

## **New insights into the fertility patterns of recent Polish migrants in the United Kingdom**

Lorraine Waller<sup>a</sup>, Ann Berrington<sup>b</sup> and James Raymer<sup>c</sup>

<sup>a</sup>Oxford Institute of Social Policy, University of Oxford, Barnett House, 32 Wellington Square, Oxford, OX1 2ER. United Kingdom. E-mail: [lorraine.waller@spi.ox.ac.uk](mailto:lorraine.waller@spi.ox.ac.uk)

<sup>b</sup>ESRC Centre for Population Change and Division of Social Statistics & Demography, University of Southampton, Southampton. SO17 1BJ. United Kingdom.

<sup>c</sup>Australian Demographic and Social Research Institute, Australian National University, Canberra ACT 0200. Australia.

### **Abstract**

There have been important changes in the United Kingdom's (UK) fertility and immigration in the past decade, with a large share contributed by migrants from Poland. A detailed understanding of Polish migrant fertility is lacking, however, because the relevant data are not routinely collected. This paper provides new insights into the fertility patterns of Polish migrants in the UK, and compares these patterns with those of other large immigrant groups, the UK-born population and with patterns in Poland. We use the UK Labour Force Survey with the Own Child(ren) Method, illustrating the potential of survey data for estimating immigrant fertility in settings where other data are unavailable. We first compare the fertility patterns of recent Polish migrants with those of other key recent immigrant groups and the UK-born population; estimating: 1) Age-Specific Fertility Rates (ASFRs), and Total Fertility Rates (TFRs), by country of birth for the 2004-2012 period, 2) The proportions in each immigrant group that arrive without children, and, 3) Of those childless at arrival the proportions of women who go on to have births within a short period of arrival. Next, we compare the ASFRs and TFR for Polish migrant women with those observed in Poland. Our results show that the fertility of Polish migrants is amongst the lowest for all population subgroups in the UK, and that Polish migrants are less likely to have children soon after arrival than other immigrant groups. The findings are consistent with migration not being so closely linked to family formation for Polish migrants as it is for immigrants in the comparison groups. We also find that the fertility patterns of Polish migrants are different to those observed in Poland with a later childbearing profile and a slightly higher TFR.

**Keywords:** Polish migration; Migrant fertility; United Kingdom; Own Child Method

### **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 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, whilst the comparable figure for 2011 is 26% (Office for National Statistics, 2012a). Furthermore, in 2011, the Total Fertility Rate (TFR) of the foreign-born population as a whole was higher (2.29) than that of the UK-born population (1.90), meaning that their increasing shares of childbearing contributed to increases in UK fertility levels. This has been highlighted by Tromans et

al. (2009) who showed that foreign-born women were 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.

In this study, we provide new insights into the fertility patterns of the Polish migrant group in the UK. This is important because, the size of the Polish population had reached 579,000 in 2011, up from 95,000 in 2004 and, since 2010 Poland has featured as the most common country of birth for foreign-born mothers having live births in the UK (Office for National Statistics, 2012a, 2012b, 2004a). 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, despite their growing importance for understanding the wider context of immigrant fertility in the UK. This paucity is partially due to the difficulty in obtaining sufficient data to study such issues. Live births by mother's country of birth are recorded by vital registration, but these data have to be combined with another source to provide a denominator for calculating fertility rates. Furthermore, information on year of arrival to the UK, which is necessary for understanding the timing of births in relation to migration, is not available at vital registration.

The Polish fertility estimates presented here are derived from the UK Labour Force Survey (LFS) using the Own Child(ren) Method (OCM; e.g. Cho et al. 1986), which allows the numerator and denominator to be calculated from the same data source. We further estimate fertility patterns for other large immigrant groups in the UK, originating from the Indian subcontinent, who also feature highly amongst the most common countries of birth of foreign-born mothers having UK births. In doing so, we make comparisons with women whose fertility patterns have typically been the focus of existing research on immigrant fertility in the UK context. These findings situate the fertility of Polish migrants in relation to other key immigrant groups, and thus contribute new evidence to current debates on the interrelationships between immigration and fertility for the UK context, with reference to new immigration flows from a low fertility origin country. Further, we compare the fertility of the Polish immigrant group with comparable estimates of fertility at 'origin' in Poland, to consider whether there are differences between these two groups.

The paper is structured as follows. In Section 2, we review the literature on immigrant fertility in the UK. This is followed in Section 3 by a description of the dataset created from the UK LFS and of the OCM used to estimate fertility rates. The results are presented in Section 4, focusing first on the comparison of overall fertility and the relationship between immigration and fertility timing for the Polish migrant group and other key immigrant groups; to understand how the family formation patterns of Polish migrants compare to those of other groups. In the second part of Section 4, the fertility of the Polish migrant group is compared further against fertility patterns in Poland. We end the paper by discussing our findings in relation to recent debates on the relationship between immigration and fertility.

## **2. Background**

With the accession to the European Union (EU) of the 'EU8'<sup>1</sup> countries in May 2004, there have been large increases to the flows of immigrants, originating from these countries, to the UK. In particular, 71% of immigrants to the UK from these eight countries after 2004 have been from Poland (Office for National Statistics, 2011), notably the largest country amongst the EU8 grouping. Whilst Polish migration to, and from, the UK has fluctuated since peak immigration levels in 2007, estimates for 2011 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, 2012c).

