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Descriptive Finding

Immigrant fertility in Sweden, 2000–2011: A descriptive note

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Abstract

BACKGROUND
Modern Scandinavian population registers provide excellent data sources that allow a user to quickly gain an impression of the level of fertility and its structure across subpopulations. This may also allow the analyst to check a feature of the much-cited disruption hypothesis, at least in part.

OBJECTIVE
The purpose of this note is to exploit this potential to give an overview of the structure of recent total fertility after immigration to Sweden from various groups of sending countries, separately for males and females. In the process we demonstrate to what extent the post-migration fertility compensation which is part of the fertility disruption hypothesis is fulfilled in our study population. Due to the nature of our data we have refrained from studying fertility *before* migration.

METHOD
Based on data from a combination of two Swedish administrative registers (the Historic Population Register and the Multi-Generation Register) that cover both men and women in the entire population for the years 2000–2011, we compute and plot TFR-like age-cumulated fertility levels, specific for years since immigration, for six groups of sending countries, separately for men and women.

RESULTS
We find that the post-migration fertility compensation specified as part of the fertility disruption hypothesis is visibly confirmed in our Swedish study population for female European immigrants from non-EU countries and for female immigrants from non-European countries with a low or medium UN Human Development Index, but not so for other female immigrants, i.e. not for those who come from a Nordic country or from

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a non-Nordic EU country, and not for female immigrants from a non-European country with a high Human Development Index, including the United States. We find mild but less conclusive evidence for the same feature for males.

CONCLUSIONS
This shows that at least as far as post-migration fertility compensation is concerned, the disruption hypothesis for migrants corresponds to a fertility pattern exhibited by some groups of migrants under some circumstances, but it is not universal.

1. Immigrant fertility and the fertility disruption hypothesis

From the years 2000–2011, female immigrants to Sweden had a Total Fertility Rate (TFR) of 2.10, which was well above the TFR of 1.73 for women born in Sweden for the same period. In the present note, we show how Swedish register data can be used to quickly gain an impression of the level and some of the structure of immigrant fertility. In the process we address the question to what extent the much-cited fertility disruption hypothesis is fulfilled in our study population. The fertility disruption hypothesis goes back to Goldstein (1973), who found that new migrants in his data from Thailand had lower fertility than individuals who had not moved for some time. One explanation of such a finding, the current migration literature (Ford 1990; Stephen and Bean 1992; Hill and Johnson 2004; Kulu 2005; Roig Vila and Castro Martín 2007; and others) holds that in the period just before migration, during the migration process itself, and for some time following migration, childbearing is likely to be postponed in general or possibly forgone among migrants. Fertility disruption may occur as a result of spousal separation surrounding migration, or because of a difficult transition period in terms of time needed to prepare for migration, to settle into the destination society, and to find basic housing and employment there. The literature suggests that following temporary fertility disruption, at least some of the fertility that is postponed may be made up for during a period of fertility catch-up. We note that there may also be (increased) childbearing due to post-migration union formation.

Provided one has enough *pre*-migration information, it is in principle possible to study fertility developments in all three phases of the migration process (Hoem 2013). If one's data *before* migration is restricted to the migrants alone, however, one must take care not to produce biased results concerning fertility behaviour for the phase prior to migration. Because in our case the reliable data *are* restricted to the migrants alone, we have refrained from trying to study fertility in the phase before in-migration, and have restricted our study of aspects of the disruption hypothesis to *post*-migration

fertility compensation. A study of fertility around the time of migration needs more accurate data than what is available in our sources.

There is a lot of interest in various aspects of the fertility of migrants for the moment, and we further note the recent contributions by Généreux 2007, Milewski 2010, Schmid and Kohls 2010, Adsera and Ferrer 2011, Mussino and Strozza 2012ab, and Mussino and Van Raalte 2013.

All results in the present study have been produced by our own computations based on data drawn from a combination of the Swedish Historic Population Register and the Swedish Multi-Generation Register.

