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Changes in Birth Seasonality in East and West Germany, 1946-2017

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Abstract: Seasonal trends in fertility are found in several contexts and are affected by societal and environmental factors. This paper documents how birth seasonality in East and West Germany changed over time and, in particular, after 1989 and the onset of Reunification. We use birth counts by month from the Human Fertility Database, broken down into East and West Germany, from 1946 to 2017. We observe similar birth seasonality in East and West Germany in the years from 1946 to the 1970s, with an initial peak occurring in the first months of the year followed by a second peak in September. In the 1970s, West Germany starts to diverge, with the emergence of a single peak in births in late summer. Shortly after Reunification, the seasonal fertility trends found in West Germany are mirrored in East Germany. Consequently, it appears that the socioeconomic, cultural and institutional differences in the two areas have potentially influenced the intra-annual distribution of births, as well as the timing and number of children as described in previous studies.

Keywords: Seasonality · Germany · Fertility · Demographic changes

1 Introduction

Seasonal trends in births are found in several contexts around the world, but are not homogeneous across regions, time and sociodemographic groups. Importantly, economic (*Ruiu/Breschi* 2019), cultural (*Symul et al.* 2022; *Wood et al.* 2017), environmental (*Wilson et al.* 2020), sociodemographic (*Bobak/Gjonca* 2001; *Haandrikman/van Wissen* 2008; *Recio Alcaide et al.* 2022), and physiological factors (*Ellision et al.* 2005) as well as parity (*Sobotka et al.* 2005), and pandemics (*Aassve et al.* 2021; *Krombholz* 2024) are major determinants of birth seasonality. However, as economic, cultural and environmental factors change over time, shifts in the seasonality of births may well be expected to follow. For example, existing research has reported extensively on how the industrialisation process has affected seasonality of fertility in the past (*Ruiu/Breschi* 2019). Nevertheless, there is a lack of studies investigating how major socioeconomic and institutional changes in already industrialised settings with similar environmental conditions alter seasonality of births. For instance, the socioeconomic, technological and cultural differences

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evident in East and West Germany after the Second World War have been found to influence the timing and total number of births (*Goldstein/Kreyenfeld* 2011; *Kreyenfeld* 2003, 2004), but the intra-annual distribution of births could have differed as well.

In this study, we explore how seasonality of fertility is shaped by long-term differences in socioeconomic factors and sudden changes in economic structures, drawing on the unique context found in East Germany and West Germany in the period following the Second World War. The economic and societal differences between East and West Germany post-Second World War have been substantial and it is possible that they have shaped seasonality of births. Notably, environmental factors are not expected to determine differences in the two areas as found in other contexts (*Martinez-Bakker et al.* 2014; *Wilson et al.* 2020), since the two areas share a similar climate. Conversely, differences might be expected due to the higher religiosity found in West Germany compared with the East. The latter has one of the highest rates of atheism, due in part to the strong process of secularisation experienced during the rule of the Socialist Unity Party of Germany (SED) (*Froese/Pfaff* 2005). The higher share of the population employed in agriculture in East Germany could be a determinant of higher birth seasonality as already documented in the 19th century, most notably for non-marital births (*Klüsener/Goldstein* 2016). Furthermore, the abrupt changes in socioeconomic structures that occurred in East Germany with the process of Reunification may have brought about a sudden change in seasonal trends in the area. Consequently, by exploring seasonal trends in East and West Germany, we contribute to the broader existing literature focusing on seasonal fertility trends and the potential determinants thereof.

2 Change in seasonality of fertility over time

Only a small number of studies have documented changes in the seasonality of births over time. In Spain, a peak in births was documented in the spring months between the 1940s and the 1980s, but a decline in such a peak was observed in later years, disappearing in the 2000s (*Cancho-Candela et al.* 2007). In recent decades, this has been replaced by a new peak in late summer (*Recio Alcaide et al.* 2023). Similar findings to Spain were also observed in France, West Germany, the Netherlands (*Haandrikman/van Wissen* 2008) and Poland (*Cypryjański* 2019; *Lerchl et al.* 1993; *Régnier-Loilier/Divinagracia* 2010). In Sweden, births peaked in spring between 1940 and 1999, but showed a loss of seasonality in the 21st century (*Dahlberg/Andersson* 2018).

There are multiple mechanisms used to explain changes in birth seasonality. One explanation relates to industrialisation and the economic and technological developments in societies *(Dahlberg/Andersson* 2018). For instance, in Italy at the turn of the 20th century, the shift in seasonal birth trends occurred earlier in the north of the country than in the south due to the north's earlier industrial development (*Ruiu/Breschi* 2019). Other possible factors relate to the introduction of birth control, a higher level of non-marital births and the declining importance of religion (*Recio Alcaide et al.* 2023). Furthermore, short-term changes in birth seasonality have

been observed and linked to environmental factors such as hot temperatures (*Conte Keivabu et al.* 2024; *Hajdu/Hajdu* 2022) or pandemics (*Chandra et al.* 2018). Nevertheless, it remains unclear as to how sudden changes in socioeconomic and institutional structures might affect birth seasonality.

3 Data and methods

In this study, we leverage data on monthly birth counts separately for East and West Germany from January 1946 to December 2017, as provided by the Human Fertility Database (*HFD* 2023) (for further information on the data, we refer the reader to the HFD documentation on Germany).