Mirroring recent immigration flows, Poland has featured as the most common country of birth for foreign-born mothers having live births in the UK since 2010 onwards, with Pakistani, Bangladeshi and Indian mothers also featuring highly on this list (Office for National Statistics, 2012a). Polish

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<sup>1</sup> The countries known as the 'EU8' group are: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

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 than that of the UK-born population (e.g. Dubuc, 2012; Coleman and Dubuc, 2010). However, in the Polish case, fertility at origin is low with recorded TFRs over the 2004-2012 period from 1.2 to 1.4 births per woman (Central Statistical Office of Poland, 2013, 2008). This raises the question of whether Poland featuring as the most common country of birth for foreign-born mothers having UK births 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 EU8 countries has been primarily economically driven and consisting of mostly individuals who are single (Office for National Statistics, 2009). This contrasts with the migration of individuals from countries, such as Pakistan, India and Bangladesh, where flows are often associated with family formation related migration (Ballard, 2008; Robinson et al. 2007). Thus, there is a need for analyses of the fertility of Polish females in comparison to these South Asian groups in the UK, contributing to existing literature by examining immigrant fertility amongst immigrants for whom flows are thought to be economically driven and who originate from low-fertility societies.

There has been some research focusing on the family structures and migration experiences of Polish immigrants in the UK. Both White (2011) and Ryan et al.'s (2009) qualitative 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. Furthermore, Waller's (2011) quantitative research with the UK LFS found consistent evidence with this 'reunification' trend, when examining the country of birth and timing of arrival of the partners of Polish immigrants. White (2011) also gives the example of Polish females, with children of late teenage ages and above, migrating to the UK alone without their children. Finally, Marczak (2010) has investigated the fertility intentions of Polish immigrants in the UK. The findings outlined above suggest evidence for family reunification, more so than for family formation related migration, or alternatively for what would appear as 'single' migration for those of older ages with established families. However, further research is needed, with little attention having been paid to the experience of Polish females having births in the UK.

More recently, Zumpe et al. (2012) have published a report on immigrant fertility in the UK, which estimates General Fertility Rates (GFRs) for Polish immigrants. These are estimated for 2007 and 2011, by combining birth registration and survey data to provide numerators and denominators, respectively. The report shows that Poland's GFR is lower than that of females from Pakistan (in both 2011 and 2007) and Bangladesh (only significantly so in 2011), higher than that of UK born women, and comparable to that of females from India. However, as Zumpe et al. (2012) acknowledge, the limitation with GFRs is that they do not account for differential age structures between groups when calculating, and comparing, fertility estimates, and do not provide information on age patterns of fertility. This paper provides estimates of age-specific fertility for the Polish-born, and other immigrant groups, in the UK, and moves beyond this existing research by looking at childbearing after arrival in the UK, according to time of arrival.

Many countries are interested in the impact of immigrant fertility on their population dynamics, with a number of competing hypotheses proposed in the international literature to explain relationships between migration and fertility (see Kulu, 2005, for a review). These include theories covering both quantum (e.g., socialisation, adaptation, assimilation) and tempo (disruption, interrelation of events) effects on fertility outcomes, which have been well investigated across many settings (e.g. Milewski, 2007, 2010; Scott and Stanfors, 2010; Chattopadhyay et al. 2007; Andersson, 2004; Abbasi-Shavazi and McDonald, 2002; Stephen and Bean, 1992; Hertz, 1985; Goldstein and Goldstein, 1981; Zarate and de Zarate, 1975). In the UK context, the data are limited and do not allow a comprehensive testing of these hypotheses. Despite this, there has been some recent progress in understanding immigrant fertility in the UK, particularly with regard to longer term trends. Coleman and Dubuc (2010) and Dubuc (2012) present evidence in support of intergenerational fertility convergence to the UK average when comparing first and second generation migrants from Bangladesh, India and Pakistan. Meanwhile, Wilson (2013) studies different types of fertility convergence using completed fertility of

migrant groups in the UK, finding evidence of convergence to UK-born fertility levels but also differences within migrant groups, dependent on whether comparisons are made within, between or across generations.

Whilst the studies discussed above have focused on longer term relationships between fertility and migration, short-term hypotheses are the most relevant here because we study recent immigrants. These include the interrelation of events hypothesis, whereby migration and family formation are interrelated and as such, fertility after arrival is elevated (e.g. Robards et al. 2012; Toulemon, 2006, 2004; Andersson, 2004); and the disruption hypothesis, whereby there is a temporary depression of fertility due to the process of migrating (e.g. Hervitz, 1985; Goldstein and Goldstein, 1981). It is not possible to directly address these hypotheses here with the data available in the UK context, since we do not have detailed partnership, migration and fertility histories available; and we focus on a group of very recent immigrants for whom fertility patterns should be observed over a longer time period to address whether observed patterns are in fact only tempo distortions or related to longer term trends. Nonetheless, this paper adds to the literature by providing new estimates of recent immigrant fertility, and we use information on migration and birth timing to provide some first attempts at ‘unpacking’ the relationship between the two. The findings highlight the insights that can be gained from using survey data, and increase the evidence base for a better understanding of the processes of fertility in the UK in relation to recent immigration.

