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Abstract

Immigrants and their descendants increasingly shape fertility patterns in many European contexts. While childbearing among immigrants is well explored, less is known about fertility patterns of the descendants of immigrants. Using Swedish register data, we studied differences in parity-specific fertility between immigrants and their descendants in Sweden and compared them with patterns of the native-born population. The analyses were done with life-course data for women as well as for men. We distinguished between individuals with a background in high- and low-fertility contexts, and whether the descendants of immigrants were offspring from endogamous or exogamous country-background relationships. For most migrants, we found elevated first birth rates shortly after arrival. First birth rates among the second generation were generally very close to - but lower - than the rates observed among native Swedes. Fertility among offspring from exogamous relationships tended to be closer to that of native Swedes than what was the case for offspring from relationships in which both parents were migrants. Second birth rates were very similar across all population subgroups but were generally lower among immigrants and their descendants than for native Swedes. Third birth rates were somewhat polarized into patterns of high- and low-fertility behavior. Overall, we found that fertility patterns among the second generation are clearly drifting away from the patterns observed among immigrants. Especially individuals with one immigrant and one Swedish-born parent exhibited fertility behavior which was very similar to those with two Swedish-born parents, suggesting that fertility differences between migrants and natives tend to vanish in one to two generations.

Keywords: Fertility, Migration, Descendants of Immigrants, Generation 2.5, Sweden

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Introduction

As most European countries, Sweden has experienced a growth of its immigrant population within the past decades. According to Statistics Sweden, approximately 20% of Sweden's population in 2021 was foreign-born, while this proportion was less than 7% in 1970 (SCB 2021). Statistics also show that the proportion of newborn children with either one or two foreign-born parents has increased from 16% in 1970 to 38% in 2018 (SCB 2020). The growth of immigrant populations in Western societies has stimulated diverse interdisciplinary research examining differences in demographic behavior between immigrants and their descendants in comparison to different native populations.

Studies of fertility among immigrants and their descendants are often motivated by two key factors. The first factor is that, from a social policy perspective, it is imperative to understand the childbearing behavior of immigrants as their characteristics have an impact on population structures at local, regional, and national levels (Castles et al. 2013). Unlike other European countries, Sweden has relatively high levels of fertility. In combination with its positive net migration, Sweden has thus experienced population growth within the past decades, which is projected to continue in the future (Gassen and Heleniak 2016). Notwithstanding its population growth, Sweden is also experiencing a process of population aging and the youthful nature of immigrant populations may counteract this demographic trend.

The second factor is that migrant fertility often is considered a reflection of the degree of integration into mainstream society (Kulu et al. 2019). For example, migrants may be considered fully integrated in terms of demographic behavior when

their fertility patterns mirror those of the natives in the context in which they live. In contrast, immigrant groups with a differing pattern may be considered less integrated, which is often interpreted as an indicator of their social isolation from mainstream society.

Our study addresses well-established limitations of previous research on patterns of childbearing among immigrants and their descendants in different contexts. Our study contributes to the following three aspects of fertility behavior and fertility differentials:

We investigate fertility outcomes across a full range of migrant generations, including immigrants and their descendants and by distinguishing further generations among immigrants (Generation 1.0 and 1.5) and their descendants (Generation 2.0 and 2.5). This is the first novelty of our study. To date, fertility research in Europe has overwhelmingly focused on immigrants - leaving their descendants understudied. This research imbalance has arisen from data constraints and the youthful nature of the second generation, which is especially pronounced within the European context (Kulu et al. 2017). In addition, research has failed to account for the heterogeneity of the second generation and typically does not distinguish whether individuals have one or two foreign-born parents. In our study, we refer to the former group as a Generation 2.0 and the latter as a Generation 2.5. So far, little is known about the impact of endogamous and exogamous country-background unions on the fertility patterns of the children born in those unions. In our study, we further distinguish whether it is the mother or the father who is a first-generation immigrant in parental unions with one foreign-born and one native-born parent. For first-generation immigrants, we also distinguished between individuals who moved as adults, and

those who made their migration during their childhood. The latter are both descendants of immigrants and immigrants themselves. We refer to this group as a Generation 1.5. By including this specification, we can additionally assess whether spending parts of the childhood in the migration destination of Sweden, makes this group more similar to Swedish-born individuals than immigrants who did not at all grow up in Sweden.

Second, we investigate the extent to which the Swedish context impacts the childbearing behavior of immigrants and their descendants by studying selected population sub-groups with backgrounds in different types of fertility regimes. For this purpose, we provide in-depth information on migrants and their descendants with a background in Poland, Southern Europe, India, Turkey, North Africa, and the other Nordic countries (Denmark, Finland, Iceland, Norway). The first two backgrounds are typically considered as low-fertility contexts (Mussino et al. 2021). In contrast, the next three typically represent high-fertility backgrounds in studies of migrant fertility (Andersson 2004; Robards & Berrington 2016). In contrast, migrants from other Nordic countries stem from contexts that are very similar to that of Sweden, but individuals differ from natives in Sweden by their migration experience (Andersson 2004). Theoretical models on fertility change suggest that individuals from low-fertility backgrounds may display increasing fertility levels with more extended duration of exposure to the Swedish context (Tønnessen & Mussino 2019; Mussino et al. 2021). In contrast, the opposite tendency would hold for migrants and their descents from high-fertility backgrounds (Dubuc, 2012). This comparison of childbearing patterns among individuals from high- and low-fertility backgrounds in the same welfare state context is a second novelty of this study.

The third contribution of our study arises from studying the childbearing behavior for men as well as for women. This represents a third novelty as previous research on migrant fertility, as on childbearing behavior in general, tended to focus on women only. However, the timing of migration in relation to family formation may often be inter-linked in different ways for migrant men and women. We therefore argue that only a gendered approach allows us to properly explore the extent to which men and women adjust their family behavior to the Swedish context.

The Swedish Context: Fertility and International Migration

Sweden's fertility regime can be characterized as 'highest-low' (Andersson 2008). This means that fertility levels are typically below replacement level, but still higher than in most other developed societies. Sweden's relatively high fertility has often been linked to its progressive and universalistic welfare regime (Neyer & Andersson 2008), with policies aimed to ensure that labor-market participation is conducive to childbearing and childrearing. For example, in Sweden childbearing and labor-market participation are supported through a system of subsidized childcare, individual-based taxation, income-replacement parental leave and policies which promote gender equality (Andersson 2008).

Sweden is known for its liberal immigration policies and its embracement of multiculturalism. Following the Second World War, Sweden became a distinct country of immigration. During the 1950s and 1960s, it received large numbers of labor immigrants primarily from Finland to supply Sweden's growing industry. In addition, Sweden has attracted many refugees fleeing war and unrest. For example,

during the 1940s, 1950s and 1960s Sweden welcomed refugees from Eastern Europe, during the 1970s from Latin America, during the 1980s from Iran, during the 1990s from the former Yugoslavia, during the 2000s from Iraq, and during the 2010s from Syria.

Sweden's multicultural policies can be traced back to the 1960s and 1970s (Borevi 2013). In the 1960s Sweden extended its social welfare system to its immigrant population. The change ensured that immigrants had the same social rights as the rest of the population. The policy reflected concerns that immigrants would otherwise contribute to creating a more stratified society. The move to universal social rights instead sought to ensure a more socially cohesive society. In 1975, the Swedish government adopted a new immigration policy which sought to bring 'equality, freedom of choice and partnership' to immigrants (Borevi 2013). Under the new policies, immigrants would be encouraged to maintain their cultural distinctiveness whilst simultaneously be granted equal rights to participate in Swedish society.

Among the country groups included in our study, we note that Turkish migration to Sweden began in the 1960s with the arrival of work-seeking men who were later followed by their wives and families. Qualitative research by Bayram et al. (2009) hints at a strong attachment of first- and second-generation Turks in Sweden to Turkish culture and identity and a social distance to Swedish natives. Many study participants did not support inter-marriage with a Swedish native and favored socialization with fellow Turks. However, immigrants from Turkey stem from several different cultural belongings: Kurdish, Turkish and Syriac/Assyrian.

In contrast to Turkish migration, immigration from India is a relatively new development with levels increasing threefold since the turn of the new century (SCB

2016, 2020). Given that this is a new immigrant group, Myrvold (2012) has recommended that researchers should pay more attention to the integration patterns of this population. Myrvold (2012) shows that Indian immigrants are relatively well educated and have strong presence in the IT and healthcare sectors. Immigrants from Northern Africa come from a broad set of countries and display a significant degree of cultural diversity. They stem from different Arabic and Berber speaking areas of the region.

In the late 1940s and 1950s, migration from Poland was heavily restricted by policies of the communist regime. However, following the easements of international travel in the late 1960s and 1970s, increasing numbers of Poles acquired passports and relocated to Sweden permanently. Still, it was not until the collapse of the Soviet Union in the early 1990s when Poles could freely migrate. This pattern was further extended through Poland's accession to the European Union in 2004. Today, immigrants from Poland constitute the fourth largest immigrant group in Sweden (Lindström et al. 2022). During most of the time, female Polish migrants have outnumbered those of males, and many have married Swedish men. Polish migrants in Sweden have relatively high levels of education, and many have skills that are easily transferable to the Swedish labor market (Józefowicz 1996).

International migrants from Southern Europe come from several countries and thus make for a less cohesive group in Sweden. However, they all come from countries with strongly familistic systems and fertility regimes that are characterized by low levels of childbearing (Mussino et al. 2021). They tend to have relatively high levels of education and a many transferable skills for the Swedish labor market.

Theoretical Considerations and Previous Research

Explaining Immigrant Fertility

The body of literature on immigrant fertility in Europe has grown rapidly in recent decades (for reviews, see Kulu et al. 2019; Andersson 2021). Four hypotheses tend to be highlighted when explaining patterns in childbearing among immigrants. The hypotheses are not mutually exclusive and are often interrelated (Lindström et al. 2022). They can be summarized as follows.

The *socialization hypothesis* argues that the fertility behavior of immigrants mainly reflects the fertility preferences that prevailed in their childhood origin (Cygan-Rehm 2014). Socialization can be considered a lifelong process, with different stages, such as primary and secondary socialization. Primary socialization takes place during childhood with behavioral traits transmitted from family, school, and the wider community (Kulu et al. 2019; Andersson 2021). Secondary socialization occurs in adulthood whenever an individual encounters a new environment or context such as moving to a new country. The *adaptation hypothesis* proclaims that immigrants will adapt to the social, cultural, and economic conditions that prevail in their host country (Cygan-Rehm 2014). As migrants are exposed to a new context, their fertility levels are likely to converge with that of natives. Proponents of the adaptation hypothesis argue that convergence in behavior can take place rather rapidly, as migrants gravitate towards their new context following their move to a new country. The *selection hypothesis* builds upon the observation that immigrants are often a distinct group when compared both to non-movers in their country of origin and natives in their destination (Hervitz 1985; Kulu 2005; Blau and Kahn 2007; Lindström

et al. 2022). Research has shown that migrants typically arrive at young ages and tend to be positively selected in terms of education and health. In addition to human capital, migrants may possess distinct personality traits including being adventurous, taking risks and being ambitious (Massey et al. 1993). Aspects of selection among immigrants add a further layer of complexity. For example, the positive selection of immigrants by educational attainment may be related to less high fertility of migrants from high-fertility countries. Finally, the *hypothesis of interrelated life events* predicts that immigrants experience generally elevated fertility shortly after arrival. The reason for high fertility at these durations is that migration, marriage, and childbearing are often interrelated in individuals' lives (Milewski 2007). Many women also move from one country to another to marry or to join a partner and will have a child soon after migration (Andersson 2004; Kulu 2005).

