

Compendium

Migration, 2012-based NPP Reference Volume



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1 . Introduction

A new method for determining assumptions of future migration was introduced for the 2012-based population projections.¹ This approach was formulated as a result of a review of the assumptions setting methodology carried out by the Economic and Social Research Council (ESRC) Centre for Population Change in 2012.² The review recommended that the existing arguments-based methodology should be streamlined and brought into line with current academic recommendations as the first step of a multi-stage redevelopment process.

The previous assumptions setting methodology had been in place since the 1991-based projections and the review suggested that while these methods were in line with the current practice of many statistical agencies, they were not necessarily in accordance with the recommendations from academic literature, in particular surrounding the use of net migration levels. The methodology was also found to contain a number of 'patches' which had to be included to respond to unpredicted changes in trends (for example for migration from Central and Eastern Europe following the EU enlargement), or specific data situations. These patches were found to reduce the cohesion of the whole system of assumption setting.

A user forum was run in parallel to the review to ensure that users' views fed into the process. The users agreed with the principle of moving to gross flows as long as net migration levels were also available. As the first step in the redevelopment process, the recommendations to move to the use of gross flows and to streamline and update the methodology were therefore incorporated into the 2012-based projections.

This chapter summarises the resulting assumptions adopted for the 2012-based population projections.

It is important to emphasise that the migration assumptions are based on past demographic trends. They do not attempt to predict the impact that new or future government policies, changing economic circumstances or other factors (whether in the UK or overseas) might have on migration patterns.

2 . Past Trends in Migration

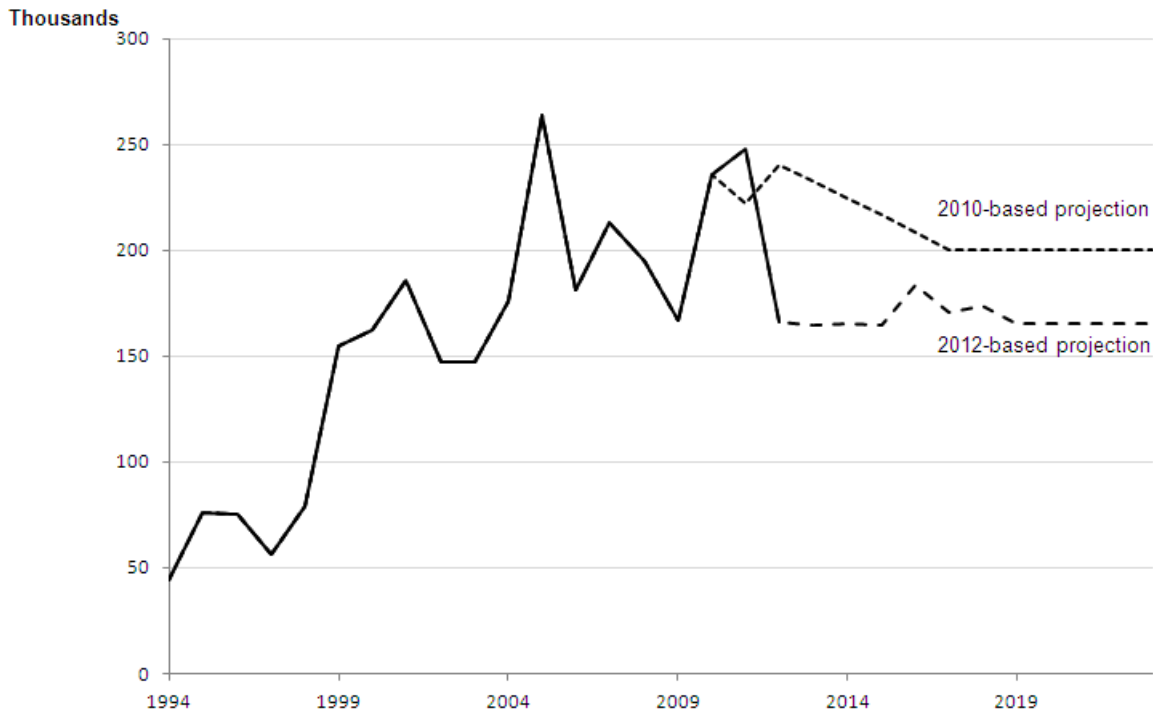
Since the early 1980s, the UK has transitioned from being a country characterised by net emigration to one characterised by net immigration. This is due to the fact that the growth in immigration, which has risen from less than 200,000 per year in 1981 to over 500,000 in 2012, has outstripped any increases in emigration. Net migration peaked in 2004/05 partly as a result of immigration from countries that joined the EU in 2004. Since the peak, annual net migration has fluctuated between 150,000 and 250,000.³

In the year ending June 2012 (the base year of the projection) 515,000 people immigrated to the UK which was the lowest immigration estimate since the year to June 2004, when 528,000 people migrated to the UK. Net migration in the year to June 2012 fell to +163,000, a significant decrease compared with the previous year. These recent trends are reflected in the migration assumptions.

3 . Overall Assumptions

The new assumptions result in long term net migration to the UK of +165,000 each year compared with +200,000 a year in the 2010-based projections. Figure 5-1 compares the future net migration assumptions with historical international migration estimates back to 1994 and also includes the assumptions made for the previous 2010-based projections. It is based on mid-year to mid-year, rather than calendar year figures, so the latest 'actual' data point shown is the estimated total net inflow to the UK of 166,000 between mid-2011 and mid-2012.

Figure 5-1: Actual and assumed total net migration, year ending mid-1994 to year ending mid-2023, United Kingdom



Source: Office for National Statistics

Notes:

1. All data are displayed on a mid year basis
2. Historic international migration figures for England, Scotland and Wales are primarily based on International Passenger Survey data and Northern Ireland figures are obtained directly from NISRA so aggregate totals may differ from published international migration data

4 . International Migration

ONS uses the United Nations recommendation for defining an international long-term migrant. That is, someone who changes their country of usual residence for a period of at least a year, so that the country of destination effectively becomes the country of usual residence.