### **3. Data and Methods**

#### **3.1 UK Labour Force Survey (LFS)**

The 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 collects on country of birth, nationality and year of entry to the UK. Furthermore, the frequency of the sampling means that relatively recent immigrants are likely to be included in the sample, in addition to immigrants who have been living in the UK for longer periods of time. However, as Gilpin et al. (2006) highlight, the LFS may not capture immigrants who have been resident in the UK for less than six months, or those who are living in communal establishments since it is a household survey. This is not problematic for our research purposes since we are primarily interested in family formation patterns, i.e. amongst those who remain in the UK for longer than six months and who are more likely to be resident in households.

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 (this method is described in Section 3.3 below). 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. Response rates have declined in recent years with a wave one response rate for April-June 2012 of 61%, in comparison to approximately 72-73% for wave one responses in March-May, and June-August, 2004 quarters<sup>2</sup> (Office for National Statistics, 2012d, 2004b, 2004c). 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 2004 through to 2012. Respondents in their fifth wave are dropped from the sample to ensure it is cross-sectional, as

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<sup>2</sup> 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.

they would have been in the wave one sample of the April-June quarter in the previous year. Non-respondents, representing 2.7% 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, 10.1% of individuals are foreign-born, reflecting the different proportions of the population constituted by immigrants across this time period. For example, for those interviewed in 2012, immigrants constitute approximately 12.3% of the general population in comparison to approximately 8.6% for those interviewed in 2004. The data reflect the witnessed increases in the proportion of immigrants in the UK population over this period.

### **3.2 Key variables**

The *countries of birth* focused on in these analyses are Bangladesh, India, Pakistan, Poland and 'Other'. Due to small sample size issues, the Pakistani and Bangladeshi groups are combined together. As outlined above, we focus on these countries because they have typically featured as the most common countries of birth for foreign-born mothers having live births in the UK over the past decade.

*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.

### **3.3 The Own Child Method (OCM)**

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 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 et al. (1986) and more recently, Dubuc (2009). 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, Dubuc (2012), 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. 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 women in the survey. 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 immigrant 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.

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 2004-2012, it is possible to calculate fertility estimates for the 1990-2012 period. However, we focus on the 2004-2012 period here, due to the interest in understanding recent Polish immigrant fertility, with the large inflows from Poland occurring from 2004 onwards. 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 our focus on immigrant 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 immigrants may be leaving their children at home 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.

Childbearing may be accelerated following immigration leading to inflated period measures of fertility (Toulemon, 2006). This would be particularly problematic if estimating immigrant fertility based on births only in the destination country, such as with vital registration data. However, the OCM allows estimation of fertility prior to, and after migration (assuming that children are living with their immigrant mothers at the time of survey) so to some extent deals with this issue (Dubuc, 2009). However, Toulemon (2006) shows that issues remain due to the fact that there is a complex interaction between age at arrival, duration of residence and birth timing. This could be problematic when comparing age-specific fertility amongst immigrant groups whose migration trajectories are quite different. Due to this, we first estimate age-specific fertility for these immigrant groups, and secondly, produce further analyses which examine whether or not they are childless at arrival when taking into account age at arrival, and then examine births following arrival when taking into account both age at arrival and duration of residence.

### **3.4 Sample**

A distinction can be made between the sample of females at childbearing ages at the time of survey, and the sample 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 2004-2012, 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 sufficiently large for these analyses.

The distributions of females of childbearing ages, by country of birth, at the time of survey, shown in Table 1, are informative for understanding the current picture of UK-born and foreign-born childbearing in the UK. Firstly, it can be seen that substantial proportions of the females at ages 20-24, 25-29, 30-34 and 35-39 years are foreign-born, with this peaking at approximately 20% for both the 25-29 and 30-34 age groups. 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 proportions of the populations of females at ages 20-24 and 25-29 years are constituted by Polish females, than by Pakistani and Bangladeshi females. At ages 30-34 years, the proportion of this population constituted by Polish females is comparable to that of both the Pakistani and Bangladeshi and Indian groups. This highlights the relative importance of the recent Polish immigrant group, and of understanding how their fertility patterns compare to these other immigrant groups.

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 2004-2012 period, and therefore in the most extreme case, females aged 57 years at survey in 2012 represent females aged 49 years in 2004. In terms of the actual sample size used in implementing the OCM, 221,246 females aged 15-57 years at the time of survey are analysed. Of these, 192,124 (86% weighted) are UK-born and 29,122 (14% weighted) are foreign-born. Across the 2004-2012 period, 50,789 births and 966,929 woman-years are retro-constructed.

**Table 1: Weighted row percentages (95% CI in parentheses) showing the country of birth distribution of UK females of childbearing ages, 2004-2012.**

Age group	UK	Poland	Pakistan & Bangladesh	India	Other	Total	<i>n</i> *
15-19	93.25 (92.93-93.57)	0.40 (0.32-0.49)	0.44 (0.37-0.54)	0.25 (0.19-0.32)	5.66 (5.37-5.96)	100	26,577
20-24	85.77 (85.29-86.24)	1.84 (1.66-2.03)	1.16 (1.02-1.32)	0.62 (0.52-0.74)	10.61 (10.20-11.04)	100	23,034
25-29	79.67 (79.14-80.20)	3.11 (2.88-3.36)	1.78 (1.61-1.96)	1.73 (1.57-1.92)	13.70 (13.26-14.17)	100	25,297
30-34	79.53 (79.03-80.02)	1.93 (1.76-2.12)	2.03 (1.87-2.21)	1.91 (1.74-2.09)	14.60 (14.17-15.05)	100	27,926
35-39	84.35 (83.92-84.76)	0.74 (0.64-0.85)	1.47 (1.34-1.61)	1.21 (1.09-1.35)	12.23 (11.85-12.61)	100	31,691
40-44	87.28 (86.90-87.65)	0.30 (0.25-0.38)	1.19 (1.07-1.32)	0.99 (0.88-1.11)	10.23 (9.90-10.58)	100	33,541
45-49	88.13 (87.75-88.50)	0.30 (0.25-0.38)	1.19 (1.07-1.33)	1.27 (1.14-1.41)	9.11 (8.78-9.45)	100	31,068
Total	85.44 (85.28-85.61)	1.18 (1.13-1.24)	1.33 (1.28-1.38)	1.15 (1.10-1.20)	10.90 (10.75-11.04)	100	199,134

