Fertility by Birth Order among the Descendants of Immigrants in Selected European Countries

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European populations are characterized by an increasing share of immigrants and their descendants (Castles and Miller 2009; Rees et al. 2012). In the second half of the twentieth century, most immigrants 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, and van der Erf 2011). Central and Eastern European countries with state socialist regimes and planned economies showed specific migration patterns during the post–World War II period; some countries contributed to intra-European labor migration, others 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 the twenty-first century (Fassmann and Münz 1994; Frejka 1996; Raymer, de Beer, and van der Erf 2011; Rees et al. 2012). Over time, the share of the descendants of postwar immigrants has also increased (we also refer to them as ethnic minorities or the second generation). 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). Immigrants and their descendants thus increasingly shape demographic, social, and cultural trends in European societies.

There is extensive research on different aspects of immigrants' lives, including their legal status and citizenship (Bauböck 2003; Seifert 1997), employment and education (Adsera and Chiswick 2007; Rendall et al.

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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 and Milewski 2007; Milewski 2010b; Mussino and Strozza 2012; Sobotka 2008; Tromans, Natamba, and 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 fertility levels for some groups remain high relative to the fertility of the host population (Coleman and Dubuc 2010; Dubuc 2012; Milewski 2010b; Sobotka 2008).

The present study investigates the childbearing patterns among the descendants of immigrants in six European countries: the UK, France, Germany, Belgium, Sweden, and Spain. This group includes "old" and "new" immigrant countries as well as countries with different migration and family policies and fertility dynamics and patterns. The cross-country analysis of fertility behavior among ethnic minorities allows us 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 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 (defined here as native-born persons with native-born parents). Our study is the first to analyze ethnic minority fertility by parity, with and without controls for demographic and socioeconomic factors.

Explaining fertility among the descendants of immigrants

Previous research has investigated the role of origin and destination country contexts in shaping immigrant fertility. Some studies have demonstrated that immigrants maintain the childbearing patterns dominant in their country of origin (Coleman 1994; Garssen and Nicolaas 2008), whereas others have shown that, over time, immigrant fertility behavior increasingly resembles that of natives in the destination country (Andersson 2004). However, immigrants moving from high-fertility to low-fertility countries tend to have larger families than the natives in the destination country (Milewski 2010b). As a result of selection processes, the fertility behavior of immigrants can also differ substantially from the behavior dominant in the sending country (Chiswick 1999; González-Ferrer, Hannemann, and Castro-Martín 2016). The fertility behavior of the descendants of immigrants is primarily influenced by the social environment in the country in which they grew up, although that environment is not uniform. Some may

grow up under the influence of mainstream society, while others may be raised and live largely under the influence of a minority subculture, if such a subculture exists.

The influence of mainstream society leads to structural (mainly economic) and cultural assimilation of the descendants of immigrants, suggesting that their behavior becomes similar to that of the majority population (Berry 1992). The existence of a minority subculture indicates that populations of immigrant background may preserve values, norms, and attitudes toward family and fertility that are common in their 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," a distinction that is also perceived by members of the majority group (Bean and Tienda 1987; Milewski 2010a).

Research should therefore determine whether the childbearing behavior of the descendants of immigrants from high-fertility societies more closely resembles that of their parents (and their country of origin) or the behavior that dominates in the mainstream society. If immigrants and their descendants exhibit similar fertility behavior, and that behavior differs significantly from the behavior of the native population, we could assume that the descendants of immigrants were mostly raised under the influence of the minority subculture (Kulu and 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 (ibid.). If both the minority subculture and mainstream society played an important role (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 now living 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 factors explain the fertility patterns among the descendants of immigrants? Cultural factors are likely to be important. Relatively high fertility levels 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 and Fogli 2006; Penn and Lambert 2002; Robson and Berthoud 2006). Extended family can support young mothers with children, particularly by providing high-quality and cheap childcare when needed. Furthermore, the value and societal meaning of children may

vary between countries and ethnic origins, which would explain some differences in fertility behavior among various ethnic groups (Nauck 2007; Nauck and 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 cultures (Reher 1998). Larger families could also be a result of the cultural pressure to continue childbearing until couples have at least one and preferably two sons (Hampshire, Blell, and 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 emphasize the importance of cultural factors, education and employment-related factors may play a key role in shaping the fertility behavior of the descendants of immigrants. Successful structural integration suggests that high educational aspirations and increased opportunity costs of childbearing may lead to a lengthy 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 discrimination in the labor 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 and mother with high status (Salway 2007). While such a belief may be consistent with traditional gender roles in South Asian communities (Hennink, Diamond, and Cooper 1999), it could equally be explained by the poor employment options among ethnic minority women.

Welfare state benefits and policies have been shown to shape fertility trends and patterns in Europe and other industrialized countries (Hoem 1993b; Luci-Greulich and Thevenon 2013; McDonald 2006; Neyer and Andersson 2008). State policies may influence the fertility behavior of migrants as well (Andersson and Scott 2005). In addition, as with the native population, the descendants of migrants are influenced by the state welfare policies in their home country from early childhood. Thus, state policies may explain whether and how much convergence toward 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 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 dominate individuals' lives (Esping-Andersen 1990; Esping-Andersen and 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 being located in ethnic minority areas) or selective school systems (where selection takes place at an early age, leaving little chance for minority children to excel) may lead to poor educational attainment 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 low fertility among ethnic groups in a country (Kulu and González-Ferrer 2014).

