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The Fertility of Immigrants From Low-Fertility Settings: Adaptation in the Quantum and Tempo of Childbearing?

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ABSTRACT Immigrant women who have lived longer in a destination often have relatively low levels of fertility, which is sometimes taken as evidence of the adaptation of behavior. This evidence is almost exclusively based on studies of immigrants from high-fertility settings, while the fertility of immigrants from low-fertility settings has been largely overlooked. Research has also rarely studied the fertility of immigrants who migrated as children, despite the methodological advantages of applying such an approach. This study focuses on women who grew up in Sweden with a migration background from low-fertility origins. We expect that Sweden's welfare regime makes it easier for women to combine childbearing and working life, regardless of migration background, thereby facilitating an adaptation of fertility behavior toward that prevailing in Sweden. We find evidence of adaptation in terms of birth timing for at least half of the country-origin groups that we study, but very little evidence of adaptation in terms of completed fertility. Further, we find that, in comparison with ancestral Swedes, completed fertility differentials are larger for second-generation individuals than for immigrants who arrived during childhood. This is evidence against the notion of "straight-line" adaptation for immigrants and the children of immigrants who are born in Sweden.

KEYWORDS Fertility • Immigrants • Second generation • Descendants • Sweden

Introduction and Motivation

In the last few decades, immigrant fertility has become an increasingly high-profile issue for demographers and policymakers alike, particularly in aging societies with below-replacement fertility (Kulu and González-Ferrer 2014; Parrado and Flippen 2012). The childbearing of immigrants is one of the mechanisms that may counteract the impact of depressed birth rates and help slow population aging (Feichtinger and Steinmann 1992). This supposition is based on evidence that in many European countries, some immigrant groups have higher fertility rates than the destination (or native-born) average (OECD 2015, particularly figure 2.6; Sobotka 2008). Although some of this evidence may be biased because of problems measuring immigrant fertility using total fertility rates (TFR) (Parrado 2011; Sobotka and Lutz 2010; Toulemon

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2006), the number of children born to immigrants—the *quantum* of immigrant fertility—may play an important role in aging societies, for example, by reducing dependency ratios for future working-age cohorts (Grant et al. 2004).

In addition to the consequences of quantum differentials, the timing of births to immigrant parents—the *tempo* of immigrant fertility—may also have significant implications for social policy. In many high-income settings, foreign-born women often experience an earlier age at first birth than those who are native-born (OECD 2015). This may be a source of socioeconomic inequality, with respect to both mothers and their children (Goisis and Sigle-Rushton 2014). For example, early parenthood may prevent women from gaining higher education or progressing in the labor market, with potentially detrimental lifelong consequences (Myrskylä et al. 2017). Tempo differentials in childbearing can also have macro-level consequences, for example, by generating differences in population composition among the native-born, immigrants, and their descendants over the long run, including with respect to age structure and kinship networks (Espenshade 1986).

It follows that there are different motivations for studying either the quantum or the tempo of fertility. Perhaps for this reason, empirical research has tended to focus on one or the other, with a subsequent lack of research that contrasts the quantum and tempo of fertility for immigrants or their descendants (for recent reviews of research, see Kulu and González-Ferrer 2014; Milewski 2010a; Milewski and Mussino 2018). This is an important shortcoming, not least because conclusions about immigrant fertility behavior—in particular, those relating to theories like adaptation—may differ according to the measure of fertility used. For example, immigrants may differ from natives with respect to fertility at younger ages, while still having the same levels of completed fertility at the end of their reproductive career (Wilson 2020). This is not only possible for immigrants who arrive as adults, but also for the children of immigrants—both those who arrive as children and the second generation—who are the main subject of this study.

Despite the lack of direct comparisons between tempo and quantum, many studies have addressed immigrant fertility in developed societies (for summaries, see Kulu and González-Ferrer 2014; Milewski 2010a), focusing on measures of quantum (e.g., Parrado and Morgan 2008), tempo (e.g., Milewski 2010a), or a composite of quantum and tempo (such as TFR; e.g., Dubuc 2012). This literature almost exclusively focuses on adult immigrants from high-fertility origin countries (Milewski 2010a). Consequently, there is a lack of research on immigrants who were born in countries with below-replacement fertility, that is, from *low-fertility origins*. This is unfortunate because studies of immigrants from low-fertility origins have a similar or perhaps even greater potential for testing theories of fertility adaptation (Tønnesen and Mussino 2020). At present, there is little evidence whether fertility adaptation occurs among immigrants from low-fertility settings, despite the prominence of migration streams from low-fertility origins in many destinations (Castles et al. 2013; Livi Bacci 2012). Many immigrant-sending countries with previously high fertility have now completed the fertility transition, yet other countries with substantial emigration have had low (or even very low) fertility levels for several decades (Neyer et al. 2013; United Nations 2019). Global fertility dynamics have led to a much smaller pool of countries with high-fertility behavior, and a much larger pool of countries with low fertility (Billari and Wilson 2001; Dyson 2010).

Another advantage of studying immigrants from low-fertility origins is that they might be less likely than migrants from high-fertility origins to have children before or in close connection to migration, which minimizes one of the challenges in studies of fertility adaptation, namely, the bidirectional relationship between fertility and migration (Andersson 2004; Hoem 2013; Hoem and Nedoluzhko 2016; Toulemon 2006). Patterns of decreasing fertility for immigrants at longer durations of residence—as compared with elevated fertility for those with short durations—may be the result of interrelationships between migration and family formation rather than adaptation. Likewise, it is difficult to imagine how immigrants can adapt toward the destination norm if they arrive having already had more children than the norm. These issues concern studies of migrants who arrive at adult ages, in the midst of their family formation and reproductive careers. As argued in recent research, one way to avoid such issues is to study *child migrants*, who arrive prior to reaching childbearing age and can therefore be studied in the absence of concerns about reverse causality or selective migration based on factors linked to fertility or family formation (Adserà et al. 2012; Adserà and Ferrer 2014). Studies of child migrant fertility make it easier to draw conclusions about fertility adaptation and can also focus attention on the role of age at arrival for subsequent behavior. Differences in ages at arrival produce differential childhood exposure in countries of origin and destination, and therefore allow researchers to examine one of the main mechanisms of adaptation in social behavior—not only for fertility (Adserà and Tienda 2012; Beck et al. 2012; Bleakley and Chin 2010), but also for other social outcomes (e.g., Åslund et al. 2015; Guven and Islam 2015; Hermansen 2017).

In this study, we focus on the fertility of immigrants who were born in low-fertility origins and migrated to Sweden as children (younger than age 18). Our aim is to examine the adaptation of both the quantum and tempo of fertility, distinguishing between child migrants by age at arrival (0–5, 6–12, and 13–17), and also compared with ancestral Swedes (the Swedish-born children of Swedish-born parents), the second generation (the Swedish-born children of foreign-born parents), and immigrants who arrived as adults (in the initial analysis). As a European country with relatively high fertility and close to replacement level (Andersson et al. 2009; Jalovaara et al. 2019), Sweden is an interesting case when focusing on migration from low-fertility settings. Sweden's welfare regime helps to enable women and men to combine childbearing and employment (Andersson and Scott 2005, 2007; Neyer and Andersson 2008). Consequently, the country represents an ideal destination for studying whether immigrants from low-fertility origin countries—which often lack policies that support the reconciliation of childbearing with working life—can more easily realize their fertility intentions than those who remain in their origin country. In most cases, these low-fertility countries have similar levels of desired fertility as in Sweden, but much higher unmet demand in terms of realized fertility (Sobotka and Beaujouan 2014; Testa 2012; see also Tables A1 and A2 in the online appendix). This raises the question of whether immigrants from low-fertility countries—where women often do not meet their desired fertility—are able to achieve a fertility quantum similar to the Swedish norm. A similar question can be asked in terms of their fertility tempo. Structural conditions related to living in Sweden may be impediments or incentives to early or late fertility, irrespective of migration background, but Sweden may provide more favorable conditions for early childbearing than those prevailing in low-fertility origins, which in turn may enable a convergence toward the Swedish quantum norm.