To analyse the change in the seasonality of fertility in the two areas over time, we first adjust our time series of monthly birth counts by the number of days in each month. Second, we construct a birth index that is computed as: $I_{m,y,r} = \frac{B_{m,y,r}}{MA_{m,y,r}} * 100$, in which the index *I* for year *y*, month *m* and region *r* is determined by the monthly birth counts in region *r* and month *m*, divided by the centred moving average number of births in region *r* and year *y*, and multiplied by 100. The moving average is computed symmetrically, averaging the 12 months around a specific month (six months prior and six months after). In this regard, we follow similar previous studies that used such an index to observe monthly variations in births from expected values in a specific year (*Haandrikman/van Wissen* 2008; *Recio Alcaide et al.* 2022; *Wilson et al.* 2020). Third, we estimate the change in seasonality over time based on equation (1):

1) $Y_{m,y,r} = \alpha_r + MONTH_m X \alpha_r + \varepsilon_{m,y,r}$

Here, we run an OLS model with the birth index as our outcome representing the index in region *r* at month *m* and year *y*. We then run an interaction between our variable α denoting region *r* and the month variable *MONTH* and we run this model for eight separate periods, from 1946 to 1954, 1955 to 1963, 1964 to 1972, 1973 to 1981, 1982 to 1989, 1990 to 1998, 1999 to 2007 and 2008 to 2017. The results allow us to provide an estimate of the months with higher and lower numbers of births in a specific period and region of Germany.

Finally, to better investigate changes in birth seasonality in the years prior to Reunification (1980-1989) compared with the periods immediately thereafter (1990 to 1998, 1999 to 2007 and 2008 to 2017), we use a p-score as per similar previous studies analysing changes in seasonal trends (*Fallesen* 2021). The p-score is used to calculate the percentage difference in the birth index of a given month in the *period* after Reunification relative to the *baseline*, namely the years before Reunification. The p-score is calculated as:

2) $P_{m,period,r} = \frac{I_{m,period,r} - I_{m,baseline,r}}{I_{m,baseline,r}}$

here, with P denoting the percentage change in the monthly birth index in the periods after Reunification relative to the period just before Reunification. Positive values therefore denote an increase in the birth index in the periods after Reunification, whereas negative values describe a decrease. Importantly, we calculate this score separately for East and West Germany.

The code and data available to replicate the analysis are accessible in this repository: https://osf.io/9a835/.

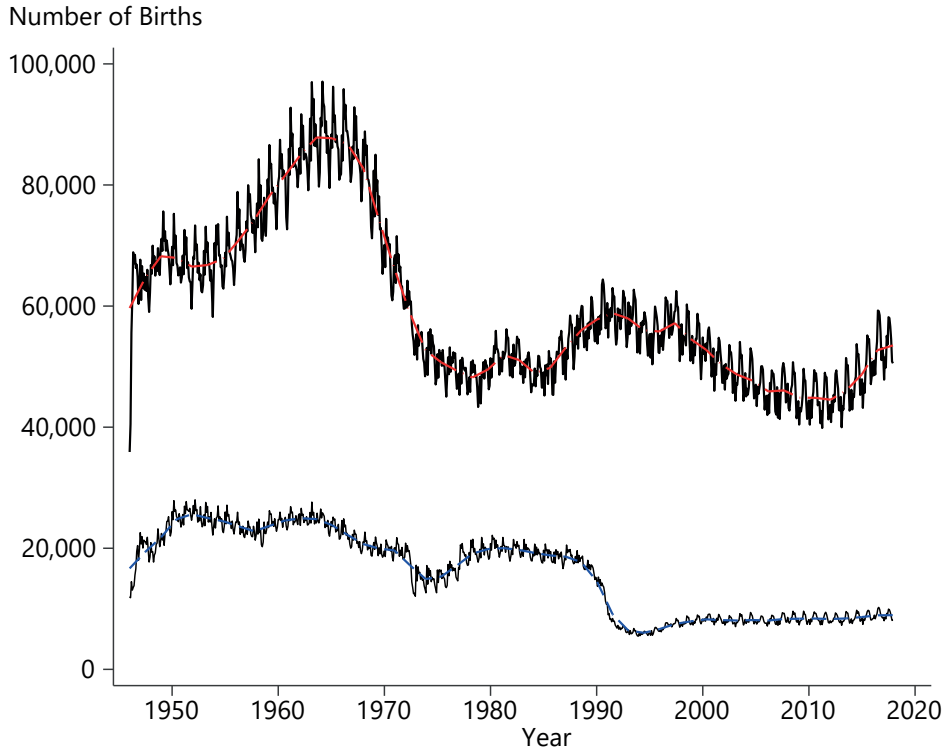
4 Results

In Figure 1, we plot the total number of monthly births in East and West Germany from 1946 to 2017. As reported in several previous studies, we observe an increase in births in the years after the Second World War. However, we also observe a sharp decline in births in West and East Germany in the 1970s that coincides with the oil crisis. Following Reunification, births in East Germany decline sharply, with a steady, albeit only partial recovery from the early 2000s onwards. Conversely, in West Germany, there is no sharp decline in births in the immediate post-Reunification period. Such descriptive findings are consistent with existing studies depicting a difference in fertility rates before and after Reunification, especially in East Germany (*Goldstein/Kreyenfeld* 2011; *Kreyenfeld* 2004). Nevertheless, it should be noted that we plot these numbers here for descriptive purposes only and that the trends depicted show the absolute number of births but do not take into consideration changes in population size and age structure. As a result, these should be interpreted carefully and compared with figures such as the Total Fertility Rate (TFR) provided in previous studies (*Goldstein/Kreyenfeld* 2011; *Kreyenfeld* 2004).

To better understand the spread of births between months in a given year, we compute a yearly coefficient of variation (CV) in East and West Germany. The CV is calculated as: $C_{y,r} = \frac{\sigma_{y,r}}{\mu_{y,r}} * 100$. Here, we divide the standard deviation in region *r* and year *y* by the average number of births in the same region and year. The values of the CV are interpreted as percentages and denote variability relative to the mean, where high values signify years with values dispersed from the average, and vice versa for low values.