2. Countries of origin

To differentiate between the various streams of immigrants, we have organized the sending countries into six groups: the Nordic countries, other countries in the European Union, other non-EU European countries, and three sets of non-European countries, grouped into those who have a high, a middle-level, and a low Human Development Index (HDI) (United Nations 2007). (For the European Union, excluding the Nordic countries, we have used the current non-Nordic countries of the EU27 throughout, namely Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, France, the current Germany, Great Britain and Northern Ireland, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and their predecessors where relevant, as in Czechoslovakia and so on.)

We have simplified the search for fertility patterns according to sending region by organizing the immigrants according to country of birth, as is common in Swedish official statistics, and not by country of citizenship, as has been used, e.g. by Toulemon and Mazuy (2004). In any case, using the country of birth should catch most important patterns. The exposure counts in Table 1 give an impression of the size order of the various streams of female immigrants to Sweden. The table notes list the four countries with the largest number of female immigrants in each group of sending countries during our years of observation (2000–2011). Throughout our analysis we only count occurrences and exposures for periods when the immigrants are actually recorded as living in Sweden. The individual records are censored on latest emigration and on death.

Table 1: Person-years of exposure to childbearing after immigration to Sweden, 2000–2011. Women at ages 16 through 45

Nordic countries[a]	110 930
Non-Nordic countries in the EU27[b]	261 762
European countries outside the EU27[c]	243 889
High-HDI[g] countries outside Europe[d]	90 597
Middle-level-HDI[g] countries outside Europe[e]	586 278
Low-HDI[g] countries outside Europe[f]	122 458

Notes: [a] Denmark, Finland, and Sweden (in the EU), Iceland and Norway (not in the EU); [b] Poland, Germany, Romania, Great Britain and Northern Ireland, and others; [c] Yugoslavia, Bosnia-Herzegovina, Turkey, Russia, and others; [d] Chile, South Korea, the United States, Brazil, and others; [e] Iraq, Iran, Thailand, China, and others; [f] Somalia, Ethiopia, Eritrea, Afghanistan, and others; [g] Grouping as of 2007 (United Nations 2007/08).

3. Cumulative fertility by duration since immigration

In analogy with the usual way of producing a period-based Total Fertility Rate, we have computed an age-cumulated measure of fertility by duration of stay in Sweden as the sum over all single years of age for age-and-duration-specific occurrence/exposure rates of fertility, separately for each of the six groups of sending countries.

In these computations we have taken into account the length of stay in Sweden of the individual immigrant as far as we know and trust it. As the population registers provide data given with a recorded accuracy as exact as a calendar day, we could, in principle, have computed fertility with a much finer grid of recorded durations. While we trust that births recorded in Sweden actually occur on the date stated, such accuracy is illusory for dates of in-migration, however, for they tend to be recorded with a delay which can sometimes be considerable. (See, e.g., Statistics Sweden 2013, page 18–19. As noted by Andersson 2004, pages 774–755, and Andersson and Scott 2005, pages 23–24, immigrants who need a residence permit to stay in Sweden are recorded as immigrated only effective as of the date of which such a permit is issued, which can be much later than the date at which residence in Sweden actually started. In practice, this is the case for citizens of all nationalities except those of the Nordic countries and the European Union, but we must imagine that the in-migration record could be dated long after the actual change of residence for these sending countries as well.) This causes problems for the computation of duration since immigration. We have therefore chosen to use single-year durations for our computations. This should be a reasonable compromise for positive durations, but special attention must be given to the data from the calendar year of immigration ("year 0"), because an unknown number of the births

recorded in that year may have occurred (in or outside of Sweden) before recorded immigration. To avoid the dangers of anticipatory analysis (see the warnings issued by Hoem 2013), for year zero we have only included births recorded as occurring after recorded immigration, even though some of the births may have happened between a real move to Sweden and the subsequently recorded date of the move. Trial calculations show that alternative ways of computing births in year 0 (such as whether all births in that calendar year are counted or only births that occur after recorded immigration) give meaningful differences in the fertility calculated for the year of immigration, in some cases a difference in cumulative fertility of as much as a whole child.

