

WHAT HAPPENS WHEN INTERNATIONAL MIGRANTS SETTLE? ETHNIC GROUP POPULATION TRENDS AND PROJECTIONS FOR UK LOCAL AREAS

**Phil Rees, Pia Wohland, Paul Norman
and Peter Boden** School of Geography, University of Leeds

The ethnic make-up of the UK's population has changed significantly over recent decades. Groups outside the White British majority are increasing in size and share. For the most recent period, the UK Census 2001 documents a steep increase in the Black, Asian and Minority Ethnic (BAME) groups. In Great Britain, these groups grew by 53% between 1991 and 2001, from 3.0 million to 4.6 million. In 2001 the percentage of BAME groups in the UK's total population was 7.9% (ONS, 2001), up from 5.5% in 1991 (Rees and Butt, 2004). In some urban areas the share of ethnic minority groups exceeded 50% in 2001 (authors' calculation).

This growth is driven by all the demographic components: immigration balanced by emigration, differences among ethnic groups in fertility levels and varying mortality experiences. Important spatial re-distribution of the population is also taking place through internal migration. The composition of the population is also changing through the birth of children of mixed ethnic origins.

The main aims of the research reported here were to understand: (i) the demographic changes that the UK's ethnic populations are likely to experience to mid 21st century; (ii) the impact that international and internal migration will have on the size and ethnic composition of the UK population; (iii) the role that differences in fertility and fertile age concentration between the UK's ethnic groups play in shaping future trends; (iv) the role that mortality differences between ethnic groups play in the changing demography of the UK populations; and (v) the way in which the ethnic diversity of UK's national and local populations is likely to change in the future.

To achieve our research aims, we constructed a model with an accompanying database for projecting the ethnic group populations of UK local areas and to explore alternative futures. To carry out the projections we made estimates of: (i) ethnic group fertility using alternative

data sources; (ii) ethnic group mortality through combining information on local mortality and ethnic long-term limiting illness; (iii) international migration for local areas by using census, survey and administrative data to produce new estimates of local immigration; and (iv) internal migration into and out of local areas for ethnic groups using census and register data.

We now briefly describe how we estimated the components of change; we highlight the most important model features and we give a short overview of the most important results. A detailed account of the project can be found in Wohland *et al.* (2010).

Key findings

- The UK in 2051 will be a more diverse society than in 2001 and this diversity will have spread to many more parts of the country beyond urban areas where ethnic minorities are now concentrated.
- The ethnic composition of the UK will change substantially over the period to 2051. All our projections predict an increase in the share of ethnic minority groups in the overall population.
- Ethnic minorities will shift out of the most deprived local authorities and will move into the least deprived local authorities.
- Population ageing will take place across all ethnic groups, but to varying extents. International migration will slow down population ageing, but cannot stop the process.
- Applying ethnic-specific intensities in our model does not affect UK total population numbers projected, but does significantly affect ethnic group and local area projection outcomes. Local area populations would be

under- or overestimated if applying the same intensities to all groups.

- When we project using emigration rates rather than flows, it significantly alters the projection outcomes. The use of emigration rates compute a final population in 2051 which is 9 million lower compared a population projected with emigration flows.

Novel input components

As ethnic group intensities for components of change either do not exist in the UK on the scale needed or in some cases are not produced at all, we estimated all components of change for 16 ethnic groups and 352 local authorities in England together with Wales, Scotland and Northern Ireland. The most reliable estimates can be made for 2001, when the last census took place. However, we extend these estimates to later in the decade, to the 2006-7 or 2007-8 mid-year to mid-year intervals, depending on the component.

Estimates of ethnic group mortality (Rees *et al.*, 2009) show moderate variation between groups. The range in life expectancies between best and worst experience is five years, lower than in other countries where equivalent information is available such as the USA or New Zealand. Model assumptions about mortality are driven by adopting annual percentage decline rates for age-sex-ethnic specific mortality which are converted into improvement rates for the survivorship probabilities used in the model. For the UPTAP projections we adopt a decline rate of 2% per annum, which is much lower than the decline in the last decade, about equivalent to the declines of the past 25 years and much higher than the 1% per annum assumed by National Statistics.

