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Understanding recent migrant fertility in the United Kingdom

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ABSTRACT

There have been important changes in the United Kingdom's (UK) fertility and immigration in the past decade, with rising period fertility and increasing shares of UK live births to foreign-born mothers. Understanding of the rates underlying these figures, however, is currently limited because the relevant data are not collected directly. In this paper, we estimate UK fertility rates by key countries of birth, for the 1997-2010 period. For recent migrants to the UK, we present analyses disentangling the timing of migration and fertility, and address short-term hypotheses of migration-fertility patterns. Own Child fertility estimates confirm that the fertility of the Polish group is relatively low, characteristic of that at origin. For young South Asian migrants, evidence is found for family formation related migration, with high proportions arriving to the UK childless and having births soon after arrival. For Polish women, this phenomenon exists at younger ages but is less common, and those in their early thirties more commonly bring their children to the UK with them.

KEYWORDS

Migrant fertility; United Kingdom; Polish migration; Own Child Method

EDITORIAL NOTE

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UNDERSTANDING RECENT MIGRANT FERTILITY IN THE UNITED KINGDOM

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1. INTRODUCTION

In recent years, immigration has been particularly important for the United Kingdom (UK) in terms of population growth, distribution and ethnic composition. Low fertility levels combined with high levels of immigration have meant that between 1999 and 2008 net migration accounted for UK population growth to a greater extent than natural change, until natural change overtook net migration again in 2008. The increase in the contribution of natural change to population growth is largely associated with recent rises in UK fertility, which have been partially driven by foreign-born childbearing. For example, 14% of births within England and Wales in 1999 occurred to women born outside of the UK. The comparable figure for 2010 is 25% (Office for National Statistics, 2011a). Furthermore, in 2010, the Total Fertility Rate (TFR) of the foreign-born population as a whole was higher (2.45) than that of the UK-born population (1.88), meaning that their increasing shares of childbearing contributed to increases in UK fertility levels. Tromans, Jefferies and Natamba (2009) suggest that foreign-born women are responsible for 39%, 88% and 100% of the increases in fertility between 2001-2007 seen at ages 20-24, 25-29 and 30-34 years, respectively. Fertility has also risen due to an increase in the fertility of UK-born women of all ages, except amongst the under 20s, with the UK TFR rising from 1.63 in 2001 to 1.98 in 2010, the highest observed level since 1973 (Office for National Statistics, 2011b)[1]. As found for many other countries experiencing a recent upturn in period fertility, the rise can be attributed to both some recuperation of previously postponed births, but also to immigration (Goldstein, Sobotka, and Jasilioniene, 2009).

Despite the importance of foreign-born fertility within the UK, relatively little is known about the context within which this childbearing is occurring, particularly for migrants who arrived after 2001. Most of the quantitative evidence regarding migrant fertility and family composition is based on 2001 census data. However, since this time, there have been well documented, important changes in the nature of immigration to the UK. With the accession to the European Union (EU) of the 'A8'[2]

[1] According to the ONS website, the UK-born TFR declined a little in 2009 with a value of 1.85, before increasing again to 1.88 in 2010 (Office for National Statistics, 2011c).

[2] The countries known as the 'A8' group are: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

countries in May 2004, there have been large increases to the flows of migrants originating from these countries. In particular, 71% of immigrants to the UK from these eight countries after 2004 have been from Poland (Office for National Statistics, 2011d), notably the largest country amongst the A8 grouping. Whilst Polish migration to, and from, the UK has fluctuated since peak immigration levels in 2007, the size of the Polish population within the UK has continually increased from approximately 95,000 individuals in 2004 to 532,000 in 2010 (Office for National Statistics, 2012, 2011e, 2004). Estimates for 2010 show that Poland is the second most common non-UK country of birth and that Polish is the most common non-UK nationality (Office for National Statistics, 2011e).

Mirroring recent immigration flows, Poland now features as the most common country of birth for foreign-born mothers having live births in the UK in 2010, with Pakistani, Bangladeshi and Indian mothers also featuring highly on this list. Polish migration to the UK presents an interesting case because the fertility of more traditional immigrants in the UK, from Pakistan, Bangladesh and India, has typically been higher on average as they originate from high fertility societies (e.g. Coleman and Dubuc, 2010). However, in the Polish case, fertility at origin is low with recorded TFRs over the 1997-2010 period from 1.2 to 1.5 births per woman. This raises the question of whether Poland featuring as the most common country of birth for foreign-born mothers having live births in the UK is due simply to the size of the Polish population, or rather to an increase in fertility in comparison to that found at origin. Moreover, it has typically been thought that much of the migration from Poland and other A8 countries has been primarily economically driven and consisting of mostly individuals who are single (Office for National Statistics, 2009). The Polish case contrasts with the migration of individuals from countries, such as Pakistan, India and Bangladesh, where flows are often associated with family migration (Ballard, 2008; Robinson, Reeve and Casey, 2007). Thus, there is a need for analyses of the fertility of Polish females in comparison to those of the South Asian groups.

Given that large-scale Polish migration to the UK is a relatively new phenomenon, there is at present little quantitative evidence on the family formation patterns of this group. This is partially due to the difficulty in obtaining sufficient data to study such issues. There have, however, been a number of qualitative studies

focusing on the family structures and migration experiences of Polish migrants in different parts of the UK. Both White (2011) and Ryan et al.'s (2009) studies, for example, point to the jointly determined decision made by couples for husbands to migrate to the UK first and, in some cases, to be later joined by their wives and young children. White (2011) also gives the example of Polish females migrating alone without their children, but this is more common for females with children who are of late teenage ages and above. Less attention has been paid to the experience of Polish females having births in the UK, although there has been some qualitative research investigating the fertility intentions of Polish migrants (Marczak, 2010).

In our study, we calculate age and country specific birth rates with nationally representative data, and relate the timing of births to the timing of migration. This research contributes to the literature by analysing the relationships between migration and fertility for recent migrants, and by examining differences between key groups. This work is especially important for understanding the behaviours of the Polish-born group. Finally, our findings offer understanding of the ways in which various migrant groups contribute to the population structure of the UK and of the trends underlying current foreign-born fertility.