Previous research on the fertility of immigrants to Sweden provides support for several of the hypotheses presented above. Studies show that the hypotheses are not mutually exclusive and may have different explanatory power at different stages of migrants' lives. For example, Andersson (2004) demonstrates strongly elevated fertility rates of newly arrived immigrant women to Sweden, which suggests that family formation and migration are often highly inter-linked events in the life of individuals. The same study also shows rapid adaptation with fertility rates declining by duration of residence in Sweden. Andersson and Scott (2005, 2007) provide further insight into these patterns of adaptation and how they extend to the relationships between socioeconomic and labor market characteristics and fertility outcomes. Mussino et al. (2021) shows that the upward fertility adaptation of immigrants from low-fertility contexts appear less strong than patterns of adaptation in the other direction. The study also extends the focus to cover the childbearing

outcomes of children who arrived in Sweden during childhood and any differences in fertility outcomes by their different ages of migration to this destination.

Fertility of the Descendants of Immigrants

In contrast to research on the fertility of immigrants, the childbearing among the descendants of immigrants in Europe is not that well explored. While fertility patterns of migrants are strongly influenced by the country of origin, the second generation is primarily exposed to a different environment. For example, many descendants of immigrants grow up under the influence of the majority population and may adopt or assimilate seamlessly into various cultural and social norms of the mainstream society (Kulu et al. 2019). Hence, such hypotheses of *assimilation* predict that the fertility behavior of the descendants to immigrants is similar to that of the majority population. Those who grow up in the second generation are also influenced by their immigrant parents. In addition, a wider immigrant community may matter, and some descendants may socialize into a minority subculture. The hypothesis of *segmented assimilation* predicts that the descendants of immigrants instead exhibit specific childbearing patterns that are different from those of the majority population - assuming that the immigrant population differs from the native population (Kulu et al. 2019).

Both hypotheses provide a valuable framework for approaching population subgroups which are located in the intersection of different generations in a given context. For example, many immigrants move with their children. As these children were socialized in at least two different contexts, they fall in-between migrants who

moved as adults and the descendants of immigrants who were born in the destination context. This group, often referred to as the Generation 1.5, may thus exhibit fertility patterns that are similar to both immigrants and their descendants. Another example are individuals who are descendants of one immigrant and one non-migrant parent; they could be referred to as a Generation 2.5. It can be assumed that the childbearing patterns of this generation are very similar to those of the native population. Mainly due to data constraints, research usually aggregates second-generation people with one and two immigrant parents into one single category of descendants to immigrants. However, it can be argued that research that treats the two groups as distinct categories will provide important insights into the integration of descendants of immigrants in a given context (Karthick Ramakrishnan 2004; Braack & Milewski 2019).

Research on the fertility of the descendants of immigrants in Sweden has been more advanced than in most other parts of Europe. Scott and Stanfors (2011) found that descendants of immigrants generally had lower fertility than Swedish natives. In a comparative study of fertility among the descendants of immigrants across six European countries, Kulu et al. (2017) found that the variation between second-generation groups were the smallest in Sweden. The authors attribute this to the equalizing effect of Sweden's welfare system, which has enabled minorities with a migration background to integrate better than in many other societies. Finally, Andersson, Persson and Obucina (2017) found that most groups of descendants of immigrants had lower fertility than Swedish natives, and that this was exhibited in depressed rates of first as well as second births.

Hypotheses

Based on previous research and our study design, we expect to find the following: First, most immigrant groups are expected to exhibit elevated fertility levels shortly after arrival in Sweden (Andersson 2004). However, it is likely that we observe such elevated fertility mostly for women and less so for men who may have arrived in Sweden before being joined by a partner. We aim at determining the extent to which such gender differences in behavior differ between migrants from different countries of origin. Second, all migrant groups are expected to experience some degree of fertility change with increasing duration of residence in Sweden. These patterns may differ between immigrants from high- and low-fertility contexts. As hypothesized in previous research for Sweden, we assume that the adaption from high-fertility backgrounds to Swedish fertility levels occur faster than the adaption from low-fertility behavior (Mussino et al. 2021).

Third, we expect the descendants of immigrants to generally exhibit childbearing patterns that are relatively similar to those of the native Swedish population (Kulu et al. 2017). However, it is less clear whether those who arrived in Sweden as children are more similar in behavior to either adult immigrants or to the descendants of immigrants who were born in Sweden (Mussino et al. 2021). In the case of the descendants of one immigrant and one native-born parent, we aim at determining whether fertility levels differ with respect to whether the mother or the father was an immigrant. Fourth, descendants of immigrants with only one migrant parent are expected to display fertility behavior that is closer to that of natives than for the descendants of two immigrant parents.

Data & Methods

Data

For this study, we relied on individual-level register data from Sweden. These routinely collected, administrative data cover the entire population with legal residence in Sweden. The quality of Swedish register data, especially its completeness and accuracy, is widely acknowledged (Ludvigsson et al. 2016). We had access to data from the Swedish Total Population Register (TPR) covering the period from 1968 to 2017. The TPR covers all major demographic events, such as childbirths, marriages, deaths, or international migrations of the population in Sweden. All individuals covered in the TPR receive a unique personal identification number, which is assigned either immediately after being born in Sweden, or after having registered in Sweden after arrival (Ludvigsson et al. 2009). With an anonymized version of this identification number, we followed individuals throughout different data sets via deterministic record linkages. For this study, we linked records from the TPR with data from the longitudinal integrated database for health insurance and labor market studies – the LISA collection of data. Data from LISA are available since 1990 and cover all individuals aged 16 and older who are registered in Sweden (Ludvigsson et al. 2019). The LISA collection of data is updated by Statistics Sweden on a year-to-year basis and information are typically reflective of an entire calendar year (SCB 2019). We had access to data from LISA that covered the period 1990-2016. From this data collection, we obtained information on individuals' education, any unemployment benefits and student allowances, as well as whether individuals were in employment. The indicators reflecting labor-market characteristics were binary indicators. Our indicator for education is based on a

harmonized classification of the Swedish SUN codes. This classification allowed broad levels of education to be captured consistently over time, focusing on the highest achieved level of education (SCB 2019).

Reconstructing Birth Histories and Population Subgroups

Swedish register data provide the opportunity for inter-generational linkages of individuals as the personal identification number of children and parents can be linked (Wall-Wieler et al. 2018). These inter-generational linkages allowed us to reconstruct detailed birth histories for all individuals, providing an exact date of birth for each parity progression. Furthermore, it enabled us to capture the parents' country of origin and to establish a detailed migration history of individuals' parents. All first- and second-generation groups were further differentiated into different country-of-origin backgrounds, capturing a wide range of fertility-relevant background contexts.

We split first-generation immigrants into Generation 1.0 and Generation 1.5, as discussed above, reflecting the age at which an individual arrived in Sweden. Generation 1.0 is defined as immigrants who arrived in Sweden at the age of 16 or above. Meanwhile, Generation 1.5 reflects individuals who arrived in Sweden at age 15 or younger. We classified descendants of immigrants as Generation 2.0 and Generation 2.5. This differentiation indicates whether an immigrant's descendant was an offspring from an endogamous or exogamous migration-background relationship. In our study, Generation 2.0 encompasses second-generation offspring whose both parents were born outside of Sweden, and thus were in an endogamous

relationship with respect to their migration experience. Generation 2.5 corresponds to descendants of immigrants whose parents were in an exogamous relationship. In our case, this means that one parent was born in Sweden while the other parent was born outside of Sweden. For all individuals of Generation 2.5, we also distinguished study subjects depending on whether it was the father or the mother who was an immigrant. Descendants of immigrants from two different country groups of origin were assigned to the category “All other” in our Generation 2.0 variable, together with descendants of immigrants from all other countries than those in focus of our study.

Study Population and Study Period

In the TPR, we identified all individuals who were born between 1 January 1941 and 31 December 2000, and who had plausible information on sex, year of birth, and country of birth as well as plausible information on their parents' demographic background (N = 8,080,338). Overall, the amount of implausible information was very small, underlining the high quality of the data. We chose this range of birth cohorts as we focused on the age range 15 to 49 throughout the study period, which lasted from 1 January 1991 to 31 December 2017.

In a next step, we excluded all individuals for which the coverage in the register was less than 30 consecutive days and who did not reside in Sweden been age 15 to 49 during the study period. Major causes of exclusion were death or out-migration before age 15 or immigration after age 50. This reduced the size of our study-population to 7,286,140 individuals. We then accounted for over-coverage in the Swedish register. Over-coverage represents a common phenomenon in most

administrative data sources, including the Swedish registers (Monti et al. 2020). A major factor contributing to over-coverage in population registers is the under-reporting of emigration, particularly in working ages. For this purpose, we utilized our own register-trace algorithm. Using our algorithm, we identified periods of inactivity among all studied individuals based on missing information regarding income, unemployment benefits, student allowances, labor market activity, and educational attainment. Identifying and correcting for periods of inactivity reduced the size of the study-population to 7,265,899 individuals.

Out of all remaining 7,265,899 individuals we then identified all individuals who were at risk of a first birth in Sweden during the study period we cover. This meant that we excluded all individuals who had a first birth outside of Sweden or before 1991. This reduced the study population to 5,322,242 individuals. For analyses of higher order births, we aimed to ensure comparability across all population subgroups. This meant that we only followed those individuals for a second birth, for which we recorded a first birth during the study period in Sweden - and that we followed only those individuals for a third birth, for which we recorded a second birth during the study period in Sweden. As soon as an individual experienced a multiple birth, the individual was excluded from further analyses of higher order births.

Start and End of Individuals' Observation Periods

For all Swedish-born individuals, the start of the observation period was defined as the latest of the following events: 1 January 1991, the date the individual turned 15 - or, in a small number of cases, the earliest return to Sweden in case the first

recorded migration event for a Swedish-born individual was an in-migration to Sweden. For foreign-born individuals who arrived in Sweden before the age of 15, the starting point of the observation period was determined in a similar way and as the latest of the following events: 1 January 1991 or the date the individual turned 15. The period of observation for all migrants who arrived in Sweden after the age of 15 was defined as either 1 January 1991 or the date of earliest arrival in Sweden - whichever date was the latest. We defined the end of each individual's observation period similarly across all population subgroups. It was defined as the earliest of the following events: death, earliest emigration, no sign of activity in the register, reaching age 50, or a third birth.

Data Setup

To allow a study design with time-varying covariates, we applied a long-format splitting of the data. Based on the start and end dates of individuals' observation periods, we created series of one-year episodes for all individuals. We incorporated all socioeconomic covariates in a time-updated manner. To minimize problems of reversed causality, we incorporated all socioeconomic covariates with a one-year lag. This means that the socioeconomic information for a parity-specific birth reflect the circumstances of the year the child was conceived. In a small number of cases, we corrected for delays in the recording of information on education for foreign-born individuals, which are typically clustered within the immediate years after arrival in Sweden (Saarela & Weber 2017). For this purpose, we used information on education from the second year if data for the first year was missing - and information from the third year if information for the first two years was missing. The

long-format data setup helped us create parity-specific data subsets. Each subset included only the relevant at-risk population for the respective birth order, with the corresponding start and end dates of follow-up for each individual spell. For all first birth analyses, we used age as the time scale, with age 15 as start point and age 49 as upper limit. In our second- and third birth analyses, we used time since previous birth as the time scale.