Our fertility rate estimates (Norman *et al.*, 2010) are based on three sources: annual vital statistics, census populations (mothers and children) and labour Force Survey (LFS) data for post-census information on ethnic fertility. The method is calibrated for 1991 and 2001. For 2006-11 the total fertility rate estimates range from 1.47 for the Chinese women to 2.47 for Bangladeshi women, with total fertility rates (TFRs) for White women estimated to be 1.88 and for mixed women 1.74. Asian group fertility is estimated to be higher than Black group fertility.

Our work on international migration has focussed on improving local area estimates of immigration using administrative sources (Boden and Rees, 2010). We combined these with ethnic profiles based on 2001 Census immigration data.

Our internal migration estimates were based on a commissioned table from the 2001 Census which provided counts of total migrants (persons) moving between local authorities in the UK by ethnic group. From this information we computed the total probabilities of out-migration and the total probabilities of out-migration from the 'Rest of the UK' to each local authority. Uniform age profiles by age and sex were applied to these probabilities. After 2000-1 the migration probabilities were factored up or down depending of changes in the rate of out-migration from

local authorities as monitored by the Patient Registration Data System (PRDS).

There is clear evidence in our projections that the internal migration probabilities are driving a significant redistribution of the BAME populations. They are spreading out from their clusters of concentration in 2001 to a wider set of residential locations by mid-century.

The model

To project the UK's future local ethnic populations we designed an innovative *cohort component model*. The key new feature of the model is its bi-regional structure that captures the migration connections between areas and enables simultaneous projection of 355 zone populations. The model handles internal migration through probabilities of out-migration conditional on survival within the country. Such probabilities enable the proper separation of mortality and migration processes. The model design makes possible different configurations of the international migration process as gross flows or rates. We have explored two configurations: treating immigration and emigration as gross flows (the EF model) and treating immigration as gross flows and emigration as a product of emigration rates and populations at risk (the ER model).

The model handles all sixteen ethnic groups recognised in the 2001 Census. The model connects together ethnic groups by generating births of mixed ethnic parentage, using information from the 2001 Census. The model handles explicitly all population components of change: fertility, mortality, immigration, emigration, internal in-migration and internal out-migration for each local area and for each ethnic group population. The model uses single years of age from 0 to 100+, which recognizes the need to know more about the distribution of the population of the very old, as the population ages.

Projection results

Here we briefly present noteworthy projection results, from five alternative scenarios and five reference projections. The different scenarios contrast in their handling of international migration (EF or ER) or in assumptions on fertility trajectory, mortality trajectory and the extent of international migration (Table 1). The reference scenarios tested the impact that various components of change have on the projection results.

Projection	Key assumptions
UPTAP ER/EF	Emigration rates (ER), Emigration flow (EF) mortality, improvement 2% per annum
TREND EF	Aligned to the 2008 based national population projections
BENCHMARK ER/EF	Constant components from 2001 onwards

TABLE 1. ASSUMPTIONS BEHIND PROJECTION SCENARIOS



In the TREND-EF projection, we aligned our projection assumptions as closely as possible to the 2008-based National Population Projections (NPP). The resulting trajectory for the UK population as a whole is comparable to the 2008 NPP. By 2051, the UK population grows to 77.7 million compared with 77.1 million in the NPP. The gap of 0.6 million is an estimate of the aggregation effect in projection, being due to the difference between projecting four home country populations and projecting a large number ($355 \times 16 = 5680$) of local authority ethnic groups.

Our BENCHMARK projections, which assume the status quo of 2001 throughout the 50 year projection period, produced much lower populations than the NPP at 55.1 million (the ER model) and 63.0 million (the EF model) in 2051. The gaps of 20.0 and 14.1 million people demonstrate the dramatic demographic shift in the 2000s, that is, the combined impact in the 2001-2009 period of lower mortality (gains of 2.1 years in male life expectancy and 1.5 years in female life expectancy for the UK from 2000 to 2007), higher fertility (gains of 0.33 of a child in TFR for the UK between 2001 and 2008) and higher net immigration (+154,000 in 2000 and +217,000 in 2007).

The differences between our UPTAP-EF and UPTAP-ER projections demonstrate the impact that a change in the model for emigration can have. Modelling emigration as a fixed flow count rather than a flow produced by applying a fixed rate to a changing population at risk produces total populations in 2051 that differ by 9.1 millions.

