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Country-specific case studies on fertility among the descendants of immigrants

Part 1

Introduction: Hill Kulu and Tina Hannemann
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Contents

Introduction:
Country-specific case studies on fertility among the descendants of immigrants

Hill Kulu and Tina Hannemann

This report consists of six case studies on fertility among the descendants of immigrants by comparing their patterns to those of the 'native' population. The countries that are included in the analysis are Germany, Sweden, United Kingdom, France, Spain and Switzerland. All of the case studies use large-scale longitudinal data and apply event-history analysis. The analysis shows that the descendants of immigrants have lower first-birth rates than 'natives' suggesting the postponement of childbearing among ethnic minorities; the only exception are women of Turkish origin who exhibit elevated first-birth levels in several countries (Germany, Sweden, Switzerland and France) indicating early childbearing among this group. Some ethnic minority groups have somewhat higher second-birth risks than 'natives' (e.g. South Asians in the UK, women of Turkish origin in Germany and Moroccans in Spain), but many show significantly higher third-birth rates; elevated third-birth levels are observed among women of Turkish, Middle Eastern and Northern African origin in Sweden, South Asians in the UK and North Africans in France and Spain. Elevated third-birth levels largely explain a relatively high total fertility among these minority groups. Fertility differences between the 'native' and ethnic minority women largely persist once women's educational level is included in the analysis, but decrease after factors related to language, religion and family of origin are controlled.

Overall, the analysis supports the importance of cultural-normative factors, potentially related to minority subcultures, in shaping childbearing patterns of ethnic minority groups, particularly third-birth rates. The analysis also suggests that education and employment related factors may play a role, e.g. explain delayed entry into motherhood among most ethnic minorities or low fertility among highly educated women of Turkish descent in Germany.

Childbearing among the descendants of immigrants in Germany

Sandra Krapf and Katharina Wolf

Abstract:
Turkish migrants and their descendants are the largest migrant group from a single origin country living in Germany. The German Mikrozensus as a large dataset allows us to distinguish between Turkish migrants who migrated as children (1.5 generation) and those who were born to Turkish parents in Germany (second generation migrants). We compare both groups to German non-migrants. Using event-history techniques, our results show that 1.5 generation migrants have the highest risk of first and second births, while German non-migrants have the lowest birth risks. The second generation lies in-between. This pattern persists also after taking into consideration the educational attainment of respondents. However, there seems to be an adaptation for highly educated second generation Turkish migrants to non-migrant Germans: we find no significant differences in the first birth risks in the two groups. For second births, we do not find this pattern which might be related to the young age structure in the sample of second generation migrants.

Keywords: immigrant descendants, fertility, second generation, 1.5 generation, Turkish migrants, Germany

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1. Introduction

In the last decades, Germany has experienced on average positive net migration and the stock of foreign people living in the country has been growing since the mid-20th century (Destatis, 2013; 2014). The majority of international migrants arrived in the context of labor migration in the 1960s and early 1970s from Mediterranean countries (e.g., from Turkey, Italy, and Greece) and family reunion thereafter. Today, migrants with Turkish roots form the largest immigrant group originating from a single country, representing 3.6 percent of the total population in Germany (Destatis, 2012). Migrant behavior has often been examined by focusing on the question whether they "adapt" to behavioral patterns of the receiving country. In this vein, labor market integration (Granato & Kalter, 2001; Konietzka & Seibert, 2003; Seibert & Solga, 2005), educational adaptation (Fick, 2011; Groh-Samberg et al., 2012; Segeritz et al., 2010) and patterns of life satisfaction among migrants (Safi, 2010; Siegert, 2013; Zapf & Brachtl, 1984) have been under study. An aspect that is less explored is the demographic adaptation of migrants. This is of specific interest if migration occurs from high fertility to low fertility countries, like from Turkey to Germany. A large body of research has investigated the childbearing behavior of first generation migrants showing that the timing of migration, the duration of stay, the reasons to migrate and a person's labor force participation affect migrant fertility (Andersson, 2004; Andersson & Scott, 2005, 2007; Cygan-Rehm, 2011; Mayer & Riphahn, 2000; Milewski, 2007; Mussino & Strozza, 2012; Toulemon, 2004; Wolf, 2014). Such aspects are less relevant for second generation migrants who were born in the country of destination. Children of labor migrants, who relocated mostly in the early 1970s (and later in the context of family reunion), now reach ages above 30 years. Although they have not yet reached the end of their reproductive phase, studying their fertility behavior in their thirties is already indicative for their overall fertility behavior.

This study aims at comparing native Germans and descendants of Turkish migrants. While most studies focused on fertility behavior of first generation migrants in Germany, we examine also fertility transitions of the second and the so-called 1.5 generation, i.e. those who migrated as children. Our central research questions are: How do first and second birth patterns of native Germans, 1.5, and second generation Turkish migrants differ? Are fertility variations caused by differences in the socio-economic composition of the groups? Do those who take over the German citizenship show more similar childbearing to German natives than to those who have kept Turkish citizenship? Analyzing those who migrated as children as a

separate group is promising in two respects. First, contrasting second and 1.5 generation migrants allows us to single out the effect of childhood socialization as this is the main distinction of these two groups. The 1.5 generation was partly exposed to family values in the country of origin while second generation experienced their entire childhood in the country of destination. Therefore, variations in fertility behavior between the two groups are likely to be the result of different socialization environments. Second, 1.5 generation migrants did not take the decision to migrate themselves. While the first generation, who migrated as adults, might consciously time their decision to migrate and to start a family, for the 1.5 generation both migration and fertility transitions can be assumed to be independent of each other. Their fertility should not be biased by migration timing like for migrants who arrived during their childbearing years (Toulemon, 2004; Wolf, 2014). Accordingly, selection into migration is less relevant for the 1.5 generation and biases are avoided (Adsera et al., 2012).

Our analyses are based on the German Mikrozensus. The large sample size allows us to study the descendants of Turkish migrants as a single migrant group. We use two Mikrozensus waves from the years 2005 and 2009. In other survey years, migration information was limited to citizenship and year of migration. Based on this information, it was not possible to identify second generation migrants with German citizenship. The extended question program in 2005 and 2009 allows us for the first time to identify these second generation migrants. Using the own-children method, we generate information on age at childbirth. We compare the transition to first birth among women of the two migrant groups to non-migrant western Germans employing event history techniques. Furthermore, the transition to second birth is examined.[1] Focusing on structural aspects of integration, we analyze the effect of education and citizenship on fertility behavior.

In the following section, we discuss the theoretical approaches to understand the fertility behavior of descendants of migrants. In section 3, we give an overview on Turkish migrants and their descendants in Germany. Following that, the data and methods of our analyses are discussed (section 4), while section 5 is dedicated to the presentation of results. The last section summarizes and discusses the results.

[1] It would have been interesting to also analyze third birth behavior. However, as can be read from Table 3 in the appendix, particularly the second but also the 1.5 generation Turkish migrants are very young and until today, only a very selective group is at risk of having a third birth.

2. Theoretical consideration

For the demographic development of a country, particularly those migrants who decide to stay are of great importance. Thus, the question arises, in how far their integration processes pass off and what are the determinants. A first attempt to present a theoretical framework was made by representatives of the Chicago School who developed an approach to explain assimilation processes in the US (Gordon, 1964; Park & Burgess, 1921). Classical assimilation theory describes the decline of an ethnic or racial distinction and the cultural and social differences that express it (Alba & Nee, 1997). Assimilation was expected to be an inevitable, gradual process which increases over immigrant generations (Alba & Nee, 1997; Zhou, 1997). However, the theory received a lot of criticism. It was argued that receiving societies are not homogenous and that migrants might adapt to specific groups rather than mainstream society, resulting in segmented assimilation (Portes & Zhou, 1993; Rumbaut, 1994). Moreover, it was criticized that both classical assimilation and segmented assimilation theory do not offer explicit mechanisms to explain assimilation processes but rather describe empirical outcomes (Esser, 2004, 2008). Others observed that the concept of assimilation in general implies a dominance of the majority society (Bade & Bommes, 2004). Thus, in Europe since the 1980s, researchers prefer the normatively more neutral concept of integration to the term assimilation (Aumüller, 2009 (pp. 34)). Social integration can be conceptualized as a "process of inclusion and acceptance of migrants in the core institutions, relations and statuses of the receiving society" (Heckmann, 2006 (pp. 18)). The processes can refer to first generation immigrants but also to their children and grandchildren (ibid.: pp. 17).

The fertility patterns of migrants can serve as an indicator of integration into the society in the country of destination (Coleman, 1994). Fertility decisions in advanced societies are influenced by both cultural and structural conditions (Lesthaeghe & Surkyn, 1988; Letablier et al., 2009; Rindfuss & Brewster, 1996). Both aspects might differ between countries, resulting in diverse fertility patterns among migrants and non-migrants. A number of theoretical arguments were suggested to explain the fertility behavior of first generation migrants, such as the socialization, adaptation, disruption, and selection hypotheses (Kulu, 2005; Kulu & González-Ferrer, 2013; Lindstrom & Giorguli Saucedo, 2007). However, there is less research on the fertility behavior of migrants' descendants. As second generation migrants have not migrated themselves and 1.5 generation migrants arrived during childhood, disruption and selection effects do not play a role in their fertility patterns. In the following,

we discuss how socialization, adaptation and composition effects might explain differences in fertility behavior among natives, second, and 1.5 generation migrants.

2.1. Childhood socialization

Family values as well as gender role attitudes differ across countries (Nauck & Klaus, 2007). Based on socialization theory, researchers expect that these social roles and values are transmitted to each social group member via socialization (Goode, 1964). In the classic formulation of the theory, socialization was described as a process that takes place largely within the family and during childhood (Parsons, 1955). Also family-related norms and values are transmitted during childhood within the family (Putney & Bengtson, 2002). In line with this, it has been shown that mothers pass on their gender role attitudes (Moen et al., 1997), their childbearing preferences and behavior to their daughters (Barber, 2000).

Concerning international immigrants, it is argued that the home country's norms and values regarding fertility persist also after migration. Empirical evidence shows that those who migrate from high fertility origin countries have considerably higher fertility than the natives in the low fertility destination countries (Alders, 2000; Andersson, 2004; Kahn, 1988). However, fertility norms and values are also transmitted via the first generation to their children. In line with this, it was found that first generation migrants transmit their higher child number ideals and lower age norms concerning the first child to their children (Nauck, 2001; Nauck et al., 1997). Also for female migrants in the Netherlands, studies have indicated that children reproduce their parents' preferences for an early entry into motherhood (De Valk, 2006; De Valk & Liefbroer, 2007). Accordingly, the second generation of Turkish migrants shows higher first birth rates than the majority population in several European countries (Milewski, 2011). Moreover, a study on Germany indicates that second generation migrants are on average younger at first birth than native (western) Germans but older than first generation migrants (Milewski, 2010a).

Socialization arguments not only explain why migrants and their descendants show different fertility behavior than natives. In addition, they provide a framework to explain why migrant generations are distinct. Based on the fact that the 1.5 generation was born in Turkey while second generation migrants were born in Germany, the two groups have different socialization experiences. Both groups are influenced by the Turkish community and family.

But those migrating as children were partly socialized in the country of origin, i.e. they were exposed to their home countries' norms to a larger extent than those born in the host country. By contrast, the second generation experienced socialization entirely in the receiving society. They maintained social contacts with both peers of Turkish origin and non-migrant Germans during childhood and were thus exposed to German family norms to some extent. According to socialization theory, we expect that 1.5 generation Turkish migrants have higher childbearing risks than Germans and the second generation lies in between the two groups (hypothesis 1).

2.2. Adaptation

While socialization arguments are usually employed to explain behavioral differences between migrant generations and non-migrants, adaptation arguments help us to understand why fertility patterns converge. Adaptation consists of two different mechanisms that are interrelated and affect one another (Frank & Heuveline, 2005; Kulu, 2005; Rumbaut & Weeks, 1986). On the one hand, the economic conditions in the country of destination affect childbearing. From a neo-classical micro-economic perspective, fertility decisions are the product of direct costs and opportunity costs of children (Becker, 1991; Hotz et al., 1997; Mincer, 1963). Moving to a country with better job perspectives for women and higher living costs increases the costs of childrearing for migrants from less developed areas. Accordingly, they adapt their fertility behavior towards lower fertility and later birth transitions. In line with this, studies for Sweden showed that women participating in the labor market had largely the same fertility patterns – independent of migrant background (Andersson & Scott, 2005; 2007). On the other hand, fertility is determined by norms and values concerning the ideal family size and the timing of parenthood. According to Hoffman and Hoffman's (1973) the "Values of Children"-approach, the "value of children refers to the functions they serve or the needs they fulfill for parents" (ibid.: pp. 46). Empirically, it has been shown that the value parents attach to children differs systematically across countries (Nauck, 2007; Nauck & Klaus, 2007). In a similar vein, the notion of Second Demographic Transition links the cultural change seen in many European countries over the last decades, marked by secular individualization trends, with decreasing fertility levels (Lesthaeghe, 1995; Sobotka, 2008; Van De Kaa, 1994). Non-Western migrants are exposed to these individualistic norms and values after migrating to European countries. They might adapt to the lower child number ideals and preferences for later entry into parenthood prevalent in the country of destination.

Initially, the concept of adaptation was used to explain adjustment processes of first generation immigrants in the short-term. Related to their duration of stay, adaptation was assumed to increase the longer a migrant resides in the receiving society (Hervitz, 1985; Kahn, 1988; Lindstrom & Giorguli Saucedo, 2002; Singley & Landale, 1998; Stephen and Bean, 1992). But adaptation theory can also be translated to immigrants' children. For their whole adult life, both the 1.5 and the second migrant generation are exposed to the normative and economic conditions in the country of destination. They might thus experience cultural adaptation via social contacts with the majority population, affecting their childbearing preferences. Migrants' descendants are subject to the receiving society's institutions and labor markets, which impacts the opportunity structure of having children. In line with this, it has been shown that across Europe, second generation migrants reported higher ideal ages at parenthood than the first generation migrants (Holland & De Valk, 2013).

The adaptation of norms and values somehow contradicts socialization theory in its original sense, where fertility preferences are assumed to be based on childhood socialization and stay constant over the life course. Nevertheless, socialization can be seen as a lifelong process, as individuals change their preferences and attitudes also after the beginning of adulthood (Mortimer & Simmons, 1978; Settersten Jr., 2002). According to adaptation arguments, the relevance of the conditions in the receiving society exceeds the influence of the fertility preferences absorbed during childhood socialization. As second and 1.5 generation Turkish migrants are exposed their entire adult life to German values and conditions, according to adaptation arguments we expect that both groups should have similar fertility patterns (hypothesis 2).

2.3. Compositional effects

Migrants differ in their socio-economic, cultural and demographic structure from natives. These aspects are relevant for childbearing decisions. Therefore, the composition of migrant generations could be responsible for fertility differentials. Besides cultural factors, such as religion, language, and family orientation, differences between migrants and non-migrants in the country of destination particularly occur in the socio-economic sphere. One indicator to approximate the socio-economic status of a person is the educational attainment. From a micro-economic perspective, higher educational levels are related to higher opportunity costs and lead to lower fertility (Schultz 1969). This negative effect is also reflected in elevated

postponement of first births among highly educated and career-oriented women (Gustafsson 2001). Concerning higher order births, the relationship seems to be more complex. For some western European countries, it has been shown that education was positively related to second and/or third birth risks (Kreyenfeld & Konietzka, 2008; Lappegård & Rønsen, 2005; Tesching, 2012).

It has been shown that second generation migrants on average attend school longer than first generation migrants (Dustmann et al., 2012). Yet, the gap in school attainment between 1.5 and second generation Turkish migrants and native Germans persists (Fick, 2011). The composition hypothesis assumes that these educational differences account for deviating fertility patterns of migrants' descendants and native Germans. Based on such compositional effects, we expect that fertility risks of native Germans, 1.5 and second generation Turkish migrants converge after accounting for the effect of education (hypothesis 3).

3. Turkish migrants and their descendants in Germany

Within Germany, the population of Turkish origin is the largest international migrant group from a single sending country. Immigration from Turkey to Germany was induced by large labor shortages in Germany after World War II. To acquire foreign workers the German government initiated agreements with several European and Northern African countries.[2] The contract on coordinated labor migration from Turkey to Germany was signed in 1961. Most labor migrants from Turkey came from agrarian regions and had vocational qualifications for jobs in craft industries. Thus they had higher qualifications than the average Turkish population, but on a lower level compared to native Germans (Treichler, 1998). Once in Germany, labor migrants mostly filled unskilled and semi-skilled jobs in industry (Seifert, 1997). After the oil price shock and the resulting recession in 1973, the recruitment agreements were terminated. Since 1973, for Turkish citizens, the only option to immigrate legally to Germany is to rely on the right of family reunification or asking for political asylum. For family reunification, an immigrant living in Germany was allowed to bring a foreign spouse and children up to age 15 to the country. As a result, the size of the foreign population in Germany increased and its composition changed (Heckmann, 2003). Before

[2] Agreements were made with Italy (1955), Spain and Greece (1960), Morocco (1963), Portugal (1964), Tunisia (1965) and former Yugoslavia (1968).

1973, immigrants were mainly workers aged between 20 and 40, most of them men. Later, more and more women and children migrated for family reunion (Münz et al., 1999).

Today, Turkish migrants and their descendants represent 3.6 percent of the total German population (Destatis, 2012). About half of them belongs to the first immigrant generation and migrated themselves, the second generation makes up the other half (Destatis, 2012). Turkish migrants and their descendants mostly live in western Germany, particularly in urban areas (Haug et al., 2009). According to religion, Turkish migrants form a quite homogeneous group since more than 80 percent are Muslim (Haug et al., 2009). Concerning the educational status, the transferability of educational and vocational degrees is the main problem. Qualifications that were gained in a foreign country, particularly non-EU countries like Turkey, are often not recognized by employers and public institutions in Germany. Among first generation migrant women from Turkey, less than 10 percent have a vocational degree that is recognized in Germany (Stichs, 2008). This is not only due to transferability problems, but also to the fact that heading for a vocational qualification was less common in their regions of origin. In sum, first generation Turkish migrants show on average lower educational degrees than native Germans (Müller & Stanat, 2006; Segeritz et al., 2010). This also affects their position in the labor market. It was found that immigrants in Germany have easier access to blue-collar jobs than to white-collar jobs (Seifert, 1996). The picture is different for the second migrant generation. They are not affected by the transferability problem, since they grew up and obtained their educational degrees in Germany. On average, they reach higher educational degrees and obtain vocational education more often than first generation migrants. However, compared to native Germans their educational and vocational status is still lower (Müller and Stanat, 2006; Segeritz et al., 2010; Stichs, 2008). The 1.5 generation lies in between. They obtained a higher educational status than their parents, but are on average less educated compared to the second migrant generation (Fick, 2011; Segeritz et al., 2010; Seibert, 2008).[3]

In sum, Turkish migrants and their descendants in Germany differ from native Germans in several ways. As a result of the migration history, most of them come from working class families, what is also reflected in their (on average) lower educational and vocational status compared to native Germans. Yet, not only socio-economic conditions but also religious and

[3] It has to be noted that the definition of the 1.5 generation migrants differ across studies. Seibert (2008) defines 1.5 generation migrants as those who arrived to Germany before age 15. Segeritz et al. (2010) and Fick (2011) refer to those who arrived to Germany until school starting age (6 years).

cultural factors are of great importance for fertility decisions. Since migrants' descendants are partly socialized within their home country norms and values, the prevailing fertility development in Turkey, which differs markedly from the one in Germany, plays a major role. Turkey has seen a sharp fertility decline beginning in the mid-20th century. The average total fertility rate (TFR) fell from 6.62 in the period 1950-1955 to a value of 2.16 - close to replacement level - in 2005 - 2010 (United Nations, 2012). With a TFR of approximately 1.4 in Germany since the 1970s, fertility in Turkey is still considerably higher. But within Turkey large differences occur across ethnic groups, particularly Kurdish women show much higher rates of having a higher order birth than women of other ethnicities (Yavuz, 2008). In addition, fertility behavior differs by region. Women living in urban regions experience the transition to first, second, and third childbirth less often and later in their life course compared to women living in rural areas (Eryurt & Koç, 2012).

4. Data and methods

4.1. Data

Our analyses are based on pooled cross-sectional data from the German Mikrozensus of the years 2005 and 2009. In these two years, the household survey's obligatory question program was extended. Prior to that, migrants could be identified only on basis of citizenship and place of birth, so that descendants of migrants who were born in Germany and who had German citizenship could not be identified. In the 2005 and 2009 questionnaires, a number of items refer to parents' migration status which allows us to distinguish the second generation even if respondents have German citizenship.

The Mikrozensus is a one-percent sample of all German households and covers standard socio-demographic characteristics such as age, citizenship, region of residence, educational attainment, etc. The scientific use file contains a 70 percent subsample of the Mikrozensus data. While other studies usually considered migrants from different countries of origin, the large sample size of the Mikrozensus allows us to differentiate Turkish migrants from other migrant groups. Moreover, in comparison with other surveys, nonresponse is of minor relevance in the Mikrozensus because participation is not voluntary but respondents are required by law to submit information. Unfortunately, the detailed information collected in the survey refers to only the household members but not to persons who do not live in the household. Therefore, no complete fertility histories are provided. Instead, the number of

children born per woman needs to be estimated via the number of co-residing children. By means of the so-called "own-children method" women's fertility histories are reconstructed based on the year of birth of the mother and the year of birth of each child living in the household. This procedure might underestimate the true number of children of a person especially in case that a child has already left parental home. It has been shown for respondents living in western Germany that the number of children calculated on basis of the "own-children method" is largely consistent with the reported number of biological children up to a maternal age of 40 years in the Mikrozensus (see Krapf, Wolf, Kreyenfeld, forthcoming).[4] Therefore, we use information on children co-residing with women in the age range 18 to 40 years. Another limitation of the data is related to the fact that respondents' characteristics refer to only the time of interview so we cannot account for time-varying covariates.

The vast majority of people with foreign origin migrated to western Germany and still lives there (Destatis, 2012; Münz et al., 1999). As fertility patterns differ between eastern and western Germans (Huinink et al., 2012), we compare those with Turkish background to non-migrants living in western Germany excluding respondents living in eastern Germany from our analyses. Moreover, we do not consider respondents with other than Turkish or German background.

