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Abstract

This paper examines childbearing among Polish migrant women and their descendants in Sweden. Unlike most studies on migrant fertility, we do not rely solely on a comparison between different migrant generations and the natives in the country of destination. Instead, we also consider the non-migrants in the country of origin. This unconventional country-of-origin and country-of-destination approach is preferable to more carefully examine the relevance of three migrant fertility hypotheses, namely the socialization, the selection and the adaptation hypotheses. Based on a piecewise-exponential model, the transitions to first and second births are analyzed using Swedish register data and the Polish Generations and Gender Survey (GGS). The results show that the Polish stayers and the first-generation Polish immigrants are similar in terms of the timing of births but are more different in terms of quantum. Selection into migration and compositional differences can, to some extent, explain both similarities and differences between the first-generation migrants and the Polish stayers and Swedish natives. For example, when introducing cohort in the second-birth analysis, the socialization hypothesis is confirmed for the younger cohorts. Examining the second-generation in relation to the Swedish natives, we find convergence of fertility behavior across migrant generations both in terms of quantum and timing.

Keywords: Immigrant fertility, adaptation, socialization

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Introduction

The migrant population has grown substantially in many European countries in the last decades (Castles, de Haas and Miller 2014), increasing the importance to gain a better understanding of their fertility behavior. Since most immigrants are in childbearing ages, their contribution to the overall number of births in the destination country is substantial in countries with large immigration (Andersson 2004; Sobotka 2008). In addition, some scholars argue that immigrants' fertility behavior can be considered an indicator of their cultural integration (see Adserá and Ferrer 2015; Coleman 1994; Milewski and Mussino 2018). Previous studies on immigrant fertility have almost exclusively compared migrants with native women in the destination country as pointed out by Lübke (2015), Baykara-Krumme and Milewski (2017), and Impicciatore, Gabrielli and Paterno (2020). Such comparison is vital because it enables examination of the migrants' adaptation process and, to some extent, the effect of compositional differences. However, this unilateral focus is problematic as some of the proposed explanations regarding migrant fertility (socialization and selection into migration) require comparison between migrants and non-migrants (called 'stayers' in this paper) in the origin country. Several scholars (e.g. Glick 2010; Lessard-Phillips et al. 2017; Schoenmaekers, Lodewijckx and Gadeyne 1999) have stressed the need to include the stayers in the analysis, but it has rarely been implemented (as exception see Baykara-Krumme and Milewski 2017; Impicciatore, Gabrielli and Paterno 2020; Lübke 2015). Combining the country-of-origin approach and the country-of-destination approach is essential to deepen our understanding of migrant fertility. To our knowledge, only Impicciatore and colleagues (2020) have implemented this combined approach studying migrants from Morocco, Albania, and Ukraine in Italy. Therefore, this study's first aim is to carry out such an analysis for Sweden.

Despite increasing number of migrants moving from low-fertility countries, such as East-Europeans to other European countries in recent decades (Castles, de Haas and Miller 2014),

only few studies have addressed their fertility behavior (as exceptions see e.g. Hwang & Saenz 1997; Lübke 2015; Nahmias 2004; Tønnessen and Mussino 2019). This is unfortunate as studying immigrants from low fertility origins can greatly enhance the understanding of the mechanisms at stake, both because they might be less likely to have children prior to arrival, and because any fertility adaptation "from below" may make it easier to disentangle the forces of adaptation from the impact of interrelated demographic events on post-migration fertility (cf. Tönnessen and Mussino 2019, Mussino, Wilson and Andersson 2020). Hence, the second aim of this study is to fill this knowledge gap.

More specifically, we examine the fertility behavior of immigrants from Poland, one of the largest groups moving within Europe (Eurostat 2019), settling in Sweden. After Poland entered the European Union in 2004, Sweden has become one of their main destination countries. Therefore, a study on Polish migrants' fertility in Sweden has been proposed (see Lübke 2015), but not carried out, to complement and complete the picture of Polish migrants' fertility behavior. Sweden is a compelling case also because of the availability of high-quality longitudinal data on the demographic careers of the entire population. Furthermore, Poland and Sweden differ to a large extent in terms of institutional setting (e.g. Hobson and Oláh 2006; Matysiak 2009; Oláh and Bernhardt 2008). This is important with respect to the argument suggesting that policies facilitating the combination of family life and labor market participation for women result in higher fertility rates (Kreyenfeld 2004; McDonald 2013). Examining how women with Polish background behave in different institutional settings may thus provide deeper insights on how policy influences fertility. Our third aim is then to compare the Polish migrants with the Swedish natives (Swedish-born children of Swedish-born parents), the second-generation (Swedish-born children with at least one Polish born parent) and the Polish stayers to reveal the medium/longer term effects of migration on fertility. This will also provide

us with a better understanding on how social policies and socialization in tandem influence immigrants' fertility behavior.

The novelty of this study is thus to combine a country-of-origin approach and a country-of-destination approach and to examine migrants moving from a country with lower fertility to a country with (relatively) higher fertility. Our article proceeds as follows. First, we present a short overview on Polish migration history in Sweden, the two countries' fertility development and their institutional contexts. Second, we introduce previous literature on immigrant fertility with our subsequent operative hypotheses. Third, we discuss the data and methods used. Fourth, we present our results, both descriptive ones and regression analyses. Fifth, we discuss our findings in relation to previous research as well as the limitations, and highlight our contribution to the field of migrant fertility.

Background

The number of Poles moving to Sweden has varied over the years, from about 1000-2000 annually between 1968 and 2004 (Klinthäll 2007; OECD 2020), to above 4000 per year after Poland entered the EU. By 2018, Poles have become the fourth biggest immigrant group in Sweden with 91,180 individuals (Eurostat 2020). Their reasons of migration have varied as well, from coming as political refugees in the 1980s (Andersson and Scott 2005; Klinthäll 2007), to family reasons in the beginning of the 2000s and working reasons after 2004 (Bengtsson 2008), the latter also explaining the increasing share of men (47 % by 2018) in this migrant group (Eurostat 2020). Previous low return rates notwithstanding (Klinthäll 2006), a more recent economic growth in Poland has led to increasing return migration and decreasing emigration (Castles, de Haas and Miller 2014).

When it comes to fertility regimes, there are substantial differences between Sweden and Poland. Sweden is characterized by relatively high and stable cohort fertility (around two

children per woman on average), despite strongly fluctuating period fertility rates related to changes in the business cycle, the labor market as well as family policy measures (Oláh and Bernhardt 2008). Except for the mid-/late 1990s, period fertility rates have in any case remained reasonably close to the replacement level (Statistics Sweden 2018). Poland in contrast has exhibited dramatic shifts in both period and cohort fertility rates, especially from the early 1990s onwards. From a TFR of 2.09 then, to 1.22 in the early 2000s, and also cohort fertility declining from about 2.0 to 1.6, the new demographic regime has been closely linked to declining progression of first and second births in addition to earlier reductions in higher-order births (Kotowska et al. 2008).

The institutional context and family policies have been suggested to have played an important role in both countries' fertility developments (Billingsley and Matysiak 2018; Hobson and Oláh 2006). Guided by the principle of gender equality, Sweden has consequently facilitated the combination of paid work and family responsibilities for both women and men from the late 1960s-early 1970s onwards. Female employment rates rank among the highest in OECD given extensive opportunities to work part-time, a generous and highly flexible parental leave program, and subsidized, high-quality public childcare, which also facilitate parents' active engagement with their children, independently of gender, from early ages (Neyer 2013). In Sweden services are prioritized with respect to public spending on families promoting the dual earner-dual carer model. In Poland in contrast, there is less emphasis on the combination of employment and family responsibilities. The latter is seen in rigid labor market structures with nearly exclusively full-time job opportunities, a balance between cash benefits and services in the relatively low public spending on families and limited access to inexpensive quality childcare (OECD 2019). Also, traditional norms prevail in Poland, with emphasis on marriage as the proper context for childbearing and low social acceptance of mothers working if they have young children (Matysiak and Vignoli 2013; Szelewa 2017). The level of non-marital

cohabitation has remained low in Poland with about 25 % of children born out of wedlock in recent years, while in Sweden 55 % of births occur outside marriage, mostly in cohabiting relationships (OECD 2018), and societal norms as well as gender role attitudes are highly liberal (Kaufman, Bernhardt and Goldscheider 2017; Lesthaeghe 2011).

Previous research on immigrant fertility

The literature on immigrant fertility behavior offers various theoretical explanations (see Milewski 2010b; Kulu and González-Ferrer 2014; Wilson 2013). Here we focus on three competing but not mutually exclusive explanations which are of interest with respect to medium and long-term effects migration has on fertility. By medium and long-term effects we simply mean that the focus is not on the timing of childbearing around the time of migration.

For the first, the fertility behavior, norms, values and aspirations individuals experience during childhood influence their fertility behavior and preferences, which remain constant over the life-course. This is the *socialization hypothesis* according to which a move to another country will not affect people's preferences. They will thus have similar fertility behavior as their peers in the country of origin. The socialization hypothesis has been supported both for migrants from high-fertility contexts (see e.g. Turks in West Germany, Milewski 2010a; Moroccans and Albanians in Italy, Mussino and Strozza 2012), and migrants moving from low-fertility countries (see e.g. Romanians in Italy, Mussino and Strozza 2012). Without including the stayers in the analyses, it can be however questioned whether it is possible to assess the socialization effect. Unlike the studies mentioned above, Baykara-Krumme and Milewski (2017) and Impicciatore, Gabrielli and Paterno (2020) test the socialization hypothesis by comparing the migrants with the stayers, but their results are inconsistent. In the former study, the authors find no support for the socialization hypothesis among Turkish migrants in Europe.

In the latter study, it is supported for Moroccan migrants in Italy but not for Albanian and Ukrainian migrants.

Second, people moving from one country to another have certain characteristics that distinguish them from both the population of origin and the population of destination. This is the *selection hypothesis*, suggesting that migrants' fertility behavior will be different compared to the natives in the country of destination and the non-migrants in the country of origin (Milewski 2010b). The selection can reflect both observed and unobserved characteristics (Milewski 2007) that may differ within an immigrant group over time (Frank and Heuveline 2005; Kahn 1988). Observed characteristics are, for instance, education, marital status and occupation (Bagavos, Tsimbos and Verropoulou 2008; Kulu and González-Ferrer 2014; Macisco, Bouvier and Renzi 1969). Ability, aspiration and open-mindedness are examples of unobserved characteristics (Blau, 1992; Goldstein and Goldstein 1983; Kahn, 1988). In Baykara-Krumme & Milewski's study (2017), the selection hypothesis is supported in terms of the transition to first birth since marital status can explain the difference between the first-generation Turkish immigrants and the Turkish stayers. In contrast, it is rejected in the transitions to second and third births since the groups do not become more similar when controlling for education, marriage type and family characteristics.

