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Disentangling the Swedish Fertility Decline of the 2010s

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Abstract

BACKGROUND: The declining fertility trends in Western countries during the 2010s is puzzling, not least for the Nordic countries.
OBJECTIVE: In order to better understand the driving forces of the decline, we examine whether it is driven by differential behavior across socio-demographic population subgroups. We study Sweden, which is a particularly puzzling case.
METHODS: Event-history techniques are applied to register data of the Swedish-born population to provide an in-depth analysis of the socio-demographic profile of the country's decade-long fertility decline.
RESULTS: The decline is confined to first births, with no apparent differences between individuals living in different types of municipalities or between those with a full Swedish or non-Swedish background. The first-birth decline is notable across labor-market activity groups, but is somewhat more pronounced among those with the weakest labor-market positions. The share of men and women who were active in the labor market increased, however, and among them a growing part had high earnings. The findings are strikingly similar for men and women.
CONCLUSIONS: Little of structural factors seem to be at play in shaping the Swedish fertility decline, and other, perhaps global factors, may be at play in the general tendency to increasingly forego or postpone having children. The polarization in childbearing across labor-market positions is an area of future attention.

Keywords: Fertility, Childbearing, Fertility trends, Fertility decline, Sweden

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Introduction

The declining fertility rates in the 2010s across many Western countries is a puzzling new phenomenon, not least for the Nordic countries with their previously relatively high fertility levels and beneficial social-policy setting. Standard approaches to fertility change, such as those related to impacts of the business cycle, social-policy reforms, or changing gender relations seem to offer little explanatory insight. Sweden has not seen such a long-term and persistent decline in its fertility rates since the 1970s and the societal consequences of this development are still to be determined. In order to better understand the social, demographic or economic forces that may have fostered this trend, we need to look into whether it is driven by differential behavior across subgroups of the population or by changes in the composition of women and men at different childbearing ages.

The fertility decline in the 2010s has been remarkable in all Nordic countries: Sweden, Norway, Denmark, Finland and Iceland. The decline has mainly been attributable to changing trends in relation to first births (Hellstrand et al. 2021a), in Sweden it appears uniquely confined to this birth order (Comolli et al. 2021). As a first step in our analysis we demonstrate the extent to which this previous finding based on data for women is also replicated when studying the fertility of men. Thereafter we demonstrate whether the first-birth trend has declined uniformly in the Swedish population, or whether it is driven by differential behavior across regions and social groups in Sweden. We expect similar general trends based on data for men and women, but there may be gender differences in the sociodemographic profiles of the fertility decline.

The onset of fertility declines seems triggered by the economic recession that hit developed societies in 2008 but the connection between these two developments is anything but straightforward (Comolli 2017, Comolli et al. 2021). Recent fertility trends appear to be related to economic conditions at the regional level in some parts of Europe but this seems not to be the case in the Nordic region (Matysiak et al. 2021). Vignoli et al. (2020a,b) and others instead highlight the role of real or perceived uncertainties in explaining recent demographic change. Comolli et al. (2021) found that the decline in first-birth rates in the Nordic countries pertained to women of all educational levels, and argued that perceived uncertainties related to global developments rather than factual uncertainties could offer a potential explanation for the fertility decline. Nevertheless, they also found that the decline was somewhat stronger among women with low education, which they argued could be related to objective social welfare deficits, especially for those outside the labor market, and in the second half of the 2010s.

Building on this previous research, we change our focus to consider the actual labor-market positions of women and men in Sweden in relation to fertility outcomes, as well as the role of their regional residence and that of their parental migration background. The focus on regional fertility developments is motivated by an increasing interest in sub-national demographic trends (e.g., Matysiak et al. 2021) and a perception that societies during the 2010s have become increasingly polarized in terms of their social fabrics. This appears to hold for factors such as political discontent and voting behavior and it is not unreasonable to suspect that fertility developments may also be related to such social changes (Comolli and Andersson 2021, Aassve et al. 2021). With increasing levels of international migration and increasing fractions of the population with a migration background we also want to consider whether recent fertility developments differ for women and men with a migration background through their parents and those with a full Swedish background. We know that second-generation Swedes in general have had lower first-birth rates than ancestral Swedes (Andersson et al. 2017) and want to detect whether any such differentials have widened during the past decade. The fertility behavior of first-generation migrants is not considered in our study. It depends very much on short-term influences related to their durations of residence in Sweden, which are more challenging to consider in a study with focus on period fertility trends (Andersson 2004, Mussino et al. 2021).