In Figure 2, we observe the yearly CV in East and West Germany from 1946 to 2017. The CV is relatively low, showing values of around 5 for most of the years. Nevertheless, in certain periods the CV displays a sharp increase. A high coefficient of variation in both East and West Germany is observed in the years immediately following the Second World War, but declines thereafter. Notably, we observe a major increase in the coefficient of variation in East Germany in 1972. This increase is surprising and could be the result of several political, socioeconomic and cultural factors that occurred in the late 1960s and early 1970s. For instance, several reforms in family and reproductive policies were implemented in 1972 and might explain this pattern (*Kreyenfeld* 2004). Monetary incentives were implemented to boost fertility in a country with low immigration *(Kreyenfeld* 2004). However, in Figure 1 (also shown in more detail in Appendix: Fig. A1), we observe a notable decline in

Fig. 1: Number of births in East (blue) and West Germany (red)

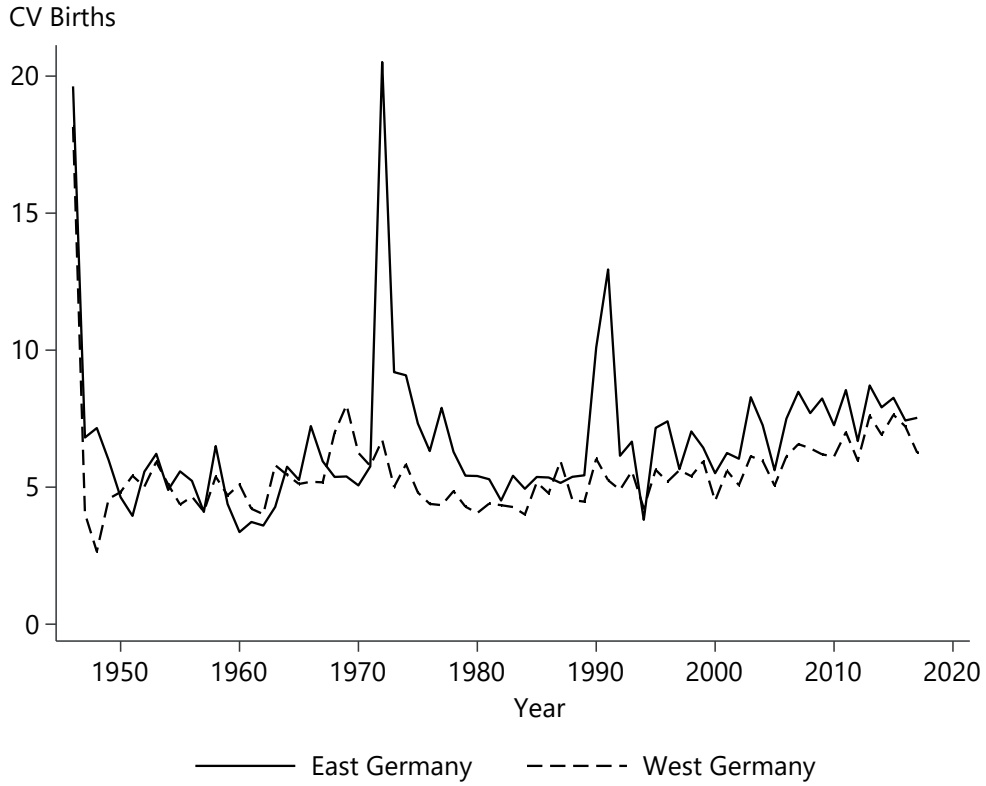


Note: In the Figure, we show the monthly number of births in East and West Germany between 1946 and 2017. The monthly values are shown in black. The red line is a curve generated using a kernel-weighted (Epanechnikov) local regression fit with a bandwidth of three months. The blue line represents a similar curve, but for East Germany.

Source: Human Fertility Database, own calculations.

births in East Germany in 1972, from August onwards in particular. Consequently, the family policies implemented to boost fertility do not seem to have had the expected impact, rather the contrary. March 1972 witnessed a major change in reproductive rights with the legalisation of abortion, making it available to all women within 12 weeks of pregnancy and at later stages for specific cases such as health dangers to the mother (*Mehlan* 1990). Approximately 110,000 abortions were performed in 1972 but the number decreased to some 80,000 in 1988 (*David* 1992; *Mehlan* 1990). Studies on the legalisation of abortion and the effects on the fertility rate find mostly a negative association (*Levine et al.* 1999; *Pop-Eleches* 2010; *Valente* 2014), although there are also some contrasting findings (*Fernández/Juif* 2023). In East Germany, we observe a decline in births from 234,870 in 1971 to 200,443 in 1972, suggesting a decline of about 14.7 percent which is somewhat comparable with the decline of 11 percent documented in parts of the United States (*Levine et al.* 1999). Additionally, in Appendix Figure A1, we see that the average number of births in