Statistical Modelling

We estimated Kaplan-Meier survival curves for the transitions to a first, second and third birth (Kaplan & Meier 1958). Immigrants entering Sweden after age 15 represented late entries in all first birth analyses. We therefore omitted the survival curves for immigrants with respect to first birth. We then used Cox proportional hazards models to study differences in first, second, and third birth rates between population subgroups (Cox 1972). All models were estimated separately for men and women. In all models, native Swedish men and women were the reference category. Cox proportional hazards models for first birth included the following time-varying covariates: period (calendar year), level of education, student allowances, unemployment benefits, employment status as well as time since first arrival for first-generation immigrants who arrived in Sweden as adults. Models for second and third birth included the following time-varying covariates: period (calendar year) level of education, student allowances, unemployment benefits, employment status, and age at previous birth. We report Hazard Ratios (HR) and corresponding 95% confidence intervals (95% CIs). Data preparation and statistical modelling were carried out using R, Version 4.1.1 (R Core Team 2021). Data preparation was carried out using the R-

package data.table (Dowle et al. 2021). The R package survival was used for time-to-event analyses (Therneau et al. 2021).

Results

First Birth

We studied 5,322,242 men and women who were at risk of a first birth in Sweden between 1 January 1991 and 31 December 2017. Within this period, we observed 2,315,687 first births. An overview of the population at risk of first birth is provided in Table 1. Men and women with a native Swedish background formed the largest population subgroup but still amounted to just two thirds of the study population (65%), followed by immigrants. More immigrants at risk of first birth had arrived in Sweden as adults than during their childhood: our Generation 1.0 makes 18% of the childless population; Generation 1.5 makes an additional 6% of the population. The second-generation groups have more people with one Swedish-born and one foreign-born parent than two foreign-born parents: the Generation 2.0 constitutes 4% of the population at risk of becoming a parent; the Generation 2.5 makes an additional 7% of the childless population. Slightly more people from an exogamous parental union have an immigrant father than an immigrant mother. An overview of the population at risk of first birth by more detailed country-of-origin backgrounds is provided in our Appendix **Table S-1**.

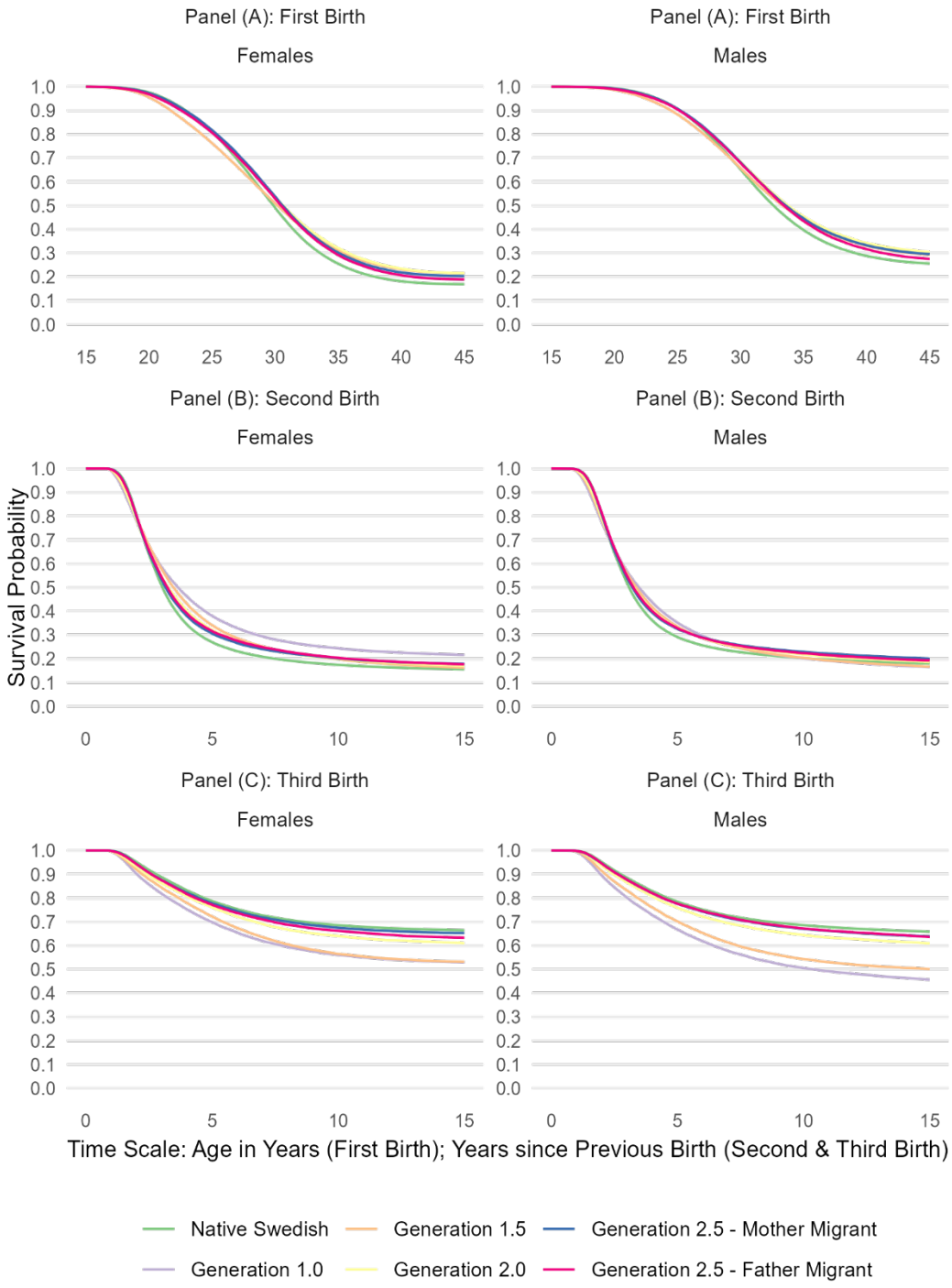
Table 1: Overview of the study population at risk of first birth and number of first births by aggregated population subgroups.

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Native Swedish	1,858,844	1,605,907	3,464,751	815,448	827,415
Generation 1.0	534,847	407,913	942,760	152,847	161,478
Generation 1.5	159,601	145,297	304,898	53,122	60,687
Generation 2.0	119,158	108,639	227,797	37,401	41,018
Generation 2.5 - Mother Migrant	98,929	85,638	184,567	39,370	40,070
Generation 2.5 - Father Migrant	103,216	94,253	197,469	41,707	45,124
Total	**2,874,595**	**2,447,647**	**5,322,242**	**1,139,895**	**1,175,792**

Figure 1, Panels A show Kaplan-Meier survival curves for the transition to becoming a parent. The aggregated population subgroups followed a similar trajectory of this parity transition. As expected, women have, on average, a first child at slightly younger ages than for men. In addition, the levels of childlessness are lower among women than among men. We found that men and women of Generation 1.5 had a first birth slightly earlier than migrants and other generations. Thereafter, and starting in their late 20s, native Swedish men and women had the highest first birth rates. We found that levels of childlessness at age 49 differed only marginally between population subgroups. However, the final levels of childlessness at age 49 were consistently smallest among native Swedish men and women when compared to immigrants and their descendants. For example, by age 49, 25% of native Swedish men were still childless, while 29% of men from Generation 2.0 were childless. For women, the corresponding levels were 17% among native-born in the synthetic cohort we study and 21% among women of Generation 2.0. The levels of childlessness reported here are higher than what has been observed for the completed fertility of actual birth cohorts in Sweden (Jalovaara et al. 2019). This difference is caused by the fact that the levels of childlessness in our synthetic,

period-based cohorts are influenced by falling first birth rates in the first and last decade of the period we study (Ohlsson-Wijk & Andersson 2022).

Figure 1: Kaplan-Meier survival curves for transitions to any first, second, and third birth. *Note:* The x-axis is truncated in the plot and does not correspond to the upper age limit (age 49) of censoring.



Next, we examined differences in first birth rates across population subgroups using Cox proportional hazards models. As shown in Table 2, first birth rates were generally highest among immigrants who arrived in Sweden as adults – particularly within the first two years following their arrival in Sweden. For example, for women from Turkey who arrived in Sweden as adults, first birth rates were substantially elevated in the first two years after arrival in Sweden when compared to the baseline category of native Swedish women (HR: 5.62 (5.43-5.81)). A similar but somewhat less pronounced pattern is observed for many groups of immigrant men: in the case of newly arrived migrant men from Turkey the hazard ratio of first birth was 3.93 (3.79-4.08)). For several groups of immigrant men, the profile of elevated first birth fertility stretches into a longer time span of durations since arrival: the hazard ratio of immigrant men from Turkey who have been in Sweden for five or more years was 1.78 (1.71-1.86). Some country groups have very different patterns for women and men: newly arrived men from Finland and women from India have strongly elevated first birth rates, while a similar elevation is not observed for women from Finland and men from India. One immigrant group from a low-fertility background is characterized by consistently low first birth rates when living in Sweden: immigrants from Southern Europe. This holds in particular for women for whom we found first birth rates to be much lower than for native Swedish and other women, but that they increased slightly over time since migration to Sweden (HR: 0.63 (0.59-0.68), 0.84 (0.79-0.89), and 0.89 (0.83-0.95)).

In contrast, first birth rates among immigrants who arrived in Sweden as children rarely show any strong tendency of being much higher than those of native Swedish women and men. At the same time, we observed some degree of polarization into patterns of elevated or depressed first birth rates that in most cases reflect whether

migrants originated from a high- or low-fertility context. For example, first birth rates were elevated among women and men who arrived in Sweden as children from Turkey (HR: 1.29 (1.24-1.35); 1.58 (1.52-1.64)) but somewhat depressed among women and men who arrived as children in Sweden from Poland (HR: 0.89 (0.85-0.92); 0.95 (0.91-1.00)). The hazard ratios for childhood migrants from India (0.79 (0.76-0.82); 0.68 (0.64-0.72)) do not reflect any influences from a context of early and universal parenthood, instead highlighting the role of selectivity of different migrant groups in in Sweden.

For most studied second-generation groups, we found that first birth rates were remarkably low and in all cases except for the descendants of immigrant women and men from Finland they were visibly lower than the first birth rates of childhood migrants from the same country background. It was only women with two parents from Finland and the descendants of migrants from Turkey who had somewhat higher first birth rates than native Swedish women and men. Thus, while there was still some reflection of high- and low-fertility backgrounds, there was a much smaller level of polarization among the second generation. For example, women who were descendants of two Turkish immigrants had slightly higher first birth rates than native-Swedish women (HR: 1.07 (1.03-1.10)), while women who were descendants of two Southern European immigrants had much lower first birth rates than native Swedish women (HR: 0.73 (0.69-0.78)).

For both women and men, we found that the first birth rates among the descendants of immigrants of an exogamous country-background relationship with one native and one immigrant parent were generally closer to the level of the native Swedish population than those of the second-generation women and men who were

descendants of an endogamous relationship. Further, there was no polarization into patterns reflecting any impact of high- or low-fertility backgrounds among the descendants of the exogamous relationships. In this regard, we consistently found a slightly stronger similarity of Generation 2.5 with the native Swedish population among men than among women, and in cases where the father was the immigrant in the exogamous relationship. In most cases, first birth patterns were somewhat depressed for all groups of descendants from an exogamous family background, and they were more depressed if it was the mother who was in immigrant than if it was the father who was the immigrant to Sweden.

A comprehensive overview of all discussed Cox proportional hazards models, including all utilized covariates and their respective parameter estimates, is provided in Appendix **Tables S-2A** and **S-2B**.

Table 2: Results of Cox proportional hazards models for the transition to a first birth, by migration generation and country-of-origin background, separately for women and men. *Note:* All HRs are controlled for period, education, unemployment benefits, student allowances, and employment status.