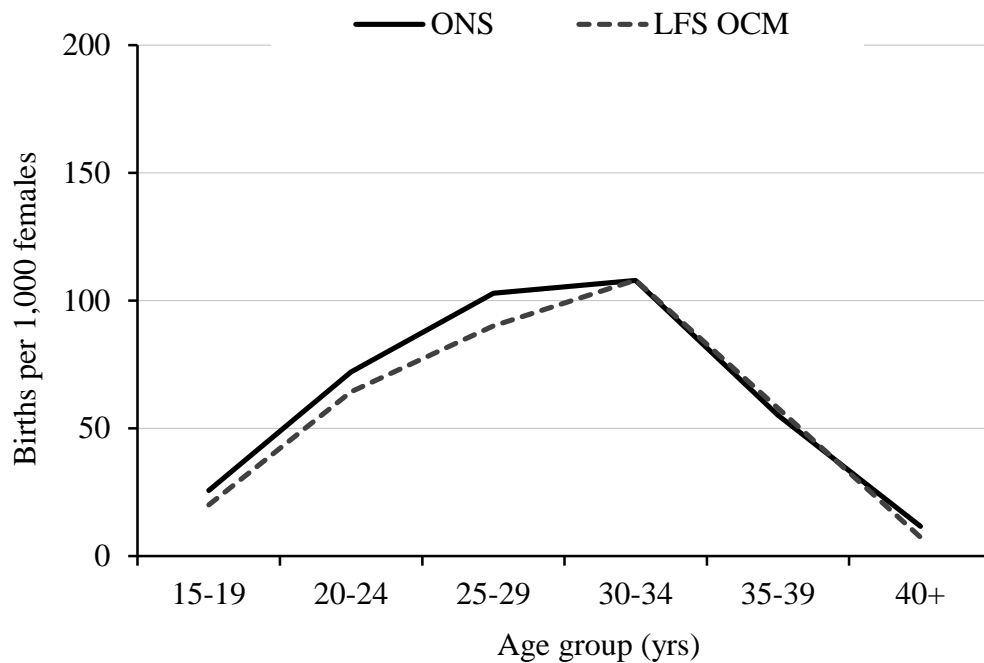
Source: UK LFS, April-June quarters 2004-2012

\*Unweighted sample sizes

## 4. Findings

### 4.1 External Consistency of OCM estimates

In Figure 1, weighted OCM estimates<sup>3</sup> obtained from the LFS for the UK are compared with Age-Specific Fertility Rates (ASFRs), provided by the Office for National Statistics (ONS) for the 2004-2010 period<sup>4</sup>, to assess their validity. The two sets of estimates are very close with the LFS slightly underestimating fertility at younger ages and matching ONS estimates at older ages. However, any observed differences are reasonably small, with the findings providing support for the validity of OCM estimation with the LFS data.



**Fig. 1** Comparison of weighted Own Children Method (OCM) estimates of UK Age-Specific Fertility Rates (ASFRs) obtained with the LFS against Office for National Statistics (ONS) official estimates based on vital registration and population estimates, 2004-2010

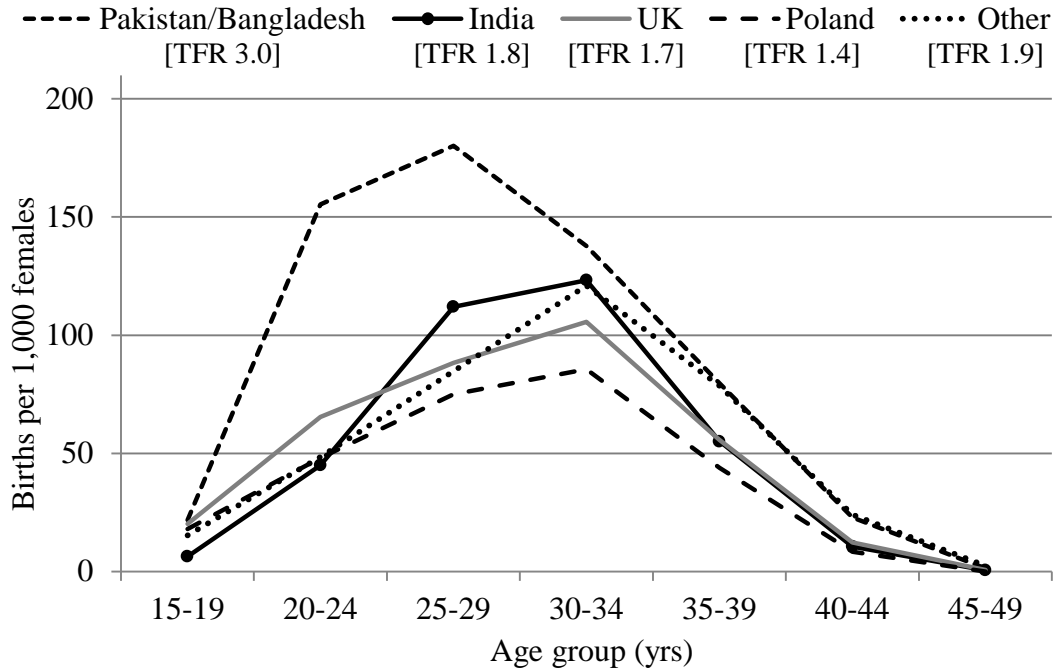
#### 4.2 Fertility estimates by country of birth