Fig. 2: Coefficient of variation in East and West Germany



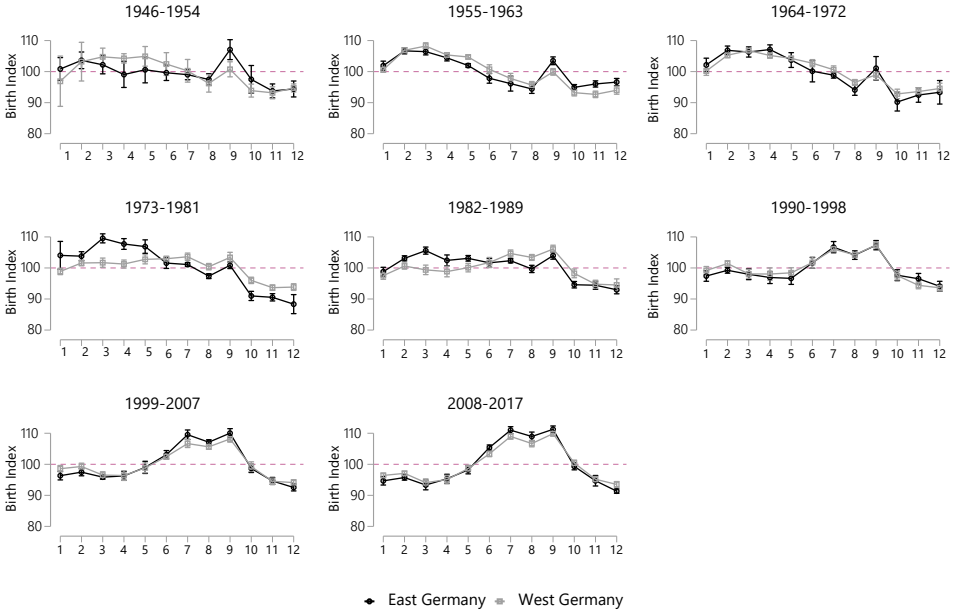
Note: The coefficient of variation in births in East and West Germany is reported for the period from 1946 to 2017.

Source: Human Fertility Database, own calculations.

January and February of 1972 resembles that of the previous three years, but a decline can be seen from March onwards, with the largest decrease evident eight and nine months after the legalisation of abortion, in November and December 1972 respectively. Nevertheless, such insights should be treated with caution and require additional future research, since other competing social and economic factors could have contributed to the observed decrease in births. Conversely, the sharp increase in the CV in 1990 in East Germany can be linked to the process of Reunification and the political movements of 1989 which depressed births in the early months of 1990 and postponed them to later months of 1990 as against previous years (Appendix: Fig. A2). Post-Reunification, East and West Germany exhibit a similar CV in births, albeit with a slightly higher value in East Germany.

In Figure 3, we show results based on equation (1) run separately for the eight periods (1946 to 1954, 1955 to 1963, 1964 to 1972, 1973 to 1981, 1982 to 1989, 1990 to 1998, 1999 to 2007 and 2008 to 2017). Here, we observe higher values in the birth index during the early months of a year in both regions between 1946 and

Fig. 3: Seasonality of fertility in East and West Germany across eight periods from 1946 to 2017



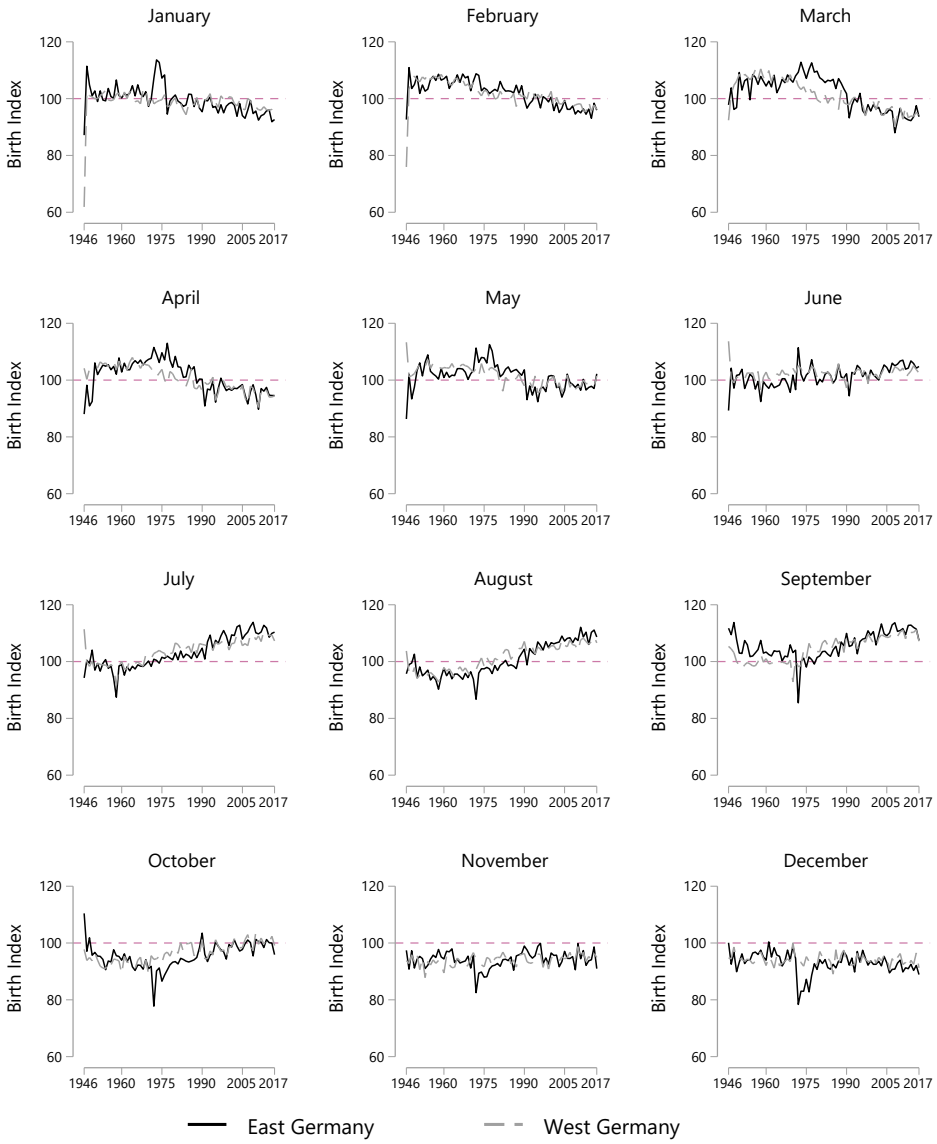
Note: Our results are reported based on equation (1), run separately for the eight periods 1946 to 1954, 1955 to 1963, 1964 to 1972, 1973 to 1981, 1982 to 1989, 1990 to 1998, 1999 to 2007 and 2008 to 2017. We report 95% confidence intervals.

