Fertility Among the Descendants of Immigrants in Eight European Countries

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Abstract:

This study investigates the childbearing patterns of the descendants of immigrants in eight European countries, with a focus on ethnic minority women whose parents arrived in Europe from high-fertility countries. While the fertility levels of immigrants to Europe have been examined in the recent literature, the childbearing patterns among their descendants have received little attention. Using longitudinal data from eight European countries and applying Poisson regression models, the study shows that many descendants of immigrants exhibit first-birth levels that are similar to the native population in their respective countries; however, first-birth levels are slightly elevated among women of Pakistani and Bangladeshi origin in the UK and for those of Turkish descent in France and Belgium. Transition rates to a second child vary less across ethnic groups; only women of Pakistani and Bangladeshi ethnic origin in the UK exhibit elevated second-birth levels. Most ethnic minority women in the UK, France and Belgium show significantly higher third-birth levels than natives in those countries. The inclusion of women's level of education in the analysis has little effect on fertility differences across the ethnic groups. Overall, the childbearing behaviour of the 'second-generation' falls in between the fertility pathways experienced by their parents' generation and the respective native populations. The analysis supports the idea that both the *mainstream society* and the *minority subculture* shape the childbearing patterns of the descendants of immigrants in Europe. Fertility levels of the descendants of immigrants from high-fertility countries are expected to further decline in the 'third generation', but a significant intra-group heterogeneity will likely persist.

Keywords: Fertility, immigrants, the second-generation, Europe, Poisson regression

1. Introduction

European populations are characterised by an increasing share of immigrants and their descendants (Castles & Miller, 2009; Rees, van der Gaag, de Beer, & Heins, 2012). In the second half of the 20th century, immigrants mostly arrived in Northern and Western European countries, whereas in the first decade of this century, Southern European countries experienced a rapid increase of the immigrant population (Arango, 2000; Cornelius, 1994; Raymer, de Beer, & van der Erf, 2011). Central and Eastern European countries with state socialist regimes and planned economy showed specific migration patterns during the post-WWII period; some countries contributed to intra-European labour migration, some experienced emigration of political refugees. The East-West migration streams significantly increased after the fall of communism and some Eastern European countries have experienced large emigration streams also in the first decades of this century (Fassmann & Münz, 1994; Frejka, 1996; Raymer et al., 2011; Rees et al., 2012). Over time, the share of the descendants of post-war immigrants has also increased. In many Northern and Western European countries, immigrants and their descendants form approximately one-fifth to one-fourth of the population (OECD, 2014; Zimmermann, 2005). Ethnic minorities thus increasingly shape demographic, social and cultural trends in European societies.

There is extensive research examining different aspects of immigrants' lives, including their legal status and citizenship (Bauböck, 2003; Seifert, 1997), employment and education (Adsera & Chiswick, 2007; Rendall, Tsang, Rubin, Rabinovich, & Janta, 2010), and residential and housing patterns (Arbaci, 2008; Musterd, 2005). There is also a growing interest in family and fertility dynamics among ethnic minorities. While the fertility of immigrants in European countries has received considerable attention in the recent demographic literature (Andersson, 2004; Kulu & Milewski, 2007; Milewski, 2010b; Mussino & Strozza, 2012; Sobotka, 2008; Tromans, Natamba, & Jefferie, 2009), the childbearing patterns among the descendants of immigrants have been little studied and understood. The few existing studies show that the descendants of immigrants from high-fertility countries usually have lower fertility levels than their parents' generation, but for some groups, fertility levels remain relatively high (Coleman & Dubuc, 2010; Milewski, 2010b; Sobotka, 2008).

This study investigates the childbearing patterns among the descendants of immigrants in eight European countries: the UK, France, Germany, Belgium, Switzerland, Sweden, Spain and Estonia. This group includes "old" and "new" immigrant countries as well as countries with different migration and family policies and fertility dynamics and patterns. While each country represents a unique case study, the cross-country analysis of fertility behaviour among ethnic minorities will provide the opportunity to detect similarities and differences across European countries. Our main focus is on the fertility of the descendants of immigrants from high-fertility countries. We examine whether the fertility patterns of the so-called second generation are similar to those of their parents' generation, which are often shaped by fertility patterns in the sending country, or those of the native population.

This study extends previous research on ethnic minority fertility in the following ways. First, we conduct a comparative study on the fertility patterns of the descendants of immigrants in eight European countries to advance our understanding of the factors that shape the childbearing patterns among the second generation. Second, we disaggregate fertility measures and analyse the fertility of ethnic minorities by parity to gain information on the underlying fertility behaviour of ethnic minorities. Third, we fit a series of regression models with and without controls for demographic and socio-economic factors to improve our understanding of the role of various factors in shaping the fertility patterns of the descendants of immigrants. The novelty of this study is thus in the use of disaggregated and standardised fertility measures in a comparative study on ethnic minority fertility.

2. Explaining fertility among the descendants of immigrants

The research to date has investigated the role of origin and destination country contexts in shaping immigrant fertility. Some studies have demonstrated that immigrants maintain the childbearing patterns that are dominant in their country of origin (Coleman, 1994; Garssen & Nicolaas, 2008), whereas others have shown that over time, immigrant fertility behaviour increasingly resembles that of natives in the destination country (Andersson, 2004). However, those moving from high-fertility countries to low-fertility settings tend to have larger families than the natives in the destination country (Milewski, 2010b). Due to selection processes the fertility behaviour of immigrants can also substantially differ from that dominant in the sending country (Chiswick, 1999; González-Ferrer, Hannemann, & Castro-Martín, 2016). The fertility behaviour of the descendants of immigrants is primarily influenced by the social

environment in the country in which they grew up. However, their living environment may differ significantly. Some may grow up under the influence of *mainstream society*, while others may be raised and (mostly) live under the influence of the *minority subculture*, if such a subculture exists.

The influence of mainstream society leads to structural (or mostly economic) and cultural assimilation of the descendants of immigrants suggesting that their behaviour becomes similar to that of the majority population (Berry, 1992). The existence of minority subculture suggests that populations of foreign origin may preserve values, norms and behaviour concerning family and fertility behaviour that are common in the respective countries of origin (Milewski, 2010b). Over time a group of immigrants and their descendants may gradually become a minority group with a sense of self-awareness to distinguish between 'us' and 'them', which is also perceived by members of the majority group (Bean & Tienda, 1987; Milewski, 2010a).

Research should therefore determine whether the childbearing behaviour of the descendants of immigrants from high-fertility societies is similar to that of their parents (and their country of origin) or to the patterns that dominate in the mainstream society. If immigrants and their descendants exhibit similar fertility behaviour, which significantly differs from that of the native population, we could assume that the descendants of immigrants were mostly raised under the influence of the minority subculture (Kulu & González-Ferrer, 2014). In contrast, if we observe similar patterns for the descendants of immigrants and the natives, we can conclude that the descendants of immigrants have mostly been influenced by the mainstream society (Kulu & González-Ferrer, 2014). If both the minority subculture and mainstream society have been important (potentially at various stages in an individual's life, e.g., the minority subculture at earlier ages and the mainstream society later), the second generation should show fertility levels that are in between those of immigrants and natives. Such a comparison assumes some differences in fertility levels between the two reference groups, which may be true for immigrants from high-fertility countries in low-fertility settings (e.g., Turkish immigrants in Germany), but not for those who have moved between two countries with similar fertility levels (e.g., Romanians in Spain), although a detailed analysis of childbearing patterns may still reveal some important differences between the groups (e.g., the timing of family formation).

What are the factors that explain the fertility patterns among the descendants of immigrants? Cultural factors may be important. A relatively high fertility rate among some ethnic minority groups may be explained by the fact that they come from large families, they may have grown up in a 'high-fertility' culture and extended family may play an important role in their lives (Fernández & Fogli, 2006; Penn & Lambert, 2002; Robson & Berthoud, 2006). Extended family can support young mothers with children, particularly by providing (high-quality and cheap) childcare when needed. Furthermore, value and societal meaning of children may vary between countries and ethnic origins, which would explain some differences in fertility behaviour among different ethnic groups (Nauck, 2007; Nauck & Klaus, 2007). Besides the value of children, the intensity and strength of family ties and the impact of kin on fertility decisions may vary between the different cultures (Reher, 1998). Larger families could also be a result of the cultural pressure to continue childbearing until they have at least one and preferably two sons (Hampshire, Blell, & Simpson, 2012). Similarly, normative factors may be responsible for a desire for small families among the descendants of immigrants who grew up under the influence of a 'low-fertility' mainstream society.

While most research on immigrant and ethnic minority fertility tends to emphasise the importance of *cultural factors*, it is possible that *education* and *employment*-related *factors* may play a key role in shaping the fertility behaviour of the descendants of immigrants. Successful structural integration suggests that high educational aspirations and increased opportunity costs may lead to a significant postponement of family formation and smaller family size among ethnic minority women, thus following the trends for natives in European countries. In contrast, poor employment prospects among some ethnic minority groups due to inferior education and hidden discrimination in the labour market may promote early onset and high completed fertility. Young ethnic minority women may decide to choose the 'motherhood track' to find meaning for their lives and justify their lives to others. For example, research in the UK shows that women of Pakistani and Bangladeshi ethnic origin equate being a housewife with high status (Salway, 2007). While such a belief may be consistent with traditional gender roles in South Asian communities (Hennink, Diamond, & Cooper, 1999), it may be equally explained by the poor employment options among ethnic minority women.

