Projections of the Ethnic Minority populations of the United Kingdom 2006- 2056

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Abstract

The ethnic minority populations in the UK are growing substantially as a consequence of continued immigration, youthful age-structure and in some cases relatively high fertility. Their diverse demographic and socio-economic characteristics have attracted considerable academic and policy attention, especially insofar as those distinctive characteristics have persisted in the generations born in the UK. Although detailed short and medium term projections have been prepared at local and regional level, none has been published at the national level since 1979. This paper provides projections to 2056 and beyond, on a variety of alternative assumptions, of twelve ethnic groups considered separately and together. Given overall net immigration, total fertility, and mortality trends as assumed in the ONS 2008-based Principal Projection, the ethnic minority populations (including the 'Other White') would increase from 13% of the UK population in 2006 to 27 % by 2031 and to 43% by 2056. By the latter date over half the 0-4 age group would be members of the minority populations. Alternative projections assume various lower levels of immigration. In the long run the growth of populations of increasingly complex mixed origins could make the definition and elaboration of ethnic groups as currently understood increasingly difficult, if not meaningless for a growing proportion of the future population. Possible implications of projected changes are discussed.

Purpose

This paper presents projections of the ethnic minority populations of the UK up to 2056. It reviews the data available for such projections and the assumptions adopted in making them. It compares the results with other projections for the UK and for other countries of the developed world. It explores various future scenarios depending upon the size of migration flows.

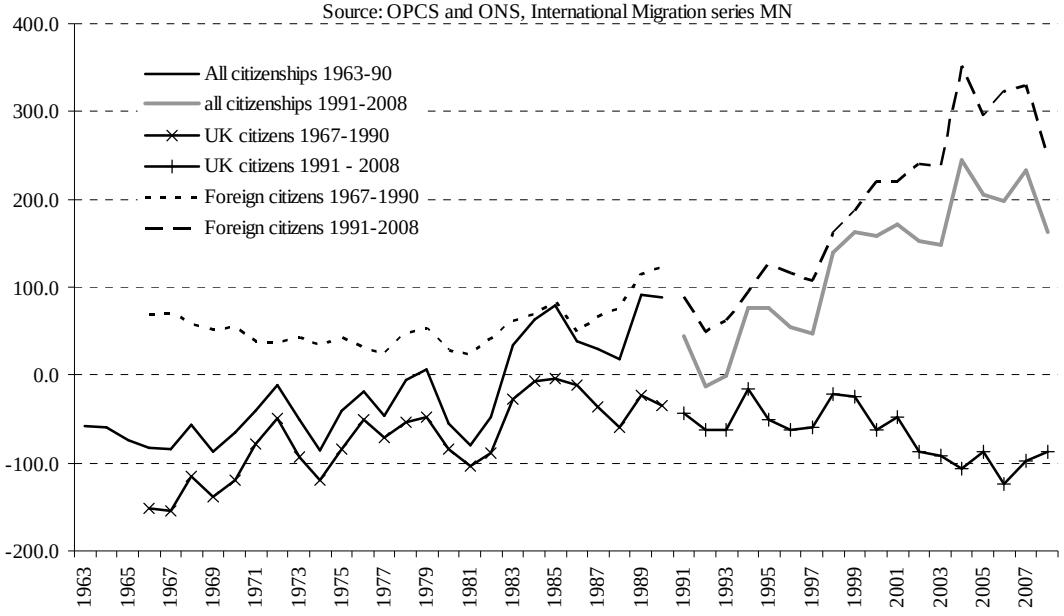
Introduction

For the last decade, immigration has been the major factor determining UK population growth. This is new. For centuries many more people left the British Isles than entered it. By the early 1990s, however, the UK had ceased to be a 'country of emigration'. Inflows increased rapidly after the late 1990s to take net immigration to an historic peak of 245,000 in 2004, the balance between a net inflow of 352,000 foreign citizens and a net outflow of 107,000 UK citizens (Figure 1). The long-term annual net inflow is now assumed by the Office for National Statistics (ONS) to be 180,000, for its latest population (2008-based) population projections. That is the predominant component of the projected increase in UK population from 61.4 million in 2006 to 77.1 million by 2051 and to 85.7 million by 2081 (ONS 2009).

Figure1

Net immigration to the UK , all citizenships and British and Foreign citizenships, 1963 - 2008 (1000s).

Source: OPCS and ONS, International Migration series MN



Immigration is assumed to continue at a high rate in the population projections of most other developed countries and to be a major factor in projected population change. Where national birth rates are also relatively high (e.g. Scandinavia, France) population is projected to increase by between 15% and 25% by mid century (Eurostat 2008a). For those countries where projections distinguishing national or

foreign origin have been made, immigrants and their descendants are projected to comprise a growing proportion of those populations. Such projections have now been published for eight European countries: Austria (Lebhart and Münz 2003); Denmark (Statistics Denmark 2003); Germany (Ulrich 2001, Birg 2002, 2004); Greece (Tsimbos 2008); The Netherlands (Alders 2005); Norway (Statistics Norway 2008); Sweden (Statistics Sweden 2008) and Switzerland (by citizenship only; Office fédéral de la statistique 2006). Analogous projections have been published for the US (race and Hispanic origin, US Census Bureau 2008), Canada (ethno-cultural minorities, Bélanger et al. 2007) and New Zealand (ethnic groups, Statistics New Zealand 2005). In the European projections (see Coleman 2006), immigrants from outside Europe comprise between one third and one half of the initial total foreign-origin population, although that proportion increases over time and eventually predominates in the projections.

Given all these existing projections, it may be asked why additional findings, for the UK only, may be of interest to an international as well as to a domestic readership. The author believes that the novel demographic changes and ethnic transitions explicit in these projections are highly significant. The wider the knowledge of different examples of these transitions and of their variety in the developed world, the better will be our understanding of them. Furthermore, Germany apart, the UK is by far the biggest of the European counties for which such projections have been presented . And it is the only European country for which projections are available using ethnic categories similar to those employed in the US, Canada and New Zealand, as opposed to the 'foreign background' categories derived from registration systems, used in continental European projections. Finally, as well as presenting ethnic projections within the officially projected total population envelope, alternatives are presented not on the customary, and somewhat arbitrary, high and low variants, but on the basis of specific policy and migration futures based on the work of others.

In the UK there is a particular need for new projections. A new policy has developed since 1997 presenting immigration as an economic and social asset to be encouraged, (Spencer 1994, Home Office 1998, Home Office 2002), not as a problem to be restricted as formerly (see, e.g. Home Office 1994). The new policy emphasises the merits of 'diversity' (e.g. Roche, 2000; Blair 2006), formerly regarded as a potential

source of difficulty. The White Papers and other publications presenting the economic advantages of immigration (e.g. Gott et al. 2002) did not consider its impact on the size or composition of the population. This paper explores what those might be.

Previous work in the UK

In 1979 the Office of Population Censuses and Surveys (OPCS, now ONS) provided the first UK projections of 'ethnic minority' populations (Immigrant Statistics Unit 1979). Those projections concerned solely the non-white populations of 'New Commonwealth' (NC) origin, almost entirely of post-war immigrant origin from the former (and the few remaining) colonies and protectorates of the Empire, which had remained within the Commonwealth, from India, Pakistan, the West Indies, Nigeria, Hong Kong and many other places. These are termed 'New Commonwealth' countries to distinguish them from the old Dominions, of predominantly white population, of the 'Old Commonwealth' (OC) which comprises Australia, Canada and Neew Zealand. The ethnic categories now employed, and used in the projections presented here, include a much wider variety of geographical origins, reflecting the diversification of inflows into the UK since that time. The adoption of that new demographic category recognised that the novel demographic, economic and cultural characteristics of those immigrants were likely to persist, and that numbers were increasing rapidly. The projections, which extended only to 1991, slightly under-estimated the actual out-turn. The controversial politician J. Enoch Powell MP, drawing attention to what he saw as the problems arising from non-European immigration (Harrison, 2009, pp 218 – 223), made a number of forecasts of the future size to the end of the century of what was then called the 'coloured' population, some of which were accurate (Hillman 2008, pp 100-103). Since the 1979 exercise, no official projections of the ethnic minority populations have been made.

The Office for National Statistics (ONS) has, however, considered the construction of new projections (Haskey 2002) – and judged it to be necessary, albeit difficult, and possible. Annual estimates have been published of the ethnic minority populations at national and local authority level up to 2007, for England only (Large and Ghosh 2006 a,b). But beyond that updating exercise, as of January 2010 no actual projections are planned. Since the 1976 Race Relations Act, the UK's multicultural policy has defined various ethnic groups in law. Local authorities use ethnic demographic data to

plan for the needs of the different ethnic populations and to monitor ethnic representation and the enforcement of equal opportunity targets. Some have produced their own ethnic projections (e.g. Greater London Authority (Bains 2006) / Bradford City Council (Williamson 2007)). Detailed projections up to 2030 for the UK regions, on somewhat different assumptions and methods, have also been published (Rees 2008), followed recently by exceptionally detailed projections of 16 ethnic groups for 352 local authorities in England, plus Wales, Scotland and Northern Ireland (Rees, Norman, Wohland and Boden 2010). An experimental probabilistic projection (Keilman 2002) up to 2100 (Coleman and Scherbov 2005), was based on the 2001 census and estimates of vital rates and immigration at that time of four major ethnic groups (white, black, Asian and mixed). Conventional cohort-component projections of a slightly modified version of the standard 12 census-defined ethnic groups in the UK, reported in 2007 and 2008 (Coleman, 2007; Coleman and Dubuc 2008), served as a prototype for the analysis presented below.

Ethnic group membership was first asked in official enquiries in the National Dwelling and Housing Survey of 1979 and subsequently in the Labour Force Survey (now absorbed into the Annual Population Survey) from 1981 and the censuses of 1991 and 2001. The use of the categories is now ubiquitous, ethnic group membership being requested on applications ranging from employment and promotion in all public bodies and recruitment to university, to applications for planning permission to erect garden sheds. The categories, which are heterogeneous and pragmatic, are broadly based on (ancestral) national / geographical origin and colour. They have evolved somewhat over time (Coleman and Salt 1996, Bulmer 1996, ONS 2007a) as a result of continued research into their acceptability and utility, and in response to representations by various pressure groups. Ethnic group is self-ascribed. In surveys and the census, respondents are presented with a standard list, with the additional option of writing in any group as they wish. The 16 standard groups are shown in Table 1. For the purposes of these projections, and because the numbers in each group are relatively small, the four ‘mixed’ groups were amalgamated into one, as is often done in official tabulations. The ‘White Irish’ category are combined with the ‘White British’ to form a group representing the ‘native’ or indigenous’ population of the British Isles. Compared with the other groups, their demographic, cultural and

political distinctions and salience are minor. That contraction yields 12 groups in all, as numbered in Table 1.

Individuals are free to choose the same or different group membership in response to successive enquiries. Comparing the 1991 and 2001 censuses using the individual linkage provided by the Longitudinal Study, responses were highly consistent among those describing themselves as White, Chinese and the South Asian groups (over 90%); less so among the Black African and Black Caribbean groups (about 75%) and least among the various 'Other' groups (Platt, Simpson and Akinwale 2005). Part of the problem arises from the different categories used in the two censuses, notably that introduction of a four-fold 'mixed' category in 2001, with which a large number of persons identified who had noted themselves as 'Black Other' or 'Other Asian' in 1991. This is a source of indeterminacy but no obvious solution is apparent and no obvious adjustment seems possible, a conclusion also reached by Rees et al. (2010) for their projections.