In our sample, the migrant groups differ in their age structure. Respondents of the second generation are considerably younger than 1.5 generation migrants and native Germans. The reason for this is simple: Turkish women immigrated mainly after 1973 in the context of family reunion (Münz et al., 1999). Second generation migrants are largely born after that and in the two Mikrozensus waves 2005 and 2009, they had not yet reached the age of 40 years (see Table A1 in the appendix).

4.2. Methods

In order to compare the fertility behavior of respondents of migrant origin and native Germans, we use discrete-time hazard models. For the transition to first birth, the process time is the age of the respondent at first birth, while for the transition to second birth it is the

[4] In the Mikrozensus 2008, female respondents were asked how many children they have given birth to, which gave the opportunity to compare the actual number of births to number of children living in the household.

duration since the birth of the first child. The information on the age at first birth is generated based on the difference between the mother's birth year and the year of birth of the oldest child in the household. For second births, we calculate the duration since first birth based on the difference in the birth year of the oldest and the second oldest child living in the family. Using yearly time information results in an overestimation of the Kaplan-Meier survival estimates (see descriptive analysis below). In order to reduce this overestimation, we imputed a random birth month. Still, the time scale is discrete, and assuming that the underlying latent time variable was continuous, we specified the hazard rate as complementary log-log (cloglog) function (Allison, 1982). The data were organized in person-month format, with each person potentially contributing one entry per month. Cases are censored in the year a woman gives birth or when a respondent has not yet had a first (second) birth at time of the interview.

To identify whether education has a different effect on fertility patterns among native Germans and the descendants of migrants, we additionally interact the level of education with migrant status (two-way interaction). Moreover, we run three-way interactions in order to account for the fertility intensities by age according to educational group. It has been shown that low educated women have their highest first birth risks in their mid-twenties, while those with higher education enter motherhood on average at later ages (Tesching, 2012). In order to examine whether these age patterns differ according to migrant background, we interact the level of education, migrant status and the age of first birth. It has to be noted that for this model, we reduced the number of age groups to three (18-25, 26-32, 33-40 years). This is necessary because of the small sample size especially for respondents of Turkish origin in the high education group. Due to sample size issues we refrain to run the three-way-interaction also for second births.

4.3. Explanatory variables

In the multivariate analyses, the key variable is the migration background of a woman. We distinguish native Germans (those who were born in Germany and whose parents have or had exclusively the German citizenship), second generation Turkish migrants (those who were born in Germany but whose parents have or had the Turkish citizenship)[5] and 1.5 generation

[5] In order to clearly distinguish between second and third generation migrants we would need information not only on parents' citizenship but on their place of birth which is not available for all respondents in the Mikrozensus. However, we

(those who were born in Turkey, migrated to Germany as a child and who have or had the Turkish citizenship). Respondents are categorized as 1.5 generation if they migrated before age 15. It would have been interesting to investigate the behavior of those with one Turkish and one German parent. But this group is too small for meaningful analysis and therefore we excluded it from the sample.[6]

Another independent variable of interest is education. As mentioned before, the variables in the Mikrozensus are available only for the time of interview. Assuming that the school education was finished in early adulthood, we distinguish women with lower secondary or no school degree (low), secondary education (medium) and those with higher secondary education (high). The group that was enrolled in school education was very small and we categorized it into the lower secondary school group. The descriptive statistics show that in our sample, native Germans have the highest level of education compared to 1.5 and second generation Turkish migrants. This is the case for both the sample for the first birth and the sample for the second birth analyses (see Tables A1 and A2 in the appendix). For both samples, while only a small share of respondents of the 1.5 generation had high education (first birth sample: 18 percent, second birth sample: 6 percent), this share has increased for the second generation.

Further, we control for citizenship. Prior research found a higher average number of children for those immigrants without German citizenship compared to naturalized immigrants (Stichnoth & Yeter, 2013). Although there are different naturalization rules for 1.5 and second generation Turkish migrants,[7] Table A1 shows that in both groups a similar share has German citizenship.[8] In order to account for cohort effects, we control for the birth year of respondents. This variable is grouped in 10 year categories. In the analyses of the transition to second birth, we also control for age at first birth.

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argue that third generation Turkish migrants only reach adulthood now and are thus only to a minor extend considered in the age groups under study.

[6] Also those with a parent with other than Turkish or German citizenship were excluded.

[7] A second generation migrant with Turkish parents obtains Turkish citizenship by birth. Since 2000, residents of Turkish origin in addition immediately obtain the German citizenship, if they are born in Germany. Those second generation migrants are allowed to keep both citizenships until the age of 23, when they have to decide for one of them and give up the other.

[8] The category Turkish citizenship includes some respondents among 1.5 generation and second generation migrants who have both the German and the Turkish citizenship. The number of cases was too small to examine this group separately.

5. Results

5.1. Descriptive Results

Figure 1 describes the pattern of the transition to first and second births on basis of the pooled Mikrozensus data for the years 2005 and 2009. The first panel shows the estimated Kaplan-Meier survival curves for first births. For Germans, the median age at first birth was reached at 31.3 years. For 1.5 generation Turkish migrants, the median age was 24.3 while for second generation migrants it was 27.6 years. This shows that first childbirth occurs earlier for 1.5 generation Turkish migrants in Germany compared to natives, while second generation migrants lie in between. Concerning childlessness, we find a similar pattern: Germans remain childless more often compared to Turkish migrants' descendants. By age 40, 27 percent of native German women were still childless while it was 11 percent of 1.5 generation Turkish migrants. Also for childlessness by age 40, the second generation takes an intermediate position between the other two groups. [9]

The second panel of Figure 1 illustrates the transition to second birth. Here, the process time of interest is the duration since first birth. For all three migrant status groups, children are most likely to be born in the time span of one to four years after the first child. While the curves for the three groups follow a similar pattern for the first four years after first birth, they diverge afterwards. For Germans, we see a levelling off after four years. For Turkish descendants on the other hand, second childbirth occurs with a higher distance between first and second birth. Moreover, the graph shows that the overall share of women having a second child within 10 years after first childbirth is lower among Germans compared to Turkish migrants' descendants. Migrants of the 1.5 generation have their second child in shorter intervals, while the curve of the second generation lies in-between. However, the curves of both migrant groups are quite similar to each other. Women with Turkish origin seem to start their childbearing career earlier and space their subsequent births further apart than non-migrant Germans.

(Figure 1 about here)

[9] The second generation Turkish migrants in our sample consists of very young respondents, just reaching the ages of 30 and above at time of the interview. Since both Turkish migrants and German natives experienced a postponement of the entry into motherhood among the cohorts observed, the first birth behavior of the very young second migrant generation might be underestimated. However, examining first birth patterns by migrant status and birth cohort we found that there is no such bias that affects our results.

5.2. Multivariate Analyses

This section presents the results of the discrete-time hazard models on the transition to first and second births (see Tables 1 and 2). Table 1 reports the results of a stepwise model on first births, which includes Germans and descendants of Turkish migrants. Model 1 shows a hump-shaped effect of age: The first birth risk for respondents under age 25 is low, rises for those between 26 and 35 years and diminishes again for those in the age group 36 to 40 years. For birth cohort, we find a negative effect: women born earlier show higher first birth risks than those born in younger birth cohorts. This indicates that there is an on-going postponement of first births.

Concerning the migration background of respondents, we defined second generation Turkish migrants as reference category in order to not only show the difference between those with Turkish origin and natives but also to show whether there are significant differences between the two migrant generations. Our results show that, as expected, native Germans have a lower first birth risk (relative risk (RR)=0.53) while 1.5 generation migrants have a higher risk (RR=1.45) than respondents of the second generation. In Model 2, we added the level of respondent's school education. We find a negative gradient of educational attainment: the higher the school education, the lower are the first birth risks. Moreover, the effect of the migration background is slightly reduced compared to Model 1: the difference in first birth risks of Turkish 1.5 and second generation migrants and native Germans diminishes after controlling for education. However, the effects of the migrant status on first birth remain significant. It reveals that fertility differentials can only partly be explained by educational differences.

In order to identify whether the effect of education on first births differs across migrant generations, Model 3 includes the two-way interaction effect of migrant background and educational attainment that is graphically displayed in Figure 2. In the first panel, the reference category is second generation migrants with medium level education. The results show that Germans have the lowest birth risk, followed by second generation Turkish migrants while respondents of the 1.5 generation have the highest risk. In all three groups, the effect of education is negative. In the second panel the standardized effect is shown with second generation migrants as reference category for each educational group. What is remarkable is the fact that the relative difference in birth risks is considerably reduced for

women with high education. For highly educated women of second generation Turks and native Germans, the difference in birth risks is not significant.

(Table 1 about here)

(Figure 2 about here)

In order to compare the age patterns of different educational groups, we additionally interacted age at first birth, educational attainment and migrant status. The numbers of events in each category are partly very small which can be seen in Table A3 in the appendix. To compare across educational groups, we display the medium education level as reference category for each age group. Table 4 in the appendix and Figure 3 show the results of the three-way interaction. The first panel of Figure 3 presents the pattern for Germans. Respondents with low education have lower first birth risks with increasing age compared to the reference group of women with a medium level education. By contrast, highly educated women postpone their first birth and have the highest fertility risks in the age group 33 to 40 years. The pattern for descendants for Turkish migrants with low education is similar as for Germans: Panel 2 of Figure 3 shows that first birth risks of lowly educated 1.5 generation Turkish migrants decline with age (reference category: medium educated). The same is the case for second generation migrants (Panel 3 in Figure 3). However, the highly educated women of Turkish origin differ from the German pattern. Both for 1.5 and second generation migrants in this group, first birth risks are significantly lower than for women with medium education. By contrast to the German respondents, this is also the case for highly educated women in the older age group. For the interpretation, however, we have to keep in mind that the results especially for highly educated women in the highest age group refer to a small number of women in our sample (see also Table 3 in the appendix). This is related to two aspects: First, a lower number of Turkish origin women have higher education. Second, Turkish migrants descendants are still very young and reach only now the second half of their thirties.

(Figure 3 about here)

In the next step, we were interested in the effect of citizenship. As all Germans in our sample have German citizenship, the results in Table 2 only refer to respondents with Turkish origin. Again, belonging to the 1.5 generation was related to increased first birth risks. Also the

effects of the other control variables were largely the same as they were in the models above. Compared to the results for the sample including Germans (see Table 1), we now find that the birth of the first child occurs earlier in life for Turkish respondents: Among women with Turkish origin first birth risks are highest for those aged between 26 and 30. In Model 4, we did not find significantly different first birth risks among those with Turkish versus German citizenship. In order to account for different naturalization rules for 1.5 and second generation Turkish migrants, we ran interactions between citizenship and generation. The results of the interaction effect between migrant generation and citizenship (Model 5) also imply that the difference between generations are more pronounced while having German or Turkish citizenship did not have any significant effects.

(Table 2 about here)

Table 3 is devoted to determinants influencing the transition to second birth. In these models, the process time is the duration since first birth. The results show that second birth risks are highest two to four years after the first birth. Before and after that, the second birth risks were lower. We also control for maternal age at first birth. In line with other studies (e.g., Kreyenfeld 2002), we find a lower second birth risk for women who had their first child after age 30 compared to those who were younger. Similar as for first births, Model 6 indicates higher second birth intensities for 1.5 generation migrants (RR=1.24) and lower intensities for Germans (RR=0.89) compared to respondents of the second generation Turkish migrants. In Models 7 and 8, we control for the educational attainment of respondents. Our results imply that for second births, women with low and medium level education show similar birth risks. By contrast, highly educated mothers have significantly higher second birth rates than those with medium education (RR=1.20). In order to identify whether this pattern is different for respondents with Turkish origin and native Germans, we specify an interaction effect (Model 8) which is graphically displayed in Figure 4. As the first panel in Figure 4 indicates, the positive effect of high education is found only for Germans. For second and 1.5 generation migrants, we find a negative gradient for education. Interestingly, the second panel in Figure 4 reveals that the difference in relative second birth risks is smallest for women with high education, while for the other education groups, differences between respondents of each migrant status group are more pronounced. However, it has to be noted that only few of the interaction effects in Model 8 are significant which is related to small sample sizes especially

in each education category for women with Turkish background. This is also the reason why we refrained from running the three-way-interaction models for second births.

(Table 3 about here)
(Figure 4 about here)

When taking into consideration the effect of citizenship for respondents with Turkish origin (Table 4), Model 9 indicates that also for the transition to second birth members of the 1.5 generation have higher rates than those of the second generation. We do not find significant differences between those with German and Turkish citizenship. This implies that also for second births socialization effects seem to be important – independent of citizenship. Interestingly, we find a negative effect of age at entry into motherhood on second birth rates. Due to the age structure of women with Turkish origin in our sample, there are no respondents in the age group above 35 years. Also we do not find significant effects for different birth cohorts and school education.

(Table 4 about here)

6. Discussion

Based on data of the German Mikrozensus this study focuses on fertility patterns of the 1.5 and second generation Turkish migrants compared to native Western Germans. Our results show that the 1.5 generation, who migrated as children, have the highest first birth risks, Germans have the lowest birth risks, while second generation lie in between the two other groups.

The comparison of second and 1.5 generation Turkish migrants allowed us to disentangle adaptation and socialization effects. According to adaptation theory, the destination country's childbearing values and its opportunity structure influence migrants' fertility behavior. Since both groups, the 1.5 migrant generation as well as the second generation, spent their entire adult life in Germany, they should adapt to the low fertility patterns of Germans to the same extent. 1.5 generation migrants differ markedly from the German pattern, while the fertility behavior of the second generation is more similar to that of Germans. Both migrant generations differ from each other in that way that for generation 1.5, childhood socialization

has partly taken place in Turkey, while it took place in Germany for the second generation. The differences in fertility behavior between both groups indicate that family values learnt through childhood socialization are of great importance for the later fertility behavior of migrants' descendants.

This finding does not necessarily contradict adaptation arguments, but it seems that socialization effects are more relevant here. In our data, we find some adaptation tendencies of fertility, particularly among highly educated women. For the lowly educated, first birth risks varied strongly, the difference diminished slightly for those with medium education. Highly educated women of the second generation behave very similar to Germans of the same educational status, while 1.5 generation migrants still differ. Again, it reveals that differences between 1.5 and second generation migrants, which are likely to be related to socialization effects, are prevailing, even after considering the socio-economic background of the women. That means that the composition hypothesis finds support only partly. Our findings indicate that education has an equalizing effect especially among highly educated second generation migrants – but less for those with lower education and the generation 1.5.

Three-way interaction models of education, migrant status, and age provided us with further insights concerning the age patterns for each group. Highly educated German women show higher first birth risks with increasing age. Migrants of Turkish origin with a high educational status, by contrast, do not show this direct relation, but have constantly low first birth risks in each age category. The finding for Germans indicates a postponement of first childbirth into higher ages, as also found in previous works on western countries (Blossfeld & Huinink, 1991; Ní Bhrolcháin & Beaujouan, 2012; Tesching, 2012). For Turkish descendants, we see no postponement of first births occurs among the highly educated, but their fertility level remains low across all age groups compared to those with lower education. However, particularly second generation migrants are still young and so far only few women with Turkish roots have attained high education and reached ages above 30 years. Until they have reached higher ages, it remains unclear if highly educated Turkish descendants follow different age patterns for first childbirth than Germans with the same educational level.

An interesting control variable in our analyses was women's citizenship. We assumed that those descendants of migrants, who gave up Turkish citizenship in order to obtain the German one, identify with German culture more than women who keep their Turkish citizenship.

Accordingly, those with German citizenship were expected to have more similar birth rates to native Germans than Turks. Contrary to this hypothesis, in our analyses citizenship seemed to be of minor relevance for fertility behavior. One explanation for this finding might be that naturalization among young Turks might be less an act of identification with the German culture but is related to other reasons. Having German citizenship is accompanied by a number of advantages, such as easier access to the labor market; the right to vote and higher mobility within the European Union (see Avitabile et al., 2012 for more detail). Those who decide to give up Turkish citizenship might have the desire to profit from these side effects and still feel attached to Turkish family values that affect childbearing patterns.

Our study adds to the literature on the fertility behavior of migrants in advanced societies. First, in line with findings for other countries (Blau et al., 2008; Garssen & Nicolaas, 2008; Parrado & Morgan, 2008; Scott & Stanfors, 2011) we were able to show a process of convergence across Turkish migrant generations in Germany. However, the second generation still differs markedly from Germans, thus fertility adaptation seems to be less developed like for example in the Netherlands (Garssen & Nicolaas, 2008). In addition, we illustrated that a distinction between 1.5 and second generation migrants is appropriate and necessary. From a theoretical point of view, both groups should differ in their fertility behavior due to differing socialization experiences during childhood. Like for several migrant groups in Sweden (Scott & Stanfors, 2011), our results confirm this theoretical relationship for the case of Turkish migrants in Germany. So far, only differences between 1.5 and second generation Turkish migrants concerning completed fertility were shown (Stichnoth & Yeter, 2013). We extend this to parity-specific evidence. Both the transitions to first and second childbirth were found to differ considerably between the two migrant generations. Regarding fertility determinants, we were able to show that naturalization plays a minor role for fertility assimilation of Turkish migrants in Germany. Furthermore, our results indicate a potential for fertility convergence in future if descendants of Turkish migrants increase their average educational attainment. Today, those of Turkish origin still have lower levels of education on average than native Germans. Given an increase in educational attainment, a larger share of women with migrant origin will earn a degree in higher secondary education. As this group has similar fertility patterns as Germans, the aggregated fertility of Turkish migrants should decline in future.

For future research, in order to complete our picture of the fertility of migrants' descendants, we should study the transition to third birth. This is of specific interest, as there might be a large difference between women in western Germany, who follow a two child norm, and women of Turkish origin, who experience a transition to a third child more often (Milewski, 2010b). In this paper, we refrained from analyzing third births which was related to the age structure of second (and partly 1.5) generation Turkish migrants in Germany who only now reach ages above 35 years and who are at risk of having a third birth to a limited extent (see Table A3 in the appendix for the number of events and person-months). This will change as second generation migrants grow older. The Mikrozensus 2013 again includes the survey items on parents' migrant status which offers the opportunity to further investigate the fertility behavior of the descendants of migrants in Germany.

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Figures and Tables

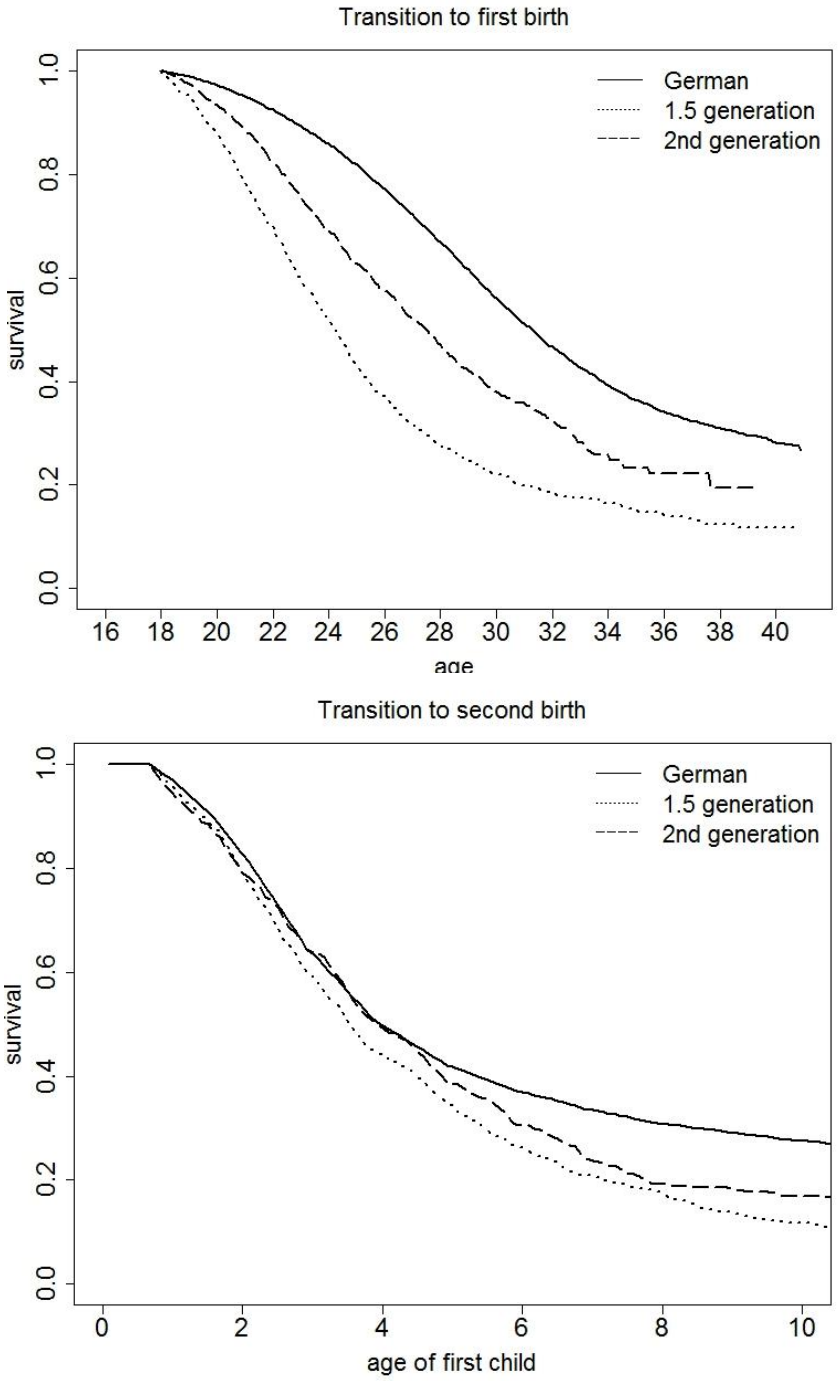


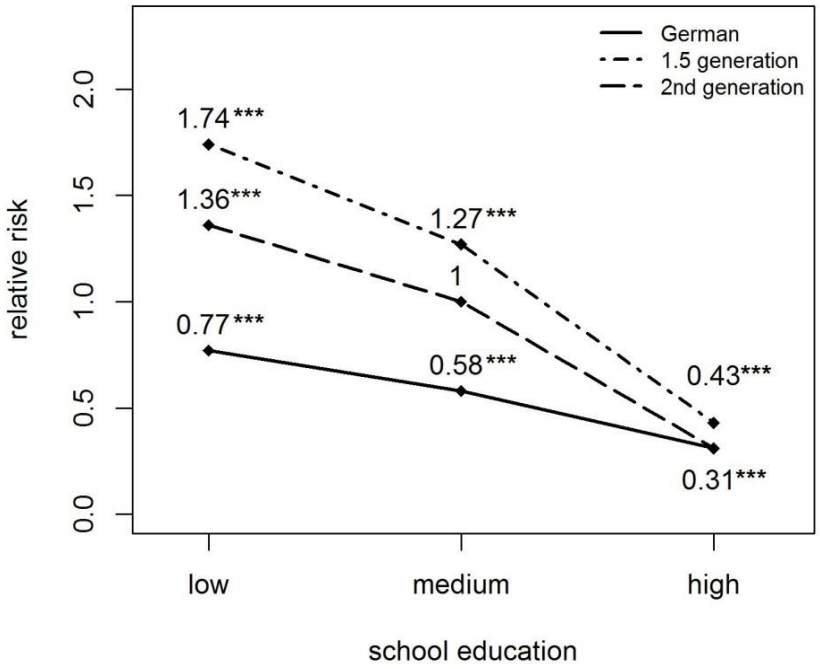
Figure 1. *Survival curves for Germans, 1.5 and second generation migrants. Female respondents of birth cohorts 1959-1991.*

Source: German Mikrozensus 2005 and 2009.

