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Fertility recovery despite the COVID-19 pandemic in Finland?

Jessica Nisén, Marika Jalovaara, Anna Rotkirch, and Mika Gissler

Abstract

Finland's increase in births, recorded in the months following the first two waves of the COVID-19 pandemic, was among the strongest. We assess whether this fertility increase occurred because of or despite the pandemic, or both, by investigating the country's fertility trends by women's region of residence, age group, and parity. Finland overall was modestly hit by the early pandemic, but Helsinki-Uusimaa faced more severe restrictions. We used aggregate register data until September 2021 to assess monthly fertility. In 2020 and 2021, the relative increases in fertility were strongest among women aged 30 and over. In 2021, but not in 2020, fertility increased most in Helsinki-Uusimaa, and across parities. Model-based estimates suggested a modest fertility boost of the early pandemic. To conclude, Finland's notable fertility increase in 2021 broadly followed pre-existing trends where the country recovered from its all-time low fertility levels, and the early pandemic may have reinforced this trend.

Keywords: fertility, age-specific fertility, TFR, region, COVID-19, Finland

Introduction

The decade-long strong fertility decline in Finland came to a halt at least temporarily in 2020, after the total fertility rate (TFR) had reached its all-time low of 1.35 children per woman in 2019 (Official Statisics of Finland, 2021). The 28% decline in TFR from 2010 to 2019 was remarkable and unexpected, and the recovery in 2020 to 1.37 negligible, yet notable in marking the end of the continuous decline since 2010. Given these prolonged low levels of period fertility, completed cohort fertility in Finland will also be subject to strong declines (Hellstrand et al., 2020). The fertility decline in Finland is not unique, since the 2010s were characterized by declines in period fertility across the Nordic countries (Hellstrand et al., 2020), as well as in several other high-income countries with traditionally relatively high fertility, such as the US, the UK, France, and the Netherlands (Human Fertility Database, 2022b). The decline in the 2010s was, however, the strongest in Finland, closely followed by Iceland and Norway. At the same time, Finland was also the country reporting among the strongest increases in births nine months following the onset of the COVID-19 pandemic in March, 2020 (Sobotka, Jasilioniene, Galarza, et al., 2021)[1]. This background makes Finland a particularly interesting case study in which to observe fertility trends during the COVID-19 pandemic. Given the prolonged decline in fertility in the preceding decade, there are

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expectations for fertility recuperation in the near future (Hellstrand et al., 2021; Nisén et al., 2020). At the same time, the pandemic is theorized to affect fertility as well (Aassve et al., 2020; Berrington et al., 2022; Ullah et al., 2020). Period fertility can be affected by both long-term trends and short-term events (such as the onset of a global crisis and its immediate effects on health, economic security, and daily living), which furthermore may affect different demographic groups differently. We may therefore expect period fertility during the pandemic to result from multiple factors, some of which may be caused by the pandemic itself.

This study aims at providing a first assessment of whether fertility in Finland in late 2020 and early 2021 increased despite or because of the pandemic, or some combination of the two, by investigating the country's fertility trends by women's region of residence, age group, and parity. This has value also given that existing studies on fertility developments during the COVID-19 pandemic have mainly analyzed total numbers of births, thereby overlooking possible population heterogeneity. The current study is based on monthly data from 2015 until September 2021 provided by Statistics Finland, allowing us to cover the fertility response to the first two waves of the COVID-19 pandemic in Finland (THL, 2022). We describe fertility developments in the recent years until September 2021, focusing on differences in fertility rates between groups of women of different region of residence, age group, and parity (birth order) and investigate how fertility trends evolved based on the time of conception (estimated from live births) before and after the onset of the pandemic. We discuss our findings in light of societal developments in Finland during the first two waves of the pandemic.

Background

COVID-19 and fertility: Plausible mechanisms and early evidence

Across countries, the COVID-19 crisis which began in early 2020 has already had a vast array of consequences, including those on demographic processes. The crisis may affect family formation and fertility levels, but potentially in different ways in different societal contexts (Aassve et al., 2020; Ullah et al., 2020). In the context of high-income countries, demographers generally expect fertility levels to be mainly affected through planned pregnancies, reflecting individuals' and couples' opportunities and intentions to have a(nother) child (Berrington et al., 2022; Ullah et al., 2020; Voicu & Bădoi, 2021).[2] Therefore, the first effects on fertility can be observed around nine months after the outbreak of the pandemic. Some of the expected processes affecting fertility levels are less immediate and slower, such as those operating via partnership formation and stability, and any consequences of them for fertility can be observed only with a longer delay. It is important to note that any effects of the pandemic intertwine with other factors influencing fertility levels regardless of, but possibly together and in interaction with, the effects of the pandemic.

The evidence from previous health crises (e.g., The Great Famine in Finland in 1866–1868, Spanish Flu in 1918, Zika in 2014–2017) suggests a pattern in which fertility first drops but then recovers, so that the negative effect on fertility remains temporary (Ullah et al., 2020). However, this evidence is largely based on settings in which fertility was high and diseases targeted the young. For instance, the Great Famine in Finland in the late 19th century was accompanied by a temporary drop and a subsequent increase in fertility level, which remained close to five children per woman (Turpeinen, 1979). More recently in Brazil—a country with readily low fertility levels—the Zika virus epidemic that started in 2014 resulted in an immediate decline in births (Castro et al., 2018), with potentially limited long-term impact on TFR (Marteleto et al., 2020), despite the severe direct risks of the virus associated with the development of the fetus. Hence, the effects of a pandemic targeting mostly the elderly in the context of wealthy and low-fertility societies remain largely unknown. Generally, the current global crisis is expected to affect fertility levels of high-income countries negatively, at least among young women who have more time to postpone childbearing (Berrington et al., 2022).

Pandemic-induced factors that may affect fertility negatively include economic and employment-related uncertainty, psychological stress, increased work-load for parents of young children, effects of the COVID-19 pandemic on own or family members' health and access to healthcare, and difficulties in housing transitions (Aassve, Cavalli et al., 2021; Berrington et al., 2022; Ullah et al., 2020). Moreover, the effect of increased workload may be mediated by its different impact on women and men (Voicu & Bădoi, 2021). Women have commonly faced larger challenges to balance work and family responsibilities during the pandemic than men (Del Boca et al., 2020; Eurofound, 2020), which in turn may weaken further childbearing intentions (Esping-Andersen & Billari, 2015; Goldscheider et al., 2015). Economic and employment-related uncertainty has also increased more strongly among women than men during the pandemic, given that increases in unemployment have been larger among women (Eurofound, 2020). Moreover, in the current pandemic, difficulties to access assisted reproduction may also have immediate negative effects on fertility of women of higher reproductive ages.