Given this background and motivation, our main research questions are (1) How does the fertility of child migrants from low-fertility origin countries compare with the typical pattern of fertility in Sweden? (2) Is there evidence of adaptation within and across generations, or a lack of adaptation, for quantum, tempo, or both? (3) How does this evidence vary by country of origin? To answer these questions, we compare child migrants from different low-fertility countries, which allows us to study the interaction between origin and destination in determining subsequent fertility in Sweden. We aim to gain a deeper understanding of patterns of fertility adaptation and the potential influences of fertility-supporting conditions in Sweden. In addition to the contextual advantages of studying Sweden, we can make use of high-quality longitudinal data on the demographic careers of the entire population. This allows us to analyze the complete fertility profiles—in terms of quantum and tempo—for all registered immigrants, while also disentangling variation by country of origin and age at arrival.

Old Theories for a New Approach

Many hypotheses have been used to explain and predict the fertility of immigrants and their descendants (Andersson 2021; Kulu and González-Ferrer 2014; Kulu et al. 2017; Kulu et al. 2019; Milewski 2010a). Most explanations have been generated in the context of migration at adult ages and from origins with higher fertility than the destination. In this section, we therefore focus on the theories and hypotheses that are most relevant for our focus on the descendants of immigrants from low-fertility origins. Hypotheses that focus on the fertility of immigrants who arrive as adults—such as those related to selection, disruption, anticipation, interrelation of events, family formation, or legal status (Andersson 2021; Kulu and González-Ferrer 2014; Kulu et al. 2017; Kulu et al. 2019; Milewski 2010a)—are of much less relevance for child migrants and the second generation (Wilson 2020), and thus will not be discussed further.

The hypothesis of *adaptation* typically asserts that, on arrival, migrants' fertility will be different from that of the destination population, but will converge with increasing duration of residence to become more similar, or at least the average or "norm" for the majority (Farber and Lee 1984; Hervitz 1985; Kahn 1988; Milewski 2010a). The hypothesis of *intergenerational adaptation* extends the same argument to changes in fertility across different generations of migration background (Kulu and González-Ferrer 2014; Kulu et al. 2017; Kulu et al. 2019). Although typically used when studying high-fertility origins, adaptation can be applied equally to the study of immigrants and their descendants from low-fertility origins. The adaptation process may be driven by shifting norms, but also by responses to the institutional context of the host society (Andersson and Scott 2005). Previous research on Sweden suggests that the parity-specific birth rates of most immigrant groups from high-fertility countries tend to resemble those of the native-born population relatively soon after arrival, and that such socioeconomic factors as labor market participation play a similar role in relation to fertility for Swedish- and foreign-born women alike (Andersson and Scott 2005, 2007; Lundström and Andersson 2012). As mentioned, it is sometimes difficult to study the adaptation of fertility for immigrants who arrive as adults

(Adserà et al. 2012), in part because they may arrive having already had more children than the reference for adaptation (Tønnessen and Wilson 2020), and also because migration often interacts with family formation (Andersson 2004; Hoem 2013; Hoem and Nedoluzhko 2016; Milewski 2010a; Toulemon 2006); however, these factors are avoided entirely when studying immigrants who arrive as children. The adaptation hypothesis can be tested by comparing child migrants who arrived at different ages, which allows us to examine differences in fertility according to the amount of exposure to the destination. Additionally, by comparing the behavior of child migrants with that of the second generation, we are able to study intergenerational adaptation.

Working alongside adaptation, the hypothesis of *childhood socialization* poses that fertility behaviors mainly depend on exposure to norms and behavior during childhood (Goldberg 1959, 1960; Hervitz 1985). Childhood socialization can explain why immigrants from different origins exhibit different fertility patterns in the same destination—in particular, if they conform with norms from their country of origin. This hypothesis also has the capacity to make predictions for the descendants of immigrants who were born in the destination—for example, the second generation. As the second generation spends their entire childhood in the destination, childhood socialization is usually interpreted to mean that they are more likely than those born abroad to have fertility similar to that of ancestral natives (Milewski 2010b). This can be investigated alongside the hypothesis of *cultural entrenchment*, which predicts that some descendants of immigrants will maintain fertility behavior that is different from the destination norm—because of exposure to preferences and values held by their parents or the influence of minority culture—even if they are born in the destination (Abbasi-Shavazi and McDonald 2002). This hypothesis challenges the notion that adaptation is guaranteed to occur for the second and later generations, who may instead (choose to) adapt to the norms of minority groups, rather than those of the majority population (Portes et al. 2005).

The foregoing hypotheses can be contrasted using comparisons within and between different origin and generational groups. As discussed, adaptation can be tested by comparing child migrants arriving at different ages. This is also a test of childhood socialization, which makes the additional prediction that child migrants will differ by origin in direct relation to the fertility norms that they experience as children (often measured using average fertility behavior in their origin and destination countries, which we show in the online appendix tables for the origins studied here). With respect to the second generation, childhood socialization typically predicts an absence of fertility differentials (versus ancestral natives), and intergenerational adaptation predicts smaller fertility differentials (versus ancestral natives, as compared with child or adult immigrants), whereas cultural entrenchment predicts the maintenance of fertility differentials (versus ancestral natives). Thus, in our study (and elsewhere), evidence may support several hypotheses, but these are more likely to be disentangled by comparing outcomes not only across generations, but also across different countries of origin.

Few studies have examined the fertility of immigrants from an origin country that has substantially lower fertility than their destination. Moreover, most of these are studies of a single origin, which therefore makes it harder to test childhood socialization or to generalize findings across different origin groups. There is some evidence that the fertility levels of "low-fertility" immigrants (measured in different ways) are

higher for those who have a longer duration of residence than for those who recently arrived. For example, this appears to be the case for Romanians in Italy (Mussino and Strozza 2012), German immigrants in Norway (Tønnesen and Mussino 2020), and immigrants from the Soviet Union in Israel (Nahmias 2004), although the latter is somewhat contradicted in another study of Israel (Okun and Kagya 2012). It is tempting to interpret these findings as evidence for or against adaptation, but they are potentially confounded by the forces of anticipation, disruption, and selection, because they focus on immigrants who arrived as adults. The same can be said for research on Chinese immigrants to the United States (Hwang and Saenz 1997), which nevertheless shows that the fertility of female immigrants from China is distinct from that in their origin country. To the best of our knowledge, only a few studies have estimated the fertility of child migrants from any low-fertility origins (Adserà and Ferrer 2014; Andersson 2004; Scott and Stanfors 2011; Wilson 2020). In general, these studies indicate that child migrants from low-fertility origins—such as Eastern European countries—have lower fertility rates than the native-born population; however, the studies do not compare quantum and tempo measures of childbearing or make systematic comparisons across a wide range of origin countries or country groups.