Recent research has emphasized the importance of gender equality in shaping fertility trends and patterns in Europe, showing that more egalitarian countries have higher fertility levels than less equalitarian societies in the low-fertility context (Esping-Andersen and Billari 2015; Kohler, Billari, and 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 high aspirations for gender equality among ethnic minority women, fertility levels may be low, especially in countries where compatibility between employment and parenthood is difficult to achieve (McDonald 2000).

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 origin, with early childbearing and relatively high completed fertility levels (Sobotka 2008). Milewski (2010b) analyzed fertility of the second generation in Germany and showed that there were few (if any) differences between the childbearing behavior of the descendants of immigrants from Southern Europe and native Germans, whereas those of Turkish descent exhibited distinct childbearing patterns. Immigrants 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), investigating the fertility levels of ethnic minorities in Sweden, showed that the descendants of immigrants in general had lower first birth rates than the native Swedish population. Only a limited number of groups of descendants from a 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) showed that fertility levels declined significantly among ethnic minority populations in Britain in the last decades of the twentieth century. For each ethnic group, fertility levels were lower among the descendants of immigrants than among 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. They 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. Milewski (2011), analyzing the family formation of women of Turkish descent in seven European countries, showed that they had high levels in all seven countries. However, there were also significant differences across countries: second-generation Turkish women had higher rates in Sweden, France, and the Netherlands and lower levels in Germany and Switzerland. Thus, the study provided evidence of both socialization into a minority subculture and assimilation within the mainstream society.

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. Our hypotheses derive from previous research, which was briefly discussed above. 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 those of non-Western origin. It is less clear whether their expected high fertility is attributed to the higher likelihoods of all three parity transitions or mostly to high levels of third births. Second, we expect fertility differences between natives, immigrants, and their descendants to decrease after adjusting for women's sociodemographic characteristics; again, an interesting question is the extent to which education explains initial fertility differences across the population subgroups. Finally, we expect to observe smaller variation in ethnic minority fertility in countries that have social policies to reduce inequalities and differences between population subgroups.

Data

Data for the UK are 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 sample for the main ethnic groups (University of Essex 2015; Kulu and Hannemann

2016). For France, data from two sources were combined: the Trajectories and Origins survey, conducted in 2007 by the French National Institute of Demography and the French National Statistical Office; and the Family and Housing Survey, 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 micro-census of 2005 and 2009, a one percent sample of all German households. The fertility histories of German women were reconstructed using the own-children method (Cho, Retherford, and Choe 1986; Krapf and Wolf 2015). For Belgium, we use 2001 census data, which contain information on women's full fertility histories. The Swedish data are derived from the Swedish Population Register, which includes information on all main life events of individuals, including the birth of children (Andersson and Persson 2015). Finally, for Spain, we use data from the Fertility and Values Survey, which was conducted by the Centre for Sociological Research in 2006 (González-Ferrer, Castro-Martín, and Kraus 2015).

We investigate fertility by parity among the descendants of immigrants in these six countries. In total, there are as many as 40 population subgroups for the analysis of first births. For some countries, groups of natives, immigrants (the first generation), and their descendants (the second generation) are included, while for other countries data are available only for natives and the descendants of immigrants. The UK data distinguish among four groups of origin for both immigrant generations: 1) Europe and other industrialized countries; 2) India; 3) Pakistan and Bangladesh; and 4) Caribbean countries. For France, the following groups of immigrants and their descendants 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 minorities in Belgium are: 1) Italy; 2) Morocco; and 3) Turkey. The data on the minority populations of Sweden 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") and immigrants who were older than 15 at arrival (first generation): 1) the EU and North America; 2) Maghreb; and 3) Latin America.

Our sample consists of women born between 1940 and 1989, and the data are categorized into five ten-year birth cohorts. For two countries, information was available for a shorter cohort range: Germany 1965–1989, and Spain 1950–1989. For Sweden only the birth cohorts 1970–1979 were used. Sensitivity analysis was conducted to determine the effect of different cohort ranges on the results. The analysis showed that the results changed only slightly (the confidence intervals for the parameters were the most predominant changes); therefore, for the sake of the sample size, the full cohort

TABLE 1 Number of women by country

Country	Number
United Kingdom	18,636
France	21,720
Germany	24,114
Belgium	42,170
Sweden	36,243
Spain	12,024
Total	154,907

SOURCE: Authors' calculations based on merged data from six countries.

range (available for the most countries), that is, women born between 1940 and 1989, is used for this analysis.

We use data both from sample surveys (the UK, France, and Spain) and from population registers (Belgium, Germany, and Sweden). The sample size varied across countries (see Table 1). In a preliminary analysis, different weights were applied to account for the different sample sizes. Again, the results for this sensitivity analysis did not change significantly; the most common change was an increase or decrease in confidence intervals around the parameters when we applied sample weights (see Table A1 in Appendix).[1] Because our main interest is the fertility of ethnic groups and we have included only a few control variables, we use the original sample sizes despite the differences across countries. Another issue was related to the comparison of fertility rates obtained by using register data and rates based on survey data. A previous study on the UK by Kulu and Hannemann (2016) showed that survey data tend to overestimate fertility levels, although differences were small. Therefore, this study may slightly underestimate fertility levels in Belgium, Germany, and Sweden relative to levels in other countries. However, this possibility is not a major concern since the main aim is to compare fertility variation across population subgroups and identify 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 of datasets from the six countries was straightforward.

