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Fertility and religion in the UK: trends and outlook

by Sylvie Dubuc
University of Oxford, Social Policy and Social Work Department, Barnett House, 32 Welli ngton Square, OX1 2ER Oxford, UK. *sylvie.dubuc@socres.ox.ac.uk*

Introduction

Fertility rates differ significantly between different countries and within countries due to various economic, social, cultural, political, ethnic and potentially religious factors. It has been suggested that religious affiliation, as opposed to non-religious, may support higher fertility rates through norms supporting childbearing and/or rejecting contraception and abortion (e.g. McQuillan, 2004; Lehrer, 2004). How religions contribute to fertility is of considerable debate and interest (McQuillan, 2004). One approach to dissect potential factors and to evaluate how religious and cultural background/geographical origin impact on fertility, is to study fertility rates in a multi-cultural context over time. Cultural plurality results from past and current migration waves and fertility rates are likely to be influenced by fertility characteristics in the country of origin. Therefore, family size preference may be a persistent cultural and/or religious trait in immigrant communities and possibly their descendents. However, economic, social, cultural, and political parameters in the country of settlement may differ and influence childbearing behaviour, presumably more or less depending on the duration of the settlement since migration occurred.

In order to evaluate the impact of different regional cultural backgrounds versus religious belonging on fertility we produced estimates by religious (and non religious) and ethnic groups and country of birth. A number of studies have shown fertility differentials by ethnic groups, including published estimates up to 2001 in the UK, questioning the possibility of converging trends in a near future (Rees, 2007, Large, Gosh and Fry, 2006, Coleman and Smith, 2005). No fertility estimates by religious (or non religious) categories were available and estimates by ethnic groups needed to be updated. We estimated fertility by religious and ethnic groups in the UK over time (1988-2006), using the Labour Force Survey (LFS) data and applying the improved robust Own-Child Method (OCM). Distinction between UK-born and foreign-born mothers served as proxy for settlement history. This work constitutes the first step, necessary to understand the influence of religion and cultural background on fertility in the UK. Results allow

population projections by religion in the UK and address assumptions for future trends, which are discussed, including intergenerational religious transmission.

Methodology

No birth registration by ethnic and religious groups exists to directly determine TFR (defined as the sum of 1 year period Age Specific Fertility rate (ASFR, the number of births by women aged x / Total women of age x)) of a population. The ONS-Longitudinal Study is an available source (based on 5% census sample), but does not allow detailed estimates for small groups. Thus, indirect methods are needed. Commonly the census data is used to estimate the Total Period Fertility Rate (TFR) by ethnic groups (e.g. Rees, 2007; Large, Gosh and Fry, 2006) and has been used, for instance to estimate local fertility.

Inter-census data estimates allowing detecting trends of TFR between ethnic and religious groups remains challenging. There is a clear risk of increasing bias when using the previous census data. Using other sources like the annual Labour Force Survey, which includes variables on ethnicity and religion, has been proposed together with the Own-Child Method (OCM) by Berthoud (2001) to analyse ethnic teenage births in the UK and was later applied by Coleman and Smith (2005) to produce national estimates by ethnic groups up to 2001.

The quarterly annual LFS provides information regarding the religious group of the respondent since 2002 (third quarter). It is a self-defined question, similar to the one introduced for the first time in the 2001 census (see below). The possible categories offered to the survey respondants are as follow: Christian, Muslim, Hindu, Sikh, Jewish, Buddhist, Other religion, No religion, do not apply (DNA), and there is always the possibility not to answer the question. It may be argued that those who answered 'no religion' are not necessarily 'non believers' but simply reject established religions. But the latter may as well have chosen 'other religion', DNA or have not answered the question (further, see discussion). As a simplification here, the terms 'no religion', 'non religious' and 'non believers' are used indistinctively.

Data from the cross sectional Labour Force Survey (LFS), combined with the Own Child Method (Cho, Retherford and Choe, 1986) were used to estimate ASFR and TFR for ethnic and religious

groups. This method amalgamates retrospectively annual pooled surveys (2001-2006), significantly increasing sample size. Importantly, 0-14 years old children are matched to mothers within households allowing reconstructing birth to mother of fertility age (15-49) up to 15 years prior to the survey. Thus and as previously done for ethnicity, fertility by religious affiliation could be retro-constructed to the year 1988 (15 years prior to survey in 2002). In order to improve the accuracy of the previously applied method, mortality rate corrections in a reverse survival table was introduced and instead of matching children within household, they were matched within family unit. Both refinements correct for otherwise possible underestimations of TFR (Dubuc 2009, submitted). No mortality rates are available by religious group (and ethnic groups). Therefore, same mortality rates were assumed for all and death rates by sex and age for the overall UK population (published by the ONS) were applied through the survival table (Dubuc 2009, submitted).