It is perhaps worth reiterating that this study places a priority on investigating the hypotheses that make predictions for different generations. We move beyond most previous research by studying both the quantum (completed fertility) and tempo (age at first birth) of fertility for the descendants, and by comparing the descendants of immigrants from a range of low-fertility origins. Coupled with our comparison across different generational groups, this allows us to examine evidence for or against different theoretical predictions, and explore whether this depends upon the aspect of fertility that is considered.

The Swedish Case

Sweden offers a compelling context for examining whether women can achieve their desired fertility, particularly for women who were born—or whose parents were born—in lower fertility countries. An important factor here is the strong support provided by the Swedish welfare regime, not only in terms of family support and gender equity, but also in its integration policies. Sweden formulated a multicultural immigrant policy in the mid-1970s that encourages cultural diversity and equality in culture and education, which means that immigrants and their children have the right to "retain their own language, develop their own cultural activities and maintain contact with their original country" (Borevi 2012:41). In other words, equality and freedom of choice are promoted, and immigrants can maintain their own distinct cultural identity.

The origin countries of immigrants to Sweden have become more diverse over time (Statistics Sweden 2016), resulting in greater variation in immigrant fertility (Andersson 2004; Andersson et al. 2017; Lundström and Andersson 2012; Statistics Sweden 2014). Close to 20% of the Swedish population is currently foreign-born (Statistics Sweden 2020), which is one of the highest proportions in Europe. Moreover, despite the well-publicized receipt of large numbers of refugees since 2011, this proportion has its roots in a long history of receiving immigrants from many

countries, including most countries in Europe. After the expansion of the European Union in the early 2000s, migration from European countries began to include larger proportions of migrants from such accession countries as Poland and Romania.

The macro-level context of the Swedish welfare regime appears to be important in shaping the childbearing behavior of both foreign- and native-born residents (Andersson and Scott 2005, 2007). Swedish period fertility rates have fluctuated considerably during the last 50 years, yet the completed fertility of cohorts of Swedish women has remained remarkably stable at a level of just below two children per woman (Andersson et al. 2009; Jalovaara et al. 2019). During earlier decades, period trends in parity-specific fertility have been very similar for foreign-born and Swedish-born women (Andersson 2004). When comparing groups of foreign-born women to the Swedish-born, aggregate indicators of period TFRs are typically inflated (Statistics Sweden 2014: figure 2.1), but differences in completed fertility at age 40 are much less pronounced (Statistics Sweden 2014: figure 5.14). The parity-specific fertility of the descendants of immigrants is often depressed when considering the children of both high-fertility and low-fertility origins, but there is considerable heterogeneity by sex, education, labor market status, and parental nativity (Andersson et al. 2017; Scott and Stanfors 2010, 2011). Period TFRs for the second generation (overall) have been similar to or slightly lower than those of ancestral Swedes over recent decades, but the negative differential has widened since the turn of the millennium (Andersson et al. 2017: figure 1).

With this in mind, our study focuses on female child migrants born in a range of the most prominent countries or groups of countries with lower fertility than that of Sweden (Figure 1; Table A3 in the online appendix). Despite being constrained by selecting countries with sufficiently large populations in Sweden, our study covers the vast majority of immigrants from countries with recent low-fertility behavior—and 51% of the female foreign-born population in 2017 for the cohorts that we study.

Data and Methods

Sweden represents an ideal context for this study, in part because of the availability of high-quality, longitudinal demographic data from its population registers. Our main source is the Migrant Trajectories data collection from Statistics Sweden, which enables us to study the resident population of Sweden between 1968 and 2017. People enter the register when they are born (if born in Sweden), or when they receive a resident permit or register their immigration. All members of the population have a unique person number, which is available in our data in an anonymized format.

Swedish population registers collect information on all major demographic events, such as childbirths, deaths, domestic and international relocations, marriages, and divorces, including the date of each event; children can be linked to their parents using their person number (as long as the parents have lived in Sweden, either now or at some point in the past). This enables us to estimate the entire childbearing history of all women living in Sweden with a high degree of accuracy, including for child migrants (who are highly unlikely to have had any children prior to arrival) and the second generation. Our data include all recorded immigrations (and emigrations), allowing us to calculate age at (registered) arrival to Sweden for all immigrants.

We are able to use our longitudinal data to compare and contrast measures of fertility quantum and tempo. Although the term "quantum" can be defined as the accumulated number of event occurrences and hence can be measured at any age (Pressat 1985; Ryder 1980), we focus here on quantum at the end of childbearing. This enables a comparison of quantum between groups that is unaffected by differences in birth timing between the same groups. Similarly, we note that tempo can be measured in different ways—for example, with reference to different birth parities—but here we measure tempo using age at first birth.

To facilitate comparison, our analysis of completed fertility and of first birth uses the same study population: women who completed (or almost completed) their childbearing. This enables us to compare their birth timing (for those who became mothers) with their realized completed fertility. We restrict our study population to women 40 or older, as most women in Sweden have completed their childbearing by age 40, regardless of their migration background (Andersson and Scott 2005, 2007). More specifically, we select only women who were born between 1940 and 1976 (i.e., those aged 40–76 in 2017) and did not emigrate or die prior to age 40. We measure completed fertility in 2017, when 90% of our study population were aged 45 or older. For the other 10%, we expect their completed fertility to be underestimated by no more than 4% (based on analysis of the 1972 cohort), with this bias being similar for immigrants, ancestral Swedes, and the second generation.

We first present a univariate comparison of completed fertility and age at first birth for adult immigrants and child immigrants from countries with lower fertility than that of Sweden (Figure 1). We then use generalized linear models (GLMs) with a Poisson link function to estimate the completed fertility for different groups of women (Figure 2) and GLMs with an identity link function to analyze ages at first birth (Figure 3). In both sets of GLMs, we control for birth cohort, grouped into four categories (1940–1949, 1950–1959, 1960–1969, and 1970–1976). We do not consider it appropriate to control for other variables because this would not only render our results more difficult to compare across groups, but also would entail the assessment of (time-varying) variables that in many cases are endogenous to the outcomes we want to study (see Hoem 2013; Hoem and Kreyenfeld 2006a, 2006b, including for related discussions of anticipatory analysis). Although our GLM analysis of age at first birth effectively drops those women who never experienced a birth (13% of ancestral Swedes, 13% of child migrants, and 16% of the second generation), we favor this approach because it is more immediately comparable with our analysis of completed fertility. Nevertheless, we also analyze the transition to first birth using event-history models of time to event (Figure 4). For this analysis, the process time is age, ending at first birth, and cases are censored if no first birth occurred by age 40 (i.e., the age of last observation).

In each of the models, for quantum and tempo, we compare the fertility of (1) child migrants with that of (2) the second generation and (3) ancestral Swedes. Child migrants are defined as women born in one of the lower-fertility origins studied. There are many ways to classify countries as having low fertility (or lower than Sweden), but here we follow the most prominent approach in the demographic literature by using period TFRs. Although this is not the same measure that we use in our analysis, it has the advantage of being readily available for all countries. The TFR for Sweden in 2016 was 1.9, which is close to the completed fertility for cohorts of

women in Sweden born in the late nineteenth century onward (Statistics Sweden 1999: table 3.7). We focus on the largest origins in Sweden with a TFR below 1.9 in 2013 (which is the latest year for which we have data on all origins that are prominent and identifiable in our population data; see Table A1 in the online appendix). Most of these countries have been classified by other authors as having "low" or "lowest low" fertility at extended periods of time in the last few decades. Our data include a detailed classification of countries of birth, which in some cases allows us to separately identify individual countries; however, some countries are required to be grouped together, largely to minimize disclosure issues. As a result, we analyze a total of 14 different origin country groups. In most cases, these are natural groupings—for example, Spain and Portugal. In some cases, such as the former Yugoslavia and Czechoslovakia, they also reflect the history of geographical change in relation to childhood background. Since almost all of these 14 origin groups are European, we present the majority of results for the 12 European origins together (in Figures 2–4) and the results for the remaining two Asian origins in a separate figure (Figure 5). Of these, only Thailand can be separately identified in our data (owing to population size). The other origin—East Asia— groups several countries: China (including Hong Kong and Taiwan), Korea, Japan, and Singapore.