International migration figures are derived from a number of sources. The principal source is the International Passenger Survey (IPS). Adjustments are made to account for people who enter or leave the country initially for a short stay but subsequently decide to remain for a year or more ('visitor switchers') and people who originally intend to be migrants but in reality stay in the UK or abroad for less than one year ('migrant switchers'). Flows to and from the Republic of Ireland, taking into account the discontinuity in 2008 due to methodological changes, are included in the IPS flows.

Visitor switchers are people who enter or leave the UK for a short visit (that is, less than 12 months) but end up migrating for more than a year. These people are visitors who subsequently become migrants and therefore need to be added to the migration estimates.

Migrant switchers are people who state in the IPS that their intention is to remain in their destination country for more than a year (and are therefore classed as migrants) but who leave, or return to, the UK within one year, so are actually visitors. They need to be removed from IPS migrant flows. This is effectively the converse situation to visitor switchers. The adjustments for 'switchers' are made before modelling so that these components do not have to be modelled separately.

The IPS excludes most, but not all, persons seeking asylum and some dependants of such asylum seekers. Therefore, asylum seekers are modelled separately. Data on asylum seekers and their dependants (based on the number of people applying for asylum) obtained from the Home Office, are used to estimate the number of migrants arriving or leaving Great Britain.

Northern Ireland

From 2008, ONS migration estimates no longer use IPS data for Northern Ireland and instead use data from the Northern Ireland Statistics and Research Agency (NISRA). In order to obtain the longest possible continuous time series for modelling, Northern Ireland data back to 1992 are therefore obtained directly from NISRA. The NISRA data are derived from administrative sources so they incorporate visitor and migrant switchers, asylum seekers and Republic of Ireland flows into one flow, which means that the modelling of asylum seeker flows has to be carried out at the Great Britain level only.

EU Accession

In contrast to previous projections, migrants from EU8 and EU2 countries are modelled as part of the international flows, with any discontinuity encountered after EU accession in 2004 being accounted for during modelling where necessary.

Modelling of international flows

International migration flows to and from each UK constituent country and asylum seeker flows to and from Great Britain are modelled using ARIMA4, which is a standard technique for time series forecasting. A number of models are fitted to each flow, with the most suitable one chosen based on a mixture of goodness of fit measures and consultation regarding the plausibility of the extrapolations with National Records of Scotland (NRS), NISRA and the Welsh Government. For each flow, the resulting extrapolated figures for mid-2019 are fixed as the long term assumption and are held constant for the remaining length of the projection. The short term assumptions are calculated based on the extrapolated figures as well as linear interpolation to provide a smooth run-in to the long term assumptions for each UK country.

The modelling is based on data up to mid-2012 with the length of the time series used dependent on the data source. Where there is a noticeable and explainable discontinuity in the data, for example for international inflow to the UK after EU accession of the EU8 countries in 2004, an 'intervention' can be applied during modelling to take this into account.

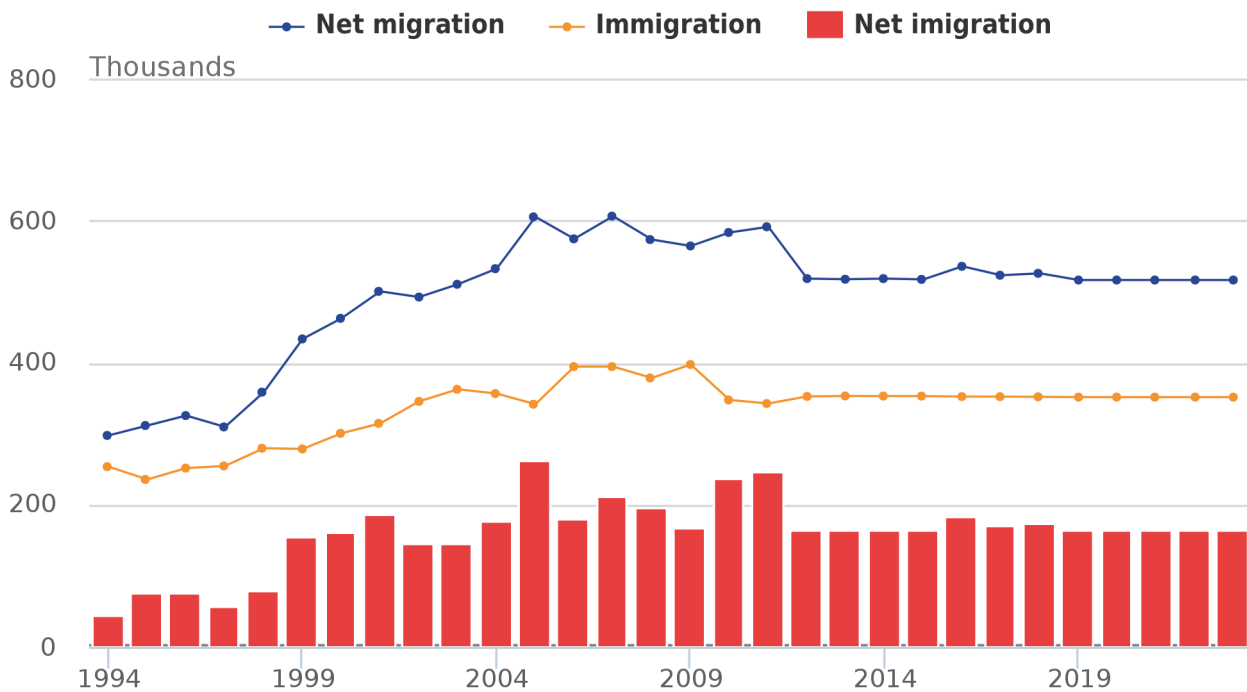
After modelling, the separate gross flows for each country are summed to produce total numbers by country and for the UK as a whole. The resulting long term assumptions can be seen in table 5-1.