Methods

We use the count-data approach to investigate fertility by parity drawing on methodology developed by Hoem (Hoem 1987, 1993a; Hoem et al. 1976). This approach can be used to compare fertility rates across population subgroups and countries with and without standardizing 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:

$$\lambda_{jk} = E_{jk} / R_{jk} \tag{1}$$

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 realization of a Poisson random variable with the mean μ_{jk}:

$$\mu_{jk} = \lambda_{jk} \times R_{jk} \tag{2}$$

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:

$$\ln \mu_{jk} = \ln \lambda_{jk} + \ln R_{jk} \tag{3}$$

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

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

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

$$\ln \lambda_{jk} = \alpha_j + \mathbf{x}_k \beta \tag{5}$$

where $\alpha_j = \ln \lambda_j$ 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 $\boldsymbol{\beta}$ is 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 nth 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 exposure-occurrence tables for each country, which were aggregated using specific combinations of socio-demographic variables. Individuals became at 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 onward, and their life histories were censored at age 40. All country files were then merged into one database and modeled using a Poisson regression model (Equation 5). The following variables were used to prepare the exposure-occurrence tables: 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 years since previous birth (0–1, 1–3, 3–5, 5–10, 10+), education level (low, medium, and high, according to ISCED (1997) levels 0–2, 3–4, and 5–6), and, for higher-order births, woman's age at first birth (15–19, 20–24, 25–29, 30–44).

Table 2 indicates the size of the population at risk and the number of events and person-months for each birth (first, second, and third) in the six countries by migrant group. In most cases, the population at risk decreases when proceeding to higher-order births because women who did not experience a previous birth are no longer included in the new at-risk population (e.g., childless women are not at risk for a second birth). For Germany, two similar-size sample sets were drawn from the original data source for the analysis of first and second births.

Results

First births

For the analysis of first births, all childless women are at risk. The first model controls solely for age and birth cohort. We fit our regression models separately for two categories of countries with slightly different timing of childbearing: early (the UK, France, and Belgium) and late (Germany, Sweden, Spain). Native British and German women are the reference groups in those two categories. First birth rates are similar for native women in the UK, France, and Belgium (Table 3 and Figure 1a). Rates are relatively low in Germany (further analysis showed lower levels for Germany in comparison to the UK) and 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 and Kohler 2004; Goldstein, Sobotka, and Jasilioniene 2009; Goldstein and Kreyenfeld 2011; Kohler, Billari, and Ortega 2002; Toulemon, Pailhé, and Rossier 2008).

Immigrants from Pakistan and Bangladesh in the UK and immigrants from Turkey in France, Belgium, and Germany have 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 similar to or slightly lower than those of natives in the respective countries. First birth rates are somewhat higher among women of Pakistani and Bangladeshi descent in the UK and for those of Turkish origin in France and Belgium. First birth levels in Germany are also higher among the descendants of Turkish immigrants than among natives, but they are not particularly high in comparison with women of Turkish origin in other European countries. In Sweden, women of Turkish descent have first birth levels similar to those of natives. Interestingly, a number of the second-generation groups have low first birth levels: Italians and Moroccans in Belgium and Iranians in Sweden.

Model 2 controls for women's education level. The differences in first birth levels between natives, immigrants, and the descendants of

TABLE 2 Number of women at risk, births, and person-months by migrant group

	Conception leading to first birth			Conception leading to second birth			Conception leading to third birth		
	Population at risk	Births	Person-months	Population at risk	Births	Person-months	Population at risk	Births	Person-months
United Kingdom									
Native	14866	11499	2022960	11184	8838	569256	8592	3464	916908
1G Europe and West	699	442	109964	417	312	20418	289	95	26552
2G Europe and 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 and Bangladesh	733	662	72760	642	553	21183	531	380	23764
2G Pakistan and Bangladesh	366	208	36579	196	157	4873	147	87	6658
1G Caribbean	160	137	19459	136	101	10068	99	48	8937
2G Caribbean	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**			

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TABLE 2 (continued)

	Conception leading to first birth			Conception leading to second birth			Conception leading to third birth		
	Population at risk	Births	Person-months	Population at risk	Births	Person-months	Population at risk	Births	Person-months
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**
Sweden									
Native	6740	3993	705419	5670	3638	213826	4921	1170	343099
2G Finland	2127	1169	222497	1798	1103	79947	1499	372	113532
2G Former 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**			

SOURCE: As in Table 1.

TABLE 3 Relative risk of first birth in European countries with early and late age at first birth

	Relative risk			
	Early age at first birth: UK, France, Belgium		Late age at first birth: Germany, Sweden, Spain	
	Model 1	Model 2	Model 1	Model 2
Age group				
15–19	0.31***	0.29***	0.09***	0.08***
20–24	0.82***	0.79***	0.61***	0.59***
25–29	1	1	1	1
30–34	0.71***	0.70***	1.22***	1.25***
35+	0.19***	0.18***	0.60***	0.61***
Birth cohort				
1940–1949	1.35***	1.17***		
1950–1959	1.18***	1.09***	1.28***	1.20***
1960–1969	1	1	1	1
1970–1979	0.92***	1.00	0.88***	0.91***
1980–1989	0.79***	0.86***	0.72***	0.75***
United Kingdom				
Native	1	1		
1G Europe and West	0.72***	0.77***		
2G Europe and West	0.86***	0.88***		
1G India	1.06	1.08		
2G India	0.89*	0.94		
1G Pakistan and Bangladesh	1.88***	1.58***		
2G Pakistan and Bangladesh	1.30***	1.20***		
1G Caribbean	1.23**	1.15		
2G Caribbean	1.02	1.02		
France				
Native	0.94***	0.84***		
1G Maghreb	1.03	0.81***		
2G Maghreb	0.86***	0.73***		
1G Sub-Saharan Africa	1.22***	0.99		
2G Sub-Saharan Africa	0.81***	0.75***		
1G Turkey	2.03***	1.48***		
2G Turkey	1.32***	1.06		
1G Southern Europe	1.20***	0.96*		
2G Southern Europe	0.91***	0.78***		
Belgium				
Native	0.92***	0.89***		
1G Italy	1.23***	1.03*		
2G Italy	0.48***	0.44***		
1G Morocco	1.21***	0.95***		
2G Morocco	0.62***	0.52***		
1G Turkey	2.11***	1.60***		
2G Turkey	1.06	0.88***		