Materials and assumptions

Population projections require data on the initial population structures, fertility, mortality and migration of the populations being projected, defensible assumptions about their future levels and trends, and an appropriate projection method. In the UK many of the data needed are not directly available on an ethnic basis (Storkey 1995, Haskey 2002). Without a UK population register, 'foreign origin' categories on the basis of birthplace and nationality of immigrants and their parents cannot be constructed.

Projection model

To prevent confusion with the official projections from the ONS, which will be cited from time to time, the projections presented here from the Oxford Centre for Population Research will be denoted as the 'OXPOP' projections. Each set of the 'OXPOP' projections described below used a conventional cohort-component method (Rowland 2003, Ch 12, 13) with a separate spreadsheet for each of the 12 projected ethnic populations, linked to make a national projection. To minimise the volume of material, projections proceed by five calendar years and five-year age-groups. The model closely replicated the results of the ONS Principal Projection from 2006 to

2081 (which was made on a single calendar year and single year of age basis) given the ONS assumptions on fertility, mortality and migration adjusted to 5-year intervals. The average annual difference over the whole period in total population size between the ONS Principal Projection and this model was 13,991 or 0.019 per cent, and by 2081 was -39,516 (0.05%).

The twelve separate ethnic projections interact by contributing to the 'mixed' population. For simplicity, the original four ONS categories of mixed origin were combined into one heterogeneous 'mixed' category. In each period, births are transferred from each maternal ethnic category to the 'mixed' category according to the distribution of the ethnic origin of recent births against the ethnic origin of their mothers in the 2001 Census of England and Wales (Census Commissioned Table CO 431). Those data relate to England only but are assumed to apply to the UK. The 'Mixed' group therefore accrues not only from its own proper growth from the births to mothers themselves of mixed origin, and from immigration of persons of mixed origin, but also from a proportion of the births to mothers of each of the other, non-mixed, groups. The births attributed to each of the other ethnic groups are reduced *pro rata*. Some infants from every ethnic group are attributed to an ethnic origin different from their mothers'. For the most part these cases are infrequent: under one per cent of births in about one half of possible combinations of origin of mother and child. Two significant exceptions are the 29% of the infants of mothers of 'Mixed origin', and the 50% of the infants of mothers of 'Other White' origin who were described as 'White British'. Those are considered later. Only a multi-state model could deal with all the interactions.

Base populations

There is no official census ethnic group population total for the whole UK. Separate data from the 2001 censuses of England and Wales, Scotland and Northern Ireland were combined to make that an estimate of the 2001 UK ethnic population for the present set of projections (Table 1), updated to 2006. Those censuses differed slightly in the ethnic groups employed: for example four mixed ethnic groups were recognised in England and Wales, only one in Scotland. No 'Other White' or 'Other Black' category was defined in Northern Ireland. 'White British', 'Scottish', 'Irish', and 'Irish Traveller' were combined, making twelve groups in all, as noted above. These

censuses were conducted on a *de facto* basis, corrected for under-enumeration. All the 324,600 additions to the 2001 census total arising from the post-census enquiries (ONS 2004) and other corrections were attributed here to the 'White British' group.

Table 1 Summary Census totals of ethnic groups, United Kingdom 2001 (thousands).

	Ethnic Group	England & Wales	Scotland	Northern Ireland	**United Kingdom**
	All	52042	5062	1685	58789
	White British	45534	374		
	White Irish	642	49		
1	British, Scottish, Irish	46176	4882	1673	52730
2	Other White	1345	78		1423
	All White	47521	4960	1673	54154
	All non-white	4521	102	13	4635
3	All mixed	661	13	3	677
	Mixed White/Asian	189			
	Mixed White/African	79			
	Mixed Caribbean	238			
	Other mixed	156			
4	Black African	480	5	0	485
5	Black Caribbean	564	2	0	566
6	Black Other	96	1	0	98
7	Indian	1037	15	2	1053
8	Pakistani	715	32	1	747
9	Bangladeshi	281	2	0	283
10	Other Asian	241	6	0	248
11	Chinese	227	16	4	247
12	Other	220	10	1	231
	Total	52042	5062	1685	58789

Source of data: ONS (2003) Census 2001 National Report for England and Wales Table S101; Scotland Census Standard Tables T235; Northern Ireland Census tables 20040524.
Note: revised UK post-census total was 59,113,500. The groups used in the projections are numbered here 1 - 12. British, Scottish and Irish have been amalgamated into one group, as have the four 'Mixed' populations.

The OXPOP projections below are based on 2006 using the UK ethnic populations projected from 2001 to 2006, in conjunction with the ONS experimental estimates of ethnic group populations for England only for 2006 (Large and Ghosh 2006). The latter were grossed up to UK level using coefficients relating the England ethnic population totals in the 2001 census to those of Wales, Scotland and Northern Ireland (Table 2). The Quarterly Labour Force Survey (QLFS) weighted estimates for the 2006 UK household population, grossed up to the ONS mid-year population estimate,

could not be used as a population basis for the projection. Some of the QLFS estimates of ethnic group totals were even smaller than those of the 2001 census, or of the ONS 2006 experimental estimates for England alone. Initial levels of fertility, migration and mortality, and projections of their future trends are based on data available in 2006 and updated as far as is possible to early 2010.

Table 2. Comparison of OXPOP UK ethnic totals for 2006 with ONS experimental estimates for England grossed up to total UK population size (thousands).

	UK 2001 original census count	UK 2006 OXPOP estimate	UK 2006 OXPOP adjusted to UK estimated total.	ONS experimental estimates for England grossed up to UK population total.		Excess or deficit of OXPOP projection compared with ONS.		QLFS grossed up to UK estimated total.
						1000s	percent	
	2001	**2006**	**2006**	**2001**	**2006**	**2006**	**2006**	**2006**
White British, Scottish, Irish	52730.4	52608.5	**52626.4**	52953.3	52742.6	-116.2	-0.2	51305.3
Other White	1423.5	1962.0	**1962.7**	1460.7	1851.6	111.2	5.7	3211.8
Mixed	677.3	858.8	**859.1**	688.7	874.4	-15.3	-1.8	649.8
Asian Indian	1053.4	1295.0	**1295.5**	1070.9	1296.6	-1.1	-0.1	1216.4
Asian Pakistani	747.3	924.3	**924.7**	761.5	912.0	12.7	1.4	879.5
Asian Bangladeshi	283.1	350.2	**350.3**	289.3	348.2	2.1	0.6	325.4
Asian Other	247.7	339.2	**339.3**	253.9	337.0	2.4	0.7	415.1
Black Caribbean	565.9	596.2	**596.4**	574.5	600.5	-4.0	-0.7	742.1
Black African	485.3	706.9	**707.1**	500.7	709.1	-2.0	-0.3	646.7
Black Other	97.6	108.2	**108.2**	99.7	116.7	-11.0	-10.4	58.2
Chinese	247.4	414.1	**414.2**	254.5	420.1	-5.8	-1.4	220.7
Other	230.6	403.0	**403.1**	239.0	378.2	24.9	6.2	916.1
Total population	58,789.5	60,563.8	60,587.0	59,146.7	60587.0			60587.0
Official ONS midyear revised*	59,113.5	60,587.0	60,587.0	59,113.5	60587.0			60587.0
Difference	324.0	23.2	0.0	-33.2				

Source: Census table S101. ONS Experimental Estimates for England and Wales ONS 2010, Population Estimates by Ethnic Group (Experimental). http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=14238

QLFS (Quarterly Labour Force Survey) estimate is the average of the weighted total for all four 2006 quarters, grossed up to the ONS mid-year population estimate for 2006. The QLFS covers only the household population. http://www.statistics.gov.uk/StatBase/Expodata/Spreadsheets/D7547.xls

As a basis for the projection to 2006, the post-census additions for 2001 (324,600) were all added to the White British etc' group. That brought the 2001 total (59,114.100) close to the official mid-year estimate for the UK of 59,1143,500 as a basis for projection to 2006.

The total of the individual grossed-up ONS ethnic estimates was 60,500,100 and has been adjusted upwards to the ONS mid-year estimate of 60,587,000.

The sum of the individual OXPOP ethnic group projections at 2006 for the whole UK (60.56 million) was close to the ONS 2006 UK midyear estimate of 60.59 million; 31.3 thousand short. However there are some large discrepancies between the grossed up ONS experimental estimates for some ethnic groups in 2006 and the OXPOP projection. The 'White British' population is overestimated and 'Other White' underestimated compared with the grossed-up experimental estimates. The shortfalls

in the projections of the Pakistani ‘, ‘Indian’ and ‘Black Other’ groups, and the excess estimate of the ‘Other’ group, are likely to be due to different assumptions about migration.

Fertility

In the UK, vital events (births and deaths) are not registered according to ethnic origin, only by the birthplace of the mother or of the deceased. The ethnic origin of each birth in NHS hospitals is noted in an NHS database: by 2005 89% of births were attributed to an ethnic category (Moser et al. 2008). The ONS Longitudinal Study links a one per cent sample of the census population to births, deaths and migration. But ethnic sample sizes are relatively small. Indirect approaches have related the ethnic group of each child in the 2001 census to the ethnic group of their co-resident mother (Large and Ghosh 2006; Large and Ghosh 2006), or using the ‘own-child’ method through the Labour Force Survey (Coleman and Dubuc, 2010). These methods, discussed in the latter paper, do not give identical results. The own-child method relates children to their own mothers in the same household or family group. Results from several successive surveys provide estimates of the births in the same calendar year (subject to the constraints of the panel design of that survey), substantially improving sample size. That method has been used to estimate fertility indirectly in studies where direct data are not available (Cho, Retherford et al. 1986) (Brown 1982; Berthoud 2001), and was used here.

In order to make ethnic projections, assumptions need to be made on the future development of the fertility of each ethnic group. These were based upon the time-series trends from the 1960s and 1970s reported in an earlier paper (Coleman and Dubuc 2010), adjusted for recent developments as noted below. In some groups (Black Caribbean, Other Asian), annual total fertility has fallen to about the level of the national average and has shown little recent trend. Among others (Indian, Chinese) fertility has fallen below, and remained below, the national average. Only Bangladeshi and Pakistani women retain fertility substantially above the national average, albeit with a declining trend. Fertility of Black African women, and that of the heterogeneous ‘Other‘ category, remain somewhat above average with an uncertain trend. All show a marked tendency towards delay in childbearing.