2. BACKGROUND: MIGRATION-FERTILITY HYPOTHESES

A number of hypotheses have been proposed to explain the relationships between migration and fertility (see Kulu, 2005, for a review). The *socialisation hypothesis* views childhood environment as the main factor for shaping fertility outcomes in later life. As such, the fertility patterns displayed by migrants are expected to closely resemble those of non-migrants at place of origin, rather than those of non-migrants at place of destination. This means that differential fertility patterns would be observed between migrants in the same destination area, if they originated from areas with differing fertility patterns (Milewski, 2007).

The *adaptation hypothesis* emphasises conditions in the destination area. Studies have distinguished between adaptation and the process of *assimilation* (e.g. Andersson and Scott, 2007; Andersson, 2004). Both of the processes suggest that migrant fertility trends closely resemble those of non-migrants at destination. However, the underlying explanations for why this is the case differ between the two

hypotheses. The idea behind adaptation is that migrants adapt to the social, political and economic conditions they are subject to in the new location (e.g. Schmid and Kohls, 2009; Lindstrom and Saucedo, 2007; Milewski, 2007), meaning that fertility is altered on account of practical rather than ideological reasons. Thus, the recognition of the importance of current context in shaping fertility behaviours suggests that those who share the same context also share similar fertility patterns. By contrast, assimilation refers to a process of acculturation (Andersson, 2004), whereby migrants come to adopt the cultural norms at destination and therefore fertility patterns become the same due to ideological reasons. However, depending on the age at migration and the extent of the cultural normative differences between destination and origin, it might be that assimilation is only visible for second generation migrants, because it is a more gradual process (Schmid and Kohls, 2009; Andersson, 2004).

Whilst the ideas of socialisation, adaptation and assimilation place emphases on social environment in affecting fertility outcomes, the *selection hypothesis* focuses on the importance of the characteristics of migrants (Schmid and Kohls, 2009). As described, for example, by Milewski (2007), migrants may be selected in terms of observable demographic and socioeconomic characteristics, or in terms of unobservable characteristics, such as the desire to pursue a career or indeed fertility preferences. With regards to migrant fertility, the selection hypothesis implies that similar patterns of migrant and non-migrant fertility at destination are not due to processes of adaptation or assimilation but rather due to migrants moving to locations which are more compatible with their own fertility preferences. In some scenarios, the relationship is considered to be fairly direct with fertility preferences as the main reason for migration (Lindstrom and Saucedo, 2007). An indirect relationship has been proposed by the mobility hypothesis, whereby individuals migrate for career or educational purposes to improve their own socio-economic position (Lindstrom and Saucedo, 2007). The driving forces of the migration are not fertility preferences *per se* but pursuit of further education or career goals, which are often associated with delays in childbearing (Schmid and Kohls, 2009; Bledsoe, Houle, and Sow, 2007).

The hypotheses considered above focus on relatively long lasting relationships between migration and fertility. By contrast, the *disruption hypothesis* focuses on the short-term effects of the actual process of migration. The main premise of this

hypothesis is that fertility is disrupted when a migration is made, with a predominant focus on the tempo of fertility. However, the disruption hypothesis provides little explanation of whether, and how, fertility quantum is affected by migration. The literature has generally suggested that fertility is lowered during the periods prior to, and in the short-term, after a migration (e.g. Schmid and Kohls, 2009; Kulu and Milewski, 2007). Proposed explanations for fertility decreases include stress, and anticipation of the move, prior to the migration and the need to settle in to a new environment or due to partner separation following the migration (Lindstrom and Saucedo, 2007; Milewski, 2007).

The finding of elevated fertility following a migration (e.g. Mussino, Iaccarino, Prati and Strozza, 2009; Schmid and Kohls, 2009; Andersson, 2004; Toulemon, 2004) is characteristic of *the interrelation of events hypothesis*. For example, rather than viewing events, such as migration and childbearing, as occurring consecutively in time and as causing one another, they are viewed as jointly determined and interrelated. This is hypothesised to especially be the case where migration, union formation and first births occur very closely in time. Migration might facilitate union formation, or union formation might create the need to migrate to live together and these events may in turn allow the process of childbearing. Furthermore, this type of association is expected to be especially common where short distance moves have been made, likely reflecting the need to change living arrangements to accommodate changes in family composition. The interrelation of events hypothesis is similar to the disruption hypothesis in the sense that it indicates the short-term patterns of fertility that might be observed, but does not discuss expected long-term patterns in migrant fertility. For example, it is unknown whether there are longer-term fertility differentials for individuals for whom migration is associated with childbearing, in comparison to individuals for whom the events are not interrelated.

Due to the focus on recent migrant groups, short-term hypotheses of migrant fertility are the main focus within this research. The hypotheses considered are the ‘disruption’ and ‘interrelation of events’ hypotheses, which focus on the relationship between the timing of the migration event and fertility. In line with the theories outlined above, we expect to find evidence in support of the interrelation of events hypothesis for migrants from South Asian countries, because these inflows are

commonly associated with family formation, especially in the case of migrants from Pakistan and Bangladesh. By contrast, for the Polish migrants we do not expect to find evidence in support of the interrelation of events hypothesis, but rather support for delayed fertility after arrival due to migration for non-family-formation related reasons. This may be due to migration for economic purposes in line with the selection and mobility hypotheses, but also due to family reunification for individuals who have had children prior to migration. By exploring these migration-fertility relationships for recent migrants in the UK context, we are able to provide new insights into, and understanding of, the fertility patterns underlying the important changes that have occurred in UK immigration and foreign-born fertility over the past decade.

3. DATA AND METHODS

3.1 UK LABOUR FORCE SURVEY

The Labour Force Survey (LFS) is a nationally representative, quarterly, rotating panel survey for the UK, dating in its current form from 1992 to the present. The sample of addresses is drawn from the postcode address file, with approximately 60,000 households sampled in each quarter. A major advantage of the LFS is the large sample size covered, along with the information it contains on country of birth, nationality and year of entry to the UK. Furthermore, the frequency of the sampling means that recent migrants are likely to be included in the sample, in addition to migrants who have been living in the UK for longer periods of time. The LFS contains information on all household members and their relationships to one another so that reproductive histories can be constructed for household members on the basis of who is living with them. However, the LFS does not ask questions relating to birth histories so it is only possible to construct partial fertility histories, being unable to identify children who are not currently living in the household with their parents. Another limitation to the LFS is that individuals are only followed for five quarters, hence, the longitudinal element is not considered here. Response rates have declined in recent years with a wave 1 response rate for April-June 2010 of 64.5%, in comparison to approximately 78% for wave 1 responses in March-May, and June-

August, 2001 quarters [3]. We address this by using weights which correct for nonresponse by age-group, sex and government office region (Office for National Statistics, 2008).