Table 1. *Determinants of the transition to first births. Relative Risks. Cloglog model. Female respondents between 18 and 40 years. Western Germans, 1.5 and second generation Turkish migrants.*

	Model 1	Model 2	Model 3
constant	0.14 ***	0.15 ***	0.16 ***
age			
18-25 years	0.42 ***	0.40 ***	0.40 ***
26-30	1	1	1
31-35	0.98	0.98	0.98
36-40	0.47 ***	0.46 ***	0.46 ***
cohort			
1959-1969	1.12 ***	1.06 ***	1.06 ***
1970-1979	1	1	1
1980-1991	0.61 ***	0.65 ***	0.65 ***
migration background			
German	0.53 ***	0.62 ***	
1.5th generation Turkish migrants	1.45 ***	1.33 ***	
2nd generation Turkish migrants	1	1	
school educational			
low		1.34 ***	
medium		1	
high		0.53 ***	
interaction			
low edu and German			0.77 ***
middle edu and German			0.58 ***
high edu and German			0.31 ***
low edu and 1.5th generation Turkish			1.74 ***
middle edu and 1.5th generation Turkish			1.27 **
high edu and 1.5th generation Turkish			0.43 ***
low edu and 2nd generation Turkish			1.36 ***
middle edu and 2nd generation Turkish			1
high edu and 2nd generation Turkish			0.31 ***
person-months	747,071	747,071	747,071
number of events	32,580	32,580	32,580

Source: Calculations based on the German Mikrozensus data 2005 and 2009
Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Respondents with one German and one Turkish parent and also eastern Germans were excluded from the sample.



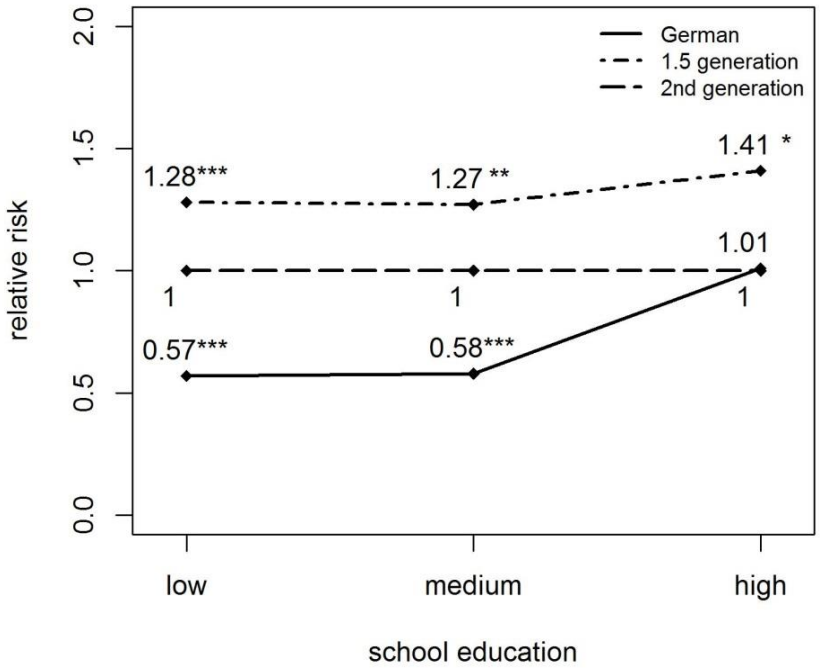


Figure 2. *Interaction between migration background and education (Model 3). Transition to first birth. Female respondents between 18 and 40 years. Western Germans, 1.5 and second generation Turkish migrants. Mikrozensus 2005 and 2009.*

Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Controlled for mother's age, cohort. Respondents with one German and one Turkish parent and those living in eastern Germany were excluded from the sample.

Source: German Mikrozensus 2005 and 2009.

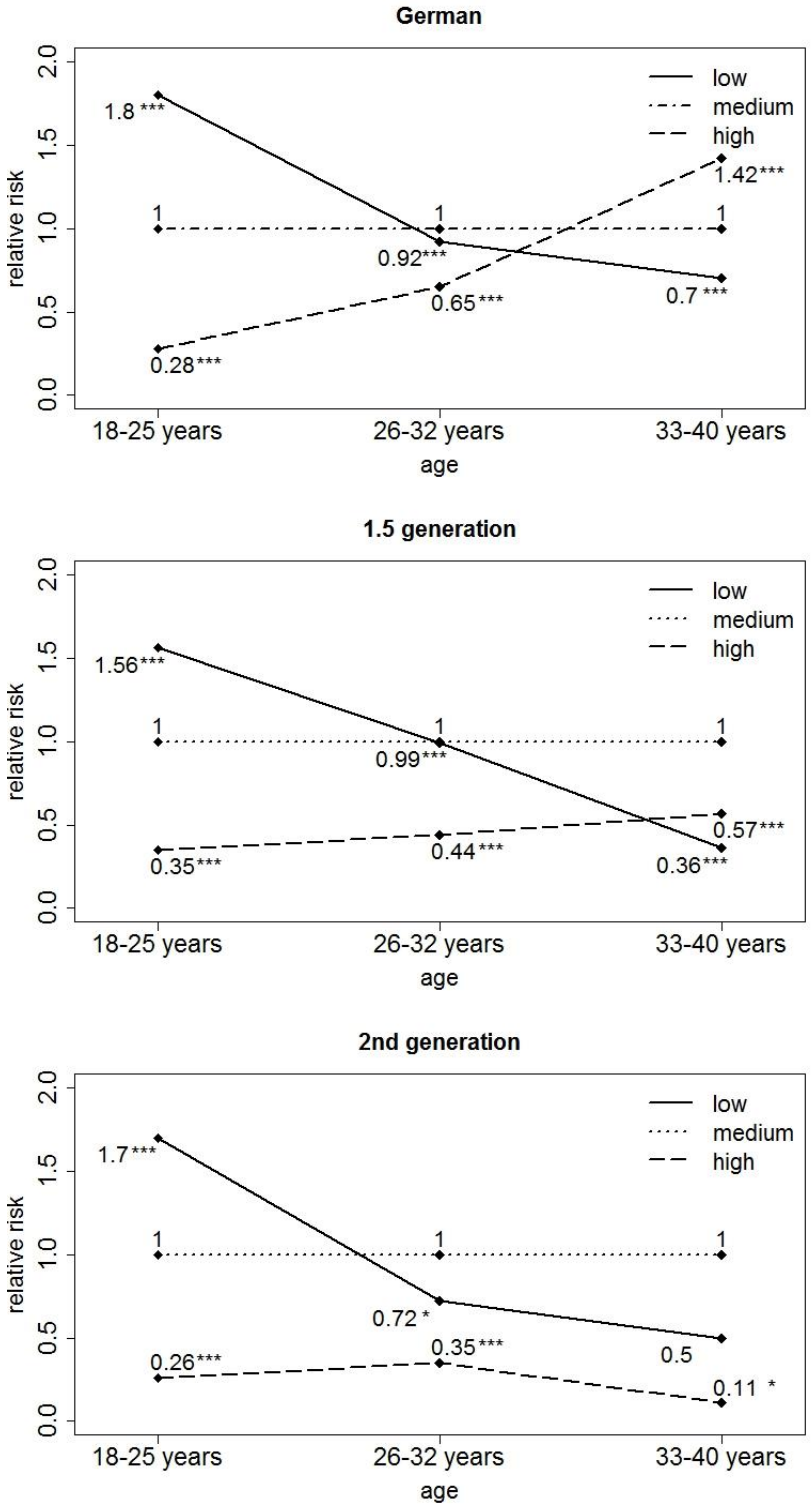


Figure 3. *Three-way interaction of migration status, education and age. Transition to first birth. Relative Risks. Cloglog model. Female respondents between 18 and 40 years. Western Germans, 1.5 and second generation Turkish migrants.*

Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Controlled for cohort. Respondents with one German and one Turkish parent and also eastern Germans were excluded from the sample.
Source: German Mikrozensus 2005 and 2009.

Table 2. *Determinants of the transition to first births. Relative Risks. Cloglog model. Female respondents between 18 and 40 years. 1.5 and second generation Turkish migrants.*

	Model 4	Model 5
constant	0.10 ***	0.11 ***
age		
18-25 years	0.74 ***	0.73 ***
26-30	1	1
31-35	0.72 **	0.72 **
36-40	0.48 *	0.48 *
cohort		
1959-1969	0.95	0.95
1970-1979	1	1
1980-1991	0.54 ***	0.54 ***
migration background		
1.5th generation Turkish migrants	1.33 ***	
2nd generation Turkish migrants	1	
school educational		
low	1.34 ***	1.34 ***
medium	1	1
high	0.35 ***	0.35 ***
citizenship		
only German	1	
Turkish	1.03	
interaction		
1.5th generation and German citizen		1.29 ***
1.5th generation and Turkish citizen		1.37 ***
2nd generation and German citizen		1
2nd generation and Turkish citizen		1.00
person-months	17,416	17,416
number of events	1,372	1,372

Source: Calculations based on the German Mikrozensus data 2005 and 2009
Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Respondents with one German and one Turkish parent and also eastern Germans were excluded from the sample.

Table 3. *Determinants of the transition to second births. Relative Risks. cloglog model. Female respondents between 18 and 40 years. Western Germans, 1.5 and second generation Turkish migrants.*

	Model 6	Model 7	Model 8
constant	0.55 ***	0.54 ***	0.50 ***
years since first birth			
0-1	0.05 ***	0.05 ***	0.05 ***
1-2	0.33 ***	0.32 ***	0.32 ***
2-4	1	1	1
4-7	0.75 ***	0.75 ***	0.75 ***
7-10	0.35 ***	0.35 ***	0.35 ***
10+	0.27 ***	0.27 ***	0.27 ***
mother's age at first childbirth			
18-25 years	1.00	1.02	1.02
26-30	1	1	1
31-35	0.88 ***	0.85 ***	0.85 ***
36-40	0.77 ***	0.72 ***	0.72 ***
cohort			
1959-1969	1	1	1
1970-1979	1.02	1.02	1.02
1980-1991	0.81 ***	0.81 ***	0.81 ***
migration background			
German	0.89 **	0.87 **	
1.5th generation Turkish migrants	1.24 ***	1.25 ***	
2nd generation Turkish migrants	1	1	
school education			
low		0.97	
medium		1	
high		1.20 ***	
migration background & school education			
low educ. and German			0.91
middle educ. and German			0.95
high educ. and German			1.15
low educ. and 1.5th generation Turkish			1.37 ***
middle educ. and 1.5th generation Turkish			1.36 **
high educ. and 1.5th generation Turkish			0.98
low educ. and 2nd generation Turkish			1.16
middle educ. and 2nd generation Turkish			1
high educ. and 2nd generation Turkish			0.84
person-months	103,440	103,440	103,440
number of events	18,675	18,675	18,675

Source: Calculations based on the German Mikrozensus data 2005 and 2009
Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Respondents with one German and one Turkish parent and also eastern Germans were excluded from the sample.

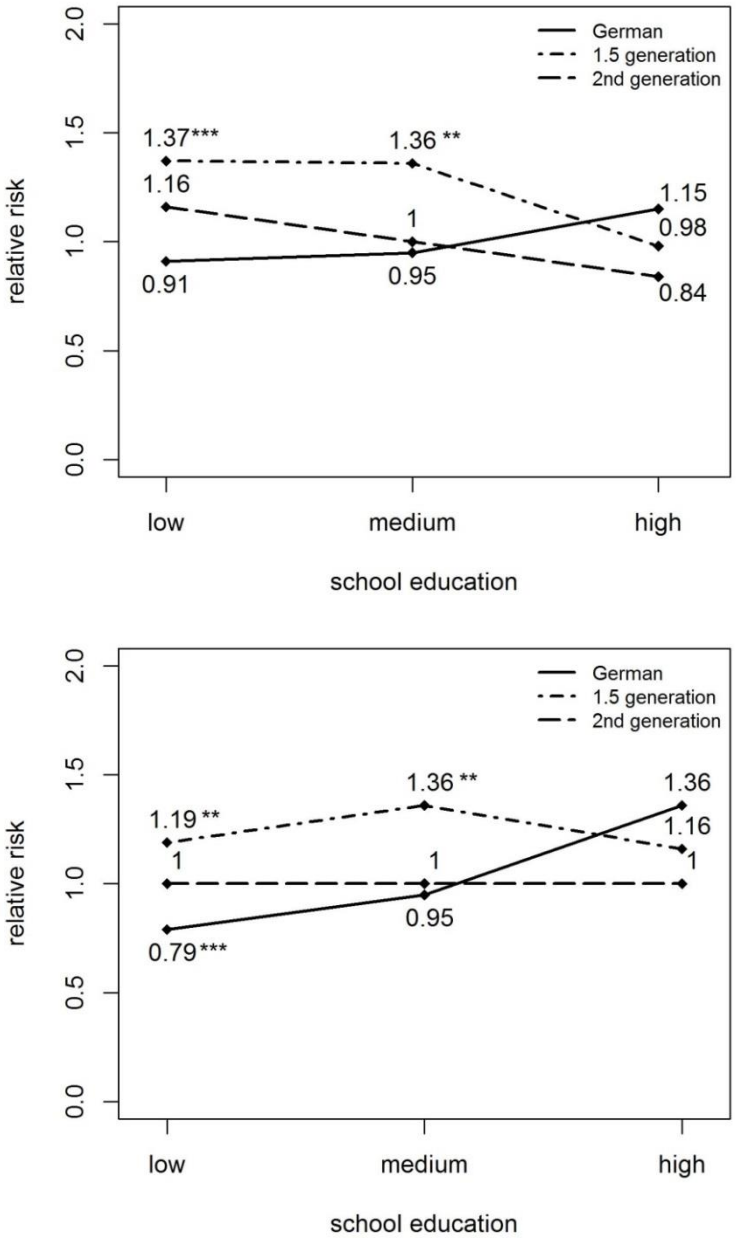


Figure 4. *Interaction between migration background and education. Transition to second birth. Female respondents between 18 and 40 years. Western Germans, 1.5 and second generation Turkish migrants*

Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Controlled for years since first birth, mother's age at first birth, cohort. Respondents with one German and one Turkish parent and those living in eastern Germany were excluded from the sample.
Source: German Mikrozensus 2005 and 2009.

Table 4. *Determinants of the transition to second births. Relative Risks. Cloglog model. Female respondents between 18 and 40 years. 1.5 and second generation Turkish migrants.*

	Model 9
constant	0.36 ***
years since first birth	
0-1	0.07 ***
1-2	0.36 ***
2-4	1
4-7	1.28 ***
7-10	0.70 **
10+	0.50 ***
mother's age at first childbirth	
18-25 years	1.30 ***
26-30	1
31-35	0.71
36-40	-
cohort	
1959-1969	1
1970-1979	0.99
1980-1991	0.82
school education	
low	1.01
medium	1
high	0.79
migrant generation & citizenship	
1.5th generation and German	1.31 **
1.5th generation and Turkish	1.34 ***
2nd generation and German	1
2nd generation and Turkish	1.10
person-months	4,332
number of events	961

Source: Calculations based on the German Mikrozensus data 2005 and 2009
Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Respondents with one German and one Turkish parent and also eastern Germans were excluded from the sample.

Appendix

Table A1. *Descriptive statistics. Number of first birth events. Germans, 1.5 and second generation migrants. Female respondents.*

	German		1.5th generation		2nd generation	
	share (person months)	number of events	share (person months)	number of events	share (person months)	number of events
education						
low	19.1%	9,558	59.6%	573	41.2%	418
middle	36.7%	13,999	22.7%	154	28.8%	206
high	44.2%	8,902	17.7%	50	30.0%	73
age						
18-25	11.5%	1,580	10.3%	46	22.9%	67
26-30	18.9%	4603	15.3%	117	34.7%	250
31-35	26.9%	9,532	30.6%	248	31.4%	285
36-40	42.7%	16,744	43.7%	366	11.0%	95
cohort						
1959-1969	31.7%	12,651	29.2%	236	4.3%	32
1970-1979	50.9%	16,961	56.6%	467	60.8%	508
1980-1991	17.4%	2,847	14.2%	74	34.9%	157
citizenship						
German	100.0%	32,459	48.2%	331	47.3%	309
Turkish			51.8%	446	52.7%	388
total		32,459		777		697

Source: Calculations based on the German Mikrozensus data 2005 and 2009.

Table A2. *Descriptive statistics. Number of second birth events. Germans, 1.5 and second generation migrants. Female respondents.*

	German		1.5th generation		2nd generation	
	share (person months)	number of events	share (person months)	number of events	share (person months)	number of events
education						
low	34.0%	5,874	75.4%	489	63.8%	281
middle	44.2%	7,787	18.4%	119	26.7%	105
high	21.8%	4,744	6.1%	30	9.4%	32
age						
18-25	2.5%	390	0.1%	18	5.1%	18
26-30	9.6%	1,914	11.0%	82	27.7%	121
31-35	25.5%	5,328	31.8%	218	47.6%	207
36-40	62.4%	10,773	57.2%	320	19.6%	72
cohort						
1959-1969	48.1%	8,169	34.2%	209	7.3%	25
1970-1979	46.8%	9,321	61.0%	399	84.8%	333
1980-1991	5.1%	915	4.8%	30	15.2%	60
citizenship						
German	100.0%	18,405	42.9%	263	41.8%	171
Turkish			57.1%	375	58.2%	247
total		18,405		638		418

Source: Calculations based on the German Mikrozensus data 2005 and 2009.

Table A3. *Descriptive statistics. Number of third birth events. Germans, 1.5 and second generation migrants. Female respondents*.

	German		1.5th generation		2nd generation	
	share (person months)	number of events	share (person months)	number of events	share (person months)	number of events
education						
low	36.2%	1,613	76.1%	227	73.2%	82
middle/high	63.8%	2,598	23.9%	37	26.8%	18
age						
18-25	0.6%	51	0.8%	3	1.5%	3
26-30	5.0%	386	6.8%	25	18.1%	20
31-35	22.3%	1,164	30.6%	83	53.5%	54
36-40	72.1%	2,610	61.8%	153	26.9%	23
cohort						
1959-1969	56.2%	1,997	40.6%	102	9.8%	8
1970-1979	41.9%	2,054	57.9%	154	83.3%	85
1980-1991	1.9%	160	1.5%	8	6.9%	7
citizenship						
German	100.0%	4,211	40.9%	105	37.1%	32
Turkish		0	59.1%	159	62.9%	68
total		4,211		264		100

Source: Calculations based on the German Mikrozensus data 2005 and 2009.

Table A4. *Descriptive statistics. Number of first birth events by migration status, education and age. Female respondents between 18 and 40 years. Western Germans, 1.5 and second generation Turkish migrants.*

	education					
	low		**medium**		**high**	
age	person months	birth events	person months	birth events	person months	birth events
German						
18-25	71%	6,020	70%	6,105	68%	1,943
26-32	25%	3,085	26%	6,583	28%	5,503
33-40	5%	240	4%	567	4%	943
1.5 migrant generation						
18-25	82%	442	81%	103	67%	24
26-32	15%	84	17%	38	28%	20
33-40	2%	6	1%	3	5%	4
2nd migrant generation						
18-25	85%	325	86%	128	77%	34
26-32	14%	63	13%	56	22%	36
33-40	1%	3	0%	2	1%	1

Source: Calculations based on the German Mikrozensus data 2005 and 2009.

Table A5. *Three-way interaction of migration status, education and age. Transition to first birth. Relative Risks. Cloglog model. Female respondents between 18 and 40 years. Western Germans, 1.5 and second generation Turkish migrants*

age	education		
	low	medium	high
German			
18-25	1.80 ***	1	0.28 ***
26-32	0.92 ***	1	0.65 ***
33-40	0.70 ***	1	1.42 ***
1.5 migrant generation			
18-25	1.56 ***	1	0.35 ***
26-32	0.99	1	0.44 ***
33-40	0.36	1	0.57
2nd migrant generation			
18-25	1.70 ***	1	0.26 ***
26-32	0.72 ***	1	0.35 ***
33-40	0.50 ***	1	0.11 ***

Notes: *** p <= 0.01, ** p <= 0.05, * p <= 0.10. Controlled for cohort. Respondents with one German and one Turkish parent and also eastern Germans were excluded from the sample.
Source: Calculations based on the German Mikrozensus data 2005 and 2009.