Population Subgroup	Females HR	(95% CI)	Males HR	(95% CI)
Native Swedish (Reference)	1		1	
Generation 1.0 - Nordic (0,2]	1.08	(1.05-1.11)	1.63	(1.57-1.68)
Generation 1.0 - Nordic (2,5]	1.17	(1.14-1.21)	1.40	(1.35-1.45)
Generation 1.0 - Nordic (5,Inf]	0.86	(0.83-0.88)	0.84	(0.82-0.87)
Generation 1.0 - Poland (0,2]	1.84	(1.78-1.90)	1.18	(1.12-1.23)
Generation 1.0 - Poland (2,5]	1.36	(1.30-1.41)	1.22	(1.16-1.27)
Generation 1.0 - Poland (5,Inf]	0.95	(0.91-0.99)	1.02	(0.97-1.07)
Generation 1.0 - Turkey (0,2]	5.62	(5.43-5.81)	3.93	(3.79-4.08)
Generation 1.0 - Turkey (2,5]	2.88	(2.73-3.03)	1.88	(1.80-1.97)
Generation 1.0 - Turkey (5,Inf]	1.37	(1.29-1.46)	1.78	(1.71-1.86)
Generation 1.0 - Europe South (0,2]	0.63	(0.59-0.68)	0.96	(0.90-1.02)
Generation 1.0 - Europe South (2,5]	0.84	(0.79-0.89)	0.96	(0.90-1.01)
Generation 1.0 - Europe South (5,Inf]	0.89	(0.83-0.95)	0.99	(0.94-1.04)
Generation 1.0 - Africa North (0,2]	5.93	(5.73-6.13)	2.37	(2.26-2.48)
Generation 1.0 - Africa North (2,5]	2.52	(2.36-2.70)	1.11	(1.05-1.17)
Generation 1.0 - Africa North (5,Inf]	1.44	(1.31-1.57)	1.77	(1.69-1.85)
Generation 1.0 - India (0,2]	1.97	(1.86-2.09)	1.00	(0.93-1.07)
Generation 1.0 - India (2,5]	1.69	(1.57-1.82)	0.81	(0.75-0.88)
Generation 1.0 - India (5,Inf]	1.12	(1.00-1.26)	1.18	(1.09-1.26)
Generation 1.0 - All Other (0,2]	2.48	(2.45-2.50)	1.78	(1.76-1.80)
Generation 1.0 - All Other (2,5]	1.56	(1.54-1.58)	1.52	(1.50-1.54)
Generation 1.0 - All Other (5,Inf]	1.09	(1.08-1.11)	1.47	(1.46-1.49)
Generation 1.5 - Nordic	0.97	(0.95-0.99)	0.91	(0.89-0.93)
Generation 1.5 - Poland	0.89	(0.85-0.92)	0.95	(0.91-1.00)
Generation 1.5 - Turkey	1.29	(1.24-1.35)	1.58	(1.52-1.64)
Generation 1.5 - Europe South	0.76	(0.70-0.82)	0.98	(0.92-1.05)
Generation 1.5 - Africa North	1.21	(1.08-1.36)	1.12	(1.00-1.26)
Generation 1.5 - India	0.79	(0.76-0.82)	0.68	(0.64-0.72)
Generation 1.5 - All Other	1.03	(1.02-1.04)	1.07	(1.06-1.08)
Generation 2.0 - Nordic	1.04	(1.02-1.05)	0.97	(0.95-0.98)
Generation 2.0 - Poland	0.72	(0.68-0.77)	0.84	(0.79-0.90)
Generation 2.0 - Turkey	1.07	(1.03-1.10)	1.11	(1.07-1.15)
Generation 2.0 - Europe South	0.73	(0.69-0.78)	0.89	(0.84-0.94)
Generation 2.0 - Africa North	0.84	(0.77-0.92)	0.88	(0.80-0.98)
Generation 2.0 - India	0.42	(0.35-0.50)	0.49	(0.40-0.61)
Generation 2.0 - All Other	0.81	(0.80-0.83)	0.89	(0.88-0.91)
Generation 2.5 - Mother Migrant - Nordic	0.96	(0.95-0.97)	0.93	(0.92-0.95)
Generation 2.5 - Mother Migrant - Poland	0.76	(0.73-0.80)	0.81	(0.77-0.85)
Generation 2.5 - Mother Migrant - Turkey	0.78	(0.60-1.01)	0.84	(0.64-1.11)
Generation 2.5 - Mother Migrant - Europe South	0.84	(0.79-0.91)	1.00	(0.93-1.07)
Generation 2.5 - Mother Migrant - Africa North	0.68	(0.54-0.86)	0.76	(0.58-0.99)
Generation 2.5 - Mother Migrant - India	0.72	(0.60-0.87)	0.86	(0.70-1.04)
Generation 2.5 - Mother Migrant - All Other	0.83	(0.82-0.85)	0.91	(0.89-0.93)
Generation 2.5 - Father Migrant - Nordic	1.04	(1.03-1.05)	1.01	(0.99-1.02)
Generation 2.5 - Father Migrant - Poland	0.87	(0.81-0.94)	0.96	(0.88-1.04)
Generation 2.5 - Father Migrant - Turkey	0.88	(0.82-0.96)	0.97	(0.89-1.06)
Generation 2.5 - Father Migrant - Europe South	0.88	(0.85-0.91)	0.95	(0.92-0.98)
Generation 2.5 - Father Migrant - Africa North	0.86	(0.81-0.91)	0.90	(0.84-0.96)
Generation 2.5 - Father Migrant - India	0.76	(0.66-0.88)	0.84	(0.74-0.97)
Generation 2.5 - Father Migrant - All Other	0.89	(0.87-0.90)	0.95	(0.93-0.96)

Second Birth

Next, we followed all individuals for whom we recorded a first birth in Sweden within the study period. Among the 2,280,584 individuals who were at risk of a second birth, we observed 1,594,838 second births within our study period. An overview of the population at risk of a second birth is provided in **Table 3**, while a detailed overview by country-of-origin background is provided in our Appendix **Table S-3**.

Table 3: Overview of the study population at risk of second birth and number of second births by aggregated population subgroups.

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Native Swedish	802,715	814,752	1,617,467	571,456	597,714
Generation 1.0	150,740	159,159	309,899	92,219	93,152
Generation 1.5	52,400	59,865	112,265	34,560	39,931
Generation 2.0	36,898	40,395	77,293	24,923	27,446
Generation 2.5 - Mother Migrant	38,742	39,448	78,190	26,651	27,771
Generation 2.5 - Father Migrant	41,068	44,402	85,470	28,152	30,863
Total	**1,122,563**	**1,158,021**	**2,280,584**	**777,961**	**816,877**

As shown by the Kaplan-Meier survival curves in **Panels B** of **Figure 1**, and as observed for first births, the aggregated population subgroups largely followed a similar pattern of transitions to a second child. **Figure 1** indicates that there was only a small amount of heterogeneity between the aggregated population subgroups. Furthermore, as most parity progressions happen in tandem for a one-child mother and father, patterns are very similar for women and men. However, immigrant women who arrived in Sweden as adults represented an exception: fewer in this group had a second child (79%) than, for example, native Swedish women (84%)

during the follow-up period. Overall, native one-child mothers and fathers were the most likely to have a second child.

We then used Cox proportional hazards models to study differences in second birth rates across population subgroups, differentiated by generations, gender and country-of-origin background. As shown in **Table 4**, we observed only a few population-subgroups that deviated substantially in their second birth behavior from that observed for native Swedish women and men.

Table 4: Results of Cox proportional hazards models for the transition to a second birth, by migration generation and country-of-origin background, separately for women and men. *Note:* All HRs are controlled for period, age at previous birth, education, unemployment benefits, student allowances, and employment status.

Population Subgroup	Females HR	(95% CI)	Males HR	(95% CI)
Native Swedish (Reference)	1		1	
Generation 1.0 - Nordic	0.93	(0.90-0.95)	0.95	(0.93-0.98)
Generation 1.0 - Poland	0.53	(0.52-0.55)	0.59	(0.57-0.62)
Generation 1.0 - Turkey	0.99	(0.96-1.02)	1.00	(0.97-1.03)
Generation 1.0 - Europe South	0.86	(0.82-0.91)	0.96	(0.92-1.00)
Generation 1.0 - Africa North	1.27	(1.22-1.31)	1.13	(1.09-1.17)
Generation 1.0 - India	0.62	(0.58-0.66)	0.61	(0.57-0.66)
Generation 1.0 - All Other	0.92	(0.91-0.92)	1.09	(1.08-1.09)
Generation 1.5 - Nordic	0.84	(0.82-0.87)	0.89	(0.87-0.91)
Generation 1.5 - Poland	0.76	(0.72-0.80)	0.77	(0.73-0.81)
Generation 1.5 - Turkey	0.99	(0.95-1.04)	1.19	(1.14-1.25)
Generation 1.5 - Europe South	0.90	(0.82-0.99)	1.03	(0.95-1.12)
Generation 1.5 - Africa North	0.93	(0.81-1.07)	1.10	(0.95-1.27)
Generation 1.5 - India	0.78	(0.75-0.82)	0.90	(0.84-0.98)
Generation 1.5 - All Other	0.88	(0.87-0.89)	0.99	(0.98-1.00)
Generation 2.0 - Nordic	0.91	(0.89-0.92)	0.90	(0.88-0.92)
Generation 2.0 - Poland	0.83	(0.77-0.90)	0.92	(0.84-1.00)
Generation 2.0 - Turkey	0.96	(0.92-1.00)	1.21	(1.16-1.27)
Generation 2.0 - Europe South	0.92	(0.86-0.99)	1.05	(0.98-1.12)
Generation 2.0 - Africa North	0.97	(0.87-1.10)	1.11	(0.97-1.27)
Generation 2.0 - India	0.99	(0.78-1.26)	1.16	(0.88-1.53)
Generation 2.0 - All Other	0.93	(0.92-0.95)	0.98	(0.96-1.00)
Generation 2.5 - Mother Migrant - Nordic	0.96	(0.94-0.97)	0.94	(0.92-0.95)
Generation 2.5 - Mother Migrant - Poland	0.90	(0.85-0.95)	0.91	(0.85-0.97)
Generation 2.5 - Mother Migrant - Turkey	0.76	(0.52-1.10)	0.78	(0.53-1.13)
Generation 2.5 - Mother Migrant - Europe South	0.92	(0.84-1.00)	0.88	(0.80-0.96)
Generation 2.5 - Mother Migrant - Africa North	0.84	(0.61-1.15)	1.33	(0.93-1.91)
Generation 2.5 - Mother Migrant - India	1.12	(0.87-1.42)	0.90	(0.71-1.16)
Generation 2.5 - Mother Migrant - All Other	0.97	(0.94-0.99)	0.96	(0.94-0.98)
Generation 2.5 - Father Migrant - Nordic	0.93	(0.91-0.94)	0.92	(0.91-0.94)
Generation 2.5 - Father Migrant - Poland	0.93	(0.84-1.02)	0.91	(0.82-1.00)
Generation 2.5 - Father Migrant - Turkey	0.89	(0.80-0.98)	0.83	(0.74-0.93)
Generation 2.5 - Father Migrant - Europe South	0.92	(0.88-0.96)	0.90	(0.86-0.94)
Generation 2.5 - Father Migrant - Africa North	0.93	(0.86-1.00)	0.94	(0.87-1.02)
Generation 2.5 - Father Migrant - India	1.01	(0.85-1.19)	1.07	(0.91-1.26)
Generation 2.5 - Father Migrant - All Other	0.94	(0.92-0.95)	0.96	(0.95-0.98)

For first-generation immigrants from high-fertility backgrounds, we found only one group with second birth rates that were higher than those of native Swedish women and men: those from North Africa (HR: 1.27 (1.22-1.31); 1.13 (1.09-1.17)). Second birth rates among first-generation immigrant women and men from Turkey who arrived in Sweden as adults were not significantly different from the rates for native Swedish women and men. In contrast, we observed that several groups, including those from low-fertility backgrounds in Poland and Southern Europe preserved a low-fertility behavior when in Sweden, this holds particularly for women and men from Poland who arrived in Sweden as adults (HR: 0.53 (0.52-0.55); 0.59 (0.57-0.62)). Again, women and men from India who arrived in Sweden as adults display much lower second birth rates than what would be expected from the general fertility context in India (HR: 0.62 (0.58-0.66); 0.61 (0.57-0.66)).