Source: Human Fertility Database, own calculations.

1972. Births tend to peak in February or March, but decline in the months thereafter, with a slight uptick in the month of September that is likely determined by a higher rate of conception during the winter holidays (*Wood et al.* 2017). In West Germany, the peak observed in the first months of the year decreases over time, becoming a period of below average births from 1982 onwards, but a new peak emerges in late summer and September. In East Germany, a peak in the early months of the year is observed up until 1989, but disappears in the periods thereafter to show a similar seasonal trend to that of West Germany.

In Figure 4, we visualise the birth index for each month over time and separately by region. We see that the months of March, April and May show the peaks in births during the first decades. By contrast, we see that the increase in the months of July, August and September takes place in the later decades. As observed in Figure 3, the shift in the trend happens earlier in West Germany, namely in the 1970s, and is slower to take place in East Germany where it accelerates and is completed in the 1990s. The observed shift indicates that conception was frequent during the summer months in the decades after the Second World War, but a postponement in conceptions to autumn and winter months emerged in the 1970s in West Germany and in the 1990s in East Germany. A common trend in the two regions regards the

Fig. 4: Birth index for each month from 1946 to 2017

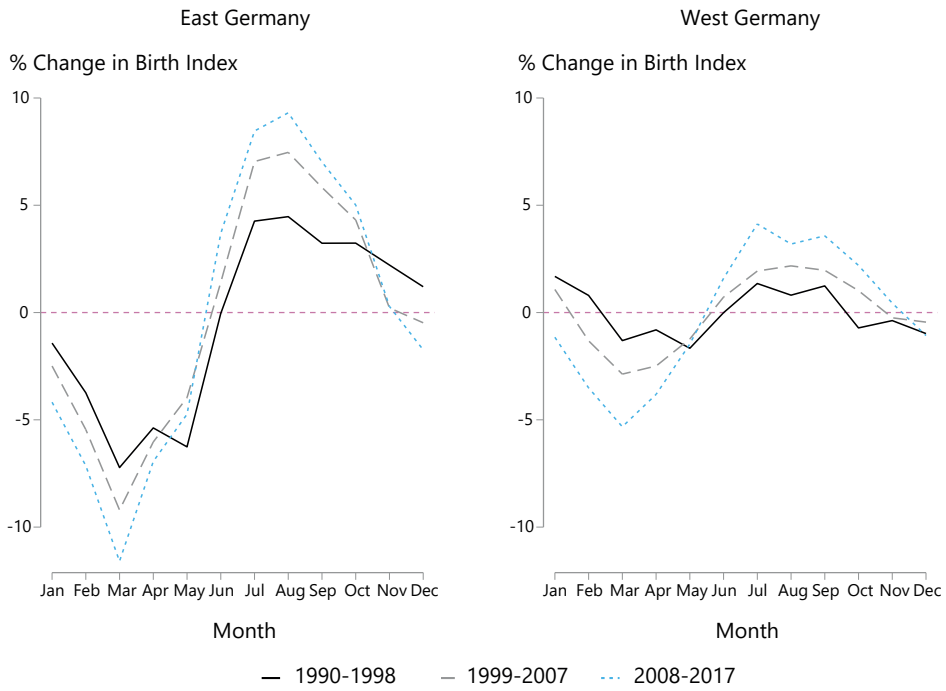


Note: We plot the birth index separately for each month from 1946 to 2017, in both East and West Germany.

Source: Human Fertility Database, own calculations.

months with the lowest number of births. This remains concentrated in the final two months of the year (November and December). However, March and April exhibit a significant decline in their seasonal component, with birth levels dropping to lows comparable with those seen in November and December.

Fig. 5: Monthly percentage difference in the birth index post-Reunification relative to the period 1980-1989



Note: In the left panel, we show the percentage difference in the birth index in the periods post-Reunification relative to the period 1980-1989 in East Germany. In the right panel, we show similar values but for West Germany. The periods are 1990-1998, 2000-2007 and 2008-2017.

Source: Human Fertility Database, own calculations.

In Figure 5, we show the p-score in East and West Germany, describing the percentage change in the birth index in the periods after Reunification relative to the period 1980-1989. In East Germany, we observe a more significant decline in the birth index concentrated in the first months of the year, followed by an increase in late summer. The decline is sharpest for the month of March and the period 2008-2017, when it exceeds -10 percent. By contrast, the increase is greatest in the late summer months and in the latest period 2008-2017, during which time the increase recorded was about 10 percent. In West Germany, a decline can be seen during the first months of the year although this is not as stark as in the East and is equal to about 5 percent. Similarly, the increase in the birth index is concentrated in the late summer months and is more significant in the period 2008-2017, albeit of minor relevance as it is below 5 percent.

5 Discussion and conclusion

This study investigated seasonal trends in fertility and their evolution in East and West Germany from 1946 to 2017. First, we observed a change in the seasonality of births over time, with births peaking in spring in the earlier periods and in late summer in the later period. Second, the change in seasonality occurred first in West Germany in the 1970s, and post-Reunification in the 1990s in East Germany. Third, we observe greater declines in the birth index in the early months of the year in the periods post-1990 relative to the pre-Reunification period (1980-1989) in both East and West Germany.