Third, the *adaptation hypothesis* suggests that the fertility patterns of immigrants resemble that of women in the destination country as the current social context influences the fertility behavior over time (Kulu and González-Ferrer 2014). Adapting to the social setting of destination with its specific social policies and labor market regulations will lead to fertility behavior which is similar to that of the natives, although cultural factors may also be important for the adaptation process (Kulu and González-Ferrer 2014; Milewski 2007). In Sweden, first-birth rates tend to converge between natives and of most immigrant groups five years after migration. Though, how long it takes to adapt varies depending on, for instance, the country of

origin (see e.g. longer adaptation process for immigrants from Muslim countries, Andersson 2004). The adaptation process has been tested both across migrant generations and by duration of stay. It has received much support in research in migrants moving from high-fertility countries to low-fertility countries (see e.g. Dubuc 2012 on Bangladeshi and Pakistani migrants in the UK; and Milewski 2007 on Turkish migrants in West Germany). There is also evidence of adaptation from below (see Nahmias 2004, on Former-Soviet Union migrants in Israel; and Tønnessen and Mussino 2019, on non-family migrants from Germany, Lithuania and Poland in Norway). The adaptation hypothesis has some shortcomings, as for example it is impossible to adapt to (below) replacement fertility levels in the host country for migrants who have more than two children prior to migration. In addition, women migrating in late childbearing ages would also have difficulties adapting to fertility patterns in the host country given few reproductive years left. These issues can be dealt with however, by testing the hypothesis across several migrant generations.

A growing body of research indeed addresses second-generation immigrants (Kulu et al. 2019). Previous research on their fertility and other demographic behavior has been conducted in countries with a long history of immigration, such as the U.S, Canada and Australia, whereas this is a relatively new topic in Europe where the number of second-generation migrant women in childbearing ages have been limited until quite recently (Andersson, Persson and Obućina 2017). As the second-generation is considered to be exposed to preferences and values held by their parents or influenced by a minority subculture, the socialization hypothesis may be relevant regarding their fertility behavior (Kulu and González-Ferrer 2014; Milewski 2011). In addition, since the members of the second-generation are exposed to the same values, norms and social policies as the natives, the adaptation hypothesis may also apply to them. The results from previous research on the second-generation immigrants supports both the socialization hypothesis and the adaptation hypothesis. For example, the former is supported among second-

generation Greeks and Italians in Australia, while the latter is supported among Lebanese descendants (Abbasi-Shavazi and McDonald 2000). Furthermore, compared to Swedish natives, individuals with Middle East descent have higher propensity of entering parenthood (Scott & Stanfors 2011), while second-generation immigrants with Nordic-born parents display similar propensity (Scott & Stanfors 2011; Statistics Sweden 2010). In addition, there is very little difference between the latter group and the Swedish natives in terms of the risk of having a second and third child. Descendants to migrants from non-Nordic EU-countries and countries outside Europe with a medium score on the Human development Index (HDI) have lower risk of having a first child than native Swedes (Statistics Sweden 2010). In addition, Milewski (2011) shows that there are differences in fertility behavior among second-generation Turkish migrants living in different countries, suggesting adaptation to the destination countries' fertility behavior.

Finally, we extend the existing literature on childbearing patterns of Polish migrants and their descendants, summarized here. In a case study of Polish migrants in the UK, Lübke (2015) finds elevated fertility right after migration. Similarly, Tønnessen and Mussino (2019) show that Polish migrants in Norway have high fertility immediately after migration. Non-family Polish migrants seem to adapt from below to Norwegian fertility levels (ibid.). Compared to Swedish natives, the share of women not proceeding having a second (and a third) child is higher among Polish migrants (Andersson 2004; Andersson & Scott 2007). Scott & Stanfors (2011) show that the impact of education on becoming a parent is more pronounced among second-generation Polish migrants than women of Swedish origin. More specifically, Polish descendant women with low education have substantially higher propensity of entering parenthood, while the highly educated have lower propensity than their Swedish counterparts. However, none of these studies include both the Polish stayers and the Swedish natives in the analysis.

Operative hypotheses

Inspired by the theoretical approaches and previous research presented above, three hypotheses will be tested in this study. The first hypothesis relates to the socialization hypothesis:

Hypothesis 1 (H1): Despite migration experience, first-generation Polish women in Sweden exhibit similar fertility behavior (with respect to both timing and quantum) as the stayers in Poland.

The second hypothesis has been informed by the selection hypothesis:

Hypothesis 2 (H2): The fertility behavior of first-generation Polish immigrants is different compared to both Polish stayers (*H2a*) and Swedish natives (*H2b*), with some differences linked to migrant women being distinct with respect to marital status, cohort and education.

Such information has been shown to be important for fertility behavior in general and for migrants in particular (e.g. Baykara-Krumme and Milewski 2017; Milewski 2007; Milewski 2010a). We focus on marital status also as an indicator of unobserved liberal value orientation of migrant women prompting them to have children out of wedlock.

The third, and last, hypothesis is derived from the adaptation hypothesis and tested across migrant generations:

Hypothesis 3 (H3): The fertility behavior of Polish immigrant women and the fertility behavior of Swedish natives converge across migrant generations. The second-generation, exposed to the mainstream norms and social policies during their childhood and reproductive years, have similar fertility behavior as the natives, and more so than the first-generation.

Data and methods

Data

We use Swedish register data and the first wave of the Polish Generations and Gender Survey (GGS)[1] and focus on women born in Poland and Sweden between 1950 and 1992. The Swedish register data is acquired from the "Migrant Trajectories: Geographical Mobility, Family Careers, Employment, Education, and Social Insurance in Sweden" project. The population is based on the Historical Population Registers ("Historiska befolkingsregistret") which is a longitudinal database covering all people who have ever been registered in Sweden. In this study, we focus specifically on women registered in Sweden in 2010. The GGS data was collected in Poland in late 2010 - early 2011. The individuals had to be Polish speaking, aged 18-79 and living in a private household to be included in the sample selection. 19,987 individuals participated in the survey, of which 11,578 were women (Kotowska et al. 2019).

In addition to exclusion criteria based on sex, year of birth, and country of birth, some women in the Swedish registers have puzzling marriage histories (for exclusion table see Table A1 in Supplemental appendix), for instance, marrying twice in a row without divorcing in between them or marrying and divorcing the same day. Such individuals are excluded from the analysis. As the marital status information is available from January 1, 1968 in the registers, divorce or widowhood is the first registered marital event for some women, while there is no information about when they got married. Some of them are Polish immigrants who married before moving to Sweden, and are therefore kept in the analysis. Swedish-born women with divorce or widowhood as their first marital event are dropped.

In the registers, there is no information about children who have never been registered in Sweden. More specifically, if a Polish immigrant woman moves to Sweden and leaves her

[1] (DOIs: 10.17026/dans-z5z-xn8g, 10.17026/dans-xm6-a262), see Gauthier et al. (2018) or visit the GGP website (https://www.ggp-i.org/) for methodological details.

children in Poland for good, those children will not be registered in Sweden. However, only about 2 % of the women migrating before the age of 40 do not bring their children to the new country (see Mussino, Miranda and Ma 2017). Hence, to minimize the problem with unregistered children living in their country of origin, women migrating after the age of 40 are excluded from the analyses. Women who already had a child at migration or gave birth the same month as immigrating are excluded from the first-birth analysis but are included in the analysis on second-birth. To ensure that this drop did not cause selection problems in the analysis on the first child, these women are included in the descriptive analysis (see Table 1).

Altogether, the study population of interest consists of 1,797,053 women. Most of them (1,757,036) were born in Sweden with two Swedish-born parents (Swedish natives). 22,496 individuals were Polish immigrants who migrated between the ages of 15[2] and 39 (first-generation). 9,562 individuals were born in Sweden with at least one parent born in Poland (second-generation). Finally, 7,959[3] individuals represent the Polish stayers (i.e. born and lived in Poland in the late 2010 - early 2011).

Method

We apply event-history techniques to analyze the transitions to first and second births. These methods are favorable as they provide information about whether an event takes place and also on its timing (Mills 2011). In addition, completed fertility biographies are not required (Blossfeld, Golsch and Rohwer 2007). Since the piecewise-exponential model allows the baseline to vary by time, it will be our tool of analysis. Control variables are included stepwise to monitor their influence on the baseline and the other covariates. Separate models are presented for the four groups (Swedish natives, first-generation, second-generation and Polish stayers), and their baseline hazards are compared. In addition, Kaplan-Meier survival analysis

[2] We do not consider migrants moving between ages 0-15, see supplemental appendix for further discussion.
[3] The lower number of respondents, compared to the initial number (11,578), is because we only consider women born between 1950-1992.

is performed, which, in the first-birth analysis, estimates the proportion of women who remain childless at different ages. In the second-birth analysis it estimates the proportion of women who remain one-child mothers.

For the first-birth analysis, the process time starts at age 15, following the conventional demographic approach on reproductive ages (Coale and Trussell 1974). Thus, we left censor all women giving birth before age 15. Since the registers only contain information about marriages entered in 1968 or thereafter, January 1968 is used as entry for women in the registers whose process starts before 1968 (this does not apply to the Polish stayers, who always enter observation at age 15). First births prior to 1968 in Sweden are therefore left censored even if the mother is older than 15. As the oldest in this study is born in 1950, these cases are not many. The first-generation enters observation at arrival to Sweden. Consequently, the time at risk prior to migration is not considered. Regardless which of the four groups a person belongs to, all women in the analysis are right censored at first birth, at age 45, December 31, 2010 (at the time of the interview for the Polish stayers, i.e. in late 2010 – early 2011) or at emigration, whichever comes first. As for individuals registered in Sweden 2010, some have emigrated first and then immigrated. Such individuals are right censored at emigration and are not considered at risk again when they move back (in line with Andersson 2004). For the Polish GGS, no one was censored for emigration given lack of information on that. There is no need to right censor for death since the data only contains individuals who lived in Sweden on December 31, 2010 and were thus registered, or participated in the Polish GGS.

For the transition to second birth, the process time starts seven months after the first child is born. First-generation women with one child at migration enter observation at migration unless they had their first child less than seven months prior to migration. Women having their first child at least seven months before age 15 enter the second-birth analysis at age 15. Women having twins (or other multiple births) at first birth are not included in the second-birth analysis

(19,459 individuals). Women are right censored when they experience the event, at age 45, December 31, 2010 (the time of the interview for the Polish stayers), or at emigration, whichever comes first.

Variables

Only biological children are taken into consideration in this paper. Women with no biological children are considered childless even if they have adopted children, foster children and/or stepchildren.

In the first-birth analysis, the *woman's age* is the process time, specified as a time varying variable. It is split in three-year intervals, starting at age 15. In the second-birth analysis *time since first birth* is the process time. Two-year intervals are specified, starting seven months after first birth. To ensure that possible fertility differences between the groups are not caused by variation in the *cohort* distribution, a cohort variable categorized into four groups, 1950-1959, 1960-1969, 1970-1979 and 1980-1992, is included as control variable. *Marital statu*s is an important factor for childbearing (see e.g. Milewski 2007), included in the analysis as a time-varying covariate categorized into: never married, married and widowed/divorced. Non-marital cohabitation is not considered as cohabiting couples cannot be identified in the registers up until 2012. In the second-birth analysis, *age at first birth* is considered and grouped into five age-groups, 15-19, 20-24, 25-29, 30-35 and 36+. Since the *education* information is somewhat problematic for newly arrived migrants in the Swedish registers, seen in high prevalence of missing values and incorrect education levels (see Saarela and Weber 2017), it is not included in the event-history models. However, the variable is included in the descriptive analysis and categorized into: low education, medium education and high education in accordance with Eurostat (2018), and we add the category "in education". In the GGS, the latter information is extracted from a question about the respondent's current activity. In the registers, individuals with study grants and loans as primary source of unearned income during the year and a

maximum earning of two times 'basbeloppet', which corresponds to 84 800 SEK[4], from work, were categorized as being in education. However, women who earned more than 84 800 SEK from work were also considered students if the study grant and loan also exceeded 84 800 SEK (see Andersson and Scott 2005; Andersson and Scott 2007).