All our projections show huge differences in the potential growth of the different ethnic groups. For example, under the TREND-EF projection between 2001 and 2031 the White British group grows by 4%, the White Irish group by 10% and the Black Caribbean group by 31%. These are the low growth groups. The Mixed groups grow between 148 and 249%. The Asian groups increase between 95 and 153%. The Black African group grows by 179%, the Other Black group by 104%, the Chinese group by 202% and the Other Ethnic Group by 350%. The different potential growth projected by the UPTAP projections are shown in Figure 1.

The projected growth of the UPTAP-EF model is very similar to the TREND-EF results described above. The growth patterns for the UPTAP-EF projection are more moderate for many groups. The Mixed UPTAP-ER groups exhibit the most solid increase, highlighting the pronounced contribution of natural change to the UPTAP-ER projection.

As a result of these differences, the ethnic composition of the UK will change substantially over the period to 2051. Under the TREND-EF projection, the White share of the population shrinks from 92 to 79% and the BAME share increases from 8 to 21%. Two groups face loss in share: the White British population share shrinks from 87.1 to 67.1% and the White Irish share shrinks from 2.5 to 2.1%. The Black Caribbean share stays stable at 1.0%. The other BAME groups expand their population shares along with the Other White group share, which grows from 2.5 to 9.9% (the greatest gain). Mixed groups increase their share by 3%, Asian groups by 4.8%, Black groups by 2% and Chinese and Other ethnic groups by 2.6%.

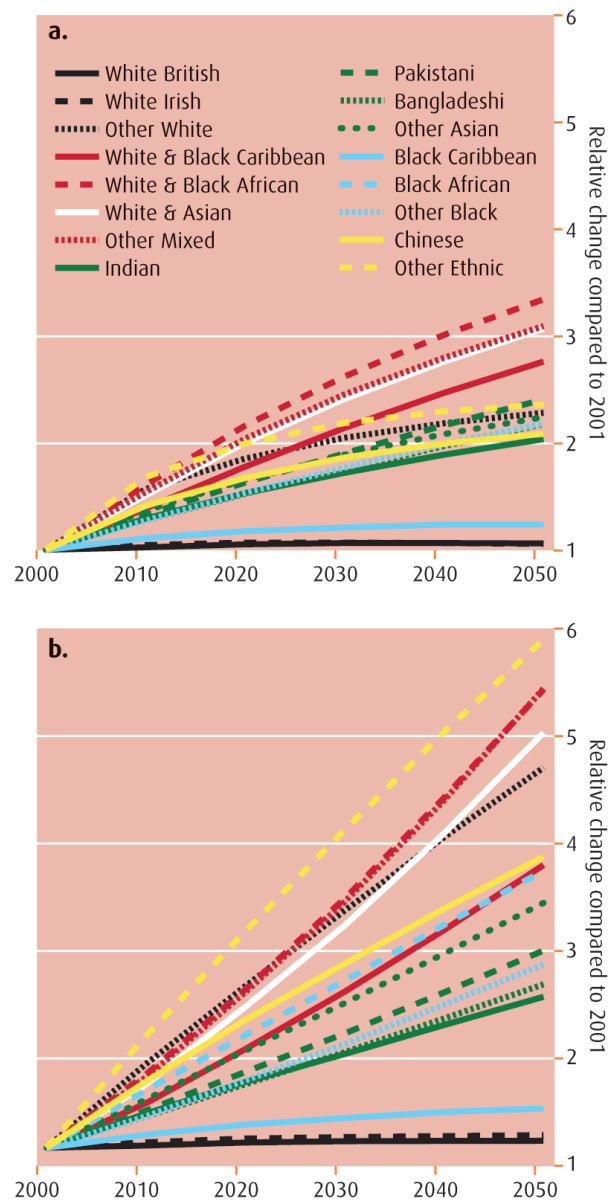


FIGURE 1: PROJECTED UK ETHNIC GROUP POPULATIONS UNDER THE EMIGRATION RATES MODEL (a) AND FLOWS MODEL (b), 2001-2051

All ethnic groups undergo population ageing. The BAME groups in general increase the share of their population that is elderly so that the 2051 share (except the Mixed groups) is comparable with the White British share in 2001. The share of the White British population in 2001 that was 65 or over in age was 17%. The BAME (except Mixed) shares in 2051 range from 15 to 28% (TREND-EF projection). The Mixed groups still have smaller elderly shares at 8-10% in 2051. The White British share has risen from 17 to 27%. This ageing has important implications for social policy. Ageing can be slowed down by international migration, but cannot be held or reversed.