The observed shifts in the season of peak fertility, from spring to late summer, align with existing studies on West Germany (*Lerchl et al.* 1993), East and West Germany (*Häussler/Dudenhausen* 2024) and other countries such as Spain, Sweden, the Netherlands, France and Poland (*Recio Alcaide et al*. 2023; *Cypryjański* 2019; *Dahlberg/Andersson* 2018; *Haandrikman/van Wissen* 2008; *Régnier-Loilier/ Divinagracia* 2010). However, we also observe that the shift in the season of peak births does not happen at the same time in East and West Germany. In the 1970s, East Germany continues to show a preference for early-year births whereas West Germany begins to see a shift towards a late summer peak. Interestingly, alignment of East German birth seasonality with that of West Germany only occurs post-Reunification. These trends lay bare the question of which factors determined the timing in the shift in seasonality in the two regions, and why this occurred only after Reunification in East Germany.

Testing the factors that shape such trends in seasonality is beyond the scope of this study, but here we provide some tentative explanations. Previous studies attributed the peak in births during spring to agricultural cycles (*Klüsener/Goldstein* 2016; *Ruiu/Breschi* 2019), whereas a peak in September has been described as being attributable to higher levels of sexual activity during the winter festivities (*Symul et al.* 2022; *Wood et al.* 2017). It is difficult to argue how much of the sudden change in birth seasonality observed in East Germany is due to the decline in the share of the population employed in the agricultural sector after Reunification. In 1991, 7.3 percent of the population in East Germany was still employed in agriculture and forestry compared with 3.5 percent in West Germany (*Burda/Hunt* 2001). In 2000, the numbers converged to 3.6 percent in East Germany and 2.4 percent in West Germany (*Burda/Hunt* 2001). Consequently, the number of people employed in agriculture was higher in East than in West Germany, but still limited relative to the overall population. Differences in religiosity are unlikely to explain the later changes in birth seasonality observed in East Germany. Further, similar attitudes on the use of contraception have been documented in East and West Germany and differences are unlikely to be fully explained by the accessibility to such technologies (*Oddens et al.* 1993), as argued in a recent study (*Häussler/Dudenhausen* 2024). Arguably, other sociodemographic factors related to the broader change in fertility behaviour, coinciding with a sharp decline in TFR, could have brought about a change in birth seasonality in East Germany after Reunification. For instance, a previous study for the Netherlands argued that seasonal changes in births were driven by a change

in age at first birth and changes in parity (*Haandrikman/van Wissen* 2008). In fact, previous findings point to an increase in mean age at birth after Reunification and a decline in second births among East German women post-Reunification (*Arránz Becker et al.* 2010; *Kreyenfeld* 2003).

In conclusion, this study documents the changes in birth seasonality in East and West Germany from 1946 to 2017. The divergent fertility behaviours in East and West Germany, and their alignment post-Reunification, bring further evidence on how economic and sociodemographic factors could influence fertility decisions. Nevertheless, our findings raise important questions regarding the mechanisms that determined the observed changes in birth seasonality. Future studies could test which precise mechanisms led to the observed changes in birth seasonality in East and West Germany and what influenced their timing, potentially providing important lessons in order to understand human fertility behaviour in other contexts.

References

Aassve, Arnstein et al. 2021: Early Assessment of the Relationship between the COVID-19 Pandemic and Births in High-Income Countries. In: Proceedings of the National Academy of Sciences 118,36: e2105709118. https://doi.org/10.1073/pnas.2105709118

Arránz Becker, Oliver; Lois, Daniel; Nauck, Bernhard 2010: Differences in Fertility Patterns between East and West German Women. Disentangling the Roles of Cultural Background and of the Transformation Process. In: Comparative Population Studies 35,1: 7-34. https://doi.org/10.12765/CPoS-2010-02

Bobak, Martin; Gjonca, Arjan 2001: The Seasonality of Live Birth Is Strongly Influenced by Socio-Demographic Factors. In: Human Reproduction 16,7: 1512-1517. https://doi.org/10.1093/humrep/16.7.1512

Burda, Michael; Hunt, Jennifer 2001: From Reunification to Economic Integration: Productivity and the Labor Market in Eastern Germany. In: Brookings Papers on Economic Activity 32,2: 1-92. https://doi.org/10.1353/eca.2001.0016

Cancho-Candela, Ramón; Andrés-de Llano, Jesús María; Ardura-Fernández, Julio 2007: Decline and Loss of Birth Seasonality in Spain: Analysis of 33 421 731 Births over 60 Years. In: Journal of Epidemiology and Community Health 61,8: 713-718. https://doi.org/10.1136/jech.2006.050211

Chandra, Siddharth et al. 2018: Short-Term Birth Sequelae of the 1918-1920 Influenza Pandemic in the United States: State-Level Analysis. In: American Journal of Epidemiology 187,12: 2585-2595. https://doi.org/10.1093/aje/kwy153

Conte Keivabu, Risto; Cozzani, Marco; Wilde, Joshua 2024: Temperature and Fertility: Evidence from Spain. In: Population Studies 1-15. https://doi.org/10.1080/00324728.2024.2382152

Cypryjański, Jacek 2019: Changes in Seasonality of Births in Poland in the Years 1900-2009. In: Demographic Research 40: 1441-1454. https://doi.org/10.4054/DemRes.2019.40.49

Dahlberg, Johan; Andersson, Gunnar 2018: Changing Seasonal Variation in Births by Sociodemographic Factors: A Population-Based Register Study. In: Human Reproduction Open 4, hoy015. https://doi.org/10.1093/hropen/hoy015

David, Henry P. 1992: Abortion in Europe, 1920-91: A Public Health Perspective. In: Studies in Family Planning 23,1: 1-22. https://doi.org/10.2307/1966824