Results

Descriptive overview

Table 1 provides a descriptive overview of the population of interest (for distribution of time at risk, see Table A2 in Supplemental appendix). As the Polish GGS sample is not completely representative for the population (see Fokkema et al. 2016), weights are used in the descriptive analysis for the Polish stayers. We specify two groups of first-generation immigrants in order to see if the distribution of characteristics changes when excluding women who have at least one child at immigration or give birth in the month of arrival to Sweden. The exclusion slightly increases the shares of women in the youngest cohort, the highly educated, and the single women. The share of women migrating at older ages decreases.

When comparing all five groups we notice cohort differences. Most notably, the second-generation exhibits a much higher share of individuals in the younger cohorts. This explains also why the proportion of individuals in education is substantially higher in this group. In terms of educational attainment, the first-generation immigrants are the most highly educated group, while the Polish stayers are the least highly educated group. Moreover, the marital status distribution also varies greatly between the groups. Similarly to the education distribution this is partly related to age differences, particularly for the second-generation. The Polish stayers have the highest share of married women, 61 %, whereas the share of widowed/divorced is

[4] Basbeloppet (base amount) is an administrative measure which most of the public transfers in Sweden are related to (Andersson & Scott 2005). It changes every year, which means that the amount of 84 800 SEK only applies to 2010. In the selection into migration analysis, we have calculated 'basbeloppet' times two for all years.

highest among the first-generation. Regarding age at migration, most of the first-generation migrants moved to Sweden between age 20 and 30.

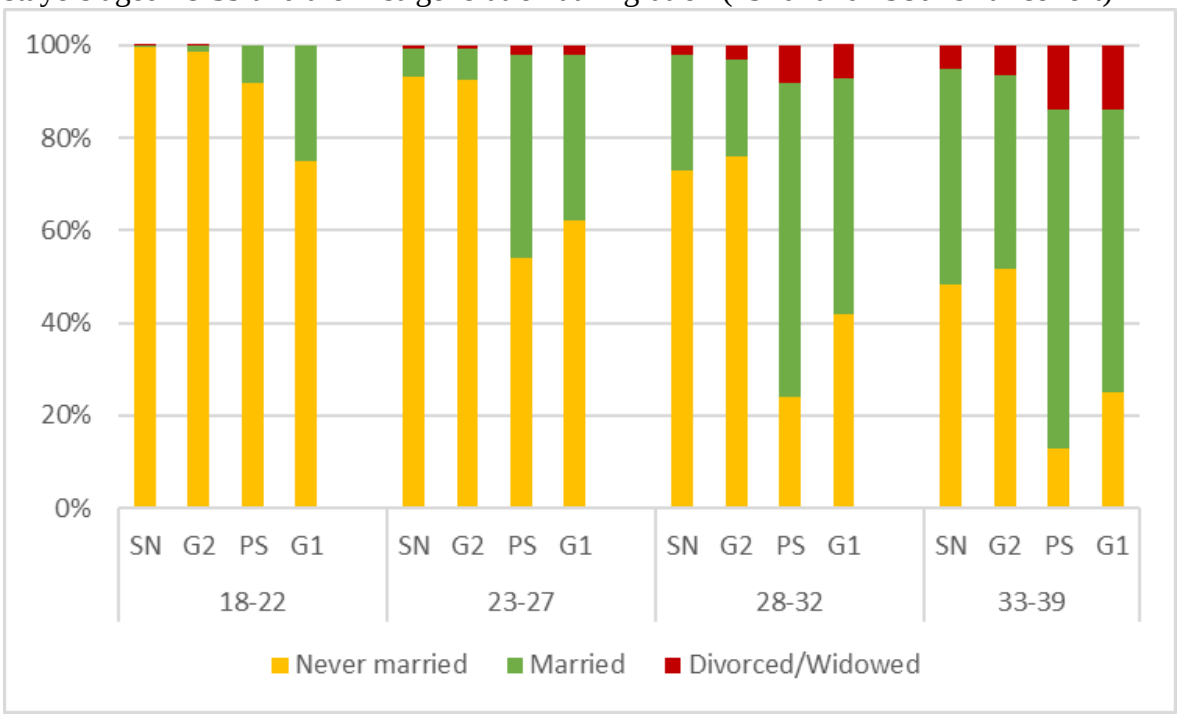
Table 1: Descriptive overview of the sample for the first birth transition, % by migrant type

	Swedish natives	**G1***	**G1**	**G2**	**Polish stayers**
Cohort					
1950-1959	23	30	29	13	19
1960-1969	24	18	17	7	22
1970-1979	22	27	23	21	28
1980-1992	30	25	30	58	30
Education in 2010					
Low	12	13	11	11	8
Medium	44	35	34	35	57
High	33	36	40	28	25
In education	11	5	5	25	8
missing	0	10	10	1	0
Marital status in 2010					
Single	52	24	32	70	26
Married	38	51	46	23	61
Divorced/widowed	10	26	23	6	13
Age at migration					
15-19		8	12		
20-24		29	38		
25-29		33	34		
30-35		19	12		
35-40		11	5		
N	1757036	22496	14525	9562	7959

Notes: G1*= first-generation Polish immigrants including women already having children at migration, G1= first-generation and G2= second-generation.

In order to examine the selection into migration and compositional differences further, the marital status distribution for the Polish stayers aged 18-39 and the two youngest cohorts (1970-1979 and 1980-1992 birth cohorts) of the first-generation immigrants are compared in Fig. 1. In addition, the Swedish natives and the second-generation are compared in a similar manner. We see that immigrants moving between ages 18 and 22 are married to a larger extent than their peers staying in Poland, but the proportion of married people is higher, in the older ages, among the stayers compared to the first-generation. Hence, Polish first-generation immigrant women seem to be a selected group in terms of marital status. The Swedish natives and the second-generation display very small differences in terms of the marital status distribution for women aged 18-39.

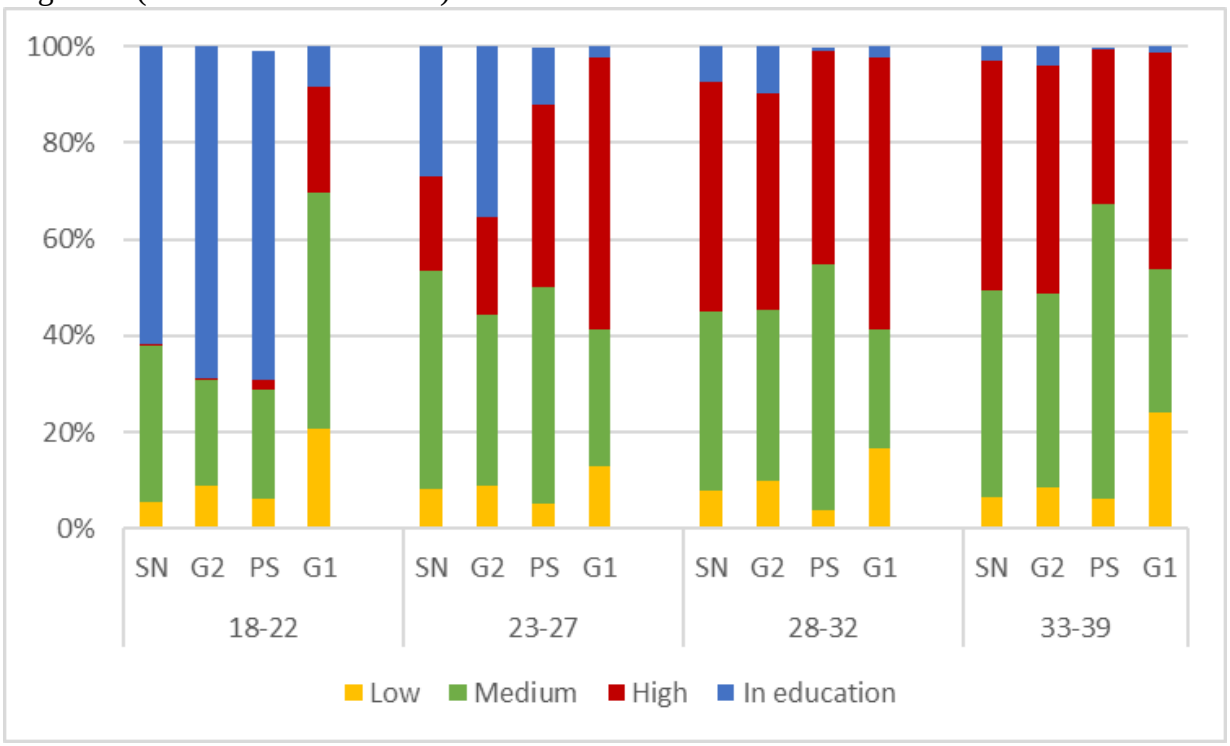
F**ig. 1**: Marital status distribution for the Swedish natives, the second-generation and the Polish stayers aged 18-39 and the first-generation at migration (1970- and 1980- birth cohort)



Notes: SN= Swedish natives (760,471), G2= second-generation Polish immigrants (6,345), PS= Polish stayers (3,914) and G1=first-generation Polish immigrants (11,062).

A similar analysis is carried out with respect to educational attainment (see Fig. 2). As already mentioned, the education information for newly arrived migrants is somewhat problematic, and therefore the comparison between the Polish stayers and the first-generation should be interpreted with caution. The figure indicates that the proportions of women with low and with high educations are larger among the first-generation (at migration) compared to the stayers in the same age-groups. This suggests that there is also a selection into migration based on education. Similarly to the marital status distribution, the Swedish natives and the second-generation are almost identical in terms of educational attainment, especially in the older age-groups.