Fertility estimates by main religious groups were produced over the period 1988-2006. Where appropriate, estimates by ethnic and religious groups, and others specific to the UK-born women were produced in order to help understanding the trends in TFR and ASFRs observed by religious groups. Based on the results, fertility assumptions to project population by religious groups in the UK are discussed.

Results

Fertilty and trends by religious affiliation

Figure 1 shows TFR calculated for all women aged 15-49 in the UK (LFS data) and the overall TFR estimates from the ONS (Office for National Statistics)[1], indicating consistency between trends and overall good agreement (largest differences <3%).

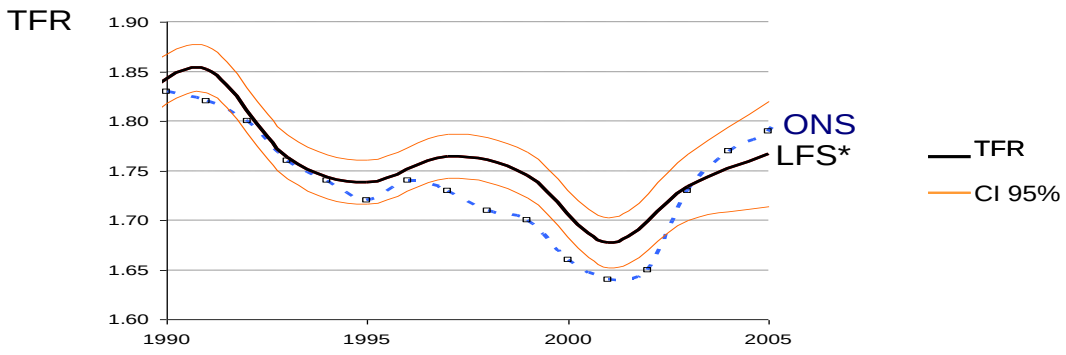

Figure 1: All women 15-49 years old, TFR 1990-2006
(Source: Dubuc 2009, submitted)
* 2 years average

The major religious (or non) groups in the UK in decreasing sample size order are : Christian (61.6% of women aged 15-49 over the period 1988-2006), No religion (9.4%), Muslim (2%), Other including Buddhist (0.9%), Hindu (0.8%), Sikh (0.4%), Jewish (0.3%), and 9.4% were not stated. The Total Period Fertility Rates (TFR) for these groups were estimated for the periods 1988-97 and 1998-2006 (Figure 2). The Hindu and Other groups have the lowest fertility rates over the period 1988-2006. Muslim TFR is the highest. Interestingly, Christian women and women with no religion show similar fertility rates. The slightly but significant rising trend of non-religious mothers above the fertility of the Christian group questions reports of non believers contributing to lower fertility (see discussion). A more detailed trend based on 3 periods calculation was produced for the two major groups, Christian and non religious (Figure 3). Up to the late 1990s the fertility was higher for Christian compared to the non religious women. The continuous fertility decrease of the Christian[2] contrasts with the increase of fertility recorded for the non religious in recent years, surpassing the TFR of the Christians. Noticable also is the recent strong rise in the Jewish fertiliy (Figure 2). If significant this needs to be analysed carefully due to the relatively large margin of error in the TFR estimated for this religious minority group.

