DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 48, ARTICLE 16, PAGES 421–438
PUBLISHED 22 MARCH 2023
https://www.demographic-research.org/Volumes/Vol48/16/
DOI: 10.4054/DemRes.2023.48.16

Descriptive Finding

How much time is left? International trends in parenthood expectancy

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Demographic Research: Volume 48, Article 16
Descriptive Finding

How much time is left? International trends in parenthood expectancy

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Abstract

BACKGROUND
Many industrialized societies have experienced increases in life expectancy and in the mean age at first birth (MAFB). This has likely impacted the lifetime that parents share with their children; i.e., parenthood expectancy (PEX).

OBJECTIVE
With increasing life expectancy contributing positively to PEX and increasing MAFB leading to a reduction in the time spent as an ever-parent, our goal is to study how PEX for both men and women has been affected in different countries over time.

METHODS
Using harmonized fertility and mortality data for women and men in 37 countries, we provide PEX estimates from a period perspective. By means of counterfactual analyses, we study the extent to which each of the two components was responsible for the observed national trends in PEX.

RESULTS
PEX varies between 50–58 years for women and tends to be up to 10 years shorter for men. While for mothers the effects of increasing MAFB and life expectancy almost cancel each other out, PEX for men would have been more heavily affected by stagnation in survival conditions.

CONCLUSIONS
For most countries and both sexes, PEX has been increasing over the observational period. However, trends in PEX over time are strongly country-specific and depend on the onset of fertility postponement relative to gains in life expectancy.

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CONTRIBUTION

We present a novel indicator that allows researchers to assess the potential impact of demographic changes on intergenerational support capacities, as well as the acceptable remaining lifespan at the onset of parenthood.

1. Introduction

Over the last decades, both life expectancy and age at first birth have increased markedly in many societies. These two macro-demographic trends have had profound structural consequences for the family. The combination of low mortality and delayed fertility has led to drastic changes in intergenerational relations (Miller 1981; Alburez-Gutierrez, Mason, and Zagheni 2021) and, potentially, the lifetime parents can expect to share with their children. In the absence of an indicator that summarizes these two developments in a single measure, the extent to which the shared lifetime of parents and their children has been affected remains an open question.

To provide preliminary answers, we introduce the concept of parenthood expectancy (PEX); i.e., the time people can expect to live as an ever-parent (not considering the possibility of the child's premature death). Increases in the mean age at first birth (MAFB) lead to reductions in PEX, yet these reductions can be counterbalanced by increases in life expectancy. The combined effect on PEX is unclear and might vary by country and gender. As a period indicator, PEX does not describe actual parental lifespans, where fertility is typically trailed by mortality only with a considerable time lag. However, PEX provides a meaningful synthesis of both fertility and mortality experiences of the ever-parent population in a specific period. Given that any cohort of first-time parents will invariably consist of people born into different birth cohorts, a period measure is still the best fit for the actual parent-cohort experience. By providing initial descriptive findings on PEX trajectories, we inform the scholarly debate on the societal consequences of changing intergenerational support capacities and their potential impact on fertility.

While many low-fertility countries have recently started to experience an increasing pattern of late first births (Beaujouan 2020), simultaneously there have been concerns about the right "timing of life" e.g., with respect to the onset of parenthood (Billari et al. 2011). Both men and women perceive social "deadlines" to becoming parents, which are not exclusively linked to biological reasons (Mynarska 2010). Missing these deadlines and potentially not having much time left to raise children into adulthood may even be a reason for not having children, as the perceived parental lifespan might influence an individual's childbearing decisions.

Several studies have shown the importance of parents for the success of their children's entry into adulthood, particularly in the face of shrinking kinship networks (Hamilton 2016; Sohn 2019). While late parenthood is associated with greater biological risks, these might be compensated by social advantages (Stein and Susser 2000; Duncan et al. 2018). However, older parents might have lower resilience to childrearing-related adversities. In the worst case, late parenthood might lead to the parent needing care when the child is still in early adulthood.

