



# DEMOGRAPHIC RESEARCH

*A peer-reviewed, open-access journal of population sciences*

---

## **DEMOGRAPHIC RESEARCH**

**VOLUME 47, ARTICLE 12, PAGES 345–358**

**PUBLISHED 10 AUGUST 2022**

<https://www.demographic-research.org/Volumes/Vol47/12/>

DOI: 10.4054/DemRes.2022.47.12

*Descriptive Finding*

**Disentangling the Swedish fertility decline of the 2010s**

**Sofi Ohlsson-Wijk**

**Gunnar Andersson**

© 2022 Sofi Ohlsson-Wijk & Gunnar Andersson.

*This open-access work is published under the terms of the Creative Commons Attribution 3.0 Germany (CC BY 3.0 DE), which permits use, reproduction, and distribution in any medium, provided the original author(s) and source are given credit.*

*See <https://creativecommons.org/licenses/by/3.0/de/legalcode>.*

## Contents

1	Introduction	346
2	Data and methods	347
2.1	Swedish register data	347
2.2	Variables	347
2.3	Method	349
3	Findings	349
4	Discussion and conclusions	354
5	Acknowledgements	355
	References	356

## **Disentangling the Swedish fertility decline of the 2010s**

**Sofi Ohlsson-Wijk<sup>1</sup>**

**Gunnar Andersson<sup>2</sup>**

### **Abstract**

#### **BACKGROUND**

The downward fertility trend in Western countries during the 2010s is puzzling, not least in the Nordic region.

#### **OBJECTIVE**

In order to better understand its driving forces, we examine whether the decline is driven by differential behavior or compositional changes across sociodemographic population subgroups, for the empirical case of Sweden.

#### **METHODS**

Event-history techniques are applied to register data of the Swedish-born population to provide an in-depth analysis of the sociodemographic profile of the fertility decline.

#### **RESULTS**

The decline is confined to first births, with no apparent difference between individuals living in different types of municipalities or between those with fully Swedish and non-Swedish backgrounds. The first-birth decline is notable across labor market activity groups, but is somewhat more pronounced among those with weaker labor market positions. However, the shares of men and women who were active in the labor market and who had high earnings increased. The findings are strikingly similar for men and women.

#### **CONCLUSIONS**

For the most part the factors driving the Swedish fertility decline do not appear to be structural. Other forces, perhaps global, may underlie the general tendency to increasingly forego or postpone having children. The polarization in childbearing across labor market positions is an area for future research.

#### **CONTRIBUTION**

The study provides new insights into the conundrum of Nordic fertility decline during the 2010s.

---

<sup>1</sup> Stockholm University Demography Unit, Sweden. Email: [sofi-ohlsson-wijk@sociology.su.se](mailto:sofi-ohlsson-wijk@sociology.su.se).

<sup>2</sup> Stockholm University Demography Unit, Sweden.

## **1. Introduction**

The declining fertility rates in the 2010s across many Western countries is a puzzling new phenomenon (Comolli et al. 2021; Seltzer 2019), not least in the Nordic countries, with their previously relatively high fertility 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, 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 are still unknown. In order to better understand the social, demographic, and economic forces that underlie this trend in Sweden, we examine whether it is driven by differential behavior across subgroups of the population or by changes in the composition of men and women of childbearing age.

The fertility decline in the 2010s was remarkable in all Nordic countries: Sweden, Norway, Denmark, Finland, and Iceland. It has mainly been attributable to changing first-birth trends (Hellstrand et al. 2021) and in Sweden appears uniquely confined to this birth order (Comolli et al. 2021). As a first step in our analysis, we demonstrate that this previous finding for women is replicated when studying men. Thereafter, we examine whether the first-birth trend has declined uniformly in the population or is driven by differential behavior across regions and social groups.

The fertility declines appear to be triggered by the economic recession that hit developed societies in 2008, but the connection between these two developments is not 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 not in the Nordic region (Matysiak, Sobotka, and Vignoli 2021). Some scholars (Vignoli et al. 2020a, b; Comolli and Vignoli 2021) instead highlight the role of real or perceived uncertainties. Comolli et al. (2021) find that the decline in first-birth rates in the Nordic countries pertain to women of all educational levels, and argue that perceived uncertainties related to global developments rather than factual circumstances could offer a potential explanation. Nevertheless, the decline has been somewhat steeper among low-educated women, which they argue could be partly related to objective social welfare deficits, especially for those outside the labor market.