We have computed the duration since immigration as the current calendar year minus the recorded year of immigration. This means that the latter is always at "duration 0". For simplicity, in cases of repeat immigration we have only included the latest case of immigration. Repeat immigration is not very common. In our data, only 2 percent of all women immigrated more than once in the twelve years they were under observation. With this low number of cases it does not matter much how we handle children born during years before the latest immigration.

4. Empirical results

4.1. Female immigrants

In Figure 1 we have plotted the age-cumulated fertility levels for female European immigrants by single years since immigration, separately for women who were born in a Nordic country, in a non-Nordic country of the EU27, and in a non-EU27 country in Europe. Figure 2 contains corresponding curves for non-European immigrants, grouped by the UN Human Development Index (HDI) for the sending countries of birth. (Note that for our descriptive purposes we do not assume that fertility is the same for all immigrants from each group of countries. There is a lot of inter-country variation in fertility levels among people living in countries with a middle-level HDI, for instance, and then presumably also for the corresponding immigrants. In our data the largest country of birth in this group is Iraq, which has high fertility, while neighboring Iran has relatively low fertility. It is possible to subdivide the mid-HDI countries by fertility level at home, say, and to study corresponding differentials after migration to Sweden, but to do so would run counter to the simplicity which we are striving for.)

Some of the curves in Figures 1 and 2 have a prominent peak in age-cumulated fertility in the year after immigration, others do not; a feature that Andersson (2004, p. 760) has observed before in Swedish data for a somewhat different period, with a different grouping of sending countries, and with a somewhat different methodology.

His interpretation is that the two processes (immigration and childbearing) are interrelated. (Mussino and Strozza 2012a have found similar peaks in data for immigrants in Italy.) In the curve for immigrants from low-HDI non-European countries in Figure 2, the peak is replaced by an upward jump in the year subsequent to the year of immigration, followed by a slow decline until we stop accounting for the cumulated fertility at a duration of seven years. For this curve and for the curves with a prominent peak, the curve format is consistent with family formation as a main reason for the immigration.

The curve for female immigrants from the Nordic countries has a particular form with a "spurt" up to the second year and another in the fourth year after immigration. While we suspect that this may be connected to patterns of completion of education among Nordic immigrants in Sweden, only future investigation with different data can lead to a real explanation of this pattern, because, while the records for immigrants from other sending countries contain some information about the cause of immigration, there is no such information for Nordic immigrants.

Figure 1: Levels of age-cumulated fertility 2000–2011 for European female immigrants to Sweden, by single years since immigration and by type of country of birth. "Year 0" is the year of immigration