We define "second generation" women as those born in Sweden to parents who were both born in any of the lower fertility countries studied. We define these women's origin on the basis of their mother's country of birth. We therefore drop all women with one foreign-born and one Swedish-born parent, as well as the small number of adopted women. As a result, our study population includes more than 37,000 female child migrants, 32,000 second-generation women, and more than 1.5 million female ancestral Swedes (see Table A3 in the online appendix for frequencies by origin country). These data enable us to compare female child migrants with second-generation women from the same ancestral origin countries, thereby helping us to investigate the hypotheses of childhood socialization and cultural entrenchment. In addition to comparing across generations, we also disaggregate the analysis by age at arrival in three categories (0–5, 6–12, and 13–17), primarily as a means of investigating adaptation and socialization.

Results

There are many determinants of adult immigrant fertility, including the interrelationship between migration and childbearing, that may lead to selective migration, anticipation, or disruption of behaviors. It is for this reason that we focus mainly on child migrants in this study. Nevertheless, in Figure 1, we compare the completed fertility of child migrants with that of adult immigrants from the same origin. This not only helps to contextualize our study population, but also shows that female child migrants from a given country typically exhibit quite different fertility behavior—in terms of both quantum and tempo—than adult migrants from the same origin.

Given our selection criteria, it is unsurprising that most adult immigrants have levels of completed fertility below the ancestral Swedish average of 2.0 children per woman. The exception is women from the former Yugoslavia, who have an average of 2.2 children. Of our 14 origin groups, those with the lowest levels of completed

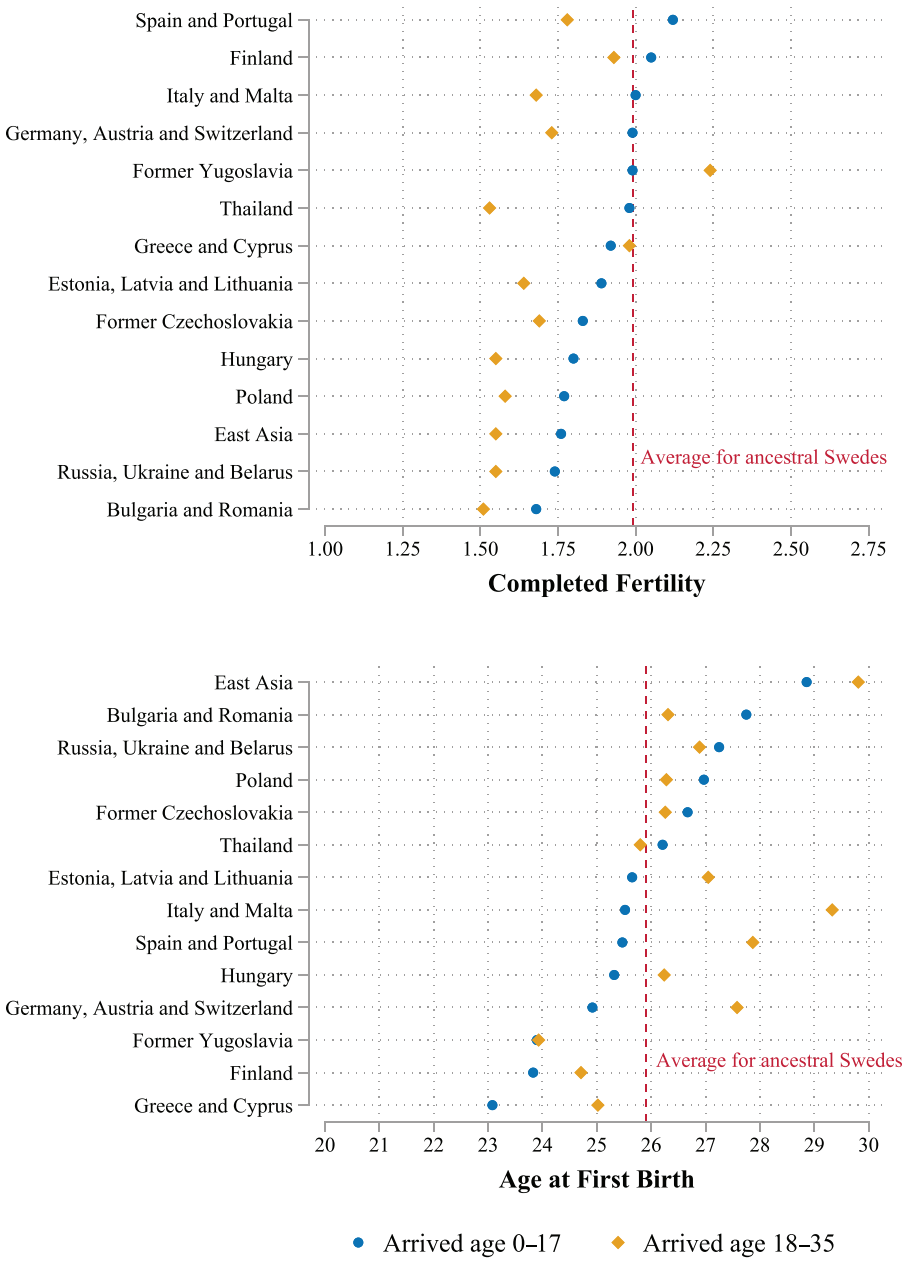

Fig. 1 A comparison of completed fertility and age at first birth for adult immigrants and child immigrants from countries with lower fertility than Sweden. Results are for the completed childbearing and age at first birth in 2017 of women who were born between 1940 and 1976 (i.e., aged 40–76 in 2017) and did not emigrate or die prior to age 40. Each plot is sorted according to the values for child immigrants. As shown by the dashed red lines, completed fertility was 1.99 and age at first birth was 25.9 for equivalent ancestral Swedes (Swedish-born women from the same birth cohort whose parents were both Swedish-born, and who did not emigrate or die before age 40). *Source:* Authors' analysis based on Swedish register data.

fertility for adult immigrants are all in Eastern Europe or East Asia. On average, child migrants tend to have a completed fertility around 0.1 to 0.3 children higher than adult immigrants, again with the exception of the former Yugoslavia, as well as Greece and Cyprus. For child migrants, the range of completed fertility is narrower than for adult immigrants, from 1.7 for those from Russia, Ukraine, and Belarus, and from Bulgaria and Romania, to 2.1 for those from Spain and Portugal.