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TABLE 3 (continued)

	Relative risk			
	Early age at first birth: UK, France, Belgium		Late age at first birth: Germany, Sweden, Spain	
	Model 1	Model 2	Model 1	Model 2
Germany				
Native			1	1
1G Turkey			3.01***	2.33***
2G Turkey			1.48***	1.36***
Sweden				
Native			1.20***	1.23***
2G Finland			1.11***	1.09***
2G Former Yugoslavia			1.06*	1.04
2G Turkey			1.16***	1.12***
2G Iran			0.72***	0.74***
Spain				
Native			1.12***	1.14***
1G EU, US, Canada			1.08**	1.10***
1.5G EU, US, Canada			0.92	0.91*
1G Maghreb			1.35***	1.12**
1.5G Maghreb			0.99	0.84
1G Latin America			1.38***	1.40***
1.5G Latin America			0.92	0.99
Education level				
Unknown		0.97*		0.12***
Low		1		1
Medium		0.74***		0.72***
High		0.48***		0.52***
Constant	0.009***	0.014***	0.006***	0.009***

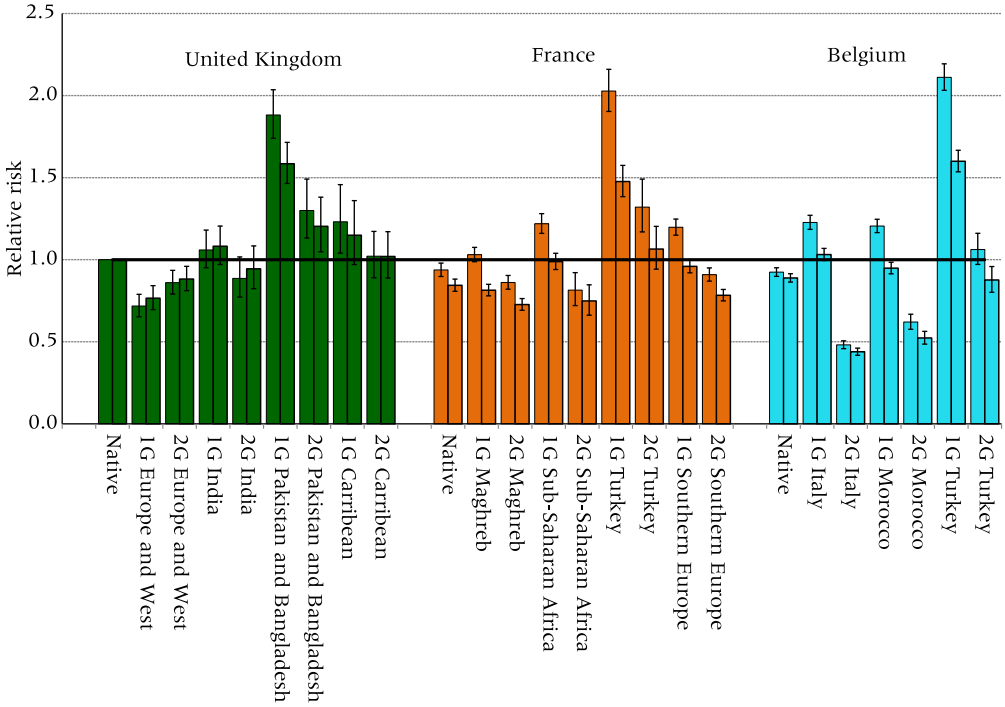
***p-value < 0.01, **p < 0.05,*p < 0.1.
Model 1: controlled for birth cohort and age group. Model 2: additionally controlled for education.
SOURCE: As in Table 1.

immigrants decline but remain significant. Briefly, high fertility among some immigrant women is only slightly explained by their lower education levels. The effects of all of the control variables are as expected. First birth rates are highest at ages 25–29 (early childbearing) or 30–34 (late childbearing), they are higher among older cohorts, and they decline with increases in women's level of education.

Second births

Women who had a first child form the population at risk for second births. The first model controls only for the time since first birth and birth cohort. Again, native women in France and Belgium have similar second birth risks, with higher levels for native British and Swedish women

FIGURE 1a Relative risk of first birth in UK, France, and Belgium (early age at first birth)

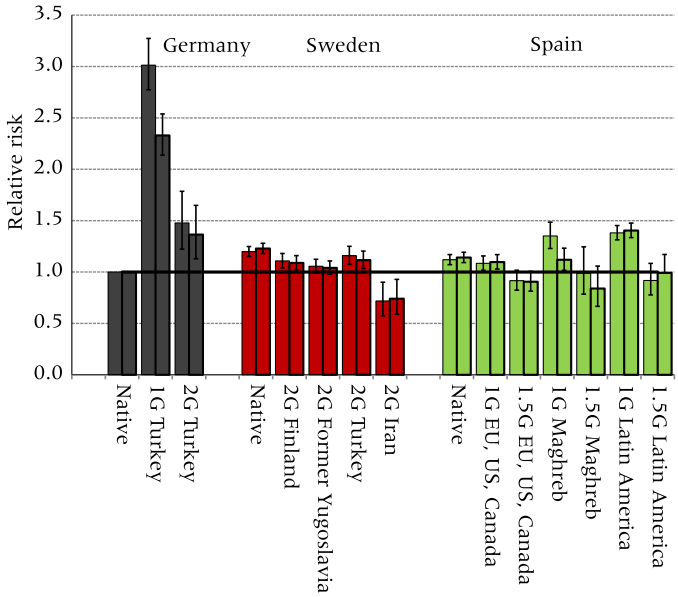


Model 1: controlled for birth cohort and age group. Model 2: additionally controlled for education.
SOURCE: Authors' calculations based on merged data from six countries.

