Two Decades of Fertility Fluctuation in Great Britain

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Background

The first decades of the 21st century witnessed significant fluctuations in fertility levels in the United Kingdom. In 2001, the total fertility rate (TFR) was 1.63. In 2012, after a decade of increase, the figure was 1.93. This continued increase was particularly noticeable given that in most other European countries fertility fell during the economic downturn of 2008–2011 (Sobotka et al. 2011). Since 2012 fertility has declined to a TFR of 1.60 in 2020 (Berrington et al. 2021). Fertility dynamics have been similar in the four constituent countries of the UK, but the levels have varied significantly (Figure 1). Rates in Northern Ireland are 5 percent higher than England or Wales (which are more similar) and 10 percent lower in Scotland.

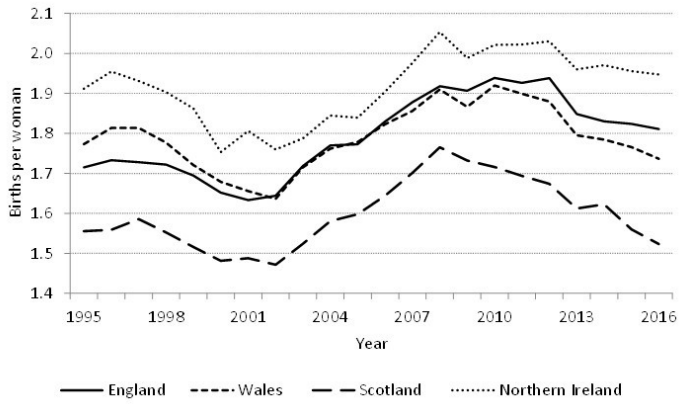

Figure 1. Total Fertility Rate in the UK, 1995–2016.

Source: Office for National Statistics (2021).

The reasons for the rising-falling fertility patterns in the UK are not well understood. Some researchers attribute increasing fertility levels in the early part of the 21st century to the stopping of fertility postponement (Goldstein et al. 2009; Bongaarts and Sobotka 2012), while others argue that increased immigration is key (Sobotka 2008; Tromans et al. 2009; Kulu and Hannemann 2016). Other scholars suggest that increased separation and repartnering may underlie continued large family sizes (Berrington and Stone, 2017), whilst others highlight the potentially pro-natalist effects of governmental policies introduced from the late 1990s to promote compatibility of employment and family life, and increased gender equality in the British society (Neyer and Andersson 2008; Goldscheider et al. 2015; Sigle 2016). By contrast, economic recession since 2008 may have had the opposite effect and explain the recent decline (Sobotka et al. 2011), albeit with a time lag that requires explanation.

This study investigates childbearing trends in England, Wales and Scotland by birth order over the last two decades. First, we will calculate annual parity-specific fertility rates by country to determine whether the increase and subsequent decline in the total fertility rate (TFR) is attributable to the

changes in first, second, third or higher-order births, or all of them. Second, we will investigate whether TFR differences between the constituent countries are the result of differences in the timing of childbearing or different family sizes among mothers. This is the first study to investigate childbearing trends in Britain by birth order and compare parity-specific fertility by country. In a subsequent study, we will examine the causes of recent fertility fluctuations in the UK.

Methodology

We move beyond aggregate fertility measures and examine childbearing trends by birth order, which is necessary to detect underlying changes in fertility patterns (Ní Bhrolcháin 1987; Murphy and Berrington 1993; Smallwood 2002). We calculate annual parity-specific fertility rates using hazard regression (or survival analysis) (Hoem 1987; Kulu and Hannemann 2016; Kulu et al. 2017). Our analytical strategy is as follows. For first births, we will calculate annual first-birth rates standardised for exact age of woman by fitting a proportional hazards regression model with two covariates: woman's age and calendar time. For second and third births, we will calculate annual parity-specific rates standardised also for duration since last birth (cf. Hoem 1990; Andersson 1999; Kulu and Hannemann 2016). This allows us to determine whether the recent changes in the TFR are attributable to the changes in first, second, third or fourth-birth rates, or all four, and whether this is similar for all UK countries. Next, we will calculate annual first-birth rates by age of woman; this provides us with valuable information on whether the (expected) increase in first birth rates in the first decade of this century is explained by the stopping of postponement of childbearing combined with the 'recuperation' effect or rather by an increased share of women who have children. Similarly, we will calculate annual duration-specific rates for second and third births to detect a possible acceleration of childbearing in the past decade and deceleration thereafter. Do we observe a shortening/lengthening of birth intervals or an increase/decrease in parity?