This *in-between* pattern, where the completed fertility of child migrants is in between that of ancestral Swedes and adult migrants, is indicative of intergenerational adaptation. It is much clearer than the results for age at first birth, where child migrants sometimes have an earlier transition to parenthood than do adult immigrants (for eight of our origin groups), but sometimes the opposite holds true (for at least five other groups). In comparison of adult and child migrants, there are only five groups in which child migrants have an age at first birth that is closer to the average for ancestral Swedes. Many adult immigrants appear to exhibit a later age at first birth than the average of 25.9 for ancestral Swedes, with values ranging from 23.9 for those from the former Yugoslavia, to 29.8 for those from East Asia; for child migrants, the equivalent range is from 23.1 for those from Greece and Cyprus, to 28.9 for those from East Asia.

Although the results for completed fertility seem to support the hypothesis of adaptation, the results for age at first birth are harder to explain. One explanation—at least for some origins—is that the results for adult migrants may also reflect the strong effect of the timing of migration on fertility behaviors. Adult migrants may experience premigration constraints or the impact of anticipation, family formation, and different aspects of selection into migration. Rather than trying to interpret these results in isolation, it is therefore more useful (especially in the context of this study) to separate child migrants by age at arrival and to compare them with the second generation.

Comparing Child Migrants by Age at Arrival and With the Second Generation

Despite what can be said about the average fertility of child migrants from different low-fertility origins, there is considerable variation between origin groups by age at arrival. In general, these differences are much less apparent for completed fertility (Figure 2 for European origins and Figure 5 for Asian origins) than for age at first birth (Figure 3 for European origins and Figure 5 for Asian origins).

In line with the adaptation and childhood socialization hypotheses, age at first birth is frequently closer to that of ancestral Swedes for European child migrants if they arrived at younger ages (Figure 3). This pattern of "differentials" (i.e., differences from ancestral Swedes) is observed for about half of our origin groups, with a particularly strong gradient evident for child migrants from Greece and Cyprus, the former Yugoslavia, and Finland. There are exceptions to this pattern, but they are less common for age at first birth than they are for completed fertility (Figure 2). We can also compare the age at first birth patterns for child migrants arriving at the oldest ages (13–17) with the mean age at first birth in their origin countries (Figure 1). For some origins, like Poland, there is very little difference; however, for others, like Greece and Cyprus, the difference is very large. This provides some potential evidence against

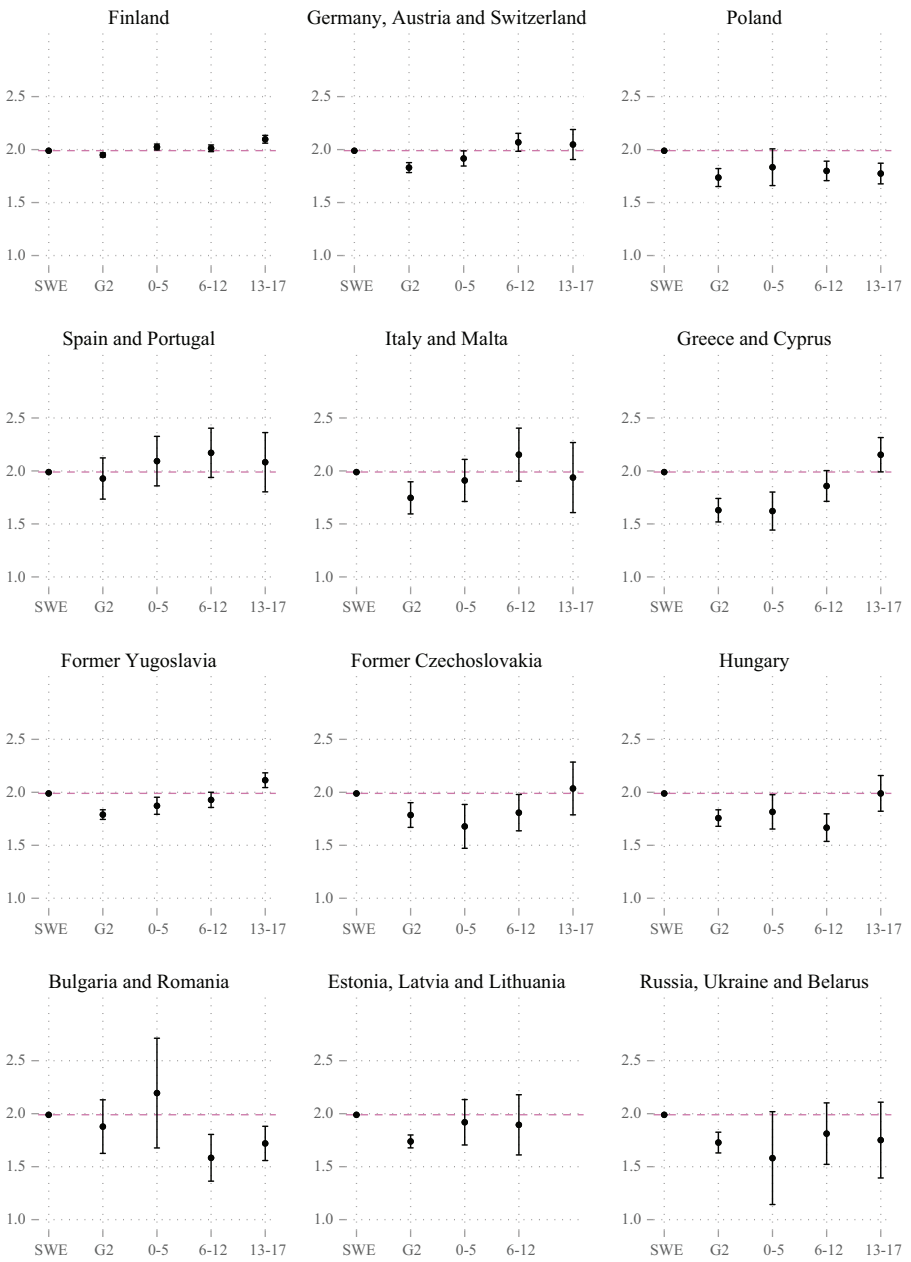

Fig. 2 Completed fertility by immigrant background (second generation or age at arrival for child migrants), relative to ancestral Swedes. Models control for birth cohort. Dashed red lines indicate that completed fertility was 1.99 for equivalent ancestral Swedes. *Source:* Authors' analysis based on Swedish register data.