Building on this previous research, we consider the actual labor market positions of men and women in relation to fertility. Furthermore, we assess two additional standard characteristics, one geographical and one demographic: regional residence and parental migration background. The regional focus is motivated by an increasing interest in sub-national demographic trends (e.g., Matysiak, Sobotka, and Vignoli 2021) and a perception that during the 2010s societies have become increasingly polarized in terms of their social fabric. This appears to hold for factors such as political discontent and voting behavior and it is reasonable to suspect that fertility developments may also have

become polarized (Comolli and Andersson 2021; Aassve, Le Moglie, and Mencarini 2021). With an increasing fraction of the population having an international migration background, we consider whether recent fertility developments differ for men and women with foreign-born parents and those with a fully Swedish background. Second-generation Swedes in general have had lower first-birth rates than ancestral Swedes (Andersson, Persson, and Obućina 2017) and we want to detect whether such differentials have changed. First-generation migrants are not considered in our study. Their fertility depends largely on short-term influences related to their duration of residence in Sweden, which is challenging to consider in a study on period fertility trends (Andersson 2004; Mussino, Wilson, and Andersson 2021).

## **2. Data and methods**

### **2.1 Swedish register data**

All analyses are based on Swedish population and administrative registers, gathered and organized at Statistics Sweden. These contain longitudinal, individual-level data on family-demographic histories and socioeconomic background information for the full resident population. Our study population covers all Swedish-born men and women of ages 16–45 residing in Sweden any time during 1991–2018, in total more than 7 million individuals born 1946–2002. For context, we include the 20-year period prior to the 2010s, covering a period of fertility decline during the 1990s related to an economic recession (Andersson 2000) and the subsequent fertility recuperation (Andersson and Kolk 2015).

### **2.2 Variables**

‘Calendar year’ is single years 1991–2018. ‘Age’ depicts the age at the end of each calendar year. ‘Region of residence’ refers to the end of the previous year. We divide Sweden’s 290 municipalities into 6 categories (Swedish Association of Local Authorities and Regions 2021): 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’ is divided into 4 categories: both parents Swedish-born, both parents Nordic-born – or one Nordic and one Swedish, both parents non-Nordic European-born – or one European and one Swedish/Nordic, and both parents born outside Europe – or one non-European and one Swedish/Nordic/European.

‘Labor market activity’ measures the main activity in the previous year with 8 categories based on work-related earnings before tax and spells of unemployment or student activity. Cut-off points for earnings categories are based on income distribution in the year 2000 among all men and women in Sweden aged 16–59. Five equally large categories of individuals with annual earnings above a base level of 36,600 SEK (€4,333) were created for year 2000. This base level is grounded in an administrative measure used for creating cut-off points for public transfers in Sweden, and corresponds to the income level on which it is impossible to maintain a livelihood. The lower bound for each quintile is Q1: €4,333, Q2: €15,024, Q3: €21,855, Q4: €26,721, Q5: €33,232. These cut-off points are adjusted for inflation for each year, and the quintiles are not sex-specific, which enables an objective comparison over time and sex. Individuals are categorized as belonging to any of the earnings categories low, medium-low, medium, medium-high, or high, if they are not unemployed or students as defined below.

The unemployed are individuals who receive unemployment benefits that exceed any income from student benefits, and whose earnings are less than the second quintile of our earnings measure. Individuals are defined as students if they receive student allowances that exceed any amount of unemployment benefits, and whose work-related earnings are lower than the second earnings quintile. Student allowances include grants and loans to students in tertiary education, or adults undertaking additional primary or secondary education. Everyone aged 16 is categorized as a student because school is mandatory in Sweden up to that age. Individuals earning below the base level who are not students or unemployed are defined as non-participants.

Two additional variables are included for higher-order births. ‘Birth order’ is measured as second, third, or fourth birth. ‘Age of the youngest child’ is measured as time since the last previous birth, with categories 0 years, 1.0, 1.5, 2.0, 2.5, 3, 4, 5, 6–7, and 8–9 years.