Table 5-1: Assumed annual long-term gross international migration flows, mid-2019 onwards

	England	Wales	Scotland	Northern Ireland	United Kingdom
International inflow	434,000	14,500	34,500	13,000	496,000
International outflow	296,000	12,000	23,500	13,000	344,500
Asylum seeker inflow	17,500	1,000	1,500	-	20,000
Asylum seeker outflow	5,500	500	500	-	6,500
Total international inflow	451,500	15,500	36,000	13,000	516,000
Total international outflow	301,500	12,500	24,000	13,000	351,000
Net international migration	150,000	3,000	12,000	0	165,000

Source: Office for National Statistics

Figure 5-2: Estimated and projected international migration to/from the UK, year ending mid-1994 to year ending mid-2023



Source: Office for National Statistics

Notes:

1. All data are displayed on a mid year basis
2. Historic international migration figures for England, Scotland and Wales are primarily based on International Passenger Survey data and Northern Ireland figures are obtained directly from NISRA so aggregate totals may differ from published international migration data

5 . Cross-border Migration within the UK

Regular estimates of the movements of population between the countries of the UK are made by ONS, NRS and NISRA. These estimates are based on changes of residence recorded by the National Health Service Central Register (NHSCR). As with the international flows, the cross border flows between each UK country (e.g. England to Northern Ireland, and so on) are modelled using ARIMA and a suitable model selected for each flow to produce the long term assumptions, with a smooth short term run-in to the long term formulated based on the modelling output and linear interpolation. Table 5-2 shows the annual long term flows between the four UK countries.

Table 5-2: Matrix of assumed long term cross border flows between the UK constituent countries, mid-2019 onwards

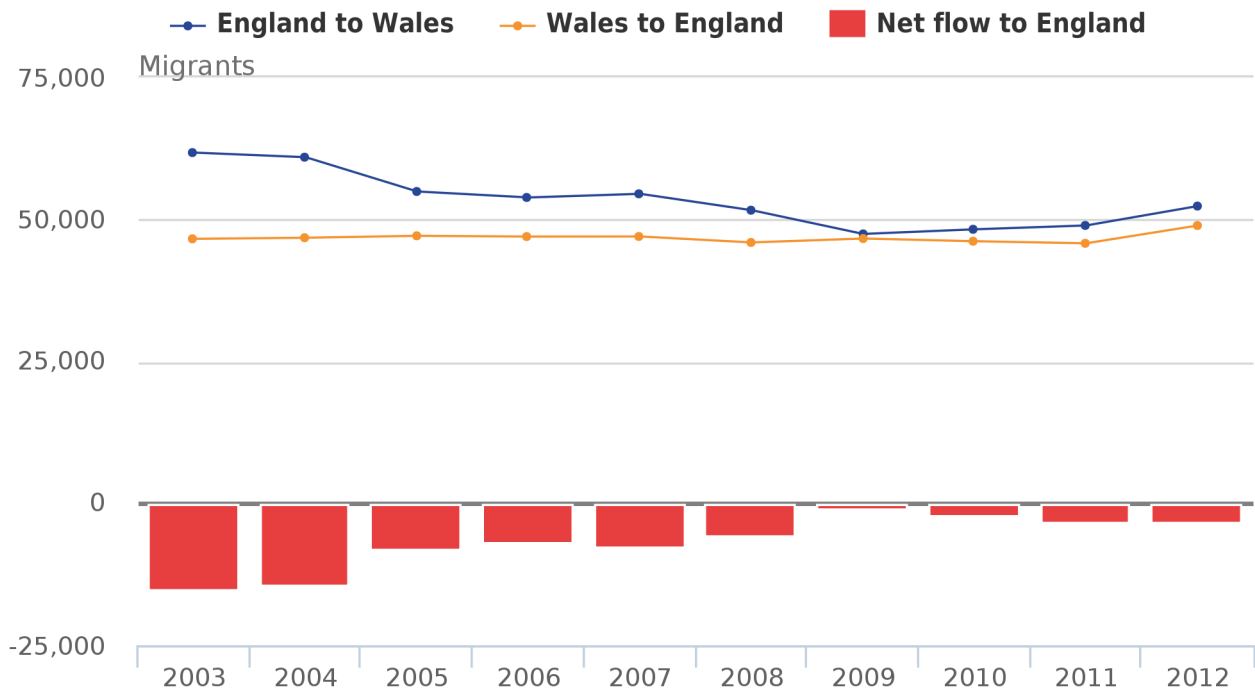
Country of origin	England	Wales	Scotland	Northern Ireland
England	-	52,500	41,000	9,500
Wales	49,000	-	2,000	500
Scotland	38,500	1,500	-	2,000
Northern Ireland	9,000	500	2,500	-
Net	-6,500	3,000	3,500	0

Source: Office for National Statistics

The resulting assumed annual long-term cross border net inflows are therefore -6,500 to England, +3,000 to Wales, +3,500 to Scotland and zero to Northern Ireland. These assumptions are compared with those from the 2010-based projections in Table 5-3.

Numerically, the dominant flows within the UK are between the smaller countries and England. Figures 5-3 to 5-5 show the trend in these flows between 2002–03 and 2011–12. Note that the scales differ in the three charts and that the flows to and from Northern Ireland are much smaller than those to and from Wales and Scotland. The figures show that cross-border migration for the flows between England and Wales and England and Scotland in particular have moved closer to a figure of net zero (represented by the bars) over the last ten years.