The *welfare state provision* and *policies* have been shown to shape fertility trends and patterns in Europe and other industrialised countries (Jan M. Hoem, 1993; Luci-Greulich & Thevenon, 2013; McDonald, 2006; Neyer & Andersson, 2008). State policies may matter for the fertility behaviour of migrants as well (Andersson & Scott, 2005). In addition, similarly to the native population, the descendants of migrants are exposed to the state welfare policies in their home country since early childhood. Thus, state policies may explain whether and how much convergence towards the native baseline has taken place among the descendants of immigrants. The effect of the mainstream society on the descendants of immigrants can be assumed to be stronger in countries with inclusive integration policies and a range of policies that reduce inequalities between population subgroups and promote equality in all spheres of society (including gender equality) than in countries with exclusionist integration policies or where market forces are expected to (mostly) dominate individuals' lives (G. Esping-Andersen, 1990; Gøsta Esping-Andersen & Billari, 2015; McDonald, 2000; Seifert, 1997). Thus, the existence of state policies or the lack of them may explain high fertility rates among some ethnic minority women. For example, high residential segregation (with the weakest schools in ethnic minority areas) or selective school systems (where selection takes place at a very early age, leaving little chance for minority children to excel) may lead to poor educational outcomes among ethnic minority populations. Ethnic minority women with poor employment prospects may decide on the 'motherhood track', particularly if family policies encourage women to stay at home with children. In contrast, low educational segregation between population subgroups and state policies that encourage women's employment and support the compatibility of employment and parenthood, in turn, may explain a lack of high fertility among ethnic groups in a country (Kulu & González-Ferrer, 2014).

Recent research has emphasised the importance of gender equality in shaping fertility trends and patterns in Europe showing that more equalitarian countries have higher fertility levels than less equalitarian societies in the low fertility context (Gøsta Esping-Andersen & Billari, 2015; Kohler, Billari, & Ortega, 2002; McDonald, 2000). The interplay between gender-related attitudes among ethnic minority women and the levels of gender equality within minority groups may significantly shape minority fertility. The conventional male-breadwinner model may promote relatively high fertility levels among ethnic minority women with conservative gender roles. However, in groups with conservative gender relations, but with a high aspiration of gender equality among ethnic minority women,

fertility levels may be low, particularly the likelihood of forming a family, especially in the countries where compatibility of employment and parenthood is difficult (McDonald, 2000).

3. Childbearing among the descendants of immigrants in Europe

Previous research has shown that the descendants of some immigrants have fertility levels that are similar to those of the native population, but there are also ethnic minorities, predominantly those of non-Western origins, with early childbearing and relatively high fertility levels (Sobotka, 2008). Milewski (2010b) analysed the fertility levels of the second generation in Germany and showed that there were few (if any) differences between the childbearing behaviour of the descendants of immigrants from Southern Europe and native Germans, whereas those of Turkish descent exhibited distinct childbearing patterns. Those of Turkish descent had their first child much earlier than other population groups, and the likelihood of having a first and a third child was much higher than among the native population. Scott and Stanfors (2011) investigated the fertility levels of ethnic minorities in Sweden. Their analysis showed that the descendants of immigrants in general had somewhat lower first-birth rates than the native Swedish population. Only a limited number of groups of descendants from few high-fertility countries had higher first-birth rates than the native Swedish population or other ethnic minority groups.

A study by Coleman and Dubuc (2010) on ethnic minority fertility in the UK showed that fertility levels significantly declined among ethnic minority populations in Britain in the last decades of the 20th century. Furthermore, for each ethnic group, fertility levels were lower among the descendants of immigrants than immigrants. However, fertility levels were low among women of Indian and Caribbean origin, but still relatively high among women of Pakistani and Bangladeshi descent. Garssen and Nicolaas (2008) found similar results in their study of the childbearing patterns of women of Turkish and Moroccan origin in the Netherlands. The analysis showed that immigrant women had significantly higher fertility levels than the native Dutch population, while the second generation exhibited fertility levels that were in between of those of immigrants and natives. Finally, Milewski (2011) analysed the family formation of women of Turkish descent in seven European countries and showed that they had high first-birth levels in all seven countries. However, there were also significant differences across countries: the second-generation Turkish women had somewhat higher first-birth rates in Sweden, France and the Netherlands and lower levels in Germany and Switzerland. Thus, the study provided evidence of both socialisation into a minority subculture as well as into the mainstream society.

In summary, previous research shows that many ethnic minority groups in Europe have fertility levels that are similar to the native population; the descendants of immigrants from high-fertility countries have lower fertility rates than their parents' generation, but for some groups, fertility levels are still higher than for the native population. This study examines childbearing patterns among the descendants of immigrants in selected European countries, with a particular focus on ethnic minority women whose parents arrived from high-fertility countries. This comparative analysis of fertility patterns combines data from eight European countries: the UK, France, Germany, Belgium, Switzerland, Sweden, Spain and Estonia. The countries represent both *old* and *new* immigration countries; they vary by welfare state provision and policies; they differ in their post-war political and economic histories; and they represent all of the major regions and fertility regimes of Europe. The diversity of countries offers the opportunity to detect similarities and differences across European countries and to gain a better understanding of the factors that shape the childbearing patterns among the descendants of immigrants. Another contribution of this study is the analysis of ethnic minority fertility by parity with and without controls for demographic and socio-economic factors. Parity-specific analysis provides rich information on the fertility behaviour of the descendants of immigrants. To the best of the authors' knowledge, no previous study on the childbearing patterns of ethnic minorities has combined a comparative approach with a parity-specific analysis.

Our hypotheses come from previous research and they are as follows. First, most ethnic minority groups in Europe will exhibit childbearing patterns similar to those of the respective native populations, but fertility levels are expected to remain relatively high among certain ethnic minority women, mostly of non-Western origin. It is less clear whether their (expected) high fertility is attributed to the high likelihood of experiencing all first three parity transitions or mostly to high third-birth levels. Second, we expect fertility differences between natives, immigrants and their descendants to decrease after adjusting patterns to socio-demographic characteristics of women; again, an interesting question is how much will education explain initial fertility differences across the population subgroups? Finally, we expect to observe smaller variation in ethnic minority fertility in countries with a range of social policies to reduce inequalities and differences between population subgroups.

4. Data

This study uses data from eight European countries: the UK, France, Germany, Belgium, Switzerland, Sweden, Spain and Estonia. Data for the UK are derived from the first wave (2009/2010) of the Understanding Society study, which collected retrospective information on the partnership and fertility histories of the British population, including a boost sample for the main ethnic groups (Kulu & Hannemann, 2015). For France, data from two different sources were combined: the Trajectories and Origins survey, which was conducted in 2007 by the French National Institute of Demography and the French National Statistical Office, and the Family and Housing Survey, which was another retrospective study that was carried out by the National Institute of Statistics and Economic Studies in 2011 (Pailhé, 2015). The German data come from the Mikrozensus of 2005 and 2009, which was a one percent sample of all German households. The fertility histories of German women were reconstructed using the 'own-children method' (Cho, Retherford, & Choe, 1986; Krapf & Wolf, 2015). For Belgium, we use the 2001 census data, which contain information on the full fertility histories for women[1]. The Swedish data are derived from the Swedish Population Register, which includes information on all of the main life events of individuals, including the birth of children (Andersson & Persson, 2015). For Spain, this study exploits data from the Fertility and Values Survey, which was conducted by the Centre for Sociological Research in 2006 (González-Ferrer, Castro-Martín, & Kraus, 2015). Finally, data for Estonia were retrieved from two retrospective studies: the Estonian Generation and Gender Survey (2004/2005) and the Estonian Family and Fertility Survey (1994) (Rahnu, Puur, Sakkeus, & Klesment, 2015).

This study investigates fertility by parity among the descendants of immigrants in eight European countries. In total, there are as many as fifty population subgroups for the analysis of first birth. For some countries, groups of natives, immigrants (the 'first generation') and their descendants (the 'second generation') are included, while for other countries, data are only available for natives and the descendants of immigrants. The UK data distinguish among four groups of origin for both immigrant generations: 1) Europe and other industrialised countries; 2) India; 3) Pakistan and Bangladesh; and 4) Caribbean countries. For France, the following groups of own and their parental origin are investigated: 1) Maghreb states; 2) Sub-Saharan Africa; 3) Turkey; and 4) Southern Europe. The German data include only one ethnic minority group – women of Turkish descent. The main groups of origin for ethnic

[1] We would like to thank Didier Willaert for providing supplementary information on the Belgian census data.

minorities in Belgium are: 1) Italy; 2) Morocco; and 3) Turkey. For Switzerland, there are also three groups of immigrants and their descendants: 1) former Yugoslavia and Turkey; 2) Western Europe; and 3) Southern Europe. The data on the Swedish minority populations consist of the descendants of immigrants from: 1) Finland; 2) former Yugoslavia; 3) Turkey; and 4) Iran. For Spain, which has experienced immigration only recently, this study distinguishes among three groups of immigrants who arrived in Spain at age 15 or younger (the '1.5 generation'): 1) the EU and North America; 2) Maghreb; and 3) Latin America. The dominant origins for ethnic minorities in Estonia are of Slavic origin with over 80% of foreign born individuals coming from Russia, Ukraine and Belarus (Rahnu et al., 2015), which are combined in this study under the label 'Russian speakers' or 'Russian-speaking population'.

For each country we decided to use the most relevant and the highest quality data with sufficiently large samples of descendants of immigrants, thus sacrificing the option for an 'easy' comparison by using international surveys such as GGS or SHARE for available countries. Our research sample consists of women born between 1940 and 1989, and the data are categorised into five 10-year birth cohorts. For two countries, information was available for a shorter cohort range: for Germany, 1965–1989 and for Spain, 1950–1989. For Sweden only the birth cohorts 1970–79 were used. Therefore, sensitivity analysis was conducted to determine the effect of different cohort ranges on the results (i.e., 1940–1989, 1950–1989, 1960–1989). The analysis showed that the results only slightly changed (the confidence intervals for the parameters were the most predominant changes); therefore, for the sake of the sample size, the full cohort range (available for the most countries), that is, women born between 1940 and 1989, is used for this analysis.