A pioneer study from the US predicted fertility declines as a consequence of the pandemic based on Google searches for unemployment and proximate determinants of fertility (e.g., conception and pregnancy; Wilde et al., 2020). There is partial support from surveys conducted in 2020 for the idea that those who expected the pandemic to clearly worsen their own economic situation were also the most likely to give up their childbearing intentions. This was the case in the UK, but not in Germany or Italy; in Germany the regional COVID-19 situation was associated with abandoning intentions to have a child, and in Italy younger women were more likely to do so (Luppi et al., 2020). In Poland, decreased financial security and worsened mental well-being during the pandemic were related to declines in childbearing intentions (Malicka et al., 2021). Previous research shows that in economically uncertain times people usually tend to put their childbearing plans on hold (e.g., Andersson, 2000; Goldstein et al., 2013; Sobotka et al., 2011), with the interesting exception of the economic recession of the 1990s in Finland, when more second and higher order children were born (Vikat, 2002, 2004).

It has also been suggested that the pandemic could have positive effects on fertility levels at least in groups not badly affected by the virus. Lockdowns allow more time at home, which might lead to a strengthened focus on family life and higher relationship quality among couples living together, as well as to a better work–life balance among some (Berrington et al., 2022). Berrington et al. (2022) suggest that the opportunity costs of having a(nother) child may have decreased during the pandemic, for instance due to fewer job opportunities, while on the other hand some couples may have accumulated more financial resources during the lockdowns to account for the direct costs of having a(nother) child. High mortality could also trigger increased fertility through the so-called "replacement effect", although such an effect is unlikely to be widespread given that the COVID-19 excess mortality is focused on old-age groups (Ullah et al., 2020). The pandemic may also have promoted a psychological re-evaluation of life goals and a desire to 'give life' when faced with illness and death (see e.g., Mathews & Sear, 2008), and death of parents and siblings is indeed associated with earlier age at first birth (Berg et al., 2020).

An early assessment of 22 high-income countries found declines in crude birth rates to be related to the COVID-19 pandemic in seven countries (in further six countries the effect was negative, but not statistically significant), indicating a drop in birth rate between November 2020 and March 2021 due to the pandemic (Aassve, Cavalli, et al., 2021). Many of the high-income countries worst hit by the pandemic (Italy, Spain, Portugal, the United States, France, and Russia) witnessed notable declines in their birth rates, while many other countries showed no significant changes. More recent evidence shows that while the pandemic was associated with continued or accelerated declines in numbers of births in most high-income countries between November and February 2021, the negative trend reversed in March and April 2021 and births increased in many countries (Sobotka, Jasilioniene, Zeman, et al., 2021). Notably, in few countries, the numbers of births increased as compared to the previous year already in early 2021; these include the Netherlands, Denmark, Norway, Finland and Iceland (Human Fertility Database, 2022a; Statistics Norway, 2022). Indeed, the Nordic countries, with the partial exception of Sweden, seem to have experienced no declines in their birth rates based on conceptions during the first wave of the pandemic and observ-

able until February 2021 (Aassve, Cavalli, et al., 2021). According to Sobotka, Jasilioniene, Zeman, et al. (2021), the number of births increased in Finland in the pandemic period until September 2021 by more than five per cent. Per cent increases in the numbers of births from January to September, 2021, compared to the same period in 2020 were 7.8 for Iceland, 7.1 for Finland, 5.7 for Norway, 3.1 for Denmark and 0.7 for Sweden (Nordregio, 2022).

The current fertility context of Finland

The fertility decline in Finland in the 2010s was pervasive: It was observed in all age groups below the age of 40, and while it largely reflected declines in first births, declines were also observed across higher parities (Hellstrand et al., 2020). Declines were observed across regions (Campisi et al., 2020), and were not limited to any socio-economic group, although declines in first births were somewhat stronger among women with shorter education (Hellstrand et al., 2022). These declines were unexpected, since for decades fertility levels in the Nordic countries remained high by European levels, which has been attributed to their welfare states' support for families and to gender equality (Balbo et al., 2013), and there were no notable negative developments in these aspects in the 2010s (see Hellstrand et al., 2021). Fertility responses to economic recession varied between the Nordic countries in the 1990s—notably, with increases in Finland (Vikat, 2002)—but after the 2008–2009 recession the responses were largely homogeneous across the countries (Comolli et al., 2021).

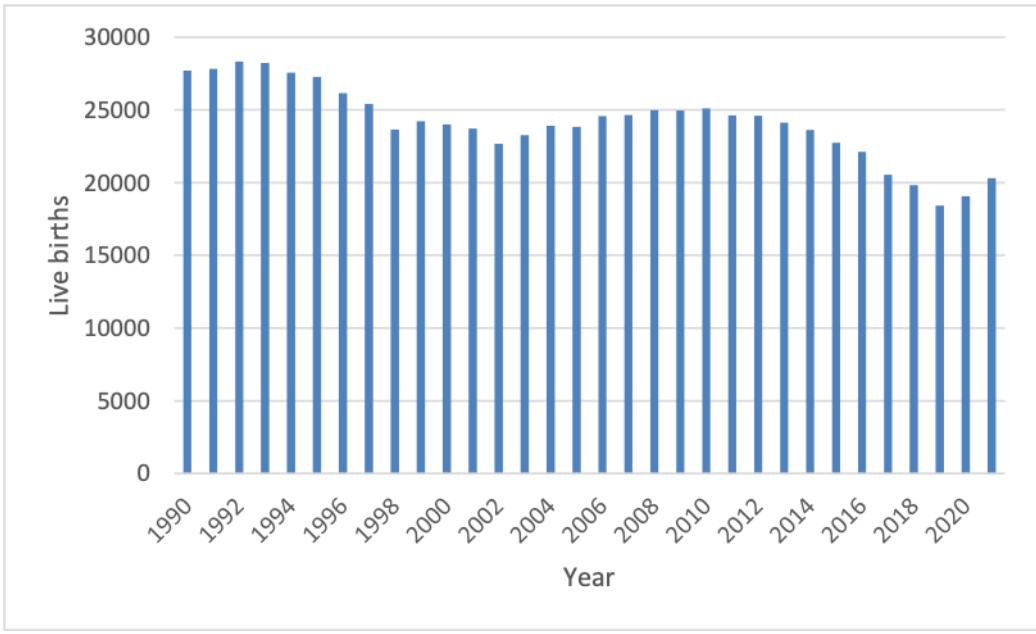
The decline in fertility rate in Finland coincides with an increase in the share of young adults expressing to prefer to stay childless (Rotkirch, 2020), and was strongly driven by couples who postpone or renounce having a first child (Hellstrand et al., 2022). The reasons behind this development remain poorly understood, but perceived uncertainty and lifestyle reasons are among the strongest candidates suggested to play a role (Savelieva et al., 2022). "Wanting to do other interesting things in life" was before the pandemic outbreak the most frequently mentioned single reason for postponing or renouncing births among both men and women and especially among young people in their 20s (Miettinen, 2015). Focus group interviews indicate that such "more interesting things" included travelling, hobbies and a more carefree lifestyle, that was often seen as opposed to the responsibilities connected with parenting (Rotkirch et al., 2017; see Bergnehr & Bernhardt, 2013 for similar results from Sweden). With the first COVID-19 lockdown, the opportunities for such "interesting other things" radically decreased, which may have paved the way for a more family-focused life and parenthood in some groups.