Therefore, rephrasing the question of what is an acceptable age to become a parent (Goldstein 2006), we ask what is an acceptable remaining lifespan at the onset of parenthood. If social norms related to lack of time for being a parent are a factor that prevents the realization of intended fertility, then PEX can be seen as a complementary tool in understanding hypothetical limits to fertility postponement. By studying PEX over time, we provide an initial descriptive overview of the changing parental support capacities in different country-contexts, bearing in mind that PEX is a proxy and is not equivalent to the actual quality or intensity of parental care. When data permit, we also account for gender differences.

2. Factors determining parenthood expectancy

2.1 Changes in the mean age at first birth

Fertility postponement has not been happening at an equal pace across different countries (Philipov 2017; Beaujouan and Toulemon 2021). Previous research has shown that increases in MAFB are to a large extent driven by increases in educational attainment, which delay the onset of the reproductive lifespan (Ní Bhrolcháin and Beaujouan 2012; Neels et al. 2017). This is particularly the case for women, who have been catching up since the 1960s and have now surpassed men in terms of education in most Western societies (Vincent-Lancrin 2008; van Hek, Kraaykamp, and Wolbers 2016), with implications also for men's fertility (Trimarchi and Van Bavel 2017).

While MAFB has increased for both women and men in recent years (Beaujouan 2020), gender differences in fertility, especially in the mean age at (first) birth, derive mostly from age differences at union formation. Given that the majority of births occur within heterosexual unions and that men tend to be a few years older than women at union formation (Bledsoe, Lerner, and Guyer 2000), MAFB tends to be higher for men.

2.2 Changes in life expectancy

The other factor determining PEX is life expectancy. While in the 1950–1955 period, Norwegian women led the global ranking in life expectancy at birth with 74.6 years, by the 2015–2020 period this global maximum had increased by almost 13 years (87.5 years for women born in Hong Kong, United Nations 2019). However, not all of this increase affects PEX, since much of it was due to improvements in survival before reproductive ages (Wilmoth 2000). With juvenile deaths becoming rare, improvements in survival at older ages have become the main driving force behind rising life expectancy in the 21st century (Aburto et al. 2020). This trend is accompanied by reduced lifespan inequality (Permanyer and Scholl 2019), albeit with strongly varying regional trends. Central and Eastern European countries, for example, experienced setbacks in the late 20th century (Meslé and Vallin 2002; Moser, Shkolnikov, and Leon 2007).

Trends in mortality are also characterized by sex differences, which are only marginally determined by biological factors. As shown by Luy (2003), in the absence of environmental and behavioral differences, the residual biological factors lead to a much smaller female survival advantage in cloister populations than in the general population. As lifestyle differences vanish, male life expectancy converges with female levels (Cullen et al. 2016; Crimmins et al. 2019).

3. Data and methods

Our derivation of PEX in different countries is based on period data from the Human Fertility Database (HFD 2021) for women, and newly available data from the Human Fertility Collection (Dudel and Klüsener 2021; HFC 2021) for men. For the first time, the HFC provides harmonized, national-level fertility measures for men across 17 high-income countries that can be complemented with female fertility information from the HFD. Additionally, we use life table information from Eurostat and the Human Mortality Database (HMD) for non-European countries. While male and female life table information is available in all the 37 HFD countries, only 16 of them also provide information on men's mean age at birth (MAB). The complete list of countries and years covered is shown in Table 1.