Figure 5-3: Migration between England and Wales, year ending mid 2003 to year ending mid 2012

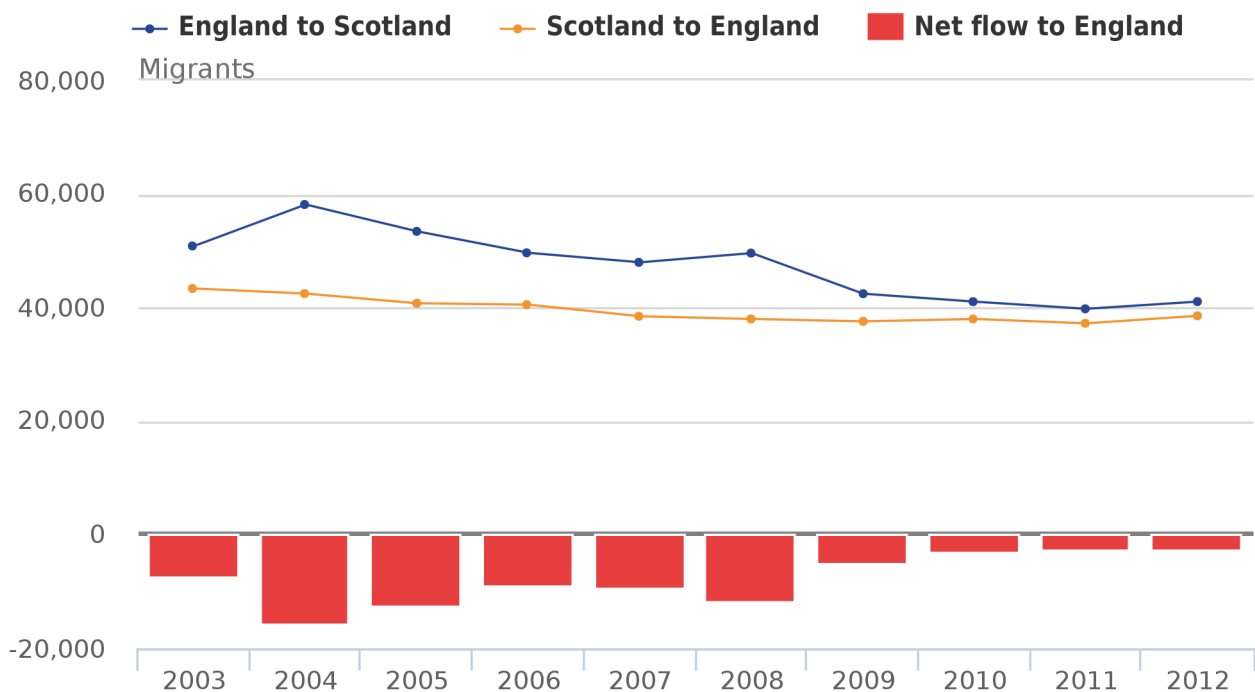


Source: Office for National Statistics

Notes:

1. All data are displayed on a mid year basis

Figure 5-4: Migration between England and Scotland, year ending mid 2003 to year ending mid 2012

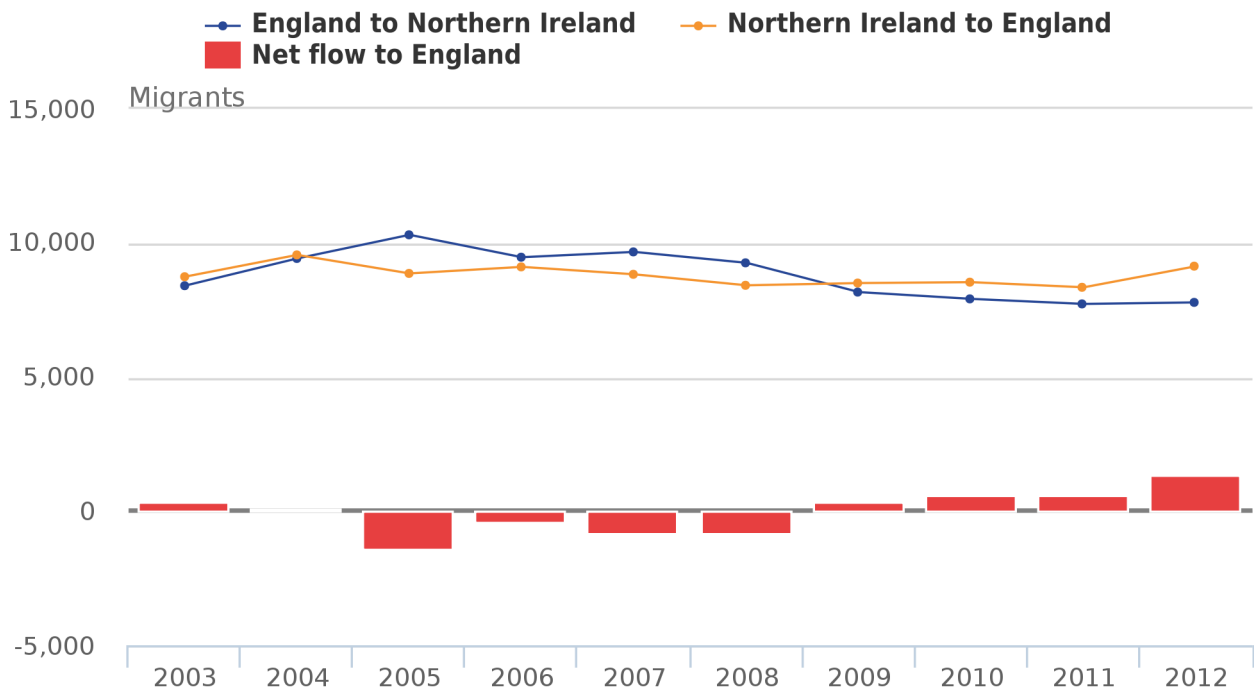


Source: Office for National Statistics

Notes:

1. All data are displayed on a mid year basis

Figure 5-5: Migration between England and Northern Ireland, year ending mid 2003 to year ending mid 2012



Source: Office for National Statistics

Notes:

1. All data are displayed on a mid year basis

6 . Total long-term net migration assumptions

Combining the assumptions for the international migration and cross border flows, gives total net migration of 143,500 to England, 6,000 to Wales, 15,500 to Scotland and zero to Northern Ireland. Table 5-3 shows that the overall assumptions for England, Wales and Scotland are lower than the 2010-based projections and those for Northern Ireland are the same.