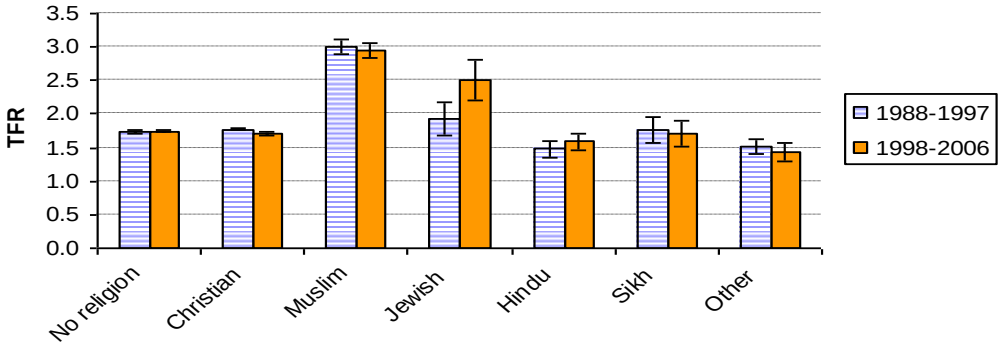

Figure 2: Trend in TFR by non-religious and main religious groups in the UK, 1988-2006*

*95% confidence interval is shown

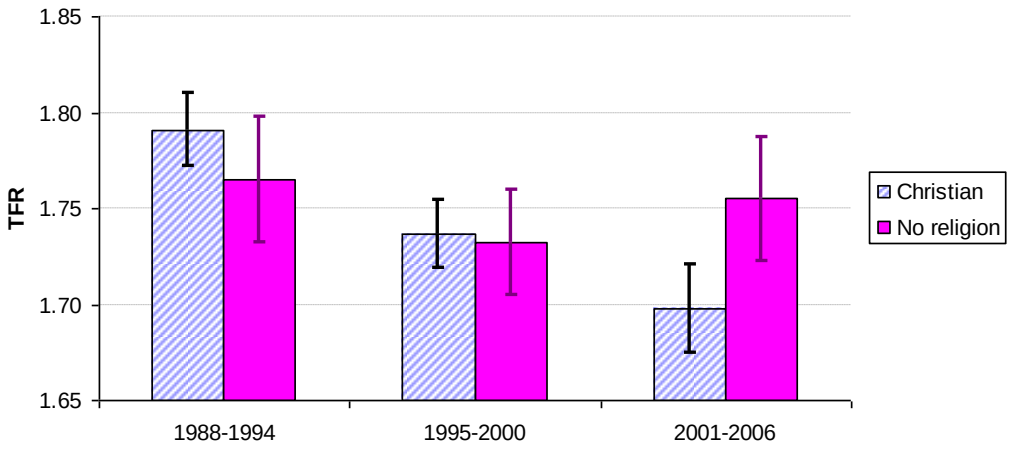

Figure 3: Christian and non-religious women TFR trends, 1988-2006*

*95% confidence interval is shown

Age specific childbearing profiles by religion

Figure 4 compares ASFRs for each group over the period 1988-2006. Not only total level of fertility (TFR) varies across religious categories but also differences in the timing of childbearing exist. Due to sample size limitations for the smaller groups, only average ASFRs for the entire period 1988-2006 are shown. Christian and non believer women show similar fertility patterns. Compared to these two groups Hindu are remarkably less likely to have children in their early 20s. In contrast, women belonging to the Sikh community are more likely to have children in their 20s and fewer later in life. If Muslim women have more children at all ages, their ASFRs distribution follows the same pattern as the Sikh women (relatively more fertile in their 20s compared to other groups). The groups 'Other' (including Buddhist) and even more the Jewish show the most delayed fertility profile. The fertility peak of the Jewish women was in their early 30s and still quite high in their latte 30s and early 40s, in average over 1988-2006 (Figure 3).

Further, ASFRs over the two sub-periods 1988-1997 and 1998-2006 were analysed for the 3 major groups (results would have been unreliable for smaller groups). The ASFRs patterns for both periods are shown in Figure 4 (plain lines). There is evidence of childbearing postponement for women belonging to the Christian group and those with no religion. These two groups comprise about 85% of all women aged 15-49 in 2002-2006 (about 8% chose 'do not apply') and 93% of all stated groups in 2002-2006. Therefore, not surprisingly, this trend is conforming to the general fertility pattern for all women in the UK, showing a recent increase of fertility to women

in their late 30s and early 40s (data not shown). Christian women in their late 20s recorded a higher childbearing level in the first period (1988-1997) but followed by a relatively strong decrease in the recent period. From Figure 4, a tendency to delayed childbearing is also apparent in recent years, if less pronounced for the Muslim women.