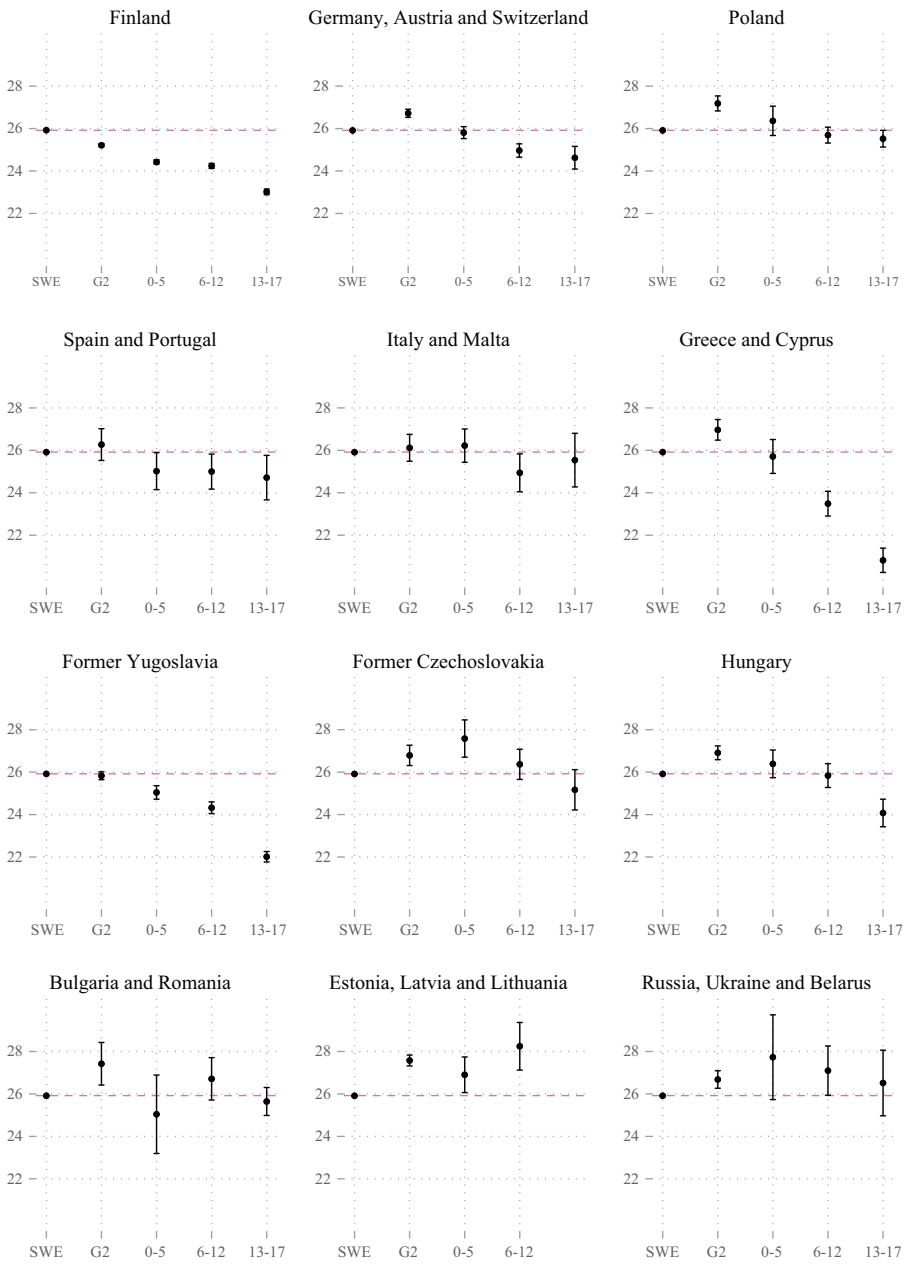

Fig. 3 Age at first birth by immigrant background (second generation or age at arrival for child migrants), relative to ancestral Swedes. Models control for birth cohort. Dashed red lines indicate that age at first birth was 25.9 for equivalent ancestral Swedes. *Source:* Authors' analysis based on Swedish register data.

childhood socialization, or at least that the mean age of first birth in origin countries is not an appropriate measure of the reference for socialization. Indeed, we note that child migrants from Finland who arrived earlier tend to be closer to the average age at first birth in both Sweden and Finland, which may tentatively be viewed as evidence of adaptation with reference to the Swedish average. It is also evidence against socialization with reference to the Finnish background, because socialization usually predicts that the oldest arrivals are closest to the origin country average. For origins like Finland, our tempo results (including Figure 4) suggest an interrelation between migration and (early) childbearing for some groups of child migrants arriving at ages 13–17.

The results for completed fertility are very different than those for age at first birth. Not only is there no clear evidence of an age at arrival gradient for completed fertility, but in some cases, child migrants are more different from ancestral Swedes if they arrived at younger rather than older ages. Even before considering the second generation, it appears that fertility patterns are highly heterogeneous. There is heterogeneity in the evidence for or against adaptation, by the degree of childhood exposure to origin and destination. Moreover, our conclusions about adaptation depend on whether we consider quantum or tempo.

Similar observations can be made with respect to the results for the second generation. For several European origin groups, the second generation shows smaller age at first birth differentials relative to ancestral Swedes than do child migrants (Figure 3). As such, there is some evidence in support of intergenerational adaptation and childhood socialization. However, this is not always the case, and the second generation often exhibits larger differences—in terms of quantum and tempo—than child migrants who arrived at the youngest ages (i.e., 0–5). Examples include women born in Sweden whose mothers were born in Poland or Hungary, who show evidence of a relative postponement of entry into parenthood (Figure 3), which could also explain the relatively low completed fertility for these second-generation groups (Figure 2).

For completed fertility, the second generation is more likely than child migrants to exhibit a negative differential. This is true for at least half of the origin groups studied, and it provides strong evidence against intergenerational adaptation and childhood socialization. If anything, the results for completed fertility for the second generation appear to confirm a predominant pattern of declining completed fertility with increasing exposure to the destination. This can be viewed as evidence in support of cultural entrenchment for many origin groups, which suggests a stronger role of migration background than exposure to the destination—or at least that there are difficulties in obtaining ideal levels of completed fertility for women from many of the origin countries studied.

Hazard Rates by Age

In Figure 4, we supplement our analysis of average age at first birth to examine variations in the risk profile of first births by age. The results provide tentative evidence of a predominant pattern of adaptation, thereby aligning with the results in Figure 3, to which they correspond. That said, the relatively large early age hazard rates for child migrants from Greece and Cyprus, the former Yugoslavia, and Finland who arrived when aged 13–17 indicate a pattern in which migration and teenage family formation coincide.