Fig. 2: Education distribution for the Swedish natives, the second-generation Polish immigrants and Polish stayers aged 18-39 and the first-generation Polish immigrants at migration (1970- and 1980-cohort)

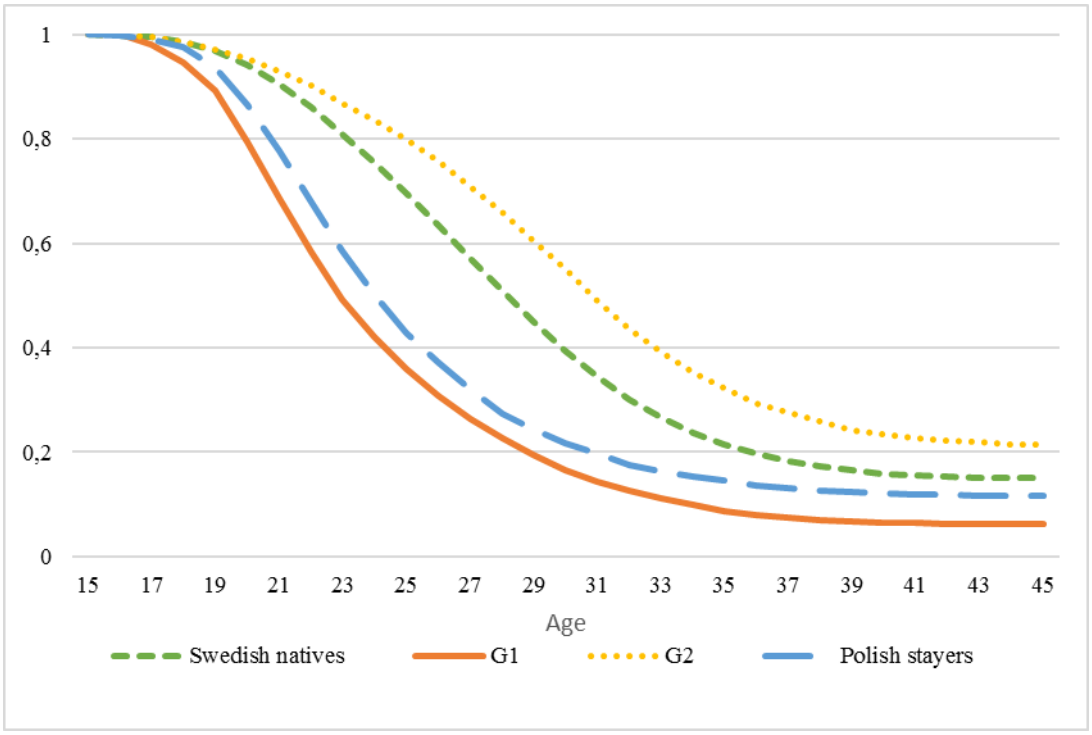


Notes: SN= Swedish natives (755,255), G2= second-generation Polish immigrants (6,254), PS= Polish stayers (3,914) and G1=first-generation Polish immigrants (7,849).

Transition to first birth

Figure 3 shows the Kaplan-Meier survival curves for the transition to first birth, indicating differences between the groups. Polish stayers and the first-generation immigrants have their first child earlier than the other groups. Swedish natives have their first child later than these two groups, but earlier than the second-generation. The share of women estimated to remain childless also varies, more specifically, it is lowest among the first-generation immigrants, only 6 %, followed by the Polish stayers (12 %) and the Swedish natives (15 %). The second-generation immigrants have the highest share estimated to remain childless, 22 %.

Fig. 3: First birth Kaplan-Meier survival curves, by age of woman



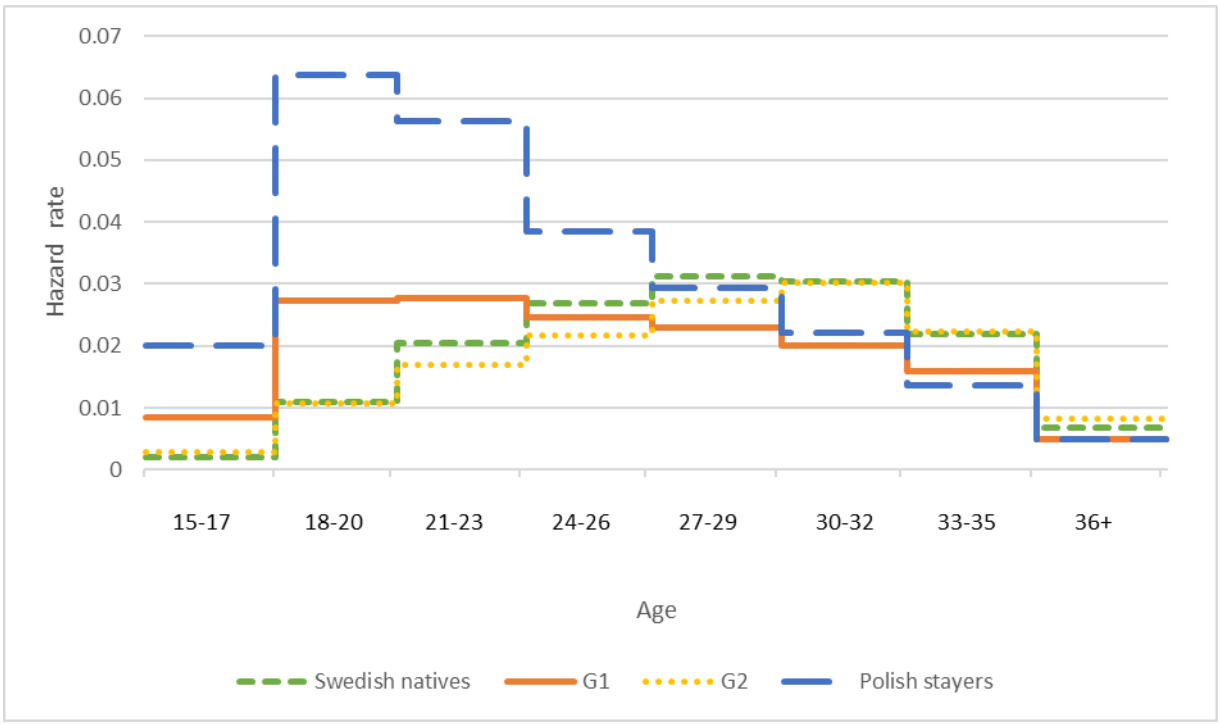
Notes: G1= first-generation Polish immigrants and G2= second-generation Polish immigrants

To analyze the transition to first birth more thoroughly, baseline hazards are compared (see Table 2). Control variables are included stepwise to see if they improve the model and influence other variables. In Model 1, only the baseline is included, which means that the hazard basically corresponds to the Kaplan-Meier distribution. We find a higher hazard rate for the first-generation and the stayers in the younger ages compared to the Swedish natives and the second-generation, while the two latter groups peak at older ages. Adding cohort in Model 2 has only modest effects except for the second-generation. For example, the relative risk of having a first child decreases for ages 36 + when cohort is included, as the share of individuals who have their first child later than the older cohorts is higher in the second-generation. When also marital status is included in the model (Model 3), the effect is substantially larger. We see significant differences for all age-groups compared to the reference category (age-group 21-23) in all groups except the first-generation immigrants aged 18-20. The inclusion of marital status

increases the intercept in all groups, most apparently among the Polish stayers. This suggests that marriage is important for the transition to motherhood in Poland.

To facilitate the interpretation of group differences, the baseline hazards are visualized in Fig. 4. These are calculated from Model 3 and represent women in the 1970-1979 cohort who are married. As illustrated the Polish stayers differ from the other groups with a considerably higher baseline among the younger age-groups. They peak the earliest, between age 18 and 20 and thereafter, their hazard rate gradually decreases. The first-generation peaks at age 21-23, thus somewhat later than the Polish stayers, but earlier than the other two groups. The Swedish natives peak at age 27-29, and the second-generation at age 30-32, with little differences in their baseline.

Fig. 4: Transition to first birth. Baseline hazards relative to age-groups for married women in the 1970-1979 cohort



Notes: Authors' own calculations. G1= first-generation and G2= second-generation

Table 2 Transition to first birth (relative risks)

	Model 1				Model 2				Model 3			
	SN	**G1**	**G2**	**PS**	**SN**	**G1**	**G2**	**PS**	**SN**	**G1**	**G2**	**PS**
Age (ref=21–23)												
15–17	0.082*	0.151*	0.138*	0.057*	0.085*	0.158*	0.148*	0,058*	0.098*	0.306*	0.175*	0.357*
18–20	0.473*	0.723*	0.547*	0.505*	0.483*	0.732*	0.565*	0,506*	0.539*	0.987	0.642*	1.130*
24–26	1.536*	0.971	1.532*	1.045	1.506*	0.966	1.470*	1,036	1.323*	0.886*	1.284*	0.684*
27–29	2.051*	0.958	2.369*	0.903*	1.951*	0.906*	2.115*	0,866*	1.534*	0.832*	1.617*	0.521*
30–32	2.225*	0.849*	3.265*	0.676*	2.021*	0.758*	2.596*	0,621*	1.494*	0.725*	1.788*	0.394*
33–35	1.688*	0.671*	2.754*	0.391*	1.482*	0.586*	2.008*	0,352*	1.073*	0.572*	1.320*	0.240*
36+	0.600*	0.211*	1.138	0.139*	0.496*	0.177*	0.722*	0,123*	0.337*	0.178*	0.492*	0.088*
Cohort (ref=1970–1979)												
1950–1959					1.456*	1.174*	1.757*	1,156*	1.169*	0.791*	1.311*	0.928*
1960–1969					1.241*	1.280*	1.417*	1,162*	1.161*	0,958	1.330*	0.982
1980–1992					0.652*	0.714*	0.677*	0,698*	0.654*	0.883*	0.684*	1.081
Marital status (ref=married)												
Never married									0.210*	0.250*	0.156*	0.031*
Widowed/divorced									0.259*	0.440*	0.204*	0.179*
Intercept	0.005	0.013	0.003	0.012	0.005	0.013	0.003	0.012	0.02	0.028	0.017	0.056
n	1,744,447	14,524	9,342	7,957	1,744,447	14,524	9,342	7,957	1,744,447	14,524	9,342	7,957

Notes: *p≤0.05. SN=Swedish natives, G1= first-generation and G2= second-generation and PS=Polish stayers

As for the other variables in the final model (Model 3)[5], the oldest cohorts display higher relative risk of having a first child in two of the groups (Swedish natives and second-generation), compared to the 1970-1979 cohort (i.e. the reference category). In contrast, for the Polish stayers and the first-generation immigrants, the oldest cohort has lower relative risks. With respect to the youngest cohort (1980-1992), the relative risk is lower for all groups except for the Polish stayers. Moreover, the never-married women have lower risk of having a first child for all groups. Nevertheless, the difference between the never married and the married varies between the groups. For instance, never-married Polish stayers have 97 % lower relative risk of having a first child compared to the married, while the difference for the first-generation is 75 %. The importance of marriage in the first-birth transition in Poland is one of the reasons why the intercept increases greatly for the Polish stayers when this variable is introduced in the model. For all groups, widows/divorcees have lower risk of having a child. The difference is the smallest for the first-generation and largest for the Polish stayers.