Childbearing among the descendants of immigrants in Sweden

Gunnar Andersson and Lotta Persson

Abstract:
This study provides analyses of the childbearing behavior of the descendants to immigrants in Sweden. The study is based on register data covering the period 1998–2012, which allows for very detailed analyses of the childbearing behavior of twenty country groups of descendants. By means of event history techniques, we analyze the transition to any first, second and third birth. Our analyses show that most groups of descendants to immigrants have lower fertility than women with a full Swedish background. The risk of having the first child is particularly depressed; only a fraction of this difference can be explained by the descendants' relatively poor labor-market standing. The risk of having the second child is also lower for the descendants to immigrants than for women with a full Swedish background. However, the patterns in third birth fertility mainly go in the opposite direction: Many groups of immigrant-descendant two-child mothers have elevated third birth risks. These findings demonstrate the necessity to account for parity-specific differences in fertility also when studying the fertility of descendants of migrants. In some cases, country background differences appear: Women with a parental background in Turkey or the Arab Mid-East seem to have higher fertility on average than women with a full Swedish background. Women with a parental background in other Nordic countries differ relatively little from women with both parents born in Sweden.

Keywords: fertility, descendants, immigration, Sweden

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1. Introduction

In recent years, immigrant fertility has been a much studied topic in Sweden (e.g., Andersson and Scott, 2005, 2007; Persson & Hoem, 2014) and other countries that receive immigrants (e.g., Abbasi-Shavazi & McDonald, 2000; Milewski, 2006; Parrado, 2011; see also Sobotka, 2008). The focus is often on immigrants from high-fertility to low-fertility countries, with research focusing on the interdependencies of migration and childbearing trajectories (Kulu & Milewski, 2007) and the fertility adaptation of migrants in different settings in Europe and North America (e.g., Kahn, 1988; Ford, 1990; Andersson, 2004; Kulu, 2005). There is less research on the childbearing of the descendants of immigrants in developed countries; this field has long been dominated by research on "second-generation" Mexicans and Hispanics in the U.S. (e.g., Stephen & Bean, 1992; Parrado & Morgan, 2008). Immigration to many countries in Europe is a more recent phenomenon than that of the migration to the US; it is only in recent years that there has been enough women at childbearing ages with parents born abroad to allow for any in-depth research on their childbearing patterns. Consequently, in Europe this field of research is still relatively young (cf. de Valk & Milewski, 2011). In this research, the descendants to immigrants are typically treated as distinct population sub-groups; the focus is often to find evidence of socio-demographic integration with the majority population of the country where they live and where they were born. In terms of data and demographic analysis, the processes involved are much less complex than in research on first-generation immigrants. As the descendants to migrants are no migrants themselves there are no temporal interdependencies between a person's own migration and his or her other life course histories to account for.

The present study provides evidence of childbearing patterns of descendants to immigrants in Sweden, a country with relatively high levels of immigration (Statistics Sweden, 2004) and increasing fractions of people with a foreign background (Statistics Sweden, 2010a). It expands on previous research on the first-birth fertility of descendants of immigrants in Sweden by Scott and Stanfors (2010; 2011). In our study, we compare the childbearing patterns of the descendants to immigrants to those of Swedish-born women with two Swedish-born parents. Our study is based on analyses of longitudinal register data that cover the entire resident population of Sweden during 1998–2012, which allows us to carry out a very detailed analysis of the childbearing behavior of widely different groups of descendants to immigrants. We present parity specific analyses of the transition to a first, second and third

child birth in Sweden. We also demonstrate how childbearing patterns and any differences in parity-specific fertility are modified by women's socioeconomic characteristics.

2. Childbearing trends in Sweden

Sweden is renowned for its roller coaster fertility (Hoem & Hoem, 1996). At least since the 1930s, periods with low levels of childbearing have alternated with periods of high fertility. There are several reasons for these fluctuations. The fertility decrease from the mid-1960s to the mid-1980s occurred during a period when it was difficult for women to combine parenthood with working life, just as the situation was, and still is, in many other parts of Europe. The introduction of modern contraceptives in the early 1960s contributed to the decline. This decrease was followed by an upturn in fertility during the 1980s, which was partly fuelled by a strong economy, partly by the expansion of increasingly ambitious social policies directed towards working parents (Bernhardt, 1993). The latter include newly introduced incentives in the Swedish parental-leave system for a more compressed spacing of childbirths (Hoem, 1993; Andersson, 1999). In Sweden, there is a clearly positive relationship between the business cycle and fertility. Economic compensation paid during parental leave is tied to previous income from work, which fuels the positive relationship at the individual level. Previous research has shown that women and men who are not established in the labor force have a much lower propensity to become a parent than those employed (Andersson, 2000; Hoem, 2000; Duvander & Olsson, 2001). This holds for immigrant and Swedish-born women and men alike (Andersson & Scott, 2005; Scott & Stanfors, 2011; Lundström & Andersson, 2012). Consequently, during the economic downturn in Sweden during the early to mid-1990s, when young women and men had increasing difficulties in getting established in the labor market, there was another strong decrease in fertility. During this decade, an increasing number of young people enrolled in higher education and postponed having children (Thalberg, 2011). In 1999, Sweden had the lowest fertility ever recorded in the country with a Total Fertility Rate (TFR) of only 1.5 children per woman. Subsequently, the TFR increased continuously until 2010 when it stood at 1.98 children per women. This peak was followed by another moderate decline.

(Figure 1 about here)

Previous research on period trends in the childbearing behavior of immigrants in Sweden shows that developments over time have been remarkably similar for Swedish- and foreign-born people but that there are sometimes differences in levels of childbearing intensities between women from different countries of origin (Andersson, 2004). First-birth rates of immigrants tend to be elevated: The differences in crude rates are often spurious and related to the fact that migration and childbearing are often interrelated events and that childbearing more likely follows migration than the other way round (Andersson, 2004; Toulemon & Mazuy, 2004). However, second-birth rates of immigrants in Sweden are generally lower than those of the Swedish-born (Andersson, 2004). To a large extent, this stems from the fact that immigrants did not react particularly strongly to the "speed-premium" incentives that were introduced in the Swedish parental leave system during the 1980s and that caused much shorter birth intervals for Swedish-born mothers (Andersson et al., 2006). Research on the fertility of immigrants in Sweden further reveals that the socioeconomic characteristics of immigrants relate to their fertility in a strikingly similar manner as for native Swedes (Andersson & Scott, 2005; 2007; Lundström & Andersson, 2012). In particular, women and men who are not established in the labor market with regular employment display very low first-birth rates.

3. Descendants to immigrants in Sweden

Like many other countries in Europe, Sweden has gone from being a country of emigration to a destination for immigration. Since 1945, immigration has contributed significantly to the Swedish population (Statistics Sweden, 2004). Until the early 1970s, immigration was mainly dominated by labor migrants, mostly from other countries in Europe. Since the 1980s, the geographical origin of migrants to Sweden has been much more diverse than before. In 2013, 16 percent of the population was foreign-born (www.scb.se). Previous migration has also contributed to a steady increase in the stock of descendants to immigrants, sometimes referred to as the "second generation" of immigrants. Evidently, this development occurs with a time lag of a generation and is a more recent phenomenon than that of migration itself. In 1970, only four percent of the population were born in Sweden and had one or two foreign-born parents (Statistics Sweden, 2010a). The corresponding figure for 2013 was 12 percent: five percent with two foreign-born parents and seven percent with one foreign- and one Swedish-born parent (www.scb.se).

In our study, we present analyses of the childbearing behavior of female descendants to immigrants in Sweden: we present analyses for descendants of one or two foreign-born parents combined. Our study covers the childbearing behavior of twenty groups of descendant women who are classified by their parents' country of birth, as specified below. If a person has just one foreign-born parent she is classified according to that parent's country of birth. If she has two foreign-born parents that are from different countries she is assigned to her mother's country of origin. The overall distribution of descendants across groups reflects migration patterns as they appeared a few decades ago.

Descendants of immigrants with a background in Finland are the by far the largest group in our study: more than a third of the descendants have one parent or two from Finland (Table 1). Migration from Finland was high during the 1950s to early 1970s. By that time, Sweden had a much better economic situation than neighboring Finland and many Finns came to Sweden for work. This movement was facilitated by the existence of a free Nordic labor market. It also helped that Finland has a Swedish-speaking minority and that Swedish language is taught in schools. The second largest group is Other Nordic countries, with descendants to parents born in Denmark and Norway, and, less often, Iceland. The third largest group is those with at least one parent born in Western Europe, with Germany as the most common country. This group is followed by the descendants to migrants from former Yugoslavia, many of whom arrived during the 1960s as labor migrants. Descendants to immigrants from Southern Europe mainly have parents from Greece or Italy, which are two other countries that contributed with labor migrants to Sweden during the 1960s. Descendants to immigrants from Poland are also well-represented. Some of their parents arrived as refugees from the old communist regime; others came as tied movers, in many cases as spouses to Swedish men. Other descendants to immigrants from Eastern Europe include those whose parents left the region during communist time, most of them from Hungary. The descendants to migrants from Turkey mainly have parents that arrived as labor migrants during the 1960s. Many of those with parents born in Central and South America have parents that came to Sweden as refugees from Chile during the 1970s. The category of descendants to parents born in the Arab Mid-East often has a background in Lebanon or Syria. Those with parents from the Baltic countries mainly have a parent or two from Estonia. Those with a parent born in the U.S., Canada, Australia or New Zealand constitute a group of their own (US/Aus/NZ/Can): The majority of them have links to the U.S. Descendants to immigrants from Africa are divided into those with links to North Africa, Sub-Saharan Africa and the

Horn of Africa. The latter group is still small when it comes to immigrants having produced young off-springs in Sweden. The most common country backgrounds in these categories are those of Morocco, Gambia, and Ethiopia, respectively. Those with parents born in South East Asia mainly have links to Thailand or the Philippines. Descendants to immigrants from Iran mostly have parents that came to Sweden as refugees during the 1980s; those with parents born in South Asia mainly have parents born in India or Pakistan. Our last two categories are those with parents born in East Asia, such as the descendants to immigrants from Japan or China, and the Post-Soviet states, with a majority of parents being born in the Soviet Union.

As a consequence of changing migration patterns, the group of descendants of immigrants has changed its composition as well. Table 1 presents statistics on the distribution of descendant women at childbearing ages in Sweden in 1998, 2003, 2008 and 2012, respectively, by the country-background categories that we apply in our study. In 1998, 57 percent of descendant women at childbearing ages had a parent or two born in Finland or another Nordic country. Another 15 percent had at least one parent born in another Western European country, and relatively few, only nine percent, had a parent born outside Europe. In 2012, the share with a Nordic background (Finland or another Nordic country) had decreased to 42 percent; the share of women with links to Western Europe had decreased to 9 percent, while the share of descendants to immigrants from countries outside Europe had increased to 28 percent. Clearly, the descendants of immigrants are still dominated by those with links to the neighboring countries of Sweden, but the changes in composition over time motivate a relatively dis-aggregated approach to the study of these descendants.

(Table 1 about here)

4. Childbearing of descendants to immigrants

To a large extent, research on the fertility of descendants to immigrants has been confined to countries with a long history of immigration, such as the U.S., Canada, and Australia, which are countries that were built by migration. Most studies suggest that the fertility of the descendants to migrants from high- to low-fertility countries is lower than that of their parents; some studies suggest that it is even lower than that of the majority population in the countries where they live. For example, Bélanger and Gilbert (2003) find evidence of depressed fertility among descendants to immigrants in Canada. Compared to women with a

Canadian background, the descendants to immigrants were less likely to have a child aged 0-4: Those with one foreign-born parent had a seven percent lower odds while those with two foreign-born parents had a 17 percent lower odds to have a young child. Similar results have been found for Australia (Khoo & McDonald, 2003). Research on descendants to immigrants in the U.S. gives another picture (e.g., Stephen & Bean, 1992; Blau et al., 2008; for a critical discussion see Parrado & Morgan, 2008). On average, second generation immigrants in the U.S. have higher fertility rates than native U.S. women. These patterns are mainly driven by the behavior of second-generation Hispanics in the U.S. Frank and Heuveline (2005) highlight the role of elevated teen-age fertility in producing high fertility among the descendants to Mexican immigrants in the U.S. They ascribe these patterns to the segmented assimilation and racial stratification of second-generation Mexicans in the U.S., rather than being reflections of any Mexican pro-natalist values.

There is much less research on the childbearing and other family-demographic behavior of the descendants to immigrants in Europe (for an overview, see de Valk & Milewski, 2011). For Germany, Milewski (2006) finds that the descendants to immigrants in most cases have adapted their behavior to the low-fertility regime of that country. In another study, she analyses the childbearing behavior of Turkish second-generation migrants in six countries in Western Europe (Milewski, 2011). Also in this case, she finds evidence of fertility adaptation towards the different fertility regimes in the countries where the descendants live.

For Sweden, Scott and Stanfors (2010; 2011) analyze how the socio-economic characteristics of descendants to immigrants influence their first birth fertility. They show that the positive relationship between a strong labor market attachment and entry into parenthood that has been observed for the majority population of Sweden also applies to the descendants of immigrants. A study by Statistics Sweden (2010a) shows that women and men who are descendants to immigrants from other Nordic countries have very similar fertility patterns as those observed for Swedish-born women and men with a full Swedish background. The study also reveals that the descendants to immigrants from other EU-countries and from countries outside Europe with a medium-level development (medium HDI) rather have lower fertility than the native Swedes.

In the current study, we provide an overview of patterns in parity-specific fertility among the twenty groups of descendants to immigrants in Sweden that were specified in Table 1. A few of the perspectives from the literature on the childbearing of international migrants may apply

to the descendants of immigrants as well. This holds for issues related to socialization into cultural sub-groups or, in the case of the descendants, into the main-stream society where these people were born and where they live their lives. Hypotheses related to the role of differences in socio-economic characteristics in creating differentials in fertility behavior matter too (cf. Milewski, 2011). In general, patterns in parity-specific childbearing may be seen as evidence of the degree of family-demographic integration of the descendants of immigrants into the society in which they live.

Patterns in fertility may differ in different ways at the various birth orders. For first births, any differentials in fertility may be seen as evidence of differences in the possibilities for descendants to immigrants to establish themselves as young adults. Differences in the timing of first births may stem from variations in the success in getting established in the Swedish labor market; if this is the case we would find that crude differences in first-birth rates disappear once we add controls for women's socio-economic characteristics. For second births, we may regards differentials in fertility rates as evidence of how different population sub-groups adjust to the Swedish pattern of close spacing of first and second births. The "speed premium" of the Swedish parental leave system matters more for those who are well established in the labor market; the subtleties of its regulations may be more efficiently communicated among some groups of mothers than others. For third births, we may detect true evidence of low- or high-fertility behavior. This is the first parity progression with real variation in the quantum of fertility; only about half of Swedish two-child mothers progress to have a third child (Statistics Sweden, 2011).

5. Data and methods

Swedish population registers provide demographic information on all persons with legal residence in the country. The data for our analyses are retrieved from the Historical Population Register, which is a longitudinal database with information on the histories of all vital events to every de jure resident in Sweden (Statistics Sweden, 2006). Data on individuals' parents and their country of birth are derived from the Multi-Generation Register (Statistics Sweden, 2010b). Information on parents and their country of birth exists for almost all individuals born in Sweden after 1950 (almost 100 percent of these cohort members have information on their mother; 98 percent have information on their father). In addition, we are able to link data on various socio-demographic characteristics from different administrative

registers; this is facilitated by Sweden's system of personal identification numbers. Our analyses are based on data for all individuals born in Sweden that lived in the country at any time during 1998–2012.

As specified above, the descendants to immigrants are classified into twenty groups depending on their parents' country of birth (Table 1). We present event-history analyses of their transition from being childless to having a first child; from having one child to having a second birth; and from having two children to having a third birth. We present relative risks of childbirth by country background and other control variables. These are estimated by means of Cox proportional hazard regressions in the PROC PHREG procedure of SAS. The main independent variable of interest is the country category of a woman's background, i.e., her parents' country of birth. As mentioned, women born to one Swedish-born and one foreign-born parent are classified as a descendant to the immigrant parent. Women with two foreign-born parents from two different countries are classified by their mother's country of birth. In our basic models, we control for the role of age group of woman and time since any last previous birth. In the strongly fluctuating period fertility of Sweden it is also essential to control for calendar year. In our extended models we further control for a woman's educational attainment and her labor market status. The socio-economic status during a given calendar year is treated as a determinant of the conditional probability to have a(nother) child during the subsequent year.

Women enter the study at age 17 or in 1998, whichever comes last. They are censored at age 45, at any emigration, death, or the end of 2012, whichever comes first. Those who had twins in their first or second delivery are excluded from the analysis of the subsequent parity progression. Appendix Tables A1-A2 provide an overview of the number of woman years under observation (Table A1) and the number of children born at the different birth orders (Table A2), by country groups of origin. Appendix Tables A3-A5 show the distribution of descendants to immigrants over age groups (Table A3), categories of educational attainment (Table A4), and labor-market status (Table A5).

6. Results: Childbearing of descendants to immigrants in Sweden

As an introduction to our analysis, we present period Total Fertility Rates for each year during 1970-2012 for Swedish-born women with at least one foreign-born parent and Swedish-born women with two Swedish-born parents, respectively (Figure 2). This shows that during the

entire period, total fertility has been slightly lower for the descendants to immigrants in Sweden than for women with a full Swedish background. During more recent years differentials have widened. This may be due to changes in the composition of descendants to immigrants during the 2000s, with larger fractions of descendants with links to other countries than the neighboring Nordic ones. This appears to happen despite the fact that many of these descendants' parents stem from countries with relatively high fertility. Contrary to popular belief, the more recent groups of immigrants may not carry any long-lasting high-fertility behavior to their off-spring in Sweden. In the next step of our study, we provide a more detailed analysis of the parity-specific fertility of the descendants to immigrants.

(Figure 2 about here)

6.1. First-birth fertility

Table 2 provides an overview of the relative risks to become a mother, by country group of background and other control variables. Model A includes controls for age and calendar year. It shows that the risk of having a first child is significantly lower for 17 of the 20 groups of women with a foreign background. The relative risks are particularly depressed for women with parents born in Iran, the Horn of Africa or East and South Asia. The relative risks are also very low for women with a parent or two from Poland, the Post-Soviet states, US/Aus/NZ/Canada, South East Asia or Sub-Saharan Africa. Only two groups, women with a parent born in Turkey or another Nordic country than Finland, i.e., Denmark, Norway, or Iceland, have slightly higher first birth risks than those with two parents born in Sweden. The largest group, women with a parental background in Finland has a three percent lower risk to have a first child than those with a full Swedish background.

In the next step we extend our model in order to see how much of the differences in first-birth risks that can be explained by differences across country groups in socioeconomic characteristics (Model B). Table A4 of the Appendix shows that most groups of descendants to immigrants have lower educational attainment than those with a full Swedish background. Table A5 shows that they are also employed to a lower extent than women with two Swedish-born parents (see also Statistics Sweden 2010a). There are exceptions though; daughters of parents born in the Baltic States stand out with high educational attainment and high levels of employment. Women with parents from Western Europe, Eastern Europe, or East Asia also

have relatively high educational attainment. On the other end, women with a parental background in the Horn of Africa, the Arab Mid-East, Iran or South East Asia have much lower levels of education than women with a full Swedish background (Table A4). Many women in these groups are still students (Table A5). To a large extent, this is related to the fact that the descendants to the most recent groups of immigrants are still relatively young (Appendix Table A3). In our multivariate analyses, we control for such differences in age distribution.

Our Model B shows that socio-economic differences have some role to play in explaining differences in levels of first birth fertility, but that most of the variation remains also after controlling for these factors. For all groups of descendants, the relative risks of first birth fertility increases somewhat when we add controls for educational attainment and labor-market status. However, we still find seventeen country groups with significantly lower first-birth fertility than that of women with a full Swedish background. Thus, the depressed first birth fertility of descendants of immigrants in Sweden cannot be explained by their relatively weak labor-market status.

(Table 2 about here)

6.2. Second-birth fertility

The relative risks of one-child mothers to have a second child are presented in Table 3. It shows that most groups of descendants to immigrants also have significantly lower second birth fertility than women with two Swedish-born parents. For descendants to immigrants from different parts of Europe the levels are depressed by some four to fourteen percent. For descendants to immigrants from other parts of the world the relative risks are in many cases depressed by more than that. Only one group, descendants to immigrants from the Arab Mid-east have slightly higher second birth rates than women with a full Swedish background.

As for first birth fertility, differences in socio-economic characteristics explain only a small part of the differences in second birth fertility (Model D). The patterns of associations and changes in patterns when adding controls are very similar to those observed in our first birth analyses.

(Table 3 about here)

6.3. Third-birth fertility

Evidently, most groups of descendants of immigrants in Sweden have depressed first and second birth fertility. To some extent, this reflects postponed rather than foregone childbearing. In contrast, when we turn to differences in third birth fertility we may observe patterns that relate more strongly to differences in the ultimate number of children born. Table 4 shows that the descendants who have already had two children no longer display any low-fertility behavior. In this case, many groups of descendants to immigrants rather have higher third birth rates than women with a full Swedish background. Women with at least one parent born in the former Yugoslavia are the only exception in terms of significantly depressed third-birth fertility. Nine of the country-background groups have significantly higher third birth risks than women with two Swedish-born parents. Two-child mothers with at least one parent born in Finland or another Nordic country have 5-6 percent higher third birth risks than the reference category of full Swedes. Two-child mothers with a parent born in Western Europe have nine percent higher risks whereas several groups with a parent or two from outside Europe have between 24 and 56 percent higher third birth intensities: this holds for descendants to immigrants from overseas Anglo-Saxon countries (US/Aus/NZ/Can), sub-Saharan Africa, North Africa, Turkey, the Arab Mid-East, and South Asia.