Figure 1 shows the total number of live births in Finland between 1999 and 2021 between January and May. It illustrates that the decade-long continuous fertility decline in Finland ended just before the beginning of the COVID-19 pandemic in March 2020. Births in May in 2020 were not yet subject to the pandemic, since most children born that month were conceived in September to October 2019. However, in 2020, fertility level in Finland was still substantially below the levels of the early 2010s. Importantly, the recuperation of birth rates continued also in late 2020 and in the first half of 2021, when children who were conceived during the first two waves of the COVID-19 pandemic were born. Further evidence indicates that the overall increase in year 2020 was limited to parities two and higher, while no increase was observed for first births (Official Statistics of Finland, 2021). This crude evidence suggests no strong negative effect of the early pandemic on fertility in Finland, at least for second and higher parities.

During the first two waves of the pandemic in 2020, Finland as a whole was more modestly hit by the pandemic than many other European countries in terms of COVID-19 incidence and mortality (ECDC, 2022; Pifarré i Arolas et al., 2021). Notably, incidence and excess mortality remained comparatively low also in the other Nordic countries, except Sweden (Nordregio, 2022). Finland had the first lockdown relatively early, from March 18, 2020 (Finnish Government, 2020a). Most restrictions were lifted in May–June (Finnish Government, 2020b). Since March, state of emergency due to the coronavirus was mostly maintained for the rest of the year. Schools were in distance learning from mid-March to mid-May 2020, and were subject to local temporary physical closures in case of a local virus outbreak later on (Finnish

Government, 2020b), but childcare centers for children under school age remained largely open despite the pandemic (Varanka et al., 2022). Yet, an overall less stringent and more flexible government response was characteristic of Finland as well as other Nordic countries in 2020 (Hale et al., 2020). Further, the declines in employment rates were modest and the trust in the government remained comparatively high in the Nordic countries (Eurofound, 2020, 2021). In Finland, more severe containment measures were in place in 2020 in the Helsinki-Uusimaa region, where also the incidence was higher than in other regions (Kestilä et al., 2021).

The Finnish workforce and educational system adjusted rapidly to digital and remote forms of work; in 2020 Finland had the highest share (60%) of employees working remotely in Europe (Sostero et al., 2020; Häkkilä et al., 2020). Apart from mortality and ill health, the adverse effects of the pandemic were in many ways concentrated to groups of reproductive age. Unemployment and psychological stress increased more strongly among the working-aged below 50 (Karvonen & Honkatukia, 2021; Suvisaari et al., 2021). A survey among social workers in late 2020 suggested that issues related to mental health and housing were more common in large cities, while problems with daily coping and financial issues were more often faced in smaller cities and towns (Eronen et al., 2021). Generally, in late 2020 around a third of Finns expressed weakened optimisms about the future (Suvisaari et al., 2021) and stress levels in families with children had risen (Aalto-Setälä et al., 2021). Unemployment and stress levels increased more strongly among women than men (Kestilä et al., 2021). In Finland, also women's unemployment is likely to delay the entry into parenthood in most groups (Alderotti et al., 2021; Miettinen & Jalovaara, 2020), but strong welfare policies may have buffered the increase of uncertainty related to unemployment during the pandemic (Lappegård et al., 2022).



Source: Population statistics (2021: Preliminary data), Statistics Finland

Figure 1. Live births between January and May in Finland, years 1990–2021.

Aims and expected findings

This study aims to increase understanding of the recent fertility developments in Finland, in particular following the first two waves of the COVID-19 pandemic. More broadly, we aim at providing evidence of fertility developments in times of a societal crisis. We describe fertility developments from 2015 until September 2021 by women's region of residence, age group, and parity using register data covering the entire population of Finland. Our analysis is centered around the commonly used measure of total fertility rate (TFR), which is an estimate of the number of children that would be born to a woman over her lifetime, were she exposed to the age-specific fertility rates observed in a current year. Therefore, TFR is subject to changes in current conditions, which may reflect both postponement of childbearing as well as ultimate fertility. In times where women postpone their childbearing, TFR tends to underestimate the ultimate number of children born to women (Bongaarts & Feeney, 1998). In turn, in a period in which postponement of childbearing lessens, TFR increases (Bongaarts & Sobotka, 2012). We discuss fertility trends in Finland in light of societal developments during the COVID-19 pandemic, including the spread of the virus across population sub-groups and the governmental responses to curtail the spread and mitigate the negative consequences of it (OECD, 2021a).

Our first expectation is that the increase in birth rates in Finland which started before the pandemic either continued or flattened out across most population subgroups in late 2020 and in 2021. This general expectation is based on (i) the fact that the negative consequences of the pandemic have been less severe than in countries that were hit harder by the pandemic, as indicated by higher COVID-19 incidence and mortality, more extensive lockdowns, and stronger consequences for national economies, (ii) that the negative consequences have been less severe in welfare states with a highly-educated work force, high level of digitalization, and continued provision of child care and a well-functioning economic safety net in case of unemployment or illness during the pandemic, (iii) that the boost to fertility is larger in countries where subjective reasons (e.g. perceived uncertainty and lifestyle factors) were prominent for postponing or renouncing childbearing before the pandemic, (iv) that the perception of the uncertainty of the future may, however, affect fertility negatively, even when such uncertainty is not experienced directly (Vignoli et al., 2020).