Continued decline was assumed among those populations where fertility is currently elevated, not otherwise. Simple model curves (exponential, logarithmic, logistic) fitted to Pakistani and Bangladeshi fertility trends from the 1970s up to 2005 pointed to a decline to 2.0 variously between 2010 and 2040. The estimates adopted are given in Table 3. It was not assumed that fertility would converge to a uniform level. A persistently depressed socio-economic and educational position, low engagement in the workforce among Bangladeshi and Pakistani women, specific religious and ethnic influences, may take a long time to change. Continued immigration from countries with incomplete fertility transitions may also retard fertility decline. In similar projections for other Western countries, fertility of populations from less developed areas is assumed to stabilise at slightly above the national average e.g. (Statistics Norway 2008, Statistics Sweden 2008) or to decline only slowly (US Census Bureau 2008). Very likely the delay in childbearing noted in all groups has depressed period total fertility in UK ethnic groups, as in the US (Yang and Morgan 2003). If so some recovery to a higher level may be expected. However lack of appropriate data prevents calculation of a tempo-adjusted total fertility for UK ethnic groups.

The increase in UK total fertility to 1.95 (2008) needs to be taken into account. Recent immigration has increased the number of immigrant women. Births to immigrant women comprised 24% of all births in England and Wales in 2008 compared with 13% in 1997, and 58% of the increase in births in England and Wales between 2002 and 2008. Despite that, data from the Labour Force Survey show that the actual fertility rates of overseas-born women remained level between 2004 and 2007, although overall, they continue to have higher average fertility than UK-born women: (2.51 compared with 1.79; Tromans et al. 2009). Fertility of UK born women (including UK born members of ethnic groups), however, increased from 1.68 to 1.79 over the same period (ONS 2008a). The total fertility estimates derived from earlier LFS therefore need up-rating.

Following the 2008-9 economic imbroglio and rising unemployment, it is assumed that this overall fertility increase will cease. In all the projections presented here, overall UK total fertility is assumed to remain at 1.95 in 2009 and 2010. That gives a total fertility for 2006-11 of 1.91, a little lower than the assumption in the ONS 2008-based projection (1.93). For comparability with the ONS Principal Projection, the

OXPOP 'standard' projection will assume that long-term overall UK fertility will revert after 2015 to the ONS long-term assumption of 1.84.

The fertility rates of individual ethnic minority groups are likely to have shared in the general upswing up to 2008, not the least because of the substantial recent inflow of immigrant women, with their higher birth-rates, into those groups. In the higher fertility groups such as Pakistanis and Bangladeshis, no increase is assumed. Instead, the expected decline in fertity is assumed to have stopped for five years. Otherwise, it is assumed that all groups share in this increase and a subsequent reversion to a lower level (Table 3).

Table 3

Table 3 Total Fertility estimate for 2001-5, and assumptions for standard projection from 2006.

	2001-5	2006-7 to 2010-11	2010-11 to 2015-16	2015-16 to 2020-21	long term
White British	1.71	1.90	1.83	1.83	1.83
Other White	1.50	1.68	1.62	1.64	1.75
Mixed	1.53	1.70	1.64	1.66	1.80
Indian	1.64	1.84	1.78	1.76	1.70
Bangladeshi	2.97	2.98	2.64	2.58	2.00
Pakistani	2.79	2.82	2.88	2.55	1.99
Other Asian	1.81	2.02	1.95	1.95	1.90
Black Caribbean	1.94	2.16	2.08	2.07	2.00
Black African	2.32	2.34	2.29	2.25	1.99
Other Black	2.23	2.42	2.34	2.29	2.00
Chinese	1.24	1.42	1.42	1.45	1.70
Other	2.09	2.37	2.29	2.25	2.00
All groups	**1.73**	**1.91**	**1.89**	**1.87**	**1.84**

Sources: For 2001-2006 Own-child fertility estimates to 2006. 2006-2010, from Coleman and Dubuc (2010) Table 3.
For 2006-11, 5-year increase in asfrs calculated from increase in 2001-5 average asfrs from vital registration data from ONS England and Wales website basic fertility statistics 1998 - 2008, t.2 (England and Wales).
NB Bangladeshi, Black African, Pakistani asfrs for 2006-2010 as in 2001-5
'White British' includes Irish, Scottish, Irish Traveller.

Mortality

Despite high mortality in most of the countries of origin, the death rates of immigrants born in the New Commonwealth and other non-Western countries are little different from the general population (Table 4), (Wild and McKeigue 1997). Some groups in

the UK enjoy superior survival: also in the US (Kochanek et al. 2004, p.4, table 4.); in Germany (Razum et al.2000) and in France (Courbage and Khlat 1996). Infant mortality rates of UK-born babies of women born in the New Commonwealth, however, have been higher than the national average since data collection began (Davis 1980, Modell 1991):8.1 per 1000 births in 2002 compared with 5.2 per 1000 among UK-born mothers. Infant mortality rates for mothers born in West Africa (9.7 per 1000) and Pakistan (11.5) remain particularly elevated (Griffiths and Brock 2004, Wild et al. 2007). Adult all-cause Standardised Mortality Ratios (aged 20 and over) in 2001-3 were higher than the national average among immigrants from Africa, lowest among those from China and Hong Kong (Wild, Fischbacher et al. 2007). Data on deaths of immigrants of all ages in England and Wales from 1999-2003, kindly provided by ONS (see Griffiths and Brock 2004), were used in conjunction with 2001 census population data (Census table M1000) to derive life tables for these projections (Table 4), fitted to the models of the UN (1982) and Coale and Demeny (1982).

Table 4. Comparison of expectation of life at birth, immigrant groups in England and Wales 2001.

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	Expectation of life at birth		IMR		Ratio to E&W		age-stand'd rate / 10000	
Place of birth	m	f	m	f	m	f	m	f
E&W 1999-01	75.6	80.3	6.2	5.0	100	100	1150	775
Bangladesh	74.9	82.0	4.9	4.1	99	102	1225	725
East Africa	75.5	80.9	7.9	6.5	100	101	1150	770
India	76.0	79.8	6.4	5.2	101	99	1150	825
Pakistan	75.5	80.3	12.5	10.3	100	100	1160	810
West Africa	74.5	81.5	11.9	9.8	99	101	1275	725
West Indies	75.0	80.9	11.0	9.0	99	101	1200	770
China	77.7	81.8	5.6	4.6	103	102	1000	660

*(North gave 75.97), ** (closest average e0 CD North 75.67), Age-standardised rates Griffiths and Brock (2004), ONS Mortality by country of birth in England and Wales 2001-2003, Model Life Tables from Mortpak COMPAR

But small numbers of deaths of children and young adults make the results precarious and the fit unstable. Difference in expectation of life at birth of males do not exceed an advantage of 2 years (Chinese) or a deficit of one year (West Africa). These are in any case 'immigrant', not 'ethnic' differences. The latter remain unknown, although

one study has shown that some higher mortality persists into the third generation among the Irish in Britain (Harding et al 2001). For ethnic mortality, Rees (2008, p.342) adopted an indirect procedure for a fine-grained ethnic projection down to local authority level (Rees 2008 p. 342). Using expectations of life for local areas, ethnic estimates of mortality were inferred using the prevalence of ethnic groups in those areas. A similar approach was adopted for the ONS experimental ethnic group statistics for local authority areas in England (Large and Ghosh 2006). That work has not yet generated national-level ethnic life tables that could be used in these projections.

Given that, and in view of the relatively modest mortality differentials evident from other data, it was decided to use the UK level of mortality for all groups in the projection as assumed in the 2008-based GAD Principal Projection (ONS 2008), converted to 5-year survival ratios.

Migration

Migration data are the most problematic and inadequate of all data, and migration theory is fragmentary. UK trends are reviewed by Salt (2009). Comprising numerous unrelated flows from many origins for unconnected purposes, migration has defied satisfactory modelling or projection except where it is unusually dominated by regular labour migration (e.g. Brunborg et al. 2009). Political processes at home and abroad can be paramount. For population projection, most national statistics offices assume the continuation of the current level or the extrapolation of recent trends. Critics of such a simple approach are usually baffled to suggest anything better (see Howe et al. 2005).

The inadequacies of UK international migration data have become more obvious as migration has increased to unprecedented levels (House of Commons Treasury Committee 2008). The basis of UK immigration data is the International Passenger Survey (IPS)., an annual voluntary interview sample conducted at major ports of entry. Until the late 2000s, this sample size was about 2800 immigrants and 750 emigrants. From 2008, following Parliamentary and other criticisms, incoming interviews were increased to 2886 and outgoing to 2231 (ONS 2009, appendix). Immigrants and emigrants are recorded according to the United Nations definition

(UnitedNations 1998) of intention to stay / depart for at least 12 months, having resided elsewhere for at least 12 months. Basic IPS estimates are augmented (by about 40,000 annually) by adjustments for asylum seekers, movement to and from the Irish Republic, estimates of 'visitor switchers' and 'emigrant switchers' to produce annual estimates of overall net immigration or 'Long-Term International Migration' (LTIM, formerly called 'Total International Migration or TIM)). ' Visitor switchers' are those who state on arrival an intention of staying for less than 12 months, but who actually remain for more than a year, 'emigrant switchers' are the reverse case. The IPS sample size permits only broad-brush classifications of migrants according to citizenship, birthplace and country of last/next residence and other variables, taken separately (ONS 2006, ONS 2008, UK Statistics Authority 2009). The grouped countries of origin published in the annual report, with the partial exception of 'country of last residence' (Table 5) are large and heterogeneous, although annual data on the 'top ten' inflow countries are now also published in addition.

Table 5. Net migration to the United Kingdom according to country of birth 2001-2008 ('Long-Term International Migration', thousands).

Country of birth						*Old	*New	Other
year	All	UK	*EU	EU 15	EU A8	CW	CW	foreign
2000	158	-68				21	88	120
2001	171	-61	4	4		37	74	118
2002	153	-98	2	2		29	71	148
2003	148	-99	11	11		27	85	123
2004	245	-116	83	34	50	45	122	112
2005	206	-93	92	29	61	25	99	83
2006	198	-134	109	36	69	16	118	89
2007	233	-97	123	31	87	12	105	91
2008	163	-88	60	33	21	6	92	93

Source: Office for National Statistics 2009 Long-Term International Migration (LTIM) Table 2.03. http://www.statistics.gov.uk/statbase/Product.asp?vlnk=15053
Note: 'Old CW' = 'Old Commonwealth' Australia, Canada and New Zealand, South Africa. 'New CW' = 'New Commonwealth' e.g. former colonies and protectorates in the Indian Sub-Continent, Africa, the West Indies and elsewhere.
'EU' is the European Union. EU15 comprises Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden, UK. EU A8 comprises the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia, Slovenia, Poland. Together with Cyprus and Malta these make up the EU 27 from 2004.
Note: data for a more detailed set of countries, from the International Passenger Survey only, are given in appendix table 1.

Data confined to foreign citizens admitted to the UK are recorded by the Home Office (2006, 2009) but on legal, not demographic criteria. Migration can be estimated indirectly from stock data from the census, the Labour Force Survey (Rendall et al. 2003) and from administrative sources (National Insurance, National Health Service and other records (UK Statistics Authority 2009, Appendix 1, Salt 2009).

Since 1991 the census and Labour Force Survey have asked questions on the ethnic origin, birthplace and citizenship of respondents and on their residence one year previously; i.e., whether they were recent immigrants. Among ethnic groups, up to 16% did not respond to the last question in the census (Commissioned table CO 576). The ethnic origin of immigrants can thus be related to their former country of residence and birthplace. For example, among immigrants recorded in the LFS 1995-2001, 89% of immigrants of Black - Caribbean ethnic origin in any given year were born in the Caribbean and 99 percent of Bangladeshis in Bangladesh. An estimate of annual ethnic inflow can be made by grossing up the distributions according to ethnic origin by the annual net immigration total (Coleman and Smith 2005). But nothing can be inferred directly about the ethnic origin of emigrants. Outflow, and length of stay, varies greatly between immigrants from more developed and less developed countries (Rendall and Ball 2004).