Data and Methods

Swedish register data

All analyses are based on data from Swedish population and administrative registers, gathered and organized at Statistics Sweden. These are longitudinal, individual-level data, comprising family-demographic histories, socio-economic and background data for the full resident population of Sweden. The analytical study population cover all Swedish-born men and women of ages 16-45 that were residing in Sweden any time during 1991-2018. This covers slightly more than seven million men and women that were born in 1946-2002, with at least one million individuals in each sub-set of parity-specific analysis of fertility outcomes. In order to put the fertility developments during the 2010s in context, we also include the twenty-year period prior to the 2010s in our study design. This covers previous periods of fertility decline in relation to

an economic recession during the 1990s (Andersson 2000) as well as subsequent fertility recuperation during the first decade of the current century.

Variables

Calendar year is analyzed in terms of single years during 1991 through 2018. **Age** was incorporated as the age at the end of each calendar year. **Sex** is man or woman, as recorded in the registers. For the variable **type of region**, which describes the municipality of residence at the end of the previous year, we divided Sweden's 290 municipalities into six categories (see Swedish Association of Local Authorities and Regions 2021). These were *Large cities* (Stockholm, Gothenburg, Malmö), *Commuting municipalities near large cities, Medium cities, Small towns, Municipalities near medium cities or small towns,* and *Rural areas.* **Parents' birth country** was divided into four categories: Both parents *Swedish-born*, 1-2 parents *Nordic-born* (if one was Swedish-born), 1-2 parents non-Nordic *European-born* (if one was Swedish- or Nordic-born), and 1-2 parents *Born outside Europe* (if one was Swedish/Nordic/European-born).

Labor-market activity measures the main activity in the previous year and was divided into eight categories based on work-related earnings before tax and any spells of unemployment or student activity. The work-related earnings primarily stem from wages, entrepreneurial activities, and temporary welfare payments during periods of illness, parental leave and care for sick children or children with a disability.

Cut-off points for earnings categories were based on the income distribution in year 2000 among all men and women in Sweden at ages 16-59, including those that were not part of our analytical sample. Five equally large categories of individuals with annual earnings above a "base level" of 36,600 SEK (at that time corresponding to €4,333) were created for year 2000: the lower bound for each quintile were Q1: €4,333, Q2: €15,024, Q3: €21,855, Q4: €26,721, Q5: €33,232). These cut-off points were adjusted for inflation for subsequent years, and the quintiles were not sex-specific, which allow the categories to vary in size across years and sexes. It enables a comparison over time and between men and women according to the same objective measure. Individuals were categorized as belonging to any of the earnings categories *Low, Medium-Low, Medium, Medium-High,* or *High* if not being categorized as unemployed or student as defined below.

The category *unemployed* includes individuals who received unemployment benefits that exceeded any income from student benefits, and whose earnings were less than the second

quintile of our earnings measure. Individuals were categorized as *students* if they received student allowances that exceeded any amount of unemployment benefits, and whose work-related earnings were lower than that of the second earnings quintile. Student allowances include grants and loans to students primarily in tertiary education, but also to adults who undertake additional primary or secondary education. All boys and girls aged 16 were also categorized as students, because school is mandatory in Sweden up to that age. Individuals who earned below the "base level" and were not categorized as students or unemployed were defined as *non-participants* in the labor market.

A few additional variables are added for higher-order births. **Birth order** is measured as second, third, or fourth birth. **Age of the youngest child** is measured as the time since last previous birth**,** with categories 0 years, 1.0, 1.5, 2.0, 2.5, 3, 4, 5, 6–7, and 8–9 years. Here 0 years refers to the first twelve months, 1.0 to the next six months etc., and age 8-9 years cover the last 24 months before the child turns 10 years.