In general, the second birth rates of native Swedish women and men are higher than what is observed for most groups of immigrants and their descendants. This even holds when compared to women and men with one foreign-born and one native Swedish mother or father. In particular, the descendants of immigrants from Poland display striking low second birth rates in Sweden. This holds both for the descendants who moved with their parents from Poland to Sweden during childhood (HR: 0.76 (0.72-0.80); 0.77 (0.73-0.81)) and those who grew up in Sweden without being migrants themselves (HR: 0.83 (0.77-0.90); 0.92 (0.84-1.00)).

A comprehensive overview of the discussed Cox proportional hazards models for the transition to a second birth is provided in Appendix Tables **S-4A** and **S-4B**.

Third Birth

Lastly, we studied third birth rates among all individuals for whom we previously recorded a first and second birth in Sweden. Among all 1,573,041 individuals who were at risk of a third birth, we observed 439,917 third births during our right-truncated study period. An overview of the population at risk is presented in **Table 5**. A more detailed overview by country-of-origin background is provided in Appendix Table **S-5**.

Table 5: Overview of the study population at risk of third birth and number of third births, by aggregated population subgroups.

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Native Swedish	563,445	589,435	1,152,880	150,050	156,699
Generation 1.0	91,070	92,015	183,085	32,711	30,016
Generation 1.5	34,140	39,442	73,582	11,622	12,925
Generation 2.0	24,597	27,082	51,679	7,109	7,898
Generation 2.5 - Mother Migrant	26,260	27,361	53,621	7,276	7,445
Generation 2.5 - Father Migrant	27,792	30,402	58,194	7,634	8,532
Total	**767,304**	**805,737**	**1,573,041**	**216,402**	**223,515**

Panels C of Figure 1 presents Kaplan-Meier survival curves for the transition to a third birth and a family size that exceeds the Swedish two-child norm. In this case, our results indicate a strong polarization in the outcomes of immigrants and those born in Sweden, including the second generation. This polarization was not observed for first and second births but is evident in the fact that 54% of immigrant two-child fathers who arrived as adults in Sweden had a third child within 15 years from a second birth, while only 33% of native Swedish two-child fathers experienced the same parity progression.

Results of the Cox proportional hazards models for the transition to a third birth are shown in **Table 6.** A comprehensive overview of the results from all third birth models is provided in Appendix Tables **S-6A** and **S-6B**. Table 6 demonstrates that it is mainly immigrants from high-fertility contexts that contribute to the elevated third birth rates for the aggregate group of immigrants in Sweden: this holds for immigrant women and men from Turkey and North Africa in particular, regardless of whether they arrived during childhood or as adult migrants. For example, third birth rates among men who arrived from Turkey as an adult were elevated (HR: 1.59 (1.52-1.66)) as well as for men who arrived from Turkey as children (HR: 1.97 (1.86-2.09)), when compared to native Swedish men. Further, the patterns of elevated third birth rates for these country backgrounds were manifested also among the descendants of immigrants from Turkey and North Africa. For example, third birth rates were elevated among men who are descendants of two immigrants from Turkey (HR: 1.63 (1.51-1.75)) or North Africa (HR: 1.72 (1.34-2.19)). However, no similarly strong elevation in third birth rates was observed among their counterparts from exogamous relationships with a native Swedish mother or father, which reveals a clear difference between our Generations 2.0 and 2.5. In contrast, women and men who arrived as adults from Poland to Sweden exhibited low third birth rates (HR: 0.68 (0.62-0.74); 0.78 (0.70-0.86)). However, this clear-cut low-fertility behavior was not transferred to the descendants of Polish immigrants in Sweden.

Table 6: Results of Cox proportional hazards models for the transition to a third birth, by migration generation and country-of-origin background, separately for women and men. *Note:* All HRs are controlled for period, age at previous birth, education, unemployment benefits, and student allowances, and employment status.

Population Subgroup	Females HR	(95% CI)	Males HR	(95% CI)
Native Swedish (Reference)	1		1	
Generation 1.0 - Nordic	1.13	(1.08-1.19)	1.05	(0.99-1.11)
Generation 1.0 - Poland	0.68	(0.62-0.74)	0.78	(0.70-0.86)
Generation 1.0 - Turkey	1.22	(1.16-1.29)	1.59	(1.52-1.66)
Generation 1.0 - Europe South	1.00	(0.87-1.14)	1.02	(0.93-1.13)
Generation 1.0 - Africa North	1.97	(1.87-2.08)	3.07	(2.92-3.23)
Generation 1.0 - India	0.75	(0.64-0.88)	1.11	(0.95-1.29)
Generation 1.0 - All Other	1.40	(1.38-1.42)	1.91	(1.88-1.93)
Generation 1.5 - Nordic	1.03	(0.98-1.08)	1.07	(1.02-1.12)
Generation 1.5 - Poland	0.93	(0.84-1.03)	0.97	(0.87-1.08)
Generation 1.5 - Turkey	1.64	(1.54-1.75)	1.97	(1.86-2.09)
Generation 1.5 - Europe South	1.00	(0.83-1.21)	1.19	(1.03-1.38)
Generation 1.5 - Africa North	1.57	(1.26-1.95)	1.70	(1.36-2.13)
Generation 1.5 - India	0.90	(0.81-0.99)	1.00	(0.85-1.17)
Generation 1.5 - All Other	1.18	(1.16-1.21)	1.41	(1.38-1.44)
Generation 2.0 - Nordic	1.02	(0.99-1.05)	1.04	(1.01-1.08)
Generation 2.0 - Poland	0.77	(0.65-0.91)	0.96	(0.80-1.14)
Generation 2.0 - Turkey	1.52	(1.42-1.61)	1.63	(1.51-1.75)
Generation 2.0 - Europe South	0.88	(0.76-1.02)	1.01	(0.89-1.15)
Generation 2.0 - Africa North	1.51	(1.23-1.85)	1.72	(1.34-2.19)
Generation 2.0 - India	0.83	(0.45-1.55)	1.52	(0.88-2.62)
Generation 2.0 - All Other	1.01	(0.97-1.05)	1.04	(1.00-1.08)
Generation 2.5 - Mother Migrant - Nordic	1.04	(1.01-1.06)	1.07	(1.04-1.10)
Generation 2.5 - Mother Migrant - Poland	1.07	(0.95-1.20)	1.00	(0.88-1.15)
Generation 2.5 - Mother Migrant - Turkey	1.21	(0.61-2.42)	0.56	(0.18-1.75)
Generation 2.5 - Mother Migrant - Europe South	0.99	(0.83-1.18)	1.13	(0.95-1.33)
Generation 2.5 - Mother Migrant - Africa North	0.85	(0.40-1.78)	0.88	(0.42-1.84)
Generation 2.5 - Mother Migrant - India	1.58	(1.00-2.51)	0.79	(0.44-1.42)
Generation 2.5 - Mother Migrant - All Other	1.08	(1.03-1.13)	1.05	(1.00-1.10)
Generation 2.5 - Father Migrant - Nordic	1.04	(1.01-1.08)	1.02	(0.98-1.05)
Generation 2.5 - Father Migrant - Poland	1.03	(0.85-1.25)	1.05	(0.86-1.29)
Generation 2.5 - Father Migrant - Turkey	0.98	(0.81-1.19)	1.25	(1.02-1.53)
Generation 2.5 - Father Migrant - Europe South	1.06	(0.98-1.15)	1.14	(1.05-1.23)
Generation 2.5 - Father Migrant - Africa North	1.25	(1.09-1.43)	1.19	(1.01-1.39)
Generation 2.5 - Father Migrant - India	1.48	(1.11-1.97)	1.07	(0.77-1.49)
Generation 2.5 - Father Migrant - All Other	1.08	(1.05-1.12)	1.04	(1.00-1.08)

Discussion

Interpretation of Key Findings

In this study, we investigated patterns of childbearing among immigrants and their descendants in Sweden, by parity. We used a more careful definition of the generations of immigrants and their descendants than what is done in most previous research and we studied the fertility patterns from the perspective of women as well as of men. For this purpose, we drew on register data covering demographic events for the total population in Sweden and linked these data with socioeconomic background information. We utilized a life-course approach with time-varying covariates covering a calendar period of over 25 years. The setup allowed us to gain much better insights into behavioral patterns than what is possible from relying on aggregate-level descriptive statistics such as Total Fertility Rates.

Our analysis showed elevated first birth rates shortly after arrival for most immigrants who moved to Sweden as adults - especially for women. However, our results for first birth also indicate that fertility rates decline rapidly with increasing time since migration to Sweden. However, for immigrant men this change happens at a somewhat slower pace. Overall, our findings for immigrants who arrived in Sweden as adults support previous observations that multiple factors related to family formation, socialization, adaptation, and selectivity shape the fertility patterns after arrival (Lindström et al. 2022). For example, we found strong evidence for the socialization hypothesis as our findings showed that fertility patterns among immigrants who arrived in Sweden as an adult tended to reflect fertility patterns in their respective country-of-origin backgrounds. Simultaneously, low birth rates

among immigrants from India support the hypothesis of migrant selectivity. Declining first birth rates across most immigrant groups with increasing time since arrival in Sweden indicate an interrelation of life events and the ties that exist between family formation and migration. Second birth rates showed little variation among most Generation 1.0 groups. The impact of high- and low-fertility backgrounds became obvious again with respect to third births.

In contrast to immigrants who arrived as adults, fertility patterns among immigrants who arrived in Sweden as children were often in between those of their respective first- and second-generation counterparts. Our findings highlight the unique position of the Generation 1.5 at the intersection of immigrants and the descendants of immigrants. To shed more light on this intersectionality, recent researcher has explored the role of age at arrival as a factor that moderates influences of childhood socialization for immigrants who arrived in their destination as children. Age at arrival may have a strong incremental impact on the childbearing patterns of women and men from different backgrounds (Wilson 2020, 2021). The first birth patterns of our Generation 1.5 of immigrants may indicate that the adaption from high to ‘highest low’ fertility occur more strongly than the adaption from low to ‘highest low’ levels of fertility (cf. Mussino et al. 2021). The impact of low-fertility backgrounds may thus have a longer legacy than that of high-fertility backgrounds. Nevertheless, when focusing on higher-order births, we find that the high-fertility behavior of immigrants from high-fertility contexts also prevailed in the Generation 1.5 and for the descendants of immigrants in Generation 2.0.

For the descendant of immigrants, we distinguished between second-generation residents in Sweden with two migrant parents and those with one foreign-born and

one Swedish-born parent. For individuals with only one foreign-born parent, we differentiated whether it was the father or the mother who was immigrant. Overall, the childbearing patterns in the second generation showed strong similarities with patterns observed in the native Swedish population, indicating a high level of assimilation within the Swedish context. This underlines the strong deviation of fertility patterns among the second generation when compared to immigrants with similar country backgrounds. This pattern was especially apparent with respect to first birth rates, which were depressed among most groups of descendants to immigrants. While for some groups this proximity may be viewed as a sign of adaptation to patterns prevailing in Sweden, the depression of first births may also point to different negative aspects of a minority-group status that may work as an impediment for family formation (Andersson et al. 2017). According to the minority status hypothesis, depressed first birth rates could be explained by the situation that some descendants of immigrants may need to invest more resources into education and employment to achieve the same level of security as their native Swedish counterparts, leading to postponed family formation. While we observed depressed first birth rates among women and men in most second-generation groups, no depressed birth rates were observed for higher-order births, i.e., for the progression of two-child parents to have a third child.