Table 5-3: Long-term annual net migration assumptions, UK and constituent countries, mid-2019 onwards

Country	2012-based	2010-based	Difference
International net migration (includes asylum seekers)			
England	150,000	188,000	-38,000
Wales	3,000	3,000	0
Scotland	12,000	9,000	3,000
Northern Ireland	0	0	0
United Kingdom	165,000	200,000	-35,000
Cross-border net migration			
England	-6,500	-15,500	9,000
Wales	3,000	7,000	-4,000
Scotland	3,500	8,500	-5,000
Northern Ireland	0	0	0
Total net migration			
England	143,500	172,500	-29,000
Wales	6,000	10,000	-4,000
Scotland	15,500	17,500	-2,000
Northern Ireland	0	0	0
United Kingdom	165,000	200,000	-35,000

Source: Office for National Statistics

Notes:

1. International migration includes IPS, migrant and visitor switchers, asylum seekers and Republic of Ireland flows

The projections assume constant levels of annual net migration beyond mid-2019. In reality, of course, migration will inevitably continue to fluctuate from year to year, but such long-term fluctuations are impossible to predict. The assumptions should therefore be regarded as representing average annual levels of net migration for the future.

7 . Assumptions for the short-term

Special assumptions have been applied for the first few years of the projections (mid-2013 to mid-2018). The breakdown of these assumptions is shown in Table 5-4. The short-term run-in has been formulated to represent a smooth transition from the last year of actual data to the long-term assumptions. The run in also takes the following factors into account:

1. The modelling output over the short term, although the difference from the long term is minimal in the 2012-based projections.
2. A short term armed forces flow, which has been included to account for the planned return of home armed forces personnel and their dependants from Germany.

Home armed forces

A separate flow to account for the planned return of home armed forces personnel from Germany to England (plus their dependants) is included in the short term assumptions. This flow is not modelled, rather it is based on actual planned numbers of troops returning up until 2019. The flow is set to zero in the long term.

Table 5-4: Short-term annual net migration assumptions, United Kingdom and constituent countries, year ending mid-2013 onwards

	United Kingdom	England	Wales	Scotland	Northern Ireland
Total net migration					
2012-13	164.5	145.1	6.9	13.4	-0.9
2013-14	165.5	145.8	6.7	13.7	-0.7
2014-15	164.5	144.4	6.6	14.1	-0.6
2015-16	183.5	163.1	6.4	14.4	-0.4
2016-17	171	150.2	6.3	14.8	-0.3
2017-18	174	152.9	6.1	15.1	-0.1
2018-19 onwards - long-term assumption	165	143.5	6	15.5	0
International migration assumption¹					
2012-13	164.5	151.1	3.7	9.9	-0.2
2013-14	164.5	150.8	3.5	10.2	0
2014-15	164.5	150.5	3.4	10.6	0
2015-16	165	150.9	3.2	10.9	0
2016-17	165	150.6	3.1	11.3	0
2017-18	165	150.4	3	11.6	0
2018-19 onwards - long-term assumption	165	150	3	12	0
Cross border migration					
2012-13	0	-6	3.2	3.5	-0.7
2013-14	0	-6	3.2	3.5	-0.7
2014-15	0	-6.1	3.2	3.5	-0.6
2015-16	0	-6.3	3.2	3.5	-0.4
2016-17	0	-6.4	3.2	3.5	-0.3
2017-18	0	-6.5	3.1	3.5	-0.1
2018-19 onwards - long-term assumption	0	-6.5	3	3.5	0
Returning armed forces from Germany (including dependants)					
2012-13	0	0	0	0	0
2013-14	1	1	0	0	0
2014-15	0	0	0	0	0
2015-16	18.5	18.5	0	0	0
2016-17	6	6	0	0	0
2017-18	9	9	0	0	0
2018-19 onwards - long-term assumption	0	0	0	0	0

Source: Office for National Statistics

Notes:

1. International migration includes IPS, migrant and visitor switchers, asylum seekers and Republic of Ireland flows

8 . Other considerations

Illegal migration

In line with ONS estimates of total international migration, no explicit or separate allowance has been made in the projections for illegal migrants entering the UK.

Age and sex distribution

For England, Wales, Scotland and Northern Ireland, the assumed age and sex distributions for the international migrant flows have been based on the age-sex distributions of the international migration component in the relevant mid year population estimates. The assumed distributions are based on averages of the last five years' data (2008-2012). The international distributions are also applied to the asylum seeker flows because single year of age distributions are not available for this data source.

For cross-border migration, separate age and sex distributions, based on NHSCR data, were calculated for each flow, with the exception of the flows to and from Northern Ireland, where the age and sex distributions were obtained directly from NISRA.

Where appropriate, the age distributions for each sex were smoothed with a variation of the Rogers-Castro model⁵, which was able to include a student migration peak where necessary. This method involves fitting a curve with a number of parameters to the data, allowing the age distributions to be smoothed while retaining the typical migration patterns at different ages, for example student and retirement peaks.

In each case the age and sex distributions were considered separately for immigrants and emigrants. The long-term net migration distribution for the UK is summarised in Table 5-5. The table shows that the projections assume slightly more male migrants than female migrants. Equivalent tables for the constituent countries and further tables containing in- and out-migration by age and sex are available on the [ONS website](#).