We have also developed a strategy to simultaneously analyse administrative data from two (or more) countries in fertility research. Individual-level administrative data from different countries cannot be merged due to issues of data confidentiality. To overcome this issue, we will use the count-data approach to explicitly compare parity-specific fertility rates across countries adjusted to various covariates (Hoem 1987; Preston 2005). The individual-level data will be used to calculate aggregated event-time (or occurrence-exposure) tables for each country, which will be aggregated by different combinations of variables; the country files will then be merged into one common database and the data will be analysed using a Poisson regression model (see Kulu et al. 2017). Our approach will provide rich and precise information on recent fertility dynamics in Britain.

Data

We will use data from the ONS Longitudinal Study (LS), and Scottish Longitudinal Study (SLS). The LS was initiated in 1971 and it contains linked census and vital events data on a 1 per cent sample of the population of England and Wales (currently more than 1 million records). The dataset is attractive for fertility research as it contains full fertility histories for women who were interviewed in 1971 and for those who became 16 in subsequent years. The ONS Longitudinal Study thus allows us to calculate parity-specific birth rates, standardised for demographic characteristics (woman's age and time since the last birth, if any) (Robards et al. 2011). The SLS was initiated in 1991 and they contain linked census and vital events data on a 5 per cent sample of the population of Scotland (currently more than 250 thousand individuals). The datasets allow the construction of fertility histories for women who were interviewed in 1991 and for those who became 16 in subsequent years. The SLS thus allows us to calculate parity-specific birth rates over past two decades standardised for demographic characteristics (the woman's age and the time since last birth if any).

Preliminary findings based on the ONS Longitudinal Study

For first births, the risk population is 167,053 women; for second births, the risk population is 90,930. We have 92,061 first births and 64 835 second births. How good is data quality? We have compared the percentage of women who entered motherhood by age and birth cohort. For women born between 1950 and 1959, the estimated percentage of mothers at age 45 is 84% for ONS Vital Statistics and 81% for LS; for the 1960s they are 81% and 78%, accordingly. The figure is slightly lower for LS among the recent cohorts. We have not included immigrants in this analysis – this might be one potential explanation for a small discrepancy.

Figure 2 presents relative first birth rates in England and Wales over the last three decades. The rates are standardised for women's age and presented relative to 2000-04, which is the reference point. We see that the rates declined in the 1990s, then increased in the first decade of this century, followed by a new decline in the last decade.

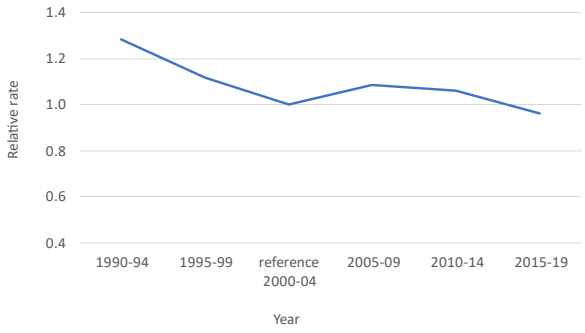

Figure 2. Relative first birth rates in England and Wales, 1990-2019. Adjusted for women's age
Source: ONS Longitudinal Study

Next, we disaggregate the first birth rates by age. First birth rates in all ages declined in the 1990s (Figure 3); as we see, this was part of a longer-term decline. In the first decade of this century, the decline continued in ages 15-19. In contrast, first birth rates in all other ages increased. Since the beginning of 2010s, we observe diverging trends: first birth rates have declined in all ages below 30 or even 35; they have increased in ages 35+. Clearly, it seems that the postponement of childbearing, the subsequent stopping of postponement (or a recuperation) and a further postponement have characterised the first birth trends in England and Wales over the past three decades.