Changes in working age shares vary depending on ethnic group. Only the Mixed groups and the Bangladeshi group increase their working age share. The other groups see falls in the working age share ranging from -1% for the Other Black and Pakistani groups to -13% for Black Caribbean group. There is important regional and within region

variation in the changes in ethnic group population sizes, shares and concentration.

Ethnic minorities will shift out of the most deprived local authorities and will move into the least deprived local authorities. The distribution of ethnic minority populations shifts favourably over the projection horizon, while that of Whites remains stable. The percentage of the Mixed group population in the most deprived quintile of LAs reduces from 26 to 19%, while the percentage in the least deprived quintile increases from 22 to 29%. The corresponding shifts for Asian groups are from 25 to 18% for the most deprived quintile and from 9 to 20% for the least deprived quintile. For Black groups, the most deprived quintile sees a decrease from 54 to 39% while the least deprived quintile sees an increase from 7 to 19%.

There are significant shifts to LAs with lower ethnic minority concentrations by Mixed, Asian and Black populations from LAs with high ethnic concentrations, while the White and Chinese and Other group distributions remain in 2051 as they were in 2001. Ethnic groups will be significantly less segregated from the rest of the population, measured across local authorities, in 2051 than in 2001. The indexes of dissimilarity between each group and the rest of the population fall by a third over the projection period.

Conclusion

The UK in 2051 will be a more diverse society than in 2001 and this diversity will have spread to many more parts of the country beyond the big cities where ethnic minorities are concentrated. Figure 2 contains cartograms that illustrate the change in the Black Caribbean population between 2001 and 2051. The intense concentration in the UK's big metropolitan cities has reduced substantially by mid-century.

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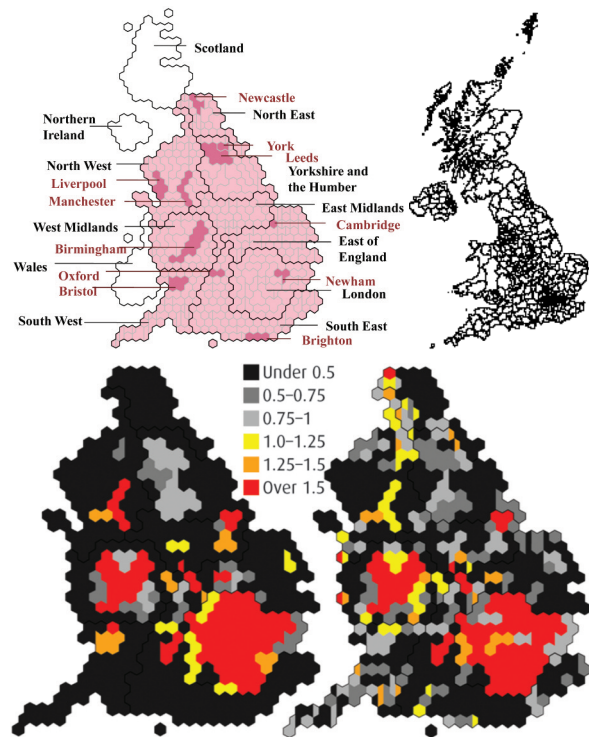


FIGURE 2. ORIENTATION KEY AND LOCATION QUOTIENTS FOR THE BLACK CARIBBEAN GROUP, UPTAP-ER PROJECTION, MID-YEAR 2001 (LEFT) MID-YEAR 2051(RIGHT)

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Contact details of authors

Philip Rees, School of Geography, University of Leeds, Leeds LS2 9JT
Email: p.h.rees@leeds.ac.uk

Pia Wohland, School of Geography, University of Leeds, Leeds LS2 9JT
Email: p.n.wohland@leeds.ac.uk

Paul Norman, School of Geography, University of Leeds, Leeds LS2 9JT
Email: p.d.norman@leeds.ac.uk

Peter Boden, School of Geography, University of Leeds, Leeds LS2 9JT
Email: p.boden@leeds.ac.uk