The April-June quarters of the household version of the LFS are combined for the years 2001 through to 2010. Respondents in their fifth wave from 2002 onwards (236,013 individuals) are then dropped from the sample to avoid any repetition, as they would have been in the wave one sample of the April-June quarter in the previous year. At least, this is true for the majority of cases where households and individuals were successfully contacted and interviewed at wave one. If they did not enter the survey until a later wave, they are omitted from this sample altogether. Some individuals entered the survey at later waves for a number of reasons, including failure to make contact with the household in previous waves or if they joined a household that was already participating in the survey. Non-respondents, representing 2.57% of the total sample, and those individuals whose country of birth or year of entry information are missing or erroneously reported (0.1% of the total sample) are also removed from the sample.

Within the sample, 8.7% of individuals are foreign-born, reflecting the different proportions of the population constituted by migrants across this time period. For example, for those interviewed in 2010, migrants constitute approximately 10% of the general population in comparison to approximately 7% for those interviewed in 2001. The data reflects the increases in the proportion of migrants in the UK population over this time period.

3.2 KEY VARIABLES

The *countries of birth* focused on in these analyses are Bangladesh, India, Pakistan, Poland and all 'Other' non-UK countries. Due to small sample size issues, the Pakistani and Bangladeshi groups are combined together.

[3] The response rates are given for March-May and June-August quarters (rather than April-June) because the LFS data was originally collected seasonally, with collection later changed to calendar quarters. The survey years used in this research have been subsequently revised to calendar quarters by ONS to allow for a consistent series of calendar quarters over time.

Duration of residence in the UK is created by subtracting year of arrival from the year of survey.

Age of arrival to the UK is calculated by subtracting the number of years of residence in the UK from age at survey. These estimates are then aggregated into five-year age groups to minimise error.

3.3 THE OWN CHILD METHOD

As previously described, the LFS is a valuable data source for this research because it provides information on migration, whilst also offering relatively large sample sizes. However, the LFS does not collect a birth history. This limitation can be overcome by using the 'Own Child(ren) Method' (OCM), which is an indirect estimation technique that uses relationship information from household surveys. The method, along with modifications and improvements, is outlined in detail in Cho, Retherford and Choe (1986). This research uses OCM to analyse the fertility patterns of minority groups in the UK with a particular focus on country of birth differences and on duration of residence, for recent migrants, using the 2001-2010 data.

The advantage of the OCM approach is that it allows the estimation of fertility when the data are of poor quality or lacking. This method is also useful in settings where good quality data are available but without the detail required to study specific population groups (Cho et al., 1986). This is certainly the case for the UK, where official birth registration data are not available for migrants by year of arrival. Furthermore, an advantage of applying the OCM with the LFS is that both the numerator and the denominator can be obtained from the same data source and, thus, subject to the same method of data collection, minimising biases arising from combining different data sources (Dubuc, 2009).

The merits of OCM for estimating fertility of subgroups within the UK using the LFS data have been demonstrated. For example, Murphy and Berrington (1993) used data from 1987 and 1989 to estimate period parity progression ratios; Berthoud (2001) estimated teenage fertility rates by ethnicity with data pooled from 1987-1999; and more recently, Coleman and Dubuc (2010) and Dubuc (2009) studied fertility by ethnicity and amongst second generation groups from 1979-2006.

The OCM is a reverse-survival technique that uses current survey data to retrospectively estimate fertility for the years prior to the survey (Bordone, Billari, and Zuanna, 2009). To obtain birth estimates, the age of each child is subtracted from that of their mother and from the year of survey to give both the age of the mother at the birth of the child and the year for that age-specific birth. The number of women in the year when the age-specific birth took place is also calculated by reverse-surviving those women in the survey.

Whilst the OCM technique allows indirect fertility estimation, there are a number of limitations of the approach to consider. One such limitation is that children are not detected if they are not living within the same household as their mother. In order to minimise any problems associated with this, Cho et al. (1986) suggest that analyses should not be conducted further than 15 years ago because any children aged 15 years and above are more likely to have left the parental home. Therefore, in this study, all estimates calculated from a particular survey year only date back to 15 years prior to the survey year and are based on children aged 14 years and under at the time of that survey.

Given that the pooled sample ranges from 2001- 2010, it is possible to calculate fertility estimates for the 1987-2010 period. However, we focus on the 1997-2010 period here, due to the interest in understanding recent migrant fertility. This period can be separated into two equal time periods of 1997-2003 and 2004-2010 so that fertility can be estimated for the period prior to, and following, the large-scale immigration of Polish migrants to the UK from 2004 onwards.

The period from 1997 to 2001 is that for which the largest sample sizes are available based on the survey years from 2001-2010. From 2002 onwards, the sample sizes diminish with each increase in year. For example, estimates for 2002 are based on 2002-2010 data, whilst estimates for 2010 are based solely on 2010 data. Thus, a higher degree of caution is required when constructing the fertility estimates for the most recent period. The fertility estimates can be considered as mid-year estimates, with the data based on the April-June quarters in each year.

The question of whether children are living with their mothers is of further importance due to the focus on migrant mothers. The LFS does not contain information for children who did not migrate with their mothers, since it is based on who is living in the household at the time of survey. Since the migration from Poland to the UK is fairly recent and thought to be primarily economically driven, it is possible that some of the migrants may be leaving their children in Poland with alternative caregivers. It is not known to what extent this might be occurring as there is currently very little quantitative information available on the family patterns of these groups, although qualitative evidence suggests that this is less common for mothers with children in the 0-14 years age range included in the OCM estimation (White, 2011). Another potential problem with the OCM is that mortality is not accounted for in the estimations. However, recent studies adjusting for mortality in the UK context have shown that differences in estimates obtained are negligible (Dubuc, 2009). Therefore, corrections for mortality are not made in this study.