Our second expectation is that possible negative effects of the pandemic on fertility were stronger in younger age groups (i.e., below 30), the childless (and therefore 'at risk' of first birth), and those residing in the Helsinki-Uusimaa region. Fertility of the young age groups and those without children can be expected to be more severely hit by the pandemic due to economic uncertainty, given the generally weaker attachment of younger adults to the labor market on one hand and the important role of labor market attachment for entry into parenthood on the other (Andersson et al., 2014; Miettinen & Jalovaara, 2020; Vikat, 2004). Young women also have more time to postpone their childbearing without implications on their ultimate fertility. However, strong welfare state policies may have buffered against the increase of unemployment-related uncertainty during the pandemic in Finland. Moreover, we expect the pandemic to have affected more negatively childbearing among those who live in regions with higher infection rates as well as stricter containment measures, such as Helsinki-Uusimaa during the first two waves.

Data and method

This study is based on aggregate data on preliminary numbers of births and women by woman's region of residence, age, and number of previously born children on a monthly basis received from Statistics Finland. We calculated monthly age-specific, parity-specific, and total fertility rates from March 2015 until September 2021. For fertility rates, we first calculated the monthly female mid-population as the average of the number of women on the last day of the current month and the previous month. Then we multiplied this mid-population by the share of days of the current month of the days in the whole year, in order to adjust

the length of the exposure in the fertility rates. We distinguished between four large regions (suuralue, NUTS2, see Eurostat, 2022): the capital region of Helsinki-Uusimaa, Western Finland, Southern Finland, and Eastern and Northern Finland. Further, we distinguished between four age groups (15–24, 25–29, 30–34, 35–49) and three parity groups (one, two, and three or higher). The fifth NUTS2 region, Åland, was excluded given the small size of the region's population (31 000 in 2021) and the corresponding high fluctuation of its monthly rates.

Futher, model-based estimates were calculated following the strategy by Aassve et al. (2021). The aim here is to separate the effect of the pandemic from existing time trends in fertility (irrespective of the pandemic). We note that these estimates capture an average effect of the pandemic on births from November 2020 to September 2021 as resulting from the two first waves of the COVID-19 pandemic in 2020. We estimated the following linear model using ordinary least squares:

$$TFR_t = \beta_0 + \beta_1 Pandemic_t + \sum^3_{(i=1)} \gamma_i \ Time^i_t + \alpha_m + \epsilon_t$$

We estimated the coefficient β_1 of the variable "Pandemic", which was categorized as zero in months from March 2015 until October 2020 and as one from November 2020 to September 2021. The pandemic was assumed to affect the circumstances before and at the time of (potential) conception, i.e., fertility rates with a nine-month delay. Existing time trends in fertility were captured by including the linear, quadratic and, cubic time trend in the model. We also adjusted for seasonal variation with month fixed effects α by including a dummy variable for each month in all models. Model 1 uses a country-level monthly TFR as the outcome (N=79). We further estimated a Model 2 which uses the corresponding TFR calculated for each of the four regions as the outcome (N=361) and additionally controls for regional fixed effects. We also conducted analogous modeling of the four regional TFRs separately (Models 1) and of the four age-specific fertility rates (ASFRs) (Models 1 and 2). We used the command robust (with the Huber-White-option) of Stata 17 to calculate p-values and confidence intervals adjusted for heteroscedasticity of the error terms.

Results

Country-level trends

As Figure 2 shows, September 2019 marked the beginning of at least a temporary fertility rebound, as it was the first month in which fertility did not decline further as compared to the same month in the previous year, after a continuous decline since 2010 (Hellstrand et al., 2020). Throughout 2020 the monthly rates were very similar to those in 2019, although higher in some months particularly in the first half of the year. Rates in November and December 2020 were very similar compared to the previous year, although they were already subject to the COVID-19 pandemic. In turn, from January to September, the monthly fertility rate was higher in 2021 than in the corresponding month in 2020, thereby indicating a clear increase in the TFR in 2021. When comparing the average TFR across two following years (January to September) in Table 1, we observe that the average monthly declines from January to September were as strong as 5.5% in 2017, 5.0% in 2018, and 4.5% in 2019.

The year 2020 was the first in which fertility increased, modestly by 1.5%; in 2021, the increase amounted already to 6.8% (Table 1). The monthly increase in TFR in 2021 as compared to the year 2020 was between 1.8 to 11.0 per cent. This includes the largest increases since 2015 (February 10%, March 10%, June 11%), but in magnitude they are not substantially different from respective decreases until 2019, which amounted to 9.6%. To add, in the whole period in which fertility was subject to the pandemic (November 2020 to September 2021), the monthly TFR increased by 5.5% on average, which is similar to a previous estimate for Finland based on the number of births (Sobotka, Jasilioniene, Galarza, et al., 2021).

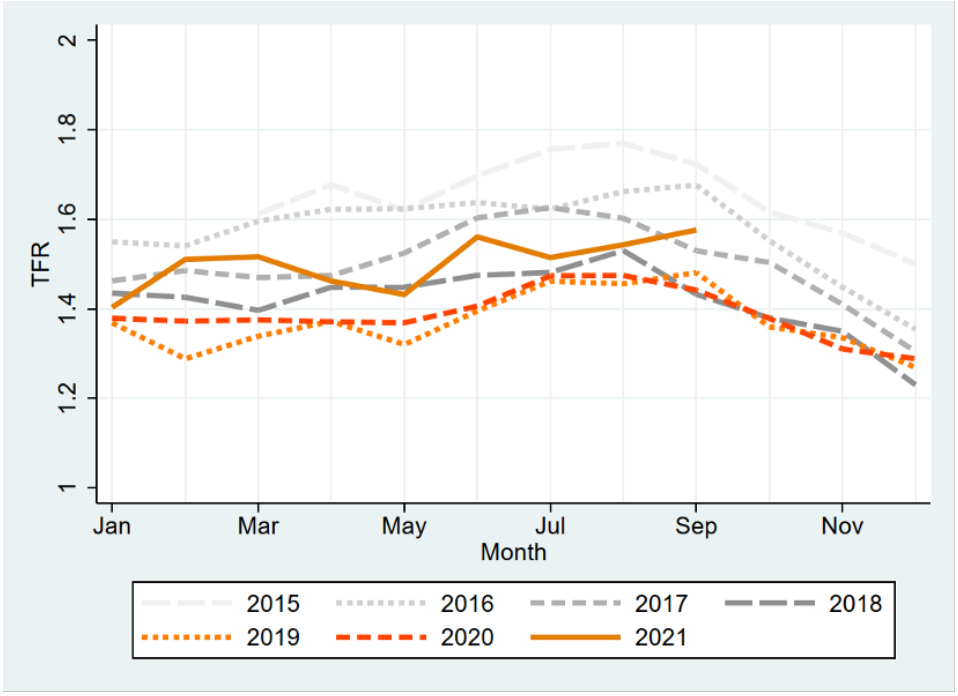


Figure 2. Monthly TFR in Finland, March 2015 – September 2021.