We use both, data from sample surveys and population registers (Belgium, Germany and Sweden). To keep the samples of the same size we drew a sample of population registers. The sample size still varied across countries (Table 1). In a preliminary analysis, different weights were applied to account for the different sample sizes. Again, the results did not change significantly – the most common change was that the confidence intervals around the parameters increased or decreased when we applied sample weights (see Table A1 in Appendix). Because our main interest is the fertility of ethnic groups and we have included only a few control variables, we decided to use the original sample sizes despite some differences across countries. Another issue was related to the comparison of fertility rates

obtained by using register data and those based on the survey data. Previous study on the UK by Kulu and Hannemann (2015) showed that the survey data tend to overestimate fertility levels, although differences for the UK were small. Therefore, this study may slightly underestimate fertility levels in Belgium, Germany and Sweden relative to those in other countries. However, the latter is not a major issue if the main aim is to compare fertility variation across population subgroups and detect the groups with low or high fertility levels. Given the high quality of the data sources and use of well-defined control variables, the harmonization process between the various datasets from all eight countries was straightforward.

(Table 1 about here)

5. Methods

We use the count-data approach to investigate fertility by parity in eight European countries by drawing upon methodology developed by Hoem (Hoem, 1987; J. M. Hoem, 1993; Hoem et al., 1976). This approach is preferred to merge data from different countries and conduct a data analysis when individual-level data cannot be released to another research group or country. The count-data approach can be used to compare fertility rates across population subgroups and countries with and without standardising the rates to individual characteristics. An event-time (or occurrence-exposure) table for each country is prepared, which is defined by a cross-classification over a set of time intervals and covariate categories (Preston, 2005). The data for each cell in such a table include the total number of events, E_{jk}; the total time (normally person-years) at risk, R_{jk}; and values of covariates, x_{jk}, for time period j and category k. For each cell, the ratio of the number of events to the risk-time is a crude hazard:

$$\lambda_{jk} = E_{jk} / R_{jk} \qquad (1)$$

where λ_{jk} is the hazard for category k in time period j. Let E_{jk} denote the number of first births for group k in age group j. We treat E_{jk} as the realisation of a Poisson random variable with the mean μ_{jk}:

$$\mu_{jk} = \lambda_{jk} \times R_{jk} \qquad (2)$$

The expected number of first births is, thus, the product of the hazard of first birth and exposure time. We can present the model in a log-linear format:

$$\ln \mu_{jk} = \ln \lambda_{jk} + \ln R_{jk} \qquad (3)$$

We then rearrange the equation to investigate the hazard of first birth:

$$\ln\left(\mu_{jk} / R_{jk}\right) = \ln \lambda_{jk} \qquad (4)$$

Finally, we present a log-linear model for the hazard of first birth while also including additional covariates:

$$\ln \lambda_{jk} = \alpha_j + x_k' \beta \qquad (5)$$

where α_j = ln, λ_j measures the hazard of first birth by age (the 'baseline'), $\mathbf{x}'_k$ is a vector of the covariates (migrant status and country combined, cohort and educational level) and $\boldsymbol{\beta}$ represents a vector of the parameters to measure their effects. For higher order births (i.e., second and third), α_j measures the hazard of the *n*th birth by time since previous birth, and the individual's age at first birth can be included in the analysis as an additional covariate.

We used individual-level data to calculate aggregated exposure-occurrence tables for each country, which were aggregated using different combinations of socio-demographic variables. Individuals became under risk at age 15 and were censored at age 45 or the last data collection date, whichever came first. In the case of Germany, the data source only allowed us to observe women from their 18th birthday onwards, and their life histories were censored at age 40. All country files were then merged into one common database and modelled using a Poisson regression model (5). The variables that were used to prepare the exposure-occurrence tables were as follows: migrant group (specific to country, see data section), birth cohort (1940-49, 1950-59, 1960-69, 1970-79, 1980-89), age group (15-19, 20-24, 25-29, 30-34, 35-44) or time since previous birth in years (0-1, 1-3, 3-5, 5-10, 10+), educational level (low, medium and high, according to ISCED (1997) levels 0-2, 3-4 and 5-6) and for higher order births, the woman's age at first birth (15-19, 20-24, 25-29, 30-44). Table 2 provides the size of the risk population and the number of events and person-months for each birth (first, second and third) in the eight countries by migrant group. In most cases, the

available risk population decreases when proceeding with the investigation to higher order births because women who did not experience a previous birth are no longer included in the new risk population (e.g., childless women are not under risk to experience a second birth). In the case of Germany, two similar size sample sets were drawn from the original data source for the analysis of first and second births.

(Table 2 about here)

6. Results

6.1. First birth

For the analysis of first births, all childless women are at risk. The first model only controls for age (baseline) and cohort. We fit our regression models separately for two groups of countries with slightly different timing of childbearing (early versus late). Native British and German women are the reference groups in all comparisons, accordingly. We see that first-birth rates are similar for native women in the UK, France and Belgium (Table 3 and Figure 1a). The first-birth rates are high in Estonia, as expected. The first-birth rates are relatively low in Germany and Switzerland (further analysis showed lower levels for Germany in comparison to the UK); they are slightly higher in Spain and Sweden (Table 3 and Figure 1b). The results are consistent with well-known differences in the timing and level of family formation across European countries (Adsera, 2011; Billari & Kohler, 2004; Goldstein et al., 2009; Goldstein & Kreyenfeld, 2011; Kohler et al., 2002; Toulemon, Pailhé, & Rossier, 2008). *Immigrants* from Pakistan and Bangladesh in the UK and those from Turkey in France, Belgium and Germany exhibit significantly higher first-birth rates than most other population subgroups, which is expected, given that they arrived in Europe from high-fertility societies. The patterns vary among the *descendants* of immigrants. For most ethnic minority groups, first-birth rates are relatively similar to those of natives in the respective countries or slightly lower. First-birth risks are somewhat higher among women of Pakistani and Bangladeshi descent in the UK and for those of Turkish origin in France and also Belgium. Interestingly, first-birth levels are also higher among the descendants of Turkish immigrants in Germany and Switzerland than those of natives, but they are not particularly high in comparison with similar groups in other European countries. In Sweden, women of Turkish descent exhibit first-birth levels similar to those of natives. The Russian-speaking population in Estonia has relatively high first-birth risks, which are related to specific patterns in Eastern

Europe in general, namely, early and universal childbearing. Interestingly, a significant contrast between Russian-speaking immigrants and native Estonians only emerges in the 'second generation'.

(Table 3 about here)
(Figure 1a about here)
(Figure 1b about here)

Model 2 controls for the women's educational level. The differences in first-birth levels between natives, immigrants and the descendants of immigrants decline but remain significant. Briefly, high fertility among some ethnic minority women is only slightly explained by their lower educational levels. The effects of all of the control variables are as expected. First-birth rates are the highest the second half of the twenties (early childbearing) or the first half of the thirties (late childbearing), they are higher among older than younger cohorts and they decline with increases in the women's level of education.

6.2. *Second birth*

Women who had a first child form the risk population for the study of second births. (The analysis uses data from seven countries because data for the transition to second births was too small for Switzerland.) The first model controls only for the time since first birth as the baseline and birth cohort. Again, 'native' women in France and Belgium exhibit similar second-birth risks, with higher levels for 'native' British and Swedish women (Table 4 and Figure 2). Women in Germany, Spain and Estonia have relatively low second-birth levels. The observed patterns are consistent with the variation in second childbearing across European countries reported in previous studies (Goldstein & Kreyenfeld, 2011; Klesment, Puur, Rahnu, & Sakkeus, 2014; Van Bavel & Różańska-Putek, 2010). Immigrants from Pakistan and Bangladesh in the UK, those from Turkey in France and those from Turkey and Morocco in Belgium have significantly higher second-birth rates than most of the other groups in the respective countries, suggesting that the majority of women who become mothers have a second child. Again, the patterns vary among the *descendants* of immigrants. The descendants of immigrants from Pakistan and Bangladesh exhibit high second-birth levels, similar to their parents (or even higher), whereas second-birth rates are somewhat lower among women of Turkish origin in France and Belgium. The descendants of Turkish immigrants in Germany and Sweden show second-birth risks that are similar to those of

natives, while children of immigrants from the Maghreb region in Spain have somewhat higher fertility levels than natives.

The analysis also shows that a number of the 'second-generation' groups have low second-birth levels: Caribbeans in the UK, Italians in Belgium, Latin Americans in Spain and the Russian-speaking population in Estonia. Several 'second-generation' groups of European descent (South Europeans in France, Italians in Belgium, Russian-speakers in Estonia) exhibit lower second-birth rates than their counterparts in the 'first generation', and hence, an increased difference from the native population in the respective countries. Model 2 additionally controls for the women's age at first birth and their educational level. Interestingly, for some groups, the fertility differences relative to 'native' British women slightly decline, while for others they slightly increase, although the changes are not large. Further analysis showed that some unexpected changes are related to the inclusion of education in the analysis. Second-birth rates are the highest (rather than the lowest) among highly educated women showing shorter birth intervals (rather than higher parity progression levels) among the majority population of the respective countries.

(Table 4 about here)

(Figure 2 about here)

6.3. *Third birth*

Information on third births was available for five countries (i.e. samples were large enough for all minority groups): the UK, France, Belgium, Sweden and Estonia. The analysis shows that third-birth levels are relatively similar for natives in the UK, France and Belgium; the levels are somewhat lower for Sweden and Estonia (Table 5 and Figure 3). A number of immigrant groups exhibit very high third-birth risks: women from Pakistan and Bangladesh in the UK, immigrants from Turkey, North and Sub-Saharan Africa in France and those from Turkey and Morocco in Belgium. Fertility rates are also relatively high among immigrants from other non-European countries: Indians and Caribbeans in the UK. Interestingly, most descendants of immigrants also show relatively high levels. Third-birth rates are high among women of Pakistani and Bangladeshi descent in the UK and also among those of Indian and Caribbean origin. Similarly, elevated third-birth rates are observed among the *descendants* of immigrants from both African regions in France and Morocco in Belgium and those of

Turkish descent in both countries. In contrast, third-birth rates are low for Southern Europeans in France and Belgium and for Russian-speaking women in Estonia. In Sweden, most ethnic minorities have fertility levels similar to natives, except those of Turkish origin who exhibit somewhat higher third-birth rates. Model 2 additionally controls for the women's educational level and age at first birth. The fertility differences between ethnic groups slightly decline, but the main differences persist. The effects of the covariates are largely as expected. Third-birth rates are highest one to three years after the birth of the second child, and they are higher for the oldest cohorts. The rates also decline with increases in the women's age at first birth; the rates are higher among women with the lowest educational levels.