Despite the similarity in childbearing outcomes to the native Swedish population, our results also indicate a substantial amount of heterogeneity among those who are usually labelled as belonging to the second generation. In particular, our results showed that childbearing patterns differed between the offspring from endogamous and exogamous migration-background relationships. Overall, first-, second- and third birth rates among the offspring from exogamous relationships that involved one

Swedish-born parent tended to be much closer to those of the native Swedish population than was the case for the offspring from endogamous migration-background relationships. It can be argued that the effect of migration-background on a person who was born and grew up in Sweden and had one Swedish-born and one foreign-born parent is not very strong. Evidently, what is often referred to as a second generation is anything but a homogenous group and patterns of parental country-background homogamy and exogamy must be properly acknowledged in any study of generational change in socio-demographic behavior. It should perhaps come as no surprise that having a Swedish-born parent works as a strong mechanism towards the behavioral integration with respect to fertility. More pertinent may be that this pattern appears to be stronger for men than for women, and in case the father rather than the mother was an immigrant in an exogamous parental union. The exact mechanism behind these gender differences in outcomes remains unknown and cannot be explained by the data we have at our disposal. Evidently, these findings indicate a clear research gap and it remains for future research to uncover further dimensions of the gendered nature of the socio-demographic integration of the descendants of exogamous parental unions.

Our differentiation of women and men by their country-of-origin backgrounds also highlights that first- and second-generation people with an own or parental background in the same fertility context may behave very differently in different destinations. For example, in the UK, descendants of immigrants from India typically represent a high-fertility group (Robarts & Berrington 2016), which is quite different to what we find for Sweden. In order to explain these differences, the selection argument may provide a helpful concept and point towards the fact that migrants and their descendants from India in the UK might differ from those in Sweden. At the

same time, this observation raises questions about the extent to which differences with respect to the cultural and institutional context in the destination country contribute to shaping processes of integration and assimilation.

Lastly, our study highlights that the direction and magnitude of fertility differentials between population subgroups may vary strongly if fertility metrics are measured through the birth outcomes of men or women. For all parity births, but especially with respect to first births, we often found clear evidence of gender-specific patterns across the studied country-of-origin backgrounds. These findings sometimes reflect gender differences in the causes and timing of migration. We therefore argue that studies that examine the socio-demographic outcomes of migrants and the generations of immigrants and their descendants need to incorporate an explicit gender perspective in its research design.

Limitations

Our study has many strengths but is also subject to some limitations. First, the utilized data do not capture births which occurred outside of Sweden - unless the children themselves have moved to Sweden. This means that for some immigrants, the information on birth histories might be incomplete. This issue may be more pressing for male than for female migrants. A further limitation is the interpretation of the hazard ratios. The age pattern of fertility is commonly bell-shaped, but the timing of family formation varies by socioeconomic characteristics. Given the large sample size it was no surprise that statistical tests indicated a violation of the proportional hazards assumption. While this is generally not problematic, it slightly modifies the

interpretation of our hazard ratios (Stensrud & Hernán 2020). By utilizing a study design with time-varying covariates, we followed the usual best-practice approach to minimize the potential bias arising from the violation of the proportional hazards assumption (Kuitunen et al. 2021). Nevertheless, we did not further explore all n-way interactions over age and their impact on the proportionality of hazards as such an analysis would have required a stringent machine-learning approach, which is beyond the scope of this study.

Conclusion

In this study, we examined the childbearing across the generations of immigrants and their descendants in comparison with the native population in Sweden. We found strong evidence that the fertility among second-generation individuals in Sweden is drifting away from the patterns observed among their immigrant parents. While fertility patterns among the second generation to a large extent resembled patterns of the native population, differences between the offspring from endogamous and exogamous relationships indicate that the so-called second generation does not represent a homogeneous group. Future research with focus on the descendants of immigrants needs to account for the diversity of the second generation. It should also pay better attention to the gendered dimensions of fertility differentials among immigrants and their descendants. Our study is novel in its generation and gender approaches to fertility change among immigrants and their descendants, and in showing in better detail how fertility differences between migrants and natives tend to vanish in only one to two generations.

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Supplementary Material: Generations and Gender in the Fertility of Immigrants and their Descendants: A Register-Based Study of Sweden

First Birth

S-1 Table: Overview of the study population at risk of a first birth by sex, population subgroup, and country-of-origin background.

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Native Swedish	1858844	1605907	3464751	815448	827415
Generation 1.0 - Nordic	65306	57343	122649	10749	12946
Generation 1.0 - Poland	26080	21484	47564	5327	8054
Generation 1.0 - Turkey	14615	8896	23511	7087	5756
Generation 1.0 - Europe South	19204	12077	31281	3777	2733
Generation 1.0 - Africa North	12087	7211	19298	4916	4668
Generation 1.0 - India	16015	6862	22877	2263	2201
Generation 1.0 - All Other	381540	294040	675580	118728	125120
Generation 1.5 - Nordic	20386	16091	36477	8116	7341
Generation 1.5 - Poland	6187	5699	11886	2138	2338
Generation 1.5 - Turkey	4745	4127	8872	2674	2457
Generation 1.5 - Europe South	2377	1870	4247	866	663
Generation 1.5 - Africa North	972	787	1759	278	304
Generation 1.5 - India	2539	4876	7415	939	2521
Generation 1.5 - All Other	122395	111847	234242	38111	45063
Generation 2.0 - Nordic	31045	26571	57616	15906	16520
Generation 2.0 - Poland	3011	2865	5876	863	1003
Generation 2.0 - Turkey	9024	8580	17604	2896	3554
Generation 2.0 - Europe South	2750	2557	5307	1273	1190
Generation 2.0 - Africa North	1866	1808	3674	345	498
Generation 2.0 - India	652	652	1304	87	110
Generation 2.0 - All Other	70810	65606	136416	16031	18143
Generation 2.5 - Mother Migrant - Nordic	59281	50203	109484	25904	26245
Generation 2.5 - Mother Migrant - Poland	4661	4360	9021	1472	1731
Generation 2.5 - Mother Migrant - Turkey	301	271	572	50	57
Generation 2.5 - Mother Migrant - Europe South	1834	1708	3542	710	777
Generation 2.5 - Mother Migrant - Africa North	236	250	486	54	74
Generation 2.5 - Mother Migrant - India	528	521	1049	99	109
Generation 2.5 - Mother Migrant - All Other	32088	28325	60413	11081	11077
Generation 2.5 - Father Migrant - Nordic	43274	38638	81912	18956	20326
Generation 2.5 - Father Migrant - Poland	1641	1566	3207	606	648
Generation 2.5 - Father Migrant - Turkey	1858	1687	3545	500	606
Generation 2.5 - Father Migrant - Europe South	7235	6775	14010	3159	3467
Generation 2.5 - Father Migrant - Africa North	2757	2630	5387	895	1081
Generation 2.5 - Father Migrant - India	587	513	1100	204	198
Generation 2.5 - Father Migrant - All Other	45864	42444	88308	17387	18798

S-2A Table: Comprehensive overview of results of multivariate cox proportional hazards models for transitions to first birth for females, differentiated by country-of-origin background.

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 1.0 - Nordic (0,2] (Ref: Native Swedish)	1.08	1.05	1.11
Generation 1.0 - Nordic (2,5]	1.17	1.14	1.21
Generation 1.0 - Nordic (5,Inf]	0.86	0.83	0.88
Generation 1.0 - Poland (0,2]	1.84	1.78	1.90
Generation 1.0 - Poland (2,5]	1.36	1.30	1.41
Generation 1.0 - Poland (5,Inf]	0.95	0.91	0.99
Generation 1.0 - Turkey (0,2]	5.62	5.43	5.81
Generation 1.0 - Turkey (2,5]	2.88	2.73	3.03
Generation 1.0 - Turkey (5,Inf]	1.37	1.29	1.46
Generation 1.0 - Europe South (0,2]	0.63	0.59	0.68
Generation 1.0 - Europe South (2,5]	0.84	0.79	0.89
Generation 1.0 - Europe South (5,Inf]	0.89	0.83	0.95
Generation 1.0 - Africa North (0,2]	5.93	5.73	6.13
Generation 1.0 - Africa North (2,5]	2.52	2.36	2.70
Generation 1.0 - Africa North (5,Inf]	1.44	1.31	1.57
Generation 1.0 - India (0,2]	1.97	1.86	2.09
Generation 1.0 - India (2,5]	1.69	1.57	1.82
Generation 1.0 - India (5,Inf]	1.12	1.00	1.26
Generation 1.0 - All Other (0,2]	2.48	2.45	2.50
Generation 1.0 - All Other (2,5]	1.56	1.54	1.58
Generation 1.0 - All Other (5,Inf]	1.09	1.08	1.11
Generation 1.5 - Nordic	0.97	0.95	0.99
Generation 1.5 - Poland	0.89	0.85	0.92
Generation 1.5 - Turkey	1.29	1.24	1.35
Generation 1.5 - Europe South	0.76	0.70	0.82
Generation 1.5 - Africa North	1.21	1.08	1.36
Generation 1.5 - India	0.79	0.76	0.82
Generation 1.5 - All Other	1.03	1.02	1.04
Generation 2.0 - Nordic	1.04	1.02	1.05
Generation 2.0 - Poland	0.72	0.68	0.77
Generation 2.0 - Turkey	1.07	1.03	1.10
Generation 2.0 - Europe South	0.73	0.69	0.78
Generation 2.0 - Africa North	0.84	0.77	0.92
Generation 2.0 - India	0.42	0.35	0.50
Generation 2.0 - All Other	0.81	0.80	0.83
Generation 2.5 - Mother Migrant - Nordic	0.96	0.95	0.97
Generation 2.5 - Mother Migrant - Poland	0.76	0.73	0.80
Generation 2.5 - Mother Migrant - Turkey	0.78	0.60	1.01
Generation 2.5 - Mother Migrant - Europe South	0.84	0.79	0.91
Generation 2.5 - Mother Migrant - Africa North	0.68	0.54	0.86
Generation 2.5 - Mother Migrant - India	0.72	0.60	0.87
Generation 2.5 - Mother Migrant - All Other	0.83	0.82	0.85
Generation 2.5 - Father Migrant - Nordic	1.04	1.03	1.05
Generation 2.5 - Father Migrant - Poland	0.87	0.81	0.94

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 2.5 - Father Migrant - Turkey	0.88	0.82	0.96
Generation 2.5 - Father Migrant - Europe South	0.88	0.85	0.91
Generation 2.5 - Father Migrant - Africa North	0.86	0.81	0.91
Generation 2.5 - Father Migrant - India	0.76	0.66	0.88
Generation 2.5 - Father Migrant - All Other	0.89	0.87	0.90
1995-1998 (Ref: 1991-1994)	0.83	0.83	0.84
1999-2002	0.82	0.81	0.83
2003-2006	0.88	0.87	0.88
2007-2010	0.90	0.89	0.90
2011-2014	0.83	0.83	0.84
2015-2017	0.77	0.77	0.78
Education Secondary (Ref: Primary)	0.85	0.84	0.85
Education Tertiary	0.92	0.91	0.92
Education Missing	0.67	0.66	0.68
Unemployment Benefits: Yes (Ref: No)	1.12	1.12	1.13
Student Benefits: Yes (Ref: No)	0.39	0.39	0.39
In Employment: No (Ref: Yes)	0.68	0.68	0.69

S-2B Table: Comprehensive overview of results of multivariate cox proportional hazards models for transitions to first birth for males, differentiated by country-of-origin background.