(Table 4 and Figure 2). Women in Germany and Spain have relatively low second birth levels. The observed patterns are consistent with the variation in second births across European countries reported in previous studies (Goldstein and Kreyenfeld 2011; Klesment et al. 2014; Van Bavel and Różańska-Putek 2010). Immigrants from Pakistan and Bangladesh in the UK, immigrants from Turkey and North Africa in France, and immigrants 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 have high second birth levels, similar to their parents (or even higher), whereas second birth rates are somewhat lower among women of Turkish and North African origin in France and Belgium. The descendants of Turkish immigrants in Germany and Sweden show second birth risks similar to those of natives; in Spain, children of immigrants from the Maghreb have somewhat higher fertility levels than natives.

FIGURE 1b Relative risk of first birth in Germany, Sweden, and Spain (late age at first birth)



Model 1: controlled for birth cohort and age group. Model 2: additionally controlled for education.
SOURCE: Authors' calculations based on merged data from six countries.

The analysis also shows that a number of second-generation groups have low second birth levels: Caribbeans in the UK, Southern Europeans in Belgium and France, and Europeans and Latin Americans in Spain. Model 2 additionally controls for women's age at first birth and their education 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.

Third births

For third births, samples were large enough for all minority groups in the UK, France, Belgium, and Sweden. Third birth levels are relatively similar for natives in the UK, France, and Belgium and are somewhat lower in Sweden (Table 5 and Figure 3). A number of immigrant groups have very high third birth risks: women from Pakistan and Bangladesh in the

TABLE 4 Relative risk of second birth in six European countries

	Relative risk	
	Model 1	**Model 2**
Years since first birth		
0–1	0.40***	0.40***
1–3	1	1
3–5	0.85***	0.85***
5–10	0.38***	0.38***
10+	0.08***	0.08***
Birth cohort		
1940–1949	1.16***	1.12***
1950–1959	1.06***	1.04***
1960–1969	1	1
1970–1979	1.02**	0.98**
1980–1989	0.92***	0.81***
United Kingdom		
Native	1	1
1G Europe and West	0.96	0.94
2G Europe and West	0.89**	0.89**
1G India	1.04	1.00
2G India	1.16*	1.15*
1G Pakistan and Bangladesh	1.53***	1.50***
2G Pakistan and Bangladesh	1.83***	1.79***
1G Caribbean	0.65***	0.63***
2G Caribbean	0.60***	0.56***
France		
Native	0.77***	0.77***
1G Maghreb	1.22***	1.29***
2G Maghreb	0.88***	0.90***
1G Sub-Saharan Africa	0.89***	0.88***
2G Sub-Saharan Africa	0.76***	0.76***
1G Turkey	1.46***	1.42***
2G Turkey	1.04	1.06
1G Southern Europe	0.73***	0.73***
2G Southern Europe	0.67***	0.68***
Germany		
Native	0.62***	0.65***
1G Turkey	0.93**	0.93**
2G Turkey	0.60***	0.61***
Belgium		
Native	0.69***	0.67***
1G Italy	0.77***	0.74***
2G Italy	0.61***	0.60***
1G Morocco	1.48***	1.34***
2G Morocco	0.92	0.88**
1G Turkey	1.45***	1.26***
2G Turkey	0.78***	0.72***