(Table 5 about here)

(Figure 3 about here)

7. Summary and discussion

This study investigated fertility among the descendants of immigrants in selected European countries, with a focus on ethnic minority women whose parents arrived in Europe from high-fertility countries. The main results are as follows. First, many of the descendants of immigrants exhibited first-birth levels that were similar to the native population in their respective countries; however, first-birth levels were slightly higher among women of Pakistani and Bangladeshi origin in the UK and for those of Turkish descent in France and Belgium, which mostly suggests earlier childbearing among these ethnic groups. Second, transition rates to a second child varied less across the descendants of immigrants; only women of Pakistani and Bangladeshi ethnic origin in the UK exhibited elevated second-birth levels. Third, most ethnic minority women in the UK, France and Belgium showed significantly higher third-birth levels than natives in those countries. Fourth, the inclusion of the women's education in the analysis slightly changed the results, but the main differences across the ethnic groups persisted. Finally, fertility variation across ethnic groups was the largest in France, the UK and Belgium and the smallest in Sweden.

The following groups of the descendants of immigrants can be distinguished based on their fertility patterns. Women of Pakistani and Bangladeshi origin in the UK showed consistently high fertility levels; their first-birth rates were somewhat higher than those of native women in the UK; their second- and third-birth levels were significantly higher. Similarly, women of

Turkish descent in France and Belgium exhibited slightly higher first-birth rates; their second- and third-birth levels were somewhat lower, although still higher than those among the respective natives in each country. Indians in the UK and those of North African origin in France had first- and second-birth rates that were similar to natives, but significantly higher third-birth levels. Finally, Caribbeans in the UK and (also) Sub-Saharan Africans in France had first-birth levels that were similar to natives, lower second-birth rates and relatively high third-birth levels, suggesting a polarisation among women of these groups by fertility behaviour.

The analysis supported the idea that both the *mainstream society* and the *minority subculture* have shaped the childbearing patterns of the descendants of immigrants in Europe. Overall, the descendants of immigrants from high-fertility countries had lower parity-specific fertility than their parents' generation. Furthermore, in Sweden and Germany, the second generation exhibited fertility levels that were very similar to or even lower than those of natives. However, we also observed relatively high first-birth rates for some and high third-birth rates for many ethnic minority women, which suggest that factors specific to ethnic minorities have also shaped fertility patterns. What are the factors that explain the higher fertility rates for some ethnic minority women? We expected that education would explain a larger share of the high fertility among ethnic minority women. However, this was not the case. The inclusion of women's *educational level* in the models slightly reduced the fertility differences between ethnic groups, but the main differences persisted. It is possible that factors directly related to employment played a key role; however, previous research suggests that the inclusion of employment status in the models would not change the patterns significantly (Bernhardt, 1993; Hamel & Pailhé, 2015). A number of *cultural factors* may (further) explain fertility variations across ethnic group and the high fertility levels among some ethnic minority women. Further research shows that ethnic minority women with high fertility levels come from large families and are more religious than natives (Kulu et al., 2015). Previous research supports that individuals who come from larger families are more likely to have larger families themselves, and those who are more religious have higher fertility levels, particularly third-birth rates (Michael & Tuma, 1985; Philipov & Berghammer, 2007).

Our analysis also supported the idea that the *country context* matters both in shaping overall fertility levels and differences across population subgroups. The analysis showed that first-birth rates were relatively low for all ethnic minority groups in Germany, Switzerland and

Spain, suggesting later family formation and/or a lower likelihood of becoming a mother in those countries, which is a well-known finding from previous studies. In contrast, all of the population subgroups in Estonia exhibited early and universal first births, as expected, whereas second- and third-birth levels were relatively low. Those examples underline the importance of country context and illustrate that immigrant fertility behaviour can be influenced strongly by the mainstream society and local fertility patterns. Fertility variation across ethnic groups was the smallest in Sweden and the largest in France, the UK and Belgium. The former finding is not surprising; research has shown that the generous and universal Nordic welfare system has an equalising effect on all population subgroups; furthermore, ethnic minorities are relatively well integrated into education and the labour market in those countries, and residential segregation levels are relatively low (Bevelander, 2004). Welfare state policies have likely reduced differences across population subgroups in the UK and France; however, the size of the main minority groups is large in those countries and residential and school segregation is high, particularly in the UK (Musterd, 2005; Pan Ke Shon & Verdugo, 2015). These factors certainly promote the existence of minority subcultures in those countries and reinforce specific family patterns, e.g., through high levels of ethnic intermarriages. Examples for this are Turkish immigrants and their descendants in France and Belgium and South Asians in the UK.

We conducted a series of analyses to determine how sensitive the results of a comparative study of eight countries are to different sample selections and model specifications. We applied different weights to countries, simultaneously used a set of different countries, fitted models with and without immigrants, used natives from different countries as a reference group and explored the shape of the baseline risk (the woman's age or time since previous birth) for population subgroups. Overall, the results on second- and third-birth rates were robust to different sample selections and model specifications. However, there was some variation across first-birth models for some ethnic groups. The estimated first-birth rates for women of Pakistani and Bangladeshi descent in the UK and those of Turkish origin in France and Belgium varied across models. For example, the first-birth levels for the descendants of Pakistani and Bangladeshi immigrants were only slightly higher than those of British native women when we only used the sample of the British and French women; the differences increased when we included all other countries in the analysis.

The reason for such a variation is that the timing of family formation seems to significantly vary across countries and ethnic groups (which is an interesting finding per se), and it is therefore not easy to find a common baseline (i.e. the shape of the age-specific first-birth rates) for all groups and countries. An obvious solution would be to allow different baselines for different groups or to estimate separate models for different age groups (e.g., 15-29 versus 30-44). However, our further analysis showed that these strategies may not work well either. The second generation mostly comes from younger cohorts, and there are only a few among them who have reached older (childbearing) ages; this figure also varies across groups. To address the issue of timing of family formation, we decided to fit first-birth models separately for two groups of countries, those with earlier family formation and those with later. Our sensitivity analysis therefore suggests that the results of the first birth and particularly the elevated fertility levels for some groups should be interpreted with some caution. However, the estimated second- and third-birth rates are robust to different sample selections and model specifications.

Another issue is related to immigrant fertility. Recent research shows that that tempo and quantum bias is ingredient in the comparison of period fertility of immigrants and native population (Parrado, 2011; Persson & Hoem, 2014; Robards & Berrington, 2015). Due to the tendency to have a child shortly after arrival in the country for the migrant population, period measures of fertility often overestimate migrant total fertility. Because this study uses full fertility histories and controls for age and birth cohort, such bias should be reduced to a minimum, although the use of pre-migration fertility for immigrants can be challenged from the methodological point of view (Hoem, 2014). The only way to avoid the tempo distortion would thus be to analyse completed fertility for immigrants and their descendants, for which many of the analysed migrants groups in this study are still too young.

This is the first study to investigate parity-specific fertility rates among the descendants of immigrants in Europe from a comparative perspective. Our analysis showed that fertility levels are lower among the descendants of immigrants than immigrants, often similar to those of the respective native population, but they, particularly third-birth rates still remain relatively high among certain ethnic minority groups. Overall, fertility levels of the descendants of immigrants from high-fertility countries are in-between those of immigrants and the native population. However, the results of this study also refer to some polarisation among the descendants of immigrants from high-fertility countries. There is a significant

minority who have their first child as late as native women or even remain childless, while the majority have relatively large families, three or four children similarly to their parents. Such polarisation also characterises groups with lower fertility levels, e.g. descendants of Indians and Caribbeans in the UK or North and Sub-Saharan Africans in France. Some of them have small, some large families. Educational differences explain some fertility variation across population subgroups, but significant variation persist; further analysis showed that factors related to family of origin (e.g. number of siblings, religiosity) correlate with the presence of large families among some ethnic minority groups. Intra-group marriages also dominate among high-fertility populations, although the direction of causality between marital patterns and fertility is not clear.

Fertility levels of the descendants of immigrants from high-fertility countries are likely to further decline in the 'third generation' due to the changes in their families of origin (e.g. fewer come from large families and the strength of their religiosity is expected to decline). This could be considered as a sign of intergenerational assimilation of fertility (Coleman & Dubuc, 2010), which for some minority groups in Europe will take place slower than perhaps expected. However, we will simultaneously expect to see increasing heterogeneity among ethnic minority populations. There will be a significant number of those who exhibit childbearing patterns similar to those of the majority population, but, most importantly, there will be still a significant group of those with large families, with three to four children. European societies should see large ethnic minority families as an asset for low-fertility societies and ensure that that children from such families will have the same educational and employment opportunities as those from the 'average', one or two-child families.