Age-specific fertility rates by country of birth for the total 2004-2012 period are shown in Figure 2.

<sup>3</sup> We also conducted our analyses with unweighted LFS data, and found no substantive differences in the findings.

<sup>4</sup> Comparable official age-specific fertility estimates have not been released for 2012 at the time of writing, or for the whole of the UK for 2011. Therefore, we focus on the 2004-2010 time period for this validation exercise.





**Fig. 2** Age-specific fertility rates of females in the UK, 2004-2012, by country of birth

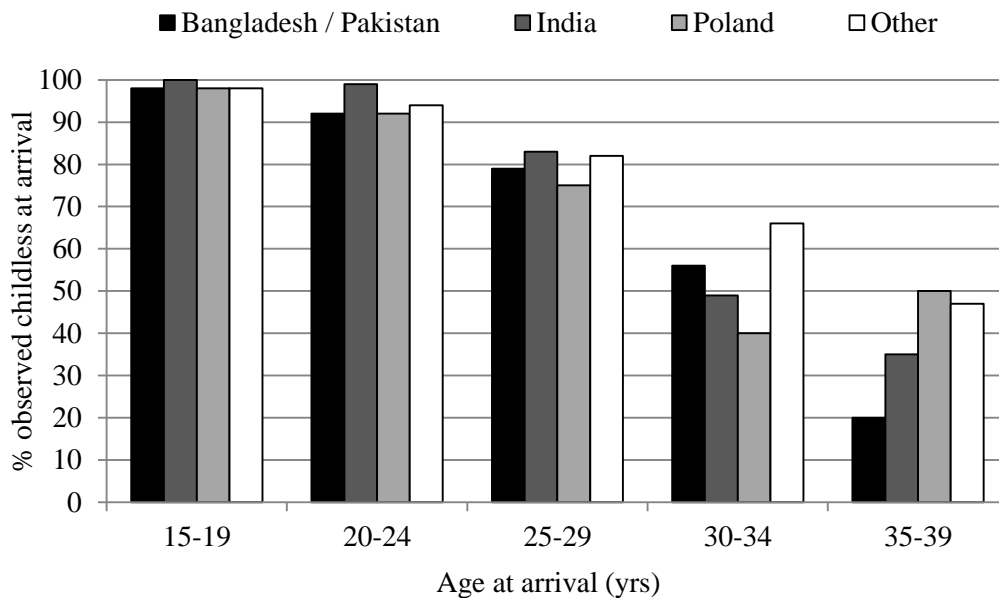
The findings shown in Figure 2 for the South Asian groups are consistent with those seen in previous research (e.g. Dubuc, 2012, Coleman and Dubuc, 2010). Overall, fertility is found to be highest for the Pakistani and Bangladeshi females, as we would expect, with a younger childbearing age profile in comparison to the other groups shown here. The Indian born group is found to have much lower fertility than the Pakistani and Bangladeshi group, but slightly higher fertility than the UK-born group. Whilst Indian born fertility is higher than UK-born fertility overall, this is not found to be the case at ages 15-19 and 20-24 years, with Indian born fertility peaking, and particularly concentrated, at ages 25-29 and 30-34 years. For the UK-born group, a smoother age profile is seen than for the Indian born, with fertility peaking at ages 30-34 years.

The ASFR shown for the Polish group in Figure 2 is especially revealing, with Polish fertility shown to be the lowest of all groups. This highlights the importance of calculating ASFRs, controlling for age structure, in addition to GFRs because GFRs are found to be higher for the Polish born group than the UK-born group (Zumpe et al. 2012), but here Polish fertility is shown to be lower than UK-born fertility. This difference could also be partly explained by the fact that the GFRs calculated by Zumpe et al. (2012) are based on births occurring only in the UK, whilst using the OCM here births prior to migration are also included. However, when calculating GFRs with the OCM data from this sample, the GFR is found to be higher for the Polish group in comparison to the UK-born also (results not shown, available upon request), but the reverse is found when calculating age-specific fertility. The shape of the Polish fertility profile, shown in Figure 2, is identical to that of the UK-born, with relatively late childbearing, though at lower levels than for the UK-born at all ages.

The fertility estimates presented in Figure 2 are informative for understanding the fertility patterns of recent Polish migrants in the UK, in comparison to the UK-born and other recent immigrant groups. However, as discussed above, these patterns could still be affected by tempo effects owing to the strong relationship between migration and birth timings (e.g. Toulemon, 2006). Since the migration trajectories of individuals within and between groups could be quite different with regards to age of arrival to the UK and duration of residence in the UK, our estimates may be affected by these factors. We examine this further in Sections 4.3 and 4.4 below, to see how the childbearing patterns of the Polish migrant group relate to their age at arrival and compare this with the other immigrant groups.