(Table 4 about here)

7. Discussion

This study shows that many groups of descendants to immigrants in Sweden have lower fertility than women with a full Swedish background: The first and second birth risks are depressed for almost all country groups of descendants to immigrants. Differences in socio-economic characteristics such as educational attainment and labor-market attachment explain only a small fraction of the differences in fertility. The depressed first-birth fertility of descendants to immigrants suggests that their family formation and entry into adult life run slower than for women with two Swedish-born parents. A related study by Andersson et al. (2014) shows that the marriage formation of descendants to immigrants also is slightly lower than for women with a full Swedish background. However, this mainly holds for women with one Swedish- and one foreign-born parent. Another study shows that descendants to immigrants from outside Europe often form families with someone with similar background (Statistics Sweden, 2010a); this may reduce the scope of partner markets and make family

formation more difficult. Some young women and men are even afraid that they will not have the possibility to choose whom to marry (Swedish National Board for Youth Affairs 2008). Another explanation to depressed first birth risks could be that children of immigrants need to invest more in job and career than those with a full Swedish background to achieve the same status. In such a situation, family formation may be delayed. It could also be the case that with access to networks in more than one country, they have more opportunities to pursue many other activities than settling down early to form a family. Finally, it may be that some of the observed differences in first-birth rates stem from the bias created by un-registered emigration of descendants to immigrants. As a robustness check we have re-estimated fertility rates based on women with clear evidence of registered activity in Sweden. This procedure produces rates that are very similar to those presented here.

Our study also shows that most groups of descendants to immigrants have lower second birth fertility than women with a full Swedish background; this holds especially for those with a parent or two from outside Europe. These patterns indicate that a strong two child norm exists for women with a full Swedish background. They also suggest that the Swedish pattern of very rapid progression to second childbearing is not universally shared by all sub-groups in society. In contrast to the first two parity progressions, we find at least some evidence of high-fertility behavior when it comes to the third birth fertility of the descendants to immigrants. Such patterns likely stem from the transmission of high-fertility behavior from parents to their children (Murphy & Knudsen, 2002; Kolk, 2014).

We note that the descendants to immigrants from Turkey and the Arab Mid-East may be the only groups in Sweden that are not characterized by depressed fertility overall. They have similar or slightly higher first and second birth rates than native Swedes and elevated third birth rates. Bernhard et al. (2007) demonstrate that the descendants of immigrants from Turkey often consider partnering someone of their own background important and that they are more likely than other young Swedes to live with their parents. Continuous ties to the parental home might reinforce commitments to the values of relatively high fertility.

In sum, our study reveals that most categories of descendants to immigrants in Sweden display depressed fertility rates while only a few groups have somewhat high fertility. In contrast, descendants to immigrants from another Nordic country differ relatively little in their

childbearing behavior from women with a full Swedish background. It remains for future research based on other kinds of data to find explanations to the observed differentials.

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Tables and Figures

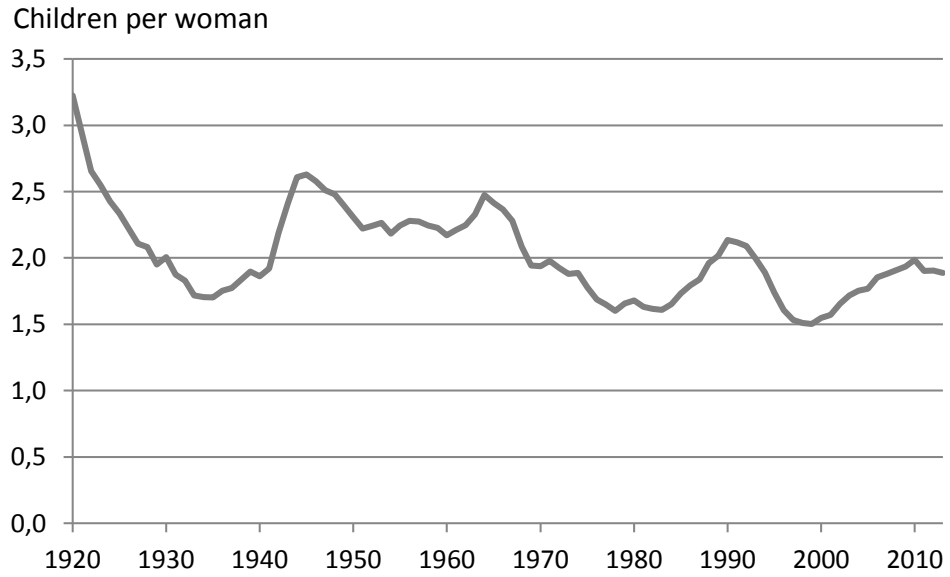

Figure 1: *Total Fertility Rate in Sweden, 1920–2013*
Source: Statistics Sweden

Table 1: *Descendants of immigrants in Sweden, by country background, women aged 17-45 in 1998, 2003, 2008 and 2012. Percentage distribution*

	1998	2003	2008	2012
Finland	41	40	37	32
Other Nordic	16	14	12	10
Former Yugoslavia	5	6	7	8
Poland	2	3	4	4
Western Europe	15	13	11	9
Southern Europe	4	5	5	4
Baltic	3	2	1	1
Eastern Europe	4	4	3	3
US/Aus/NZ/Can	2	2	2	2
Central/South America	1	2	3	4
Horn of Africa	0	0	1	1
Sub-Saharan Africa	1	1	1	1
North Africa	1	1	2	2
Arab Mid-East	1	1	3	5
Iran	0	1	1	2
Turkey	2	3	4	4
East Asia	0	1	1	1
South East Asia	0	1	1	2
South Asia	0	1	1	1
Post-Soviet States	1	1	1	1
Total	100	100	100	100

Source: Swedish register data, authors' own calculations

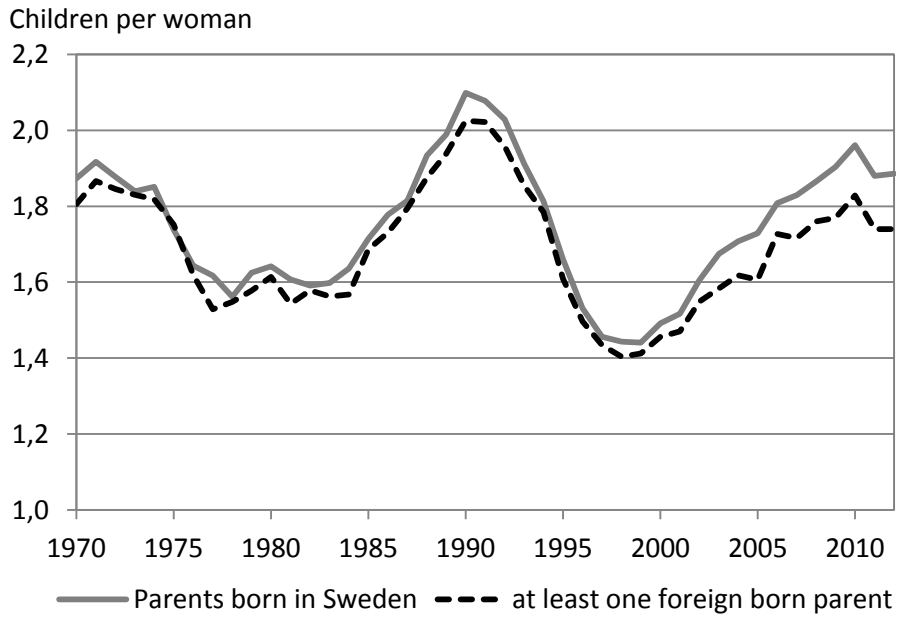

Figure 2: *Total Fertility Rate by background in Sweden, 1970-2012*
Source: Swedish population registers, authors' own calculations

Table 2: *Relative risk of having a first child in Sweden, childless women aged 17–45, 1998–2012. Swedish-born women by their parents' country of birth.*

Variable	Relative risks	
	Model A	Model B
Parent/parents born in		
Sweden	1	1
Finland	0.97***	0.99**
Other Nordic	1.02**	1.04***
Former Yugoslavia	0.91***	0.94***
Poland	0.69***	0.75***
Western Europe	0.84***	0.88***
Southern Europe	0.78***	0.84***
Baltic	0.88***	0.89***
Eastern Europe	0.80***	0.84***
US/Aus/NZ/Can	0.70***	0.78***
Central/South America	0.85***	0.92***
Horn of Africa	0.43***	0.49***
Sub-Saharan Africa	0.73***	0.79***
North Africa	0.77***	0.82***
Mid-East	0.96	1.02
Iran	0.43***	0.48***
Turkey	1.06***	1.10***
East Asia	0.58***	0.63***
South East Asia	0.71***	0.76***
South Asia	0.60***	0.66***
Post-Soviet States	0.65***	0.70***
Age group		
-19 years	0.07***	0.12***
20-24 years	0.35***	0.40***
25-29 years	1	1
30-34 years	1.65***	1.52***
35-39 years	0.98***	0.92***
40-45 years	0.19***	0.19***
Calendar year		
1998	0.88***	0.92***
1999	0.88***	0.90***
2000	0.92***	0.94***
2001	0.93***	0.94***
2002	0.99	0.98**
2003	1.01	1.01
2004	1.01	1.01
2005	1	1
2006	1.04***	1.04***
2007	1.05***	1.03***
2008	1.08***	1.04***
2009	1.09***	1.06***
2010	1.10***	1.09***
2011	1.04***	1.01*
2012	1.03***	1.01
Educational level		
Compulsory		1.00
Secondary		0.83***
Post secondary <3 years		0.71***
Post secondary >3 years		1
Unknown		0.78***
Employment status		
Employed		1
Student		0.34***
Unemployed		0.74***
Social allowance		1.00
Other		0.33***

Source: Swedish register data, authors' own calculations

*** = significant at the 1-percent level, ** = 5-percent level, * = 10-percent level.

Table 3: *Relative risk of having a second child for one-child mothers aged 17–45, 1998–2012. Swedish-born women by their parents' country of birth.*

	Relative risks	
	Model C	Model D
Background		
Sweden	1	1
Finland	0.88***	0.93***
Other Nordic	0.89***	0.94***
Former Yugoslavia	0.88***	0.93***
Poland	0.88***	0.91***
Western Europe	0.96***	0.96***
Southern Europe	0.86***	0.90***
Baltic	1.05	1.02
Eastern Europe	0.93***	0.94***
US/Aus/NZ/Can	0.94	0.94
Central/South America	0.82***	0.88***
Horn of Africa	0.73***	0.74**
Sub-Saharan Africa	0.83***	0.87***
North Africa	0.83***	0.89***
Mid-East	1.08**	1.15***
Iran	0.92	0.93
Turkey	0.94**	1.02
East Asia	1.00	0.97
South East Asia	0.84***	0.90*
South Asia	0.75***	0.75***
Post-Soviet States	0.76***	0.78***
Age group		
-19 years	0.21***	0.32***
20-24 years	0.67***	0.81***
25-29 years	1	1
30-34 years	1.15***	1.06***
35-39 years	0.73***	0.70***
40-45 years	0.12***	0.12***
Calendar year		
1998	0.88***	0.95***
1999	0.88***	0.94***
2000	0.87***	0.92***
2001	0.87***	0.91***
2002	0.92***	0.94***
2003	0.95***	0.96***
2004	0.98**	0.99
2005	1	1
2006	1.04***	1.03***
2007	1.03***	1.01*
2008	1.03***	1.00
2009	1.06***	1.02**
2010	1.10***	1.06***
2011	1.06***	1.02**
2012	1.07***	1.03***
Educational level		
Compulsory		0.60***
Secondary		0.73***
Post secondary <3 years		0.84***
Post secondary >3 years		1
Unknown		0.69***
Employment status		
Employed		1
Student		0.74***
Unemployed		0.88***
Social allowance		0.62***
Other		0.86***

Source: Swedish register data, authors' own calculations

*** = significant at the 1-percent level, ** = 5-percent level, * = 10-percent level.

Table 4: *Relative risk of having a third child for two-child mothers aged 17–45, 1998–2012. Swedish-born women by their parents' country of birth.*

	Relative risks	
	Model E	Model F
Background		
Sweden	1	1
Finland	1.05***	1.06***
Other Nordic	1.06***	1.07***
Former Yugoslavia	0.87***	0.88***
Poland	1.05	1.00
Western Europe	1.09***	1.07***
Southern Europe	0.96	0.94
Baltic	1.02	0.99
Eastern Europe	1.06	1.04
US/Aus/NZ/Can	1.30***	1.24***
Central/South America	0.98	0.95
Horn of Africa	0.94	0.87
Sub-Saharan Africa	1.24**	1.17
North Africa	1.39***	1.35***
Mid-East	1.56***	1.52***
Iran	1.13	1.05
Turkey	1.26***	1.26***
East Asia	1.14	1.08
South East Asia	1.21	1.16
South Asia	1.47***	1.40***
Post-Soviet States	0.89	0.87
Age group		
-24 years	0.93***	0.85***
25-29 years	1	1
30-34 years	0.82***	0.80***
35-39 years	0.49***	0.48***
40-45 years	0.08***	0.08***
Calendar year		
1998	0.85***	0.87***
1999	0.87***	0.90***
2000	0.91***	0.93***
2001	0.91***	0.93***
2002	0.93***	0.95***
2003	0.99	1.01
2004	1.00	1.00
2005	1	1
2006	1.08***	1.06***
2007	1.11***	1.09***
2008	1.11***	1.08***
2009	1.11***	1.07***
2010	1.17***	1.11***
2011	1.11***	1.06***
2012	1.12***	1.06***
Educational level		
Compulsory		0.82***
Secondary		0.66***
Post secondary <3 years		0.74***
Post secondary >3 years		1
Unknown		1.05
Employment status		
Employed		1
Student		0.95***
Unemployed		1.25***
Social allowance		1.39***
Other		1.23***

Source: Swedish register data, authors' own calculations

*** = significant at the 1-percent level, ** = 5-percent level, * = 10-percent level.

Appendix

Table A1: *Woman years in Sweden, by country background, 1998–2012*

Group	Woman years as:		
	Childless	Parity 1	Parity 2
Sweden	8 852 048	2 774 740	4 717 810
Finland	535 018	185 801	277 433
Other Nordic	171 429	64 718	106 844
Former Yugoslavia	112 206	29 127	35 114
Poland	70 383	10 886	10 479
Western Europe	169 730	56 702	92 023
Southern Europe	76 916	19 550	22 800
Baltic	18 555	9 647	20 210
Eastern Europe	53 679	14 771	21 662
US/Aus/NZ/Can	30 271	6 134	9 396
Central/South America	59 637	7 608	5 141
Horn of Africa	12 592	604	457
Sub-Saharan Africa	20 445	2 739	2 262
North Africa	28 440	4 465	3 516
Arab Mid-East	53 868	5 302	3 751
Iran	25 730	1 108	752
Turkey	63 945	11 746	9 427
East Asia	14 041	1 748	1 793
South East Asia	27 213	2 396	1 514
South Asia	21 677	2 254	1 793
Post-Soviet States	8 738	2 580	4 181

Source: Swedish register data, authors' own calculations

Table A2: *Number of children born, by country background in Sweden, 1998–2012*

Group	Number of children born, birth order:		
	First	Second	Third
Sweden	454 609	371 756	128 087
Finland	27 458	22 308	8 429
Other Nordic	8 735	7 329	2 916
Former Yugoslavia	5 163	3 890	1 095
Poland	2 283	1 419	372
Western Europe	8 057	6 785	2 416
Southern Europe	3 322	2 430	691
Baltic	1 140	1 093	415
Eastern Europe	2 371	1 816	602
US/Aus/NZ/Can	970	721	265
Central/South America	1 848	923	200
Horn of Africa	151	72	16
Sub-Saharan Africa	617	353	99
North Africa	973	557	187
Arab Mid-East	1 510	812	256
Iran	321	146	32
Turkey	2 634	1 706	561
East Asia	369	246	60
South East Asia	618	303	75
South Asia	521	269	87
Post-Soviet States	271	226	74

Source: Swedish register data, authors' own calculations

Table A3: *Woman years in Sweden, by country background and age, 1998–2012. Percentage distribution by age (time-varying)*

Group	Woman years						Total
	-19	20-24	25-29	30-34	35-39	40-45	
Sweden	11	18	19	19	16	17	100
Finland	11	19	19	19	17	16	100
Other Nordic	11	17	17	17	17	21	100
Former Yugoslavia	17	22	22	20	13	6	100
Poland	20	31	23	14	7	5	100
Western Europe	9	15	17	19	19	21	100
Southern Europe	12	22	23	20	14	9	100
Baltic	2	4	11	21	27	36	100
Eastern Europe	12	18	19	19	17	16	100
US/Aus/NZ/Can	18	23	16	13	12	17	100
Central/South America	31	36	19	9	4	2	100
Horn of Africa	45	33	12	5	3	1	100
Sub-Saharan Africa	27	31	20	12	6	3	100
North Africa	24	31	21	14	7	3	100
Arab Mid-East	40	36	15	6	2	1	100
Iran	42	38	12	5	2	1	100
Turkey	25	36	24	11	3	1	100
East Asia	24	27	19	14	9	7	100
South East Asia	37	36	17	6	2	1	100
South Asia	28	34	20	10	5	3	100
Post-Soviet States	14	15	13	14	18	27	100

Source: Swedish register data, authors' own calculations

Table A4: *Woman years in Sweden, by country background and educational level, 1998–2012. Percentage distribution by educational level (time-varying)*

Group	Woman years					Total
	Primary	Secondary	Post-sec <3 years	Post-sec >3 years	Unknown	
Sweden	18	46	16	20	1	100
Finland	21	49	14	15	1	100
Other Nordic	22	49	13	15	1	100
Former Yugoslavia	25	47	13	14	1	100
Poland	28	38	16	17	2	100
Western Europe	16	44	17	22	1	100
Southern Europe	22	45	14	17	2	100
Baltic	7	43	20	29	0	100
Eastern Europe	19	42	16	21	1	100
US/Aus/NZ/Can	24	38	17	19	2	100
Central/South America	40	36	12	10	3	100
Horn of Africa	49	29	10	9	3	100
Sub-Saharan Africa	35	35	13	15	2	100
North Africa	32	38	13	13	3	100
Arab Mid-East	46	33	10	8	3	100
Iran	46	30	13	9	2	100
Turkey	36	43	10	9	2	100
East Asia	28	30	18	23	1	100
South East Asia	44	34	11	10	2	100
South Asia	32	33	16	16	2	100
Post-Soviet States	22	40	18	19	1	100

Source: Swedish register data, authors' own calculations
Note: Educational level refers to the highest educational level according to the Swedish Educational Nomenclature, SUN 2000

Table A5: *Woman years in Sweden, by country background and labor-market status, 1998–2012. Percentage distribution by labour-market status (time-varying)*

Group	Woman years					Total
	Employed	Student	Unemployed	Allowance	Other	
Sweden	70	19	4	1	6	100
Finland	67	19	5	3	7	100
Other Nordic	67	18	5	2	7	100
Former Yugoslavia	59	24	6	3	8	100
Poland	50	34	4	3	9	100
Western Europe	69	18	4	2	8	100
Southern Europe	60	22	5	2	12	100
Baltic	81	8	4	1	6	100
Eastern Europe	64	22	5	2	8	100
US/Aus/NZ/Can	57	28	4	2	10	100
Central/South America	43	41	4	4	9	100
Horn of Africa	29	57	3	3	9	100
Sub-Saharan Africa	45	38	4	3	9	100
North Africa	47	34	4	5	10	100
Arab Mid-East	35	47	5	5	8	100
Iran	32	55	3	3	7	100
Turkey	47	33	7	3	9	100
East Asia	50	38	3	1	8	100
South East Asia	39	47	4	3	7	100
South Asia	42	44	3	2	8	100
Post-Soviet States	63	23	4	2	8	100

Source: Swedish register data, authors' own calculations
Notes: Employed: The data are originally derived from labor-force statistics from administrative sources. Based on a number of conditions, the person is either defined as working or not working. To be counted as employed, the person should have worked at least one hour a week in November in a given year.
Student: The data are originally derived from The Register of Education. To be counted as student the person has to be registered as student in the fall semester of the current year.
Unemployed: If the person is neither counted as a student or as employed and have been registered at the employment office more than 75 days in a calendar year, the person is classified as unemployed. Information on registration at the employment office is derived from the "AMS register" of the Swedish Employment Board.
Allowance: If the person has received income support for more than five months of the current year, the person is included in this category.
Other: Those who do not fit into any of the above-defined groups.

Why does fertility remain high among certain UK-born ethnic minority women?

Hill Kulu and Tina Hannemann

Abstract:
This study investigates fertility among the descendants of immigrants in the UK and examines the causes of high fertility among certain ethnic minority groups. Previous research has shown high total fertility among the UK-born Pakistani and Bangladeshi women, but the reasons for their high fertility have remained far from clear. Some researchers attribute elevated fertility levels among the UK-born ethnic minorities to cultural factors, whereas others argue that high fertility is the consequence of their poor education and labour market prospective. Using data from the Understanding Society study and applying multivariate event history analysis the study shows, first, that relatively high second-, third- and possibly also fourth-birth rates are responsible for the high total fertility among women of Pakistani and Bangladeshi origin; there is little variation in the first-birth rates among the UK-born women. Second, the fertility differences between ethnic minorities and 'native' British women slightly decrease once the socio-economic and cultural characteristics, particularly religiosity, are controlled, but significant differences persist. Third, cultural factors account for some elevated fertility among ethnic minorities in the UK, whereas the role of education and employment seem to be negligible.

Keywords: Fertility, second generation, immigrants, event history analysis, UK

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1. Background

European populations are characterised by a growing share of immigrants and ethnic minority populations (Castles & Miller, 2009; Raymer et al., 2011). A large body of literature investigates various aspects of immigrants' lives: their employment and education (Adsera & Chiswick, 2007; Rendall et al., 2010), residential and housing patterns (Musterd, 2005; Arbaci, 2008), health and mortality (Sole-Auro & Crimmins, 2008; Wengler, 2011; Hannemann, 2012), legal status and citizenship (Seifert, 1997; Bauböck, 2003; Howard, 2005). Recently, there has also been a growing interest in family and fertility dynamics among immigrants and ethnic minorities. While the childbearing dynamics of immigrants have received considerable attention (Andersson, 2004; Sobotka, 2008; Tromans et al., 2009; Milewski, 2010; Mussino & Strozza, 2012), the fertility patterns of the descendants of immigrants have been scarcely studied and understood. In the UK, those few studies show that the fertility levels of the descendants of immigrants from high-fertility countries are usually lower than those of their parents, but for some ethnic groups, e.g., Bangladeshi and Pakistani, fertility remains relatively high (Sobotka, 2008; Coleman & Dubuc, 2010). The reasons for high fertility levels among particular ethnic minority women are far from clear. Some researchers attribute high fertility to cultural factors and religion, arguing that large families continue to be a norm (Penn & Lambert, 2002). Others argue that early childbearing and high fertility is the consequence of poor education and labour market prospective among ethnic minorities (Coleman & Dubuc, 2010).