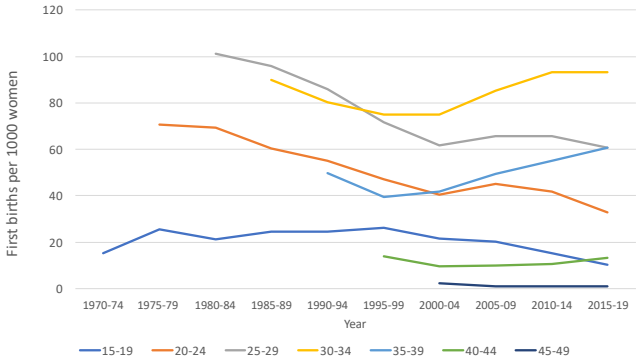

Figure 3. First birth rates in England and Wales by age, 1970-2019.
Source: ONS Longitudinal Study

Figure 4 presents relative second birth rates in England and Wales over the last three decades. The rates are standardised for the time since first birth and presented relative to 2000-04. We see that the second birth rates declined in the 1990s, and have stayed relatively stable since the turn of the century. Next, we have also adjusted the rates to women's age at first birth. There are small changes across the periods suggesting that the postponement of childbearing may explain a slight decline in the rates in the 1990s – with later childbearing women have less time to have another child.

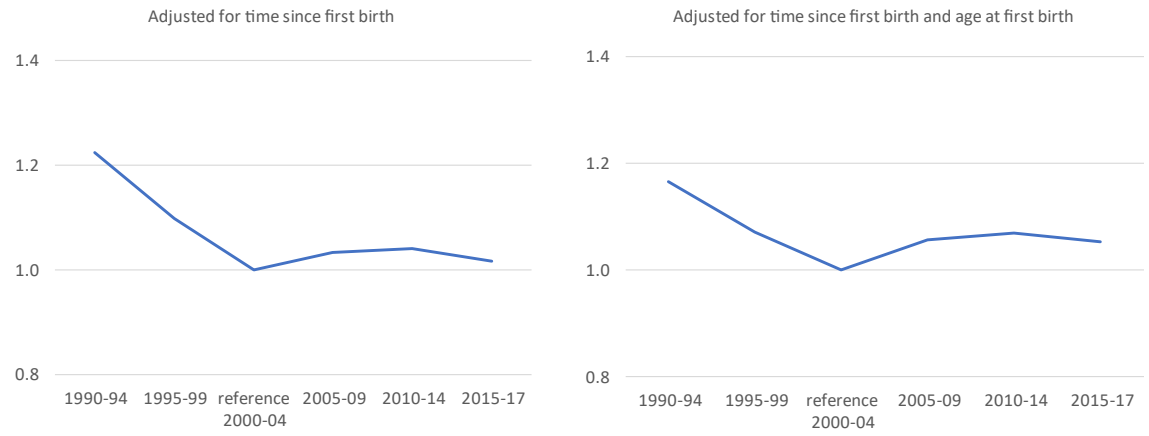

Figure 4. Relative second birth rates in England and Wales, 1990-2019.
Source: ONS Longitudinal Study

Next, we examine birth intervals. Whether birth intervals changed (i.e. lengthened) in the 1990s or all duration-specific rates declined? We see that most women have their second child between 1 and 5 years after their first birth (Figure 5). Interestingly, birth intervals have stayed relatively stable. Clearly, second birth rates declined in the 1990s at all durations suggesting that women had a declining likelihood of having a second child. Still there might be a small increase in birth intervals in the most recent period, which will require a closer inspection.

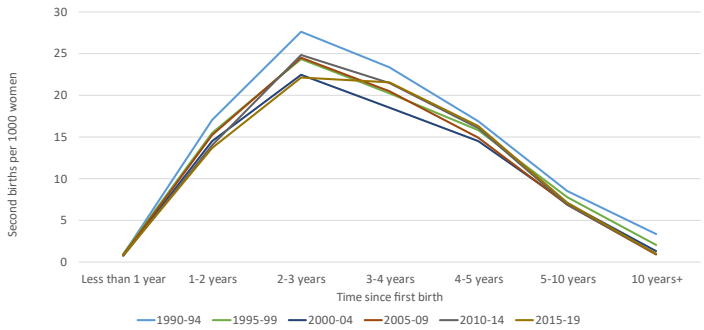

Figure 5. Second birth rates in England and Wales by time since first birth, 1990-2019
Source: ONS Longitudinal Study