A more direct procedure was adopted translating net immigration (LTIM) flows from different countries of birth into ethnic flows using the detailed cross tabulations of birthplace and ethnic origin from the census (table S102) and LFS. Special IPS tabulations requested from ONS, necessarily grouping together several years' immigration data, gave more detail on countries of origin, e.g. Turkey, the Philippines and other countries. Those tabulations were based on IPS data alone. To estimate overall inflows, those IPS tabulations were augmented with annual information on the citizenship of asylum claimants and their dependants (Home Office 2008 and earlier), with allowance for those claimants who leave within a year. No correction could be made for 'visitor switchers', 'migrant switchers', or movement to and from the Irish republic (see ONS 2008b). Large proportions born in some major countries or regions of origin (India, Pakistan, sub-Saharan Africa) belong to their corresponding ethnic groups (Indian, Pakistani, Black African). Most of those born in the EU, the rest of Europe and Eastern Europe, the Old Commonwealth, the US and the rest of America

described themselves as ‘Other White’. Some persons originating in non-European countries also describe themselves as ‘Other White’: from Turkey and the Middle East, North Africa and elsewhere. A large proportion are asylum seekers. 53% of immigrants originating from Canada, 36% from Australia and New Zealand and 19% from the US described themselves as ‘White British’ in the Census and LFS. That correction (a small one, net inflows are not high) reduces the net ‘Other White’ inflow and the net ‘White British’ outflow. The ‘Other Asian’ group includes immigrants from Sri Lanka and the Philippines.

The results were compared with the estimates of net immigration by ethnic group for England prepared for the experimental ONS estimates (Large and Ghosh 2006a,b,c). P.Large, and R.Fry, pers. comms.). For comparison with the assumptions used for the present OXPOP projection, their results for 2005-6 were grossed up to give overall net inflow to the UK (see Appendix table 1). The estimates for net inflow of persons of Black Caribbean, Indian, Bangladeshi, Chinese and Other origin are reasonably close, but there are discrepancies in respect of ‘Other White’. In that case, the grossed-up estimate was employed.

Mid-year to mid-year estimates differ from the calendar year inflows because migration varies seasonally during the year. For the OXPOP 2006-based ‘standard’ projection, numbers were grossed up in proportion to the total net inflow as estimated and projected by the ONS to facilitate comparison, that is: 196,700 annually 2006-7 to 2010-11 and 180,000 after 2014-15.

Variant scenarios

The assumptions outlined above defined a ‘standard’ scenario (no. 1) with the same aggregate fertility, overall net migration and mortality assumptions as the 2008 ONS Principal Projection. That shows the consequences of recent overall patterns continuing into the middle term. Alternative scenarios are presented based solely on different assumptions of future immigration. This is partly for reasons of simplicity, partly because assumptions on migration, at its current very high level, are the dominant source of future potential population change. All scenarios assume the same trend in mortality for all groups, that defined by the ONS 2008 – based Principal Projection. Likewise the fertility assumption of that projection is assumed to apply to

the overall projection, although different ethnic groups follow different trajectories. These are constrained to keep overall total fertility to about 1.84, the ONS assumption. Most of the projections and comments below refer to the period 2006 – 2056. A few examples are presented of projections up to the end of the century, assuming constant migration and fertility from 2056 and survival continuing to improve at the (reduced) rate assumed from 2031 onwards. These projections, of course, are purely illustrative.

2. 'Natural change' scenario

A 'natural change' projection was computed without international migration of any kind in or out, to highlight the demographic power of migration. It is unrealistic in current UK circumstances, although as recently as 1992, net migration into the UK was just below zero. However 'zero net migration' or 'balanced migration', where inflows and outflows are numerically the same, is not the same as 'natural change'. Equal inflows and outflows may – usually do - still differ in age-structure and in composition. In the UK case, that generates population growth.

3. 'Reduced migration' scenario

Migration theory cannot easily forecast the likely future trends of aggregate migration flows (Eurostat 2000, Howe et al. 2003). Economic models can only succeed in replicating migration trends closely when migration is primarily for labour. Usually it is not. The buoyant Norwegian economy provides an exception. The econometric model of Brunborg and Capellen (2009) fits past trends well and predicts a strong downturn in immigration to Norway as its economic attractions are expected to fade.

Migration pressure from poor countries to developed countries is likely to remain high, and possibly increase for some time, before declining. Economic and demographic disparities between North and South continue and in some cases have widened. Employers demand easy access to labour, especially if earlier migrant flows have made them dependant upon it, and if population ageing restricts domestic supply. Many third-world countries remain politically unstable. The 'cumulative causation' of established immigrant populations induces further immigration through networks and chain migration (Gurak et al. 1992, Massey et al. 1998, Mitchell and Pain 2003, Massey and Zenteno 1999). Commitment to human rights, family re-union

and asylum conventions, and growing ethnic electorates, make it difficult for Western states with liberal pretensions to restrict immigration effectively (Freeman 1994, Castles 2007). The EU Commission, supported by the UK government among others (Miliband 2007), wishes to expand EU membership to countries on the edge of Europe and beyond (Ukraine, population 50 million), Turkey (population 76 million), even North Africa) with large populations and even lower levels of development than those recently admitted. That would guarantee migration pressure well into the future (Rowthorn 2009).

Special factors affecting the UK include the commitment by HM Government to migration, notwithstanding its recent moderation; the prospect of future amnesties following the 'Family Indefinite Leave to Remain' exercise of 2003 (see Orrenius et al. 2003), the dependency upon immigrant labour in low-skill, low pay occupations reinforced by the large inflows from the 'A8' countries, the attraction of the English language, the dependency of English universities upon non-EU foreign students for their solvency. Rising economic inequality within the UK may also encourage immigration (Hatton 2005). Most commentators have concluded that the economic downturn will have only transient effects on inflow. 'A8' apart, most immigrants are not labour migrants; marriage migration and the inflow of dependants, students, asylum seekers and others will be little affected (Dobson et al. 2009; Beets et al. in press; OECD 2009a pp. 63 – 65.).

Translating these trends into ethnic categories, net emigration of the 'White British' population has risen sharply. Emigration of citizens has also increased from other Western European countries (e.g. Germany; Sauer et al. 2007). Little studied in the UK (but see Hatton 2004), in the Netherlands emigration – recently increased - is attributed to dissatisfaction with domestic conditions, crowding and social and environmental deterioration (van Dalen and Henkens 2007). Strong UK population growth may provoke further outflow from the UK for similar reasons, along with the gloomy outlook for the UK economy. On the other hand retirement emigration may slow while the adverse exchange rate with the euro persists.

A reduction in 'Other White' immigration is already apparent, as economies of East European source countries grow, exchange rates become unfavourable and UK

unemployment rises. In 2011 all EU countries must open their doors to the new accession countries for entry for work, hitherto only the UK and a few others had done so. Immigrants from Turkey, the Middle East, North Africa and elsewhere also contribute to the 'Other White' population, mostly as asylum seekers, There is no reason to expect that flow to diminish quickly.

The South Asian inflow may move in diverse directions. Marriage migration from the Indian sub-Continent has been growing roughly *pro rata* with the growth of the young South Asian population in the UK: from 9,630 in 1996 to 16,985 in 2006 (Home Office 2007, t, 2.6) However, the numbers given limited leave to enter for marriage, the dominant inflow from Pakistan and Bangladesh, have changed little since 2006. The volume of asylum seeking is likely to continue. Labour migration, an important component of inflow from India, may well decline. The projected growth of the Indian economy may absorb more of its own IT and other specialists, although inflows of Indian workers to the UK continue to increase: 1997 in 1995, 18999 in 2002 , 31879 in 2008 (Salt 2009 t.5.6, 5.4).

Medical personnel apart, African immigrants are mostly asylum seekers, students and dependants. Marriage migration has trebled since 1996 to 7270 in 2006. Chronic political instability, rapid population growth and economic and environmental fragility is likely to keep inflow high. It may increase substantially if projected global climate change has early effects. Chinese immigration, greatly augmented by recent student inflow, is likely to diminish with the expansion of domestic tertiary education, economic growth and the labour shortage from rapid population ageing.

Can reliable numbers be given to these generalisation? Barrell et al. (2009) projected migration up to 2031 using the model of future economic and demographic change of the UK and major source countries developed by Mitchell and Pain (2003). Key factors were population growth in the source countries, pull effects of the growing UK immigrant populations and change in per capita incomes in the UK relative to the source locations. The narrowing of that gap was projected to reduce substantially net migration to the UK from the A8, the Old Commonwealth countries, India, Latin America (that assumed that the A8 migration, unlike other inflows of young males from relatively poor counties, would not eventually draw in a chain of dependents).

By 2015 migrant stock was projected to be 300,000 fewer than expected by ONS, 8-900,000 fewer by 2020 and 2.3 million fewer by 2030 (p37, Figure 6): a halving of net inflow to the UK to 88,400. Translated into ethnic inflows, 'Other White' immigration would be more than halved, that of Chinese, Indians and 'Other Asians' substantially reduced. That was used as the framework for a 'reduced migration' scenario. Immigration was assumed constant after 2021-6.

4. 'Limits to growth' scenario.

The officially projected rise of UK population to 77 million by 2051 has provoked opposition to the prospect of such an unexpected inflation of numbers. However the Government of the time envisaged 'no upward limit' on international migration to the UK (Blunkett 2005). A subsequent Home Secretary promised that population would not exceed 70 million (Johnson 2009) - the first announcement of any official UK population target, albeit made somewhat informally, on television. Presumably migration - and only inflow of foreign citizens - would be the only demographic component whose regulation would be considered. Annual net immigration would need to fall to about 50,000 to keep the UK population below 70 million. This fourth alternative OXPOP scenario explores the possible consequences for ethnic inflow and population composition of attempting to keep within this 'target' maximum population size.

5. 'Balanced Migration' scenario.

A cross-party group of members of both Houses of Parliament, concerned about the increase in UK population arising from current immigration levels, has proposed a policy of numerically 'balanced' migration, where gross inflows would match gross outflows (http://www.balancedmigration.com/about.php), leading therefore to 'zero net migration'. This scenario explores its implications for numbers and ethnic balance if net inflows were reduced pro rata in each ethnic group so that inflow and outflow were both 75,000 (the gross outflow of 'White British' assumed in the 'standard' scenario).