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Tables and Graphs

Table 1: Number of women by country

Country	Number of women
United Kingdom	18636
France	21720
Germany	24114
Belgium	42170
Switzerland	7114
Sweden	36243
Spain	12024
Estonia	7233
Total	**169254**

Table 2: Number of women at risk, events and person-months by migrant group

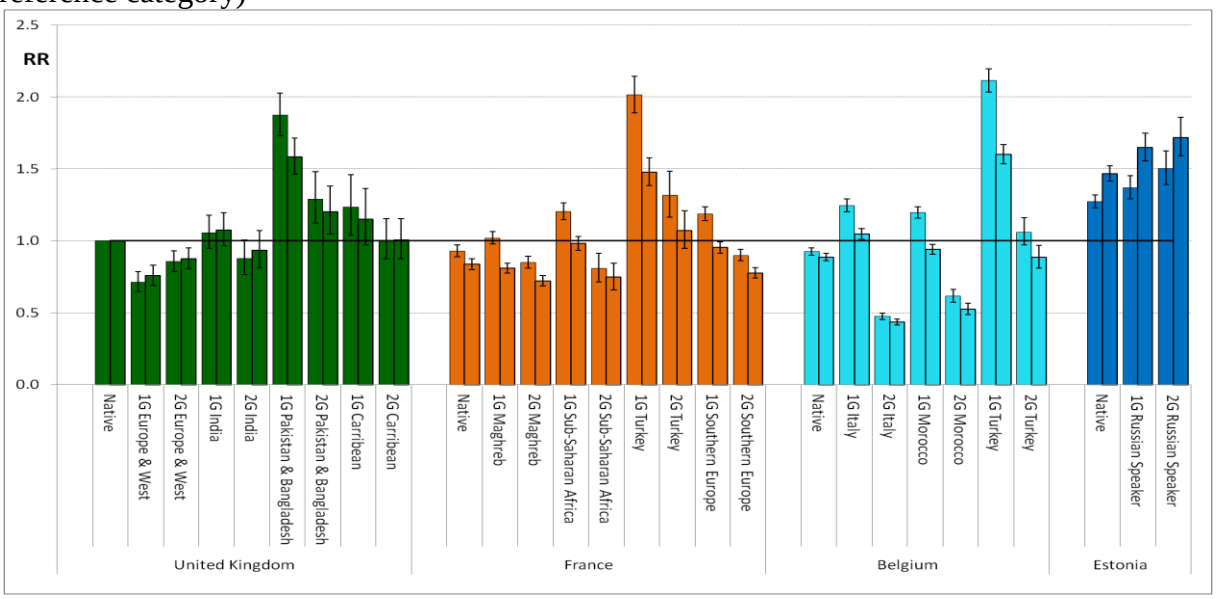
		Conception leading to first birth			Conception leading to second birth			Conception leading to third birth		
		Risk population	Events	Person-months	Risk population	Events	Person-months	Risk population	Events	Person-months
United Kingdom	Native	14866	11499	2022960	11184	8838	569256	8592	3464	916908
	1G Europe & West	699	442	109964	417	312	20418	289	95	26552
	2G Europe & West	772	576	116264	561	422	31297	417	197	40882
	1G India	447	339	59015	331	258	14298	243	108	20431
	2G India	320	208	44285	199	163	8131	159	81	11341
	1G Pakistan & Bangladesh	733	662	72760	642	553	21183	531	380	23764
	2G Pakistan & Bangladesh	366	208	36579	196	157	4873	147	87	6658
	1G Carribean	160	137	19459	136	101	10068	99	48	8937
	2G Carribean	273	206	38194	199	131	15555	126	68	9393
	Total	**18636**	**14277**	**2519480**	**13865**	**10935**	**695079**	**10603**	**4528**	**1064866**
France	Native	3400	2475	501427	2514	1820	187115	1789	670	229137
	1G Maghreb	3400	2679	486532	2667	2139	114953	2106	1400	121246
	2G Maghreb	3400	1988	461819	1958	1306	97717	1286	581	79992
	1G Sub-Saharan Africa	2369	1873	301600	1828	1352	97474	1321	817	70328
	2G Sub-Saharan Africa	673	264	72377	260	134	10525	133	52	4838
	1G Turkey	1196	1063	112912	1036	894	36265	880	607	45198
	2G Turkey	482	270	48023	262	162	9111	160	53	7128
	1G Southern Europe	3400	2904	451849	2868	2202	234113	2174	827	349423
	2G Southern Europe	3400	2430	506422	2476	1682	190698	1666	451	223788
	Total	**21720**	**15946**	**2942961**	**15869**	**11691**	**977971**	**11515**	**5458**	**1131078**
Germany	Native	22933	9006	2467174	22169	12263	1141857			
	1G Turkey	807	599	62768	1650	1336	77928			
	2G Turkey	374	109	25356	280	129	11749			
	Total	**24114**	**9714**	**2555298**	**24099**	**13728**	**1231534**			
Belgium	Native	12797	8341	1575889	8350	5693	597994	5696	2104	625549
	1G Italy	5385	4558	622354	4591	3586	318255	3594	1737	411661
	2G Italy	7317	1874	773568	777	763	67314	350	119	27833
	1G Morocco	6497	4858	731635	1879	4031	164766	764	3125	155003
	2G Morocco	3896	776	290976	3555	349	19968	3051	102	8979
	1G Turkey	4270	3473	340531	4967	3022	120471	4075	2178	143971
	2G Turkey	2008	518	127767	520	228	14970	228	56	6588
	Total	**42170**	**24398**	**4462720**	**24639**	**17672**	**1303738**	**17758**	**9421**	**1379584**
Switzerland	Native	5620	3060	930415						
	1G For. Yugoslavia & Turkey	99	81	14870						
	2G For. Yugoslavia & Turkey	54	27	7918						
	1G Western Europe	385	287	69930						
	2G Western Europe	395	251	71280						
	1G Southern Europe	222	191	30327						
	2G Southern Europe	339	223	56974						
	Total	**7114**	**4120**	**1181714**						
Sweden	Native	6740	3993	705419	5670	3638	213826	4921	1170	343099
	2G Finland	2127	1169	222497	1798	1103	79947	1499	372	113532
	2G For. Yugoslavia	2234	1208	241011	1803	1066	76484	1447	287	107425
	2G Turkey	1406	759	150172	1114	697	46520	925	321	58031
	2G Iran	176	76	22736	92	51	2848	71	15	3513
	Total	**12683**	**7205**	**1341835**	**10477**	**6555**	**419625**	**8863**	**2165**	**625600**
Spain	Native	5728	3297	1701564	3420	2195	262608			
	1G EU, US, Canada	1779	1144	574332	1144	639	102876			
	1.5G EU, US, Canada	129	74	40188	74	57	4728			
	1G Maghreb	604	361	203184	361	221	31680			
	1.5G Maghreb	2834	2019	868140	2019	1222	174144			
	1G Latin America	622	459	195564	459	325	27072			
	1.5G Latin America	328	143	97620	143	83	11724			
	Total	**12024**	**7497**	**3680592**	**7620**	**4742**	**614832**			
Estonia	Native	4992	4120	571846	4086	2833	298794	2835	1000	324261
	1G Russian Speaker	1373	1262	155927	1251	794	130110	797	119	117615
	2G Russian Speaker	868	674	87946	669	321	64501	323	53	40108
	Total	**7233**	**6056**	**815719**	**6006**	**3948**	**493405**	**3955**	**1172**	**481984**

Table 3: Relative risks of first birth

Variable	Category	Country set 1 (UK, France, Belgium and Estonia)						Country set 2 (Germany, Switzerland, Sweden and Spain)					
		Model 1			Model 2			Model 1			Model 2		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group													
	15-19	0.30	***	0.29 - 0.30	0.28	***	0.27 - 0.28	0.09	***	0.08 - 0.09	0.08	***	0.08 - 0.08
	20-24	0.85	***	0.83 - 0.86	0.82	***	0.81 - 0.84	0.60	***	0.58 - 0.61	0.57	***	0.56 - 0.59
	25-29	1			1			1			1		
	30-34	0.69	***	0.67 - 0.72	0.69	***	0.66 - 0.71	1.18	***	1.14 - 1.22	1.20	***	1.16 - 1.24
	35+	0.19	***	0.18 - 0.20	0.18	***	0.17 - 0.19	0.50	***	0.47 - 0.53	0.50	***	0.48 - 0.53
Birth cohort													
	1940-1949	1.25	***	1.22 - 1.28	1.09	***	1.06 - 1.11	1.26	***	1.16 - 1.36	1.13	***	1.04 - 1.22
	1950-1959	1.15	***	1.13 - 1.18	1.08	***	1.05 - 1.10	1.26	***	1.21 - 1.32	1.20	***	1.14 - 1.25
	1960-1969	1			1			1			1		
	1970-1979	0.90	***	0.88 - 0.92	0.97	***	0.94 - 0.99	0.85	***	0.83 - 0.88	0.88	***	0.85 - 0.91
	1980-1989	0.77	***	0.74 - 0.80	0.83	***	0.80 - 0.86	0.66	***	0.63 - 0.70	0.68	***	0.65 - 0.72
Country and Migrant group	United Kingdom												
	Native	1			1								
	1G Europe & West	0.71	***	0.65 - 0.78	0.76	***	0.69 - 0.83						
	2G Europe & West	0.86	***	0.79 - 0.93	0.88	***	0.81 - 0.95						
	1G India	1.06		0.95 - 1.18	1.07		0.96 - 1.20						
	2G India	0.88	*	0.76 - 1.01	0.93		0.81 - 1.07						
	1G Pakistan & Bangladesh	1.87	***	1.73 - 2.03	1.59	***	1.47 - 1.72						
	2G Pakistan & Bangladesh	1.29	***	1.12 - 1.48	1.20	***	1.05 - 1.38						
	1G Carribean	1.23	**	1.04 - 1.46	1.15	*	0.97 - 1.36						
	2G Carribean	1.00		0.88 - 1.15	1.01		0.88 - 1.15						
	France												
	Native	0.93	***	0.89 - 0.97	0.84	***	0.80 - 0.87						
	1G Maghreb	1.02		0.98 - 1.06	0.81	***	0.77 - 0.84						
	2G Maghreb	0.85	***	0.81 - 0.89	0.72	***	0.69 - 0.76						
	1G Sub-Saharan Africa	1.20	***	1.15 - 1.26	0.98		0.93 - 1.03						
	2G Sub-Saharan Africa	0.81	***	0.72 - 0.91	0.75	***	0.66 - 0.84						
	1G Turkey	2.01	***	1.89 - 2.15	1.48	***	1.39 - 1.58						
	2G Turkey	1.32	***	1.17 - 1.49	1.07		0.95 - 1.21						
	1G Southern Europe	1.19	***	1.14 - 1.24	0.95	**	0.91 - 0.99						
	2G Southern Europe	0.90	***	0.86 - 0.94	0.78	***	0.74 - 0.81						
	Belgium												
	Native	0.92	***	0.90 - 0.95	0.89	***	0.86 - 0.91						
	1G Italy	1.25	***	1.20 - 1.29	1.05	**	1.01 - 1.08						
	2G Italy	0.47	***	0.45 - 0.50	0.44	***	0.41 - 0.46						
	1G Morocco	1.20	***	1.16 - 1.24	0.94	***	0.91 - 0.98						
	2G Morocco	0.62	***	0.57 - 0.66	0.53	***	0.49 - 0.57						
	1G Turkey	2.11	***	2.03 - 2.20	1.60	***	1.54 - 1.67						
	2G Turkey	1.06		0.97 - 1.16	0.89	***	0.81 - 0.97						
	Estonia												
	Native	1.27	***	1.23 - 1.32	1.47	***	1.41 - 1.52						
	1G Russian Speaker	1.37	***	1.29 - 1.45	1.65	***	1.56 - 1.75						
	2G Russian Speaker	1.50	***	1.39 - 1.62	1.72	***	1.59 - 1.86						
	Germany												
	Native							1			1		
	1G Turkey							3.02	***	2.78 - 3.28	2.34	***	2.15 - 2.55
	2G Turkey							1.50	***	1.24 - 1.81	1.38	***	1.15 - 1.67
	Switzerland												
	Native							0.91	***	0.87 - 0.95	0.93	***	0.88 - 0.97
	1G For. Yugoslavia & Turkey							1.56	***	1.25 - 1.94	1.51	***	1.21 - 1.88
	2G For. Yugoslavia & Turkey							1.26		0.86 - 1.83	1.23		0.84 - 1.79
	1G Western Europe							1.04		0.92 - 1.17	1.15	**	1.02 - 1.29
	2G Western Europe							0.96		0.85 - 1.09	1.02		0.90 - 1.16
	1G Southern Europe							1.82	***	1.57 - 2.11	1.73	***	1.49 - 2.00
	2G Southern Europe							1.14	*	1.00 - 1.30	1.14	**	1.00 - 1.31
	Sweden												
	Native							1.21	***	1.17 - 1.26	1.24	***	1.19 - 1.29
	2G Finland							1.12	***	1.06 - 1.20	1.10	***	1.04 - 1.18
	2G For. Yugoslavia							1.07	**	1.01 - 1.14	1.05	*	0.99 - 1.12
	2G Turkey							1.17	***	1.09 - 1.26	1.13	***	1.04 - 1.22
	2G Iran							0.73	***	0.58 - 0.91	0.75	**	0.60 - 0.94
	Spain												
	Native							1.11	***	1.07 - 1.16	1.13	***	1.08 - 1.18
	1G EU, US, Canada							1.08	**	1.02 - 1.16	1.10	***	1.03 - 1.17
	1.5G EU, US, Canada							0.91	*	0.82 - 1.01	0.90	*	0.81 - 1.00
	1G Maghreb							1.35	***	1.23 - 1.48	1.12	**	1.02 - 1.23
	1.5G Maghreb							0.99		0.79 - 1.25	0.84		0.67 - 1.06
	1G Latin America							1.38	***	1.31 - 1.45	1.40	***	1.33 - 1.47
	1.5G Latin America							0.92		0.78 - 1.09	0.99		0.84 - 1.17
Education level													
	Unknown				0.98		0.95 - 1.02				0.12	***	0.07 - 0.22
	Low				1						1		
	Medium				0.73	***	0.72 - 0.75				0.73	***	0.70 - 0.75
	High				0.49	***	0.48 - 0.50				0.52	***	0.50 - 0.54
Constant		0.009	***	0.009 - 0.010	0.015	***	0.014 - 0.015	0.006	***	0.006 - 0.007	0.009	***	0.009 - 0.010