The OCM approach matches all children to mothers meaning that it is only on the mother's characteristics that one needs to select information for sub-groups of interest. This is particularly important in this study of migrant mothers, where women may have given birth to children following their arrival to the UK, and therefore have a different country of birth to their children. The OCM approach also avoids overestimation of fertility which can arise in studies where migrant fertility is only measured following arrival to the destination country (Dubuc, 2009). For example, as the interrelation of events hypothesis states, fertility may be elevated following migration. In this case, period based measures of fertility would be inflated, due to tempo effects (e.g. Bongaarts and Feeney, 2000, 1998). However, the OCM estimates fertility for up to 15 years prior to the survey, meaning that fertility prior to migration is also estimated. Thus, any postponement of fertility prior to migration would counterbalance any elevation following arrival. Important differences such as these can be explored further within this research by relating fertility outcomes to year of arrival information.

3.4 SAMPLE

A distinction can be made between the sample sizes of females at childbearing ages at the time of survey, and the sample sizes of females who contribute to retrospective

OCM estimation because they were at childbearing ages during the time periods of interest. The distribution of females at childbearing ages at the time of survey, in 2001-2010, is shown in Table 1 by country of birth. Childbearing ages are defined as 15-49 years here. It is evident in Table 1 that the sample sizes start to become quite small when disaggregating the sample by five-year age bands and country of birth. However, after data for respondents born in Pakistan and Bangladesh have been combined, the remaining sample sizes offered by the pooled data are considered sufficiently large for these analyses.

The sample sizes for females of childbearing ages at the time of survey, shown in Table 1, are informative for understanding of the current picture of UK-born and foreign-born childbearing in the UK. Firstly, it can be seen that substantial proportions of the female populations at ages 20-24, 25-29, 30-34 and 35-39 years are foreign-born, with this peaking at approximately 18% and 17% for the 25-29 and 30-34 age groups, respectively. However, the overall proportion of females at childbearing ages who are foreign-born is still substantially lower than the proportion of births occurring to foreign-born women over this period, reflecting the higher average fertility of foreign-born females in comparison to UK-born females.

Secondly, the important changes that have occurred to the UK population in the past decade as a result of Polish immigration can be seen in Table 1. Polish females make up a greater proportion of the populations of females at ages 15-19, 20-24 and 25-29 years than do Indian females. Furthermore, greater proportion of the populations of females at ages 20-24 and 25-29 years are constituted by Polish females, than by Pakistani and Bangladeshi females. In this study, we are interested in whether Poland is the most common country of birth for foreign-born mothers having live births in the UK due to: 1) migration and fertility being strongly related for this group, and thus resulting in an increase in fertility over that seen in Poland; or, 2) whether this phenomenon is attributable to the increase in the *size* of the Polish population, as reflected in Table 1.

As discussed above, the OCM estimates fertility for the years of, and prior to, the survey, meaning that females aged above 49 years at survey are still included in the estimation sample if they were at childbearing ages during the time period of

interest. In this study, fertility rates are calculated for the 1997-2010 period, and therefore in the most extreme case, females aged 62 years at survey in 2010 represent females aged 49 years in 1997. In terms of the actual sample size used in implementing the OCM, 292,857 females aged 15-62 years at the time of survey are analysed. Of these, 259,857 (88% weighted) are UK-born and 33,420 (12% weighted) are foreign-born. Across the 1997-2010 period, there were 113,727 births and 2,225,339 woman-years retro-constructed.

Age group	UK	Poland	Pakistan & Bangladesh	India	Other	Total
15-19	**93.78**[1] *29,725*[2]	**0.25** *63*	**0.42** *124*	**0.21** *61*	**5.34** *1,553*	**100** *31,526*
20-24	**87.15** *23,802*	**1.40** *309*	**1.24** *314*	**0.60** *142*	**9.61** *2,370*	**100** *26,937*
25-29	**81.98** *25,056*	**1.93** *482*	**1.68** *485*	**1.45** *393*	**12.96** *3,559*	**100** *29,975*
30-34	**83.27** *29,527*	**0.89** *261*	**1.75** *591*	**1.44** *452*	**12.64** *4,047*	**100** *34,878*
35-39	**86.72** *34,533*	**0.41** *136*	**1.28** *499*	**1.01** *375*	**10.58** *3,870*	**100** *39,413*
40-44	**88.40** *35,072*	**0.20** *68*	**1.12** *408*	**1.05** *384*	**9.23** *3,423*	**100** *39,355*
45-49	**88.38** *31,378*	**0.23** *71*	**1.23** *393*	**1.31** *415*	**8.86** *2,986*	**100** *35,243*
Total	**87.08** *209,093*	**0.72** *1,390*	**1.25** *2,814*	**1.02** *2,222*	**9.92** *21,808*	**100** *237,327*

Table 1: Females of childbearing ages at the time of survey, 2001-2010, by country of birth
Source: Labour Force Survey, 2001-2010 April-June quarters
[1]Row percentages (weighted); [2]Sample sizes (unweighted)

4. FINDINGS

4.1 EXTERNAL CONSISTENCY OF OCM ESTIMATES

In Figure 1, the OCM estimates obtained from the LFS are compared with Age-Specific Fertility Rates (ASFRs) for 1994-2007 provided by ONS to assess their validity. The two sets of estimates are very close with the LFS slightly underestimating fertility at younger ages and slightly overestimating fertility at older ages. However, these differences are very small, with the findings providing strong support for the validity of OCM estimation with the LFS data.

4.2 FERTILITY ESTIMATES BY COUNTRY OF BIRTH

Age-specific fertility rates for the total 1997-2010 period are shown in Figure 2, whilst the ASFRs for the more recent 2004-2010 period are shown in Figure 3. The ASFRs presented in Figure 2 are based on larger sample sizes and provide an overview of fertility rates by country of birth for the key groups of interest. For the Polish migrants, these are some of the first ASFR estimates shown for this group. Polish fertility is shown to be lower than that of the other groups, and is characteristic of fertility levels found at origin. The Pakistani and Bangladeshi group are found to have the highest fertility, as expected, whilst the Indian group has higher overall fertility than the UK-born group, but lower age-specific fertility at 15-19 years.