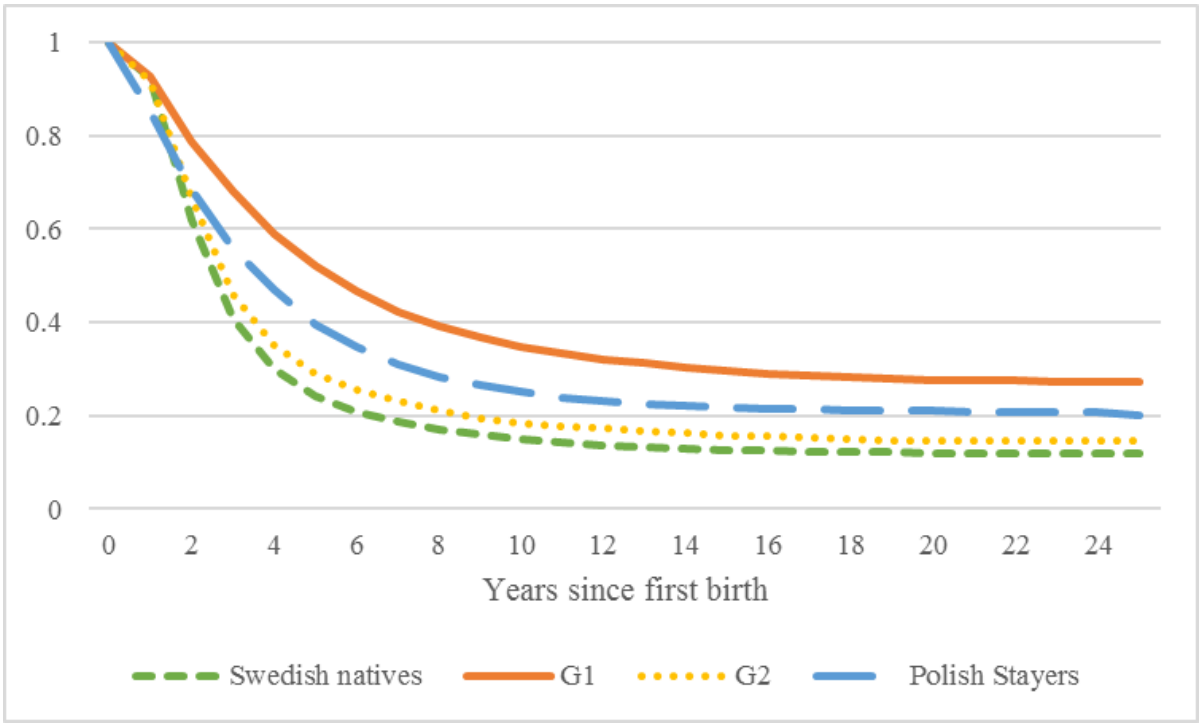
In sum, the first-generation and the Polish stayers have, in the first-birth analysis, relatively similar absolute risks before marital status is introduced in the model. Thereafter, the first-generation is more similar to the Swedish natives and the second-generation. In addition to the varying importance of marriage, a likely explanation is that the percentage of person-time at risk is significantly higher among the first-generation compared to the other groups when being married (see Fig. A1, Supplemental appendix). Furthermore, the initial timing and quantum fertility difference between the Swedish natives and the second-generation can partly be ascribed to cohort and marital status variation.

[5] Robustness checks with duration of stay, for both birth transitions, is shown for the first-generation in the supplemental appendix (Table A3 and A4).

Transition to second birth

As the second-birth Kaplan-Meier survival curves show (see Fig. 5) the two-child norm is strong among Swedish natives. Only 12 % of the women having a first child are estimated not to proceed to have a second one. The second-generation is not very different, approximately 15 % will not proceed to have a second child. Among the first-generation, the share is substantially higher, 27 %. The Polish stayers are in between the second-generation and the first-generation with 20 %.

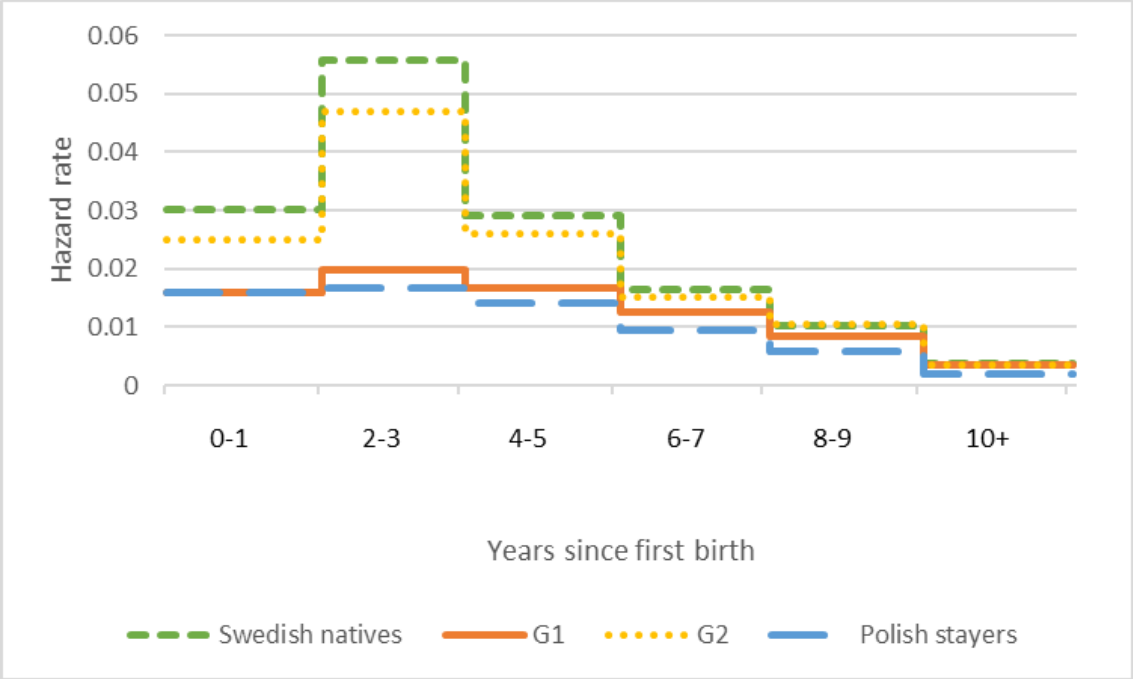
Fig. 5: Second birth Kaplan-Meier survival curves, by years since first birth



Notes: G1= first-generation Polish immigrants and G2= second-generation Polish immigrants

The stepwise inclusion of control variables (Table 3) indicates that the covariates impact on the baselines and other covariates are small. There are only two statistically significant changes, both regard the 1980-1992 cohort. Among the first-generation, this cohort's risk of having a second child becomes lower than the reference group when age at first birth is included. In contrast, the youngest cohort for the second-generation is no longer different when marital status is included. For the Swedish natives and the second-generation, the intercept increases substantially when marital status is included.

Fig. 6: Transition to second birth. Baseline hazards relative to years since first birth for married women in the 1970-1979 cohort aged 20-24 at first birth



Notes: Authors' own calculations. G1= first-generation Polish immigrants and G2= second-generation Polish immigrants

In Fig. 6 the baseline hazards are calculated from Model 4 and refer to married women in the 1970-1979 cohort having their first child at age 20-24. Even though it is not possible to say if the groups statistically differ from each other or not, the figure suggests large group differences both when it comes to timing and quantum. The highest hazard rate is shown at 2-3 years after the first birth for all groups. However, the difference between hazard rates at various time-

episodes is smaller for the first-generation and the Polish stayers. For the Swedish natives and the second-generation the second birth is more concentrated to this time episode (i.e. 2-3 years). The Polish stayers and the first-generation immigrants have similar baseline hazards.

To interpret Model 4 further, all cohorts among the Swedish natives and first-generation immigrants have lower risks of having a second child compared to the 1970-1979 cohort. For the second-generation, only the oldest cohort has lower relative risk. Among the Polish stayers, the two oldest cohorts have significantly higher risk of having a second child. This means that the similarity between Polish stayers and the first-generation applies to the two younger cohorts, while the older cohorts' fertility behavior is less similar. As for the first-birth transition, married women have higher risk of having a second child, in all age groups, compared to the never-married and divorcees/widows. However, the difference is substantially smaller in the second-birth transition compared to the first-birth transition. The importance of age at first birth varies across the groups. For instance, among the first-generation and the Polish stayers, the risk of having a second child is highest among the women who had their first child aged 15-19.

In short, the intercepts do change even though the time since first-birth hazard rates change little when cohort is included. The first-generations' baseline becomes very similar to the Polish stayers' in the two youngest cohorts and different in the two older cohorts. When including the marital status variable, the two groups do not seem to become more similar. In addition, since the intercept for the Swedish natives and the second-generation increases when marital status is included, they become even less similar to the Polish stayers and the first-generation.

Table 3 Transition to second birth (relative risks)

	Model 1				Model 2				Model 3				Model 4			
	SN	**FG**	**SG**	**PS**	**SN**	**G1**	**G2**	**PS**	**SN**	**G1**	**G2**	**PS**	**SN**	**G1**	**G2**	**PS**
Year since first birth (ref=2-3)																
0-1	0.564*	0.810*	0.556*	0.972	0.559*	0.800*	0.555*	0.973	0.544*	0.776*	0.529*	0.955	0.541*	0.795*	0.532*	0.950
4-5	0.489*	0.825*	0.506*	0.820*	0.491*	0.831*	0.508*	0.815*	0.516*	0.862*	0.555*	0.841*	0.521*	0.843*	0.554*	0.846*
6-7	0.270*	0.611*	0.291*	0.540*	0.274*	0.622*	0.293*	0.533*	0.293*	0.661*	0.328*	0.566*	0.293*	0.630*	0.325*	0.573*
8-9	0.172*	0.411*	0.202*	0.327*	0.174*	0.422*	0.205*	0.320*	0.186*	0.460*	0.229*	0.348*	0.183*	0.427*	0.225*	0.351*
10+	0.064*	0.169*	0.071*	0.106*	0.066*	0.177*	0.072*	0.101*	0.072*	0.202*	0.081*	0.115*	0.068*	0.171*	0.077*	0.109*
Cohort (ref=1970–1979)																
1950–1959					0.796*	0.750*	0.843*	1.248*	0.712*	0.718*	0.744*	1.221*	0.712*	0.777*	0.750*	1.235*
1960–1969					0.954*	0.793*	0.990	1.154*	0.922*	0.782*	0.986	1.136*	0.946*	0.810*	1.016	1.173*
1980–1992					0.794*	0.938	0.828*	0.964	0.853*	0.962	0.917	1.068	0.811*	0.827*	0.877	0.957
Marital status (ref=married)																
Not married									0.579*	0.600*	0.513*	0.439*	0.573*	0.609*	0.507*	0.446*
Widowed/divorced									0.387*	0.509*	0.371*	0.292*	0.390*	0.514*	0.373*	0.306*
Age at first birth (ref=20-24)																
15-19													0.905*	1.178*	1.032	1.267*
25-29													0.978*	0.806*	1.035	0.706*
30-34													0.799*	0.626*	0.861*	0.452*
35+													0.430*	0.414*	0.582*	0.271*
Intercept	0.031	0.012	0.027	0.016	0.035	0.014	0.030	0.014	0.051	0.017	0.045	0.015	0.056	0.020	0.047	0.017
n	1,056,327	13,122	3,300	5,883	1,056,327	13,122	3,300	5,883	1,056,327	13,122	3,300	5,883	1,056,327	13,122	3,300	5883

Notes: *p≤0.05. SN=Swedish natives, G1= first-generation and G2= second-generation and PS=Polish stayers

Discussion and conclusions

Following previous literature on migrant fertility this study had three aims. The first one was to apply a country-of-origin and country-of-destination approach, in order to better test the socialization and the selection hypothesis. Second, we aimed to deepen the knowledge on a group which has been largely ignored in migrant fertility research, namely migrants moving from a low fertility setting to a country with higher fertility levels. Finally, to complement and complete the research on Polish migrants' fertility behavior, we examined them in a Swedish setting.

First, we hypothesized, in line with the socialization hypothesis, that first-generation immigrants and Polish stayers have similar fertility behavior (*H1).* We indeed find similarities, but unlike in previous studies (e.g. Milewski 2010a; Mussino and Strozza 2012) these apply to the timing of the events rather than the quantum.