Method

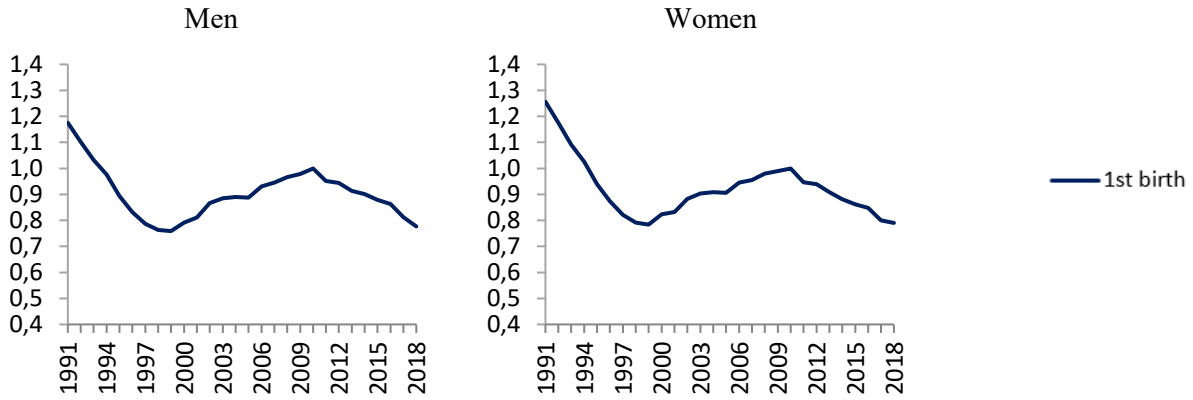
We applied event-history analysis, in the form of piece-wise constant baseline intensity models. In each set of analysis, the variable of interest was interacted with calendar year to display period fertility trends, as in Andersson (1999). Transitions to first, second, third and fourth births were analyzed with data with the accuracy of a month. Time at risk of first birth started at the month an individual turned 16 and the time at risk of higher order births started at the month of last previous birth. Individuals were censored at the month of first emigration, death, turning 46, or the end of December 2018, whichever came first. When studying 2-4 order births we also censored ten years after the birth of the last previous child. Multiple births were recorded as the order of the joint birth.

Findings

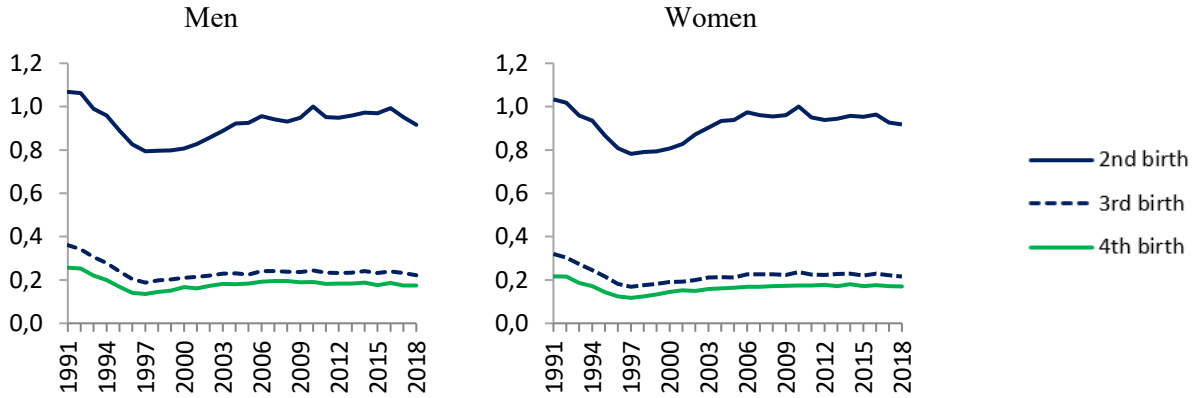
Figure 1 shows relative risks of childbearing by birth order over calendar time. It is apparent that only first births, but not higher-order births, were declining throughout the 2010s. The fertility decline is thus driven by men and women postponing or foregoing becoming a parent.

Figure 1. Relative birth risks by birth order, 1991-2018, separately for men and women.

a) Relative first birth risks.



b) Relative second, third, and fourth-birth risks modelled together in interaction of birth order and calendar year.