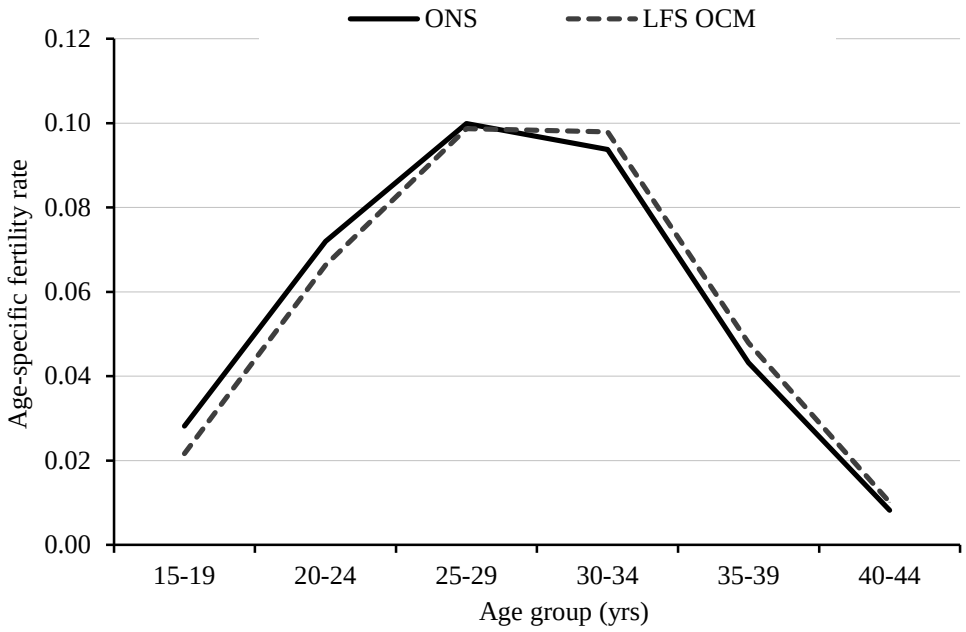

Figure 1: Comparison of weighted Own Children Method (OCM) estimates of UK Age-Specific Fertility Rates (ASFRs) obtained with the Labour Force Survey (LFS) against Office for National Statistics (ONS) estimates, 1994-2007

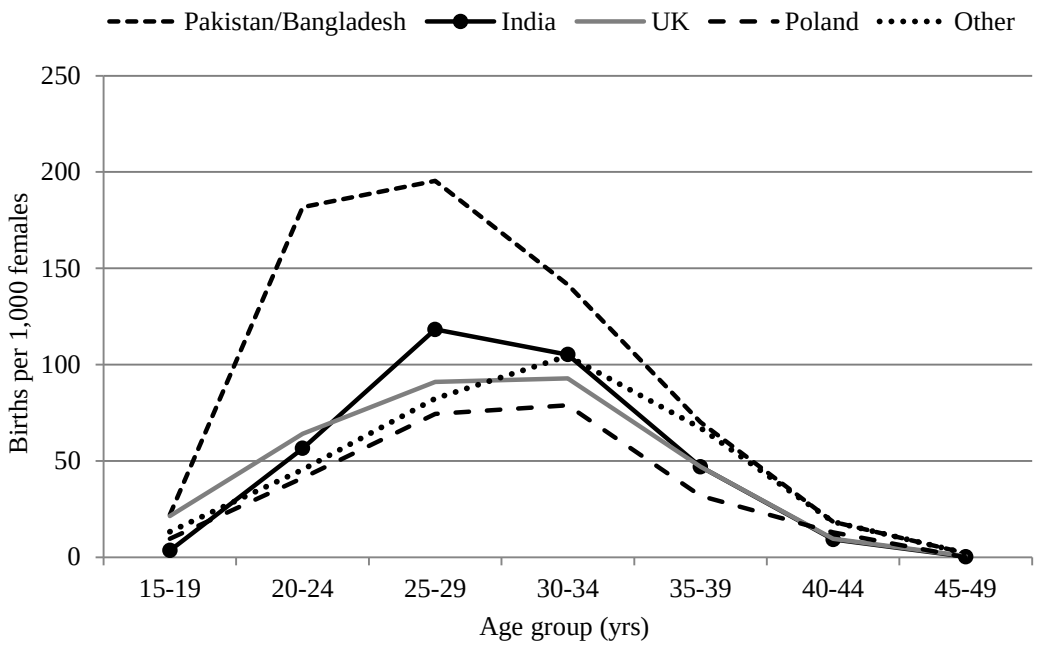

Figure 2: UK age-specific fertility by mother's country of birth, 1997-2010

In Figure 3, ASFRs are presented by country of birth for 2004-2010, focusing in detail on the more recent period. These estimates are based on smaller sample sizes than those for the whole period, shown in Figure 2. Here, the objective is to investigate whether there are any major changes in the fertility profiles across the two periods. For all groups, no large differences are found. Small differences are found with (i) a slight decrease in age-specific fertility at ages 25-29 years for Pakistani and Bangladeshi females; (ii) a slight increase in age-specific fertility at ages 25-29, 35-39 and 40-44 years for Indian females; and, (iii) a very slight increase in age-specific fertility at ages 30-34 and 35-39 years for UK-born females. The increasing fertility at older ages could be symptomatic of postponement and, to some extent, subsequent recuperation of fertility (Goldstein et al., 2009).