## **2.3 Method**

We apply event-history analysis, in the form of piece-wise constant baseline intensity models.

In each set of analysis, the variable of interest is interacted with calendar year to display period fertility trends, as in Andersson (1999). Transitions to first, second, third, and fourth births are analyzed within the accuracy of a month. Time at risk of first birth starts at the month an individual turned 16 and the time at risk of higher order births starts at the month of last previous birth. Individuals are censored at the month of first emigration, death, turning 46, or the end of December 2018, whichever comes first. When studying second- to fourth-order births we also censor 10 years after the birth of the last previous child.

## **3. Findings**

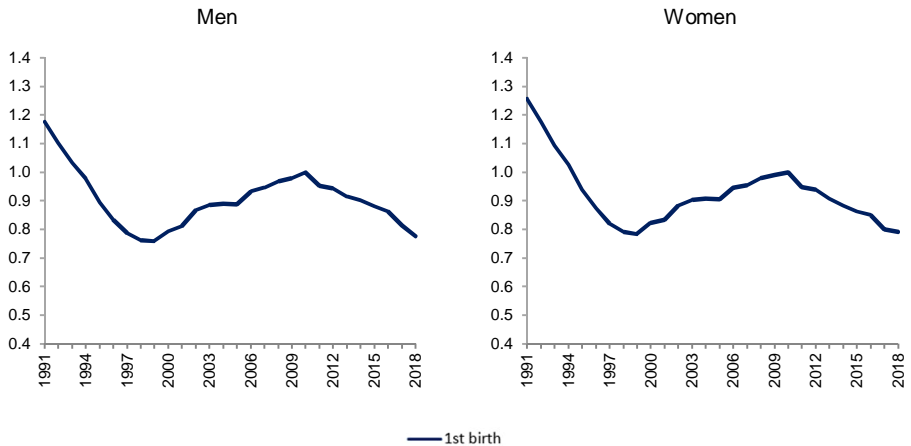
Figure 1 shows relative risks of childbearing by birth order over calendar time. Only first-birth risks, not higher-order risks, declined throughout the 2010s. The decline is thus driven by men and women postponing or foregoing parenthood.

For the sociodemographic factors we present the findings for first births exclusively, because the decline was limited to this birth order. Nevertheless, analyses of parities 2–4 reveals no clear differences across regions or parental background (available upon request). Labor market activity is not analyzed for parities 2–4 due to its bi-directional association with childbearing among parents of young children. In the following sections, first-birth risks are displayed across types of region of residence, parents' birth country, and labor market activity.

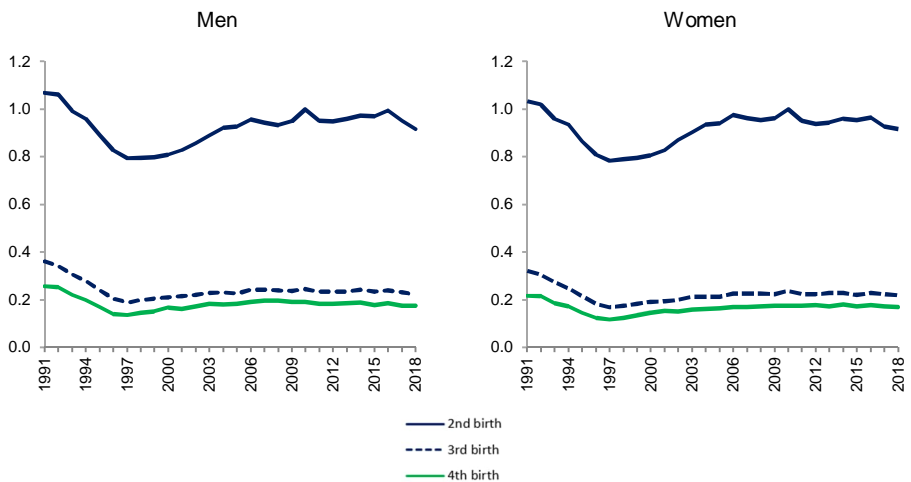
Although there are some gender differences in these patterns there is a quite uniform decline during the 2010s across all types of regions (Figure 2), as well as migrant backgrounds (Figure 3), for men and women alike. The only deviation seems to be women with non-Nordic European parent(s), who display a somewhat weaker decline during that decade.