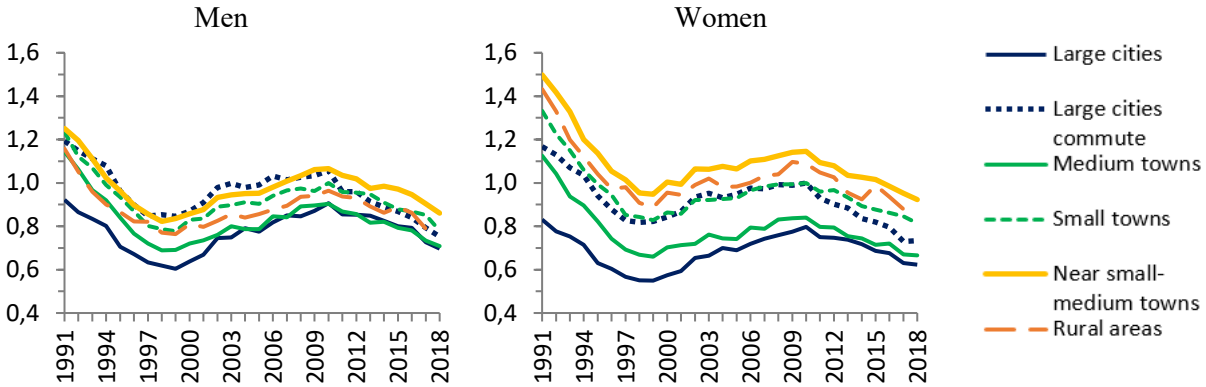
Note: First-birth risks were modelled separately and were standardized by age. 2010 was the reference category. Second, third, and fourth-birth risks were modelled jointly and were standardized by age group and age of the youngest child. Second-birth risks in 2010 was the reference category.

Additional analyses (available from the authors upon request) demonstrate age-specific trends in first births over three-year age groups up to 43–45 years. We found that for both men and women, first-birth risks declined for all age groups below age 40. For those in their 40s, the trends were stable or slightly increasing, although at low levels.

In our remaining analyses of the roles of different sociodemographic factors, we present the findings for first-birth risks only because the decline was limited to this birth order. In the following sections, first-birth risks are displayed across types of region of residence in Sweden, parents' birth country, and women and men's own labor-market activity. Although there are

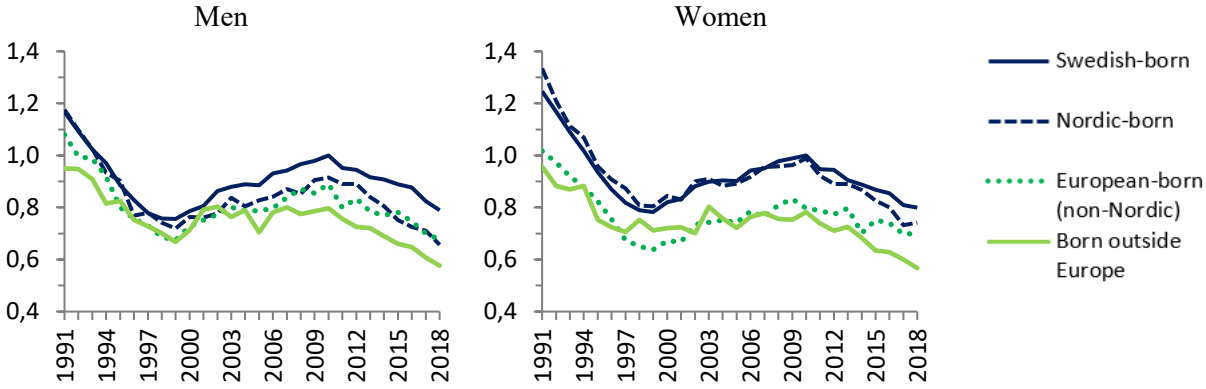
some gender differences in some of these patterns, there is a quite uniform decline during the 2010s across all types of regions (Figure 2) as well as migrant backgrounds (Figure 3), for men and women alike. The only deviation seems to be women with non-Nordic European parent(s) who display a somewhat weaker decline during that decade. The differentials between women and men with migration and non-migration background widened before the 2010s, with second-generation Swedes having lower first-birth rates than those with no migration background.

Figure 2. Relative first-birth risks by type of region, 1991-2018, separately for men and women. Interaction of type of region and calendar year.



Note: First-birth risks were standardized by age. Small towns in 2010 was the reference category.

Figure 3. Relative first-birth risks by parents' country of birth, 1991-2018, separately for men and women. Interaction of parents' country of birth and calendar year.

