

Compendium

Migration, 2014-based national population projections reference volume

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1. Introduction

In the national population projections, assumptions are made regarding future levels of migration to or from the UK and its constituent countries. This is broken down into international migration (the movement of people to or from countries outside of the UK) and cross border migration (the movement of people between countries of the UK).

In 2012, the Economic and Social Research Council (ESRC) Centre for Population Change (CPC) carried out a review of the migration assumptions-setting methodology for the national population projections¹.

The previous assumptions-setting methodology had been in place since the 1991-based projections and the review suggested that whilst 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.

The review recommended that the existing arguments-based methodology should be brought into line with current academic recommendations as a multi-stage redevelopment approach. With the support of a user forum run in parallel to the review, in the 2012-based projections there was a move to modelling migration inflows and outflows separately and a general streamlining of the methodology².

For the 2014-based projections a new SAS-based projections system was developed, enabling the setting and applying of the cross-border (intra-UK) migration assumptions as rates rather than fixed numbers of migrants ³. Introducing migration rates into the projections is a continuation of the work to implement the recommendations from the ESRC review and is another step towards fully aligning our projections with the most up to date academic ideas. By using rates, cross-border migrant flows change on the basis of the underlying population size and age structure. This means that the projections cannot produce implausible values, such as negative population stocks, when projected fixed levels of emigration are greater than the initial population size. This was previously an issue for Northern Ireland where there is a high level of cross-border migration at some ages.

This chapter summarises the resulting assumptions adopted in the short-term and long-term for the 2014-based population projections, both in terms of international and cross-border migration.

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.

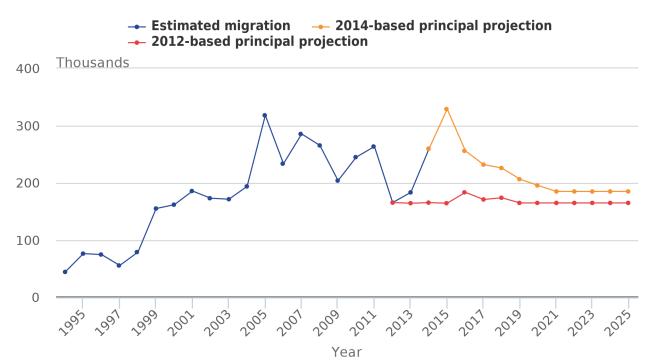
2. Past trends in migration

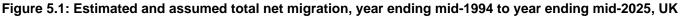
Since the early 1980s, the UK has transitioned from being a country characterised by net emigration to one characterised by net immigration. This is due to the fact that the growth in immigration, which has risen from less than 200,000 per year in 1981 to over 600,000⁴ in 2014, has outstripped any increases in emigration. Net migration peaked in 2004 to 2005 partly as a result of immigration from countries that joined the EU in 2004. Since the peak, annual net migration has fluctuated between +160,000 and +290,000 per annum.

In the year ending June 2014 (the base year of the projections), 583,000 people immigrated to the UK. Net migration in the year to June 2014 rose to +260,000, a significant increase 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 +185,000 each year compared with +165,000 a year in the 2012-based projections, reflecting the rise in net migration to the UK since 2012. 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 2012-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 260,000 between mid-2013 and mid-2014.





Source: Office for National Statistics

Notes:

- 1. All migration data are displayed on a mid-year basis
- 2. Historical 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
- 3. 2002 to 2010 immigration and emigration figures reflect revisions made in light of the results of the 2011 Census; therefore the totals may differ from the published international migration data

4. International migration

We use 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 1 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 actually leave, or return to, the UK within 1 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, our 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 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

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. This is consistent with the 2012-based projections, but in contrast to previous rounds of projections where migrants from EU8 and EU2 countries were excluded from IPS modelling and adjusted for separately.

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 separately. Initially the flows were modelled using ARIMA⁵, which is a standard technique for time series forecasting and which was used for the 2012-based projections. A number of models were fitted to each flow, with the most suitable one chosen based on goodness of fit measures.

ARIMA modelling, by its nature, gives more weight to most recent trends in the data. As the UK has recently experienced a period of high net in-migration, the modelled long-term trends assume that these high levels will continue. As this trend is contrary to the expert academic advisory panel's views ⁶ on long-term migration, alternative assumptions (using a moving average approach) were also produced.