Table 1. Change in TFR relative to the same month in the previous year (in per cent) in Finland, March 2016 – September 2021.

Month	Δ 2016	Δ 2017	Δ 2018	Δ 2019	Δ 2020	Δ 2021
January		-5.6	-1.9	-4.6	0.7	**1.8**
February		-6.9	-4.0	-9.6	6.5	**10.0**
March	-1.0	-7.9	-5.0	-4.1	2.7	**10.2**
April	-3.3	-9.1	-1.8	-5.3	-0.1	**6.6**
May	0.2	-6.1	-5.0	-8.9	3.7	**4.6**
June	-3.5	-2.1	-8.0	-5.4	0.8	**11.0**
July	-7.6	0.2	-8.9	-1.3	0.8	**2.8**
August	-6.1	-3.6	-4.5	-4.8	1.3	**4.6**
September	-2.7	-8.8	-6.4	3.4	-2.7	**9.3**
October	-3.9	-3.1	-8.3	-1.4	1.4	
November	-7.7	-2.7	-4.3	-1.1	**-1.9**	
December	-9.7	-3.6	-5.7	3.2	**1.5**	
Average	-3.4	-5.5	-5.0	-4.5	1.5	6.8

Note: Average calculated for months from January to September. Months which are assumed to have had the chance to be affected by the Covid-19 pandemic are bolded.

Trends by region

Over the study period, the average monthly TFR levels were lowest in Helsinki-Uusimaa (1.41) and highest in the North-East (1.60; Figure 3). Interestingly, the regional deviation from the country mean TFR decreased over the period, so that North-East and Helsinki-Uusimaa regions became more similar to the country average over the study period. We observe that increases in TFR in 2021 occurred across all regions in Finland. When compared to the average of the three previous years, shown in Figure 4, changes in TFR were somewhat stronger in 2021 in Helsinki-Uusimaa (8.7%) than in the other regions of West (5.6%), South (5.8%) and, particularly, North-East Finland (3.5%). To note is that respective declines in 2020—predating any pandemic effects—were also already milder in Helsinki-Uusimaa (-1.3%) than in other regions (West -5.8%, South -3.2%, North-East -4.2%). In all regions except the North-East, the increase also seemed to strengthen in the period from February to March 2021, with births dating back to conceptions in May to June 2020. As expected (see, e.g., Norum et al, 2014), the monthly TFR is also subject to seasonal variation.

To note here too is that a comparison to the previous year would provide a slightly different picture: while the comparison of the monthly TFR to a three-year-average gives the impression that TFR in 2020 was still on the decline, this was not the case when comparing to the previous year only (Table 1 and Figure 2). Moreover, based on an annual comparison (results not shown), Helsinki-Uusimaa (2.0%) was not the region with the strongest increase in TFR already in 2020 (West -1.3%, South 1.6%, North-East 3.9%). However, similarly as in the comparison to a three-year average, the annual comparison indicates that the increases in 2021 were larger in Helsinki-Uusimaa (9.0%) than in other regions (West 7.6%, South 6.6%, and North-East 3.2%). This illustrates how the choice of the reference period may influence the results.

Trends by age and parity

There was a fertility rebound in 2020 and 2021 among all but the youngest women (aged 15–24; Figure 5). This ended the fertility decline of women aged 30–34 from 2010 to 2019—a decade-long decline which had disrupted the long-term trend of fertility increase in this female age group since the 1970s (Nisén et al., 2020). The average change of the monthly rate relative to the previous year amounted in 2020 (January to September) to -5.3, 0.9, 4.2, and 2.8 per cent for women aged 15–24, 25–29, 30–34, 35–49, respectively; in 2021 the corresponding changes were 5.3, 5.1, 10.7, 9.8 (results not shown). The stable declining trend among the youngest women does not suggest a pandemic effect, but rather the continuation of a long-term trend of postponement of first births to higher ages. The apparent drop in November to December in 2020 and increase in early 2021 in the monthly rate among the 30–34-olds corresponds to hypotheses of a pandemic effect on fertility, however it also resembles the strong seasonal pattern of the previous years. Among the 35–49 year-olds there is a short-term drop in December 2020, which may reflect the fact that infertility clinics were (partially) closed in March-May 2020 (see Heino & Gissler, 2021).[3]

In terms of parity, there were increases in first, second, as well as third births to women (Figure 6). In absolute terms the increases were weaker in higher-order parities (second as well as third order children), but in relative terms increases in 2021 (January to September) as compared to 2020 were rather similar across parities, albeit slightly larger for first and third births (on average, TFR1 7.9, TFR2 5.8, and TFR3 7.8%). These results suggest a general fertility rebound not limited to any specific parity. This is in contrast to 2020, where increases in TFR occurred mainly at second and higher parities (Official Statistics of Finland, 2021). The increase of first births stands out in February and March 2021, where TFR1 amounted to much as 14.6 and 11.2% compared to the same months in the previous year. In turn, the average fertility increase later in June 2021 was particularly strong for second and third children, with TFR2 and TFR3, amounting to 15.7 and 13.8 per cent, respectively.