According to our second hypothesis the difference in fertility behavior of the first-generation compared to the Polish stayers (*H2a)* and the Swedish natives *(H2b)* can be partly linked to selection into migration and the composition of the migrant group. Our analysis suggests that Polish first-generation migrants are selected into migration based on education and marital status. Fertility differences by educational attainment has been found among second-generation Polish migrants in Sweden (Scott & Stanfors 2011), and thus it is possible that this also applies to the first-generation. The larger share of highly educated among the first-generation might therefore partly explain the lower share of women proceeding to have a second child. When including marital status in the first-birth analysis, the two groups' fertility levels become more different, however the timing remains similar. In the second-birth analysis, the fertility level difference between the two groups is largely cohort related, which means that the two younger cohorts display very similar behavior. In sum, our results suggest that selection can work in two directions, explaining both differences and similarities among the groups. Given the

varying effect of the control variables, *H2a* is partly supported and partly rejected. Our ambiguous results are in line with Baykara-Krumme and Miliewski's (2017) findings which also both oppose and support the hypothesis. Furthermore, our study shows that the impact of marriage varies between stayers and immigrants, in both birth transitions, suggesting a selection into migration also when it comes to unobserved characteristics, for instance, their view on having children outside marriage.

The inclusion of marriage in the first-birth analysis decreases the quantum difference between the first-generation and the Swedish natives, which supports *H2b.* Conversely, our results in the second-birth analysis show that including marital status increases the difference between the Swedish natives and the first-generation. Hence, similarly to the findings in *H2a,* selection seems to work in two directions. Our ambiguous results both support and reject this hypothesis. Finally, the third hypothesis *(H3)* was developed in line with the adaptation hypothesis and stated that there should be a convergence in the fertility behavior across immigrant generations. In the first-birth analysis the second-generation resembles the fertility behavior of Swedish natives rather than the Polish stayers. In the second-birth analysis the fertility behaviors seem to converge even more across migrant generations, both in terms of timing and quantum. Convergence across migrant generations resemble the findings from previous research (e.g. Scott and Stanfors 2011). With respect to social policies, the speed-premium has been shown to affect the birth-spacing of Swedish natives as well as Nordic-born individuals living in Sweden (Andersson, Hoem and Duvander 2006), and here we find similar pattern for second-generation Polish women. Such convergence across migrant generations may be considered a sign of social policy adaptation, and in line with previous literature it also suggests adapting to labor market regulations and the dominant culture in the country of destination (Andersson 2004; Kulu and González-Ferrer 2014; Milewski 2007).

This study has some limitations, however. First, since the groups had to be analyzed separately it is not possible to say if they statistically differ from each other (even if it is possible to compare the confidence intervals, see Supplemental Table A5 and A6 for Kaplan-Meier in online supplementary), and therefore we could not say exactly how much of the fertility difference between the groups can be attributed to selection. Second, the study considers the education selection only descriptively notwithstanding previous research (e.g. Scott and Stanfors 2011), showing that education matters for the fertility behavior of second-generation Polish migrants in Sweden. Since the share of missing was high for the first-generation (27 %) we decided not to include education in the analysis. Third, two different datasets, collected in different ways, hence with their own particular shortcomings, are analyzed in this study, which is not uncommon in comparative research.

Bearing in mind these limitations, we conclude that our paper contributes to the field of immigrant fertility research in multiple ways. To start with, relying on a combination of the country-of-origin and country-of-destination approach made it possible to compare the first-generation immigrants with several other groups in order to test the adaptation and socialization hypotheses more thoroughly than has been done in previous research. For example, this study has demonstrated fertility level differences among the first-generation and the stayers, highlighting that drawing conclusions on the socialization while not considering fertility behavior in the sending country in the analysis can be misleading. This underlines the importance of including the stayers in future research on immigrant fertility. Furthermore, our study has extended the knowledge about the fertility behavior of migrants moving from a country with lower fertility to a country with (relatively) higher fertility. Finally, it has complemented previous research on Polish migrant women (inspired by Lübke 2015) by adding information about what medium-/long-term effects migration has on their fertility behavior. Our findings confirm that first-generation Polish migrants' behavior is more similar

to the stayers compared to the natives in the destination country when it comes to the timing of the events. Some unexpected dissimilarities can be explained by both the composition of the migrant group and unobserved preferences. Thus, the selection effect can work in two directions, it can both explain some of the fertility differences as well as some of the fertility similarities. Convergence across migrant generations in terms of timing and quantum is also supported, in particular with respect to the second child. The Swedish multiculturalism seems to accommodate first-generation migrant women's preferences, in terms of either behaving similarly to their peers in the country of origin with respect to the timing of first and second births or by attracting individuals with specific marriage preferences. However, birth-spacing and quantum convergence across migrant generations suggests that exposure to the Swedish society and policy context also affects the longer-term fertility behavior.

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References

Abbasi-Shavazi, MJ., and McDonald, P. 2000. “Fertility and multiculturalism: Immigrant fertility in Australia, 1997-1991.” *International Migration Review, 34* (1), 215-242.

Adserá, A., and Ferrer, A. 2015. “Immigrants and demography: Marriage, divorce and fertility.” *Handbook of the economics of international migration 1*, 315-374.

———, ———, Sigle-Rushton, W., and Wilson, B. 2012. “Fertility patterns of child migrants: Age at migration and ancestry in comparative perspective.” *The annals of the American Academy of political and social science*, *643*(1), 160-189.

Andersson, G. 2004. “Childbearing after migration: Fertility patterns of foreign-born women in Sweden.” *International Migration Review 38* (2), 747–775.

———, Hoem, J., and Duvander, A-Z. 2006. “Social differentials in speed-premium effects in childbearing in Sweden.” *Demographic research, 14,* 51-70.

———, Persson, L., and Obućina, O. 2017. “Depressed fertility among descendants of immigrants in Sweden.” *Demographic research*, *36* (39), 1149-1184.

———, and Scott, K. 2005. ”Labour-market status and first-time parenthood: The experience of immigrant women in Sweden, 1981-97.” *Population studies 59* (1), 21-38.

———, and ———. 2007. “Childbearing dynamics of couples in a universalistic welfare state: The role of labor-market status, country of origin, and gender.” *Demographic Research 17* (30), 897-938.

Bagavos, C., Tsimbos, C., and Verropoulou, G. 2008. “Native and migrant fertility patterns in Greece: A cohort approach.” *European Journal of Population 24* (3), 245-263.

Baykara-Krumme, H., and Milewski, N. 2017. ”Fertility Patterns Among Turkish Women in Turkey and Abroad: The Effects of International Mobility, Migrant Generation, and Family Background.” *European Journal of Population 33* (3), 409–436.

Bengtsson, T. 2008. ”Förändrat flyttmönster från Polen.” *Fokus på näringsliv och arbetsmarknad.* Information om arbetsmarknad, 2. Statistics Sweden.

Billingsley, S., and Matysiak, A. 2018. ”Social mobility and family expansion in Poland and Russia during socialism and capitalism.” *Advances in Life Course Research 36*, 80-91.

Blau, F. 1992. The fertility of immigrant women: Evidence from high-fertility source countries. In: George, J. & Freeman, R. (Ed.). *Immigration and the Work Force: Economic Consequences for the United States and Source Areas* (pp. 93-133). Chicago and London: The University of Chicago Press.

Blossfeld, H-P., Golsch, K., and Rohwer, G. 2007. *Event History Analysis with Stata.* Lawrence Erlbaum.

Carlsson, E. 2019. “Fertility Intentions across Immigrant Generations in Sweden: Do Patterns of Adaptation Differ by Gender and Origin?” *Comparative Population Studies 43*, 211-242.

Castles, S., De Haas, H., and Miller, M. 2014. *The Age of Migration: International Population Movements in the Modern World* (fifth ed.). Guilford Publications.

Coale, A., and Trussell, T. 1974. “Model Fertility Schedules: Variations in The Age Structure of Childbearing in Human Populations.” *Population Index, 40* (2), 185-258.

Coleman, D. 1994. “Trends in fertility and intermarriage among immigrant populations in Western Europe as measure of integration.” *Journal of Biosocial Science 26*, 107–136.

Dubuc, S. 2012. “Immigration to the UK from high-fertility countries: Intergenerational adaptation and fertility convergence.” *Population and development review 38* (2): 353-368.

Eurostat. 2018. *International Standard Classification of Education (ISCED).* https://ec.europa.eu/eurostat/statistics-explained/index.php/International_Standard_Classification_of_Education_(ISCED)

———. 2019. *Migration and migrant population statistics.* http://ec.europa.eu/eurostat/statistics-explained/index.php/Migration_and_migrant_population_statistics

———. 2020. *Population on 1 January by age group, sex and country of birth.* http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do.

Fokkema, T., Emery, T., Kveder, A., Liefbroer, A., and Hiekel, N. 2016. "Generations and Gender Programme Wave 1 data collection: An overview and assessment of sampling and fieldwork methods, weighting procedures, and cross-sectional representativeness." *Demographic Research 34* (18), 499-524.

Frank, R., and Heuveline, P. 2005. "A crossover in Mexican and Mexican-American fertility rates: Evidence and explanations for an emerging paradox." *Demographic research 12* (4), 77-104.

Glick, J. 2010. "Connecting complex processes: A decade of research on immigrant families." *Journal of Marriage and Family 72* (3), 498–515.

Goldstein, S., and Goldstein, A. 1983. Migration and fertility in Peninsular Malaysia: An analysis using life history data. Santa Monica, CA: Rand Corporation.

Hobson, B., and Oláh, L. 2006. "Birthstrikes? Agency and capabilities in the reconciliation of employment and family." *Marriage & Family Review 39* (3-4), 197-227.

Hwang, S-S., and Saenz, R. 1997. "Fertility of Chinese immigrants in the U.S.: testing a fertility emancipation hypothesis." *Journal of Marriage and the Family 59* (1), 50–61.

Impicciatore, R., Gabrielli, G., and Paterno, A. 2020. “Migrants’ Fertility in Italy: A comparison Between Origin and Destination.” *European Journal of Population,* 1-27.

Kahn, J. 1988. “Immigrant selectivity and fertility adaptation in United States.” *Social Forces 67* (1), 108-128.

Kaufman, G.; Bernhardt, E., and Goldscheider, F. 2017 . “Enduring egalitarianism? Family transitions and attitudes towards gender equality in Sweden.” Journal of Family Issues, 38 (13), 1878-1898.

Klinthäll, M. 2006. “Retirement Return Migration from Sweden.” *International Migration 44* (2), 153-180.

———. 2007. “Refugee Return Migration: Return Migration from Sweden to Chile, Iran and Poland 1973-1996.” *Journal of Refugee Studies 20* (4), 579-598.

Kotowska, I., Józwiak, J., Mynarska, M. and Katarzyna, K-G. 2019. *Generations and Gender Survey Poland Wave 1 & Wave 2: Study Documentation & Wave 2 File and Variables Descriptions.* https://www.ggp-i.org/wp-content/uploads/2019/07/GGS_W1W2_Poland.pdf

———, ———, Matysiak, A., and Baranowska, A. 2008. ”Poland: fertility decline as a response to profound societal change and transformations in the labour market?” *Demographic Research 19* (22), 795–854.

Krapf, S., and Wolf, K. 2015. “Persisting differences or adaptation to German fertility patterns? First and second birth behavior of the 1.5 and second generation Turkish migrants in Germany.” *Kölner Zeitschrift für Soziologie und Sozialpsychologie 67* (1), 137-164.

Kreyenfeld, M. 2004. “Fertility decisions in the FRG and GDR: an analysis with data from the German Fertility and Family Survey.” *Demographic Research Special Collection 3* (11): 275-318.

