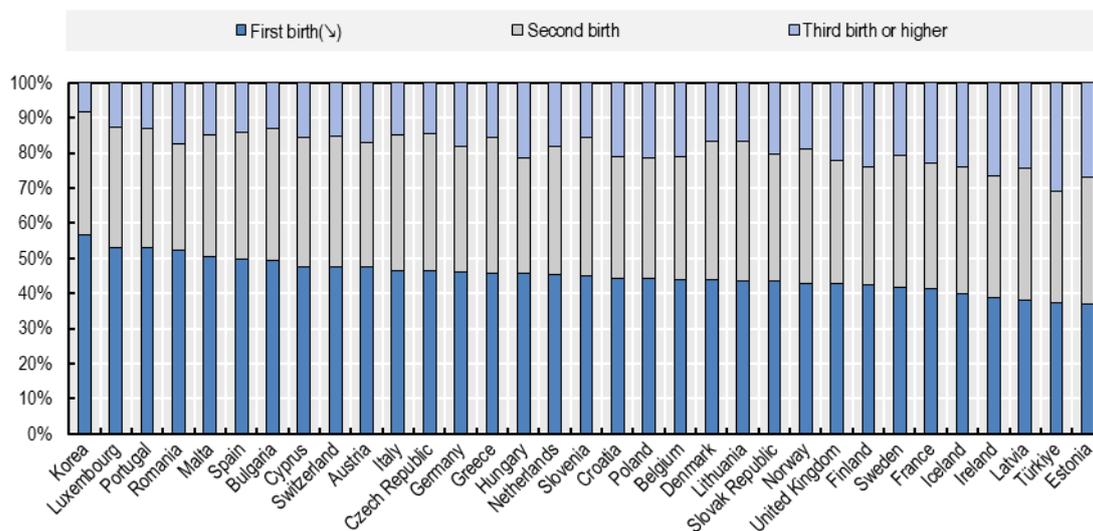
Note: 2020 for Türkiye and 2018 for the United Kingdom instead of 2021.

Source: Eurostat Database, <https://ec.europa.eu/eurostat/data/database> and Statistics Korea.

Still, in most countries, first births continue to represent a minority of births (Chart CF2.1.D). First births account for half or more of all of births in only three OECD countries (Korea, Luxembourg and Portugal). In all others, the proportion of births that are first births is less than 50%, with the share falling to as low as 37% in Estonia and Türkiye. Most remaining births are second births, with third or higher births in most countries making up less than one-in-five births.

Chart SF2.1.D. Distribution of births by birth order, 2021

Proportion (%) of births by the rank of the birth



Note: 2020 for Türkiye and 2018 for the United Kingdom instead of 2021.

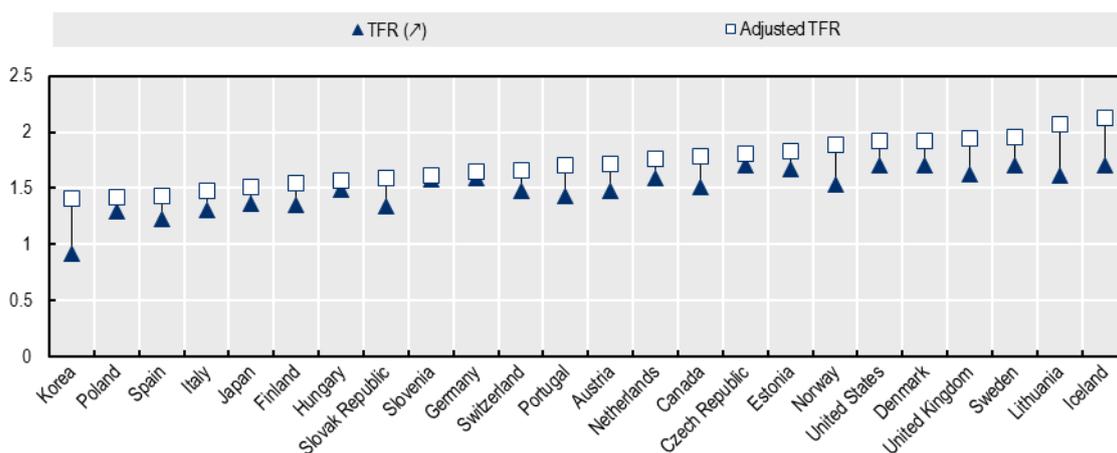
Source: Eurostat Database, <https://ec.europa.eu/eurostat/data/database> and Statistics Korea.

While completed fertility rates cannot accurately capture the most recent birth trends, it is also likely that the TFR underestimates the actual fertility rate. This happens per definition when there is a general delay in the decision to have children. To account for this, the tempo adjusted fertility rate attempts to adjust for such tempo effects in birth rates by using a model that accounts for the timing and parity of births, giving a more accurate indicator of current birth rates.