Table 1: Data availability by country and sex

Country	MAB_f	MAFB_f	PEX_f	MAB_m	PEX_m
Austria	1960–2017	1984–2017	1984–2017	NA	NA
Belarus	1964–2018	1964–2018	1964–2018	NA	NA
Bulgaria	1960–2009	1960–2009	1960–2009	NA	NA
Canada	1960–2018	1960–2018	1960–2018	1974–2016	1974–2016
Chile	1992–2005	1992–2005	1992–2005	NA	NA
Croatia	2002–2017	2002–2017	2002–2017	NA	NA
Czechia	1960–2018	1960–2018	1960–2018	NA	NA
Denmark	1960–2019	1968–2019	1968–2019	1986–2015	1986–2015
England and Wales	1960–2018	1960–2018	1960–2018	1982–2016	1982–2016
Estonia	1960–2019	1960–2019	1960–2019	1989–2014	1989–2014
Finland	1960–2019	1982–2019	1982–2019	1987–2015	1987–2015
France	1960–2018	1967–2015 *	1967–2015	1998–2013	1998–2013
Germany	1960–2017	2009–2017	2009–2017	1991–2013	2009–2013
Germany East	1960–2017	1960–2017	1960–2017	1991–2013	1991–2013
Germany West	1960–2017	2009–2017	2009–2017	1991–2013	2009–2013
Hungary	1960–2017	1960–2017	1960–2017	1970–2014	1970–2014
Iceland	1960–2018	1990–2018	1990–2018	NA	NA
Italy	1960–2017	1960–2017	1960–2017	1999–2014	1999–2014
Japan	1960–2018	1968–2018	1968–2018	2009–2014	2009–2014
Lithuania	1960–2019	1970–2019	1970–2019	NA	NA
Netherlands	1960–2018	1960–2018	1960–2018	NA	NA
Northern Ireland	1974–2018	1997–2018	1997–2018	NA	NA
Norway	1967–2018	1967–2018	1967–2018	NA	NA
Poland	1971–2016	1971–2016	1971–2016	1986–2014	1986–2014
Portugal	1960–2018	1960–2018	1960–2018	1980–2015	1980–2015
Republic of Korea	2000–2018	2000–2018	2000–2018	NA	NA
Russia	1960–2018	1960–2018	1960–2018	NA	NA
Scotland	1960–2018	2013–2018	2013–2018	NA	NA
Slovakia	1960–2014	1960–2014	1960–2014	NA	NA
Slovenia	1983–2017	1983–2017	1983–2017	NA	NA
Spain	1960–2018	1975–2018	1975–2018	1975–2014	1975–2014
Sweden	1960–2019	1970–2019	1970–2019	1968–2015	1970–2015
Switzerland	1960–2018	1998–2018	1998–2018	NA	NA
Taiwan	1976–2019	1976–2019	1976–2019	1998–2014	1998–2014
Ukraine	1960–2013	1960–2013	1960–2013	NA	NA
United Kingdom	1974–2018	2013–2018	2013–2018	NA	NA
United States	1960–2019	1960–2019	1960–2019	1969–2015	1969–2015

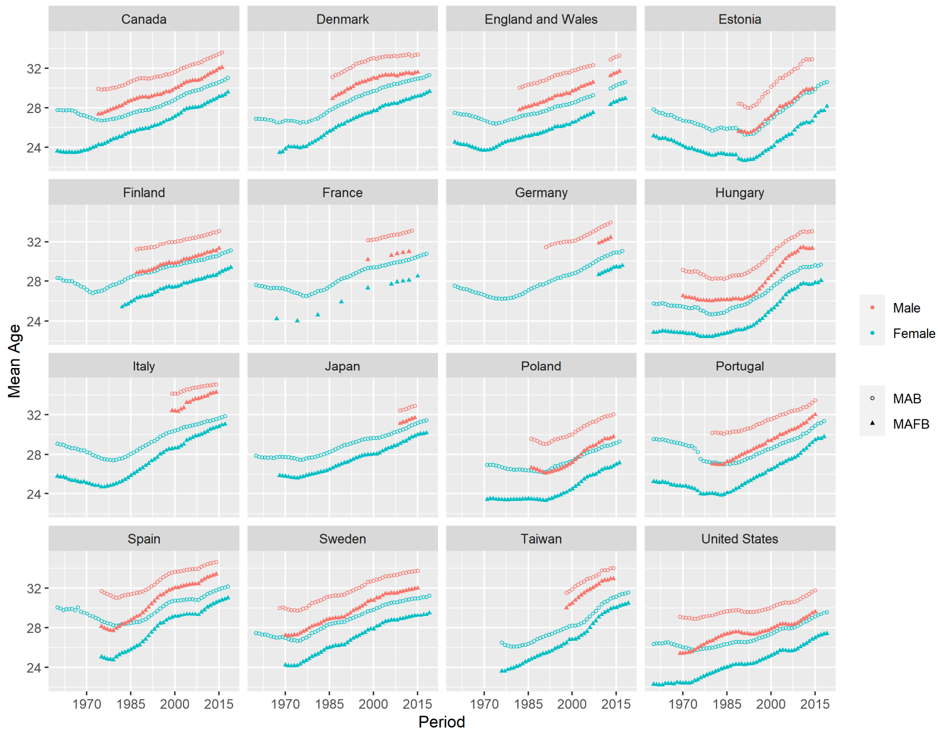
Note: * Parity-specific fertility data for French women was obtained from The National Institute of Statistics and Economic Studies (Insee 2020).