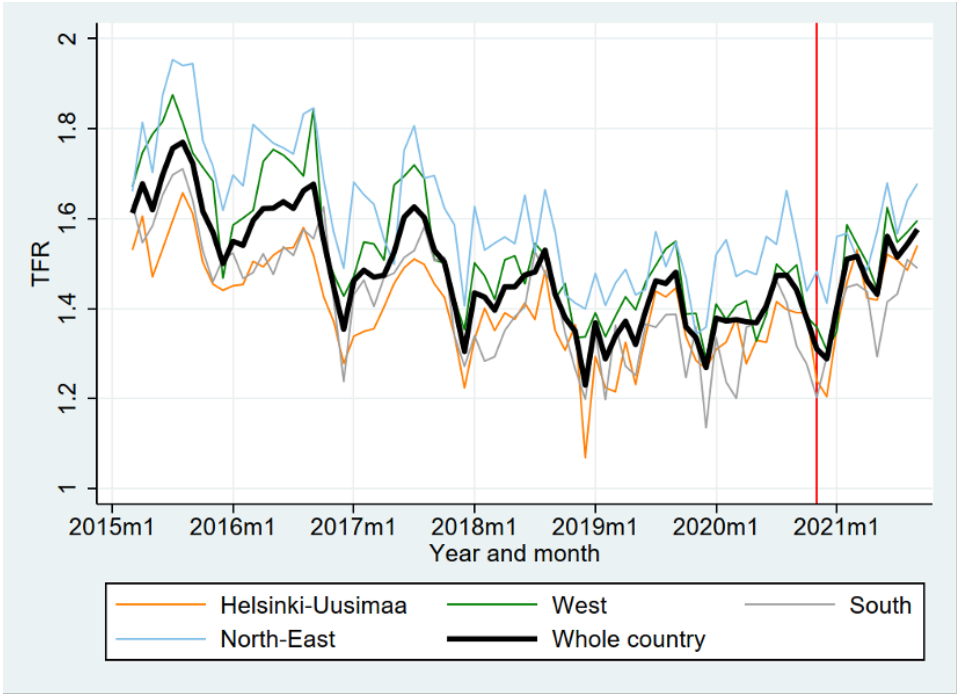


Figure 3. Monthly TFR by region in Finland, March 2015 – September 2021.

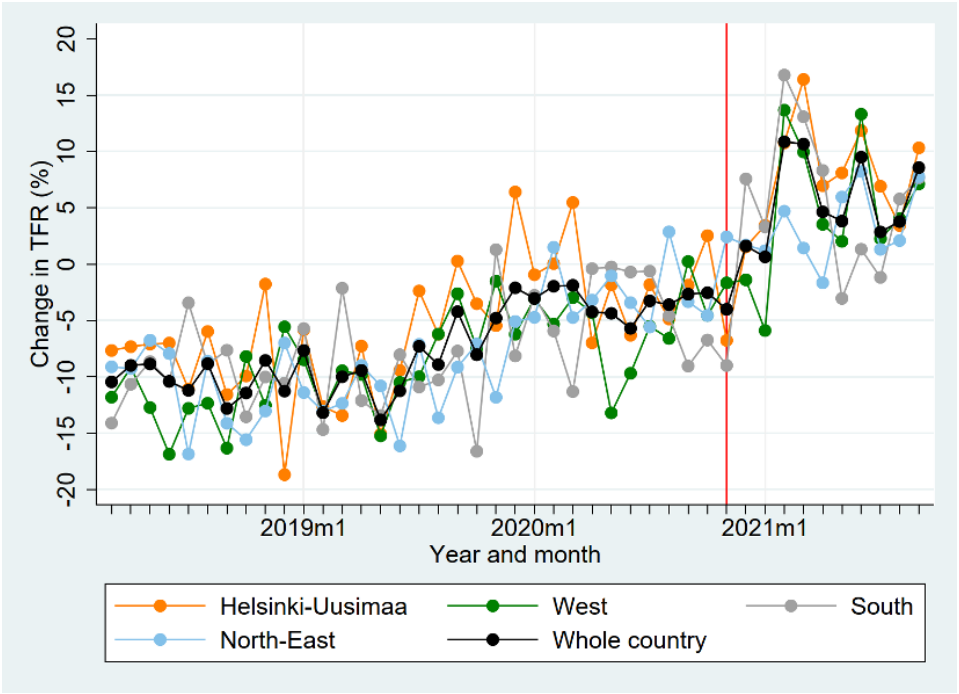


Figure 4. The change in monthly TFR as compared to a three-year average (in per cent) by region in Finland, January 2019 – September 2021.

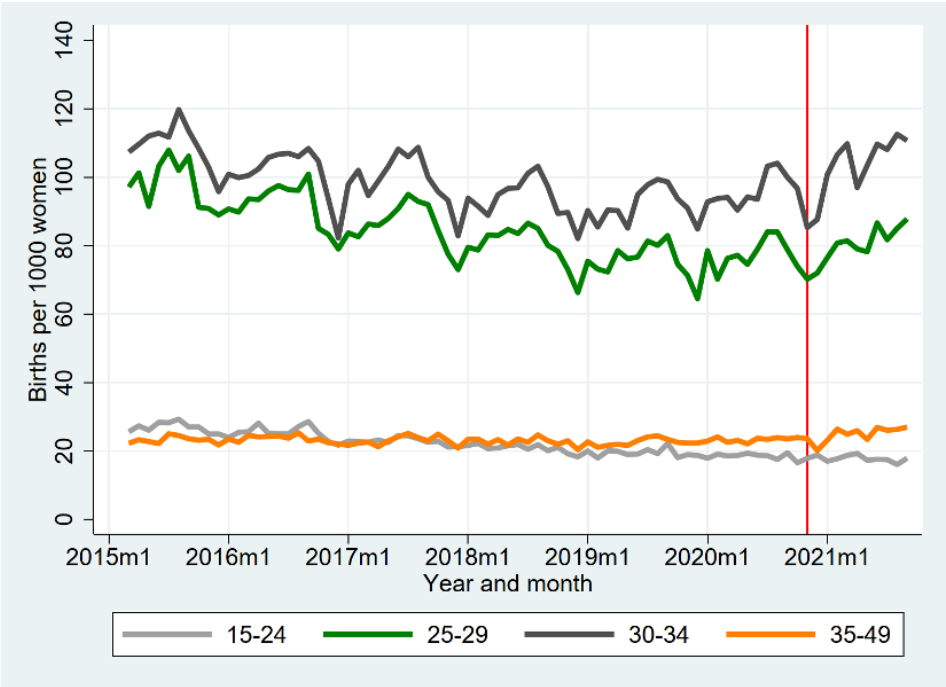


Figure 5. Monthly age-specific fertility rate (ASFR) in Finland, March 2015 – September 2021.