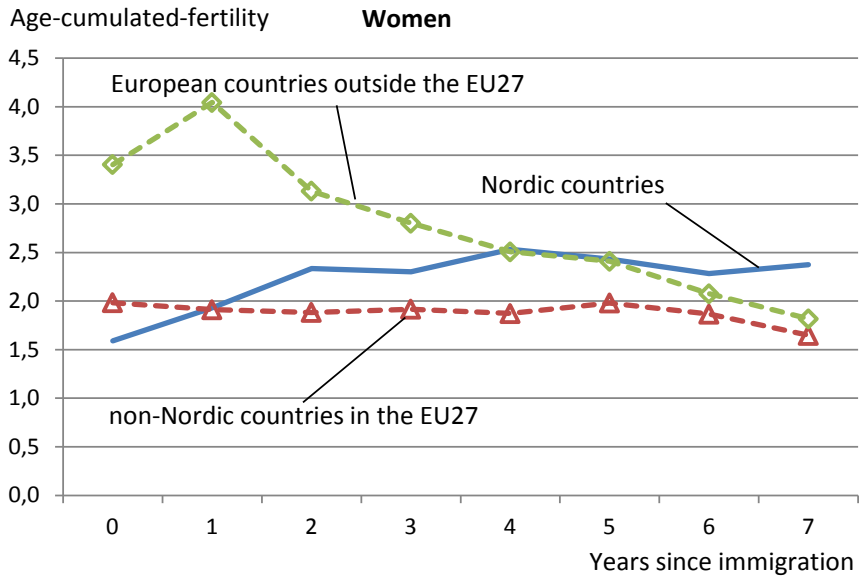
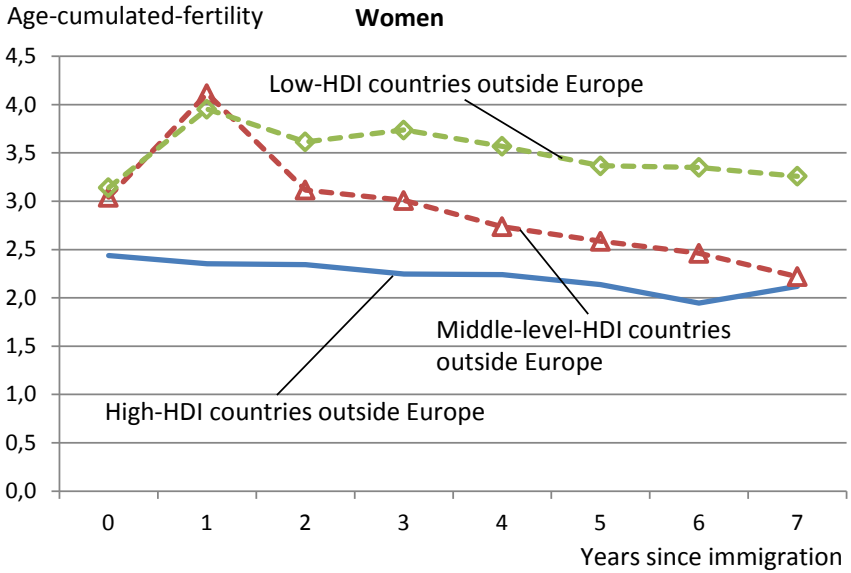


Figure 2: Levels of age-cumulated fertility 2000–2011 for non-European female immigrants to Sweden, by single years since immigration and by countries of birth grouped by the UN Human Development Index. "Year 0" is the year of immigration



4.2. Male immigrants

Figures 3 and 4 contain the diagrams for male immigrants corresponding to those of Figures 1 and 2 for females. The structure of the curves for males is noticeably different from those for females, in particular in that the early peaks are missing in almost all the curves for males, reflecting much less importance of marriage formation as an immediate reason for immigration for males. The pattern may be that men migrate early and that female partners subsequently join them in Sweden, after which the partners initiate childbearing. In Figures 3 and 4, this pattern is reflected in increased fertility at later durations for European sending countries outside the EU and for non-European countries with a middle-level or low HDI. We see this as evidence mildly in favor of the post-migration part of the disruption hypothesis for men from these countries.

5. Discussion

Weaknesses of the TFR and its components as the basis for population projections are well known and have been highlighted recently for certain groups of immigrants to the United States by Parrado (2011). Our age-cumulated fertility levels have been constructed in analogy with the TFR, but they have different properties. These levels measure current fertility at various durations since immigration in our period of observation, and not long-run fertility. We trust, therefore, that they reveal the main features of duration-specific fertility sufficiently accurately for a quick sketch like ours.

As we have mentioned, the disruption hypothesis suggests that childbearing is depressed around the time of migration, or often has not even started before immigration. Supposing that the hypothesis truly catches important aspects of the fertility of immigrant groups in Sweden, it is not surprising that total fertility rates are lower at "duration 0" than subsequently for many of our curves. Considering their general patterns, it looks as if the (post-migration part of the) disruption hypothesis is mostly relevant for immigrants from non-EU sending countries in Europe and for non-European sending countries with a low- or middle-level HDI.