Due to lack of harmonized birth-order information for men, we have to derive paternal $MAFB_{p,\,c,\,y}$ by country (c) and year (y) from paternal $MAB_{p,\,c,\,y}$, assuming that the gender difference in MAB also holds for MAFB. Hence, we derive $MAFB_{p,\,c,\,y}$ as:

$$MAFB_{p,c,y} = MAFB_{m,c,y} + (MAB_{p,c,y} - MAB_{m,c,y}) \quad (1)$$

Figure 1 compares the observed trends in MAB (paternal and maternal) and maternal MAFB with trends in paternal MAFB derived from Equation (1). Maternal MAFB for all 37 countries available from HFD can be found in the supplemental material (Figure SM1).

Figure 1: Mean age at (first) birth by gender



Sources: HFD (Female) and HFC (Male).

With few exceptions, all time series are available in single-year steps without gaps. Missing information for England and Wales and France was linearly interpolated. The most visible pattern is the general increase in MAFB and MAB in all countries. However, the timing of the onset varies. In Western Europe, Northern Europe, Italy, and Spain we already see postponement in the 1970s, whereas Central and Eastern Europe follow only in the late 1980s and 1990s. Countries in Eastern Asia follow the same trend, with the Republic of Korea reaching the highest level of MAFB for women in 2018 with a steep rise to 31.6 years.

Next, by means of a period life table for the general population, we extract life expectancy at MAFB, which under low infant mortality conditions represents parenthood expectancy (PEX = e_{MAFB}). We are aware that PEX relates only to those who have a first birth and that mortality might vary by parity. Unfortunately, we lack parity-specific life tables that would allow us to resolve this problem. Since MAFB is reported in decimals, whereas remaining life years are available only at complete ages, we round MAFB to the closest integer and subtract/add the difference from/to remaining life years at the closest complete age. Thus, implicitly we assume life expectancy declines linearly between single years of age.

Finally, to examine the extent to which trends in first-birth postponement and gains in life expectancy have influenced PEX across genders and countries, we use counterfactual analyses. Keeping MAFB constant to the lowest value observed in a given country during the observational period, we first infer by how much PEX would have increased thanks to improvements in life expectancy only. Second, we infer by how much PEX would have declined if only MAFB had increased, keeping age-specific survival conditions constant. To set a common standard for both analyses, we follow the life table from the same year when MAFB reached its lowest level. For those countries where age-specific fertility rates are available for women, we also applied a standard decomposition technique (stepwise replacement) following Andreev, Shkolnikov, and Begun (2002). The results are virtually indistinguishable from those presented here.

Addressing the potential interrelationship between fertility and mortality (using cohort life tables) is beyond the scope of our analysis. However, it is important to stress that the period indicator presented here does not capture the actual experience of the members of a given cohort of parents, whose mortality (experienced in old age) ideally will trail their fertility (experienced in early adulthood) by many decades.

4. Results

Figure 2 shows trends over time in female PEX within seven macro-regions. While Mediterranean and German-speaking countries show very consistent patterns, England and Wales resemble the experience of the non-European English-speaking countries (Canada, United States), and other regions are more diverse. Motherhood expectancy ranges between 50 and 58 years, with Japan and Chile reaching the highest levels. Among the available European countries, France leads the ranking ahead of Iceland. The maternal lifespan has been increasing in several Western and Northern European countries, which is not the case for many Eastern, South-Eastern, and Mediterranean countries. In Eastern and South-Eastern countries this is due to delays in the onset of life expectancy gains, as well as sharp increases in MAFB following the collapse of the Iron Curtain. By contrast, for the Mediterranean countries, where life expectancy tends to be high, a shorter maternal lifespan is due primarily to stronger postponement in first births.