### 4.3 Childlessness at arrival

In this section, variables relating to year and age of arrival to the UK are used to disentangle the ordering of events for childbearing and migration amongst recent immigrants. In order to measure observed childlessness at arrival, it is necessary to further restrict the sample used. 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, and since the numbers arriving at ages above these are quite small. Recent immigrants are defined here as individuals arriving to the UK in the 2004-2012 period, and observed childlessness is measured in the year of arrival. 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 immigrant females from different countries of birth that did not have any children aged 0-14 years living with them at arrival, and likewise, those immigrants 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.



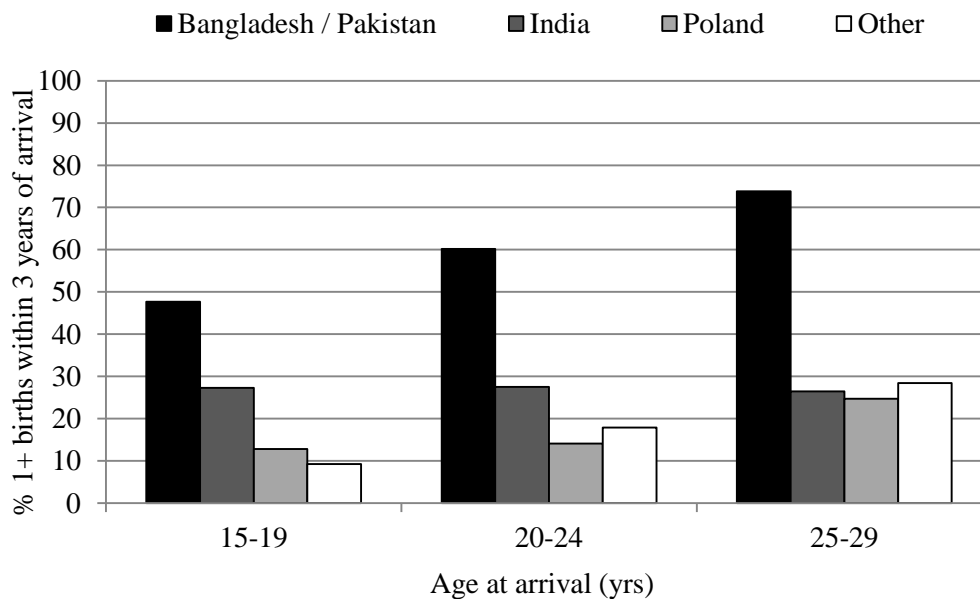
**Fig. 4** Percentages arriving without children, for females aged between 15-39 years at arrival who arrived to the UK between 2004-2012, by country of birth

Figure 4 does not reveal any particularly striking differences between groups. We see that for all groups who arrive in the UK at ages 15-19 and 20-24 years, the proportions that are childless at arrival are very high. Generally speaking, we then see a decline in this proportion for all groups, as age at arrival increases, suggesting that migration at older childbearing ages may be more associated with migrating with an already established family than is migration at younger childbearing ages. For the Other immigrant group, this proportion declines less steeply than for the rest of the groups. Whilst virtually none of those arriving at the youngest ages have children at arrival, between 45-60% of those arriving at ages 30-34 years do. An exception to the general pattern can be seen for the Polish group at ages 35-39, where it appears that childlessness increases for those arriving at these ages. This emphasises the importance of our term ‘observed childlessness’, since it is not necessarily the case that Polish females arriving at ages 35-39 years have fewer children than those arriving at ages 30-34 years, but that fewer arrive in the UK with children. Thus, it could be that older females are leaving older children at home (e.g. White, 2011), or that more childless females are selected into migration at this age due to familial constraints or ties of those who are not childless. It is not possible to tell with this data, since we do not have information on individuals who are not in the household at the time of survey.

#### 4.4 Births after arrival

In this section, we examine the proportions of females within each group who have births within three years of arrival in the UK. The three years of arrival observation period is chosen to detect births that occur fairly soon after the migration event, whilst allowing a sufficient observation period due to the use of arrival and birth data, both measured on an annual scale. The sample is restricted here to those who were observed childless at arrival in Section 4.3, which was defined on the basis of not having any children in the arrival year. Thus, allowing for two years after the arrival year should capture births occurring closely to, but following, the migration event. Conversely, a longer observation period would begin to detect births that are less closely associated with migration, for a more selective sample of immigrants with longer durations of residence in the UK.

To ensure reliability of estimates, we are unable to investigate births occurring to those who were not childless at arrival since the proportions arriving to the UK with children are very low at younger childbearing ages. We focus on those who were aged 15-19, 20-24 and 25-29 years at arrival, since at ages 30-34 years (and above) at arrival the proportions arriving childless diminish greatly. By considering females who are observed to be childless at arrival, we can provide some insight into the relationship between migration and family formation for those women who are thought to have not yet started their childbearing careers at the time of migration. In order to analyse the proportions of these women having at least one birth within three years of arrival, the sample is further restricted to those who have been resident in the UK for at least three years, arriving between 2004-2009. The findings are presented by age group at arrival and country of birth in Figure 5.