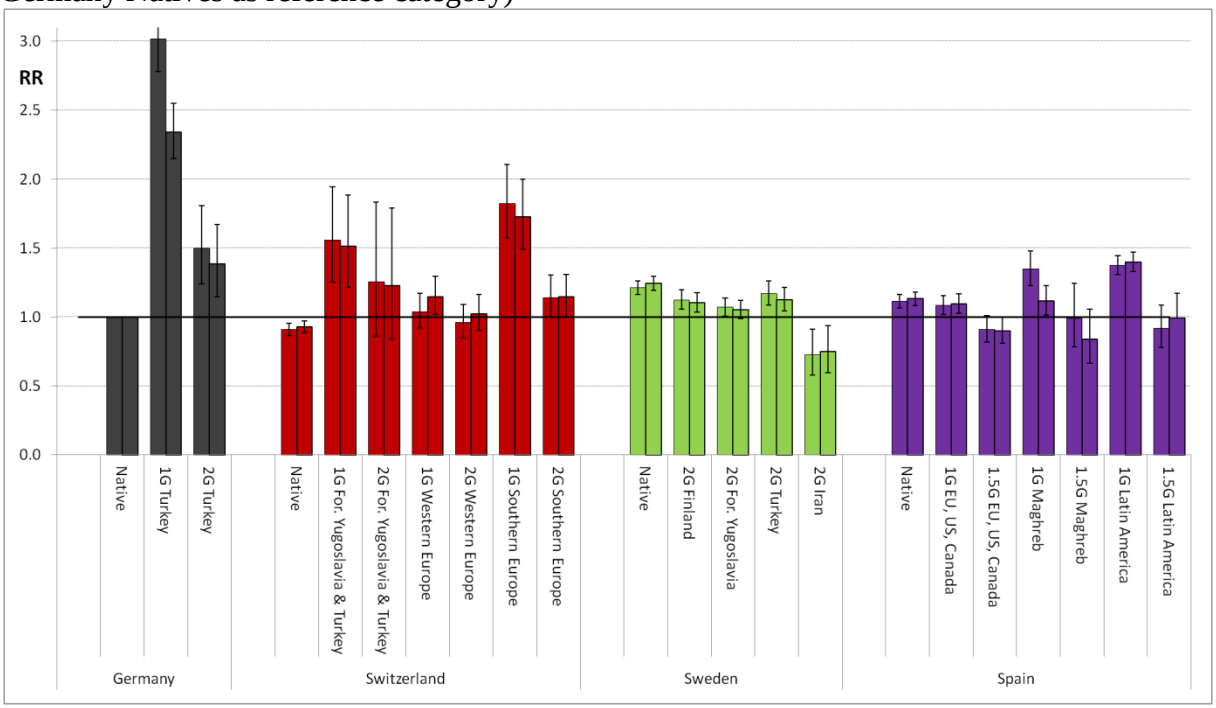
Significance level: *** = p-value < 0.01, ** = p-value < 0.05,* = p-value < 0.1
Model 1 controlls for cohort and age group
Model 2 controlls additionally for education

Figure 1a: Relative risks of first birth (UK, France, Belgium and Estonia with UK Natives as reference category)



Model 1 = controlled for cohort and age group
Model 2 = controlled additionally for education

Figure 1b: Relative risks of first birth (Germany, Switzerland, Sweden and Spain with Germany Natives as reference category)



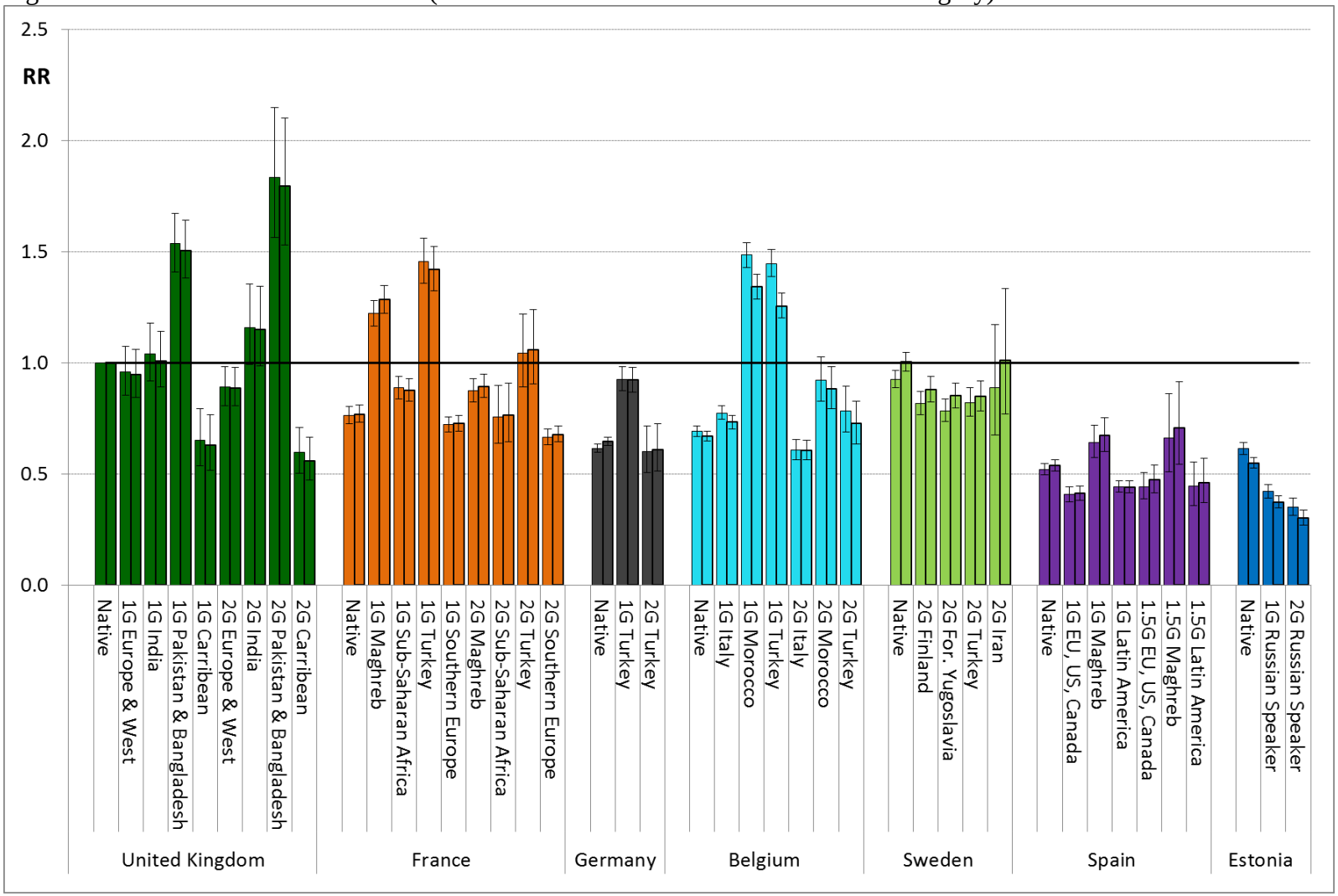
Model 1 = controlled for cohort and age group
Model 2 = controlled additionally for education