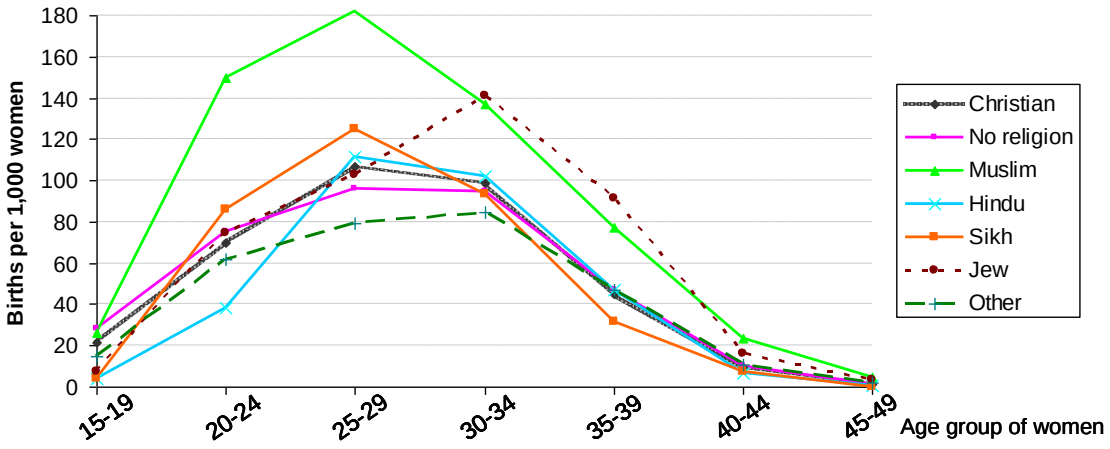

Figure 4. ASFR by non-religious and main religious groups in the UK, 1988-2006*

*95% confidence interval is shown

Change in fertility: the influence of the country of origin versus country of settlement

For women of foreign origin (immigration/ethnicity), especially within the religious minorities, it is reasonable to question if fertility behaviour of the immigrants contrasts with that of the subsequent generation(s) settled in the UK, due to cultural, social, economical and political different context in the host country. ASFRs and TFR of UK-born women by groups were calculated and compared to the estimates of the whole group (Figure 5). This investigation was limited to the main 3 groups due to small numbers. Figure 5 shows the ASFRs profiles of Christian, Muslim and non religious women (all) compared to those born in the UK for these groups. Christian ASFRs patterns are similar, irrespective of place of birth (UK or non UK). Whether immigrant or not, the profile remains the same and the trend over time shows the same childbearing postponement effect, with less children for women below 30 years and an increase of the number of children to women in their late 30s and early 40s (35 to 45 years old).