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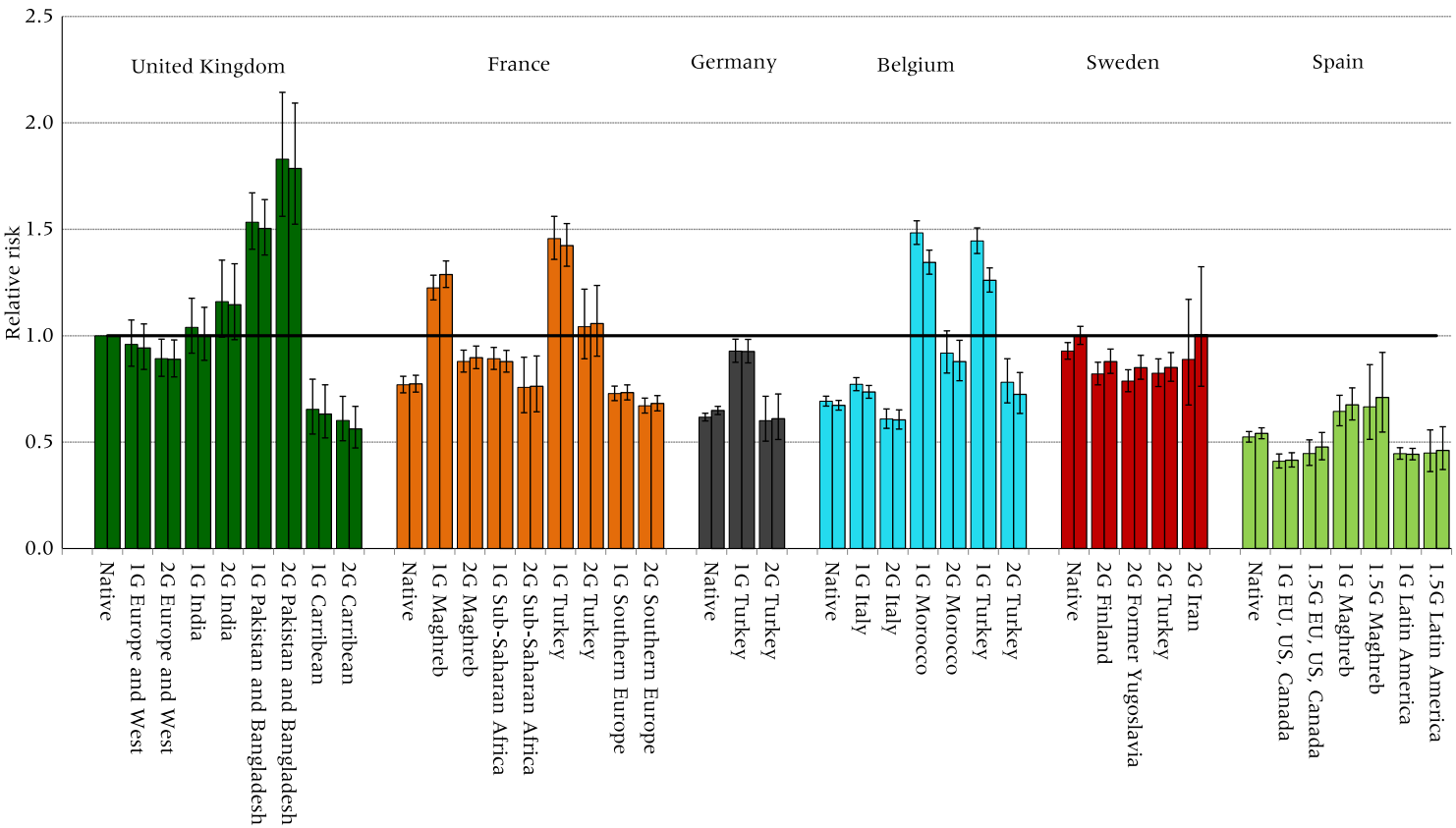
TABLE 4 (continued)

	Relative risk	
	Model 1	**Model 2**
Sweden		
Native	0.93***	1.00
2G Finland	0.82***	0.88***
2G Former Yugoslavia	0.79***	0.85***
2G Turkey	0.82***	0.85***
2G Iran	0.89	1.00
Spain		
Native	0.52***	0.54***
1G EU, US, Canada	0.41***	0.42***
1.5G EU, US, Canada	0.45***	0.48***
1G Maghreb	0.64***	0.68***
1.5G Maghreb	0.67***	0.71***
1G Latin America	0.45***	0.44***
1.5G Latin America	0.45***	0.46***
Education level		
Unknown		1.23***
Low		1
Medium		0.98**
High		1.21***
Age at first birth		
15–19		1.11***
20–24		1
25–29		0.89***
30+		0.66***
Constant	0.027***	0.028***

Significance level: ***p-value < 0.01, **p < 0.05,* p < 0.1.
Model 1: controlled for birth cohort and time since first birth. Model 2: additionally controlled for education and age at first birth.
SOURCE: As in Table 1.

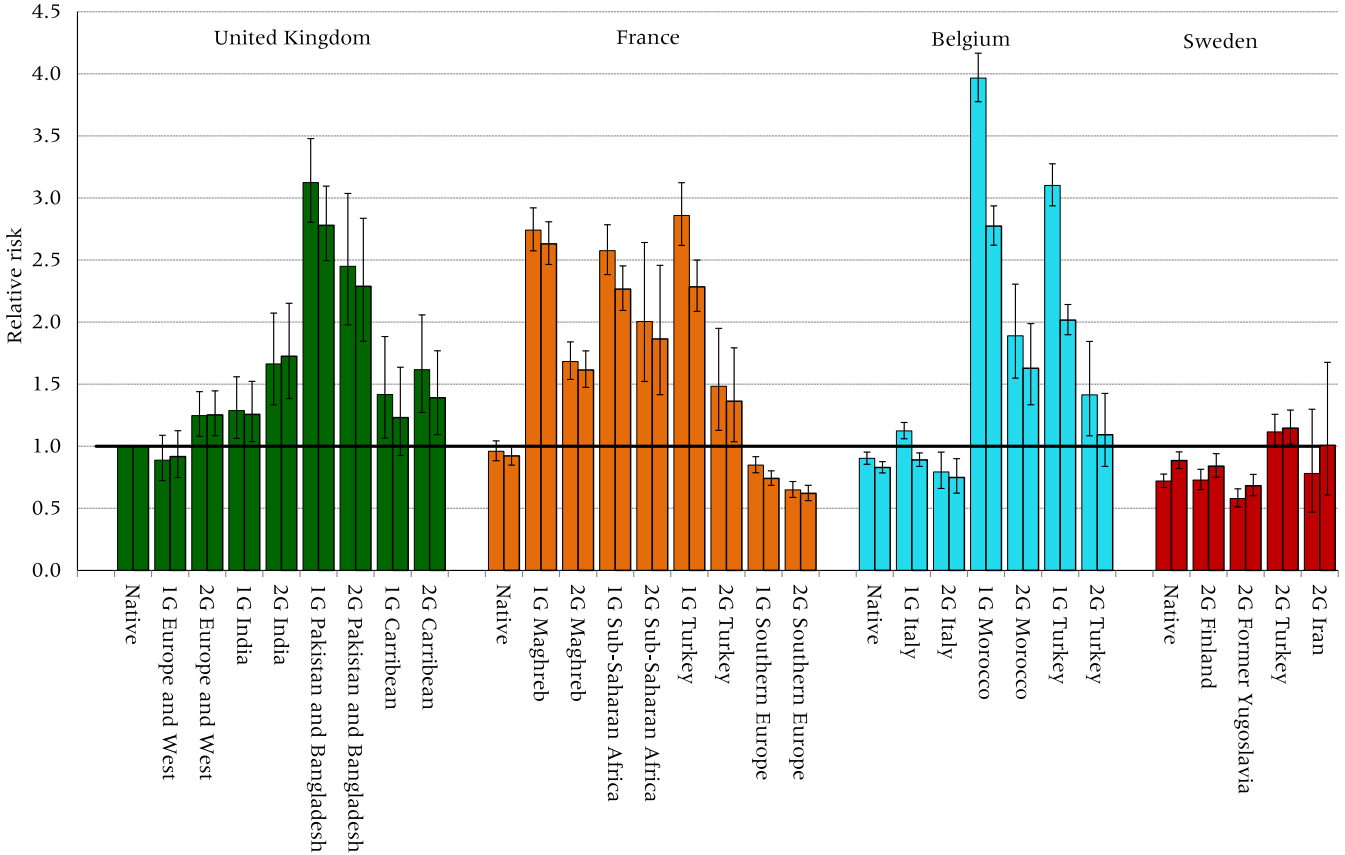
UK, immigrants from Turkey and North and sub-Saharan Africa in France, and immigrants from Turkey and Morocco in Belgium. Fertility rates are also slightly higher than native rates in the UK among immigrants from India and the Caribbean. Interestingly, most descendants of immigrants also show relatively high levels. Third birth rates are high among women of Pakistani and Bangladeshi descent in the UK and also among women of Indian and Caribbean origin. Similarly, elevated third birth rates are observed among the descendants of immigrants from both African regions in France and from 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. In Sweden, most ethnic minorities have fertility levels similar to natives, except those of Turkish origin whose third birth rates