**Fig. 5** Percentages having one or more births within three years of arrival, by country of birth: Amongst females resident in the UK for at least three years at time of survey (arrival between 2004-2009), who arrived to the UK without children

In Figure 5, it can be seen that very high proportions of the Bangladeshi and Pakistani born females who arrived childless in the UK go on to have a birth within three years of arrival. At arrival ages 15-19 years, almost half of the Bangladeshi and Pakistani group experience one or more births, rising to 60% for those arriving in their early twenties and almost three quarters of those arriving in their late twenties. For each of the other groups shown, the proportions experiencing a birth within three years of arrival are not so high. Approximately a quarter of Indian born migrants arriving at each of the three age groups shown here have one or more births within three years of arrival. For Polish females

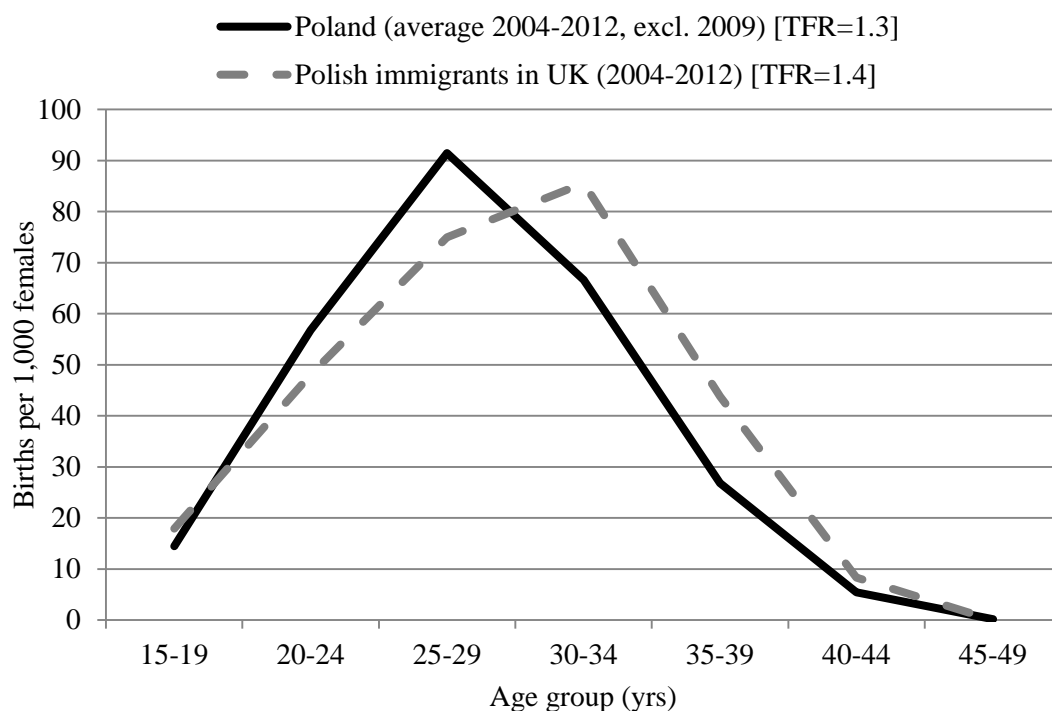
arriving at ages 15-19 and 20-24 years, around 10% have a birth within three years of arrival, in comparison to almost a quarter of those arriving from Poland at ages 25-29 years. Thus, for a relatively small proportion of Polish migrants there is a close link between migration and first birth timing.

When controlling for age at arrival and duration of residence, Figure 5 shows that there are large differences between the Polish migrant group and South Asian migrant groups in terms of the proportion of females having births within three years of migration to the UK. It could be that these findings reflect a tempo effect in the sense that migration is more closely linked with childbearing for the Pakistani and Bangladeshi and Indian groups than it is for the Polish group, and that with longer durations of residence a greater proportion of Polish females would experience a birth, allowing some 'catch-up'. If this is the case, it could be linked with the disruption hypothesis, with delayed childbearing after arrival amongst Polish migrants due to factors associated with economically motivated migration, such as initial insecurities associated with settlement, finding employment and pursuing a career. However, it is equally possible that the different proportions found amongst groups, in Figure 5, are related to their differential fertility patterns, since we do not expect Polish migrant fertility to be at the same level as the fertility of the South Asian migrants, given their different fertility levels in the origin countries. Consideration should be given to the fact that we observe younger ages at arrival here, but know that the fertility profile of the Polish group is relatively old in comparison to the Pakistani and Bangladeshi group, so we could also possibly see some 'catch up' with longer durations due to this age effect. It is quite likely that there is some interplay between both tempo and quantum effects here that we are unable to disentangle with the given data. Nonetheless, we can see that the fertility patterns of the Polish migrant group are found to be quite different to those of more traditional immigrant groups who are also found amongst the most common foreign-born mothers in the UK, suggesting that the Polish group presents a new, interesting, and different, case for UK fertility.

#### **4.5 Comparison with fertility patterns in Poland**

We compare our fertility estimates for Polish migrants in the UK against those of women in Poland over the same, 2004-2012, time period. The findings in previous sections suggest that Polish migrant fertility is relatively low in comparison to the UK-born population and other key immigrant groups. Furthermore, they suggest that smaller proportions of Polish women, who are young and observed childless at arrival, go on to have births shortly after the migration event. However, we might expect this to be the case given the relatively low fertility observed in Poland, and cannot be certain whether the patterns in relation to births soon after migration reflect actual tempo effects or relate to differential fertility patterns of these groups.