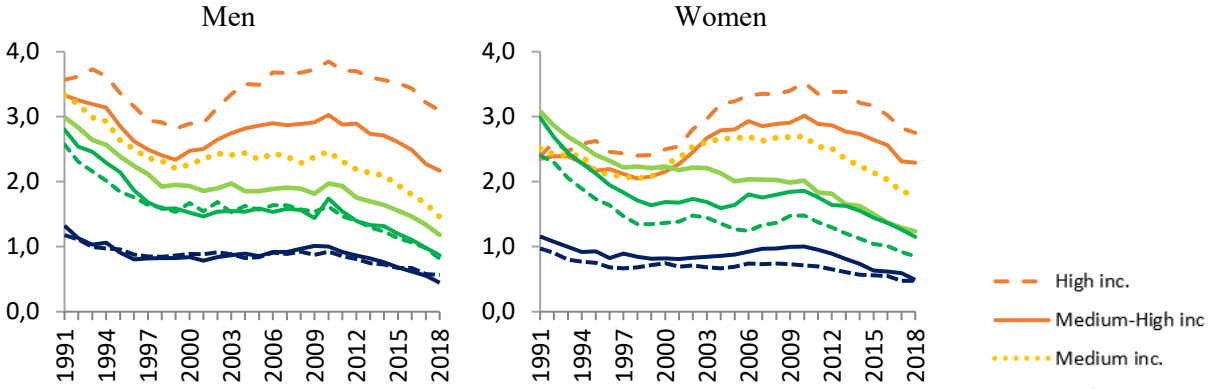


Note: First-birth risks were standardized by age. Two Swedish-born parents in 2010 was the reference category.

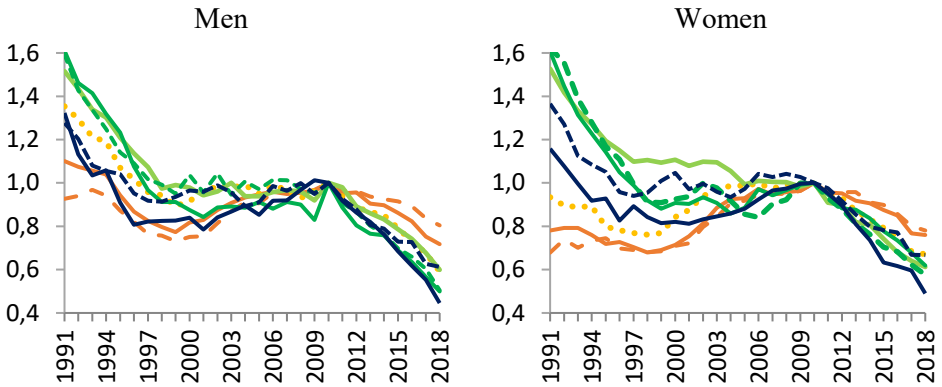
Turning to labor-market activity (Figure 4), we again find clear declines in first-birth rates during the 2010s across all groups. However, it is somewhat weaker among high to medium-high earners and stronger among non-participants followed by the unemployed and those with the lowest earnings. In essence, those with weaker labor-market positions who already have lower fertility experienced the largest drop, thus increasing the economic polarization in childbearing outcomes. The patterns look remarkably similar when viewed from the points of men and women.

Figure 4. Relative first-birth risks by labor-market activity, 1991-2018, separately for men and women. Interaction of labor-market activity and calendar year.

a) Non-participants in 2010 as reference category.



b) Each labor-market activity group in 2010 as reference categories.