FIGURE 2 Relative risk of second birth in six European countries



Model 1: controlled for birth cohort and time since first birth. Model 2: additionally controlled for education and age at first birth.
SOURCE: As in Figure 1.

FIGURE 3 Relative risk of third birth in four European countries



Model 1: controlled for birth cohort and time since second birth. Model 2: additionally controlled for education and age at first birth.
SOURCE: As in Figure 1.

TABLE 5 Relative risk of third birth in four European countries

	Relative risk	
	Model 1	**Model 2**
Years since second birth		
0–1	0.66***	0.65***
1–3	1	1
3–5	0.79***	0.79***
5–10	0.37***	0.36***
10+	0.08***	0.07***
Birth cohort		
1940–1949	1.29***	1.13***
1950–1959	1.07***	0.98
1960–1969	1	1
1970–1979	1.08***	0.99
1980–1989	1.27***	1.00
United Kingdom		
Native	1	1
1G Europe and West	0.89	0.92
2G Europe and West	1.25***	1.25***
1G India	1.29***	1.26**
2G India	1.66***	1.73***
1G Pakistan and Bangladesh	3.12***	2.78***
2G Pakistan and Bangladesh	2.45***	2.29***
1G Caribbean	1.42**	1.23
2G Caribbean	1.62***	1.39***
France		
Native	0.96	0.92*
1G Maghreb	2.74***	2.63***
2G Maghreb	1.68***	1.61***
1G Sub-Saharan Africa	2.58***	2.27***
2G Sub-Saharan Africa	2.00***	1.86***
1G Turkey	2.86***	2.28***
2G Turkey	1.48***	1.36**
1G Southern Europe	0.85***	0.74***
2G Southern Europe	0.65***	0.62***
Belgium		
Native	0.90***	0.83***
1G Italy	1.12***	0.89***
2G Italy	0.79**	0.75***
1G Morocco	3.97***	2.77***
2G Morocco	1.89***	1.63***
1G Turkey	3.10***	2.02***
2G Turkey	1.41**	1.09

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TABLE 5 (continued)

	Relative risk	
	Model 1	**Model 2**
Sweden		
Native	0.72***	0.88***
2G Finland	0.73***	0.84***
2G Former Yugoslavia	0.58***	0.68***
2G Turkey	1.12*	1.15**
2G Iran	0.78	1.01
Education level		
Unknown		1.40***
Low		1
Medium		0.83***
High		0.91***
Age at first birth		
15–19		1.35***
20–24		1
25–29		0.69***
30+		0.48***
Constant	0.007***	0.009***

Significance level: *** p-value < 0.01, ** p < 0.05,* p < 0.1.
Model 1: controlled for birth cohort and time since second birth. Model 2: additionally controlled for education and age at first birth.
SOURCE: As in Table 1.

are higher than those of native women. Model 2 additionally controls for women's education level and age at first birth. The fertility differences between ethnic groups decline slightly, 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 women's age at first birth; the rates are higher among women with the lowest education levels.