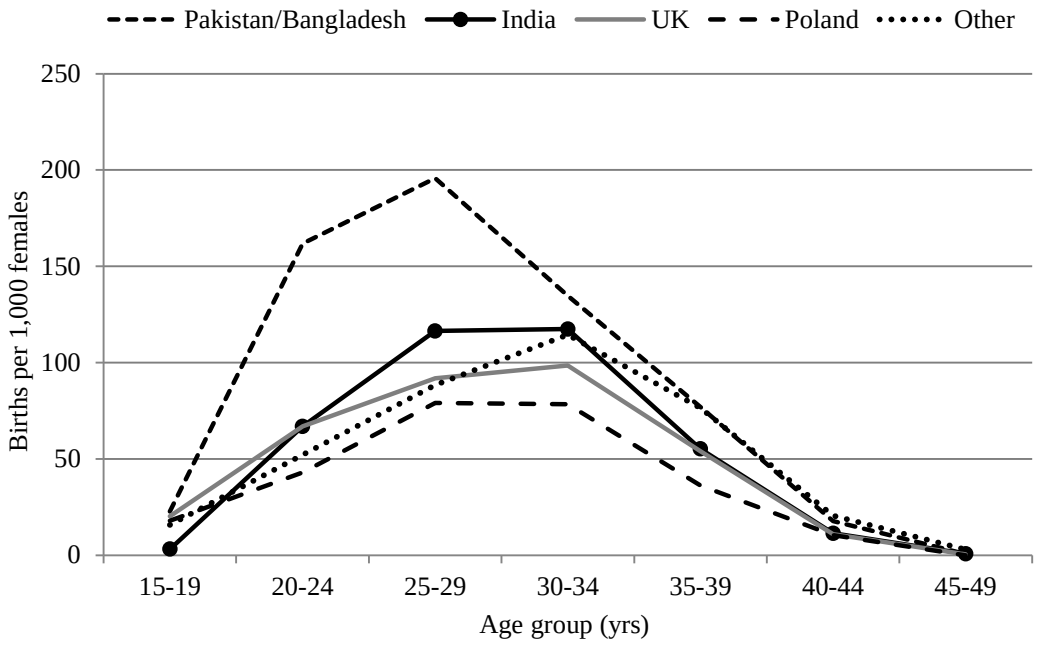

Figure 3: UK age-specific fertility by mother's country of birth, 2004-2010

For the Polish females, 2004-2010 represents a period in which large-scale immigration to the UK occurred. However, no differences are found between Figures 2 and 3 for the Polish group, suggesting that there does not seem to be evidence of fertility increasing in this period. However, for all groups, Figures 2 and 3 provide informative estimates of fertility in different time periods by country of birth, but we do not yet distinguish whether births occurred prior to, or after, migration. In Sections 4.3 and 4.4 below, the timing of childbearing and migration are considered in more detail.

4.3 CHILDLESSNESS AT ARRIVAL

In this section, variables relating to year of arrival to the UK are used to disentangle the ordering of events for childbearing and migration amongst recent migrants. In doing so, we consider the extent of childlessness amongst recent migrants to the UK, which is useful for addressing the disruption and interrelation of events hypotheses.

In order to measure observed childlessness at arrival, it is necessary to further restrict the sample used. Firstly, the sample is restricted on the basis of age at arrival, focusing on ages 15-39 years at arrival to allow for subsequent childbearing to take place after arrival. Secondly, recent migrants are defined as individuals who arrived

within the past five years prior to the survey date and so have only been resident in the UK for up to five years, with arrivals in the 1996-2010 period covered. The analyses of observed childlessness are also based on children aged 0-14 years living with their mother, since those aged 15 years and above are more likely to no longer be living with their parents. Thus, the measure of observed childlessness is informative with regard to the proportions of migrant females from different countries of birth that did not have any children aged 0-14 years living with them at arrival, and likewise, those migrants that did move with their families. The findings from this analysis are presented in Figure 4 by age group at arrival for key country of birth groupings.

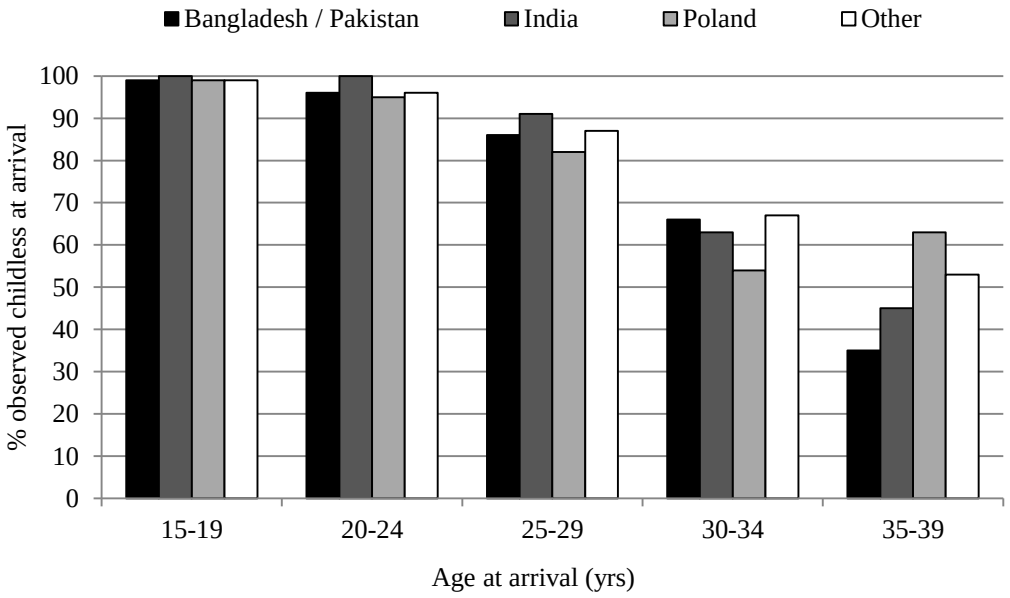

Figure 4: Percentages arriving without children, for females aged between 15-39 years at arrival who arrived up to five years prior to the survey date, between 1996-2010, by country of birth

The proportions of females who are childless at arrival is very high for all groups arriving to the UK at ages 15-19 and 20-24 years, with almost 100% and over 90% childless amongst these age groups. For Indian females arriving to the UK at ages 25-29 years, this proportion remains high at over 90%.

This could reflect the postponement of childbearing in anticipation of migration even in the late twenties amongst Indian females, or alternatively delayed childbearing associated with migration for other reasons, such as the pursuit of education (e.g. Berrington, 2004), in line with the mobility hypothesis. For Indian females arriving at

ages 30-34 years and 35-39 years, the postponement of childbearing is less common with just over 60% and 50% childless at arrival.

For Pakistani and Bangladeshi females, the proportions observed as childless also decrease with increasing age at arrival, as for the Indian females, but at all ages except for 30-34 years the proportions are lower than those found for the Indian females. This is particularly pronounced for those arriving at ages 35-39 years, with just over one third of the Pakistani and Bangladeshi group arriving to the UK without children. A slightly different pattern is found for Polish-born females where the proportion who arrive childless decreases with age up until age 35 but subsequently increases. Among those aged 35-39 years at arrival, just over 60% are childless, suggesting that some Polish females in their late thirties who migrate to the UK leave their children at the place of origin. These findings are consistent with those from qualitative research on Polish migrants in the UK (White, 2011).