Ellision, Peter T.; Valeggia, Claudia R.; Sherry, Diana S. 2005: Human Birth Seasonality. In: *Brockman, Diane K.; van Schaik, Carel P.* (Eds.): Seasonality in Primates: Studies of Living and Extinct Human and Non-Human Primates, Cambridge Studies in Biological and Evolutionary Anthropology. Cambridge: Cambridge University Press: 379-400. https://doi.org/10.1017/CBO9780511542343.014

Fallesen, Peter 2021: Decline in Rate of Divorce and Separation Filings in Denmark in 2020 Compared with Previous Years. In: Socius 7. https://doi.org/10.1177/23780231211009991

Fernández, Juan J.; Juif; Dácil 2023: Does Abortion Liberalisation Accelerate Fertility Decline? A Worldwide Time-Series Analysis. In: European Journal of Population / Revue Européenne de Démographie 39,36. https://doi.org/10.1007/s10680-023-09687-y

Froese, Paul; Pfaff, Steven 2005: Explaining a Religious Anomaly: A Historical Analysis of Secularization in Eastern Germany. In: Journal for the Scientific Study of Religion 44,4: 397-422. https://doi.org/10.1111/j.1468-5906.2005.00294.x

Goldstein, Joshua R.; Kreyenfeld, Michaela 2011: Has East Germany Overtaken West Germany? Recent Trends in Order-Specific Fertility. In: Population and Development Review 37,3: 453-472. https://doi.org/10.1111/j.1728-4457.2011.00430.x

Haandrikman, Karen; van Wissen, Leo J. G. 2008: Effects of the Fertility Transition on Birth Seasonality in the Netherlands. In: Journal of Biosocial Science 40,5: 655-672. https://doi.org/10.1017/S0021932008002733

Hajdu, Tamás; Hajdu, Gábor 2022: Temperature, Climate Change, and Human Conception Rates: Evidence from Hungary. In: Journal of Population Economics 35,4: 1751-1776. https://doi.org/10.1007/s00148-020-00814-1

Häussler, Bertram; Dudenhausen, Joachim W. 2024: Shifts in Peak Month of Births and Socio-Economic Factors: A Study of Divided and Reunified Germany 1950-2022. In: Journal of Perinatal Medicine. https://doi.org/10.1515/jpm-2024-0526

HFD 2023: Human Fertility Database [www.humanfertility.org, 29.06.2024].

Klüsener, Sebastian; Goldstein, Joshua R. 2016: A Long-Standing Demographic East-West Divide in Germany. In: Population, Space and Place 22,1: 5-22. https://doi.org/10.1002/psp.1870

Kreyenfeld, Michaela 2003: Crisis or Adaptation – Reconsidered: A Comparison of East and West German Fertility Patterns in the First Six Years after the 'Wende'. In: European Journal of Population / Revue Européenne de Démographie 19,3: 303-329. https://doi.org/10.1023/A:1024992712815

Kreyenfeld, Michaela 2004: Fertility Decisions in the FRG and GDR: An Analysis with Data from the German Fertility and Family Survey. In: Demographic Research, Special Collection 3: 275-318. https://doi.org/10.4054/DemRes.2004.S3.11

Krombholz, Heinz 2024: Seasonality of Birth Rate before and during COVID-19 Pandemic in Germany. In: PsychArchives. https://doi.org/10.23668/psycharchives.15232

Lerchl, Alexander; Simoni, Manuela; Nieschlag, Eberhard 1993: Changes in Seasonality of Birth Rates in Germany from 1951 to 1990. In: Naturwissenschaften 80,11: 516-518. https://doi.org/10.1007/BF01140808

Levine, Phillip B. et al. 1999: Roe v Wade and American Fertility. In: American Journal of Public Health 89,2: 199-203. https://doi.org/10.2105/ajph.89.2.199

Martinez-Bakker, Micaela et al. 2014: Human Birth Seasonality: Latitudinal Gradient and Interplay with Childhood Disease Dynamics. In: Proceedings of the Royal Society B: Biological Sciences 281,1783. https://doi.org/10.1098/rspb.2013.2438

Mehlan, Karl Heinz 1990: "A Responsibility for the Whole Society" -- How the Government Tackles Family Planning in the German Democratic Republic. In: Entre Nous 14-15: 17.

Oddens, Björn J. et al. 1993: Contraception in Germany: A Review. In: Advances in Contraception 9,2: 105-116. https://doi.org/10.1007/BF01990141

Pop-Eleches, Cristian 2010: The Supply of Birth Control Methods, Education, and Fertility: Evidence from Romania. In: Journal of Human Resources 45,4: 971-997. https://doi.org/10.3368/jhr.45.4.971

Recio Alcaide, Adela; López, César Pérez; Bolúmar, Francisco 2022: Influence of Sociodemographic Factors in Birth Seasonality in Spain. In: American Journal of Human Biology 34,10: e23788. https://doi.org/10.1002/ajhb.23788

Recio Alcaide, Adela; López, César Pérez; Montrull, Francisco Bolúmar 2023: Changes in Birth Seasonality in Spain: Data from 1863-1870 and 1900-2021. In: Demographic Research 49: 969-982. https://doi.org/10.4054/DemRes.2023.49.35

Régnier-Loilier, Arnaud; Divinagracia, Emily 2010: Changes in the Seasonality of Births in France from 1975 to the Present. In: Population 65,1: 145-185.