Figure 6 presents trends in third birth rates. We see that these are similar to those of second birth, but the changes across periods have been more pronounced. Third birth rates significantly declined in the 1990s and they experienced a small increase in the first decade of this century. Again, the differences between the third birth levels in the 1990s and 2000s decrease once we adjust the rates

for the woman's age at first birth suggesting that the postponement explained some decline of the third birth rates in the 1990s. Interestingly, we also observe an increase in third birth rates over the past two decades, which will require a closer inspection. The analysis of birth intervals supports that third birth rates declined at all durations in the 1990s (Figure 7).

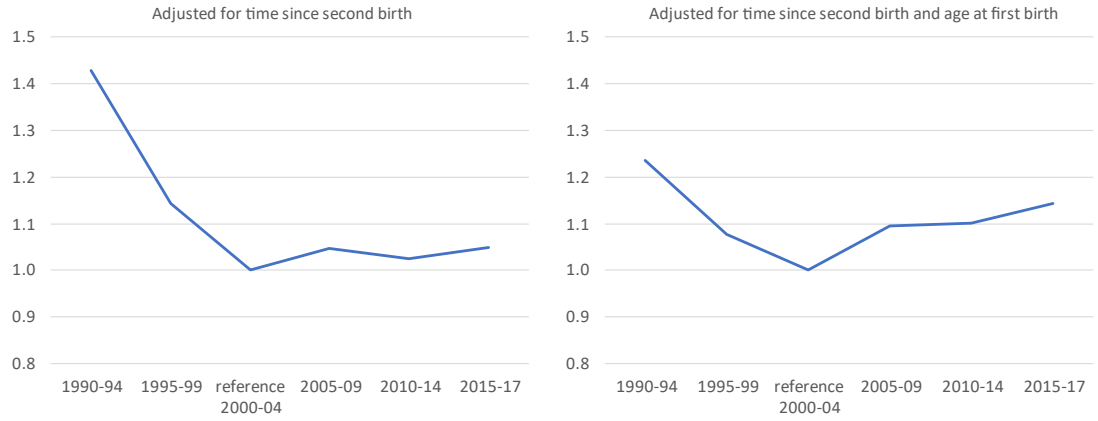

Figure 6. Relative third birth rates in England and Wales, 1990-2019.
Source: ONS Longitudinal Study

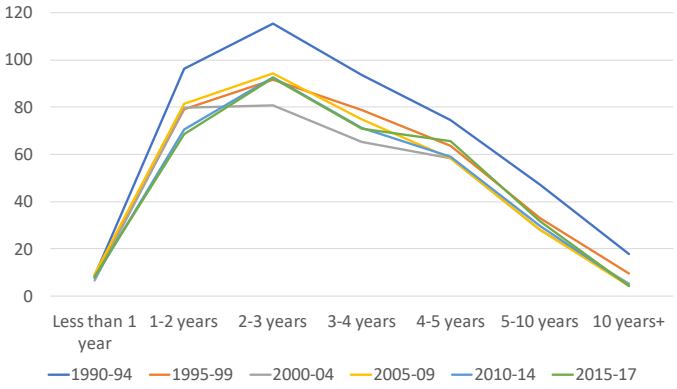

Figure 7. Third birth rates in England and Wales by time since second birth, 1990-2019
Source: ONS Longitudinal Study

Conclusion

This is the first study to investigate childbearing trends in Britain by birth order and compare parity-specific fertility by country. The study provides a detailed information on fertility trends in England, Wales and Scotland. The preliminary analysis of the ONS LS data shows, first, declining first birth rates in the 1990s, a small increase in the first decade of this century and a new decline thereafter. Second, the timing of parenthood (e.g. postponement) has been mostly responsible for the changes in first birth rates. Third, second and third birth rates declined in the 1990s; second birth rates have remained stable in the first decades of this century, whereas third birth rates have slightly increased. Finally, both declining first, second and third birth rates contributed to declining fertility in the 1990s. Changes in first birth rates have explained most fluctuations in aggregate fertility since the turn of the century.

Acknowledgements & Disclaimer

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