The aim of this study is to investigate the fertility patterns among the descendants of immigrants in the UK and examine the causes of the relatively high fertility among certain ethnic minority groups. This study extends previous research in the following ways. First, fertility measures are disaggregated, and childbearing patterns are analysed by birth order to gain a better understanding of the underlying fertility behaviour of UK-born ethnic minorities in comparison to a UK-born 'native' group. Although studies have provided information on the aggregate fertility levels of ethnic minorities in the UK (e.g., Sobotka, 2008; Coleman & Dubuc, 2010), no study has investigated the fertility dynamics among ethnic minorities by parity, to the best knowledge of the authors. Second, this study uses multivariate analysis to investigate the role of various factors in explaining the fertility patterns among the descendants of immigrants. The causes of high fertility among ethnic Pakistani and Bangladeshi women have been discussed (Coleman & Dubuc, 2010; Hampshire et al., 2012),

but no study has explicitly analysed the role of different factors. Third, this study uses newly available large-scale individual-level longitudinal data, which allow for the calculation of reliable fertility estimates for UK-born ethnic minorities and the examination of the role of various factors in explaining the fertility differences between the descendants of immigrants and the 'native' British population. Finally, although this paper focuses on childbearing among the descendants of immigrants in the UK, it is a first step towards a comparative study to investigate childbearing patterns among ethnic minorities in a number of European countries. The latter can be used to examine how socio-economic, institutional and policy settings shape the family lives of the 'second-generation' in different European societies.

1.1. Research on childbearing patterns among the descendants of immigrants in Europe

Previous research on European countries has shown that the descendants of some immigrants have fertility levels and patterns similar to those of the native population, but there are also ethnic minorities, mostly of non-Western origin, with relatively early childbearing and high fertility levels (Sobotka, 2008). Scott and Stanfors (2011) investigated the childbearing patterns of ethnic minorities in Sweden. Their analysis showed that the descendants of immigrants from high-fertility countries (Turkey, Lebanon and Syria) had significantly higher first-birth levels than native Swedes or the descendants of immigrants from other European countries. The analysis also revealed that in most cases, fertility levels were lower among the 'second generation' than for those who arrived in Sweden as children.

Milewski (2010) arrived at similar results in her study on the fertility of the 'second generation' in Germany. The analysis showed that while there were few differences in fertility behaviour between native Germans and the descendants of migrants from Southern European countries, the descendants of immigrants from Turkey showed distinct fertility patterns: They had their first child much earlier than native Germans, and the propensity to have a child and have three children was much higher than the native population. In a subsequent paper, Milewski (2011) compared the first-birth rates of the descendants of immigrants from Turkey in seven European countries. The women of Turkish descent had relatively high first-birth rates in all seven countries, although there were significant differences across countries: The descendants of Turkish immigrants had somewhat lower first-birth rates in Germany and Switzerland than in France, the Netherlands and Sweden. The author concluded that the study provided evidence for both a socialisation into a 'Turkish subculture' and an adaptation to

mainstream European societies. Garssen and Nicolaas (2008) investigated the childbearing of women of Turkish and Moroccan origin in the Netherlands and concluded that while the immigrants had significantly higher completed fertility than native Dutch women, the descendants of immigrants resembled native Dutch women much more than they resembled their mothers. However, a closer look at the results revealed that the 'second generation' held a clear middle position between immigrants and native Dutch in their fertility behaviour.

Coleman and Dubuc (2010) studied the fertility patterns among UK ethnic minority women using pooled data from two national surveys and aggregate fertility measures. The study showed that the total fertility significantly declined among the UK ethnic minority populations from the 1970s to the early 2000s. Furthermore, in each ethnic group, the total fertility of the UK-born women was lower than that of women born in the country of origin. However, while fertility levels were low among women of Indian and Black Caribbean descent, fertility was relatively high among women of Pakistani and Bangladeshi origin despite a continued fertility decline. The recent studies on various European countries thus show that the fertility levels for the descendants of immigrants from high-fertility countries are usually lower than those of their parents, but for some non-Western groups, fertility levels remain relatively high in comparison to the 'native' population. However, the reasons for their high fertility are less clear, although most studies attribute it to the incomplete cultural assimilation of the second generation.

1.2. Explanations of high fertility among certain UK-born ethnic groups

There are four possible explanations for the continued high fertility among certain ethnic groups in the UK. First, cultural factors may be responsible. Pakistani and Bangladeshi immigrants, for example, arrived in Britain from high-fertility countries. Although they experienced a fertility decline after moving to the UK, their fertility levels nonetheless remained higher than those of 'native' British and other population subgroups (Coleman & Dubuc, 2010). Several factors may support desire among ethnic minorities for large families: They come from large families, they grew up in the 'high-fertility' culture, and extended family has played an important role in their lives (cf. Penn & Lambert, 2002; Robson & Berthoud, 2007). The latter may also have a direct effect on the childbearing decisions of ethnic Pakistani and Bangladeshi women: The members of the extended family (particularly the mother-in-law) often influence the fertility decisions of young women; they encourage

them to become pregnant soon after marriage and to have many children (Hampshire et al., 2012). The culturally driven strong preference for sons may also promote high fertility. Hampshire et al. (2012) found, for example, that many Pakistani couples continue childbearing until they have at least one son, with two sons being the desired fertility outcome. The cultural and normative factors may thus explain not only a desire for large families among high-fertility ethnic minority populations in the UK, but various socio-cultural practises also ensure that the actual fertility remains high among these populations.

Second, it is possible that the early childbearing and high fertility among UK-born ethnic minority women are the consequence of their poor education and labour market prospective. Research shows that the majority of ethnic Pakistani and Bangladeshi women have poor or no educational qualifications, and their labour market participation rates are low compared to 'native' British and other ethnic minority women (Dustmann & Fabbri, 2005; Dale et al., 2006; Salway, 2007). Poor human capital may explain the low activity rates, but hidden discrimination in the labour market is also considered an important factor (e.g. Brown, 2000). The number of women pursuing higher education has increased among the younger cohorts, but many of them still remain inactive or become unemployed after attempts to establish themselves in the labour market (Dale, 2002). Consequently, young ethnic minority women may decide to choose the 'motherhood track' to find meaning for their lives and justify their lives to others. Studies show that women of Pakistani and Bangladeshi ethnic origin commonly equate 'housewife' with high status (Salway, 2007). This may be not surprising at first glance; this view is consistent with the dominance of traditional gender roles in the South Asian communities (Hennink et al., 1999). However, it is surprising given the high aspirations of younger generations in terms of educational qualifications and occupational status (Dale et al., 2002). The poor employment options may thus simply explain the high status attached to housewives by British Pakistani and Bangladeshi women.

Third, research shows that the residential segregation of ethnic minority populations, particularly Pakistani and Bangladeshi, is high by European standards (Musterd, 2005), although the debate on the role of 'choice' versus 'constraint' in the residential segregation of the UK's ethnic minorities continues (see Peach, 1998; 2009; Finney & Simpson, 2009; Raymer & Giulietti, 2009). The high residential segregation of ethnic populations may promote high fertility both indirectly and directly. The daily interaction of people with the same ethnic origin outside the home helps to sustain a cultural and normative environment,

which may be responsible for high fertility. Alternatively, it can be argued that high ethnic residential segregation may hinder young ethnic minority women's achievement of educational and occupational aspirations. While the UK educational system is equalitarian in general (non-selective comprehensive schools dominate), the schools in ethnic minority areas are often poor and leave most students little chance to pursue further studies. The high spatial concentration of ethnic minority populations may also have a direct effect on fertility levels. Areas with young families and many children tend to have relatively high fertility even after controlling for compositional factors and selective residential moves. This is attributed to the tendency of couples to copy the childbearing behaviour of their peers and friends or relatives (Kulu & Boyle, 2009).

Finally, the share of intra-group marriages is high among ethnic Pakistani and Bangladeshi populations in Britain (Voas, 2009). The prevalence of ethnically homogamous marriages, which may be explained by the factors discussed above, may sustain high fertility. The high fertility may be further supported by the fact that some spouses of UK-born ethnic minority women come from the same origin countries as their parents, where fertility has recently declined but remains high (Dale & Ahmed, 2011). It is therefore critical to also consider the origin of spouses in the investigation of the causes of high fertility among certain UK-born ethnic minority women.

2. Data

2.1. Understanding Society

This study uses data from the Understanding Society study (UoS), a large longitudinal study in the UK that was launched in 2009. The main immigrant and ethnic minority groups in Britain were over-sampled in the study, thus providing a sufficient sample size to study ethnic differences in attitudes and behaviour. Retrospective fertility, partnership and employment histories were collected at the first wave (conducted between January 2009 and January 2010). The dataset also contains information on ethnicity and birthplace of respondents and their household members. In the first wave, data were gathered on 50,994 individuals, including 27,792 women. Full interviews were conducted with 47,732 individuals, whereas the remaining interviews were proxy interviews for non-present household members. For the current study, only full interviews are used; 309 cases are excluded from the analysis because essential information is missing for those individuals. Further, 234 individuals are removed

from the sample because some information vital to the analysis showed inaccurate values, indicating recording/reporting mistakes. The analysis is limited to the birth cohorts born between 1940 and 1994; therefore, 5,690 individuals who were born before 1940 are disregarded from the original sample. The final sample consists of 41,499 individuals; the analysis is conducted only among the 23,263 women.

The research population is divided into British 'natives', immigrants (the 'first generation') and descendants of immigrants (the 'second generation'). Immigrants are also included in the analysis to provide another (natural) comparison group (in addition to 'natives') for the descendants of immigrants. 'Natives' are defined as individuals who were born and whose two parents were born in the UK; they form 70% of the (unweighted) sample. Individuals who were born outside of the UK, independent of the origin of their parents, were classified as immigrants. If a person was born in the UK but at least one of the parents was born outside of the UK, the individual is classified as a descendant of immigrant(s). If a descendant of immigrants has parents of different foreign origins, priority is given to the father's country of birth. Due to the small sample sizes, the following aggregated regions of origin are used in the analysis: 1) Europe and other Western/industrialised countries, 2) India, 3) Pakistan, 4) Bangladesh, 5) Caribbean countries, and 6) all other origins. The last group contains individuals from many different countries and continents, including Africa, the Far and Middle East, China and Latin America. Although this group is large in comparison to the other sub-groups, no specific origin has a sufficient size to be analysed separately. The descendants of immigrants are grouped using similar principles, with two exceptions. First, the descendants of immigrants from Bangladesh and Pakistan had to be combined into one group due to the small numbers in both groups of origin. Second, there is an extra group ('Missing') for cases where the specific origin is unknown but the individual is clearly defined as a descendant of immigrants. Table 1 presents the distribution of the female population by the migrant status for the entire sample as well for the subsample where information on employment is available. The share of migrant groups does not differ substantially between the samples, which supports the plan to also analyse this subsample.

(Table 1 about here)

There are two issues regarding the data from the Understanding Society study. Although information was collected on partnership histories, birthplace and ethnicity information is

available only for the partner at the time of interview. Because divorce is still a rare event among ethnic Pakistani and Bangladeshi populations, the current partner is usually also the first partner for the two ethnic groups (Hannemann and Kulu, 2014). However, a preliminary analysis showed that there were very few (if any) individuals in exogamous marriages in the sample of the South Asian population; therefore, we had to exclude this variable from the main analysis due to the lack of heterogeneity. Another issue concerns the woman's place of residence, which is available only at the (first) wave of the survey. Fortunately, however, information is also available on the number of residential changes since a woman turned 14 years old, i.e., the distance between her current residence and the place where she lived at age 14 and the date her arrival at the current address. These data will provide us valuable information to develop realistic assumptions about the places of residence of women when their children were born[10].

2.2. Accuracy of UoS-based fertility measures

To achieve confirmation about the data quality, first, this study conducts a comparison of fertility estimates based on the UoS data and data from the Office of National Statistics (ONS, 2012a; 2012b). Data on women born between 1930 and 1989 are used; weights were applied to take into account the oversampling of ethnic minorities and individuals from Northern Ireland. Table 2 presents a comparison of the percentage of women who entered motherhood at different ages by birth cohort. For women born between 1930 and 1959, the estimated percentage of mothers at age 45 is very similar across the two datasets; the ONS figures lie mostly within the 95% confidence intervals of the values based on the UoS data. For the 1960-69 cohorts, one can observe somewhat higher share of mothers for the UoS data. A similar pattern also seems to prevail for the two youngest cohorts, those born in the 1970s and 1980s and later.

(Table 2 about here)

We also calculated the mean number of children at different ages by birth cohort (Table 3). Again, one can see a consistency between the estimates based on the UoS data and those from the ONS data for cohorts born in the 1930s, 1940s and 1950s and a somewhat higher average number of children for the 1960s cohort in the UoS data. The estimates for the 1970s cohort are quite similar across the datasets. Both UoS and ONS data show that the average number of

[10] Information on an individual's place of residence was not available for this report.

children born to a woman has declined across cohorts, although fertility is still relatively high for the women born in the 1960s, the youngest cohort that has passed through their reproductive ages. The comparisons of fertility estimates based on UoS data and those from the ONS data thus show a good consistency for most cohorts, although the UoS data may slightly overestimate the fertility levels of younger cohorts, particularly first-birth rates. One should be aware of that when interpreting the results.

(Table 3 about here)

2.3. Methodology

This study examines the fertility of UK-born ethnic minority women born between 1940 and 1994. The analysis goes beyond conventional aggregate fertility measures (the total fertility rate and age-specific fertility rates) dominant in the literature on the fertility of ethnic minorities and conducts an analysis of fertility by parity, applying event history analysis. By examining childbearing patterns by birth order, fertility measures are disaggregated, which is necessary to detect the underlying fertility behaviour of ethnic minority women. Event history analysis allows to take a step further and calculate parity-specific fertility rates with and without controlling for the characteristics of the women. The model uses the time in months to conception (generated from recorded live births) to measure the effect of covariates on childbearing decisions as precisely as possible. The basic model can be formalised as follows:

$$\ln \mu_i(t) = \ln \mu_0(t) + \sum_j \alpha_j x_{ij} + \sum_l \beta_l w_{il}(t), \qquad (1)$$

where $\mu_i(t)$ denotes the hazard of the first, second, third or fourth conception (leading to a live birth) for individual i, and $\ln\mu_0(t)$ denotes the baseline log-hazard, which is specified as a piecewise constant hazard; the baseline for first birth is a woman's age in months by five-year age categories (women are considered at risk since age 15); for the second, third and fourth births, baseline is measured as time in months since the previous birth. x_{ij} represents the values of a time-constant variable, and $w_{il}(t)$ represents a time-varying variable.

The analytical strategy of this study is as follows. First, the period total fertility rate (TFR) by migrant status is presented to provide an overview of the fertility behaviour of ethnic minorities and natives in the UK. Thereafter, first-, second-, third- and fourth-birth rates are

calculated by *migrant status* controlling for *age of woman* (first birth), *time since previous birth* (higher order births) and *birth cohort*. The following models then control for women's socio-economic characteristics to explore the extent to which they explain fertility differences by migrant status. The models include individual *education level* (tertiary degree, other higher education, A-level, GSCE and no or lower qualifications); *English language skills* (speaks English as the first language, speaks English without problems, speaks English with problems) and the *importance of religion* in their lives (religion makes no difference, little difference, some difference and a great difference). The values of all three variables were measured at the first wave of the survey. However, for education level, the age of the completion of various levels were imputed following the general logic of the British educational system (e.g., GCSE at age 16; A-level at age 18; tertiary degree at age 21).

The woman's *age at first birth* (for the second, third and fourth birth models) and *partnership status* (for first birth: single, cohabiting, married and separated; and for higher order births: in union, out of union) are also included in the analysis. However, partnership status is included only once the effects of all other variables are controlled for; changes in the partnership status are strongly related to the decision of having a child, particularly a first child; the role of partnership status as an 'explanatory' variable should thus be treated with caution, particularly for the analysis of first birth. *Employment status* (full-time employed, part-time employed (including self-employed), unemployed, in education (including the time spent before the first employment is reported) and other) was measured for only one-fourth of the UoS sample. Therefore, employment status is included in the final model fitted on a subsample of the UoS study. All models use unweighted data in the analysis because migrant status, the main weighting variable, is included in the analysis. However, models that use weights are also fitted for sensitivity analysis; the comparison of the results is provided in Appendix 1 (Table 11).

Tables 4 and 5 provide the distribution of risk time and the number of births by various categories of covariates. The displayed information confirms that the number of births is sufficient to study the transition to first, second, third and fourth birth by migrant status.

(Table 4 about here)

(Table 5 about here)

3. Results

3.1. Total Fertility by migrant status

As first step of analysis, the TFR is calculated by migrant status for the period of 1989 to 2008 (cohorts born between 1940 and 1993 formed the risk population.) The estimated TFR for the UK in this period, based on the (weighted) UoS data, was 1.90, although it varied by period, being the lowest in the late 1990s (1.8) and highest in 2005 to 2008 (2.0). The analysis of UoS data by migrant status (unweighted) shows that migrants had higher fertility than 'natives'; the highest levels were observed for immigrants from Pakistan and Bangladesh (3.7); fertility levels were also relatively high among Indian (2.6) and Caribbean immigrants (2.6) (Figure 1). The descendants of immigrants had lower total fertility than immigrants, as expected. However, the fertility levels varied significantly across ethnic groups. While most groups had a total fertility level below or around the replacement level, women of Pakistani and Bangladeshi descent exhibited high fertility levels (2.8 and 2.7). The analysis of the total fertility by migrant status thus largely supports what previous studies on ethnic minority fertility in the UK have shown (Coleman & Dubuc, 2010). This study provides (period) fertility estimates explicitly for immigrants and their descendants (the 'second-generation').

(Figure 1 about here)

Next, the contribution of transitions to first, second, third and fourth birth to fertility variation is calculated by migrant status and it is investigated the extent to which the socio-economic characteristics of women explain the high fertility observed among certain ethnic minority women in the UK.

3.2. Parity-specific fertility

3.2.1. First birth

In the first step, the model only controls for age (baseline) and cohort next to the variable of interest: migrant status. One can see that immigrants from Europe and 'Other' countries have a low risk for first birth, whereas those from Pakistan and particularly from Bangladesh have significantly higher first-birth rates, supporting the early and universal childbearing among these groups (Table 6, Model 1). First-birth risks are also higher among immigrants from the Caribbean region. Fertility variations among the descendants of immigrants are smaller. The estimated first-birth risks are higher for women of Pakistani and Bangladeshi descent, but the

differences to the levels of natives are not statistically significant. The descendants of immigrants from other European countries, from India and from 'Other' countries have lower first-birth rates than 'natives' and other groups. Models 2 and 3 also control for education level, English languages skills and religiosity. The fertility differences between immigrants and natives slightly decline, but immigrants from Pakistan, Bangladesh and the Caribbean region still exhibit higher first-birth risks. Similarly, differences to 'natives' slightly decline for the descendants of immigrants, although women of (continental) European origin still have lower first-birth levels.

(Table 6 about here)

Finally, Model 4 additionally controls for partnership status. The differences between most groups of immigrants and their descendants disappear, suggesting that first-birth rates vary across groups because of different partnership patterns; some ethnic groups are more likely to marry (earlier) than other groups. Although the results from the model of partnership status are interesting, they do little to improve our understanding of the factors behind the differences in first-birth levels because the event of marriage and the birth of a first child are part of the same family formation process. Notably, once we control for partnership status, first-birth rates become elevated among immigrants from the Caribbean region and their descendants. This suggests that for most population subgroups, partnership formation (marriage) and childbearing are indeed closely related events, whereas this may be not the case for women of Caribbean origin in the UK. Given this strong relationship between fertility and marriage behaviour, the following models including employment status do not contain the variable of union status. Employment histories are only available for a subsample of the UoS study; therefore, models are estimated with and without employment status using this subsample. Model 5 (based on the subsample) shows largely similar results to Model 3 (which uses the main sample), although there is some variation in the magnitude of the coefficients for immigrants. Most importantly, however, once employment status is controlled, the variation between population subgroups slightly decreases, but previously observed differences largely persist (Table 6, Model 6).

3.2.2. Second birth

The first model controls for time since first birth and birth cohort. Only women who reported a first birth are at risk. Again, immigrants from Pakistan and Bangladesh exhibit a

significantly higher likelihood of having a second child than the 'native' British women; notably, however, whereas Caribbean immigrants have high first-birth rates, their second-birth levels are relatively low (Table 7, Model 1). The propensity to have a second child also varies among the descendants of immigrants. Women of Pakistani and Bangladeshi ethnic origin have a significantly higher risk of second birth than the 'natives', whereas the descendants of immigrants from Europe, the Caribbean region and 'Other' countries have lower fertility levels. Estimated second-birth rates are also higher for women of Indian descent, although the difference between them and the 'natives' is not statistically significant. Next, Models 2 to 4 additionally control for the women's age at first birth, their education level, their English language skills and their religiosity. Again, fertility variation between the population subgroups decreases, but the main differences persist; immigrants from Pakistan and Bangladesh and their descendants have high second-birth levels, whereas those of Caribbean origin exhibit low second-birth rates (Table 7, Model 4). Notably, religiosity explains some initial fertility differences, particularly elevated second-birth levels among South Asians, whereas the role of education is negligible. Similarly, the role of employment status is small (Table 7, Model 7); the inclusion of partnership status in the analysis reduces initial differences in the risk of second birth, indicating some differences by partnership status across population subgroups (Table 7, Model 5).

(Table 7 about here)

3.2.3. Third birth

The patterns for third birth (Table 8) are most notable; they reveal an important source of fertility variation between the descendants of immigrants and the 'native' British women. Apart from immigrants from (other) European countries, all other immigrant groups and their descendants exhibit a significantly higher propensity to have a third child than the 'native' women (Table 8, Model 1). The third-birth rates are particularly high among women of Pakistani and Bangladeshi origin; their levels are more than twice as high as the 'natives'. Third-birth levels are also elevated among the descendants of Indian and Caribbean immigrants, whose first- and second-birth rates are close to or below the levels of the 'native' women. Again, once the models control for the women's socio-demographic characteristics, fertility variations across population subgroups decrease; however, the main differences persist: The descendants of immigrants from South Asian countries, but also from Europe, still have significantly higher third-birth levels than the 'native' women (Table 10, Model 4).