Climate change may over-ride the outcomes of any scenario based only on socio-economic and political considerations. Its widely forecast effects have now crept within the time-horizon of population projections. If those forecasts prove to be

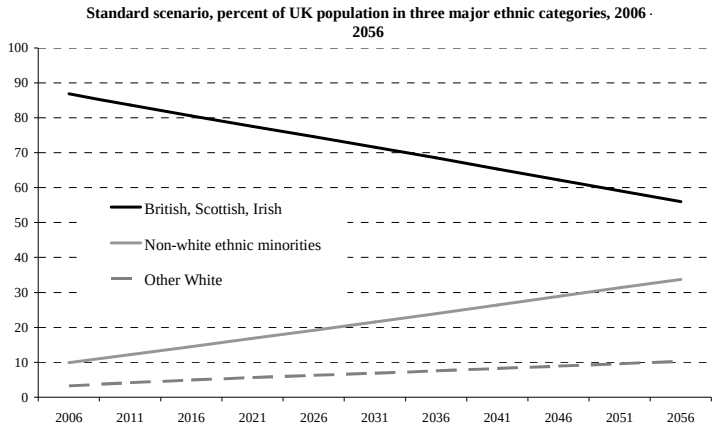
correct, there could be implications for international migration (Grote and Warner 2010, Marquina 2010) although to estimate the effect would be to pile one uncertainty on another. Most climate change models expect the UK to be among the least affected of European countries, and therefore a prime destination for forced climate refugees, (e.g. comments by Professor John Beddington, the Chief Scientific Advisor to HM Government: Sunday Times, 8 November 2009). But at present the possible impact of climate change is impossible to evaluate.

Results

1. Standard scenario to 2056: consequences of the continuation of current patterns of immigration.

On this basic 'business as usual' scenario whose assumptions were set out in Table 6, each ethnic minority group shows considerable growth over the period, while the British, Irish and Scottish population declines substantially. The latter comprised 90% of the national total at the 2001 census. By 2006 that had already fallen to 87% according to the estimates presented here, then to 73% in 2031 and to 57% by 2056. The 'Other White' population, mostly of European origin, would increase from 3% of the UK total in 2006 to 11% in 2056 (summarised in Figure 2), and the non-white minority populations to 21% by 2031 and to 32% by 2056. These results are similar, although slightly higher, than the results of the 2001-based projection presented in 2007 (Coleman 2007). Overall, as expected from the constraints imposed, projected total population stays close to the ONS 2008-based Principal Projection: net immigration was limited in the long term to 180,000 per year, and total fertility to 1.84.

Figure 2



The total UK population was projected to grow at an average annual rate of 0.5% . Only the 'White British' group declined, at 0.34% per year. All others increased, some much more than others. The 'Other' population increased about six times (equivalent to about 3.7% per year) up to 2056, the Chinese and Black African by over five times (3.5% and 3.4% per year respectively), and most of the others between two and four-fold. The Black Caribbean population, however, with little immigration, moderate fertility and strongly affected by absorption into the 'mixed' group, was projected to increase only 30% over the period. Overall, the non-white population was projected to increase by 2.9% annually up to 2056, compared with the actual past annual growth of 3.4% from 1981-1991, and 3.3% from 1991-2001 (Rees and Butt 2004)

The 'Mixed' populations increased strongly to 4.2 million by 2056, primarily by acquiring population from the other groups. It was clearly on a trajectory to become the biggest minority group, and on these assumptions would do so after 2071, similar to the median result of the earlier, probabilistic projection (Coleman and Scherbov 2005). Without those contributions from the other groups, the numbers would increase to only about 2.2 million. Of course rates of inter-ethnic union, and fashions of ethnic attribution, may well change.

Table 6 Standard projection 2006 - 2056. Basic assumptions and results.

	Total Fertility assumption			**Net migration (1000s)** annual average over five years			**Population (1000s)**			**Annual growth rate** (percent)	
	Mid 2006-Mid 2011	Mid 2031-Mid 2036	Mid 2056-Mid 2061	Mid 2006-Mid 2011	Mid 2031-Mid 2036	Mid 2056-Mid 2061	2006	2031	2056	2006 to 2031	2006 to 2056
White British	1.90	1.83	1.83	-85	-74	-74	52629	50763	43726	-0.14	-0.37
Other White	1.68	1.68	1.75	95	65	65	1962	4883	7989	3.65	2.81
Mixed	1.70	1.72	1.80	8	8	8	859	2234	4207	3.82	3.18
Asian Indian	1.84	1.74	1.70	46	46	46	1295	3172	5318	3.58	2.83
Asian Pakistani	2.82	2.30	1.99	18	18	18	924	2074	3386	3.23	2.60
Asian Bangladeshi	2.98	2.29	2.00	8	8	8	350	813	1297	3.37	2.62
Asian Other	2.02	1.93	1.90	19	19	19	339	1073	1984	4.61	3.53
Black African	2.34	2.13	1.99	30	30	30	707	2093	3769	4.34	3.35
Black Caribbean	2.16	2.04	2.00	2	2	2	596	737	812	0.85	0.62
Black Other	2.42	2.16	2.00	1	1	1	108	168	208	1.75	1.31
Chinese	1.42	1.55	1.70	21	21	21	414	1177	2025	4.18	3.17
Other	2.37	2.14	2.00	36	36	36	403	1748	3326	5.87	4.22
Total UK	1.91	1.87	1.85	199*	180	180	60587	70936	78047	0.631	0.506
ONS 2008-based PP		1.84	1.84		180	180		70933	78414		

Note*: estimate of 199 based upon actual LTIM 2006-8 and ONS PP assumption 2008 – 11. PP = Principal Projection.

Figure 2 Percent of UK Population in three major ethnic categories, 2006 – to 2056.

There would be a modest re-arrangement of the ranking of the relative sizes of some of the ethnic populations (Table 7). At the 2001 census, the largest group was the heterogeneous 'Other White' population, followed by the long-established Indian ethnic group. Due to its high assumed immigration the former group preserved the top position throughout the projection.

Table 7. Standard projection. Projected rank order of ethnic minority groups 2006, 2031 and 2056, with projected population size in thousands.

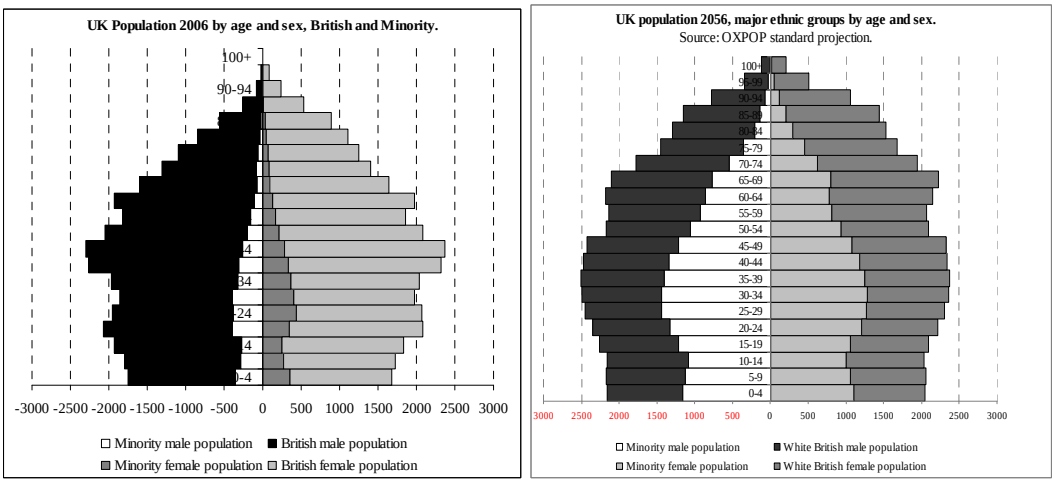
	2006		2031		2056
Other White	1962	Other White	4883	Other White	7989
Asian Indian	1295	Asian Indian	3172	Asian Indian	5318
Asian Pakistani	924	Mixed	2234	Mixed	4207
Mixed	859	Black African	2093	Black African	3769
Black African	707	Asian Pakistani	2074	Asian Pakistani	3386
Black Caribbean	596	Other	1748	Other	3326
Chinese	414	Chinese	1177	Chinese	2025
Other	403	Asian Other	1073	Asian Other	1984
Asian Other	339	Asian Bangladeshi	813	Asian Bangladeshi	1297
Asian Bangladeshi	350	Black Caribbean	737	Black Caribbean	812
Black Other	108	Black Other	168	Black Other	208
Total UK minority	7958		20173		34322

The 'Mixed' group progressively gained ground as other groups contribute members to it. Because of high levels of immigration and relatively high fertility, the Black African, Other Asian and Other group increased relative to others. The Chinese population also increased greatly, also due to the assumption of continued immigration. The Black Caribbean population is projected to become one of the smallest groups relative to the others, though not declining in absolute numbers, along with the 'Black Other' group. Most of these shifts of rank order do not reflect big changes in relative numbers.

The impact upon the composition of cohorts of different age.

In this ‘standard’ scenario, the transformation in ethnic composition is most apparent in the younger age-groups (Figure 3). By 2056, a minority of 0-4 year olds - 48% - is projected to be of British, Scottish and Irish origin;, compared with 50% of the 40-44 age-group, 63% of the 60-64 age group and 83% of 80-84 year olds. Only among people aged 85 and over would the ethnic proportions at the time of the 2001 census be preserved.. All the populations age; some would already have acquired a more ‘modern’, older, age-structure by 2056 (Table 8).

Figure 3 . Distribution by age and sex, United Kingdom 2001 (census) and 2056 (standard scenario), with White British and minority populations portrayed separately.



Some of the ethnic populations are ageing much faster than others. Overall, 16% of the total UK population was aged 65 and over in 2006. It was projected to be 22% in 2031 and 25% by 2056, corresponding to aged potential support ratios of 4.2, 2.7 and 2.4 respectively. The White British population is much further down that road than the minority populations. In 2006, 17.4% of the White British population was aged 65 and over, compared with 6.3% of the minority populations all together, rising to 34% and 13% respectively by 2056 (Table 8). By 2056 the most youthful minority population would be the ‘Mixed’ group, the most aged; the Black Caribbean.

2. ‘Natural change’ scenario: what would happen without any migration.

In the ‘natural change’ scenario, without migration in or out, the ‘White British’ group would still comprise 80% of the population by 2056, not the 57% with migration. The non-white minority populations together would comprise 17%, compared with 32% with migration. That 17% increase arises primarily from

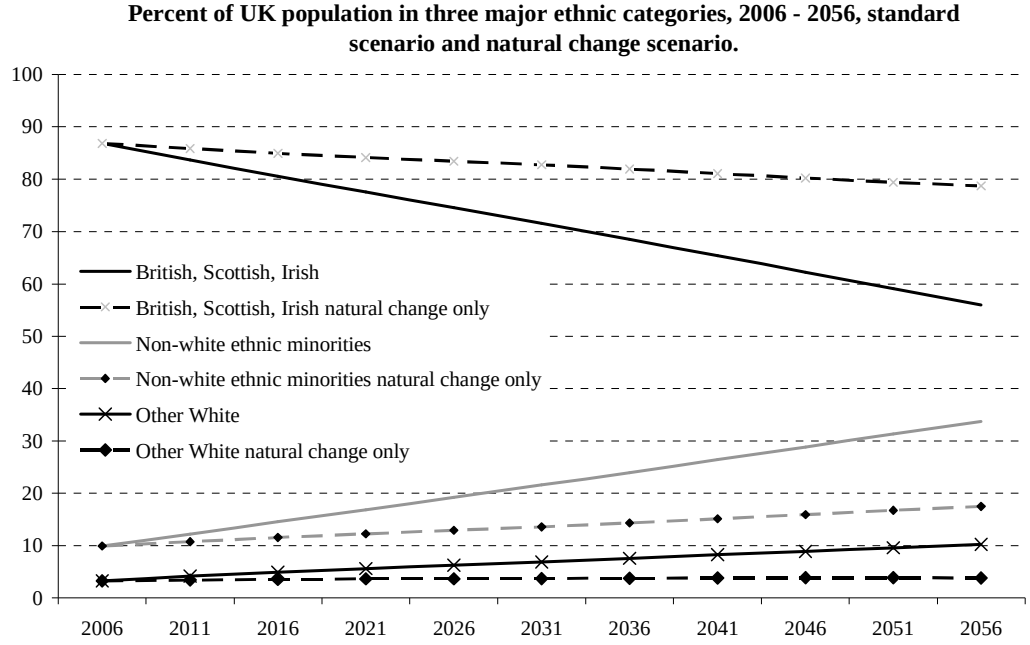
demographic momentum, built into the age-structure. The 'Other White' population would comprise 3%, not 11%.