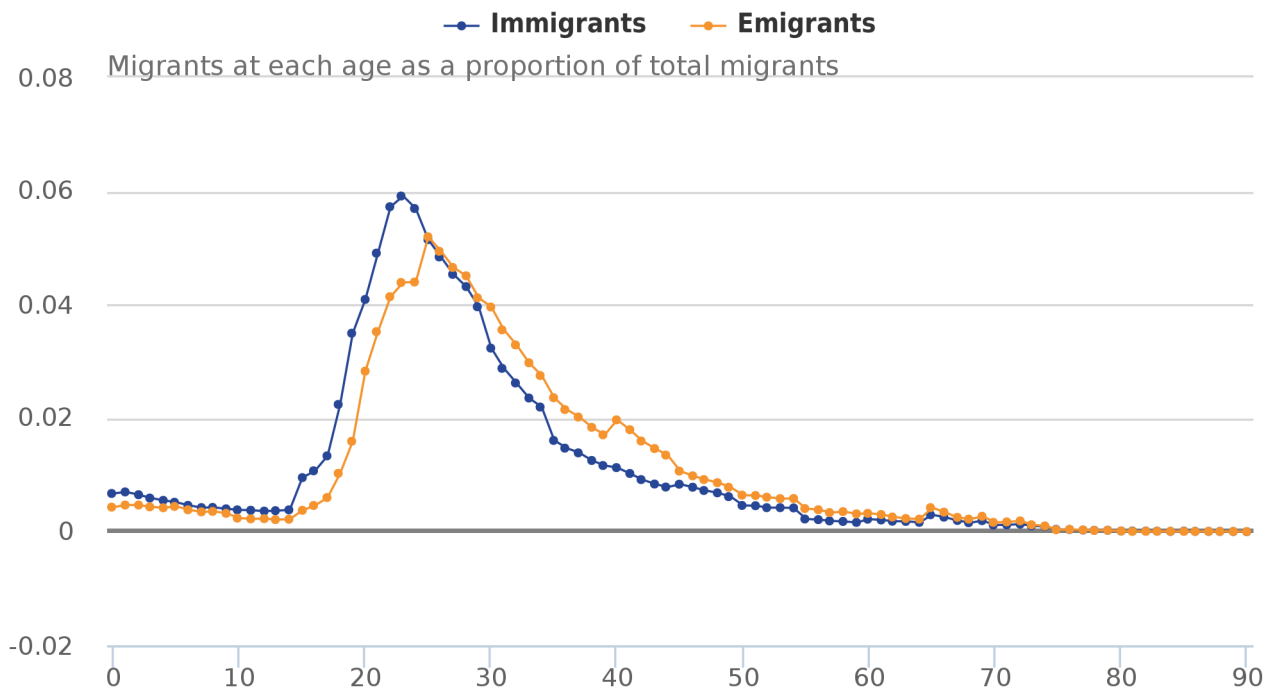
Table 5-5: Assumed annual long-term net migration by age and sex, United Kingdom

Age group	thousands		
	Persons	Males	Females
0 - 4	8.3	4.6	3.7
5 - 9	5.4	2.7	2.8
10 - 14	5.0	3.1	1.9
15 - 19	35.3	17.8	17.6
20 - 24	69.6	36.7	33.0
25 - 29	28.9	18.6	10.3
30 - 34	9.6	5.2	4.3
35 - 39	0.1	-0.2	0.4
40 - 44	-2.5	-2.7	0.2
45 - 49	1.9	1.3	0.6
50 - 54	1.1	0.2	0.9
55 - 59	-0.4	-0.8	0.3
60 - 64	0.7	0.1	0.6
65 - 69	0.8	0.2	0.6
70 - 74	0.5	0.1	0.4
75 & over	0.6	0.3	0.4
All ages	165.0	87.1	77.9

Source: Office for National Statistics

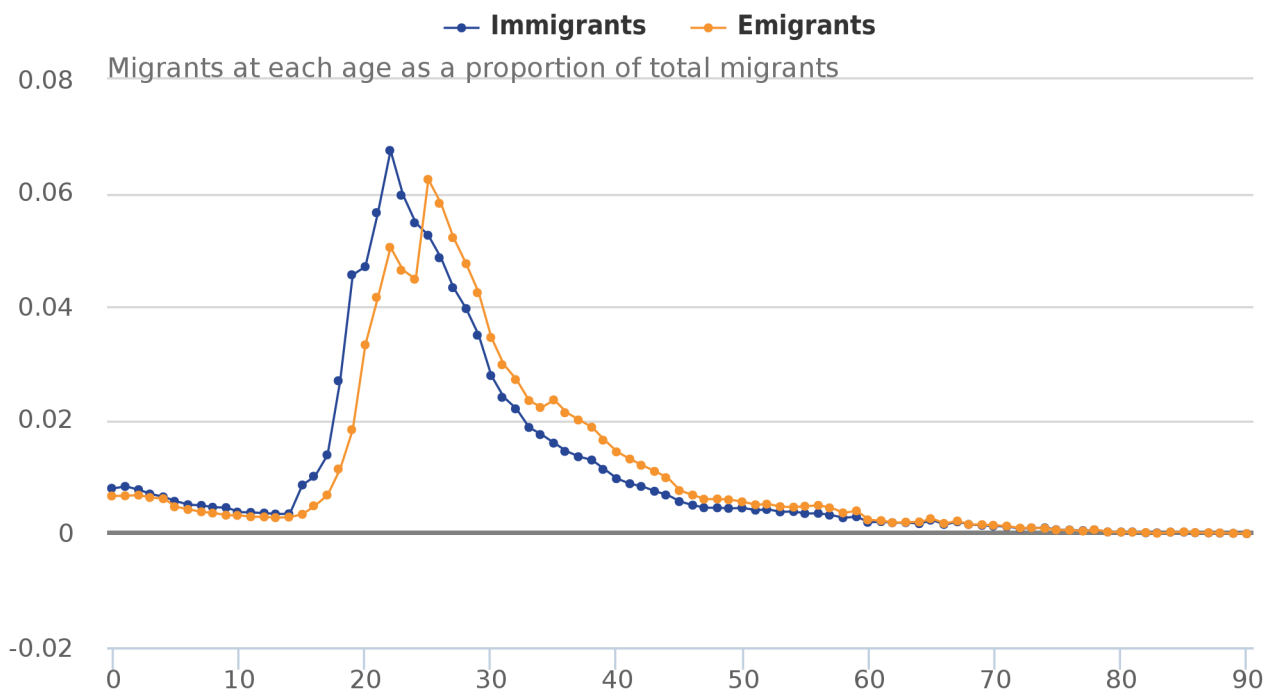
The assumed age distributions for international migration to and from the UK, and the NHSCR derived distributions for cross-border migration for England, are shown in Figures 5.6-5.9. All these distributions are highly peaked at the young working ages, with an additional prominent student peak visible in the cross border distributions. This was also the case for the distributions assumed for cross-border migration for Wales, Scotland and Northern Ireland.