**Figure 1: Relative birth risks by birth order, 1991–2018, separately for men and women**

**a) Relative first-birth risks.**



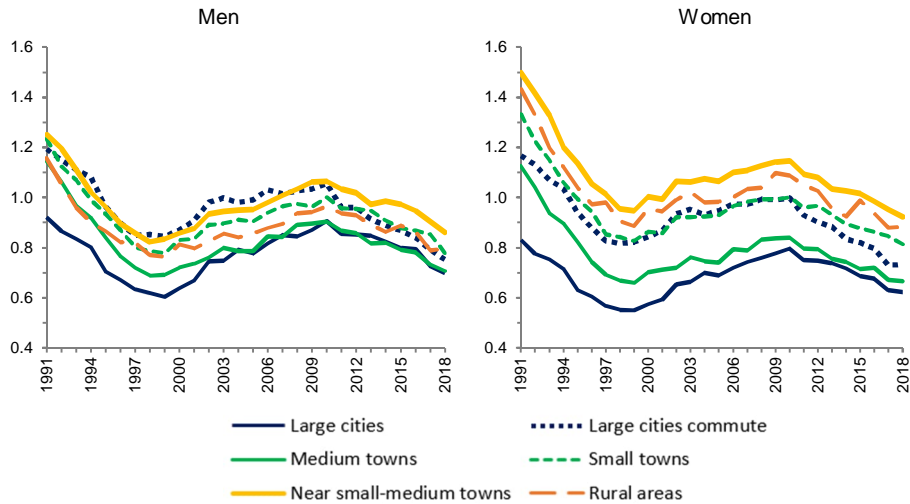
**b) Relative second-, third-, and fourth-birth risks. Interaction of birth order and calendar year.**



Note: First-birth risks are standardized by age. 2010 is the reference category. Second-, third-, and fourth-birth risks are standardized by age group and age of the youngest child. Second-birth risks in 2010 is the reference category.

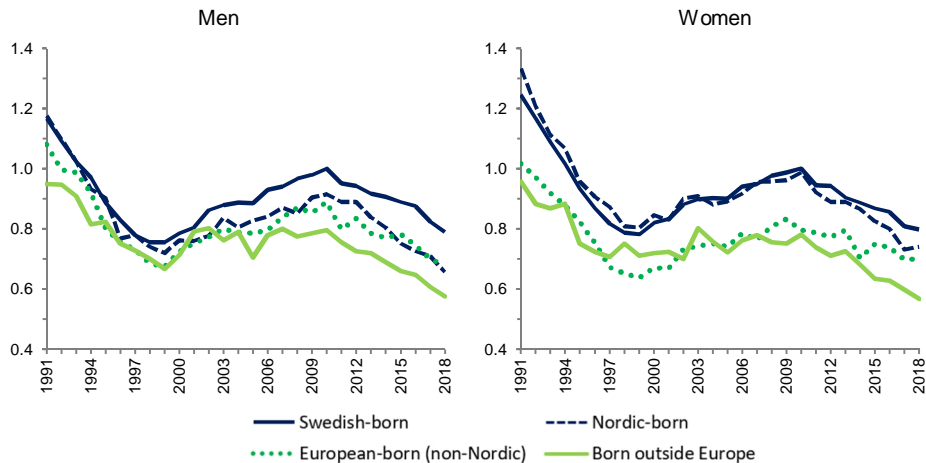


**Figure 2: Relative first-birth risks by type of region, 1991–2018, separately for men and women. Interaction of type of region and calendar year**



Note: First-birth risks are standardized by age. Small towns in 2010 is 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**