4.4 BIRTHS AFTER ARRIVAL

In order to investigate further whether those females who arrive childless remain childless or have children following migration, we next analyse births occurring in the UK to these women. This analysis allows us to address the question of how closely related the migration and childbearing events are. It is necessary to further restrict the sample used for this analysis, with only those females who were childless at arrival retained in the sample. In addition to this, we focus on two different duration of residence periods, following the migration event. Firstly, in Figure 5 the sample is restricted to migrants who have been resident in the UK for three years to see whether they have had one or more births within those three years. Thus, only those who arrived between 1998 and 2007 are considered. Secondly, in Figure 6 the sample is restricted to migrants who have been resident in the UK for five years, considering whether they have had one or more births within those five years. In this case, the sample is restricted to arrivals between 1996 and 2005. In both cases, the 30-34 and 35-39 years age groups are omitted to ensure reliability of the estimates.

In Figure 5, we see that for the Bangladeshi and Pakistani females, migration and childbearing appear to be closely related events. Even amongst the 15-19 years at arrival age group, over 40% of those who were childless at arrival have had at least

one birth within three years. This decreases slightly for those arriving aged 20-24 years, and for those aged 25-29 years at arrival, over 50% have a birth within three years. A similar, but less pronounced, pattern is found for Indian born females, with a quarter of those arriving at ages 15-19 years having at least one birth within three years of arrival, with a comparable figure of 20% for those arriving at ages 20-24 years. Over one third of Indian females arriving at ages 25-29 years experience a birth within three years. For the Bangladeshi, Pakistani and Indian born females of all ages, there is strong evidence in support of the interrelation of events hypothesis, as expected for these groups.

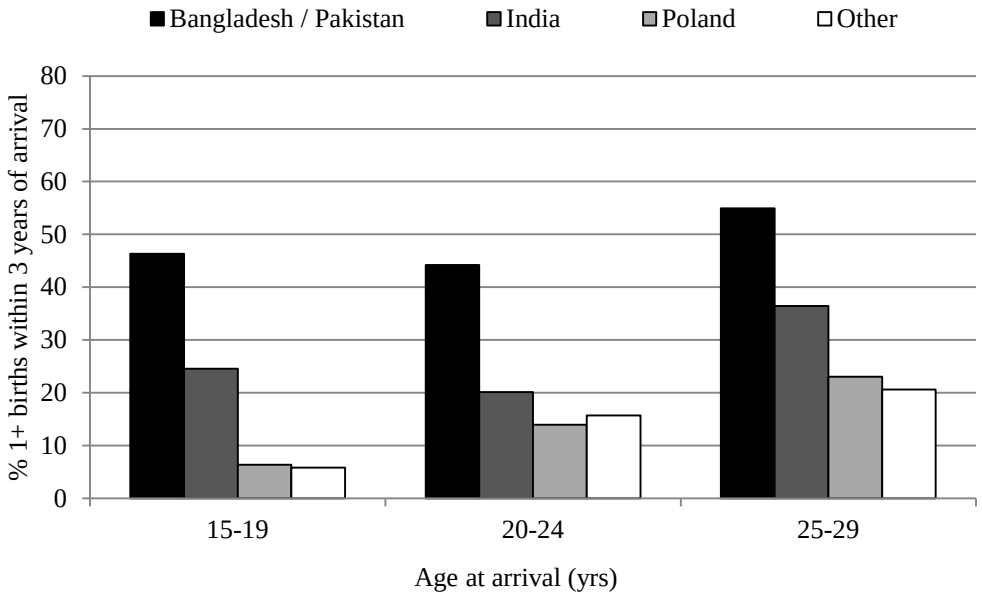

Figure 5: Percentages having one or more births within three years of arrival, by country of birth: Amongst females resident in the UK for three years at survey (arriving between 1998-2007), who arrived to the UK without children

For the Other foreign-born and Polish born groups, the percentages that experience a birth within three years of arrival are much lower in comparison to the Bangladeshi, Pakistani and Indian born groups. Under 10% of those arriving at ages 15-19 years, approximately 15% of those arriving at 20-24 years, and just over 20% of those arriving at ages 25-29 years of both groups experienced a birth within their first three years of arrival. Thus, migration and childbearing are closely related for a small proportion of these groups arriving in their late twenties. These results suggest that migration is more closely associated with childbearing and family formation for

the females born in South Asian countries than it is for those from Poland and Other countries.

Finally, in Figure 6 comparable estimates can be seen for females resident in the UK for five years at the time of survey. For these females, there are two noteworthy points to make. The first is that, when a longer time period is viewed, it is evident that over two thirds of Pakistani and Bangladeshi females experienced one or more births since their arrival, reflecting the high fertility of this group. At younger ages of arrival, this is particularly high in comparison to other groups. The second point is the closing gap between Indian and Polish females. For those aged 15-19 and 25-29 years at arrival, the proportion of Indian females experiencing a birth is approximately 10 percentage points higher than that found for Polish females, which is smaller than that shown in Figure 5. Furthermore, for those aged 20-24 years at arrival, the proportions experiencing a birth within five years are comparable for Polish and Indian females. Thus, there is some timing 'catch-up' between Polish and Indian females over the five year period.

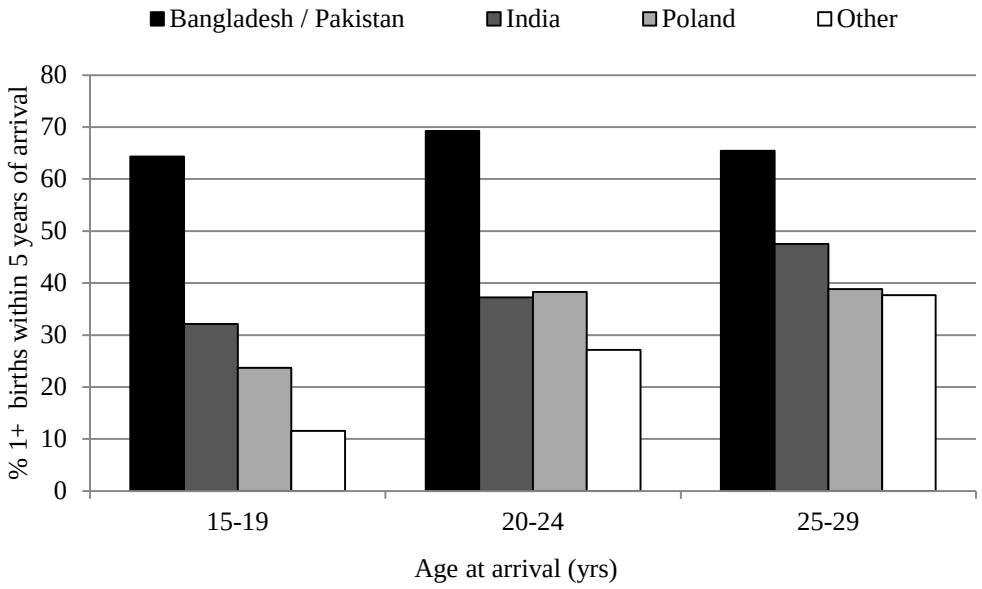

Figure 6: Percentages having one or more births within five years of arrival, by country of birth: Amongst females resident in the UK for five years at survey (arriving between 1996-2005), who arrived to the UK without children