Figure 5-6: Assumed long-term age distribution for international migration to/from the UK, males



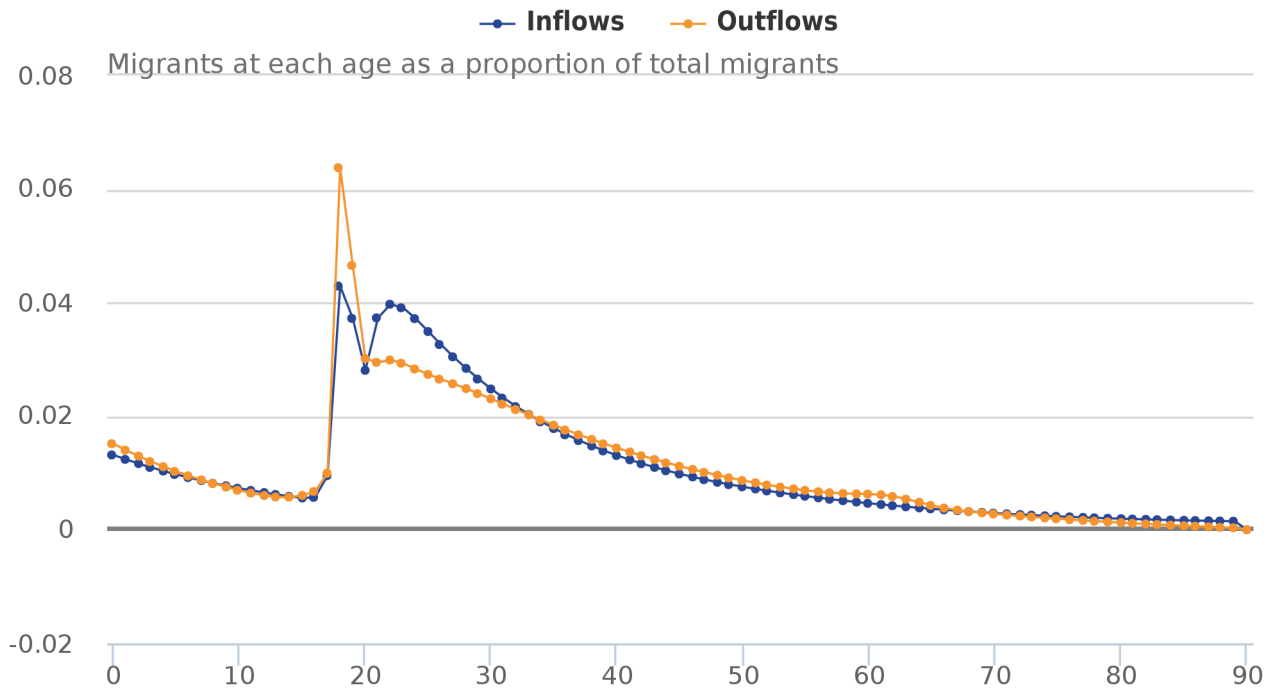
Source: Office for National Statistics

Figure 5-7: Assumed long-term age distribution for international migration to/from the UK, females



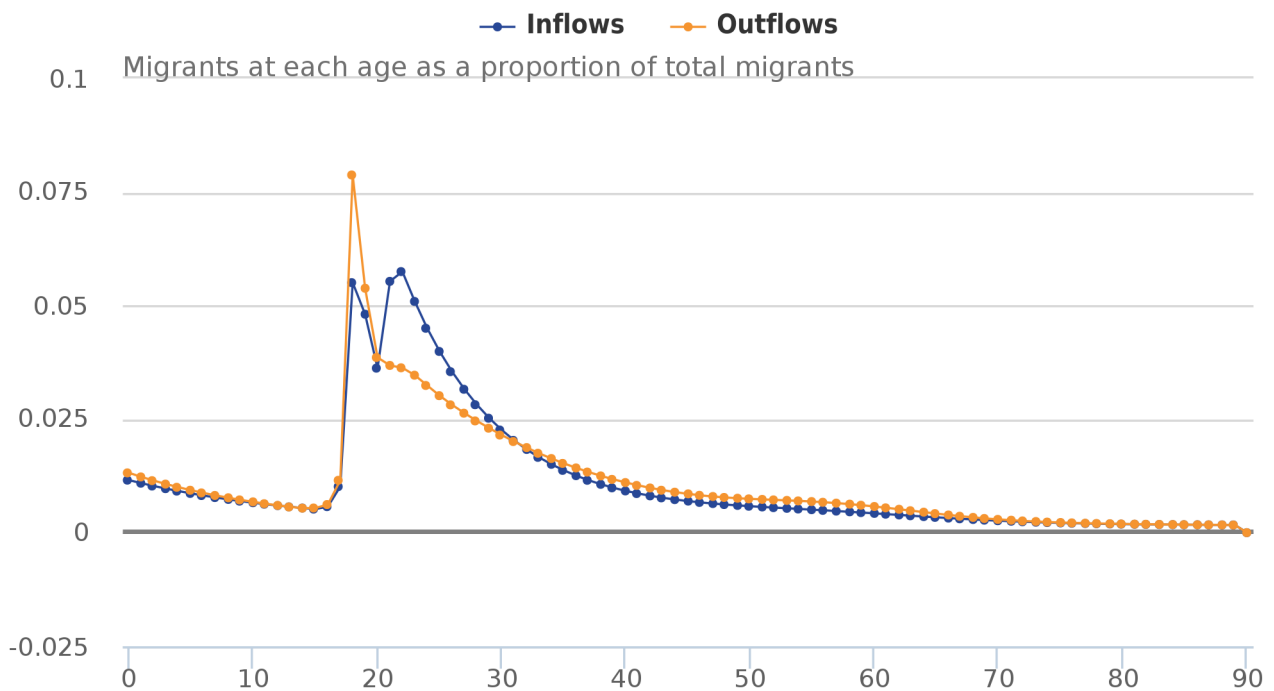
Source: Office for National Statistics

Figure 5-8: Assumed long-term age distribution for cross-border migration between England and the rest of the UK, males