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 1.0 - Nordic (0,2] (Ref: Native Swedish)	1.63	1.57	1.68
Generation 1.0 - Nordic (2,5]	1.40	1.35	1.45
Generation 1.0 - Nordic (5,Inf]	0.84	0.82	0.87
Generation 1.0 - Poland (0,2]	1.18	1.12	1.23
Generation 1.0 - Poland (2,5]	1.22	1.16	1.27
Generation 1.0 - Poland (5,Inf]	1.02	0.97	1.07
Generation 1.0 - Turkey (0,2]	3.93	3.79	4.08
Generation 1.0 - Turkey (2,5]	1.88	1.80	1.97
Generation 1.0 - Turkey (5,Inf]	1.78	1.71	1.86
Generation 1.0 - Europe South (0,2]	0.96	0.90	1.02
Generation 1.0 - Europe South (2,5]	0.96	0.90	1.01
Generation 1.0 - Europe South (5,Inf]	0.99	0.94	1.04
Generation 1.0 - Africa North (0,2]	2.37	2.26	2.48
Generation 1.0 - Africa North (2,5]	1.11	1.05	1.17
Generation 1.0 - Africa North (5,Inf]	1.77	1.69	1.85
Generation 1.0 - India (0,2]	1.00	0.93	1.07
Generation 1.0 - India (2,5]	0.81	0.75	0.88
Generation 1.0 - India (5,Inf]	1.18	1.09	1.26
Generation 1.0 - All Other (0,2]	1.78	1.76	1.80
Generation 1.0 - All Other (2,5]	1.52	1.50	1.54
Generation 1.0 - All Other (5,Inf]	1.47	1.46	1.49
Generation 1.5 - Nordic	0.91	0.89	0.93
Generation 1.5 - Poland	0.95	0.91	1.00
Generation 1.5 - Turkey	1.58	1.52	1.64
Generation 1.5 - Europe South	0.98	0.92	1.05
Generation 1.5 - Africa North	1.12	1.00	1.26
Generation 1.5 - India	0.68	0.64	0.72
Generation 1.5 - All Other	1.07	1.06	1.08
Generation 2.0 - Nordic	0.97	0.95	0.98
Generation 2.0 - Poland	0.84	0.79	0.90
Generation 2.0 - Turkey	1.11	1.07	1.15
Generation 2.0 - Europe South	0.89	0.84	0.94
Generation 2.0 - Africa North	0.88	0.80	0.98
Generation 2.0 - India	0.49	0.40	0.61
Generation 2.0 - All Other	0.89	0.88	0.91
Generation 2.5 - Mother Migrant - Nordic	0.93	0.92	0.95
Generation 2.5 - Mother Migrant - Poland	0.81	0.77	0.85
Generation 2.5 - Mother Migrant - Turkey	0.84	0.64	1.11
Generation 2.5 - Mother Migrant - Europe South	1.00	0.93	1.07
Generation 2.5 - Mother Migrant - Africa North	0.76	0.58	0.99
Generation 2.5 - Mother Migrant - India	0.86	0.70	1.04
Generation 2.5 - Mother Migrant - All Other	0.91	0.89	0.93
Generation 2.5 - Father Migrant - Nordic	1.01	0.99	1.02
Generation 2.5 - Father Migrant - Poland	0.96	0.88	1.04

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 2.5 - Father Migrant - Turkey	0.97	0.89	1.06
Generation 2.5 - Father Migrant - Europe South	0.95	0.92	0.98
Generation 2.5 - Father Migrant - Africa North	0.90	0.84	0.96
Generation 2.5 - Father Migrant - India	0.84	0.74	0.97
Generation 2.5 - Father Migrant - All Other	0.95	0.93	0.96
1995-1998 (Ref: 1991-1994)	0.82	0.81	0.82
1999-2002	0.78	0.78	0.79
2003-2006	0.86	0.85	0.87
2007-2010	0.90	0.89	0.91
2011-2014	0.84	0.84	0.85
2015-2017	0.77	0.76	0.77
Education Secondary (Ref: Primary)	1.00	0.99	1.00
Education Tertiary	1.03	1.03	1.04
Education Missing	0.59	0.58	0.60
Unemployment Benefits: Yes (Ref: No)	1.08	1.07	1.09
Student Benefits: Yes (Ref: No)	0.57	0.56	0.57
In Employment: No (Ref: Yes)	0.51	0.50	0.51

Second Birth

S-3 Table: Overview of the study population at risk of a second birth by sex, population subgroup, and country-of-origin background

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Native Swedish	802715	814752	1617467	571456	597714
Generation 1.0 - Nordic	10585	12720	23305	5537	7007
Generation 1.0 - Poland	5259	7956	13215	2296	3736
Generation 1.0 - Turkey	6959	5659	12618	4749	4043
Generation 1.0 - Europe South	3714	2698	6412	1956	1306
Generation 1.0 - Africa North	4853	4591	9444	3156	3107
Generation 1.0 - India	2227	2170	4397	822	868
Generation 1.0 - All Other	117143	123365	240508	73703	73085
Generation 1.5 - Nordic	7981	7221	15202	5561	5063
Generation 1.5 - Poland	2108	2299	4407	1300	1440
Generation 1.5 - Turkey	2634	2413	5047	2144	1897
Generation 1.5 - Europe South	856	649	1505	618	429
Generation 1.5 - Africa North	273	297	570	182	202
Generation 1.5 - India	931	2491	3422	626	1650
Generation 1.5 - All Other	37617	44495	82112	24129	29250
Generation 2.0 - Nordic	15706	16259	31965	11022	11968
Generation 2.0 - Poland	852	988	1840	521	587
Generation 2.0 - Turkey	2857	3509	6366	1997	2453
Generation 2.0 - Europe South	1259	1180	2439	883	780
Generation 2.0 - Africa North	338	493	831	204	279
Generation 2.0 - India	85	110	195	50	69
Generation 2.0 - All Other	15801	17856	33657	10246	11310
Generation 2.5 - Mother Migrant - Nordic	25505	25855	51360	17656	18554
Generation 2.5 - Mother Migrant - Poland	1443	1708	3151	908	1111
Generation 2.5 - Mother Migrant - Turkey	49	55	104	27	28
Generation 2.5 - Mother Migrant - Europe South	702	762	1464	469	527
Generation 2.5 - Mother Migrant - Africa North	51	72	123	30	39
Generation 2.5 - Mother Migrant - India	98	107	205	63	64
Generation 2.5 - Mother Migrant - All Other	10894	10889	21783	7498	7448
Generation 2.5 - Father Migrant - Nordic	18689	20029	38718	12791	14179
Generation 2.5 - Father Migrant - Poland	594	634	1228	381	412
Generation 2.5 - Father Migrant - Turkey	492	598	1090	294	377

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Generation 2.5 - Father Migrant - Europe South	3111	3404	6515	2083	2344
Generation 2.5 - Father Migrant - Africa North	887	1061	1948	552	692
Generation 2.5 - Father Migrant - India	202	197	399	145	138
Generation 2.5 - Father Migrant - All Other	17093	18479	35572	11906	12721

S-4A Table: Results of multivariate cox proportional hazards models for transitions to second birth for females, differentiated by country-of-origin background.

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 1.0 - Nordic (Ref: Native Swedish)	0.93	0.90	0.95
Generation 1.0 - Poland	0.53	0.52	0.55
Generation 1.0 - Turkey	0.99	0.96	1.02
Generation 1.0 - Europe South	0.86	0.82	0.91
Generation 1.0 - Africa North	1.27	1.22	1.31
Generation 1.0 - India	0.62	0.58	0.66
Generation 1.0 - All Other	0.92	0.91	0.92
Generation 1.5 - Nordic	0.84	0.82	0.87
Generation 1.5 - Poland	0.76	0.72	0.80
Generation 1.5 - Turkey	0.99	0.95	1.04
Generation 1.5 - Europe South	0.90	0.82	0.99
Generation 1.5 - Africa North	0.93	0.81	1.07
Generation 1.5 - India	0.78	0.75	0.82
Generation 1.5 - All Other	0.88	0.87	0.89
Generation 2.0 - Nordic	0.91	0.89	0.92
Generation 2.0 - Poland	0.83	0.77	0.90
Generation 2.0 - Turkey	0.96	0.92	1.00
Generation 2.0 - Europe South	0.92	0.86	0.99
Generation 2.0 - Africa North	0.97	0.87	1.10
Generation 2.0 - India	0.99	0.78	1.26
Generation 2.0 - All Other	0.93	0.92	0.95
Generation 2.5 - Mother Migrant - Nordic	0.96	0.94	0.97
Generation 2.5 - Mother Migrant - Poland	0.90	0.85	0.95
Generation 2.5 - Mother Migrant - Turkey	0.76	0.52	1.10
Generation 2.5 - Mother Migrant - Europe South	0.92	0.84	1.00
Generation 2.5 - Mother Migrant - Africa North	0.84	0.61	1.15
Generation 2.5 - Mother Migrant - India	1.12	0.87	1.42
Generation 2.5 - Mother Migrant - All Other	0.97	0.94	0.99
Generation 2.5 - Father Migrant - Nordic	0.93	0.91	0.94
Generation 2.5 - Father Migrant - Poland	0.93	0.84	1.02
Generation 2.5 - Father Migrant - Turkey	0.89	0.80	0.98
Generation 2.5 - Father Migrant - Europe South	0.92	0.88	0.96
Generation 2.5 - Father Migrant - Africa North	0.93	0.86	1.00
Generation 2.5 - Father Migrant - India	1.01	0.85	1.19
Generation 2.5 - Father Migrant - All Other	0.94	0.92	0.95
1995-1998 (Ref: 1991-1994)	0.86	0.85	0.87
1999-2002	0.89	0.88	0.90
2003-2006	0.96	0.95	0.97
2007-2010	0.95	0.94	0.96
2011-2014	0.91	0.90	0.92
2015-2017	0.90	0.89	0.91
Age at Previous Birth	0.94	0.94	0.94
Education Secondary (Ref: Primary)	1.31	1.30	1.32
Education Tertiary	1.85	1.83	1.86

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Education Missing	1.43	1.40	1.46
Unemployment Benefits: Yes (Ref: No)	0.91	0.90	0.91
Student Benefits: Yes (Ref: No)	0.53	0.52	0.53
In Employment: No (Ref: Yes)	0.90	0.89	0.90

S-4B Table: Results of multivariate cox proportional hazards models for transitions to second birth for males, differentiated by country-of-origin background.