The moving average modelling was based on data up to mid-2014 with the length of the time series used dependent on the data source. For international immigration and emigration, a 25 year moving average was calculated for each flow to/from England, Scotland and Wales. For Northern Ireland a 20 year moving average was used, as a consistent time series of data was not available for 25 years. For asylum seekers a 10 year moving average was calculated for each flow. This time frame was selected to exclude the unusually high historic peak of asylum seekers in Great Britain around the year 2000, after which legislative changes (Nationality, Immigration and Asylum Act 2002) were implemented that reduced unfounded asylum applications.

At the national population projections consultation, the long-term assumptions based on the moving average approach were agreed in preference to those from the ARIMA modelling. The resulting figures were fixed as the long-term assumption for the year to mid-2021 and held constant for the remaining length of the projection. Short-term assumptions were calculated based on a linear interpolation between the latest estimates (mid-2014) and the long-term assumptions to provide a smooth run-in for each UK country. At the time of producing the national population projection assumptions, migration estimates were available for the year ending December 2014 and National Insurance number allocations to March 2015. These figures were extrapolated and used to adjust the migration assumptions in the first year of the projection to reflect anticipated migration levels.

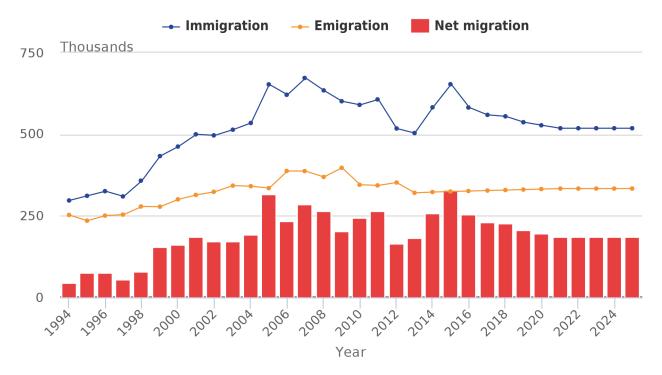
The separate gross flows for each country were summed to produce total numbers by country and for the UK as a whole. The resulting long-term assumptions can be seen in Table 5.1.

	England	Wales	Scotland	Northern UK Ireland
International inflow	438,000	12,500	32,000	13,000 495,500
International outflow	281,000	9,000	23,500	12,000 325,500
Asylum seeker inflow	20,500	1,000	1,500	- 23,000
Asylum seeker outflow	7,000	500	500	- 8,000
Total international inflow	458,500	13,500	33,500	13,000 518,500
Total international outflow	288,000	9,500	24,000	12,000 333,500
Net international migration	170,500	4,000	9,500	1,000 185,000

Source: Office for National Statistics

The estimated and projected international in and out flows to or from the UK are shown in Figure 5.2.

Figure 5.2: Estimated and projected international migration to or from the UK, year ending mid-1994 to year ending mid-2025



Source: Office for National Statistics

Notes:

- 1. All migration data are displayed on a mid-year basis
- 2. Figures up to and including the year ending mid-2014 are international migration estimates. Figures for year ending mid-2015 onwards are assumed levels of international migration
- 3. Historical 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. 2002 to 2010 immigration and emigration figures reflect revisions made in light of the results of the 2011 Census; therefore the totals may differ from the published international migration data

Table 5.2 shows that the long-term international migration assumptions for England, Wales and Northern Ireland are higher than the 2012-based projections and those for Scotland are lower.

Table 5.2: Long-term annual net international migration assumptions, UK and constituent countries, mid-2021 onwards

Country	2014-based	2012-based	Difference
England	170,500	150,000	20,500
Wales	4,000	3,000	1,000
Scotland	9,500	12,000	-2,500
Northern Ireland	1,000	0	1,000
UK	185,000	165,000	20,000

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 international migration beyond mid-2021. 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.

5. Cross-border migration with the UK

Regular estimates of the movements of population between countries of the UK are made by the Office for National Statistics, National Records Scotland and the Northern Ireland Statistical Research Agency. These estimates are based on changes of residence recorded by National Health registration systems in the respective countries.

In the 2014-based projections, migration assumptions between countries of the UK have been set as rates rather than as fixed numbers of migrants. Annual age and sex-specific migration rates for each cross-border flow (England to Northern Ireland and so on) are calculated as the number of migrants at the end of the year divided by the population of the country of origin at the start of the year. An average of the rates for the last 5 years (year ending mid-2010 to year ending mid-2014) is then taken. An adjustment is applied to these average rates to take into account the population size of the country of destination in addition to the country of origin. When only the country of origin is taken into account, migration out of fast-growing countries will always increase at a faster rate than that from slow-growing countries. By applying the adjustment, net migration rates to each country over the course of the projection are stabilised and therefore more closely resemble past trends.