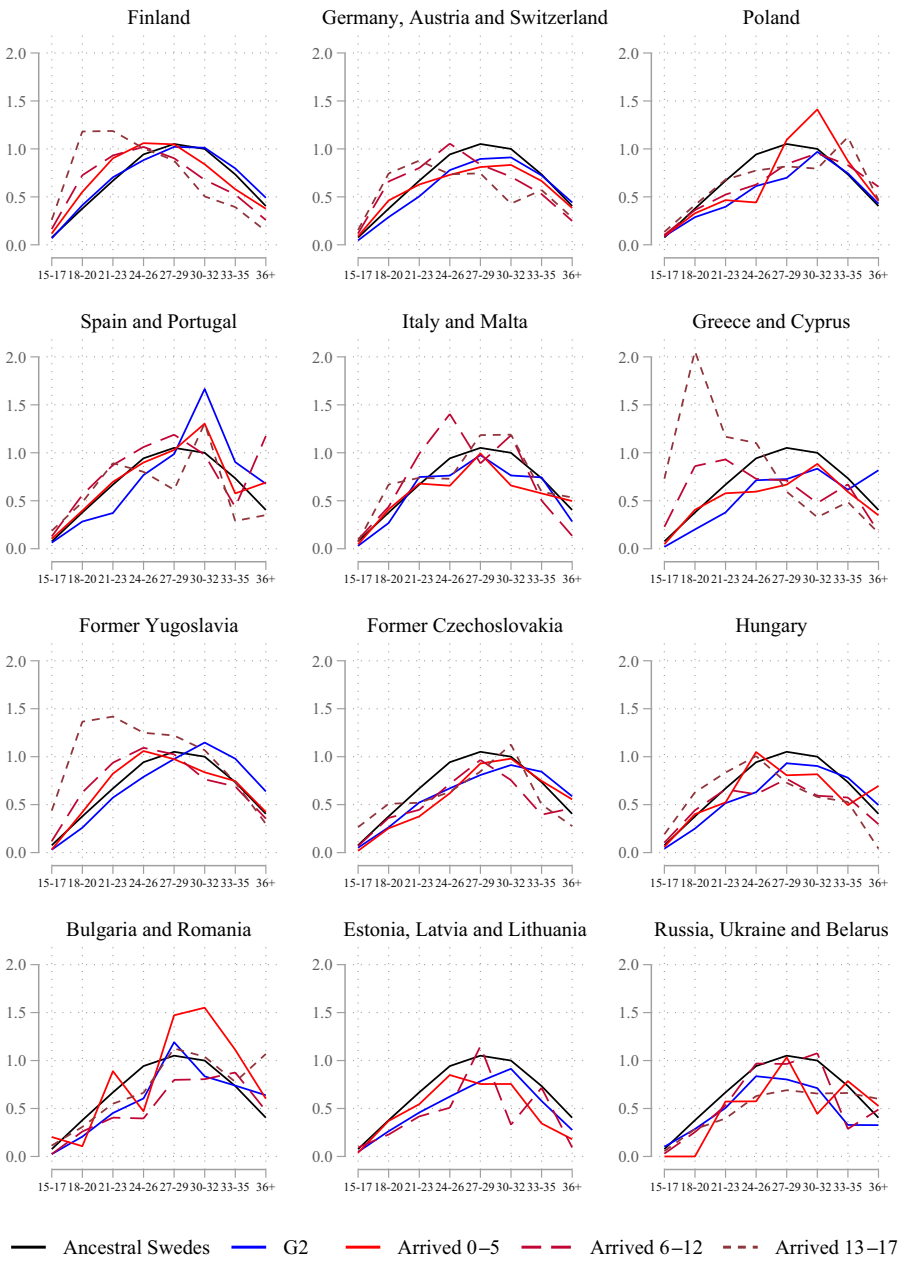

Fig. 4 Variation in hazard rates of first birth by age and immigrant background. Hazard rates are derived from event-history models, where the process time is age, ending at first birth. Cases are censored if no first birth has occurred by age 40. *Source:* Authors' analysis based on Swedish register data.

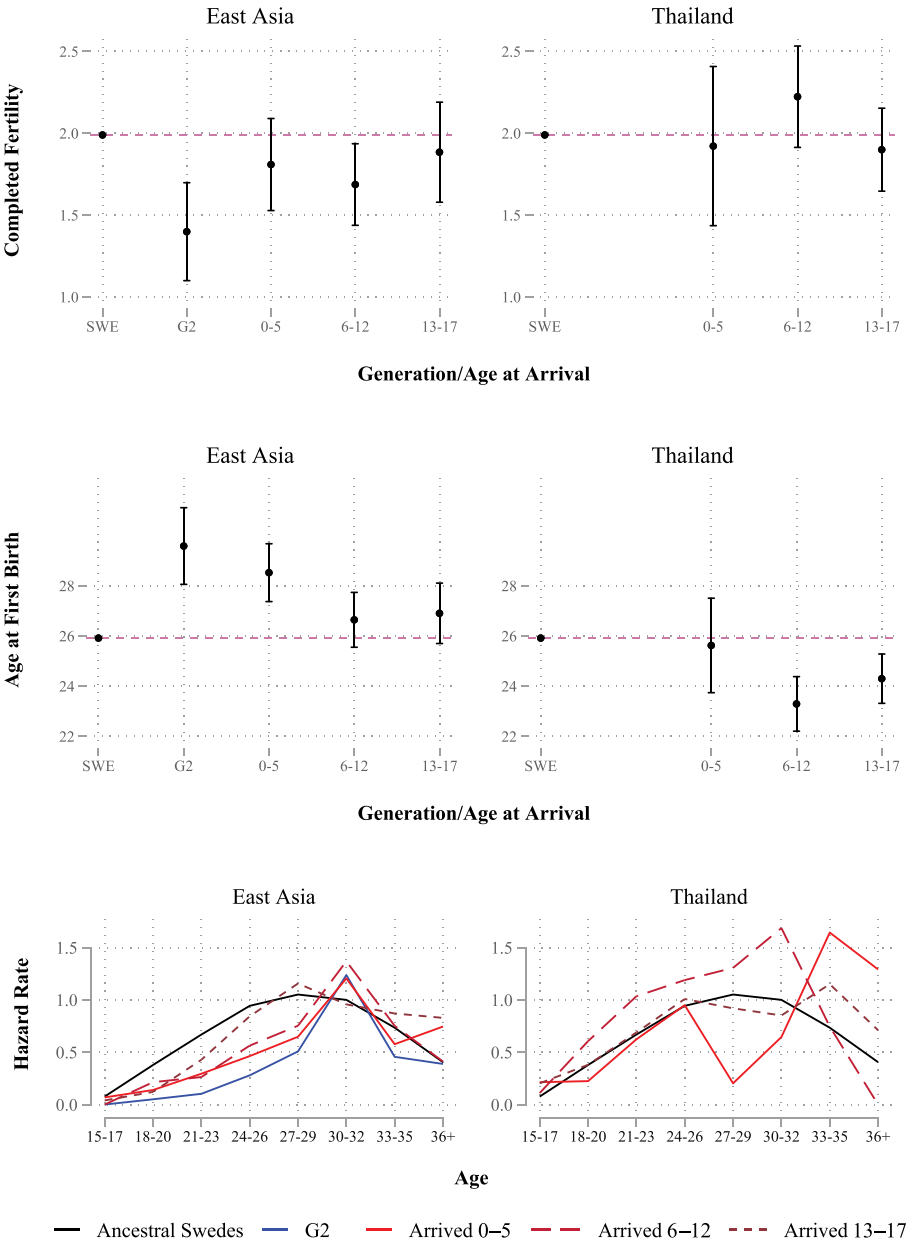

Fig. 5 Completed fertility, age at first birth, and hazard rates for those with an immigrant background from East Asia and Thailand. Models for completed fertility and age at first birth control for birth cohort. *Source:* Authors' analysis based on Swedish register data.

In many cases, the second generation exhibits a largely similar age profile of hazard rates as ancestral Swedes, but there are some noticeable differences. For example, Swedish-born women whose mothers were born in Spain or Portugal appear more likely than ancestral Swedes to postpone their childbearing, with a peak in hazard rates at ages 30–32 rather than 27–29. For the Finnish second generation, the age profile of hazard rates is almost identical to that of ancestral Swedes, suggesting a convergence in the timing and intensity of first birth rates across generations. There appears to be a similar convergence in timing for the second generation whose mothers were born in German-speaking countries (Germany, Austria, and Switzerland). However, as in the other results, we find complex variation and no single common pattern across origin groups. There is some evidence of a lack of convergence toward the pattern of ancestral Swedes, in particular for immigrants and their descendants from ex–Soviet Bloc countries.

Results for Asian Origin Groups

There are not enough Swedish-born women with a mother born in Thailand to analyze this second-generation group, but the results for child migrants appear to align with one of the main findings above—namely, evidence of adaptation for tempo but not for quantum (Figure 5). The results for East Asians are perhaps more notable because they indicate a movement away from the average for ancestral Swedes with increasing exposure to Sweden. The differentials for second-generation East Asians are considerable—with first birth an average of four years later and 0.5 fewer children ever born. This is strong evidence in support of cultural entrenchment and against both intergenerational adaptation and childhood socialization in relation to any national averages.

Discussion

By studying child migrants from low-fertility origins, we show how differential exposure to the Swedish context is related to the quantum and tempo of childbearing. Our focus on women who arrived prior to childbearing age allows us to ignore many potential explanations for the fertility of immigrants—including those related to disruption, anticipation, reverse causality, and selection—and to focus explicitly on the role of childhood socialization in adult childbearing behavior. Our focus on women from low-fertility origins allows us to examine several prominent hypotheses for groups of immigrants and their descendants who have been largely overlooked in prior fertility research.