The findings presented in this subsection highlight that migration and fertility are not as closely associated for the Polish group as they are for the South Asian

groups, as we expected. However, with longer durations of residence in the UK, higher proportions of Polish females are experiencing births in comparison to Polish females who have arrived more recently. Since, large-scale immigration to the UK from Poland has been occurring since 2004 onwards, it could be the childbearing of these more established Polish migrants that helps to explain Poland becoming the most common country of birth for foreign-born mothers having live births in the UK in 2010.

4.5 SUMMARY

The proportion of births occurring to foreign-born women has greatly increased in the past decade, with the number of women at childbearing ages increasing as a result of immigration. The estimates produced here provide a contribution to existing knowledge by estimating the fertility patterns of Polish born females and finding those fertility patterns to be characteristically low, as found at origin, in comparison to other foreign-born groups and UK-born women. Meanwhile, the fertility of the foreign-born groups from countries where the large-scale flows of immigration to the UK are more long-standing, such as the South Asian groups focused on here, is higher in comparison to UK-born fertility, as expected from existing knowledge (e.g. Coleman and Dubuc, 2010) and from trends in the countries of origin.

The relationship between migration and fertility for these different migrant groups has been disentangled by using the year of arrival information available in the Labour Force Survey. The evidence in support of the interrelation of events hypothesis seems to be stronger for females born in South Asian countries than for females born in Poland and Other countries outside of the UK. Taking a longer duration of residence perspective reveals some increase in the proportions of Polish females having births in the UK. Whilst there are increasing shares of live births within the UK occurring to foreign-born mothers, the fact that much of this increase is constituted by women with low fertility levels suggests that the influence of the Polish-born group may be to lower the foreign-born TFR, rather than to contribute to the high TFR of the foreign-born population. This might be the case should the numbers of Polish-born females at childbearing ages continue to increase in line with recent trends.

The fertility of the Polish born females has provided an interesting case study because it presents a scenario with migrants arriving from a low fertility origin in contrast to the high fertility sending countries often discussed within the migration and fertility literature. In comparing the evidence for this group and South Asian born females, it is interesting to find that the fertility displayed by both of these groups is characteristic to that found at the origin, which provides support for the socialisation hypothesis. It would be expected that origin effects would be stronger here, given that the focus is on first generation migrants. However, only a short time period and sub-sample are used in this study, with longer term patterns in fertility needing to be considered. In the case of Polish migrants this is not yet possible, given the recent nature of the large scale immigration flows. A further mediating factor in the Polish case is the length of stay in the UK, given that their movement within the EU is relatively easy and their migration often thought to be economically driven and short-term in nature. Nonetheless, it has been possible here to explore the emerging demographic trends amongst this group and to consider how they might contribute to the UK population structure, whilst dealing with the data limitations.

5. DISCUSSION

In the past decade, there has been an increase in immigration to the UK and a substantial increase in the proportion of live births occurring to foreign-born women. Within the same time period, there have been important compositional changes in immigration to the UK, with large flows from Poland, following their accession to the European Union in 2004. Poland has recently appeared amongst the most common foreign countries of birth. Despite the growing importance of foreign-born fertility and these changing compositional patterns, there are little quantitative evidence on the family formation patterns of recent migrants and, as such, limited understanding of the family formation trends.

The UK does not have a population register or social survey that provides both large sample sizes and detailed migration and fertility histories for conducting sophisticated longitudinal analyses. Therefore, the UK Labour Force Survey is used for this research with several years of data pooled together. The estimates presented in this paper provide the first quantitative estimates of the fertility patterns of Polish females living in the UK, offering important insights into the patterns underlying the

high ranking of Polish females in the live birth tables. The fertility of Polish females is shown to be lower than that of the UK-born group, and consistent with Polish fertility at origin. The implications are that: (1) the high number of live births in the UK to Polish females is likely to be attributable to the size of the Polish population, rather than to an increase in fertility of Polish women in the UK; and (2) that if the share of childbearing occurring to Polish-born females continues to increase, their fertility could actually act to lower the high foreign-born average.

Our findings concerning fertility by duration of residence in the UK provide support for the interrelation of events hypothesis operating for female recent migrants from Pakistan, Bangladesh and, to a lesser extent, India. Greater proportions of Polish females are found to bring children to the UK with them, in comparison to the other groups. This provides empirical evidence to suggest that family formation is not closely associated with migration for 'labour migrants' as it is for other types of migrants, whilst family reunification appears to be more important for the Polish group. These patterns fit with migration theory because the network between the UK and Poland is less well established than those between the UK and the South Asian countries. As a result, the migration from Poland is at an earlier stage with family formation occurring at origin and families migrating together, whilst in the South Asian case, first generation migrants are sometimes migrating to form families with second (and later) generation migrants. However, some development of family formation has been exhibited by Polish females who migrated childless and who have been resident in the UK for five years.

The analyses of Polish fertility in the UK could be expanded further. At the time of conducting this research, this is still a new emerging phenomenon and much of the fertility captured in the own child estimates reflects fertility at origin. It would be interesting to see if this pattern continues over time. Furthermore, the analyses of fertility by duration of residence considered births after arrival to only females who were childless at arrival. It would be worthwhile to also investigate higher order births and whether females who migrate with children go on to have more births after arrival to the UK. However, this would require larger sample sizes than those available in the LFS sample used for this research, and more recent data would be needed to consider the importance of longer durations of residence for fertility following arrival. Finally,

there is scope for further research on these issues as more data become available. The 2011 UK census will provide further opportunities for analyses of fertility patterns amongst different migrant groups, particularly given a new question asking the year of arrival.

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