Table 4: Relative risks of second birth

Variable		Category	Model 1			Model 2		
			RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Years since First birth		0-1	0.39	***	0.38 - 0.40	0.39	***	0.38 - 0.40
		1-3	1			1		
		3-5	0.85	***	0.83 - 0.86	0.85	***	0.83 - 0.86
		5-10	0.39	***	0.38 - 0.40	0.39	***	0.38 - 0.40
		10+	0.09	***	0.08 - 0.09	0.08	***	0.08 - 0.09
Birth cohort								
		1940-1949	1.13	***	1.10 - 1.16	1.09	***	1.06 - 1.13
		1950-1959	1.06	***	1.03 - 1.08	1.04	***	1.01 - 1.06
		1960-1969	1			1		
		1970-1979	1.01		0.99 - 1.04	0.97	***	0.95 - 0.99
		1980-1989	0.92	***	0.88 - 0.96	0.81	***	0.78 - 0.85
Country and Migrant group	United Kingdom							
		Native	1			1		
		1G Europe & West	0.96		0.86 - 1.07	0.95		0.84 - 1.06
		2G Europe & West	0.89	**	0.81 - 0.98	0.89	**	0.80 - 0.98
		1G India	1.04		0.92 - 1.18	1.01		0.89 - 1.14
		2G India	1.16	*	0.99 - 1.35	1.15	*	0.99 - 1.34
		1G Pakistan & Bangladesh	1.53	***	1.41 - 1.67	1.50	***	1.38 - 1.64
		2G Pakistan & Bangladesh	1.83	***	1.56 - 2.15	1.79	***	1.53 - 2.10
		1G Carribean	0.65	***	0.54 - 0.79	0.63	***	0.52 - 0.77
		2G Carribean	0.60	***	0.50 - 0.71	0.56	***	0.47 - 0.66
	France							
		Native	0.76	***	0.73 - 0.80	0.77	***	0.73 - 0.81
		1G Maghreb	1.22	***	1.16 - 1.28	1.28	***	1.22 - 1.35
		2G Maghreb	0.87	***	0.82 - 0.93	0.89	***	0.84 - 0.95
		1G Sub-Saharan Africa	0.89	***	0.84 - 0.94	0.88	***	0.83 - 0.93
		2G Sub-Saharan Africa	0.76	***	0.64 - 0.90	0.76	***	0.64 - 0.91
		1G Turkey	1.46	***	1.36 - 1.56	1.42	***	1.32 - 1.52
		2G Turkey	1.04		0.89 - 1.22	1.06		0.90 - 1.24
		1G Southern Europe	0.72	***	0.69 - 0.76	0.73	***	0.69 - 0.76
		2G Southern Europe	0.67	***	0.63 - 0.70	0.68	***	0.64 - 0.71
	Germany							
		Native	0.61	***	0.60 - 0.63	0.65	***	0.63 - 0.67
		1G Turkey	0.93	***	0.87 - 0.98	0.92	***	0.87 - 0.98
		2G Turkey	0.60	***	0.50 - 0.72	0.61	***	0.51 - 0.73
	Belgium							
		Native	0.69	***	0.67 - 0.71	0.67	***	0.65 - 0.69
		1G Italy	0.77	***	0.74 - 0.81	0.73	***	0.70 - 0.76
		2G Italy	0.61	***	0.56 - 0.66	0.61	***	0.56 - 0.65
		1G Morocco	1.48	***	1.43 - 1.54	1.34	***	1.29 - 1.40
		2G Morocco	0.92		0.83 - 1.03	0.88	**	0.79 - 0.98
		1G Turkey	1.45	***	1.39 - 1.51	1.26	***	1.20 - 1.31
		2G Turkey	0.78	***	0.69 - 0.90	0.73	***	0.64 - 0.83
	Sweden							
		Native	0.93	***	0.89 - 0.97	1.00		0.96 - 1.05
		2G Finland	0.82	***	0.77 - 0.87	0.88	***	0.82 - 0.94
		2G For. Yugoslavia	0.78	***	0.73 - 0.84	0.85	***	0.80 - 0.91
		2G Turkey	0.82	***	0.76 - 0.89	0.85	***	0.78 - 0.92
		2G Iran	0.89		0.67 - 1.17	1.01		0.77 - 1.33
	Spain							
		Native	0.52	***	0.50 - 0.55	0.54	***	0.51 - 0.56
		1G EU, US, Canada	0.41	***	0.38 - 0.44	0.41	***	0.38 - 0.45
		1.5G EU, US, Canada	0.44	***	0.39 - 0.51	0.47	***	0.41 - 0.54
		1G Maghreb	0.64	***	0.57 - 0.72	0.67	***	0.60 - 0.75
		1.5G Maghreb	0.66	***	0.51 - 0.86	0.71	***	0.54 - 0.92
		1G Latin America	0.44	***	0.42 - 0.47	0.44	***	0.41 - 0.47
		1.5G Latin America	0.45	***	0.36 - 0.55	0.46	***	0.37 - 0.57
	Estonia							
		Native	0.61	***	0.59 - 0.64	0.55	***	0.53 - 0.57
		1G Russian Speaker	0.42	***	0.39 - 0.45	0.37	***	0.35 - 0.40
		2G Russian Speaker	0.35	***	0.31 - 0.39	0.30	***	0.27 - 0.34
Education level								
		Unknown				1.23	***	1.19 1.28
		Low				1		
		Medium				0.98	**	0.96 1.00
		High				1.19	***	1.16 1.21
Age at first birth								
		15-19				1.12	***	1.09 1.14
		20-24				1		
		25-29				0.89	***	0.87 0.90
		30+				0.66	***	0.64 0.68
Constant			0.027	***	0.026 - 0.027	0.029	***	0.028 - 0.030

Significance level: *** = p-value < 0.01, ** = p-value < 0.05,* = p-value < 0.1
Model 1 controlls for cohort and years since first birth
Model 2 controlls additionally for education and age at first birth

Figure 2: Relative risks of second birth (all countries with UK natives as reference category)



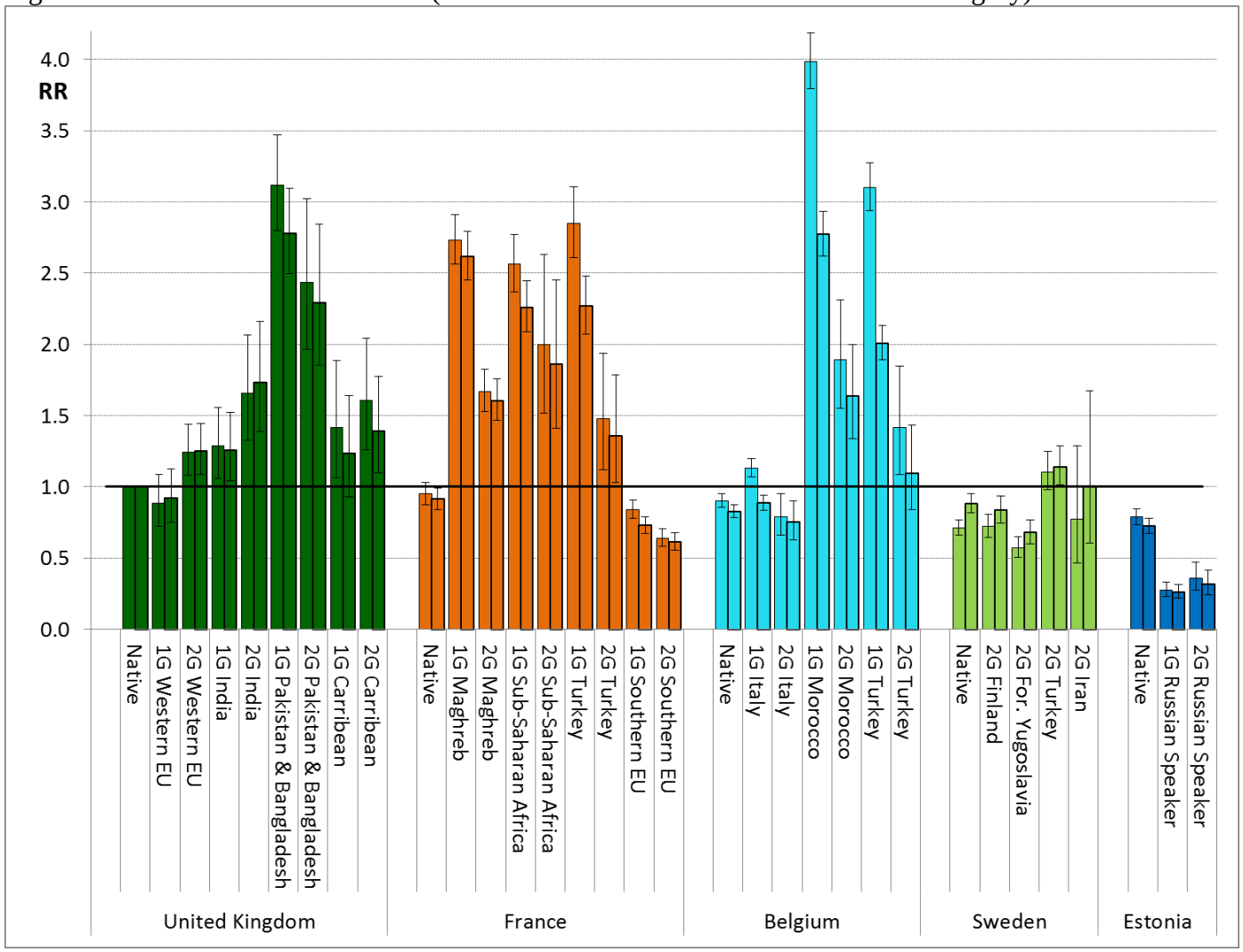
Model 1 = controlled for cohort and years since first birth
Model 2 = controlled additionally for education and age at first birth