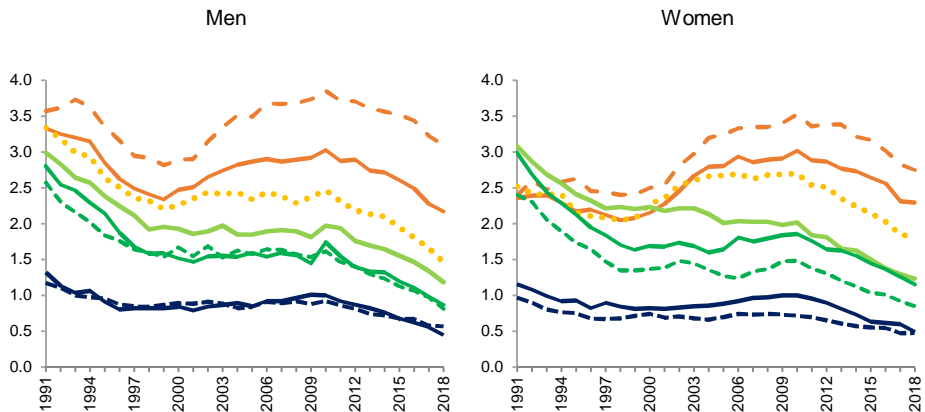


Note: First-birth risks are standardized by age. Two Swedish-born parents in 2010 is the reference category.

Regarding labor market activity (Figure 4a), first-birth rates clearly declined during the 2010s across all groups. Panel b presents the same analysis, but displays the relative decline within each category. (A corresponding procedure for region and parental background provided no additional information for those factors). This reveals a weaker decline among high to medium-high earners and stronger decline among non-participants, followed by the unemployed and those with the lowest earnings. In essence, those with weaker labor market positions who already had lower fertility experienced the largest drop in relative terms, thus increasing the economic polarization in childbearing. The patterns are remarkably similar across genders.

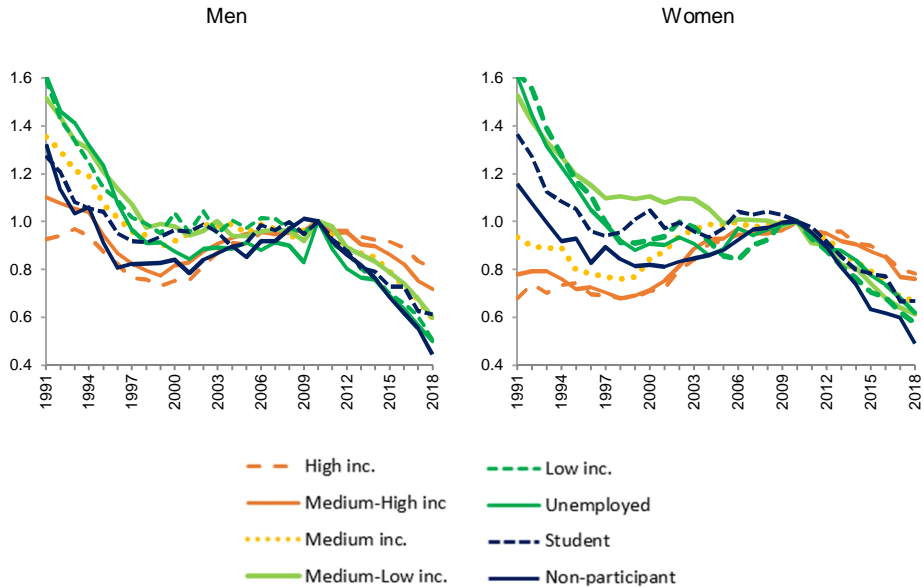
**Figure 4: Relative first-birth risks by labor market activity, 1991–2018, separately for men and women. Interaction of labor market activity and calendar year**

a) Non-participants in 2010 as reference category



**Figure 4: (Continued)**

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



Note: First-birth risks are standardized by age. Panels a) and b) display the same analyses, only with different reference categories. Panel a) displays the relative birth risks across labor market categories. Panel b) displays the relative risks compared to 2010 within each labor market category.

When examining the distribution of men and women across labor market categories over time (available upon request), we found that the economic situation did not deteriorate in the wake of the 2008 crisis, 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). For men and women, the share of those 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 is true both for our analytical sample for first-birth risks and for the total Swedish-born population aged 16–45 irrespective of parity. Thus, the patterns are not produced by compositional changes in the fractions of parents and the childless.

## **4. Discussion and conclusions**

We examined the fertility decline in Sweden in the 2010s for Swedish-born men and women. As previously found for women in Sweden and other European countries (Comolli et al. 2021; Ermisch 2021), the drop in fertility was driven by declining first-birth risks and did not extend to higher birth orders. The downward trend in first-birth rates was strikingly uniform across regions and parental migration backgrounds, and was notable over all labor market categories. Thus, the fertility decline was not due to diverging patterns between these main sociodemographic subgroups, but is seemingly a general development in the Swedish-born population.