Kulu, H., and González-Ferrer, A. 2014. “Family-dynamics among immigrants and their descendants in Europe: Current research and opportunity.” *European Journal of Population 30* (4), 411-435.

———, Milewski, N., Hannemann, T., and Mikolai, J. 2019. “A decade of life-course research on fertility of immigrants and their descendants in Europe.” *Demographic Research, 40*, 1345–1374.

Lessard-Phillips, L., Galandini, S., de Valk. H., and Fibbi, R. 2017. “Damned if you do, damned if you don’t: The challenges of including and comparing the children of immigrants.” In Bolzman, C., & Bernardi, L., & Le Goff, J-M. (Ed) Situating Children of Migrants across Borders and Origins- A methodological Overview. *Life Course Research and Social Policies 7*, 25-53.

Lesthaeghe, R. 2011. “The “Second demographic transition”: A conceptual map for the understanding of late modern demographic developments in fertility and family formation.” *Historical Social Research 36* (2), 179–218.

Lübke, C. 2015. “How Migration Affects the Timing of Childbearing: The Transition to a First Birth Among Polish Women in Britain.” *European Journal of Population 31*(1), 1-20.

Macisco, J., Bouvier, L., and Renzi, M. 1969. “Migration Status, education and fertility in Puerto Rico, 1960.” *The Milbank Memorial Fund Quarterly 47* (2), 167–186.

Matysiak, A. 2009. “Employment first, then childbearing: Women’s strategy in post-socialist Poland”. *Population Studies 63* (3), 253–276.

———, A., and Vignoli, D. 2013. “Diverse effects of women’s employment on fertility: Insights from Italy and Poland.” *European Journal of Population 29* (3), 273-302.

McDonald, P. 2013. “Societal foundations for explaining low fertility: Gender equity.” *Demographic Research 28* (34), 981-994.

Milewski, N. 2007. “First child of immigrant workers and their descendants in West Germany: Interrelation of events, disruption, or adaptation?” *Demographic Research 17* (29), 859–895.

———. 2010a. “Immigrant fertility in West Germany: Is there a socialization effect in transitions to second and third births?” *European Journal of Population 26* (3): 297–323.

———. 2010b. *Fertility of immigrants: A two-generational approach in Germany*. Berlin: Springer.

———. 2011. “Transition to a first birth among Turkish second-generation migrants in Western Europe.” *Advances in Life Course Research 16* (4), 178-189.

———, and Mussino, E. 2018. Editorial on the Special Issue “New Aspects on Migrant Populations in Europe: Norms, Attitudes and Intentions in Fertility and Family Planning.” *Comparative Population Studies, 43*, 371-398

Mills, M. 2011. *Introducing Survival and Event History Analysis.* London: SAGE Publications Ltd

Mussino E., Miranda, V., and Ma, L. 2017. “Sex ratio at birth among immigrant groups in Sweden.” *Stockholm Research Reports in Demography 2017*, 5.

———, and Strozza, S. 2012. “The fertility of immigrants after arrival: The Italian case.” *Demographic Research 26* (4), 97–130.

———, Wilson, B., and Andersson, G. 2020. “The Fertility of Immigrants from Low Fertility Settings: Adaptation in the tempo and quantum of childbearing?” *Stockholm Research Reports in Demography* SRRD 2020:22

Nahmias, P. 2004. “Fertility behavior of recent immigrants to Israel: A comparative analysis of immigrants from Ethiopia and the former Soviet Union.” *Demographic Research 10* (4), 83-120.

Neyer, G. 2013. “Welfare States, Family Policies, and Fertility in Europe.” In: Neyer G., Andersson G., Kulu H., Bernardi L., Bühler C. (Ed). *The Demography of Europe* (pp. 29-53). Springer: Dordrecht.

OECD. 2018. OECD Family Database: The structure of families (SF): SF2.4 Share of births outside of marriage. Data Chart Births_outside_marrriage. Share of births outside of marriage. http://www.oecd.org/els/family/database.htm.

———. 2019. OECD Family Database: Public Policies for families and children (PF): PF1.1 Public spending on family benefits. Data Chart PF1. 1.A. Public spending on family benefits. http://www.oecd.org/els/family/database.htm.

———. 2020. *International Migration Database.* https://stats.oecd.org/Index.aspx?DataSetCode=MIG.

Oláh, L., and Bernhardt, E. 2008. “Sweden: Combining childbearing and gender equality.” *Demographic Research 19* (28), 1105-1144.

Rumbaut, R. 2004. “Ages, Life Stages, and Generational Cohorts: Decomposing the Immigrant First and Second Generations in the United States.” *International migration review 38* (3), 1160-1205.

Saarela, J., and Weber, R. 2017. “Assessment of educational misclassification in register-based data on Finnish immigrants in Sweden.” *Scandinavian Journal of Public Health 45* (17), 20-24

Schoenmaekers, R., Lodewijckx, E., and Gadeyne, S. 1999. “Marriages and fertility among Turkish and Moroccan women in Belgium: Results from census data.” *International Migration Review 33* (4), 901–928.

Scott, K., and Stanfors, M. 2011. “The transition to parenthood among the second generation: Evidence from Sweden, 1990-2005.” *Advances in Life Course Research 16* (4), 190–204.

Sobotka, T. 2008. “Overview Chapter 7: The rising importance of migrants for childbearing in Europe.” *Demographic research 19* (9), 225-248

Statistics Sweden. 2010. Born in Sweden – but still different? The significance of parents’ country of birth. *Demografiska rapporter 2010:2*

———. 2012. *Background material about demography, children and family* 2012:1. The significance of time in Sweden on fertility. https://www.scb.se/contentassets/0bbc2d0826d1457591fac80777f352be/be0401_2000i09_br_be52br1201.pdf

———. 2018. *Nedåtgående trend i barnafödande.* https://www.scb.se/hitta-statistik/artiklar/2018/nedatgaende-trend-i-barnafodande/

Szelewa, D. 2017. “From Implicit to Explicit Familialism: Post-1989 Family Policy Reforms in Poland.” In: Auth D., Hergenhan J., Holland-Cunz B. (eds) *Gender and Family in European Economic Policy* , pp. 129-151. Palgrave Macmillan, Cham

Tønnessen, M., and Mussino, E. 2019. “Adaptation from below? Migrants from low-fertility countries in a high-fertility setting.” *Stockholm Research Reports in Demography 15*, 1-10.

Wilson, B. 2013. “Disentangling the quantum and tempo of immigrant fertility.” In *Paper presented at the 7th International Conference on Population Geographies in Groningen, The Netherlands*, 25-28 June 2013.

Supplemental appendix

Supplemental Table A1: Exclusion and censoring table (transition to first child)

Reasons for exclusion	*n*
Respondents younger than 15 at migration (Polish migrants)	3,767
Respondents older than 40 at migration (Polish migrants)	2,949
Marriage transitions do not follow in the right order	4,147
Respondents with multiple marital events the same month (if the multiple events within a month happened after second birth, they are still included)	244
Single or not born in 1968 but their first transition is not from single to married (not first-generation Polish migrants	13,116
First-generation with no marital status info the first years after migration	7
Incomplete child histories in the Polish GGS (e.g. child's birth year is missing or no information if the child is biological or adopted	15
Already having at least one child at migration (Polish migrants)	7,971
Women having their first child before age 15	321
Women having their first birth before 1968 but are older than 15 (women in the registers)	2,073
Emigrated before becoming at risk	10,418
Total number of excluded or censored cases	45,028
Final n of the working sample	1,776,270

Supplemental Table A2: Risk of first birth. Distribution of time at risk and observed events

	Person-time (in months)	Percentage of person-time	Number of observed events
Migrant status			
Swedish natives	252255524	98,8%	1105257
First-generation	844127	0,3%	8257
Second-generation	1235278	0,5%	3546
Polish stayers	967247	0,4%	6050
Time			
15-17	60898566	24%	24755
18-20	58075821	23%	137099
21-23	46300395	18%	230932
24-26	33550338	13%	256016
27-29	21883643	9%	222377
30-32	13111257	5%	144340
33-35	8143029	3%	68021
36+	13339127	5%	39570
Cohort			
1950-1959	61332429	24%	355881
1960-1969	72902033	29%	368675
1970-1979	67352865	26%	300055
1980-1992	53714849	21%	98499
Marriage status			
Never married	239451719	94%	775636
Married	13648291	5%	335144
Widowed/divorced	2202166	1%	12330
Total	255302176	100%	1123110

1.5-generation

The adaptation process has been shown to operate across generations (Scott & Stanfors 2011) and via duration of stay (Andersson 2004). When looking at generations, previous studies have pointed out the importance of include the 1.5-generation (Scott & Stanfors 2011; Adserá et al. 2012). However, there is no consensus across previous studies in terms of how this group should be categorized. For example, Baykara-Krumme & Milewski (2017) and Carlsson (2019) categorize all individuals younger than 15 at migration as 1.5-generation. In comparison, Scott & Stanfors (2011) classify individuals younger than 10 at migration into this categorization. Furthermore, Rumbaut (2004) categorizes those who migrated between 6 and 12 as 1.5-generation. It is possible that the ambiguous results (see e.g. Baykara-Krumme & Milewski 2017; Milewski 2010b; Scott & Stanfors 2011) is due to this lack of consensus. We performed an analysis with the 1.5-generation and it showed that it is relatively similar to the second-generation. We categorized it according to Baykara-Krumme & Milewski (2017) and Carlsson (2019), i.e. individuals immigrating between 0 and 15. Due to the lack of consensus in previous research we decided not to include the 1.5-generation and the analysis. Since this group is very heterogeneous we stress that more information on how this group should be categorized is needed before including it in research.

Duration of stay

Several studies (see e.g. Andersson 2004; Mussino & Strozza 2012) have shown that migration significantly matters for the timing of the first child among migrants, and therefore duration of stay is important to account for in migrant fertility research. However, its effect on the quantum is questioned (Statistics Sweden 2012). To ensure that the possible medium- and longer-term fertility differences are not affected by the duration of stay, we do a robustness check. The duration of stay variable is categorized into 0-1, 2-3, 4-5, 6-7, 8-9 and 10+. Supplemental Table

A3 indicates that there is an interrelation between migration and fertility (consistent with previous research). However, duration's effect on the baseline and on the other control variables is modest. The effect is even smaller in the transition to second birth (see Supplemental Table A4.

Supplemental Table A3: Transition to first birth (relative risks).

	Model 1	Model 2	Model 3	Model 4
	G1	G1	G1	G1
Age (ref=21–23)				
15–17	0.151*	0.158*	0.306*	0,271*
18–20	0.723*	0.732*	0.987	0,958
24–26	0.971	0.966	0.886*	0,941
27–29	0.958	0.906*	0.832*	0,956
30–32	0.849*	0.758*	0.725*	0,907*
33–35	0.671*	0.586*	0.572*	0,768*
36+	0.211*	0.177*	0.178*	0,267*
Cohort (ref=1970–1979)				
1950–1959		1.174*	0.791*	0,802*
1960–1969		1.280*	0,958	0,981
1980–1992		0.714*	0.883*	0,840*
Marital status (ref=married)				
Not married			0.250*	0,266*
Widowed/divorced			0.440*	0,508*
Duration (ref 2-3)				
0-1				1,534*
4-5				0,946
6-7				0,820*
8-9				0,769*
10+				0,724*
Intercept	0.013	0.013	0.0287	0,021
n	14,524	14,524	14,524	1,4524

Notes: *p≤0.005. G1=First-generation

Supplemental Table A4: Transition to second birth (relative risks).