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 1.0 - Nordic (Ref: Native Swedish)	0.95	0.93	0.98
Generation 1.0 - Poland	0.59	0.57	0.62
Generation 1.0 - Turkey	1.00	0.97	1.03
Generation 1.0 - Europe South	0.96	0.92	1.00
Generation 1.0 - Africa North	1.13	1.09	1.17
Generation 1.0 - India	0.61	0.57	0.66
Generation 1.0 - All Other	1.09	1.08	1.09
Generation 1.5 - Nordic	0.89	0.87	0.91
Generation 1.5 - Poland	0.77	0.73	0.81
Generation 1.5 - Turkey	1.19	1.14	1.25
Generation 1.5 - Europe South	1.03	0.95	1.12
Generation 1.5 - Africa North	1.10	0.95	1.27
Generation 1.5 - India	0.90	0.84	0.98
Generation 1.5 - All Other	0.99	0.98	1.00
Generation 2.0 - Nordic	0.90	0.88	0.92
Generation 2.0 - Poland	0.92	0.84	1.00
Generation 2.0 - Turkey	1.21	1.16	1.27
Generation 2.0 - Europe South	1.05	0.98	1.12
Generation 2.0 - Africa North	1.11	0.97	1.27
Generation 2.0 - India	1.16	0.88	1.53
Generation 2.0 - All Other	0.98	0.96	1.00
Generation 2.5 - Mother Migrant - Nordic	0.94	0.92	0.95
Generation 2.5 - Mother Migrant - Poland	0.91	0.85	0.97
Generation 2.5 - Mother Migrant - Turkey	0.78	0.53	1.13
Generation 2.5 - Mother Migrant - Europe South	0.88	0.80	0.96
Generation 2.5 - Mother Migrant - Africa North	1.33	0.93	1.91
Generation 2.5 - Mother Migrant - India	0.90	0.71	1.16
Generation 2.5 - Mother Migrant - All Other	0.96	0.94	0.98
Generation 2.5 - Father Migrant - Nordic	0.92	0.91	0.94
Generation 2.5 - Father Migrant - Poland	0.91	0.82	1.00
Generation 2.5 - Father Migrant - Turkey	0.83	0.74	0.93
Generation 2.5 - Father Migrant - Europe South	0.90	0.86	0.94
Generation 2.5 - Father Migrant - Africa North	0.94	0.87	1.02
Generation 2.5 - Father Migrant - India	1.07	0.91	1.26
Generation 2.5 - Father Migrant - All Other	0.96	0.95	0.98
1995-1998 (Ref: 1991-1994)	0.81	0.80	0.82
1999-2002	0.80	0.79	0.80
2003-2006	0.87	0.86	0.88
2007-2010	0.87	0.86	0.88
2011-2014	0.86	0.85	0.87
2015-2017	0.84	0.83	0.85
Age at Previous Birth	0.97	0.97	0.97
Education Secondary (Ref: Primary)	1.14	1.13	1.15
Education Tertiary	1.54	1.53	1.55

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Education Missing	1.07	1.05	1.10
Unemployment Benefits: Yes (Ref: No)	0.90	0.89	0.91
Student Benefits: Yes (Ref: No)	0.84	0.83	0.85
In Employment: No (Ref: Yes)	0.75	0.74	0.75

Third Birth

S-5 Table: Overview of the study population at risk of a third birth by sex, population subgroup, and country-of-origin background

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Native Swedish	563445	589435	1152880	150050	156699
Generation 1.0 - Nordic	5462	6886	12348	1245	1608
Generation 1.0 - Poland	2266	3697	5963	343	575
Generation 1.0 - Turkey	4683	3988	8671	1950	1657
Generation 1.0 - Europe South	1925	1285	3210	382	215
Generation 1.0 - Africa North	3118	3068	6186	1499	1350
Generation 1.0 - India	812	863	1675	161	153
Generation 1.0 - All Other	72804	72228	145032	27131	24458
Generation 1.5 - Nordic	5467	4994	10461	1679	1494
Generation 1.5 - Poland	1287	1420	2707	343	358
Generation 1.5 - Turkey	2114	1870	3984	1160	946
Generation 1.5 - Europe South	609	422	1031	179	113
Generation 1.5 - Africa North	181	197	378	76	81
Generation 1.5 - India	615	1630	2245	160	408
Generation 1.5 - All Other	23867	28909	52776	8025	9525
Generation 2.0 - Nordic	10878	11795	22673	3332	3661
Generation 2.0 - Poland	517	579	1096	123	129
Generation 2.0 - Turkey	1973	2423	4396	745	999
Generation 2.0 - Europe South	870	769	1639	228	183
Generation 2.0 - Africa North	204	277	481	64	91
Generation 2.0 - India	50	68	118	13	10
Generation 2.0 - All Other	10105	11171	21276	2604	2825
Generation 2.5 - Mother Migrant - Nordic	17403	18269	35672	4961	5135
Generation 2.5 - Mother Migrant - Poland	897	1102	1999	204	281
Generation 2.5 - Mother Migrant - Turkey	27	28	55	< 10	< 10
Generation 2.5 - Mother Migrant - Europe South	464	520	984	136	128
Generation 2.5 - Mother Migrant - Africa North	30	39	69	< 10	< 10
Generation 2.5 - Mother Migrant - India	63	62	125	11	18
Generation 2.5 - Mother Migrant - All Other	7376	7341	14717	1954	1868
Generation 2.5 - Father Migrant - Nordic	12635	13962	26597	3514	4092
Generation 2.5 - Father Migrant - Poland	377	401	778	97	107
Generation 2.5 - Father Migrant - Turkey	292	377	669	94	100

Population Subgroup	N Males	N Females	N Total	Males Birth	Females Birth
Generation 2.5 - Father Migrant - Europe South	2054	2306	4360	592	609
Generation 2.5 - Father Migrant - Africa North	541	681	1222	152	206
Generation 2.5 - Father Migrant - India	143	137	280	35	47
Generation 2.5 - Father Migrant - All Other	11750	12538	24288	3150	3371

S-6A Table: Results of multivariate cox proportional hazards models for transitions to third birth for females, differentiated by country-of-origin background.

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 1.0 - Nordic (Ref: Native Swedish)	1.13	1.08	1.19
Generation 1.0 - Poland	0.68	0.62	0.74
Generation 1.0 - Turkey	1.22	1.16	1.29
Generation 1.0 - Europe South	1.00	0.87	1.14
Generation 1.0 - Africa North	1.97	1.87	2.08
Generation 1.0 - India	0.75	0.64	0.88
Generation 1.0 - All Other	1.40	1.38	1.42
Generation 1.5 - Nordic	1.03	0.98	1.08
Generation 1.5 - Poland	0.93	0.84	1.03
Generation 1.5 - Turkey	1.64	1.54	1.75
Generation 1.5 - Europe South	1.00	0.83	1.21
Generation 1.5 - Africa North	1.57	1.26	1.95
Generation 1.5 - India	0.90	0.81	0.99
Generation 1.5 - All Other	1.18	1.16	1.21
Generation 2.0 - Nordic	1.02	0.99	1.05
Generation 2.0 - Poland	0.77	0.65	0.91
Generation 2.0 - Turkey	1.52	1.42	1.61
Generation 2.0 - Europe South	0.88	0.76	1.02
Generation 2.0 - Africa North	1.51	1.23	1.85
Generation 2.0 - India	0.83	0.45	1.55
Generation 2.0 - All Other	1.01	0.97	1.05
Generation 2.5 - Mother Migrant - Nordic	1.04	1.01	1.06
Generation 2.5 - Mother Migrant - Poland	1.07	0.95	1.20
Generation 2.5 - Mother Migrant - Turkey	1.21	0.61	2.42
Generation 2.5 - Mother Migrant - Europe South	0.99	0.83	1.18
Generation 2.5 - Mother Migrant - Africa North	0.85	0.40	1.78
Generation 2.5 - Mother Migrant - India	1.58	1.00	2.51
Generation 2.5 - Mother Migrant - All Other	1.08	1.03	1.13
Generation 2.5 - Father Migrant - Nordic	1.04	1.01	1.08
Generation 2.5 - Father Migrant - Poland	1.03	0.85	1.25
Generation 2.5 - Father Migrant - Turkey	0.98	0.81	1.19
Generation 2.5 - Father Migrant - Europe South	1.06	0.98	1.15
Generation 2.5 - Father Migrant - Africa North	1.25	1.09	1.43
Generation 2.5 - Father Migrant - India	1.48	1.11	1.97
Generation 2.5 - Father Migrant - All Other	1.08	1.05	1.12
1995-1998 (Ref: 1991-1994)	0.73	0.68	0.77
1999-2002	0.84	0.79	0.89
2003-2006	0.99	0.94	1.06
2007-2010	1.05	0.99	1.12
2011-2014	1.01	0.95	1.07
2015-2017	0.99	0.93	1.05
Age at Previous Birth	0.88	0.87	0.88
Education Secondary (Ref: Primary)	0.88	0.86	0.89
Education Tertiary	1.20	1.18	1.22

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Education Missing	1.34	1.29	1.40
Unemployment Benefits: Yes (Ref: No)	0.91	0.90	0.92
Student Benefits: Yes (Ref: No)	0.59	0.58	0.60
In Employment: No (Ref: Yes)	1.28	1.27	1.30

S-6B Table: Results of multivariate cox proportional hazards models for transitions to third birth for males, differentiated by country-of-origin background.

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Generation 1.0 - Nordic (Ref: Native Swedish)	1.05	0.99	1.11
Generation 1.0 - Poland	0.78	0.70	0.86
Generation 1.0 - Turkey	1.59	1.52	1.66
Generation 1.0 - Europe South	1.02	0.93	1.13
Generation 1.0 - Africa North	3.07	2.92	3.23
Generation 1.0 - India	1.11	0.95	1.29
Generation 1.0 - All Other	1.91	1.88	1.93
Generation 1.5 - Nordic	1.07	1.02	1.12
Generation 1.5 - Poland	0.97	0.87	1.08
Generation 1.5 - Turkey	1.97	1.86	2.09
Generation 1.5 - Europe South	1.19	1.03	1.38
Generation 1.5 - Africa North	1.70	1.36	2.13
Generation 1.5 - India	1.00	0.85	1.17
Generation 1.5 - All Other	1.41	1.38	1.44
Generation 2.0 - Nordic	1.04	1.01	1.08
Generation 2.0 - Poland	0.96	0.80	1.14
Generation 2.0 - Turkey	1.63	1.51	1.75
Generation 2.0 - Europe South	1.01	0.89	1.15
Generation 2.0 - Africa North	1.72	1.34	2.19
Generation 2.0 - India	1.52	0.88	2.62
Generation 2.0 - All Other	1.04	1.00	1.08
Generation 2.5 - Mother Migrant - Nordic	1.07	1.04	1.10
Generation 2.5 - Mother Migrant - Poland	1.00	0.88	1.15
Generation 2.5 - Mother Migrant - Turkey	0.56	0.18	1.75
Generation 2.5 - Mother Migrant - Europe South	1.13	0.95	1.33
Generation 2.5 - Mother Migrant - Africa North	0.88	0.42	1.84
Generation 2.5 - Mother Migrant - India	0.79	0.44	1.42
Generation 2.5 - Mother Migrant - All Other	1.05	1.00	1.10
Generation 2.5 - Father Migrant - Nordic	1.02	0.98	1.05
Generation 2.5 - Father Migrant - Poland	1.05	0.86	1.29
Generation 2.5 - Father Migrant - Turkey	1.25	1.02	1.53
Generation 2.5 - Father Migrant - Europe South	1.14	1.05	1.23
Generation 2.5 - Father Migrant - Africa North	1.19	1.01	1.39
Generation 2.5 - Father Migrant - India	1.07	0.77	1.49
Generation 2.5 - Father Migrant - All Other	1.04	1.00	1.08
1995-1998 (Ref: 1991-1994)	0.67	0.63	0.71
1999-2002	0.73	0.68	0.77
2003-2006	0.85	0.80	0.90
2007-2010	0.90	0.84	0.95
2011-2014	0.87	0.82	0.92
2015-2017	0.85	0.80	0.91
Age at Previous Birth	0.92	0.92	0.92
Education Secondary (Ref: Primary)	0.84	0.83	0.86
Education Tertiary	1.01	1.00	1.02

Parameter	Hazard Ratio	CI 95lower	CI 95upper
Education Missing	1.00	0.94	1.06
Unemployment Benefits: Yes (Ref: No)	1.07	1.05	1.08
Student Benefits: Yes (Ref: No)	0.99	0.96	1.01
In Employment: No (Ref: Yes)	1.18	1.16	1.19