Ruiu, Gabriele; Breschi, Marco 2019: Intensity of Agricultural Workload and the Seasonality of Births in Italy. In: European Journal of Population / Revue Européenne de Démographie 36,1: 141-169. https://doi.org/10.1007/s10680-019-09524-1

Sobotka, Tomáš et al. 2005: Monthly Estimates of the Quantum of Fertility: Towards a Fertility Monitoring System in Austria. In: Vienna Yearbook of Population Research 2005: 109-141. https://doi.org/10.1553/populationyearbook2005s109

Symul, Laura et al. 2022: Unmasking Seasonal Cycles in Human Fertility: How Holiday Sex and Fertility Cycles Shape Birth Seasonality. In: medRxiv – The Preprint for Health Sciences. https://doi.org/10.1101/2020.11.19.20235010

Valente, Christine 2014: Access to Abortion, Investments in Neonatal Health, and Sex-Selection: Evidence from Nepal. In: Journal of Development Economics 107: 225-243. https://doi.org/10.1016/j.jdeveco.2013.12.002

Wilson, Tom; McDonald, Peter; Temple, Jeromey 2020: The Geographical Patterns of Birth Seasonality in Australia. In: Demographic Research 43,40: 1185-1198. https://doi.org/10.4054/DemRes.2020.43.40

Wood, Ian B. et al. 2017: Human Sexual Cycles Are Driven by Culture and Match Collective Moods. In: Scientific Reports 7,17973. https://doi.org/10.1038/s41598-017-18262-5

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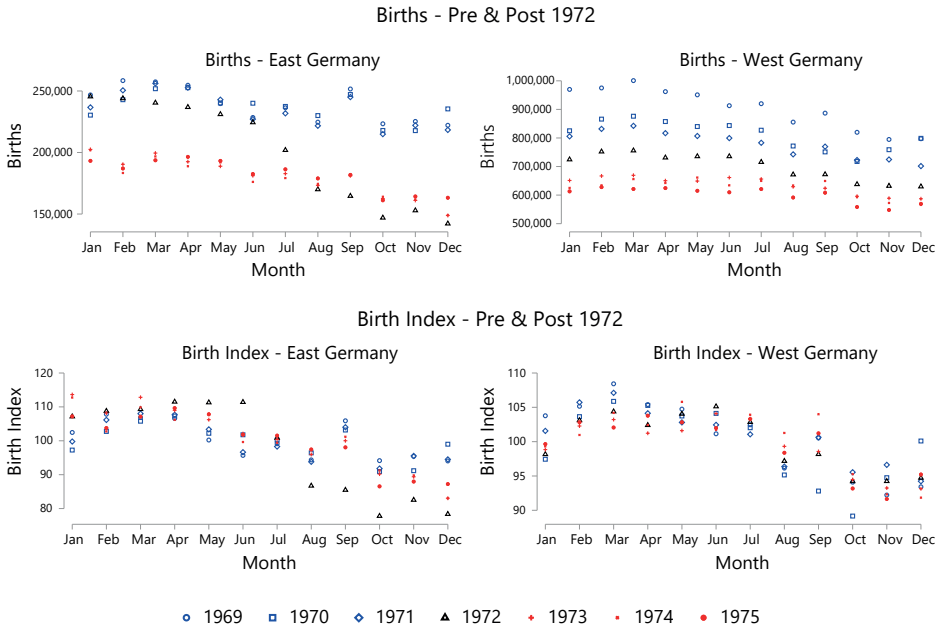
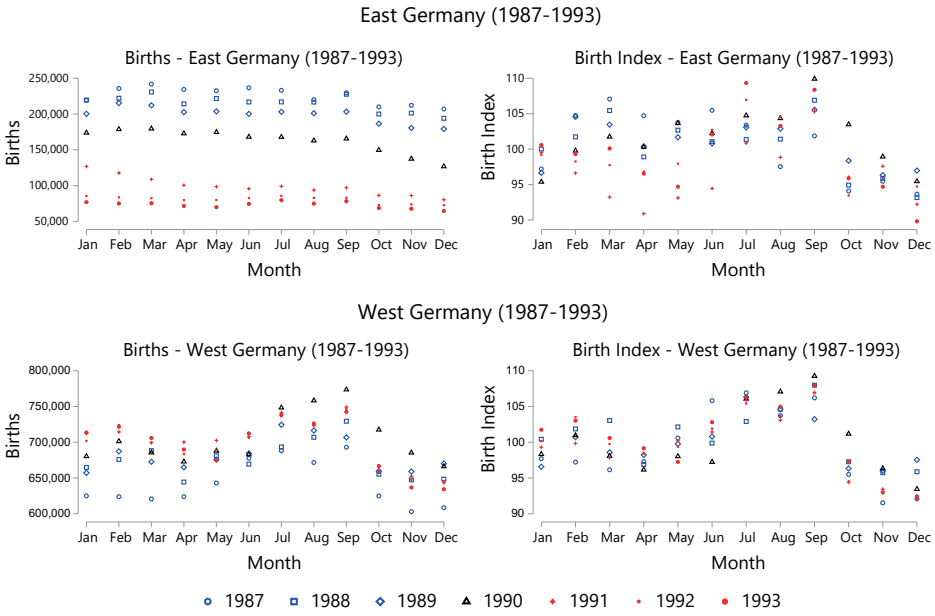
Fig. A1: Monthly birth counts and birth index in East and West Germany 1969-1975



Note: We plot the birth counts and birth index in the years between 1969 and 1975 in East and West Germany. Pre-1972 values are shown in blue and post-1972 values in red. The values for 1972 are in black.

Source: Human Fertility Database, own calculations.

Fig. A2: Monthly birth counts and birth index in East and West Germany 1987-1993



Note: We plot the birth counts and birth index in the years 1987-1993 in East and West Germany. Pre-1990 values are shown in blue and post-1990 values in red. The values for 1990 are in black.

Source: Human Fertility Database, own calculations.

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