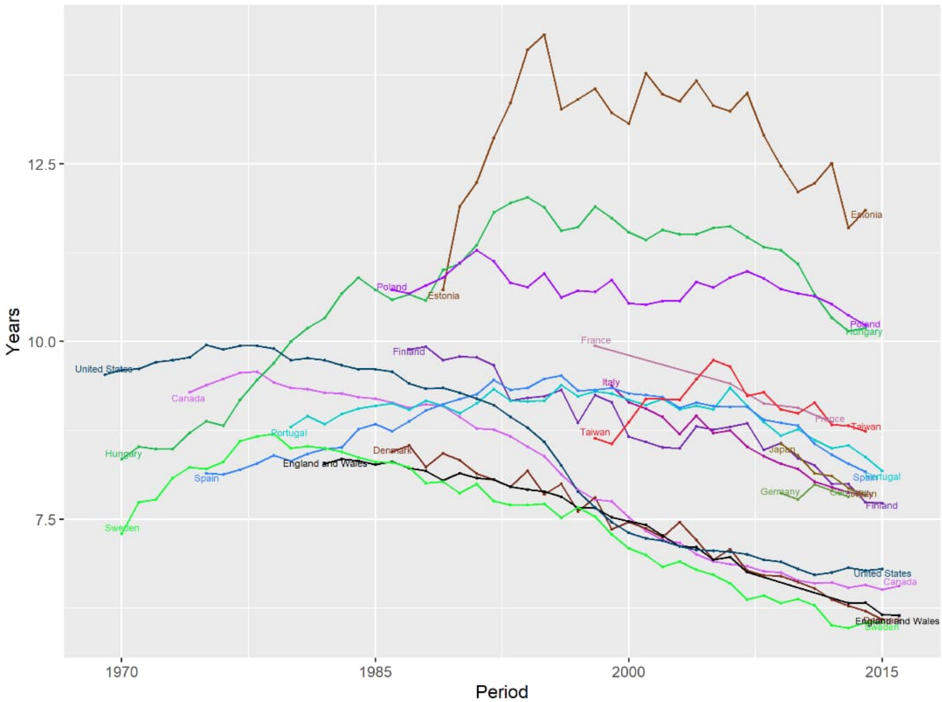
Figure 2: Motherhood expectancy, 1960–2020

Sources. HFD, HFC, Eurostat, HMD.

As a result of gender differences in MAFB (Figure SM2a) and life expectancy (Figure SM2b), men's PEX (Figure SM3) tends to be 10 years shorter than women's, and time trends mostly mirror trends in maternal PEX. Figure 3, showing gender differences in PEX, also reveals large country differences. While in Estonia the gender difference in PEX is almost 12 years, the difference is only 6 years in Denmark. Moreover, there are signs of polarization (see also Figure SM4). Nordic, Western European, and some non-

European countries show a decreasing trend in gender differences, implying convergence between men and women in the timing of fertility and mortality. Patterns observed across Central and Eastern Europe imply initial divergence. However, since the early 2000s male PEX has been converging with female levels, with Taiwan lagging slightly behind in this development.