There is one partial exception from the overall homogeneous pattern. Men and women with weak labor market attachment or low earnings displayed the steepest decline in relative terms. This is parallel to findings regarding education, where lower-educated women experienced sharper downward trends in first births in the Nordic region (Comolli et al. 2021) and the United Kingdom (Ermisch 2021). Our results reveal that the steeper decline is not confined to those outside the labor market, where the lower-educated are overrepresented, but there is also a socioeconomic gradient in the fertility decline across positions in the labor market. Factors underlying this development should be investigated further. Seltzer (2019) suggests that deteriorating labor market conditions and labor market polarization have fueled the recent fertility decline in the US. In addition, any uncertainty, whether real or perceived, may be greater among groups with weaker labor market positions. Moreover, ultimate childlessness is increasingly becoming more prominent among the lower-educated in the Nordic countries (Jalovaara et al. 2019).

Nevertheless, our findings suggest that factors other than those related to labor market structures are also at play. First-birth rates declined during an economic upturn with growing shares of working and high-earning men and women, and they did so even among groups in the strongest positions. There also appears to be limited scope for other structural factors that help explain recent downward fertility: in the last decade there has been little change in social policy design and no evidence of reversals in behaviors related to gender relations. This suggests that data covering subjective perceptions, changing preferences, and different aspects of perceived uncertainties (Andersson, Dahlberg, and Neyer 2020; Neyer et al. 2022) or generalized trust (Aassve, Le Moglie, and Mencarini 2021; Comolli and Andersson 2021) need to be incorporated in future research.

In this study we have not examined the role of partnering, because such data are not available in full for years before 2011. However, in line with findings from Finland (Hellstrand, Nisén, and Myrskylä 2022), ongoing research from Sweden (Neyer et al. 2022) shows that most of the first-birth decline was due to decreasing fertility within unions and only a minor part was related to changing partner dynamics.

The latest decline in first-birth rates in the Nordic region may not only reflect the postponement of childbearing but also translate into foregone parenthood (Hellstrand et al. 2021). The long-term consequences of current fertility declines may therefore be more pervasive than those of previous Swedish fertility fluctuations. Unlike in Finland and Norway, Swedish policymakers have not taken much notice of the recent trends, possibly because the falling first-birth rates have not yet translated into a decreasing number of births (Statistics Sweden 2021). This is due to the large cohorts born in the late 1980s entering prime childbearing age during the 2010s. If fertility rates remain low in the future, the issue of a declining number of births will also become salient in Sweden, including the consequences for future population age structures and dependency ratios.

## **5. Acknowledgements**

We thank the Swedish Research Council for Health, Working Life and Welfare (FORTE), grant number 2020-00639, for financial support, and Gerda Neyer for helpful comments.

## References

- Aassve, A., Le Moglie, M., and Mencarini, L. (2021). Trust and fertility in uncertain times. *Population Studies* 75(1): 19–36. doi:10.1080/00324728.2020.1742927.
- Andersson, G. (1999). Childbearing trends in Sweden 1961–1997. *European Journal of Population* 15(1): 1–24. doi:10.1023/A:1006145610780.
- Andersson, G. (2000). The impact of labour-force participation on childbearing behavior: Pro-cyclical fertility in Sweden during the 1980s and the 1990s. *European Journal of Population* 16(4): 293–333. doi:10.1023/A:1006454909642.
- Andersson, G. (2004). Childbearing after migration: Fertility patterns of foreign-born women in Sweden. *International Migration Review* 38(2): 747–775. doi:10.1111/j.1747-7379.2004.tb00216.x.
- Andersson, G. and Kolk, M. (2015). Trends in childbearing, marriage and divorce in Sweden: An update with data up to 2012. *Finnish Yearbook of Population Research* 50: 21–30. doi:10.23979/fypr.52483.
- Andersson, G., Dahlberg, J., and Neyer, G. (2020). New sub-module on uncertainties and resilience in the Swedish GGS2020. (Technical working paper). The Hague: Netherlands Interdisciplinary Demographic Institute.
- Andersson, G., Persson, L., and Obućina, O. (2017). Depressed fertility among descendants of immigrants in Sweden. *Demographic Research* 36(39): 1149–1184. doi:10.4054/DemRes.2017.36.39.
- Comolli, C. (2017). The fertility response to the Great Recession in Europe and the United States: Structural economic conditions and perceived economic uncertainty. *Demographic Research* 36(51): 1549–1600. doi:10.4054/DemRes.2017.36.51.
- Comolli, C. and Andersson, G. (2021). Partisan fertility in the aftermath of the Great Recession. Stockholm: Department of Sociology, Stockholm University (Stockholm Research Reports in Demography 2021:25).
- Comolli, C. and Vignoli, D. (2021). Spreading uncertainty, shrinking birth rates: A natural experiment for Italy. *European Sociological Review* 37(4): 555–570. doi:10.1093/esr/jcab001.