Table 8 Development of the age-structure of ethnic populations, UK 2006 - 2081, 'standard' scenario, ranked according to the proportion of persons of age 65 and over in 2056.

	Percent aged 65 and over				Aged potential support ratio			
Group	2006	2031	2056	2081	2006	2031	2056	2081
White British etc	17.5	29.2	34.1	36.2	3.7	1.9	1.5	1.4
Black Caribbean	13.2	23.7	26.6	28.0	5.3	2.6	2.2	2.1
Black Other	3.6	11.7	23.1	28.5	18.8	5.8	2.7	2.0
Asian Bangladeshi	4.4	6.5	16.8	23.4	14.1	10.6	3.8	2.6
Other White	8.4	6.2	16.2	22.0	9.0	12.1	4.1	2.8
Chinese	4.1	3.8	15.9	23.2	20.1	20.7	4.4	2.7
Asian Indian	7.1	7.5	14.1	21.4	10.4	9.6	4.9	3.0
Asian Pakistani	4.8	5.9	12.9	20.2	13.1	11.7	5.2	3.1
Black African	2.5	4.2	12.1	19.4	28.7	17.3	5.7	3.2
Asian Other	5.2	4.6	11.9	19.3	14.8	15.8	5.8	3.3
Other	2.5	1.9	11.2	21.0	32.3	40.4	6.5	3.1
Mixed	2.7	3.7	8.3	14.0	20.2	16.3	7.4	4.3
Total UK population	16.0	22.8	25.4	27.1	4.2	2.7	2.3	2.1

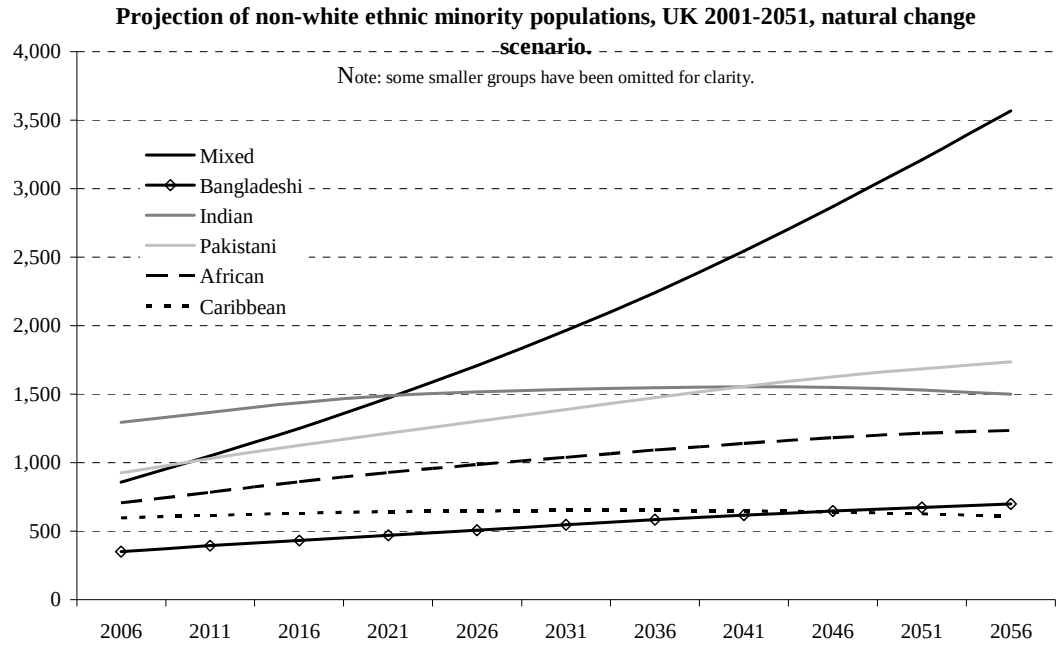
Note: The 'aged population support ratio' is the ratio of the number of persons of nominal working age (taken here to be 15-64) to persons of nominal retirement age (taken here to be 65 and over).

Figure 4a Natural change scenario: Percent of population in three major ethnic categories 2001 – 2056, with and without migration.



In all groups, the long-term level of total fertility is assumed to be below replacement. Therefore in the long run, all groups would decline without migration (except the mixed population; see below). Bereft of the dominant demographic effect, differences in fertility and age-structure emerge as the determinants of relative growth. Even without migration, relatively high fertility and youthful age-structures would give substantial momentum to some groups: e.g. the Bangladeshis (a relative increase of 2.0 to 2056), Pakistanis (1.9) and Black Africans (1.7). The former two populations would by then be close to their peak (which would lie beyond 2056), and the Black African population would have started to decline by that year. For others, more modest increases are projected: 1.3 fold among 'Other Asians' and 1.2 among Chinese, both by that time already declining in numbers. The 'Other White', Indian and Black Caribbean groups would increase by just 1.1 or less. The mixed population would keep growing at a rate scarcely slower than with migration, becoming the largest of the minority groups; 12.5% of the population (Figure 4).

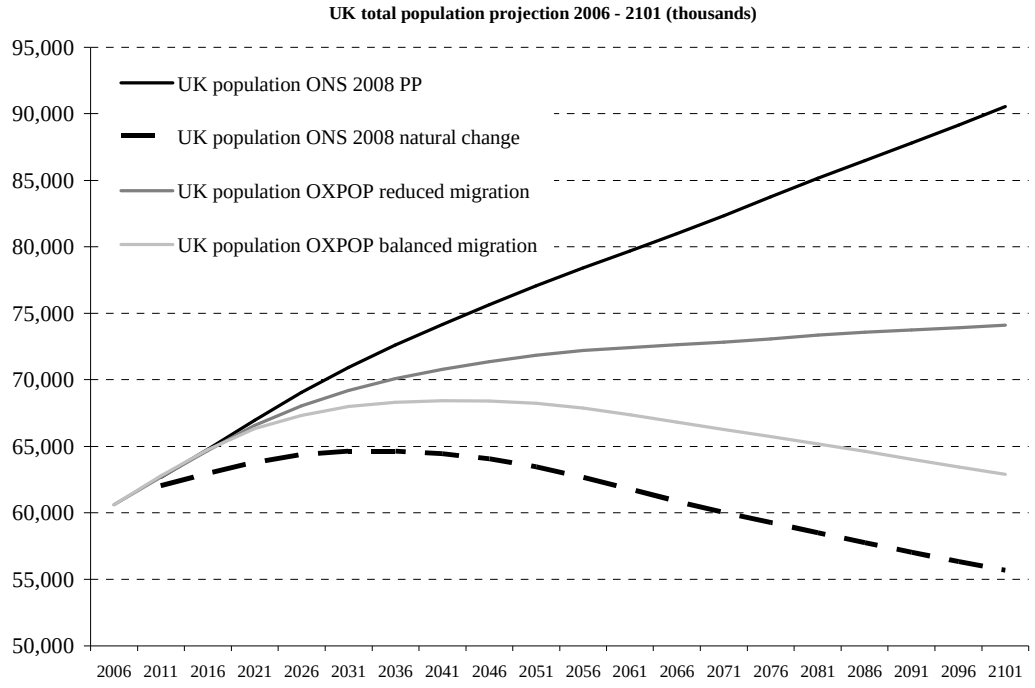
Figure 4b Natural change scenario: Projected population of selected non-white ethnic groups only, 2001 – 2056, without migration, to show continued growth of 'mixed' population in the absence of migration.



3. 'Reduced migration' scenario: a more realistic migration outlook?

In this scenario net immigration was approximately halved over 25 years to 89,000, in an unequal pattern as noted above. Accordingly, overall UK population growth under this regime is slower than in the 2008-based ONS Principal Projection. But total population would exceed 70 million by 2041 and continue to increase up to the end of the projection period (Figure 5). The progress of ethnic change would be only slightly slowed: the percent of 'White British' falling to 62% by 2056 and that of non-white minorities rising to 30%. By 2056 the numbers of 'Other White' would be reduced by 44% compared with the standard, Chinese and Indian by 22%, 'Other' by 8%; some not at all. Consequently Pakistanis, Bangladeshis and others gain ground.

Figure 5 Projected total of UK population under various scenarios: reduced migration and balanced migration compared with ONS Principal Projection and Natural Change projection



4. 'Balanced migration' scenario: a proposal to moderate population growth.

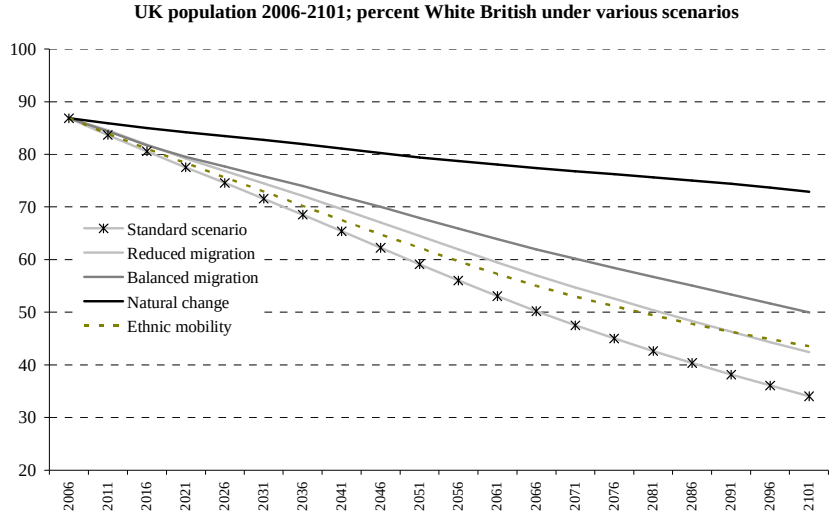
The 'balanced migration' scenario where inflow of each ethnic group is reduced pro rata to 74,000 in 2006-10, exactly matched by outflow of 74,000 'British', does keep the UK population below the 70 million target. But it still peaks at 68.4 million in 2041, 7 million greater than in 2006 and 3.6 million more than the peak of the OXPOP 'natural change' scenario described above. The ONS (2009) has also presented a 'balanced migration' variant which phases in natural change over 30 years

and peaks at exactly 70 million. In our scenario the additional growth arises partly from the overall differences in age-structure between the immigrant and emigrant populations, and partly from the continued increments through migration to particular groups with higher fertility rates. Ethnic change is slowed but does not cease. By 2056 the White British would comprise 66% of the national total, the 'Other White' 8% and the non-white minorities together 26%. Groups with low fertility that grew through migration, the Indians and Chinese, lose ground. Those with relatively high fertility and youthful age structures, Bangladeshis, Pakistanis and Africans, do better. The 'mixed' populations are little affected and become the largest group, as in the natural change scenario.