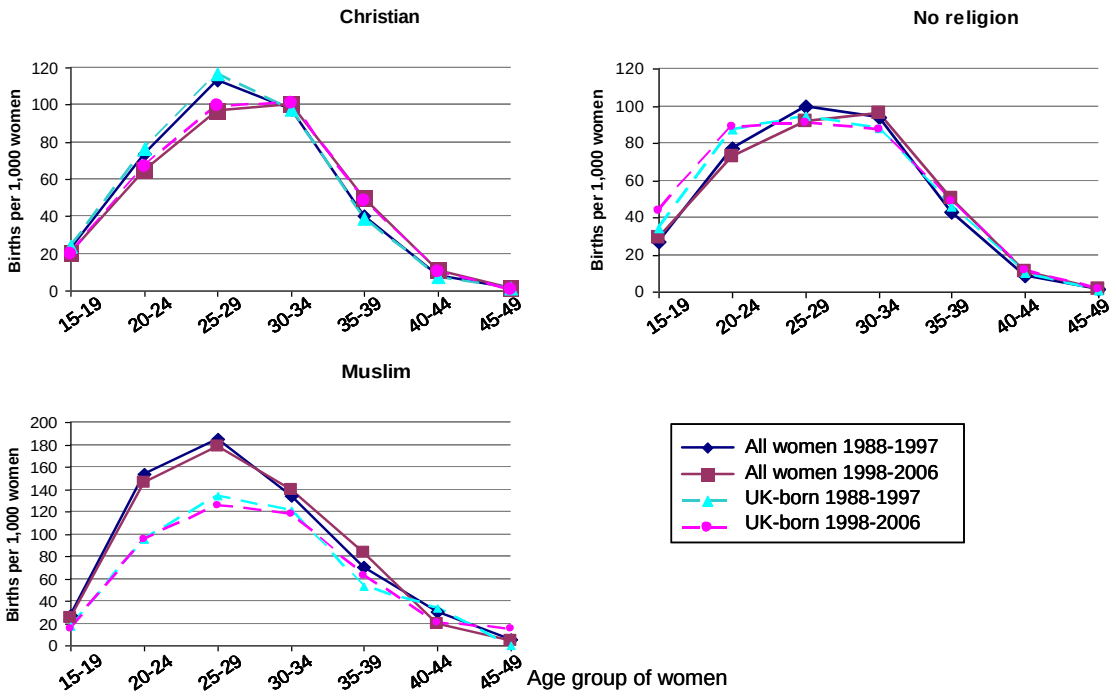

Figure 5. ASFRs of UK-born and all women: Christian, Muslim and No religion groups

This postponement effect is also apparent for the women with no religion as a whole. When considering women born in the UK versus non UK born, the patterns and trends are slightly different. Here, early childbearing (before 25 years old) is more frequent for UK born, compensating for a lower level of fertility of women between 25 and 35 years. The number of children to older women has risen in the recent period for the non believers, UK born or not. Fertility of UK-born Muslim is much lower than non UK born, especially for women below 30 years old, as evident when comparing all Muslim to UK born Muslim women. The rise in the number of children per 1,000 Muslim UK-born women in their late 30s in recent years (1998-2006) is echoed in the trend for the whole group.

Most non Christian in the UK belongs to minority ethnic groups. Further, one particular religious group may be defined by a variety of ethnicity and some parallels may exist between fertility by ethnic and religious groups. For instance, Bangladeshi and Pakistani women (92% Muslim) represented nearly 57% of the total Muslim women of 15-49 years between 2002 and 2006 (Figure 6) and were recording the highest fertility rates of all ethnic groups in the UK (Dubuc, 2009, submitted). Therefore the fertility trend of these two ethnic groups plays an important role

in explaining the level of fertility of the whole religious group. However, the weight of other less fertile ethnic groups (Figure 6) contributes to lower the TFR of the whole Muslim group.

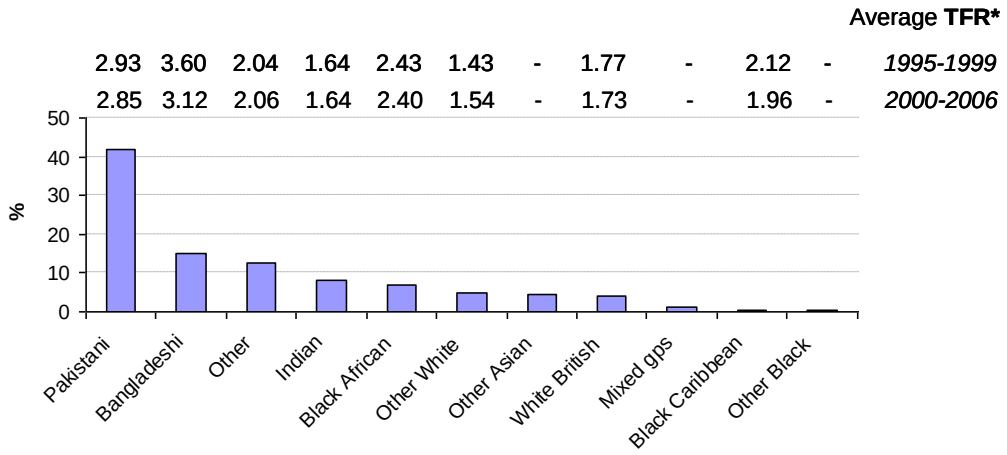

Figure 6. Composition of Muslim women aged 15-49 by ethnicity (2002-2006) and TFR by ethnic groups (1994-2006) in the UK.

**TFR by ethnic group, values shown where available (Source: Dubuc, 2008; Dubuc, 2009 submitted)*

Looking from the fertility by ethnicity point of view, the striking differences in TFR between three ethnic groups from the Indian subcontinent, the Indian, Pakistani and Bangladeshi (Figure 6), raise important questions about the causes of these differences. Indeed, the Indian fertility decrease, below the level recorded by the White British, contrasts with the still relatively high fertility (despite decreasing) of the Pakistani and Bangladeshi women. One obvious difference between those countries is the majority religions. Changes in the TFR between the period 1987-1997 and 1998 -2006 for all Muslims were compared to estimates calculated for Muslim women belonging to the Indian ethnic group, as well as the TFR for the Hindu and Sikh belonging to the Indian group (Figure 4). A significant drop in TFR for the Indian Muslims compared to all Muslims (table 1) strongly suggests that in recent years, being of Indian background (ethnicity) was more important to explain fertility than being Muslim. However, ethnicity *per se* may not be the (only) cause for the decreasing TFR for Indian Muslims in the UK (see discussion).