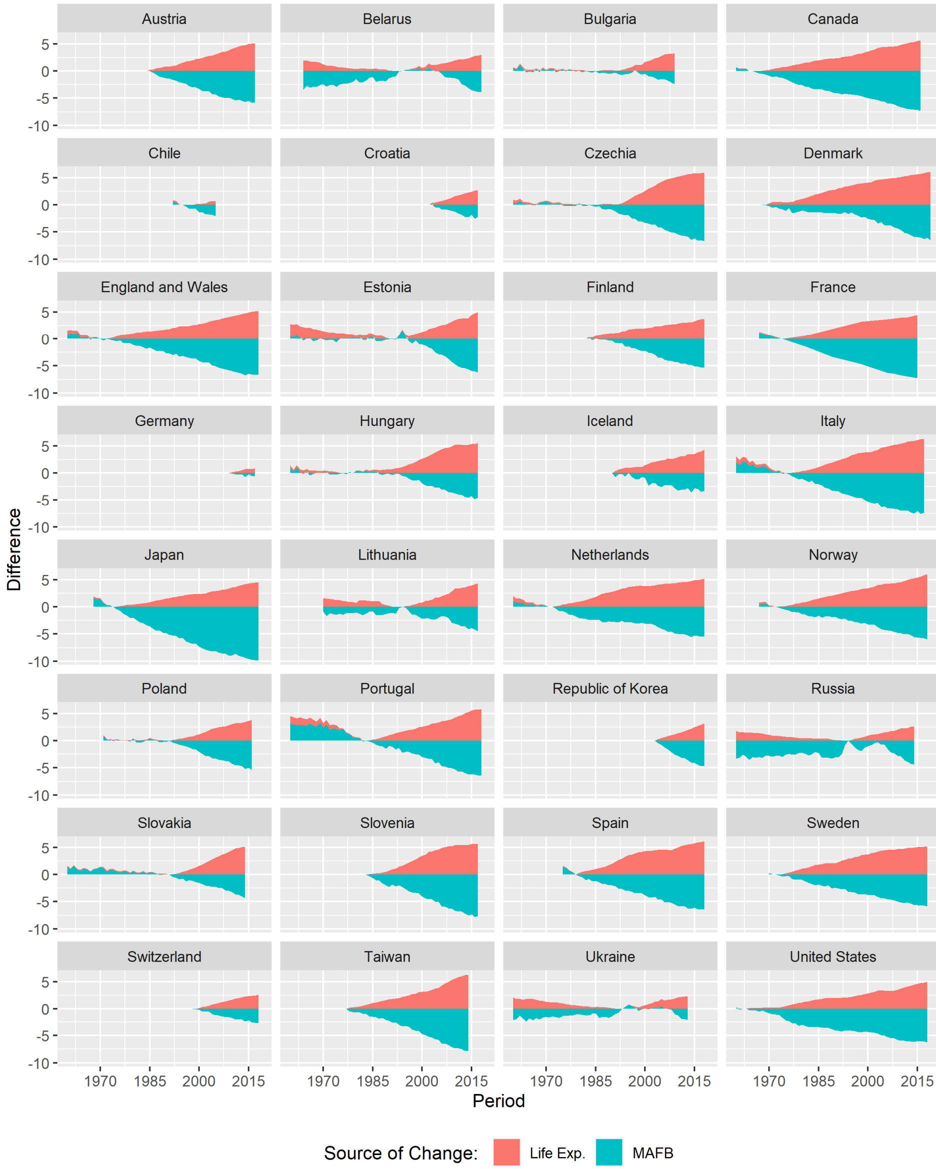
Figure 3: Gender difference (female – male) in PEX



Sources: HFD, HFC, Eurostat and HMD.

Figure 4 shows the results of two counterfactual analyses for women. The red areas indicate the hypothetical gains in PEX (relative to the empirical baseline) from increases in life expectancy, keeping MAFB constant to the year when it reached its all-time low in a given country. The turquoise areas represent the hypothetical losses due to changes in MAFB, while keeping survival conditions constant to the same year as before. In the year when MAFB reaches its minimum, the two counterfactuals have to coincide with the empirical baseline by design.

Figure 4: Counterfactual analyses of changes in motherhood expectancy



Sources: HFD, HFC, Eurostat and HMD.

Looking at the red areas, we see that all countries experience gains in PEX due to improvements in survival conditions. Yet in a few countries, mostly in Eastern and South-Eastern Europe, the data also show phases when MAFB was still declining in the empirical baseline. This leads to initially declining gains from life expectancy when keeping MAFB constant at its all-time low. However, following the minimum-MAFB year PEX exclusively increases due to improvements in survival conditions.