In general, our results show that age at migration is often an important determinant of the transition to parenthood for child migrants from low-fertility origins. There is considerable evidence of adaptation for age at first birth, our measure of fertility tempo. This is based on the existence of smaller differentials for child migrants who arrived in Sweden at younger ages for more than half of our origin groups. However, we do not find similar evidence of adaptation for completed fertility, our quantum measure. The results for age at first birth and completed fertility do not point in a similar direction, which challenges not only the generalizability of our conclusions, but also the generalizability of conclusions from all prior research on immigrant fertility that does not simultaneously examine the tempo and (completed) quantum of childbearing.

For the second generation, we typically observe depressed completed fertility relative to ancestral Swedes, which is in line with previous studies of Sweden (Andersson et al. 2017; Scott and Stanfors 2010, 2011); however, for the first time, we confirm that this is evident when the focus is children of immigrants from a wide range of low-fertility countries, including compared with child migrants from the same origin. These findings provide evidence against the impact of childhood socialization in relation to national averages and national norms, and rather support the potential role of cultural entrenchment; examples include the results for Poland and Italy, as well as for East Asia. This entrenchment may be determined by a range of different explanations. It may be because of exposure to preferences, values, and norms (relating to childbearing) that are different from those typical in Sweden—for example, via the influence of peers, role models, community environments, parents, and other family members (Abbasi-Shavazi and McDonald 2002; Forste and Tienda 1996). At the same time, it could also be because of factors that are unrelated—or not primarily related—to an individual's cultural background: for example, differential fertility among the second generation may be because of difficulties in balancing a working career and family formation (Andersson et al. 2017; Scott and Stanfors 2011).

In addition, conclusions about the second generation also depend upon whether we look at quantum or tempo. We might expect that depressed completed fertility follows from postponed parenthood (relative to ancestral Swedes), but while there is evidence of this for several groups, such as second-generation women with a Polish background, there is also evidence to the contrary—for example, for those with a Finnish background. In this case, our findings may relate to the contextual similarities between Sweden and Finland, which may make social, cultural, and economic integration easier than for immigrants from other low-fertility origins and their descendants. The postponement of parenthood among some second-generation groups, compared with both ancestral Swedes and child migrants, may relate to delays in partnership formation among the second generation that have been observed in other research on Sweden (Andersson et al. 2015; Wiik and Holland 2018).

Our results underline the importance of studying child migrants, often called the "1.5 generation," as a separate group. Results on the depressed fertility of the second generation compared with child migrants show that these two groups are very different. Similarly, Figure 1 shows that their fertility behavior is different from that of adult migrants. At the same time, our results indicate the difficulties of generalizing about child migrants, who differ not only in their fertility behavior by origin, but also by age at arrival—even for origins that are similar to the destination, such as Finland.

This study contributes to an underexplored aspect of the research on migration, yet some limitations must be taken into consideration when evaluating our results. First, although we compared two different types of fertility measure, it may be that further heterogeneity would be discovered if additional (comparable) measures of childbearing were analyzed; examples might include birth intervals or measures of quantum at other stages in the reproductive life course. A second limitation is that, because we set out to compare age at first birth and completed fertility for similar women, we restricted our study population to those women who could be observed up to age 40 (i.e., older birth cohorts who in most cases arrived in Sweden several decades ago). It is perfectly possible that our results would vary if we were to analyze the childbearing of more recent cohorts, once that becomes possible in the future.

Despite these limitations, our results provide a comparison of low-fertility origins that allows us to answer our research questions and to test the most prominent hypotheses about the fertility of immigrants and their descendants. Our first research question asked how the fertility of child migrants from low-fertility origins compares with the typical pattern of fertility in Sweden. For most low-fertility origin groups, child migrants tend to have an average completed fertility higher than that of adult immigrants, but often considerably lower than the two-child average for ancestral Swedes. Child migrants often have an earlier transition to parenthood than do adult immigrants—possibly because they do not experience any disruption in childbearing owing to migration—but the opposite is true for a number of origin groups.

Our second research question set out to establish whether there was evidence of adaptation—for quantum, tempo, or both—based on degree of childhood exposure to the receiving context. We find evidence of adaptation while analyzing age at first birth by age at arrival, confirming that childhood age at migration matters for fertility tempo—at least for most childhood migrants from low-fertility origins in Sweden. We also find that, for many groups, there are no material differences in age at first birth between the second generation and ancestral Swedes, which is evidence of fertility adaptation across generations. However, similar conclusions cannot be derived from our analysis of completed fertility, which shows very limited evidence of adaptation. Indeed, we find evidence of depressed completed fertility for the second generation relative to ancestral Swedes and heterogeneous patterns by origin and age at arrival. This could be interpreted as evidence against the importance of childhood exposure to destination as an explanation for completed fertility, but more research is needed to explain why there are such weak signs of adaptation for completed fertility—particularly for the second generation.

Our final research question asked whether evidence about adaptation and the fertility of child migrants varies by country of origin. In contrast to most studies of the fertility of immigrants and their descendants, we not only focus on low-fertility origins, but also examine variation across a wide range of origins. Although there appears to be evidence of adaptation in behavior for some groups, there is considerable heterogeneity, which stresses the potential importance of origin variation when testing the childhood socialization hypothesis. For example, our results for child migrants arriving at the oldest ages (13–17) provide some evidence against childhood socialization, or at least demonstrate that the mean age of first birth in origin countries is not an appropriate measure of the reference for socialization.

Our study underlines the advantages of testing adaptation and childhood socialization when looking at immigrants and their descendants who were raised in the destination, since this approach allows us to disentangle fertility from the direct process of migration. Unlike research that focuses primarily on adult migrants, we can dismiss such explanations as disruption, anticipation, and reverse causality from almost all our findings (with the exception of the results for adult migrants in Figure 1). Nevertheless, some of our findings raise questions about the role of adaptation and childhood socialization in fertility behavior. Overall, we find that adaptation and socialization are not ubiquitous, and take different forms when applied to the fertility of immigrants from low-fertility settings. Although there may be some adaptation of fertility tempo, our results for fertility quantum run contrary to our expectation that Sweden provides an ideal environment for women from low-fertility origins to meet their fertility ideals.

By design, our study does not focus on the mechanisms of adaptation. We follow prior research on the fertility of immigrants and their descendants in arguing that, if theories and hypotheses are to be distinguished and better understood, then the first step is to test their falsifiable predictions (Wilson 2019). Nevertheless, we recommend that future research examine the mechanisms that may explain our results, including the contrast between quantum and tempo. Such research will face considerable methodological challenges, but might focus on the role of fertility norms, values, and preferences in explaining different patterns of fertility adaptation—for example, as absorbed through exposure to parents, peers, or residential communities. At the same time, and as part of the challenge, research may also compare these explanations by applying structural explanations, such as social and gender inequalities or barriers to the maintenance of employment and family careers. Given that the Swedish context offers strong support for childbearing and parenthood, we expect that depressed completed fertility may be even more likely in other destinations for second-generation individuals whose parents were born in low-fertility countries. This remains to be examined by future research, and we recommend that such efforts place far greater attention on immigrants and their descendants from low-fertility origins—not least because their fertility adaptation is far from guaranteed. ■

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