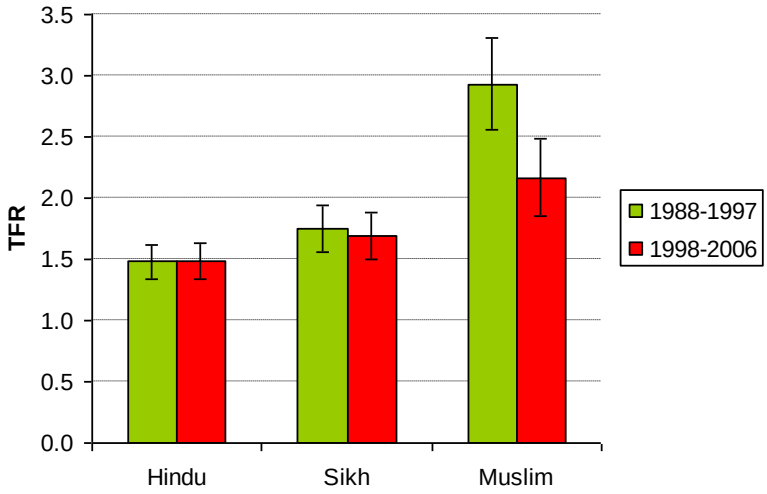

Figure 7: Average period TFR for Indian ethnic group by religious denomination*
*Only the main religious groups are represented

Table 1: Comparison of TFR for All Muslim with Indian Muslim, 1988-2006

Period	All Muslim	Indian Muslim
1988-1997	3.1	2.9
1998-2006	3.0	2.2

Discussion

Religious belonging: belief or cultural identity

'What is your religion, even if you are not currently practicing?' was the question on religion asked in the LFS (since 2002), thus no distinction was made between a sense of religious belonging and those who actively practice a religion. Interpretation of the religious groups first defined in the 2001 census in Great Britain ('What is your religion?') has generated an important debate in the UK (see for example Graham and Waterman, 2007) and remains challenging. Indeed, part of the difficulty is due to the meaning individuals would give to 'belonging to a religious group'; if part of the respondents may signify practicing a particular religion for others it might merely be a sense of cultural background they belong to. However, in the latter case the individual still refers to a particular religion as providing values, some form of moral guidance and cultural norms at least. Otherwise they would have probably selected 'no religion' or even not answered the question. Therefore, and despite the ambiguity mentioned above, it remains

meaningful to analyse fertility by religious groups (even if it means loose affiliation for some) as defined in the LFS, to question the possible impact of religious belonging on fertility. Furthermore, comparing demographic characteristics of the LFS respondents from various religious affiliations with those who choose 'no religion', clearly distancing themselves from any religion, provide us with valuable data to analyse the impact of religion versus no religion on fertility. It may further be discussed what 'no religion' exactly means. Obviously, atheists and agnostics will belong to this group. In addition, it might also partly count for people with some kind of non established religious or spiritual beliefs. However in the latter case respondents probably would have been inclined to choose 'Other religion', 'Do not apply' or even have chosen not to answer the question.