Patterns can be slightly more twisted looking at the turquoise areas. Keeping survival conditions constant (rather than keeping life expectancy constant, as in a conventional decomposition), increasing MAFB would predominantly lead to losses in PEX. However, in those countries where MAFB was still decreasing initially, sticking to the same life table would yield longer PEX because of the earlier onset of parenthood in the counterfactual scenario. As a consequence, we see initial fluctuations of the turquoise area around the baseline. These fluctuations disappear, however, once MAFB has surpassed its minimum.

Fluctuations aside, in the majority of countries the motherhood expectancy would have been equally affected by stagnation in longevity and MAFB. This balance between hypothetical gains and losses is most visible for Central and Eastern European women. The most notable exception is Japan, where allowing only MAFB to vary would have led to much bigger losses in PEX. Thus, increasing life expectancy in Japan was crucial in counterbalancing the negative effects of postponement on maternal PEX. Among European countries, this role for life expectancy is most apparent for French women.

The counterfactual analyses for men (Figure SM5) show a clearer picture. Here the hypothetical losses due to changes in MAFB clearly exceed the hypothetical gains due to improvements in survival in all countries where time series reach back to the 1980s, indicating that life expectancy in factual PEX trends is more important than fertility postponement. In recent years, gains have become smaller than losses.

5. Discussion

International trends in parenthood expectancy (PEX) indicate that in many countries, both mothers and fathers can expect to increasingly share more lifetime with their first-born children. However, PEX would have declined sharply if fertility postponement had not been counterbalanced by strong increases in life expectancy. Gender differences mirror the gender gap in mortality, which also varies across periods and countries.

Still, gender differences in PEX need to be further investigated once harmonized male parity-specific fertility data become available. If union dissolution is widespread, and re-partnering rates differ for men and women, the gender difference in MAFB might not necessarily mirror the difference in MAB, as we are assuming – for instance, because the age gap in higher-order unions might be larger (Coleman 2000).

What are the implications of trends in PEX? A shorter PEX implies less time to benefit from the positive effects of earlier investments in children. The delayed onset of parenthood can be detrimental to the wellbeing of both the children and the parents' generation. Children may lack support during key stages of the life course and older parents will be in poorer health at all ages of their children (Murphy, Martikainen, and Pennec 2006). Some parents may not live to benefit from investments made early in their children's lives. This is particularly true for men, whose PEX can be up to 10 years shorter than that of women. The fact that men can expect shorter PEX than women may serve as an incentive to increase paternal involvement in childrearing. Besides the positive effects on child wellbeing, this could also benefit fathers' health and wellbeing and contribute to gains in male longevity.

Postponement of parenthood does not necessarily lead to negative consequences for the offspring in terms of health and socioeconomic outcomes (Barclay and Myrskylä 2016; Myrskylä, Barclay, and Goisis 2017). Older parents tend to be more highly educated, financially better-off, and to have better general health, which affects their capacity to support their children. Consequently, there might be important education differentials in PEX. People with higher levels of educational attainment delay childbearing for longer, which puts them at greater risk of not having much time left to share with their offspring. Yet better-educated individuals live longer, and in many societies the increases in life expectancy seen in recent decades have disproportionately benefited people with better education (Olshansky et al. 2012; Permanyer et al. 2018).

A negative consequence of increasing longevity that we do not address is the higher risk of child death in the parent's lifetime. While we introduce PEX here as the number of years people can expect to live as an ever-parent (rather than a parent), future refinements of the indicator should account for the global burden of parental bereavement (Alburez-Gutierrez, Kolk, and Zagheni 2021) so as to derive the actual time spent with the child.

Finally, the mere length of life as an ever-parent is of course not equivalent to the actual time and effort that parents invest in their offspring. A more insightful indicator would be healthy parenthood expectancy. This measure would vary by the number of healthy-life-years parents can expect to have left at first birth. A long PEX spent largely in poor health might counteract the positive effects of having more time to share with the children. Future work should explore how health differentials and the competing effects of education play out in terms of overall PEX. Despite its limitations, our indicator provides a reasonable and intuitive period measure to summarize the potential effects of both aging and fertility postponement on intergenerational relations.

6. Acknowledgements

Alessandra Trimarchi's contribution to this work was supported by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement n°846478 Acronym: DEMOquality.

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