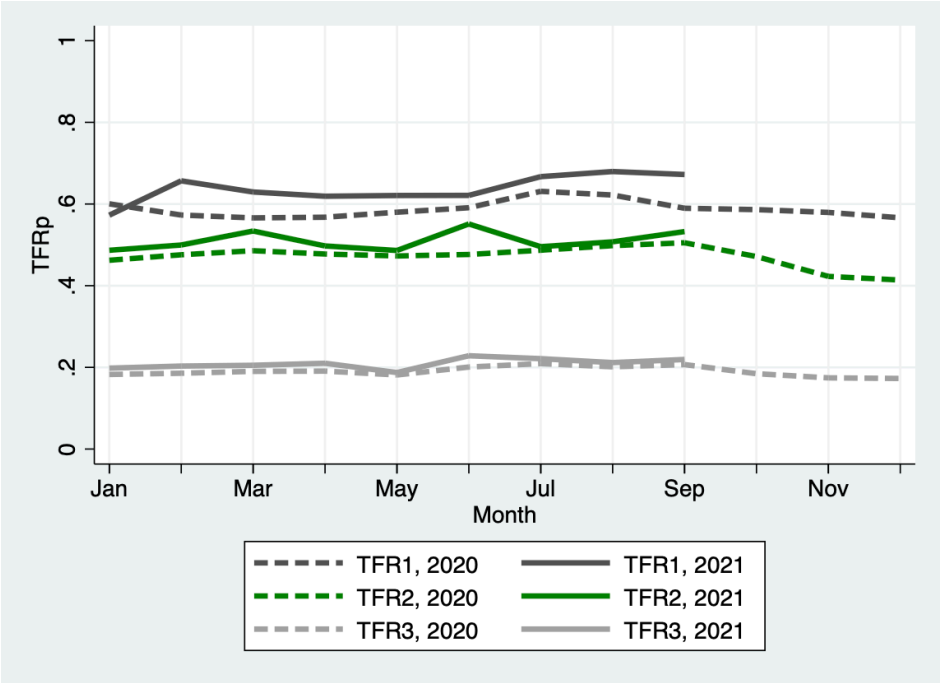


Figure 6. Monthly parity-specific TFR in Finland, January 2020 – September 2021.

Model-based results

Finally, we conducted model-based analyses with the aim to isolate an effect of the pandemic on fertility from underlying time trends in fertility. As illustrated in Table 2 (Model 1), the pandemic was estimated to increase the monthly TFR of the country by 0.043 children on average in the period from November 2020 to September 2021 in Finland, but this estimate based on 79 observations was not statistically significant (p-value 0.163). Compared to the average TFR level between October 2019 and September 2020 this would correspond to a 3.1 per cent increase. This estimate for Finland is similar (positive and insignificant) to that found by Aassve et al. (2021) using the same approach but analyzing the crude birth rate instead of the TFR and analyzing data only until March 2021. We additionally estimated a model with regional TFR as the outcome, while controlling for average regional level in TFR (Model 2). Here, the magnitude of the point estimate remained very similar, at 0.050 children, but the estimate based on 316 observations was statistically significant (p-value 0.032), and the corresponding 95% confidence interval (0.004–0.096) suggested the true effect of the pandemic on TFR to be either zero or positive.

Table 2 provides limited evidence of a pandemic effect in subgroups of a woman's region of residence or age, based on 79 observations in each subgroup (Model 1). All region- and age-specific coefficients were positive, yet only the coefficient of the youngest women aged 15–24 reached marginal statistical significance (p-value 0.079). Models 2 indicated a positive and marginally statistically significant coefficient among women aged 15–24 and 25–29 (Model 2). However, based on the coefficient size across Models 1 and 2 it may be interpreted that women aged 25–29 and 30–34 contributed the most to the increase in the TFR due to the pandemic, while the respective contribution from women aged 15–24 was smaller, and that of women aged 35–39 negligible. In all, the positive coefficients with confidence intervals in most cases to a large extent falling above zero provide further evidence of the lack of a negative effect of the pandemic on fertility in Finland by September 2021.

Table 2. Estimates of the pandemic effect on the total fertility rate (TFR) and ASFR (Age-specific fertility rate) in Finland in November 2020–September 2021.

	Models 1			Models 2		
	β_1	p-value	95 % CI	β_1	p-value	95 % CI
TFR						
Whole country	0.043	0.163	-0.018, 0.105	0.050	0.032	0.004, 0.096
Helsinki-Uusimaa	0.024	0.606	-0.067, 0.115			
West-Finland	0.070	0.138	-0.023, 0.163			
South-Finland	0.085	0.136	-0.028, 0.199			
East & North F.	0.022	0.563	-0.054, 0.098			
ASFR						
15-24	1.376	0.079	-0.165, 2.917	1.245	0.088	-0.185, 2.675
25-29	2.900	0.186	-1.429, 7.229	4.227	0.070	-0.353, 8.806
30-34	2.902	0.421	-4.253, 10.058	3.064	0.210	-1.731, 7.859
35-49	0.033	0.968	-1.597, 1.552	0.090	0.983	-1.228, 1.408
	N=79			N=316		

Note: Estimates shown are from (14) separate models. Models 1 use either country-level TFR or ASFR as the outcome, and control for linear, squared and quadratic time trend and month fixed effects. Models 2 use regional TFR/AFR as the outcome, and control additionally for region fixed effects. CI = Confidence interval. Results from full models are shown in the Appendix Tables 1–4.

Discussion

From late 2019 until 2021, Finland experienced a fertility rebound at the country level and across most population sub-groups. This study provides the first detailed evidence showing that the first phases of the global COVID-19 pandemic seem remarkably not to have negatively affected fertility in Finland. Prior to the pandemic, a recovery of the birth rate was both expected and predicted after a decade-long decline (Nisén et al., 2020; Rotkirch, 2021). Based on the quite successful handling of the pandemic in Finland in 2020, we considered it plausible that the fertility increase would either have continued of flattened out in late 2020 and in 2021. Indeed, monthly fertility (from January to September) in 2020 increased 1.5% on average, but in 2021 as much as 6.8%. To put this in perspective, the respective fertility decline in 2017–2019 amounted to 5.5% at most. Had there been concurrently an overall negative effect of the pandemic, as well as a rebound of the existing time trend in fertility, the rebound would have needed to be extremely strong. In light of the current results, a general fertility rebound, in combination with a moderate fertility-boosting effect of the pandemic, is more plausible. We found an overall increasing trend in 2021 across all age groups except the youngest women, and across all regions and parities. Moreover, model-based estimates suggested a moderate positive response to the pandemic, while controlling for the existing time trend in fertility. While these estimates capture only average responses to the first eleven months of the pandemic, a boosting effect may have been concentrated to specific months in which fertility increased relatively strongly, such as February-March and June 2021, corresponding to conceptions in May-June and September 2020. In May-June 2020 the first wave ended, restrictions were lifted and life became more normal. In September 2020 the second wave began, signaling perhaps the enduring nature of the pandemic.