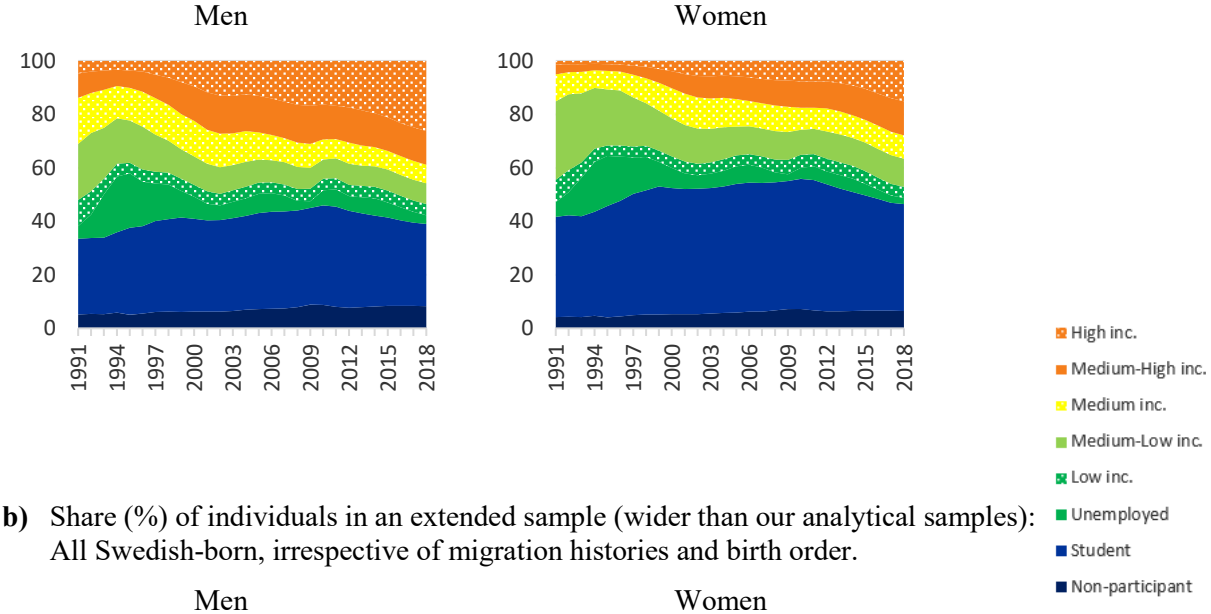
Note: First-birth risks were standardized by age. Panel a) and b) display the same analyses, only with different reference categories.

When looking at the actual distribution of men and women across labor-market categories, we find that the economic situation did not deteriorate in the wake of the 2008 crisis, in terms of

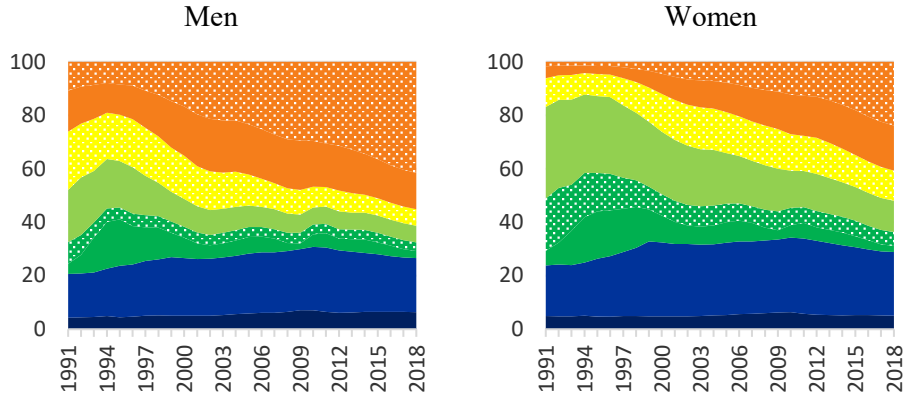
fewer active in the labor market or a fall in earnings, which could have helped explain the aggregate fertility decline. This is in contrast to the fertility decline during the economic crisis in the 1990s (Andersson, 2000.) This is demonstrated in Figure 5, which shows the distribution of men and women across labor-market categories over time. Overall, for both men and women, the share outside the labor market (unemployed and students) decreased in the 2010s, and among those working the share of high-income earners increased, while other income groups were relatively stable. This was true both when examining exposure time for first-birth risks (panel a), and when expanding the view outside our analytical sample (panel b) to all Swedish-born men and women of ages 16-45, who were alive and residing in Sweden, irrespective of migration histories and birth order.

Figure 5. Distribution of cases across labor-market activity categories 1991-2018 (ages 16-45), in two different sub-samples, separately by sex.

a) Share (%) of exposure time for the analyses of first-birth risks.



b) Share (%) of individuals in an extended sample (wider than our analytical samples): All Swedish-born, irrespective of migration histories and birth order.