The rise in fertility of the non religious women

Fertility of women with no religion is similar to the Christian group and has risen above the latter in recent years. This result does not support other findings showing very low TFR to non believers. For example in Austria, Gougon et al. (2006) find a TFR of 1.12 for the female population aged 15-49 in 1981, decreasing to 1.04 in 1991 and to 0.86 in 2001, compared to 1.7 and 1.32 for the catholic group (majority religion in Austria) in 1981 and 2001, respectively. The level as well as the trend observed here is inconsistent with findings in Austria[3]. Further, Kaufman (2007) using time series based on 10 European countries observes lower fertility for the non religious compared to religious respondents. The author acknowledges bias existing in the data based on number of children to women at the time of the survey, which likely underestimates fertility of the non religious women compared to religious ones (proportionally from older cohort and more likely to have completed their fertility life). However, after controlling for cohort effect and other effects, some fertility differential between religious population and those with no religion persists and was estimated to be around 15-20% in favor of the religious group (Kaufman 2007). Further, Frejka and Westoff (2006) in a comparison of fertility in Europe (in 2000) and the USA found lower fertility for women with no religion compared to Catholic and Protestant. However, European values of fertility in the latter studies are generally higher than those presented by Gougon et al. (2006) for Austria. After controlling for other factors including metropolitan urban location, education and income (all three acknowledged to negatively correlate to fertility) Frejka and Westoff (2006) found that religious belonging was still somewhat influencing fertility.

Not only the Total period fertility rates of non believers and Christian but also the ASFRs patterns are similar (Figure 5). Both groups are showing signs of childbearing postponement in the recent period. However, fertility to younger women (up to early 20s) is somewhat higher for the group with no religion especially when considering the UK-born women only. The combination of relatively high levels of fertility at very young age associated with sign of childbearing postponement suggests the presence of at least two distinct sub-groups of women in term of social (and/or cultural) characteristics among the non believers. Further investigation out of the scope of this paper would be necessary to test this hypothesis.

The very close fertility behavior of the Christian and the non believers tend to dismiss the effect of religion in supporting childbearing. However, it might show that the large majority of respondents defining themselves as Christian are not following the norms and principles recommended by the religious institutions they claim to belong to; In other words this may support a secularization process. Importantly, the higher level and recent rise of the non believers compared to other religious groups in this study, contradicting some previous findings in Europe, suggest that non religious values may support childbearing in the UK.

The apparent rise in fertility of the Jewish women

The board of deputies of British Jews (Vulkan and Graham, 2008) has produced a report on recent population trends among Britain's Strictly Orthodox Jews (estimated between 8 and 12% of the total Jewish population), believed to have higher fertility than the larger Jewish population. Higher fertility of the strictly Orthodox among the Jew population has been previously recognised in the USA (Mott and Abma, 1992). The Strictly Orthodox Jewish population growth since the early 1990s to 2007 in Britain is estimated by Vulkan and Graham (2008) to be 4% per annum and 1/3 of all Jewish children. Interestingly the recent rise in the Jewish fertility (1998-2006 in Figure 2) is concomitant with a rise in numbers of births to strictly Orthodox Jewish estimated by Vulkan and Graham (2008). In the meantime the LFS data shows a decrease in the number of Jewish women aged 15-49. The high fertility level of Britain's Strictly Orthodox Jews probably contributed to the rising trend observed here from LFS data (Figure 3). However, Strictly Orthodox Jews are a modest minority in Britain's Jew population and their especially high and rising fertility might not be sufficient to fully explain the strong increase recorded here.

If the figures estimated by Vulkan and Graham (2008) are correct (especially 1/3 of all Jewish children been of Strictly Orthodox parents), the proportion of Strictly Orthodox Jews is likely to increase within the Jew population. That may in turn sustain the recent recorded fertility level, assuming a high religious intergenerational transmission (and stable migration flows).

Furthermore, if the high and rising fertility of Strictly Orthodox Jews reflects on the trend in TFR of Jewish women observed here (Figure 2), the issue raised by Graham and Waterman (2005) concerning the possible refusal to answer the question on religion (probably in selecting 'Do not apply') by some Jew and especially Orthodox Jew in the Census 2001, might be minimal in the LFS.

The change in fertility of the Muslim women

Muslim women show a relatively high fertility, albeit decreasing (Table 1) and in line with other findings (e.g. Goujon et al. 2006). The decrease in the TFR of Muslims remains however modest compared with other countries; for example, in Austria the TFR of the Muslim group decreased from 2.77 in 1991 to 2.34 in 2001 (Goujon et al. 2006). A difference in the ethnic composition and the duration of settlement of the women concerned may contribute to explain the relatively modest decrease in the fertility of Muslim women in the UK. In average over the period 2002-2006, Pakistani and Bangladeshi women aged between 15 and 49 years old have contributed to nearly 57% of the Muslim group in the UK and their fertility rate, thus decreasing over time, remains relatively high (Figure 6).