We further expected a more negative response to the pandemic among younger age groups, childless women, and those residing in Helsinki-Uusimaa. A more negative effect of the pandemic on first children was expected given the importance of economic situation for the entry into parenthood and growing economic uncertainty caused by the pandemic. However, fertility increases in 2021 were not weaker for the first-parity births, which further strengthens the claim for a neutral or even positive effect of the pandemic. In fact, the trend in first births reversed from 2020 so that first-birth fertility began to increase in 2021. Fertility decline from 2020 to 2021 was observed only among the youngest age group of 15–24-year-old women. This is likely a continuation of the long-term decline of fertility in this age group since the late 1960s (Official Statistics of Finland, 2021), rather than a pandemic effect. Women aged 25–29 had milder increases in fertility compared to those aged 30–34. This could signal a somewhat stronger negative pandemic effect among younger women. However, fertility increase was weaker in women below 30 years already in 2020, before being subject to the pandemic, which questions this argument. Model-based results provided further support for these interpretations. Our results bear similarity to a recent study which found a positive fertility response to the early pandemic among women aged 28–35 in Norway, although the increases there were limited to second and higher-order births only (Lappegård et al., 2022).

In 2021, stronger increases in fertility were witnessed in Helsinki-Uusimaa despite that it was the region most severely hit in the early stages of the pandemic in Finland in 2020, in terms of both incidence and containment measures. Together with the model-based results this may be interpreted as further support of the absence of a negative effect of the early phases of the pandemic on fertility in Finland. If the pandemic had a negative effect on fertility, we would have expected the higher incidence rates or containment measures to translate into lower fertility, or a less steep increase, in the regions that suffered more in terms of these measures. This is not what we see based on the description of regional fertility trends. Our model-based estimates provide limited evidence of regional differences, but if anything, tend to suggest a not strongly heterogenous response to the pandemic across regions in Finland. Given the widespread use of communication technology and public media in Finland, it is plausible that national pandemic developments strongly influenced the individual perception of the pandemic.

Cross-country evidence shows that the fertility rates of the Nordic countries have generally been hit less negatively by the COVID-19 pandemic than fertility rates in many other European countries (Aassve,

Cavalli, et al. 2021). While there was little change in numbers of births until January 2021, there were increases in births in the following months in Finland, Norway, Denmark and Iceland (Nordregio, 2022; Sobotka, Jasilioniene, Zeman, et al., 2021). In our view, there are three possible explanations for this peculiar Nordic pattern. First, the fertility developments in 2021 in these countries, as compared to other parts of Europe, may have been influenced by the different general fertility trends before and during the pandemic. Fertility declined across the Nordic countries in the past decade (Hellstrand et al., 2020). Finland witnessed a particularly strong fertility decline in the 2010s: it recorded in 2019 its lowest-ever TFR level at 1.35 children, and it has the currently lowest TFR of the five Nordic countries (Human Fertility Database, 2022b). That Finland also witnessed one of the strongest increases in fertility between December 2020 and April 2021 (Aassve, Cavalli, et al., 2021; Sobotka, Jasilioniene, Zeman, et al., 2021) seems to be barely a coincidence, and is at least a partial explanation of the positive fertility trend in 2021. To add, to our knowledge Iceland is the only country having witnessed an even stronger fertility increase than Finland in 2021 (Nordregio, 2022). Iceland also went through an exceptionally strong fertility decline in the 2010s (Human Fertility Database, 2022b).

Second, the Nordic societies, excluding Sweden (OECD, 2021), had a swift first lockdown and were less severely hit by the pandemic in 2020–2021 in terms of incidence (ECDC, 2022), while the governmentally imposed restrictions were also less severe than in other parts of the Europe (Hale et al., 2020, Nordregio, 2022). Third, favorable institutional and cultural features of the Nordic societies may have buffered their fertility levels from falling in times of crises (see also Lappegård et al., 2022). For instance, the high general trust in governments may have helped people to accept the containment measures placed by the governments (Eurofound 2021), buffered increase in uncertainty of the future, and potentially through this mechanism also kept fertility from falling (Aassve et al., 2016; Aassve, Le Moglie & Mencarini, 2021). These factors together may have prevented at least the early stages of the pandemic from affecting fertility negatively, and even potentially paved the way for an additional fertility boost after the fertility declines witnessed in the 2010s.

This study was limited in evaluating the role of other potentially relevant factors, such as differences in educational attainment between groups of women residing in different regions. Other sources show that fertility of tertiary-educated women increased in Finland in 2020, while the fertility of women educated to the secondary or basic level continued to decline (Official Statistics of Finland, 2021). It is possible that the higher average educational level of the women residing in Helsinki-Uusimaa explains the recent strong increases there. During the pandemic, the highly educated could more easily conduct distance work from home (Golden, 2001; Sorsa & Rotkirch, 2020) and had more often spacious apartments or summer cottages with access to green space. They also generally have more stable employment and partnership careers (Jalovaara & Fasang, 2017; Thomson et al., 2013). Future studies on pandemic fertility should pay attention to heterogeneity by socioeconomic status, as the crisis has had a disproportionate impact on groups which were already in a precarious situation before the pandemic (Eurofound, 2021; Kestilä et al., 2021). Furthermore, in the longer term, research needs to consider the potential indirect effect of the pandemic on fertility through partnership formation, as the containment measures have made it more difficult to meet new partners.

We have provided the first detailed evidence pointing towards that the two first waves of the pandemic did not negatively affect childbearing in Finland. The strong fertility increases during 2021 were broadly due to a continuation of pre-pandemic fertility trends, where fertility recovers from its all-time low levels. We also found evidence of a modest fertility-boosting effect of the pandemic itself, but this effect may be largely confined to specific months in 2021. To conclude, fertility in Finland in 2021 continued to recover despite the first two waves of the COVID-19 pandemic, and it seems plausible that the early pandemic reinforced this fertility recovery. The preliminary statistics from Finland, however, indicate that the number of births declined again in 2022 (Official Statistics of Finland, 2022). The future will show how fertility trends continue to unfold after the pandemic has entered its later phases and new crises have appeared.

Endnotes

[1]Among the countries studied by Sobotka, Jasilioniene, Zeman, et al. (2021), Finland recorded the strongest increase in births between December 2020 and September 2021. This study did not include Iceland. A study by Nordregio (2022) showed that when comparing the numbers of births from January to September 2021, relative to the same months in the previous year, Iceland (7.8%) shows a slightly higher increase than Finland (7.1%).

[2]Effects of the COVID-19 virus infection on male and female reproductive systems have been suggested, but the evidence remains inconclusive (Desai et al., 2022). In the present context, also effects through unplanned pregnancies are possible, but they are likely to play a small role given their concentration at teen ages and the low level of teenage fertility in Finland (Vikat et al., 2002).

[3]In 2019 and 2020, 5.4% and 4.9% of all children, respectively, were born as a result of infertility treatments in Finland (Heino & Gissler, 2021, 2022).

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Data availability

The data are not publicly available. The license to the use of data are granted by Statistics Finland (www.stat.fi).

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