Summary and discussion

This study investigated fertility among the descendants of immigrants in six European countries, with a focus on ethnic minority women whose parents arrived in Europe from high-fertility countries. We can summarize the results as follows. First, many of the descendants of immigrants had levels that were similar to those of 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, progression rates to a second child varied less among the

descendants of immigrants; only women of Pakistani and Bangladeshi 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 women's education changed the results slightly, 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 descendants of immigrants can be distinguished according to 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, and their second and third birth levels were significantly higher. Similarly, women of Turkish descent in France, Belgium, and Sweden had slightly higher first birth rates; their second and third birth levels were somewhat lower, although still higher than those of native women in each country. Indians in the UK and North Africans in France had first and second birth rates that were similar to those of natives, while third birth rates were significantly higher. Caribbeans in the UK and sub-Saharan Africans in France had first birth levels that were similar to those of natives, lower second birth rates, and relatively high third birth levels, suggesting a polarization among women of these groups by fertility behavior. Finally, Europeans and Latin Americans had fertility patterns broadly similar to those of natives, although Southern Europeans had relatively low rates of first and third births.[2]

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 did 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. While we expected that education would explain a larger share of the high fertility among ethnic minority women, this was not the case. The inclusion of women's education level in the models only slightly reduced the fertility differences between ethnic groups. 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 and Pailhé 2015). A number of cultural factors may further explain fertility variations across ethnic groups and the high fertility levels among some ethnic minority women. Elsewhere we have shown that ethnic minority women with high fertility levels come from large families and are more

religious than natives (Kulu et al. 2015). Previous research demonstrates 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 higher third birth rates (Michael and Tuma 1985; Philipov and Berghammer 2007).

Our analysis also supported the idea that the European country context influences both overall fertility levels and differences between population subgroups. First birth rates were relatively low for all ethnic minority groups in Germany and Spain, suggesting later family formation and/or a lower likelihood of becoming a mother in those countries—a well-known finding from previous studies. Fertility variation across ethnic groups was the smallest in Sweden and the largest in France, the UK, and Belgium. The finding related to Sweden is not surprising. Research has shown that the generous and universal Nordic welfare system has an equalizing effect on all population subgroups; ethnic minorities are relatively well integrated into education and the labor market in those countries, and levels of residential segregation are relatively low (Bevelander 2004). Welfare state policies have likely reduced differences between 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 and Verdugo 2015). These factors certainly promote minority subcultures in those countries and reinforce specific family patterns—for instance, through high levels of ethnic intermarriages. Examples are Turkish immigrants and their descendants in France and Belgium, and South Asians in the UK. Those examples underline the importance of country context and illustrate that immigrant fertility behavior can be strongly influenced by the mainstream society and local fertility patterns.

This is the first study to investigate parity-specific fertility rates among the descendants of immigrants in Europe from a comparative perspective. We showed that fertility levels are lower among the descendants of immigrants (second generation) than among the first generation. Fertility among the second generation is often similar to that of the native population, although third birth rates in particular remain relatively high among certain ethnic minority groups. Overall, fertility levels of the descendants of immigrants from high-fertility countries fall in between levels of immigrants and the native population. However, we also found some polarization among the descendants of immigrants from high-fertility countries: a significant minority have their first child as late as native women or even remain childless, while the majority have relatively large families (three or four children, as was the case for their parents' generation). Such polarization also characterizes groups with lower fertility levels—for example, descendants of Indians and Caribbeans in the UK or descendants of North and sub-Saharan Africans in France. Some of these descendants of immigrants have

small families, while others have large families. Educational differences explain some fertility variation across population subgroups, but significant variations persist. Previous research 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 decline further in the third generation due to the changes in their families of origin. Fewer members of the third generation will 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 and Dubuc 2010; Dubuc 2012), which for some minority groups in Europe will occur more slowly than perhaps expected. However, we will simultaneously expect to see increasing heterogeneity among ethnic minority populations. While a significant number of members of those populations will exhibit childbearing patterns similar to those of the majority population, there will still be 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 children from such families have the same educational and employment opportunities as those from families with only one or two children.

Our findings of depressed fertility among some groups of the descendants of immigrants are also noteworthy. Some immigrant descendants in Europe showed even lower fertility than that of the native population (e.g., Southern Europeans in Western Europe and Iranians in Sweden). On the one hand, the patterns may be related to those of their parents' country of origin (e.g., for Southern Europeans). On the other hand, they may also reflect unrealized fertility intentions—for example, if young adults from minority families face difficulties when seeking to establish themselves and to start a family. Policymakers need to be sensitive to the needs of minority youth, for instance by providing more active educational counseling and addressing cases of discrimination in the labor market.

We believe that the diversity of childbearing patterns in Europe is here to stay and that immigrants and their descendants are overrepresented in non-standard family forms. In addition, we should not expect rapid changes in childbearing patterns among immigrants and their descendants; while some changes may occur quickly, others may take place over several generations, particularly if patterns reflect cultural preferences and minority identities. Historical research has shown that diversity in family forms, if appropriately supported, can co-exist with successful labor market and social integration of migrant minorities and native majorities alike.

Notes

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1 Table A1 is available at the supporting information tab at wileyonlinelibrary.com/journal/pdr.

2 We conducted a series of analyses to determine how sensitive the results of a comparative study of six countries are to different sample selections and model specifications. 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 women of Turkish and Northern African origin in France and Belgium varied across models. For example, first birth levels for the descendants of Pakistani and Bangladeshi immigrants were only slightly higher than those of British native women when we used only the sample of the British and French women; the differences increased when we included all other countries in the analysis. The estimates also varied for women of Moroccan descent in Belgium.

The reason for such a variation is that the timing of family formation seems to vary significantly 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 (the UK, France, and Belgium) and those with later (Germany, Sweden, and Spain). Our sensitivity analysis therefore suggests that the elevated first birth levels for some groups and low first birth rates for others should be interpreted with 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. Given the tendency for the migrant population to have a child shortly after arrival in the country, period measures of fertility often overestimate migrant total fertility (Parrado 2011; Persson and Hoem 2014; Robards and Berrington 2015). Because this study uses full fertility histories for immigrants 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 methodological and substantive point of views (Hoem 2014).

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