An alternative lens is offered by comparing the fertility of Polish migrants in the UK with overall fertility found in Poland, to see whether there are any differences in the fertility patterns of these two groups. This comparison is shown in Figure 6, where we present the ASFR estimates for Polish immigrant women in the UK, alongside average estimates of ASFRs in Poland for the 2004-2012 period (excluding 2009, for which data were unavailable) from the Central Statistical Office of Poland (2013, 2008). Recall that the estimated ASFRs for Polish immigrants are based on the LFS data that included childbearing both prior to and after migration. Therefore, the fertility of women in Poland is compared with the fertility of Polish-born women residing in the UK between 2004-2012.



**Fig. 6** Comparison of ASFRs in Poland (Source: Central Statistical Office of Poland) with weighted OCM estimates of Polish immigrant ASFRs obtained with the LFS, 2004-2012

Figure 6 reveals that the fertility profile of Polish immigrants in the UK is shifted to older ages in comparison to that of the Polish population. This tells us that the Polish migrants are having their children later on average than Polish women in Poland. This difference may be associated with migrating or the characteristics of women who are selected into migration. The TFR for the Polish migrant group is also slightly higher than that found in Poland across the same time period, though the difference is only 0.1. If this does reflect a true, and emerging, difference in the fertility of Polish migrants in comparison to fertility found at ‘origin’, it could be that their fertility will move closer to that of the UK-born population with time. This could be associated with the perception of the UK as offering a more favourable environment for raising a larger family. However, further research is needed, as more data becomes available and with longer periods of time, to determine to what extent such a difference actually exists, and, if it does exist, to find potential explanations. What we can say from these findings is that the fertility of Polish migrants appears to be in no way lower than that of women at origin, and whilst comparable, or slightly higher, in terms of the TFR, there are important underlying differences in age-specific fertility patterns.

#### 4.6 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 relatively low, as found at origin, in comparison to other foreign-born groups and UK-born women. It is likely that this relatively low fertility of Polish migrants is contributing to recently witnessed decreases in the TFR of the foreign-born population in the UK (Office for National Statistics, 2012a; Zumpe et al., 2012).

The evidence presented is also consistent with migration not being as closely associated with fertility timing for Polish migrants as for migrants from South Asian countries, for whom family formation related migration is known to be common (Ballard, 2008; Robinson et al., 2007). This evidence paired with findings from existing research (e.g. Waller, 2011; White, 2011; Ryan et al., 2009), which has

showed that large proportions of Polish migrants are partnered with other Polish migrants, would seem to suggest that family formation related migration is less common in the Polish case, but it is not possible for us to directly address this hypothesis here.

A comparison of fertility amongst Polish migrants with that at origin suggests that childbearing occurs at later ages on average for women who have immigrated to the UK. The TFR for these two groups is also shown to be comparable, or if anything slightly higher in the immigrant case. Further research is needed to shed light on these patterns and to provide possible explanations for any differences found.

## **5. Discussion**

In the past decade, there have been increases in immigration to the UK and 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 inflows from Poland, following their accession to the European Union in 2004. Poland is now second amongst the most common foreign countries of birth and first for the most common countries of foreign-born mothers having UK births. Despite the growing importance of foreign-born fertility and these changing compositional patterns, there is little quantitative evidence on the family formation patterns of recent Polish 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 LFS is used for the research with several years of data pooled together. The estimates presented in this paper provide the first quantitative estimates of the age-specific fertility 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 relatively consistent with Polish fertility at origin. The initial implication is that the high number of live births in the UK to Polish females is largely attributable to the size of the Polish population; but that there may also be some increase in the fertility of Polish migrants in comparison to that found at origin. Furthermore, the evidence we present is consistent with the notion that migration is not as closely linked with birth timing for recent Polish migrants as it is for the South Asian recent migrants also studied here.

Disentangling the relationship between fertility and migration can be extremely difficult, and in this case we provide some first insights into the fertility patterns of recent Polish migrant women, but with many caveats. Firstly, we are limited by the available data and sample sizes. With larger sample sizes than those currently available from UK data, future research could focus on analyses of parity, examining immigrant fertility after arrival at later childbearing ages and estimating births for immigrants who already have children at the time of arrival. The ASFR estimates reveal particularly late childbearing amongst the Polish immigrant women. Secondly, we need to observe Polish immigrants for a longer period of time in the UK (should they remain in the UK). At the time of conducting this research, fertility patterns amongst recent Polish immigrants in the UK are still an emerging phenomena 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, and what the patterns of age-specific fertility are when longer durations of residence can be taken into account.

The 2011 UK census data may provide further insight into these trends, when published, given that the year of arrival to the UK question was asked in the census for the first time in 2011 and that this should, in theory, capture the entire population. However, the census is only collected decennially in the UK, with it questionable whether a 2021 census will even be collected. As for many developed countries, understanding the impact of immigrant fertility for population change is of great importance in the UK, but we do not have Nordic-style registration data to analyse this issue. In this paper, we show the strength of using survey data for providing inter-censal estimates and new insights for recently emerging trends in immigrant fertility, which could also be utilised in other settings where registration type data is unavailable. These findings show that Polish migrant fertility presents a

new and interesting case in the UK context, and that there is much scope, and motivation, for further research in this area.

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