Estimated third-birth levels are also higher among women of Caribbean descent, but the difference between them and the 'natives' is not significant. Notably, although low educational qualifications account for some elevated fertility among immigrants, neither education nor employment explains high fertility among the descendants of immigrants (Table 8, Model 7). Again, religiosity is the main factor that accounts for some elevated fertility among immigrants and their descendants; poor English languages skills also play a role in high immigrant fertility.

(Table 8 about here)

3.2.4. Fourth birth

Finally, fourth-birth rates are also investigated by migrant status. The patterns for fourth birth are similar to those of third birth, with minor differences. Most immigrant groups and their descendants have a significantly higher likelihood of having a fourth child than the 'native' British women; again, fourth-birth rates are particularly high among immigrants from Pakistan and Bangladesh and their descendants, twice as high as among the 'native' women (Table 11, Model 1). Notably, fourth-birth levels are also high among individuals of Caribbean origin, both immigrants and their descendants, whereas the levels among women of Indian origin are relatively low, these does not differ from those of the 'native' British women with three children. Again, once the models control for the socio-demographic characteristics of women, particularly religiosity, the differences across population subgroups decrease but persist (Table 9, Models 2–7). Immigrants from Pakistan and Bangladesh and their descendants have significantly higher risks of fourth birth. Estimated fourth-birth rates are also high among individuals of Caribbean origin, but the sample size is too small to draw final conclusions.

(Table 9 about here)

4. Summary and discussion

This study investigated the fertility patterns among the descendants of immigrants in the UK in comparison to immigrants and 'native' British women and examined the causes of fertility variation across population subgroups. Using data from the UoS study, total fertility was calculated for various immigrant and ethnic minority groups, and then, fertility variation was

investigated by birth order using event history models with and without controlling for the socio-demographic characteristics of the analysed women. This is the first study in the UK to analyse fertility dynamics among ethnic minorities by parity and to investigate in a multivariate setting the role of various factors in explaining the fertility patterns among the descendants of immigrants.

The analysis of the total fertility showed that immigrants had higher fertility than 'native' British women, and the highest levels were observed for immigrants from Pakistan and Bangladesh. The descendants of immigrants had lower total fertility levels than immigrants; for most groups, the total fertility was below or around the replacement level. However, women of Pakistani and Bangladeshi descent exhibited high fertility levels. The analysis of fertility by parity showed, first, that there was little variation in the first-birth rates among the UK-born women. The first-birth levels of the descendants of immigrants of Pakistani, Bangladeshi and Caribbean origin were not different from those of the 'native' women, whereas the levels were lower for women of Indian and other European descent, suggesting a lower likelihood of becoming a mother among these groups. The differences between groups persisted once the models controlled for the socio-demographic characteristics of analysed women. Second, the descendants of immigrants from Pakistan and Bangladesh exhibited a significantly higher risk of a second birth, whereas the risk levels were low among women of European and particularly Caribbean origin. Again, the differences between the population subgroups largely persisted once individual characteristics were included in the model. Third, all UK-born ethnic minority groups exhibited a higher likelihood than 'native' British women and most other groups to have a third child and a fourth child; the third- and fourth-birth rates were particularly high among women of Pakistani and Bangladeshi descent. Once the socio-demographic characteristics were taken into account, particularly the importance of religion, differences between the 'natives' and the descendants of immigrants decreased but persisted.

The parity-specific analysis thus showed that high second-, third- and fourth-birth rates were responsible for a high total fertility observed among women of Pakistani and Bangladeshi origin; notably, their first-birth levels were not that different from those of the 'native' women, suggesting relatively similar timing and levels of family formation in comparison to the 'native' British women. Women of Indian and European descent had a low risk of first birth and relatively high third-birth rates, suggesting a polarisation among these groups in terms of fertility behaviour; some women remained childless, whereas others had two or three

children. The descendants of immigrants from the Caribbean region experienced first-birth rates similar to those of the 'natives'; they had low second-, but high third- and fourth-birth levels, again suggesting a polarisation among this group: Some women had one child, and some had three or four children.

Why do descendants of immigrants of Pakistani and Bangladeshi descent have high second- and higher order birth rates? It was expected that education and employment would explain at least some of the high fertility among women of Pakistani and Bangladeshi origin. However, this was not the case. Although education and employment accounted for some high fertility among immigrants from Pakistan and Bangladesh, they played little (if any) role in high second-, third-, and fourth-birth levels among the descendants of immigrants. One reason might be that the measures available for this study were too crude. Education level was measured at the survey, and the values of education were imputed to include it in the analysis as a time-varying variable. However, the inclusion of education in the models, measured either at the survey or with imputed values, did not change the results much. Additionally, the fact that employment status was available only for a subsample should not challenge the results of the study. The effect of employment status on fertility was consistent with that observed in other studies (e.g., Kulu & Washbrook, 2014).

Does this finding suggest that cultural factors explain the high fertility among women of Pakistani and Bangladeshi descent in the UK? The level of religiosity was the only factor related to high second- and particularly third- and fourth-birth rates among South Asian women. This was not surprising; many studies in Europe have shown the importance of religion in the decision of having a third child (Philipov & Berghammer, 2007). However, the level of religiosity was measured at the time of the survey rather than at age 15; therefore, the effect of family events and careers on an individual's level of religiosity measured at the survey is unclear. Previous studies have suggested that there may be some influence, although most research assumes that the causality runs from religiosity to family behaviour rather than the opposite. Most important, however, is the fact that once the model included religiosity, the differences in the second-, third- and fourth-birth rates decreased between women of Pakistani and Bangladeshi origin and the 'native' women, but they persisted. Because the various models also controlled for education and employment, it can be assumed that the 'residual effect' is likely related to cultural and normative factors, which are difficult to capture with measures available in standard surveys.

The study has shortcomings that offer opportunities for future research. This study could not investigate the role intra-group marriages play in the high fertility among the descendants of Pakistani and Bangladeshi immigrants. The main reason was the lack of heterogeneity. Most marriages for which the information on the partner was available in the sample were endogamous; there were very few exogamous marriages. This study could also not investigate the effect of residential segregation on the fertility behaviour of UK-born Pakistani and Bangladeshi women because the data were not available. However, it can be assumed that the possible 'place effect' would simply be a proxy for various individual characteristics already included in the analysis (e.g., education, employment, and religiosity). Future research could also examine how much a potential preference for sons might explain the elevated higher order fertility among women of Pakistani and Bangladeshi origin. Similarly, the research should explicitly examine the role of values; with the panel design of the UoS study, this should soon be possible.

This study supported the findings of high fertility among UK-born Pakistani and Bangladeshi women. It showed that relatively high second-, third- and fourth-birth rates were responsible for the high total fertility among women of Pakistani and Bangladeshi origin. The fertility differences between them and 'native' British women slightly decreased once the model controlled for the socio-demographic and cultural characteristics of women, particularly their religiosity, but they persisted in the final model.

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Tables and Figures

Table 1: *Distribution of women by migrant status, UoS-data*

Migrant group	Complete sample		Employment subsample	
	N women	**%**	**N women**	**%**
Natives	15,914	68.4	3,749	71.9
Immigrants				
Europe and Western countries	737	3.2	201	3.9
India	455	2.0	85	1.6
Pakistan	409	1.8	58	1.1
Bangladesh	347	1.5	40	0.8
Caribbean countries	166	0.7	31	0.6
Other countries	2,306	9.9	445	8.5
Descendants of Immigrants				
Europe and Western countries	807	3.5	212	4.1
India	346	1.5	65	1.2
Pakistan	314	1.3	52	1.0
Bangladesh	178	0.8	14	0.3
Caribbean countries	290	1.2	65	1.2
Other countries	825	3.5	163	3.1
Missing information	169	0.7	33	0.6
Total	23,263	100.0	5,213	100.0

Source: Authors' own calculations based on the UoS data.

Table 2: *Percentage of women who entered motherhood by age and birth cohort, comparison between ONS and UoS data (UoS data weighted)*

	ONS	UoS	95 % CI		ONS	UoS	95 % CI		ONS	UoS	95 % CI	
Age	%	%	lower	upper	%	%	lower	upper	%	%	lower	upper
	1930-1939				1940-1949				1950-1959			
20	9.8	12.3	11.0	13.8	16.2	17.9	16.7	19.3	17.0	18.0	16.8	19.2
25	53.3	52.7	50.6	54.9	58.0	57.8	56.1	59.4	46.4	47.1	45.5	48.6
30	78.6	77.4	75.6	79.2	80.4	80.0	78.7	81.4	69.9	70.5	69.1	71.9
35	85.7	83.4	81.8	84.9	86.9	86.0	84.8	87.1	79.8	81.4	80.1	82.5
40	87.4	85.0	83.5	86.5	88.4	87.8	86.6	88.8	83.1	84.5	83.3	85.6
45	87.7	85.6	84.1	87.1	88.9	88.2	87.1	89.2	83.9	85.0	83.9	86.1
	1960-1969				1970-1979				1980-1989			
20	12.0	15.7	14.7	16.7	12.5	15.3	14.4	16.4	11.8	16.6	15.5	17.7
25	36.0	40.3	39.0	41.7	32.5	38.1	36.7	39.4	-	-		
30	59.3	64.9	63.6	66.2	53.8	62.1	60.7	63.4	-	-		
35	73.4	79.3	78.2	80.4	-	-			-	-		
40	79.1	84.6	83.6	85.5	-	-			-	-		
45	-	-			-	-			-	-		

Source: Authors' own calculations based on the UoS data and ONS (2012b)

Table 3: *Average number of children by age and birth cohort, comparison between ONS and UoS data*

	ONS	UoS	95 % CI		ONS	UoS	95 % CI		ONS	UoS	95 % CI	
Age	data	data	lower	upper	data	data	lower	upper	data	data	lower	upper
	1930-1939				1940-1949				1950-1959			
20	0.12	0.11	0.10	0.13	0.20	0.18	0.16	0.20	0.21	0.18	0.16	0.19
25	0.86	0.79	0.74	0.83	1.04	0.94	0.90	0.98	0.80	0.72	0.68	0.75
30	1.72	1.65	1.59	1.71	1.76	1.69	1.64	1.73	1.43	1.36	1.32	1.39
35	2.19	2.12	2.06	2.19	2.08	2.05	2.01	2.10	1.83	1.86	1.82	1.90
40	2.35	2.24	2.17	2.30	2.18	2.15	2.11	2.20	1.99	2.01	1.96	2.05
45	2.38	2.27	2.21	2.34	2.21	2.18	2.14	2.23	2.02	2.05	2.01	2.09
	1960-1969				1970-1979				1980-1989			
20	0.14	0.15	0.13	0.16	0.15	0.15	0.14	0.16	0.14	0.15	0.14	0.16
25	0.61	0.60	0.57	0.63	0.53	0.53	0.51	0.56	0.51	0.42	0.40	0.44
30	1.20	1.21	1.18	1.25	1.01	1.05	1.01	1.08	-	-		
35	1.65	1.76	1.72	1.80	1.53	1.50	1.46	1.54	-	-		
40	1.87	1.95	1.91	1.99	-	-			-	-		
45	1.93	2.00	1.96	2.04	-	-			-	-		

Source: Authors' own calculations based on the UoS data and ONS (2012a)

Table 4: *Person-months and number of events by covariate categories among women, UoS data*

Variable	First births				Second births			
	Person-months	Percent	Events	Percent	Person-months	Percent	Events	Percent
Age								
15-19 years	1255374	41.9	4009	24.4				
20-24 years	836952	27.9	5725	34.8				
25-29 years	461455	15.4	4258	25.9				
30-34 years	225788	7.5	1895	11.5				
35+ years	218979	7.3	567	3.4				
Duration since first birth								
0 -1 year					176603	22.0	2720	21.9
1 -3 years					217424	27.1	6210	50.1
3 -5 years					112931	14.1	2026	16.3
5 - 10 years					153886	19.2	1192	9.6
10+ years					142243	17.7	250	2.0
Birth cohort								
1940 - 1949	450056	15.0	2988	18.2	153876	19.2	2559	20.6
1950 - 1959	599030	20.0	3373	20.5	187781	23.4	2831	22.8
1960 - 1969	810998	27.0	4376	26.6	250554	31.2	3468	28.0
1970 - 1979	709327	23.7	3842	23.3	160946	20.0	2711	21.9
1980+	429137	14.3	1875	11.4	49930	6.2	829	6.7
Migrant group								
Natives	2048720	68.3	11559	70.3	569648	70.9	8845	71.3
Immigrants								
Europe and Western countries	111017	3.7	445	2.7	20435	2.5	312	2.5
India	59244	2.0	339	2.1	14298	1.8	258	2.1
Pakistan	44147	1.5	353	2.1	21183	2.6	553	4.5
Bangladesh	29338	1.0	310	1.9	11305	1.4	256	2.1
Caribbean countries	19584	0.7	139	0.8	10091	1.3	101	0.8
Other countries	320096	10.7	1560	9.5	77952	9.7	1076	8.7
Descendants of Immigrants								
Europe and Western countries	117275	3.9	577	3.5	31297	3.9	422	3.4
India	45125	1.5	208	1.3	8131	1.0	163	1.3
Pakistan and Bangladesh	40258	1.3	212	1.3	4913	0.6	157	1.3
Caribbean countries	38574	1.3	207	1.3	15563	1.9	131	1.1
Other countries	106757	3.6	431	2.6	23082	2.9	299	2.4
Missing information	18413	0.6	114	0.7	6494	0.8	81	0.7
Age at first birth								
15 - 19 years					155426	19.4	2521	20.3
20 - 24 years					283698	35.3	4735	38.2
25 - 29 years					223445	27.8	3470	28.0
30+ years					140518	17.5	1672	13.5
Education level								
Tertiary degree	531034	17.7	2713	16.5	125668	15.6	2001	16.1
Other higher degree	407451	13.6	2158	13.1	111896	13.9	1727	13.9
A-level	424352	14.2	2496	15.2	127292	15.9	1869	15.1
GSCE	1063397	35.5	6090	37.0	293675	36.6	4424	35.7
No or lower qualifications	572314	19.1	2997	18.2	144556	18.0	2377	19.2
English skills								
English is first language	2578735	86.0	14081	85.6	702978	87.5	10666	86.0
Speaks without problems	343220	11.4	1808	11.0	77196	9.6	1293	10.4
Speaks with problems	76593	2.6	565	3.4	22913	2.9	439	3.5
Religion makes a difference in life								
No difference	1089636	36.3	6131	37.3	310427	38.7	4468	36.0
Little difference	546958	18.2	2913	17.7	146131	18.2	2170	17.5
Some difference	683117	22.8	3551	21.6	174218	21.7	2685	21.7
Great difference	678837	22.6	3859	23.5	172311	21.5	3075	24.8
Union status								
Single	2071740	69.1	4387	26.7				
Cohabiting	294079	9.8	2533	15.4				
Married	478516	16.0	9067	55.1				
Separated	154213	5.1	467	2.8				
In union					582094	72.5	11061	89.2
Out of union					220993	27.5	1337	10.8
Total	**2998548**	**100.0**	**16454**	**100.0**	**803087**	**100.0**	**12398**	**100.0**
Employment status (subsample)								
Full-time employed	403556	56.6	2705	69.1	70271	37.6	764	25.8
Part-time employed	31652	4.4	250	6.4	37222	19.9	576	19.5
Unemployed	12175	1.7	107	2.7	4835	2.6	48	1.6
In eductaion	234968	32.9	344	8.8	7636	4.1	85	2.9
Other	31270	4.4	507	13.0	67018	35.8	1487	50.2
Total	**713621**	**100.0**	**3913**	**100.0**	**186982**	**100.0**	**2960**	**100.0**

Source: Calculations based on data from Understanding Society

Risk time starts at age 15 (1st child) or time of first birth (2nd child) until conception or the individual is censored

Table 5: *Person-months and number of events by covariate categories among women, UoS data*

Variable	Third births				Fourth births			
	Person-months	Percent	Events	Percent	Person-months	Percent	Events	Percent
Duration since second / third birth								
0 -1 year	136734	11.7	1088	21.1	56327	11.8	438	24.1
1 -3 years	220456	18.8	2012	39.0	91548	19.2	724	39.9
3 -5 years	170705	14.6	1051	20.4	73038	15.4	307	16.9
5 - 10 years	317355	27.1	822	15.9	136832	28.8	285	15.7
10+ years	327273	27.9	190	3.7	117847	24.8	60	3.3
Birth cohort								
1940 - 1949	316387	27.0	1159	22.4	145964	30.7	421	23.2
1950 - 1959	349885	29.8	1193	23.1	134711	28.3	436	24.0
1960 - 1969	348135	29.7	1517	29.4	141859	29.8	560	30.9
1970 - 1979	139782	11.9	1079	20.9	49126	10.3	353	19.5
1980+	18334	1.6	215	4.2	3932	0.8	44	2.4
Migrant group								
Natives	916927	78.2	3465	67.1	353942	74.4	1105	60.9
Immigrants								
Europe and Western countries	26552	2.3	95	1.8	7372	1.6	35	1.9
India	20431	1.7	108	2.1	10787	2.3	42	2.3
Pakistan	12919	1.1	215	4.2	12284	2.6	112	6.2
Bangladesh	10845	0.9	166	3.2	8106	1.7	94	5.2
Caribbean countries	8937	0.8	48	0.9	4247	0.9	23	1.3
Other countries	76533	6.5	479	9.3	31922	6.7	186	10.3
Descendants of Immigrants								
Europe and Western countries	40882	3.5	197	3.8	19366	4.1	69	3.8
India	11341	1.0	81	1.6	5949	1.3	22	1.2
Pakistan and Bangladesh	6658	0.6	87	1.7	3828	0.8	43	2.4
Caribbean countries	9393	0.8	68	1.3	5194	1.1	30	1.7
Other countries	24264	2.1	110	2.1	8567	1.8	33	1.8
Missing information	6841	0.6	44	0.9	4028	0.8	20	1.1
Age at first birth								
15 - 19 years	221123	18.9	1571	30.4	150601	31.7	745	41.1
20 - 24 years	498656	42.5	2187	42.4	218278	45.9	779	42.9
25 - 29 years	343649	29.3	1063	20.6	87514	18.4	240	13.2
30+ years	109095	9.3	342	6.6	19199	4.0	50	2.8
Education level								
Tertiary degree	167680	14.3	659	12.8	53690	11.3	147	8.1
Other higher degree	166636	14.2	608	11.8	56410	11.9	162	8.9
A-level	170933	14.6	711	13.8	60595	12.7	226	12.5
GSCE	440205	37.5	1825	35.3	175008	36.8	639	35.2
No or lower qualifications	227069	19.4	1360	26.3	129889	27.3	640	35.3
English skills								
English is first language	1063809	90.7	4276	82.8	419683	88.2	1409	77.7
Speaks without problems	85463	7.3	602	11.7	38821	8.2	257	14.2
Speaks with problems	23251	2.0	285	5.5	17088	3.6	148	8.2
Religion makes a difference in life								
No difference	438974	37.4	1782	34.5	173661	36.5	578	31.9
Little difference	219260	18.7	785	15.2	78579	16.5	250	13.8
Some difference	263702	22.5	1066	20.6	103871	21.8	336	18.5
Great difference	250587	21.4	1530	29.6	119481	25.1	650	35.8
Union status								
In union	1001517	85.4	4545	88.0	399901	84.1	1584	87.3
Out of union	171006	14.6	618	12.0	75691	15.9	230	12.7
Total	**1172523**	**100.0**	**5163**	**100.0**	**475592**	**100.0**	**1814**	**100.0**
Employment status (subsample)								
Full-time employed	95836	33.1	237	20.3	36030	31.3	59	15.6
Part-time employed	86880	30.0	210	18.0	31491	27.3	67	17.7
Unemployed	3696	1.3	30	2.6	2712	2.4	11	2.9
In eductaion	5936	2.0	31	2.7	2708	2.3	5	1.3
Other	97554	33.7	658	56.4	42337	36.7	237	62.5
Total	**289902**	**100.0**	**1166**	**100.0**	**115278**	**100.0**	**379**	**100.0**

Source: Calculations based on data from Understanding Society

Risk time starts at time of second birth (3rd child) or third birth (4th child) until conception or the individual is censored

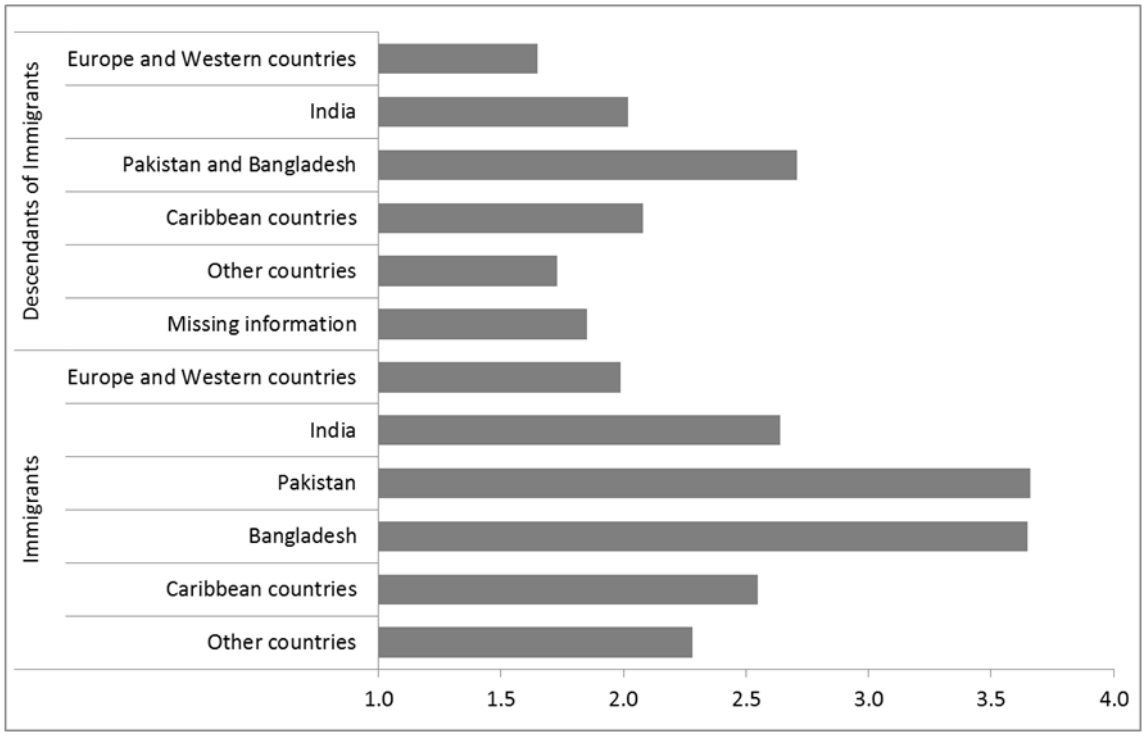

Figure 1: *TFR by migrant group 1989-2008, UoS data*

Source: Authors' own calculations based on the UoS data.