Muslim women are still predominantly having children at relatively young age (in their 20s, Figure 5). However, signs of postponement are apparent among UK-born Muslim women in the recent period that impact on the general pattern of ASFRs to Muslim women (Figure 4). The proportion of UK-born Muslim women of fertility age is increasing (20% in 1988-1997, 30% in 1998-2006 and 36% in average in 2002-2006), therefore the TFR of the Muslim group should continue to decrease in the near future, assuming a constant or decreasing level of immigration of Muslim women.

Hindu, Sikh and Muslim Indians

The more pronounced decline in fertility of the Indian Muslim women compared to the whole Muslim group might be linked to the time of arrival of Indian and non Indian Muslim immigrants and the unequal proportion of UK-born women in various ethnic subcategories of Muslim women. Results show that the fertility of the UK-born Muslim women was significantly lower than that of the foreign-born Muslim women. Therefore, a higher proportion of the UK-born women may account for a quicker decline in fertility of the Indian Muslim. Indeed, and despite a lower fertility rate of the latter, the proportion of UK-born Indian Muslim women aged 15-49 (51.5%) was slightly higher than that of their Pakistani counterpart (47.8%) and much higher when compared with UK-born Bangladeshi Muslim women (30.6%) in average over 2002-2006. A more favorable socio-economic profile of the Indian Muslim, especially the so-called 'twice migrants' from East Africa may also account for some differences in the TFR of the Indian Muslim when compared to the mainly Muslim Pakistani and Bangladeshi women groups.

Elements for future fertility trends and population outlook

In order to predict future fertility trends, it is important to consider each group individually. From recent trends, plausible scenarios may be proposed. If the Christian group does not show any sign of fertility increase, the stabilization of its TFR at 1.71 in the recent years allows to expect this trend to continue. Even a slight increase in the near future may occur due to a potential overcompensation of the recent fertility decrease of women in their 20s by higher fertility of women in their 30s and early 40s in the future. Indeed, the recent increase in fertility for all women in the UK (Figure 1), is, at least in part, explained by childbearing postponement (Jefferies, 2008). The ASFRs analysis of the non believers does not allow predicting the likelihood of the recent rise in the fertility to continue in the future. With fertility levels still relatively high, the Muslim group should consolidate its position as first religious minority in the short term. Nonetheless, a generational effect should constrain the expansion of the Muslim population. The much lower fertility of Muslim UK-born women compared to their foreign-born counterparts strongly suggest a much lower fertility level for the all Muslim group in the next decades, unless immigration of Muslim women drastically increases.

The proportion of each religious group depends on migration flows as well as religious beliefs' influence through reproductive life and their transmission to the next generation. Results from the

census of Scotland produced a cross-table of the proportion of people by religious (or no religion) groups by upbringing in a religious background (table 2). Results for the religious minorities are however difficult to interpret due to very small numbers (Christian groups represent 65.09% of the population in Scotland at the time of the census, 27.55% have no religion and all the religious minority groups together represent less than 2% of the population). However, these data suggest that loss in transmission of religious belief across generations is higher for the Christian groups compared to minority religions and of the non-religious. Unfortunately, their results do not specify the proportion of census respondents who were born in the UK. According to Voas and Crockett (2005), the 'secularisation' process is also happening among the religious minorities when considering the transmission of religion from immigrant population to the next, UK-born, generation(s). If the current trend of fertility recorded by the non believers in the next decade remains, this group is likely to increase significantly in the near future, both by natural increase and loss of religious belief in the UK population.

Table 2. Proportion of non believers by religion of upbringing

Religion of upbringing	**% with no current religion**
Christian	
Church of Scotland	14
Roman Catholic	10
Other Christian	23
Muslim	2
Hindu	5
Sikh	4
Jewish	10
Buddhist	21
Other Religion	16
No religion	92
Not answered	11

Source: Census of Scotland, Analysis of religion in the 2001 census: Summary Report. http://www.scotland.gov.uk/Publications/2005/02/20757/53570, data from Table 1.4.

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[1] Data from the ONS are using births registration and women mid-year estimates by age.
[2] A more detailed two years average trend was also produced for the Christian group (not reliable for the other groups) showing the major decrease occurring in 2001-2002 (1.689) followed by a stabilization of the TFR at 1.71 in the last 4 years.
[3] The TFR for all women in Austria is 1.67 (1981), 1.51 (1991) and 1.33 (2001).