Across countries for which data on the temp-adjusted TFR is available, it is higher than the TFR itself (Chart SF2.1.E). Especially in Korea, Norway, the United Kingdom, Lithuania and Iceland, there is a large difference between both measures (more than 0.3), which implies that recent declines in total fertility rates might be attributable to delayed childbirth which could mean a potential future rebound in fertility as these postponed births eventually occur. However, in Hungary, Slovenia, Germany, and the Czech Republic, the differences between the adjusted TFR and the regular TFR is lower than or equal to 0.1. This small difference suggests that birth postponement might not significantly influence the fertility trends in these nations, indicating that their lower fertility rates might be less likely to experience a substantial rebound in the foreseeable future.

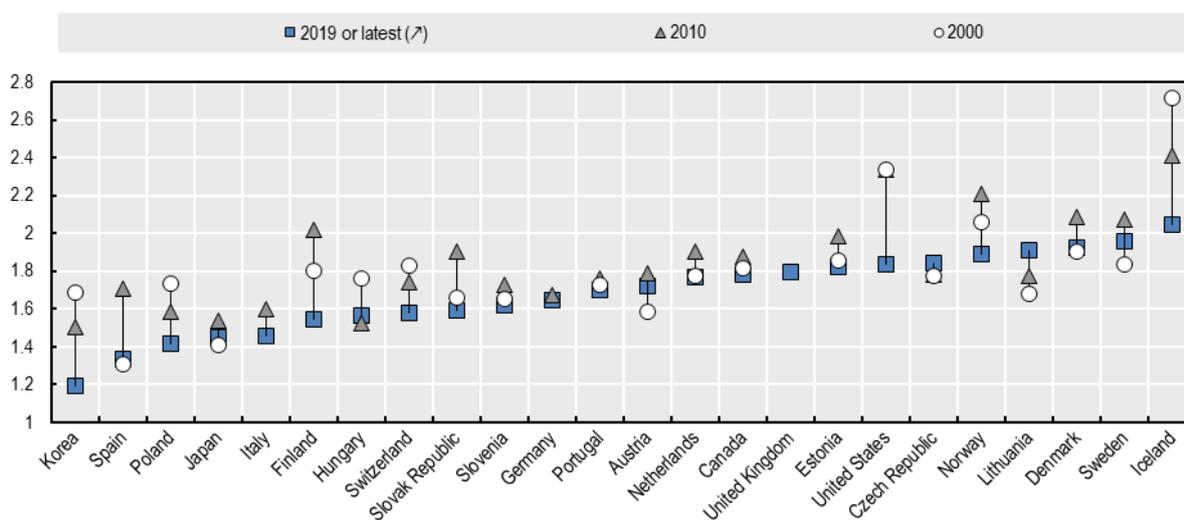
The tempo-adjusted fertility also fell over the years in most countries, which indicates that fertility is declining faster than what simple birth postponement would explain (Chart SF2.1.F). Indeed, in all countries - except for the Czech Republic, Hungary and Lithuania - the adjusted TFR in 2019 is below what it was in 2010. The biggest declines are found in Finland, Iceland, Korea, Norway, Slovak Republic, Spain and the United States. This suggests that the changes in the TFR in these countries reflect actual changes in the number of children born to each mother, rather than continued postponement of births to older ages. However, the adjusted TFR in 2010 was almost the same as the adjusted TFR in 2000 for the Czech Republic, Portugal, and the United States. As the adjustment of the TFR accounts for birth postponement, this suggests that changes in fertility between 2000 and 2010 in these countries were mainly driven by changes in the mean age at birth. In Austria, Finland, Slovak Republic, Spain, Sweden, the adjusted TFR increased substantially between 2000 and 2010, suggesting an actual increase in the number of children born to each woman.

Chart SF2.1.E. Total and tempo-adjusted fertility rates, 2019 or latest available



Note: Instead of 2019 for tempo-adjusted fertility rates, data refers to 2018 for Austria, Canada, Estonia, Italy; the Netherlands; 2016 Germany, Hungary, Slovenia; 2015 for Poland; and 2013 for the Slovak Republic
 Source: Human Fertility Database for tempo-adjusted fertility rates; see Chart SF2.1.A. for total fertility rates.

Chart SF2.1.F. Tempo-adjusted total fertility rates, 2000, 2010 and 2019 or latest available



Note: Instead of 2019, latest year refers to 2018 for Austria, Canada, Estonia, Italy; the Netherlands; 2016 Germany, Hungary, Slovenia; 2015 for Poland; and 2013 for the Slovak Republic. For Korea, data for 2000 refers to 2001.
 Source: Human Fertility Database.

Comparability and data issues

There are drawbacks to using the TFR to compare trends in fertility as changes in the aggregate can relate to either a change in family size and/or a change in the timing of births. Completed cohort fertility data can be used to measure the final number of children per women but only when women have reached the end their reproductive life. Changes in the distribution of births by rank of children also illustrate the changes in fertility patterns, since a reduction of family size is associated with a decrease in the share of higher order births.

The distribution of births is, however, also sensitive to timing effects. A closer look at the timing of births is needed to obtain a more comprehensive view of fertility behaviour and changes over time (SF2.3). The method of adjusting the TFR for tempo-effects as presented in Chart SF2.1.E and Chart SF2.1.D is a useful but incomplete approach as it doesn't account for the potential that delayed childbearing could lead to lower lifetime fertility while also assuming that the postponement of childbearing is a temporary phenomenon, which may be reversed in future.

Sources and further reading:

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