Table 5: Relative risks of third birth

Variable		Value	Model 1			Model 2		
			RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Years since								
Second birth		0-1	0.64	***	0.62 - 0.66	0.63	***	0.61 - 0.66
		1-3	1			1		
		3-5	0.78	***	0.75 - 0.81	0.78	***	0.76 - 0.81
		5-10	0.38	***	0.37 - 0.39	0.38	***	0.36 - 0.39
		10+	0.09	***	0.08 - 0.09	0.08	***	0.07 - 0.08
Birth cohort								
		1940-1949	1.24	***	1.19 - 1.29	1.10	***	1.06 - 1.15
		1950-1959	1.06	***	1.02 - 1.10	0.98		0.94 - 1.01
		1960-1969	1			1		
		1970-1979	1.07	***	1.03 - 1.12	0.99		0.95 - 1.03
		1980-1989	1.28	***	1.16 - 1.41	1.01		0.91 - 1.11
Country and	United Kingdom							
Migrant group		Native	1			1		
		1G Western EU	0.89		0.72 - 1.09	0.92		0.75 - 1.13
		2G Western EU	1.25	***	1.08 - 1.44	1.25	***	1.08 - 1.45
		1G India	1.29	***	1.06 - 1.56	1.26	**	1.04 - 1.53
		2G India	1.66	***	1.33 - 2.06	1.73	***	1.39 - 2.16
		1G Pakistan & Bangladesh	3.12	***	2.80 - 3.47	2.78	***	2.49 - 3.09
		2G Pakistan & Bangladesh	2.44	***	1.97 - 3.02	2.29	***	1.85 - 2.84
		1G Carribean	1.42	**	1.07 - 1.88	1.24		0.93 - 1.64
		2G Carribean	1.60	***	1.26 - 2.04	1.39	***	1.10 - 1.77
	France							
		Native	0.95		0.87 - 1.03	0.91	**	0.84 - 0.99
		1G Maghreb	2.73	***	2.57 - 2.91	2.62	***	2.45 - 2.79
		2G Maghreb	1.67	***	1.53 - 1.83	1.60	***	1.46 - 1.76
		1G Sub-Saharan Africa	2.56	***	2.37 - 2.77	2.26	***	2.09 - 2.44
		2G Sub-Saharan Africa	2.00	***	1.52 - 2.63	1.86	***	1.41 - 2.45
		1G Turkey	2.85	***	2.61 - 3.11	2.27	***	2.07 - 2.48
		2G Turkey	1.48	***	1.12 - 1.94	1.36	**	1.03 - 1.79
		1G Southern EU	0.84	***	0.78 - 0.91	0.73	***	0.67 - 0.79
		2G Southern EU	0.64	***	0.58 - 0.71	0.61	***	0.56 - 0.68
	Belgium							
		Native	0.90	***	0.86 - 0.95	0.83	***	0.78 - 0.88
		1G Italy	1.13	***	1.07 - 1.20	0.89	***	0.83 - 0.94
		2G Italy	0.79	**	0.66 - 0.95	0.75	***	0.62 - 0.90
		1G Morocco	3.99	***	3.79 - 4.19	2.77	***	2.62 - 2.94
		2G Morocco	1.89	***	1.55 - 2.31	1.64	***	1.34 - 2.00
		1G Turkey	3.10	***	2.94 - 3.28	2.01	***	1.89 - 2.13
		2G Turkey	1.42	***	1.09 - 1.85	1.10		0.84 - 1.43
	Sweden							
		Native	0.71	***	0.66 - 0.77	0.88	***	0.82 - 0.95
		2G Finland	0.72	***	0.64 - 0.81	0.84	***	0.75 - 0.94
		2G For. Yugoslavia	0.57	***	0.51 - 0.65	0.68	***	0.60 - 0.77
		2G Turkey	1.11	*	0.98 - 1.25	1.14	**	1.01 - 1.29
		2G Iran	0.78		0.47 - 1.29	1.01		0.61 - 1.68
	Estonia							
		Native	0.79	***	0.73 - 0.85	0.72	***	0.67 - 0.78
		1G Russian Speaker	0.28	***	0.23 - 0.33	0.26	***	0.22 - 0.31
		2G Russian Speaker	0.36	***	0.27 - 0.47	0.32	***	0.24 - 0.42
Education level								
		Unknown				1.40	***	1.34 - 1.47
		Low				1		
		Medium				0.82	***	0.79 - 0.85
		High				0.89	***	0.85 - 0.93
Age at first birth								
		15-19				1.35	***	1.30 - 1.39
		20-24				1		
		25-29				0.69	***	0.67 - 0.72
		30+				0.49	***	0.46 - 0.52
Constant			0.007	***	0.007 - 0.007	0.009	***	0.009 - 0.010

Significance level: *** = p-value < 0.01, ** = p-value < 0.05,* = p-value < 0.1
Model 1 controlls for cohort and years since second birth
Model 2 controlls additionally for education and age at first birth

Figure 3: Relative risks of third birth (all countries with UK natives as reference category)



Model 1 = controlled for cohort and years since second birth
Model 2 = controlled additionally for education and age at first birth

Appendix

Table A1: Relative risks of second birth, with and without weights

Variable		Category	Model 2, no weights			Model 2, weights		
			RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Country and Migrant group	United Kingdom							
		Native	1			1		
		1G Europe & West	0.95		0.84 - 1.06	0.96		0.83 - 1.11
		2G Europe & West	0.89	**	0.80 - 0.98	0.88	**	0.78 - 1.00
		1G India	1.01		0.89 - 1.14	1.03		0.85 - 1.24
		2G India	1.15	*	0.99 - 1.34	1.18	**	1.00 - 1.38
		1G Pakistan & Bangladesh	1.50	***	1.38 - 1.64	1.52	***	1.32 - 1.74
		2G Pakistan & Bangladesh	1.79	***	1.53 - 2.10	1.85	***	1.46 - 2.35
		1G Carribean	0.63	***	0.52 - 0.77	0.62	***	0.50 - 0.78
		2G Carribean	0.56	***	0.47 - 0.66	0.56	***	0.46 - 0.68
	France							
		Native	0.77	***	0.73 - 0.81	0.75	***	0.67 - 0.84
		1G Maghreb	1.28	***	1.22 - 1.35	1.27	***	1.14 - 1.42
		2G Maghreb	0.89	***	0.84 - 0.95	0.89	**	0.81 - 0.98
		1G Sub-Saharan Africa	0.88	***	0.83 - 0.93	0.87	***	0.79 - 0.96
		2G Sub-Saharan Africa	0.76	***	0.64 - 0.91	0.78	**	0.63 - 0.95
		1G Turkey	1.42	***	1.32 - 1.52	1.42	***	1.26 - 1.59
		2G Turkey	1.06		0.90 - 1.24	1.07		0.90 - 1.28
		1G Southern Europe	0.73	***	0.69 - 0.76	0.70	***	0.63 - 0.78
		2G Southern Europe	0.68	***	0.64 - 0.71	0.66	***	0.60 - 0.73
	Germany							
		Native	0.65	***	0.63 - 0.67	0.65	***	0.58 - 0.72
		1G Turkey	0.92	***	0.87 - 0.98	0.92		0.79 - 1.07
		2G Turkey	0.61	***	0.51 - 0.73	0.61	***	0.48 - 0.78
	Belgium							
		Native	0.67	***	0.65 - 0.69	0.65	***	0.58 - 0.74
		1G Italy	0.73	***	0.70 - 0.76	0.71	***	0.64 - 0.79
		2G Italy	0.61	***	0.56 - 0.65	0.61	***	0.55 - 0.69
		1G Morocco	1.34	***	1.29 - 1.40	1.34	***	1.22 - 1.46
		2G Morocco	0.88	**	0.79 - 0.98	0.90		0.76 - 1.07
		1G Turkey	1.26	***	1.20 - 1.31	1.25	***	1.13 - 1.39
		2G Turkey	0.73	***	0.64 - 0.83	0.74	***	0.61 - 0.90
	Sweden							
		Native	1.00		0.96 - 1.05	1.02		0.86 - 1.21
		2G Finland	0.88	***	0.82 - 0.94	0.88		0.73 - 1.05
		2G For. Yugoslavia	0.85	***	0.80 - 0.91	0.86	**	0.74 - 0.99
		2G Turkey	0.85	***	0.78 - 0.92	0.85	*	0.70 - 1.02
		2G Iran	1.01		0.77 - 1.33	1.04		0.80 - 1.36
	Spain							
		Native	0.54	***	0.51 - 0.56	0.52	***	0.45 - 0.61
		1G EU, US, Canada	0.41	***	0.38 - 0.45	0.40	***	0.36 - 0.46
		1.5G EU, US, Canada	0.47	***	0.41 - 0.54	0.46	***	0.37 - 0.58
		1G Maghreb	0.67	***	0.60 - 0.75	0.67	***	0.57 - 0.79
		1.5G Maghreb	0.71	***	0.54 - 0.92	0.69	***	0.54 - 0.88
		1G Latin America	0.44	***	0.41 - 0.47	0.43	***	0.39 - 0.49
		1.5G Latin America	0.46	***	0.37 - 0.57	0.45	***	0.37 - 0.56
	Estonia							
		Native	0.55	***	0.53 - 0.57	0.55	***	0.50 - 0.61
		1G Russian Speaker	0.37	***	0.35 - 0.40	0.37	***	0.32 - 0.43
		2G Russian Speaker	0.30	***	0.27 - 0.34	0.30	***	0.26 - 0.34

Significance level: *** = p-value < 0.01, ** = p-value < 0.05,* = p-value < 0.1
Model 2 controlls for cohort, years since first birth, education and age at first birth