Source: Office for National Statistics

Figure 5-9: Assumed long-term age distribution for cross-border migration between England and the rest of the UK, females



Source: Office for National Statistics

9 . Views of future migration levels

The NPP Expert Advisory Panel of seven academic demographic experts met in April 2013. A note of the meeting is included in the 2012-based projections November release, in Appendix A of the Background and Methodology paper. In an accompanying questionnaire, the experts were asked for their opinions on the likely levels of international migration to and from the UK in 2016 and 2036 (that is, five years and twenty-five years into the future from mid-2011, which were the latest estimates at the time).

Taking the average of the experts' responses, their predicted average annual net migration for 2036 was a net inflow of +162,000 per year (with an average 67% confidence interval of 120,000 to 280,000). This is close to the 2012 based long-term assumption for net migration to the UK of +165,000 per year.

The experts were also asked to consider five overall forces with the potential to affect levels of net migration to the UK in the long-term and assess the importance and likely impact of each force upon future migration:

- The main motives for international migration – work, study, joining/accompanying family
- Migration pressure resulting from changes in the countries of origin
- The attractiveness of the UK as a country of residence
- Costs of migration (in the broader sense)
- Controls on migration flows (referring to both the tightening and removal of controls)

The majority of experts considered the first two forces to have a small upward effect or no influence on total net migration, and forces three and four to have a downward effect or no influence. Almost all experts considered the last force, controls on migration, to have a downwards influence on migration. Other forces identified by the experts were conflict and political instability, environmental change, the economy and labour market policies.

Regarding short term migration, the annual net migration estimate derived from the experts' responses for 2016 was a net inflow of +183,000 per year (with an average 67% confidence interval of 140,000 to 232,000). This is somewhat higher than the corresponding experts' average for 2036 (+162,000 per year) and the proposed 2012-based long-term assumption of +165,000, but is close to the assumed short term run-in figure for 2015-16 of +183,500.

The experts were also asked to consider the effects of certain specific situations on migration:

There were mixed views on the effects of the economy on migration over the next five years. Two experts thought it would have an upwards influence on net migration, two that it would have a downwards influence and two that it would have little or no effect.

There were also mixed views on EU and non-EU migration in relation to the effects of controls and government policies on migration.

All but one expert thought that net migration from the EU would be roughly similar or somewhat higher over the next five years while views on non-EU net migration were more mixed, with three experts thinking it would be somewhat lower, two that it would be somewhat higher and two that it would be roughly similar.

In the long-term, four experts thought that EU migration would be higher than now, two that it would be lower, and one that there would be no change. Regarding immigration from outside the EU, three experts thought it would be higher, three lower, and one that there would be no change.

The experts also gave their opinions on the current main reasons for migration to the UK. Four experts thought that migration for study would be lower in five years time and three thought it would be similar. Three experts thought that migration for work would be lower, two that it would be higher and two that it would be about the same. Two experts thought that migration for family reasons would be higher, one lower and four that it would be about the same.

The experts' predictions for total migration from the 13 countries which joined the EU between 2004 and 2013 (Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia) ranged from 68,000 to 100,000 for 2016 and from 30,000 to 150,000 for 2036.

Generally, the experts thought that migration would continue to be concentrated in London and the South of England. They also noted that the results of the Scottish independence referendum could have an effect on future migration patterns.

It should be noted that trends in underlying 'push' and 'pull' factors in western countries do not automatically follow through to corresponding trends in net migration. For example, increases in the numbers of people wishing to enter a country may lead governments to consider more targeted or restrictive immigration policies. The different responses of EU governments to the opening of their labour markets to people from the EU8 accession countries is a reminder that migrant numbers are not just dependent on the demographic characteristics of the sending and receiving countries, but will also be affected by any intervening obstacles or incentives placed on their movement.

There is evidence that levels of international migration are correlated with economic factors such as unemployment rates, although the strength of the relationship may vary from country to country⁶. Nevertheless, few agencies explicitly use explanatory variables (whether economic or other), in projection making, other than perhaps in the very short-term. This is often because the explanatory variables are considered to be as, or more, difficult to predict than the demographic variables.

10. References

1. For further information see the revised methodology for setting the migration assumptions for the 2012-based national population projections, available at: <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/population-and-migration/population-projections/npp-migration-assumptions-methodology-review/revised-migration-assumptions-setting-methodology.pdf>.
2. For further information see the Migration Assumptions in the UK National Population Projections: Methodology Review, available at: <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/population-and-migration/population-projections/npp-migration-assumptions-methodology-review/migration-assumptions-in-the-uk-npp-methodology-review.pdf>.
3. For the latest migration statistics data see the Migration Statistics Quarterly Report available at: <http://www.ons.gov.uk/ons/rel/migration1/migration-statistics-quarterly-report/index.html>.
4. Autoregressive Integrated Moving Average time series modelling. Time series data are used to predict future trends. ARIMA modelling can take into account trends, seasonality, cycles, errors and non-stationary aspects of a data set when making forecasts.
5. Rogers A, and Castro LJ (1981). Model Migration Schedules, IIASA Research Report RR-81-030, available at: http://www.iiasa.ac.at/publication/more_RR-81-030.php
6. Analysis and forecasting of international migration by major groups. Eurostat Working Paper 3/2002/E/no. 17. Eurostat, 2003, available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-AP-01-032

11. Background notes

1. The 2012-based Population Projections for United Kingdom and constituent countries were published on [6 November 2013](#) (main release) and [10 December 2013](#) (extra variants).

2. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

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