Table 6: *Relative risks of conception leading to first birth*

Variable	Model 1	Model2	Model3	Model4	Model5 (empl. subsample)	Model6 (empl. subsample)
Age (baseline)						
15-19 years	0.003 ***	0.003 ***	0.003 ***	0.029 ***	0.003 ***	0.005 ***
20-24 years	0.007 ***	0.008 ***	0.008 ***	0.028 ***	0.008 ***	0.008 ***
25-29 years	0.009 ***	0.011 ***	0.012 ***	0.025 ***	0.011 ***	0.010 ***
30-34 years	0.008 ***	0.010 ***	0.011 ***	0.021 ***	0.010 ***	0.008 ***
35+ years	0.002 ***	0.003 ***	0.003 ***	0.006 ***	0.003 ***	0.003 ***
Birth cohort						
1940 - 1949	1.31 ***	1.22 ***	1.23 ***	0.96	1.20 ***	1.09
1950 - 1959	1.07 **	1.04	1.04	0.84 ***	1.11 *	1.08
1960 - 1969	1	1	1	1	1	1
1970 - 1979	0.95 *	0.99	0.99	1.09 ***	0.96	0.99
1980+	0.98	1.01	1.01	1.15 ***	1.02	1.10
Migrant group						
Natives	1	1	1	1	1	1
Immigrants						
Europe and Western countries	0.70 ***	0.76 ***	0.75 ***	0.85 **	0.81 *	0.91
India	1.05	1.10	1.07	1.05	0.99	1.07
Pakistan	1.57 ***	1.51 ***	1.44 ***	1.09	1.74 ***	1.41 *
Bangladesh	2.30 ***	2.14 ***	2.03 ***	1.15	1.82 **	1.69 **
Caribbean countries	1.27 **	1.21 *	1.21 *	1.74 ***	1.88 **	2.10 ***
Other countries	0.87 ***	0.91 ***	0.89 **	1.03	0.91	0.96
Descendants of Immigrants						
Europe and Western countries	0.86 ***	0.87 **	0.88 **	1.00	0.93	0.92
India	0.85 *	0.88	0.89	0.98	0.83	0.85
Pakistan and Bangladesh	1.14	1.10	1.09	0.98	1.37	1.38 *
Caribbean countries	0.99	0.97	0.97	1.46 ***	1.00	1.00
Other countries	0.74 ***	0.79 ***	0.79 ***	1.01	0.78 *	0.88
Missing information	1.13	1.00	0.99	1.09	1.22	1.05
Education level (time varying)						
Tertiary degree		0.58 ***	0.59 ***	0.69 ***	0.58 ***	0.69 ***
Other higher degree		0.72 ***	0.72 ***	0.83 ***	0.76 ***	0.93
A-level		0.91 ***	0.91 ***	0.91 ***	0.93	0.92
GSCE		1	1	1	1	1
No or lower qualifications		1.02	1.01	1.09 ***	1.08	1.19 ***
English skills						
English is first language			1	1	1	1
Speaks without problems			1.02	1.01	0.98	1.04
Speaks with problems			1.11	1.04	1.09	0.87
Religion makes a difference in life						
No difference			1	1	1	1
Little difference			0.95 *	0.94 **	0.99	1.03
Some difference			0.92 ***	0.90 ***	0.91 *	0.94
Great difference			0.99	1.03	1.04	1.07
Union status						
Single				0.08 ***		
Cohabiting				0.41 ***		
Married				1		
Separated				0.18 ***		
Employment status (subsample)						
Full-time employed						1
Part-time employed						1.24 **
Unemployed						1.33 **
In education						0.26 ***
Other						2.35 ***

Source: Calculations based on data from Understanding Society
Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 7: *Relative risks of conception leading to second birth*

Variable	Model 1	Model2	Model3	Model4	Model5	Model6 (empl. subsample)	Model7 (empl. subsample)
Duration since first birth (baseline)							
0 -1 year	0.015 ***	0.016 ***	0.016 ***	0.016 ***	0.018 ***	0.015 ***	0.012 ***
1 -3 years	0.027 ***	0.031 ***	0.030 ***	0.029 ***	0.035 ***	0.031 ***	0.024 ***
3 -5 years	0.017 ***	0.020 ***	0.019 ***	0.019 ***	0.024 ***	0.019 ***	0.016 ***
5 - 10 years	0.007 ***	0.008 ***	0.008 ***	0.008 ***	0.011 ***	0.008 ***	0.007 ***
10+ years	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.001 ***	0.001 ***
Birth cohort							
1940 - 1949	1.27 ***	1.21 ***	1.21 ***	1.19 ***	1.07 *	1.23 ***	1.19 **
1950 - 1959	1.13 ***	1.10 ***	1.10 ***	1.09 ***	1.03	1.09	1.06
1960 - 1969	1	1	1	1	1	1	1
1970 - 1979	0.98	0.93 **	0.92 **	0.93 **	0.96	0.91	0.92
1980+	0.84 ***	0.73 ***	0.73 ***	0.74 ***	0.83 ***	0.73 **	0.75 **
Migrant group							
Natives	1	1	1	1	1	1	1
Immigrants							
Europe and Western countries	0.97	0.99	0.97	0.96	0.96	1.01	1.08
India	1.04	1.04	1.01	0.95	0.90	0.95	0.94
Pakistan	1.81 ***	1.76 ***	1.76 ***	1.61 ***	1.51 ***	2.14 ***	1.98 ***
Bangladesh	1.32 ***	1.26 ***	1.25 ***	1.14	1.00	1.30	1.23
Caribbean countries	0.68 ***	0.67 ***	0.67 ***	0.63 ***	0.89	0.56 *	0.61 *
Other countries	0.89 ***	0.91 **	0.89 ***	0.84 ***	0.92	0.85	0.92
Descendants of Immigrants							
Europe and Western countries	0.90 *	0.91 *	0.90 *	0.89 *	0.92	0.88	0.89
India	1.17	1.18 *	1.17 *	1.13	1.10	1.30	1.30
Pakistan and Bangladesh	1.83 ***	1.79 ***	1.78 ***	1.64 ***	1.48 ***	1.78 **	1.75 **
Caribbean countries	0.65 ***	0.63 ***	0.62 ***	0.59 ***	0.73 ***	0.58 **	0.62 *
Other countries	0.88 *	0.89	0.87 *	0.85 **	0.97	0.93	0.99
Missing information	0.90	0.88	0.89	0.89	1.00	1.09	1.02
Age at first birth							
15 - 19 years		1.04	1.05	1.05	1.17 ***	0.99	1.01
20 - 24 years		1	1	1	1	1	1
25 - 29 years		0.90 ***	0.89 ***	0.89 ***	0.85 ***	0.87 **	0.87 **
30+ years		0.64 ***	0.62 ***	0.63 ***	0.59 ***	0.64 ***	0.64 ***
Education level (time varying)							
Tertiary degree			1.17 ***	1.15 ***	1.11 ***	1.14 *	1.23 ***
Other higher degree			1.06 *	1.05	1.03	1.09	1.15 *
A-level			1.00	1.00	1.00	1.03	1.04
GSCE			1	1	1	1	1
No or lower qualifications			1.04	1.04	1.07 *	1.11	1.11
English skills							
English is first language				1	1	1	1
Speaks without problems				0.99	0.94	0.94	0.94
Speaks with problems				0.99	0.92	0.94	0.91
Religion makes a difference in life							
No difference				1	1	1	1
Little difference				1.02	1.01	0.94	0.96
Some difference				1.05	1.04	0.98	0.99
Great difference				1.17 ***	1.16 ***	1.17 **	1.19 **
Union status							
In union					1		
Out of union					0.36 ***		
Employment status (subsample)							
Full-time employed							1
Part-time employed							1.30 ***
Unemployed							0.81
In education							0.74 *
Other							1.46 ***

Source: Calculations based on data from Understanding Society
Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 8: *Relative risks of conception leading to third birth*

Variable	Model 1	Model2	Model3	Model4	Model5	Model6 (empl. subsample)	Model7 (empl. subsample)
Duration since second birth (baseline)							
0 -1 year	0.007 ***	0.008 ***	0.007 ***	0.007 ***	0.007 ***	0.006 ***	0.005 ***
1 -3 years	0.008 ***	0.009 ***	0.009 ***	0.008 ***	0.009 ***	0.008 ***	0.006 ***
3 -5 years	0.005 ***	0.006 ***	0.006 ***	0.006 ***	0.006 ***	0.006 ***	0.004 ***
5 - 10 years	0.002 ***	0.003 ***	0.003 ***	0.003 ***	0.003 ***	0.002 ***	0.002 ***
10+ years	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.000 ***	0.000 ***
Birth cohort							
1940 - 1949	1.07	1.02	0.95	0.93	0.90 *	0.95	0.91
1950 - 1959	0.92 *	0.89 **	0.87 ***	0.86 ***	0.84 ***	0.84 *	0.81 *
1960 - 1969	1	1	1	1	1	1	1
1970 - 1979	1.17 ***	1.02	1.03	1.04	1.05	0.98	0.96
1980+	1.35 ***	0.95	0.97	0.98	0.99	0.70	0.66 *
Migrant group							
Natives	1	1	1	1	1	1	1
Immigrants							
Europe and Western countries	0.86	0.92	0.92	0.88	0.89	0.87	0.92
India	1.24 *	1.27 *	1.23 *	1.07	1.06	1.07	1.15
Pakistan	2.87 ***	2.90 ***	2.69 ***	2.20 ***	2.15 ***	2.63 ***	2.56 ***
Bangladesh	2.48 ***	2.20 ***	2.04 ***	1.62 ***	1.58 ***	1.45	1.39
Caribbean countries	1.44 *	1.20	1.25	1.13	1.23	1.09	1.17
Other countries	1.35 ***	1.42 ***	1.40 ***	1.24 **	1.27 **	1.21	1.27
Descendants of Immigrants							
Europe and Western countries	1.24 **	1.23 **	1.23 **	1.21 *	1.22 **	1.42 *	1.44 **
India	1.51 ***	1.61 ***	1.64 ***	1.54 ***	1.52 ***	1.53	1.52
Pakistan and Bangladesh	2.04 ***	1.98 ***	1.95 ***	1.69 ***	1.66 ***	2.50 ***	2.47 ***
Caribbean countries	1.45 **	1.25	1.28 *	1.19	1.28	1.44	1.52
Other countries	1.03	1.06	1.09	1.04	1.07	1.16	1.21
Missing information	1.54 **	1.31	1.24	1.24	1.27	1.17	1.13
Age at first birth							
15 - 19 years		1.54 ***	1.49 ***	1.50 ***	1.53 ***	1.52 ***	1.49 ***
20 - 24 years		1	1	1	1	1	1
25 - 29 years		0.65 ***	0.66 ***	0.66 ***	0.66 ***	0.62 ***	0.63 ***
30+ years		0.51 ***	0.52 ***	0.52 ***	0.52 ***	0.44 ***	0.45 ***
Education level (time varying)							
Tertiary degree			1.05	1.03	1.02	0.97	1.05
Other higher degree			0.96	0.95	0.94	1.12	1.21
A-level			0.98	0.97	0.97	1.11	1.14
GSCE			1	1	1	1	1
No or lower qualifications			1.32 ***	1.31 ***	1.32 ***	1.34 ***	1.31 **
English skills							
English is first language				1	1	1	1
Speaks without problems				0.96	0.96	0.99	0.97
Speaks with problems				1.19	1.18	1.44	1.34
Religion makes a difference in life							
No difference				1	1	1	1
Little difference				0.94	0.94	0.99	0.99
Some difference				1.06	1.06	1.05	1.05
Great difference				1.26 ***	1.26 ***	1.27 **	1.27 **
Union status							
In union					1		
Out of union					0.76 ***		
Employment status (subsample)							
Full-time employed							1
Part-time employed							0.95
Unemployed							1.99 ***
In education							1.12
Other							1.55 ***

Source: Calculations based on data from Understanding Society
Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 9: *Relative risks of conception leading to fourth birth*

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6 (empl. subsample)	Model 7 (empl. subsample)
Duration since third birth (baseline)							
0 -1 year	0.006 ***	0.006 ***	0.006 ***	0.006 ***	0.006 ***	0.006 ***	0.004 ***
1 -3 years	0.006 ***	0.007 ***	0.006 ***	0.006 ***	0.006 ***	0.007 ***	0.005 ***
3 -5 years	0.004 ***	0.004 ***	0.003 ***	0.003 ***	0.003 ***	0.003 ***	0.002 ***
5 - 10 years	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.001 ***
10+ years	0.000 ***	0.000 ***	0.000 ***	0.000 ***	0.000 ***	0.000 ***	0.000 ***
Birth cohort							
1940 - 1949	1.01	0.97	0.90	0.88	0.85 *	0.81	0.83
1950 - 1959	0.97	0.96	0.94	0.92	0.91	0.80	0.81
1960 - 1969	1	1	1	1	1	1	1
1970 - 1979	1.22 **	1.07	1.08	1.07	1.08	1.16	1.13
1980+	1.49 *	1.13	1.13	1.13	1.15	1.31	1.19
Migrant group							
Natives	1	1	1	1	1	1	1
Immigrants							
Europe and Western countries	1.37	1.58 **	1.65 **	1.55 *	1.55 *	1.23	1.44
India	1.21	1.24	1.18	0.97	0.96	0.81	0.91
Pakistan	2.19 ***	2.31 ***	2.07 ***	1.63 **	1.63 **	1.75	1.63
Bangladesh	2.34 ***	2.23 ***	2.02 ***	1.59 **	1.57 **	1.64	1.57
Caribbean countries	1.75 **	1.52 *	1.60 *	1.41	1.52	1.41	1.83
Other countries	1.50 ***	1.60 ***	1.58 ***	1.32 *	1.35 *	1.08	1.13
Descendants of Immigrants							
Europe and Western countries	1.16	1.14	1.17	1.15	1.16	0.94	0.94
India	0.94	1.03	1.04	0.93	0.92	0.71	0.77
Pakistan and Bangladesh	2.15 ***	2.16 ***	2.12 ***	1.76 **	1.73 **	2.07 *	2.04 *
Caribbean countries	1.63 **	1.42	1.49 *	1.36	1.45 *	0.91	1.00
Other countries	1.12	1.13	1.17	1.12	1.16	0.89	1.00
Missing information	1.56 *	1.36	1.33	1.32	1.36	1.31	1.26
Age at first birth							
15 - 19 years		1.44 ***	1.39 ***	1.40 ***	1.41 ***	1.38 **	1.35 *
20 - 24 years		1	1	1	1	1	1
25 - 29 years		0.67 ***	0.73 ***	0.72 ***	0.71 ***	0.88	0.86
30+ years		0.50 ***	0.55 ***	0.55 ***	0.54 ***	0.40 *	0.39 *
Education level (time varying)							
Tertiary degree			0.85	0.82 *	0.82 *	0.71	0.77
Other higher degree			0.91	0.89	0.89	0.59 *	0.64 *
A-level			1.02	1.02	1.01	1.00	1.00
GSCE			1	1	1	1	1
No or lower qualifications			1.31 ***	1.31 ***	1.33 ***	1.28	1.23
English skills							
English is first language				1	1	1	1
Speaks without problems				1.05	1.04	1.02	1.00
Speaks with problems				1.07	1.06	1.79	1.61
Religion makes a difference in life							
No difference				1	1	1	1
Little difference				1.02	1.01	1.09	1.07
Some difference				1.04	1.03	1.06	1.05
Great difference				1.34 ***	1.33 ***	1.19	1.19
Union status							
In union					1		
Out of union					0.79 **		
Employment status (subsample)							
Full-time employed							1
Part-time employed							1.13
Unemployed							1.41
In education							0.68
Other							1.63 **

Source: Calculations based on data from Understanding Society

Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01

Appendix

Table 10: *Numbers of individuals and events and exclusions for all transitions*

Parity	Women under risk		Exclusions	Women analysed	Conception events
First child	23263		n.a.	23263	16454
Second child	16454	367	cases due to timing*	15914	12398
		173	cases due to twin births**		
Third child	12398	257	cases due to timing	12001	5163
		140	cases due to twin births		
Fourth child	5163	128	cases due to timing	4961	1814
		74	cases due to twin births		

* Timing: women reported last birth as pregancy at time of the interview and never became under risk for a new birth during the observation period

** Twin births: mothers do not contribute any person-months between births and are removed from the analysis

Table 11: *Relative risks of conception leading to first, second, third and fourth birth for final models with and without weights*

Variable	First Birth		Second Birth		Third Birth		Fourth Birth	
	no weights	weights	no weights	weights	no weights	weights	no weights	weights
Age (baseline)								
15-19 years	0.003 ***	0.003 ***						
20-24 years	0.008 ***	0.008 ***						
25-29 years	0.012 ***	0.012 ***						
30-34 years	0.011 ***	0.011 ***						
35+ years	0.003 ***	0.003 ***						
Duration since first birth (baseline)								
0 -1 year			0.016 ***	0.015 ***	0.007 ***	0.007 ***	0.006 ***	0.006 ***
1 -3 years			0.029 ***	0.030 ***	0.008 ***	0.008 ***	0.006 ***	0.006 ***
3 -5 years			0.019 ***	0.018 ***	0.006 ***	0.006 ***	0.003 ***	0.003 ***
5 - 10 years			0.008 ***	0.008 ***	0.003 ***	0.002 ***	0.002 ***	0.002 ***
10+ years			0.002 ***	0.001 ***	0.001 ***	0.000 ***	0.000 ***	0.000 ***
Birth cohort								
1940 - 1949	1.23 ***	1.26 ***	1.19 ***	1.21 ***	0.93	0.93	0.88	0.84 *
1950 - 1959	1.04	1.05	1.09 ***	1.11 ***	0.86 ***	0.85 ***	0.92	0.89
1960 - 1969	1	1	1	1	1	1	1	1
1970 - 1979	0.99	0.96	0.93 **	0.93 **	1.04	1.06	1.07	1.07
1980+	1.01	0.93 *	0.74 ***	0.73 ***	0.98	1.08	1.13	1.23
Migrant group								
Natives	1	1	1	1	1	1	1	1
Immigrants								
Europe and Western countries	0.75 ***	0.73 ***	0.96	0.95	0.88	0.84	1.55 *	1.53 *
India	1.07	1.13	0.95	0.94	1.07	1.14	0.97	0.92
Pakistan	1.44 ***	1.52 ***	1.61 ***	1.97 ***	2.20 ***	2.48 ***	1.63 **	1.71 **
Bangladesh	2.03 ***	2.02 ***	1.14	1.38 ***	1.62 ***	1.63 ***	1.59 **	1.67 **
Caribbean countries	1.21 *	1.26 *	0.63 ***	0.66 ***	1.13	1.32	1.41	1.67 *
Other countries	0.89 **	0.90 *	0.84 ***	0.84 **	1.24 **	1.18	1.32 *	1.25
Descendants of Immigrants								
Europe and Western countries	0.88 **	0.89 **	0.89 *	0.88 *	1.21 *	1.21 *	1.15	1.08
India	0.89	0.84 *	1.13	1.15	1.54 ***	1.36 *	0.93	0.82
Pakistan and Bangladesh	1.09	1.20	1.64 ***	1.72 ***	1.69 ***	1.49 **	1.76 **	1.40
Caribbean countries	0.97	0.99	0.59 ***	0.61 ***	1.19	1.12	1.36	1.21
Other countries	0.79 ***	0.76 ***	0.85 **	0.97	1.04	1.12	1.12	1.03
Missing information	0.99	0.97	0.89	0.91	1.24	1.22	1.32	1.37
Age at first birth								
15 - 19 years			1.05	1.05	1.50 ***	1.57 ***	1.40 ***	1.41 ***
20 - 24 years			1	1	1	1	1	1
25 - 29 years			0.89 ***	0.88 ***	0.66 ***	0.63 ***	0.72 ***	0.69 ***
30+ years			0.63 ***	0.61 ***	0.52 ***	0.50 ***	0.55 ***	0.44 ***
Education level								
Tertiary degree	0.59 ***	0.58 ***	1.15 ***	1.22 ***	1.03	1.13 *	0.82 *	0.82
Other higher degree	0.72 ***	0.72 ***	1.05	1.08 *	0.95	0.97	0.89	0.92
A-level	0.91 ***	0.90 ***	1.00	1.02	0.97	0.99	1.02	1.06
GSCE	1	1	1	1	1	1	1	1
No or lower qualifications	1.01	1.03	1.04	1.02	1.31 ***	1.29 ***	1.31 ***	1.32 ***
English skills								
English is first language	1	1	1	1	1	1	1	1
Speaks without problems	1.02	0.99	0.99	0.89 *	0.96	0.84 *	1.05	0.97
Speaks with problems	1.11	1.04	0.99	0.87	1.19	1.14	1.07	1.11
Religion makes a difference in life								
No difference	1	1	1	1	1	1	1	1
Little difference	0.95 *	0.94 **	1.02	1.03	0.94	0.95	1.02	1.04
Some difference	0.92 ***	0.91 ***	1.05	1.04	1.06	1.07	1.04	1.07
Great difference	0.99	0.93 **	1.17 ***	1.14 ***	1.26 ***	1.26 ***	1.34 ***	1.34 ***

Source: Calculations based on data from Understanding Society

Risk time starts at age 15 (1st child) or previous birth (higher parity) until conception or the individual is censored