Figure 3: Levels of age-cumulated fertility 2000–2011 for European male immigrants to Sweden, by single years since immigration and by type of country of birth. "Year 0" is the year of immigration

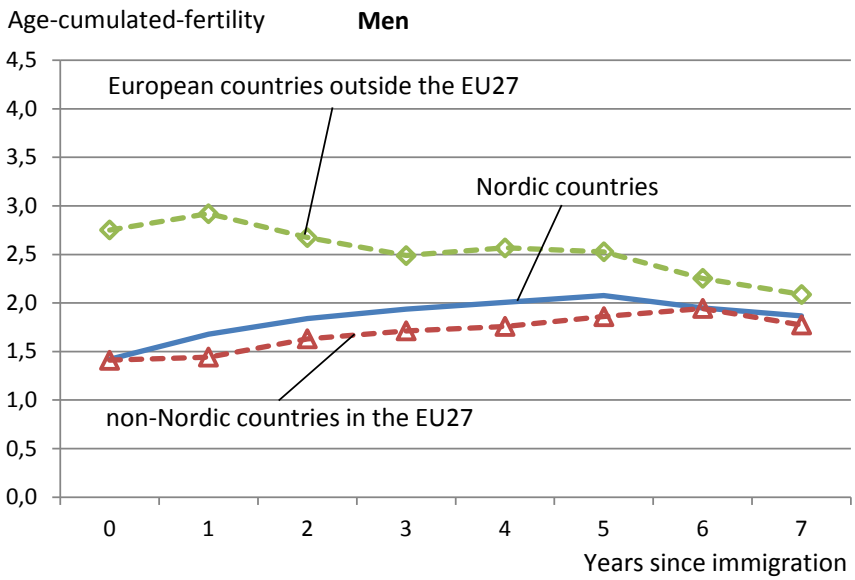
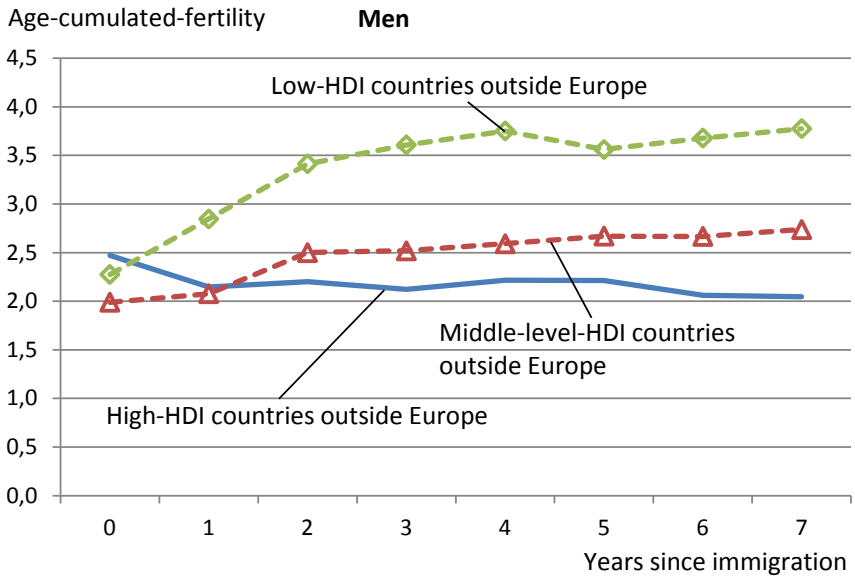


Figure 4: Levels of age-cumulated fertility 2000–2011 for non-European male immigrants to Sweden, by single years since immigration and by countries of birth grouped by the UN Human Development Index. "Year 0" is the year of immigration



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