- Comolli, C., Neyer, G., Andersson, G., Dommermuth, P., Fallesen, P., Jalovaara, M., Jónsson, A.K., Kolk, M., and Lappegård, T. (2021). Beyond the economic gaze: Childbearing during and after recessions in the Nordic countries. *European Journal of Population* 37: 473–520. doi:10.1007/s10680-020-09570-0.
- Ermisch, J. (2021). English fertility heads south: Understanding the recent decline. *Demographic Research* 45(29): 903–916. doi:10.4054/DemRes.2021.45.29.
- Hellstrand, J., Nisén, J., Miranda, V., Fallesen, P., Dommermuth, L., and Myrskylä, M. (2021). Not just later, but fewer: Novel trends in cohort fertility in the Nordic countries. *Demography* 58(4): 1373–1399. doi:10.1215/00703370-9373618.
- Hellstrand, J., Nisén, J., and Myrskylä, M. (2022). Less partnering, less children, or both? Analysis of the drivers of first-birth decline in Finland since 2010. *European Journal of Population* 38: 191–221. doi:10.1007/s10680-022-09605-8.
- Jalovaara, M., Neyer, G., Andersson, G., Dahlberg, J., Dommermuth, L., Fallesen, P., and Lappegård, T. (2019). Education, gender and cohort fertility in the Nordic countries. *European Journal of Population* 35: 563–586. doi:10.1007/s10680-018-9492-2.
- Matysiak, A., Sobotka, T., and Vignoli, D. (2021). The great recession and fertility in Europe: A sub-national analysis. *European Journal of Population* 37: 29–64. doi:10.1007/s10680-020-09556-y.
- Mussino, E., Wilson, B., and Andersson, G. (2021). The fertility of immigrants from low fertility settings: Adaptation in the tempo and quantum of childbearing? *Demography* 58(6): 2169–2191. doi:10.1215/00703370-9476273.
- Neyer, G., Andersson, G., Dahlberg, J., Ohlsson-Wijk, S., Andersson, L., and Billingsley, S. (2022). Fertility decline, fertility reversal and changing childbearing considerations in Sweden: A turn to subjective imaginations? Stockholm: Department of Sociology, Stockholm University (Stockholm Research Reports in Demography 2022:8).
- Seltzer, N. (2019). Beyond the Great Recession: Labor market polarization and ongoing fertility decline in the United States. *Demography* 56(4): 1463–1493. doi:10.1007/s13524-019-00790-6.
- Statistics Sweden (2021). Statistical database [electronic resource]. Örebro: Statistics Sweden. <https://www.statistikdatabasen.scb.se/pxweb/en/ssd/>.

- Swedish Association of Local Authorities and Regions (2021). Classification of Swedish municipalities 2017 [electronic resource]. Stockholm: Swedish Association of Local Authorities and Regions. <https://skr.se>.
- Vignoli, D., Bazzani, G., Guetto, R., Minello, A., and Pirani, E. (2020a). Uncertainty and narratives of the future: A theoretical framework for contemporary fertility. In: Schoen, R. (ed.). *Analyzing contemporary fertility*. Cham: Springer International Publishing: 25–47. doi:10.1007/978-3-030-48519-1\_3.
- Vignoli, D., Guetto, R., Bazzani, G., Pirani, E., and Minello, A. (2020b). A reflection on economic uncertainty and fertility in Europe: The Narrative Framework. *Genus* 76(28). doi:10.1186/s41118-020-00094-3.