5. A scenario incorporating further ethnic transfer.

So far, the transfer of offspring to the 'mixed' group only has been considered. In these spreadsheet-based models, it is not practicable to incorporate simultaneously all the132 possible ways in which children could be assigned a different ethnic origin from that of their mother.. Most are relatively infrequent. The most important exceptions are the 50% of children of 'Other White' mothers, and the 29% of children of 'Mixed' mothers, that are described as 'White'. That inter-generational ethnic mobility into the 'White British' group, which slows its numerical decline albeit by gradually altering its ancestry. Figure 6 shows its effects when applied in the 'standard' scenario, which would apply *pro rata* to the other scenarios.

Figure 6 Long-term projection of 'White British' population (percent) 2006 – 2101 under various scenarios

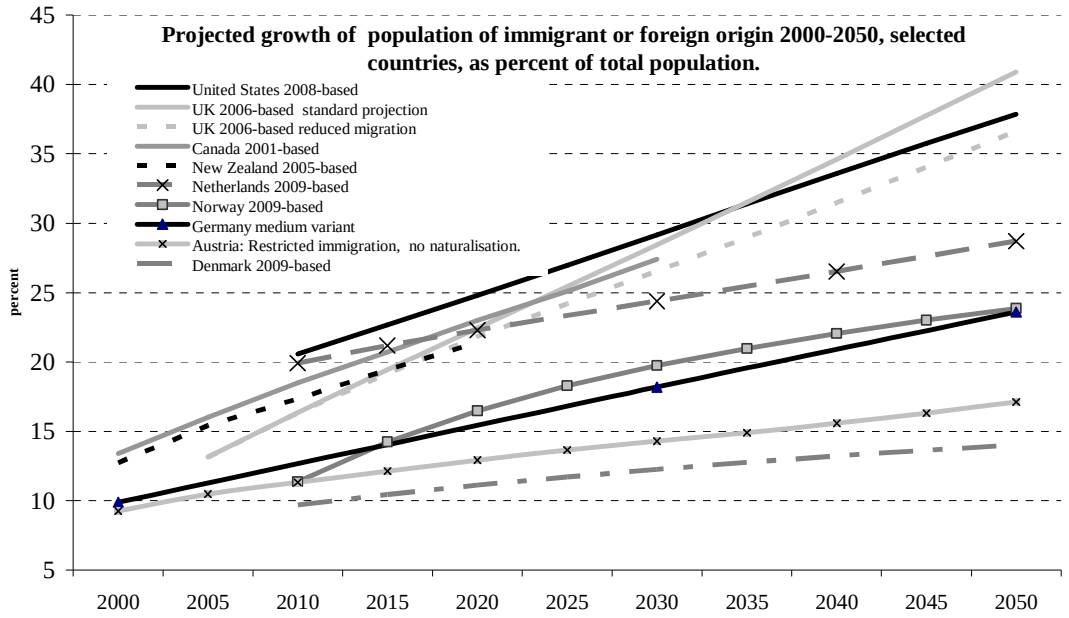


Discussion

Comparison with other developed countries

How do these OXPOP projections compare with those made for other Western countries? A comparison is desirable to see whether the possible patterns projected for the UK bear any similarity with those projected for other developed countries, or are in some way exceptional. If not untypical of others, that would imply that rather radical ethnic change may be in the offing for many if not all the countries of the developed world. All the central projections for other countries assume, as does the OXPOP standard projection, that the level of net immigration will continue unchanged or nearly so. The OXPOP standard scenario projects faster ethnic minority population growth than any of the others except that for Greece, which extends only to 2025. The minority share of the total UK population by mid-century is about the same as in the US, considering only US minority populations of mostly post-war origin (Figure 7). Why? In the European projections, persons of 'foreign origin' are assumed to become part of the national indigenous or 'autochthonous' population after the second generation, and thereby disappear from the projection. The ethnic categories employed in the UK and US projections are potentially perpetual and therefore include the third and later generations as time progresses. As in ONS usage, the 'mixed' groups are accounted part of the non-white population.

Figure 7 Projected growth of populations of immigrant or foreign origin 2000 – 2050, selected countries, as percent of total population.



Sources: US Census Bureau 2008, Bélanger and Malenfant 2007, Statistics New Zealand 2005, Garssen et al. 2009, Statistics Norway 2009 and data from Helge Brunborg, Ulrich 2001, Lebhart and Münz 2003, Statistics Denmark 2009.
Note-starting year may not be exactly 2000, 2005, or 2010. Data-points relate to years ending in '1' not '0' in Canada, New Zealand, UK.
US projections do not recognise any analogue to the UK 'Other white' minority category, except the (very large) 'White Hispanic' . To that extent those minority projections are under-stated compared with those of the UK. Likewise in the New Zealand projections whites are just classed as 'European'

Net foreign immigration to the UK has been relatively high since the 1990s. Average annual net inflow to the UK of all citizenships – British and foreign - from 2001-7 was 193 thousand; average net inflow of foreign citizens was 385 thousand. According to the balance of inflow and outflow of foreign citizens published by OECD (2009a, table A11, A12) foreign inflow to the UK from 2001-7 was 4.8 per 1000 population, the same as the ONS TIM average; the highest of any of the populations for which projections are available bar Austria. However the UK rate from a different source (OECD 2009b) for all inflow was 2.5 compared with 3.2 according to ONS.

The longer-term future

Projections by local authorities indicate that by 2020 some London boroughs will have ethnic majority populations, and eventually the whole Greater London area (Bains 2006). The cities of Birmingham, Bradford and Leicester are expected to follow by the 2030s (Simpson and Finney 2009). What of the long-term national picture? Very few projections are made beyond fifty years because of the compounding number of uncertainties; they become purely illustrative of the outcome of specific assumptions. The 2000-based projection by US Census Bureau (2008) indicated that the US white non-Hispanic population would become a minority by 2043, depending on the migration assumption (US Census Bureau 2009, Ortman and Guarneri 2009). As long as the level of US immigration continues at recent levels this outcome is inevitable.

In the UK 'standard scenario;' the 'White British' would be in a numerical minority by 2076; in the 'reduced scenario' that would be deferred until the mid 2090s (Figure 6). In scenario 5 where the shifting of identity of some offspring to the 'White British'

category from ‘Mixed’ and ‘Other White’ is incorporated, that outcome would be deferred until early in the 22nd century. With ‘balanced migration’, the White British, Scottish and Irish population would fall to about 50% by the end of the century. Under the ‘natural change’ scenario, the majority population only continues to fall (to 74% by the end of the century) because of the assumed continued transfer of population to the ‘mixed’ category and the assumption that those populations remain classed as ‘non-white’. All other groups eventually disappear. But a century, never mind two, is a long time in demography.

All this raises two other issues. How much would such reversals of majority and minority matter? What would ethnic change over such a long time mean in terms of the categories conventionally used?

A numerical reversal of majority would be powerfully symbolic of a transfer of priority and national identity; cultural, political, economic and religious. Breaking through that psychological barrier would undoubtedly attract great attention. But forthcoming ethnic change would have been written on the wall long before, when the younger generation in school, college, workforce entrance and upwards had become majority ethnic. That development is not far off in the US and is projected for about 2056 in the UK case on the ‘standard’ scenario. There must be few if any previous examples of the numerical displacement in peacetime of one cultural / religious / racial majority by others of relatively recent immigrant origin. Judging by the opposition to high immigration reported in opinion polls over several years (Pew Research Center 2007), it can be assumed that such a development would be unwelcome to most of the (diminishing) majority population. Opinion poll questions specific to the matter have not, a far as the author knows, ever been asked. Those who make decisions about immigration are seldom those who pay its penalties, and the political class in the UK and the US has tended to dismiss indigenous opposition to immigration and the multicultural policy that has gone with it (Chamie 2009).

The usual criticisms of cultural diversity: socially divisive, confusing and diluting to national identity, erosive of trust and social solidarity, would no doubt come to the fore; highlighted by difficulties of personal adjustment of the former majority to minority status. An older, more dependent white population would have to co-exist

with an increasingly ethnic workforce. Who would now be expected to adapt to whom? That would depend on whether diversity had become less salient through convergence in shared culture; how far fellow citizens had become accustomed through longer-term familiarity, to people and preferences formerly regarded as strange. Others would welcome a transition as marking the end of a society which some regard as unattractive, oppressive and racist, as a natural and beneficial development of a modern open society, or as a herald of the future numerical pre-eminence of Islam.

The relative (but far from perfect) equanimity with which the political class has received the prospect of such changes in the US is notable. However circumstances, history and expectations are hardly the same as in Europe. In such a big space, there is always somewhere else to go. In California, with a 2008 population of 37 million bigger than all but four of the EU countries, the white non-Hispanic population is already down to 42%, and the Hispanic population has risen to 37%. It is 'leading the nation, even the world, in a great transition that will become commonplace' (Myers 2007, p 346). But according to some, from a 'State of Euphoria' California has become a state of discontent. The ethnic populations are segregated residentially and divided by income and education. Richer, older, suburban non-Hispanic voters resent paying taxes for poorer, less educated Hispanics. Some have described the situation as 'unsustainable' (Clark 1998); others insist on a policy re-think (Myers 2007). These heavy matters cannot adequately be discussed here; a few additional remarks have been made elsewhere (Coleman 2006, 2009).

The British, Scottish and Irish populations all have mixed origins in some sense, although for the most part confined to persons with ancestry in the British Isles. The projected rapid growth of the numbers of people of much more diverse mixed origins and their likely future numerical dominance among 'minorities' has important consequences. It facilitates acceptance and tolerance as well as being a sign of it. Through the mixed unions of young people, more and more adults are brought into contact with other ethnic groups; literally having them in the family. It can also be a source of strife, provoking violent opposition among some from Asian and other cultures accustomed to arranged marriage and religious and caste homogamy.

Populations of mixed origin in subsequent generations are acquiring a more complex ancestry. That may eventually make the ethnic categorisation of a growing part of the population difficult or meaningless, in the UK, the US (Perez et al. 2009) and elsewhere. Such trends cast doubts on the practicability or even the propriety of continuing with exclusive, potentially divisive concepts of ethnicity or race as opposed to the more inclusive concept of citizenship. At the same time the process will slowly alter the background, and the appearance, of the once dominant group. The geneticist Professor Steve Jones may be right in saying that 'the future is brown' (Times, 7 October 2008). At recent rates of ethnic change, however, complete homogeneity of ancestry would take a very long time.