Discussion and conclusions

We have examined the fertility decline in Sweden in the 2010s based on data for Swedish-born women and men. As previously found for women in Sweden and a few other European countries (Comolli et al 2021, Ermisch 2021), the drop in fertility has been driven by declining first-birth risks but did not extend to declines in parity-specific fertility at higher birth orders. In the case of Sweden, the decline in first-birth rates has not yet translated into visible declines in the annual number of births (Statistics Sweden 2021). This is because the large cohorts born in the late 1980s have entered the peak of their childbearing ages during the decade we study.

The downward trend in first-birth rates was strikingly uniform across different types of regions and parental migration backgrounds, and was notable over all labor-market activity categories. The findings clearly demonstrate that the fertility decline is not a story about urban versus rural regions or about full native versus immigrant backgrounds. They illustrate a general decline in the Swedish-born population but little of diverging patterns across sub-groups.

However, there was one partial exception from the story of homogeneous decline. The role of having weak labor-market attachment or low earnings became somewhat more negative for first-birth fertility in the 2010s. This is parallel to previous findings on educational attainment, where lower educated women experienced sharper declines in first births in the Nordic region (Comolli et al. 2021) and the UK (Ermisch 2021). Our results thus reveal a socio-economic gradient in the degree of fertility decline across labor-market positions, including among those active in the labor market. Thus, the decline is not confined to those outside the labor market, where the low-educated are overrepresented. The underlying factors behind this development need to be investigated further. For example, Seltzer (2019) suggests that aspects of deteriorating labor-market conditions and labor-market polarization may have fueled the simultaneous fertility decline in the US. Other life conditions and changes in such conditions also warrant further examination. Any uncertainty, whether real or perceived (Comolli and Vignoli 2021) may be largest among the groups that have the weakest positions on the labor market.

However, our findings clearly suggest that other factors than those related to labor market structures are also at play. We find clear declines in first-birth rates also among those with the strongest positions on the labor market. Further, in contrast to patterns during and after the economic crisis in the 1990s we find that first-birth rates in the 2010s continued to decline also during an economic upturn with growing shares of working and high-earning men and women.

There also appears to be relatively limited scope for other structural factors in helping explain recent fertility declines: there have been little changes in social-policy designs and no evidence of reversals in behaviors related to gender relations in the last decade. This suggests that other types of data with information on issues such as subjective perceptions and different aspects of perceived uncertainties (Andersson et al. 2020, Neyer et al. 2021) or generalized trust (Aassve et al. 2021, Comolli and Andersson 2021) need to be incorporated in future fertility research.

There are indications that the decline in first-birth rates in the Nordic region reflects not only the postponement of family building, but may also translate into foregone parenthood all together (Hellstrand et al. 2021a). Jalovaara et al. (2019) also found growing social divergence in childlessness according to educational level in the Nordic countries, where lower educated women and men increasingly have been falling behind in the fractions who eventually become a parent. In our study, we have not examined the potential role of union-formation behavior and whether the decline in first-birth rates is due to lack of couple formation or to the abstaining of becoming a parent within couples. However, findings from Finland show that the main part of the first-birth decline in that country has been due to declining fertility within unions and that very little of the decline is related to changing partner dynamics (Hellstrand et al. 2021b, Andersson 2021). An ongoing study for Sweden based on the decomposition of fertility data by different household types suggests that this is the case in this country, too (Andersson 2021, Neyer et al. 2021).

In previous periods of fertility decline, the declines only occurred at younger ages, with scope for parallel recuperation in fertility rates at ages above 30 (Andersson 1999, Andersson and Kolk 2015). In contrast, the first-birth decline in the 2010s occurred at all ages below 40, with little scope for compensating fertility recuperation (cf. Hellstrand et al. 2021a, Comolli et al 2021). This means that the long-term consequences of current fertility declines may be much more pervasive than what was the case in previous Swedish fertility fluctuations. Unlike in Finland and Norway, Swedish policy makers have not taken much notice of recent fertility declines. This is because the trends of changing fertility behavior have been masked by counter-wailing forces of changes in the age composition of Swedish women and men in young adulthood, which have led to relatively stable numbers of actual births during the 2010s (Statistics Sweden 2021). If fertility rates remain low also in the future the issue of declining number of births will become prominent also in Sweden, including with its consequences for future population age structures and dependency ratios.

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