	Model 1	Model 2	Model 3	Model 4	Model 5
	FG	**G1**	**G1**	**G1**	**G1**
Year since first birth (ref=2-3)					
0-1	0.810*	0.800*	0.776*	0.795*	0.785*
4-5	0.825*	0.831*	0.862*	0.843*	0.853*
6-7	0.611*	0.622*	0.661*	0.630*	0.644*
8-9	0.411*	0.422*	0.460*	0.427*	0.454*
10+	0.169*	0.177*	0.202*	0.171*	0.19*
Cohort (ref=1970–1979)					
1950–1959		0.750*	0.718*	0.777*	0.781*
1960–1969		0.793*	0.782*	0.810*	0.821*
1980–1992		0.938	0.962	0.827*	0.825*
Marital status (ref=married)					
Not married			0.600*	0.609*	0.615*
Widowed/divorced			0.509*	0.514*	0.523*
Age at first birth (ref=20-24)					
15-19				1.178*	1.159*
25-29				0.806*	0.824*
30-34				0.626*	0.662*
35+				0.414*	0.454*
Duration (ref 2-3)					
0-1					1.012
4-5					0.985
6-7					0.971
8-9					1.014
10+					0.808*
Intercept	0.012	0.014	0.017	0.020	0.02
n	13122	13122	13122	13122	13122

Notes: *p≤0.005. G1=First-generation

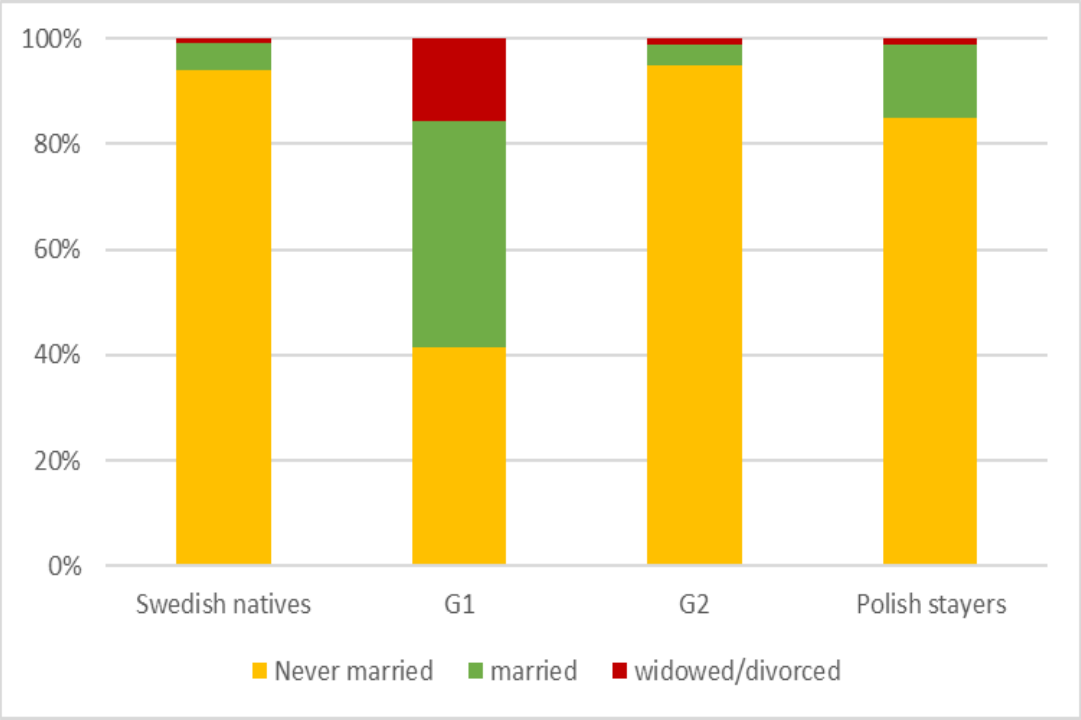
Supplemental Table A5: Survivor function with confidence intervals, transition to first birth

Age of woman	SN	95 % conf int		G1	95 % conf int		G2	95 % conf int		PS	95 % conf int	
15	1	-	-	1	-	-	1	-	-	1	-	-
16	0.999	0.999	0.999	1	-	-	0.999	0.998	1	0.998	0.997	0.999
17	0.995	0.995	0.996	0.980	0.965	0.989	0.995	0.994	0.997	0.992	0.990	0.994
18	0.986	0.986	0.986	0.948	0.929	0.962	0.986	0.983	0.988	0.976	0.972	0.979
19	0.969	0.969	0.969	0.894	0.871	0.912	0.973	0.969	0.976	0.937	0.931	0.942
20	0.942	0.941	0.942	0.794	0.770	0.816	0.955	0.950	0.959	0.867	0.859	0.874
21	0.905	0.904	0.905	0.686	0.662	0.709	0.930	0.924	0.935	0.778	0.769	0.787
22	0.860	0.859	0.860	0.584	0.561	0.605	0.902	0.895	0.908	0.679	0.669	0.690
23	0.810	0.809	0.810	0.492	0.472	0.512	0.869	0.862	0.877	0.586	0.575	0.597
24	0.755	0.754	0.756	0.422	0.404	0.440	0.836	0.828	0.844	0.502	0.491	0.514
25	0.696	0.696	0.697	0.359	0.343	0.375	0.800	0.791	0.809	0.427	0.416	0.439
26	0.634	0.634	0.635	0.307	0.293	0.321	0.757	0.747	0.767	0.371	0.360	0.382
27	0.572	0.571	0.572	0.264	0.251	0.277	0.709	0.698	0.720	0.319	0.308	0.330
28	0.510	0.509	0.511	0.226	0.215	0.237	0.660	0.648	0.672	0.274	0.264	0.285
29	0.451	0.450	0.451	0.194	0.184	0.204	0.604	0.591	0.617	0.243	0.233	0.254
30	0.394	0.394	0.395	0.166	0.158	0.175	0.550	0.536	0.564	0.217	0.207	0.227
31	0.344	0.343	0.344	0.143	0.135	0.150	0.489	0.474	0.503	0.196	0.187	0.206
32	0.300	0.299	0.301	0.125	0.118	0.132	0.436	0.421	0.450	0.175	0.166	0.185
33	0.265	0.265	0.266	0.111	0.104	0.117	0.391	0.376	0.406	0.162	0.153	0.172
34	0.237	0.237	0.238	0.098	0.092	0.104	0.352	0.337	0.368	0.154	0.145	0.163
35	0.215	0.214	0.216	0.088	0.082	0.093	0.322	0.306	0.337	0.145	0.136	0.154
36	0.197	0.196	0.198	0.080	0.075	0.085	0.293	0.277	0.309	0.137	0.128	0.146
37	0.183	0.182	0.184	0.075	0.070	0.079	0.276	0.260	0.292	0.131	0.122	0.140
38	0.173	0.172	0.173	0.070	0.066	0.075	0.259	0.243	0.275	0.127	0.118	0.136
39	0.165	0.164	0.165	0.067	0.063	0.071	0.242	0.226	0.259	0.124	0.115	0.133
40	0.159	0.158	0.160	0.065	0.061	0.069	0.234	0.218	0.250	0.122	0.114	0.131
41	0.155	0.154	0.156	0.063	0.059	0.068	0.227	0.211	0.243	0.119	0.111	0.128
42	0.152	0.152	0.153	0.062	0.058	0.066	0.221	0.205	0.238	0.117	0.109	0.126
43	0.151	0.150	0.151	0.062	0.058	0.066	0.219	0.203	0.236	0.117	0.108	0.125
44	0.150	0.149	0.151	0.061	0.057	0.065	0.215	0.199	0.232	0.116	0.108	0.125
45	0.149	0.149	0.150	0.061	0.057	0.065	0.215	0.199	0.232	0.116	0.108	0.125

Supplemental Table A6: Survivor function with confidence intervals, transition to second birth

years after first birth	SN	95 % conf int		G1	95 % conf int		G2	95 % conf int		PS	95 % conf int	
0	1	-	-	1	-	-	1	-	-	1	-	-
1	0.922	0.922	0.923	0.926	0.920	0.931	0.917	0.907	0.926	0.851	0.841	0.860
2	0.622	0.621	0.623	0.787	0.779	0.796	0.667	0.650	0.684	0.685	0.673	0.697
3	0.409	0.408	0.410	0.681	0.671	0.691	0.461	0.442	0.479	0.559	0.546	0.572
4	0.299	0.298	0.300	0.591	0.581	0.601	0.352	0.334	0.370	0.472	0.458	0.485
5	0.242	0.241	0.243	0.522	0.511	0.532	0.289	0.271	0.306	0.396	0.383	0.409
6	0.208	0.208	0.209	0.467	0.456	0.477	0.255	0.238	0.272	0.347	0.335	0.360
7	0.186	0.185	0.187	0.422	0.412	0.432	0.232	0.215	0.248	0.311	0.299	0.324
8	0.170	0.170	0.171	0.392	0.382	0.402	0.211	0.195	0.227	0.284	0.271	0.296
9	0.159	0.158	0.160	0.369	0.359	0.379	0.195	0.179	0.211	0.265	0.253	0.278
10	0.150	0.149	0.151	0.349	0.339	0.359	0.185	0.169	0.201	0.251	0.239	0.263
11	0.143	0.142	0.144	0.334	0.325	0.344	0.178	0.162	0.194	0.240	0.228	0.252
12	0.138	0.137	0.138	0.321	0.312	0.331	0.173	0.157	0.189	0.230	0.218	0.242
13	0.133	0.133	0.134	0.312	0.303	0.322	0.167	0.151	0.183	0.225	0.213	0.237
14	0.130	0.129	0.131	0.301	0.292	0.311	0.163	0.147	0.179	0.221	0.210	0.233
15	0.127	0.127	0.128	0.295	0.286	0.304	0.158	0.142	0.174	0.218	0.206	0.230
16	0.125	0.124	0.126	0.289	0.280	0.298	0.156	0.140	0.172	0.215	0.203	0.227
17	0.123	0.123	0.124	0.285	0.276	0.294	0.153	0.137	0.169	0.214	0.202	0.226
18	0.122	0.121	0.123	0.281	0.272	0.291	0.149	0.134	0.166	0.212	0.200	0.223
19	0.121	0.120	0.122	0.279	0.270	0.288	0.148	0.132	0.164	0.210	0.199	0.222
20	0.120	0.119	0.121	0.277	0.268	0.286	0.146	0.130	0.163	0.210	0.198	0.222
21	0.119	0.119	0.120	0.276	0.267	0.286	0.146	0.130	0.163	0.209	0.197	0.221
22	0.119	0.118	0.120	0.275	0.265	0.284	0.146	0.130	0.163	0.209	0.197	0.221
23	0.118	0.118	0.119	0.273	0.264	0.283	0.146	0.130	0.163	0.209	0.197	0.221
24	0.118	0.117	0.119	0.272	0.263	0.282	0.146	0.130	0.163	0.206	0.194	0.219
25	0.118	0.117	0.119	0.272	0.263	0.282	0.146	0.130	0.163	0.202	0.187	0.217

Supplemental Fig. A1 Population at risk of first birth by marital status



Notes: G1= first-generation and G2= second-generation

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