Conclusions

If overall net immigration continues as projected by the ONS, and if the ethnic distributions assumed here are even approximately correct, then the ethnic composition of the United Kingdom would be irreversibly transformed within the current century. By 2051 the non-white population would increase to 22 million (29%) and the 'Other White' minority to 8 million (10%). If the same patterns continued beyond the mid-century, the non-white populations would reach 38% by 2076, by which time the White British population would have fallen to just under one half (48%) of the total population, and to two-fifths (38%) by the end of the century. Variant projections moderate that conclusion to various degrees. But even if all immigration ceased, the minority groups (including 'Other White') would double to comprise one-fifth of the population by 2051 before age-structure momentum became exhausted. Beyond that only the 'mixed' populations would continue to increase unless some segregated groups preserved high fertility in the long run.

Projections are certain to be wrong, at least in detail; reality will inevitably deviate from assumptions. Fertility and mortality are likely to vary little. Different assumptions have – compared with the possible range of immigration – a relatively minor effect. Total fertility in the UK has mostly remained between 1.7 and 1.9 since the 1970s. Improvements in survival have followed a dependably linear path since then, despite the conservatism of actuaries. But migration has varied by an order of magnitude in 25 years. Net inflow of foreign citizens was 25,000 in 1981, 251,000 in 2008.

Immigration to the UK from developed countries, never very great except for the A8 irruption, is likely to moderate further; likewise in the longer run labour migration from the faster developing countries (India, Latin America and China). Prospects elsewhere are less good. Most migrants to the developed world, however, do not move specifically for work; other factors (including broadly economic ones) remain powerful. Marriage migration has increased; UK ethnic minorities with traditions of arranged marriage have grown rapidly. In poorer countries: Bangladesh, Pakistan, the Middle East and above all sub-Saharan Africa population growth remains considerable, pressing on employment, agriculture and access to water, and poverty remains pervasive As regards asylum, political stability and justice are unlikely to improve in countries that lack effective democratic institutions. Internal and international conflict may increase as poor populations expand (Cincotta et al. 2003; Jackson et al. 2008 Ch.4). Global climate change later in the century may provoke new migration pressures. Without intervention, while some reduction in migration pressures on the UK and similar countries seem likely on economic grounds, those may partly be cancelled out by other pressures of a non-economic nature.

Residents of the UK and other developed world countries therefore have a choice, at least in theory. If the demographic and ethnic transformations in the UK described above are not to come to pass, immigration must fall to a fraction of its present level. Many doubt whether that is possible, never mind desirable. It would require an enduring political consensus, not a reversal of policy with every change of government. Left to develop by themselves, events may turn out well. Some of the concerns noted above might evaporate in a changed, more inclusive society. But for the present, that prospect seems remote. History is not sanguine about the capacity of ethnic groups or religions to forget their differences. The ethnic transformation implicit in current trends would be a major, unlooked-for, and irreversible change in British society, unprecedented for at least a millennium. It would, perhaps, be the biggest ever unintended consequence of government activity. In a democracy it would be appropriate, at the very least, for the matter now to enter public debate.

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Appendix Table 1. Net International Migration to England and the UK, mid – 2005 to mid - 2006 (mid-y mid-year) by ethnic group, and assumptions for 2005-6 to 2020-21.

Ethnic Group	Net International Migration to England (thousands) ONS experimental estimates	Net international migration to England grossed up to UK level (thousands)	Net inflow IPS only 2005-6 foreign birthplace only.	Asylum seekers 2005-6 (adjusted) foreign citizenship only.	IPS plus asylum 2005-6	**Assumptions for projecti** for adjustment, see App. ta 2005-6 to 2010-11	2010-11 to 2016-16	2
White: British	-61.3	-75.7				-85.0	-77.8	
White: Irish	-5.0	-5.6						
Other White	71.2	77.4	88.2	2.5	90.7	95.2	75.0	
All mixed	7.7	8.1	6.9	0.4	7.3	7.5	7.5	
Indian	38.1	38.8	43.0	1.0	44.0	46.2	46.2	
Pakistani	19.4	20.4	15.3	1.3	16.6	18.1	18.1	
Bangladeshi	7.7	7.9	1.6	0.2	1.9	8.0	8.0	
Other Asian	9.1	9.5	11.9	2.0	14.0	18.7	18.7	
Black Caribbean	2.3	2.3	2.3	0.2	2.5	2.5	2.5	
Black African	25.1	25.6	23.7	6.3	30.0	30.0	30.0	
Other Black	0.9	0.9	0.5	0.1	0.5	0.5	0.5	
Chinese	24.6	27.7	17.6	1.4	19.0	21.2	21.2	
Other	24.2	26.0	45.4	6.2	51.7	36.5	36.5	
All groups	163.8	163.3	256.5	21.7	278.2	199.5	186.5	

Sources: ONS Experimental Estimates table PEEG 138, 2001 Census of England and Wales, Scotland and Northern Ireland,
(ethnic estimates) Quarterly Labour Force Survey, four calendar quarters 2006., immigrants from 2001-2005.
(net immigration) ONS 2010 Net immigration by by place of birth, 2003-4 to 2005-6 (International Passenger Survey data on
(asylum) Home Office Asylum Statistics 2005, 2006 Tables 1.2, 4.2, 6.1
(leave to enter): Home Office Control of Immigration Statistics 2005, 2006, table 2.3.
Note: coefficients for grossing up of England estimates to UK level based on ratio of ethnic populations in England to those o
at the 2001 census.

Appendix Table 2

Appendix table 2. Basic data and method for estimating net migration to the UK by ethnic group.

These numbers of immigrants by ethnic group are produced by multipling the IPS net immigration data according to place of birth, by the proportions in each category of birthplace identifying with each of the stated ethnic groups derived from the 2006 Quarterly Labour Force Survey. That 13 x 22 matrix is not shown here to save space but is available on request.

The ethnic estimates for asylum seekers were derived in the same way , using Home Office data on asylum claims. These are only published according to citizenship, not country of birth. The basic estimates were increased by the appropriate proportion in each group to allow for dependants, and reduced by 19% to allow for those who left the UK within 12 months of claiming. Most asylum seekers are not captured by the International Pasenger Survey.

Two rather arbitrary adjustments were made. The estimate for 'Other' looked seriously excessive. The 'Other' numbers born in the EU were transferred to 'Other White', those in India to 'Indian', those in Pakistan to 'Pakistani', those born in the Philippines to 'Other Asian', those born in China to 'Chinese'.

The estimate of net Bangladeshi immigration of less than 2000 seemed highly implausible compared with other information, for example the Home Office data on persons of Bangladeshi citizenship given leave to enter in 2005 / 6 for employment over 12 months, their dependants, and as spouses / fiances. Such persons can be assumed to be entering with the intention to remain at least one year. These are gross inflow figures, but immigration flows from such countries (except students) are primarily inward. That yields the final migration figures for non-'White British' persons used for the projections.

It seemed unsafe to use the ethnic distributions of immigrants born in the UK to estimate the ethnic origin of emigrants born in the UK. Net migration of 'White British' was estimated therefore as a residual; the number required to achieve the ONS Total International Migration figure for 2005-6.

Net migration, IPS data only		**Numbers of immigrants (net) by ethnic origin (thousands)**											
mean 2003/04 - 2005/06	(1000s)	Other				Bangla-	Other	Black	Black	Other			
Birthplace		White	Mixed	Indian	Pakistani	deshi	Asian	Caribbean	African	Black	Chinese	Other	total
UK	-100.0												
European Union 15	17.3	12.14	0.32	0.06	0.26	0.00	0.17	0.18	0.67	0.09	0.18	1.78	15.84
Malta, Cyprus	1.0	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.66
EU A8	42.0	35.59	0.16	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	4.47	40.28
EU A2	3.3	2.80	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.35	3.17
Australia	6.7	5.31	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.21	5.60
Canada	2.0	1.40	0.07	0.00	0.09	0.00	0.00	0.00	0.02	0.00	0.13	0.04	1.75
New Zealand	2.7	2.19	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	2.31
South Africa	15.3	9.64	0.99	0.53	0.00	0.00	0.22	0.00	1.03	0.08	0.00	1.08	13.57
Other African CW	29.7	1.50	0.69	0.56	0.02	0.00	0.81	0.11	20.61	0.18	0.00	4.20	28.69
Bangladesh	2.0	0.00	0.00	0.00	0.57	1.26	0.00	0.00	0.00	0.00	0.00	0.14	1.96
India	40.3	0.15	0.26	37.27	0.03	0.23	0.12	0.00	0.00	0.00	0.00	2.24	40.30
Pakistan	16.0	0.00	0.11	0.00	14.25	0.14	0.00	0.00	0.00	0.00	0.00	1.50	16.00
Sri Lanka	4.7	0.00	0.05	0.33	0.00	0.00	3.72	0.00	0.00	0.00	0.00	0.59	4.70
Caribbean CW	1.7	0.07	0.06	0.00	0.00	0.00	0.00	1.25	0.01	0.01	0.00	0.28	1.67
Other CW	1.7	0.24	0.19	0.22	0.00	0.00	0.00	0.05	0.07	0.00	0.00	0.89	1.65
Rest of Europe3	7.7	6.39	0.01	0.00	0.02	0.00	0.15	0.00	0.00	0.00	0.00	0.90	7.46
USA	3.7	2.90	0.09	0.00	0.00	0.00	0.12	0.00	0.04	0.05	0.01	0.16	3.37
Other America	2.7	1.46	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.88	2.55
Middle East	9.3	1.87	0.13	0.26	0.03	0.00	0.87	0.00	0.00	0.00	0.00	5.92	9.08
China	20.7	0.23	0.48	0.39	0.00	0.00	0.49	0.00	0.11	0.00	16.62	2.26	20.58
Philippines	10.7	0.27	0.26	0.05	0.03	0.00	5.19	0.00	0.02	0.00	0.62	4.20	10.65
Rest	25.3	3.52	2.79	3.29	0.00	0.00	0.00	0.73	1.10	0.00	0.00	13.19	24.62
Total	166.5	88.18	6.92	42.99	15.31	1.63	11.94	2.32	23.68	0.46	17.60	45.45	256.47
Asylum seekers (adjusted)		2.54	0.41	0.98	1.32	0.25	2.04	0.21	6.32	0.06	1.36	6.24	22.24
Grand total immigrants plus asylum seekers and dependants, 2005 - 2006													
		90.72	7.33	43.97	16.62	1.88	13.98	2.54	30.00	0.52	18.96	51.68	278.70
Transfer from 'Other' noted above		**95.19**	**7.33**	**46.21**	**18.12**	**1.88**	**18.68**	**2.54**	**30.00**	**0.52**	**21.22**	**36.51**	**278.20**

Ancillary data (not used directly in calculation). Persons given leave to enter UK for selected long-term purposes (gross inflow), thousands).
Ethnic origin assumed from nationality. (i.e. Indian = 'Indian', etc.)

employment (12 month), dependant, spouse / fiance	40.7	11.4	5.4	23	1.4	10.2	5.5	(1000s)
student	19.4	10	3.1	53	1	17.2	29.4	(1000s)

Source (ethnic estimates) Quarterly Labour Force Surve, four calendar quarters 2006., immigrants from 2001-2005.
Source (net immigration) ONS 2010 Net immigration by by place of birth, 2003-4 to 2005-6 (International Passenger Survey data only).
Soure (asylum) Home Office Asylum Statistics 2005, 2006 Tables 1.2, 4.2, 6.1
Source (leave to enter): Home Office Control of Immigration Statistics 2005, 2006, table 2.3.