These adjusted rates are applied to the population of the country of origin at the beginning of each projection year to calculate the projected number of migrants for each cross-border flow.

Using a rates-based method results in cross-border flows between countries of the UK varying year-on-year as the population size and age structure changes. In the long-term cross-border flows tend to stabilise. In previous rounds of projections, total cross-border migration assumptions to or from the other countries of the UK were set as a constant value in the long-term.

Table 5.3 shows the flows between the 4 UK countries for the year ending mid-2039, 25 years into the projection.

Table 5.3: Matrix of assumed long-term cross-border flows between the UK constituent countries, mid-2039

	Country of destination				
Country of origin	England	Wales	Scotland	Northern Ireland	
England	- :	55,200	42,700	8,200	
Wales	53,600	-	1,500	400	
Scotland	37,600	1,300	-	1,900	
Northern Ireland	8,800	400	2,200	-	

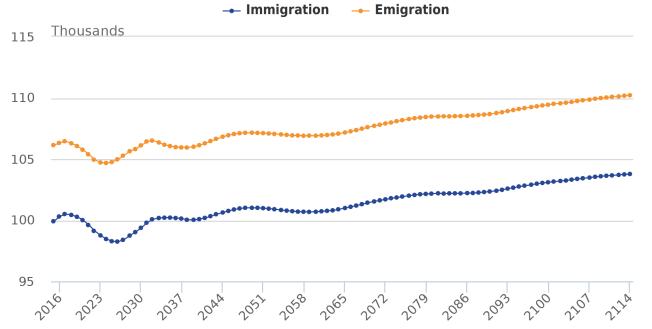
Source: Office for National Statistics

Notes:

1. Figures may not sum due to rounding

Table 5.3 shows that numerically the dominant flows within the UK are between the smaller countries and England. England tends to have a net loss to Scotland and Wales, but a small net gain in migrants from Northern Ireland. Scotland has a net gain from all 3 countries. The numbers moving between Wales and Northern Ireland each year are very small with a negligible net gain to Northern Ireland.

Figures 5.3 to 5.6 show the trend in cross-border in- and out-flows for England, Wales, Scotland and Northern Ireland throughout the projection period.

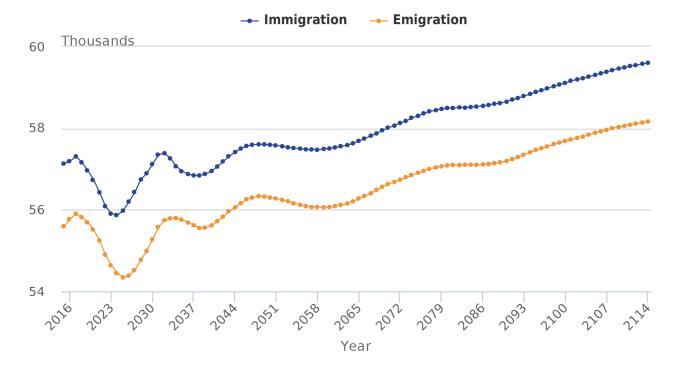


Year

Figure 5.3: Cross-border migration assumptions, England, year ending mid-2015 to year ending mid-2114

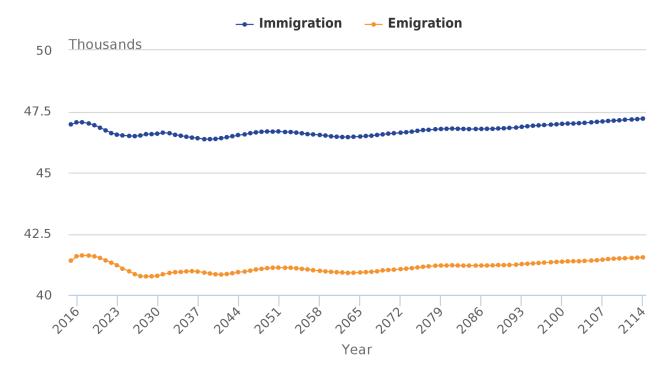
Source: Office for National Statistics





Source: Office for National Statistics





Source: Office for National Statistics

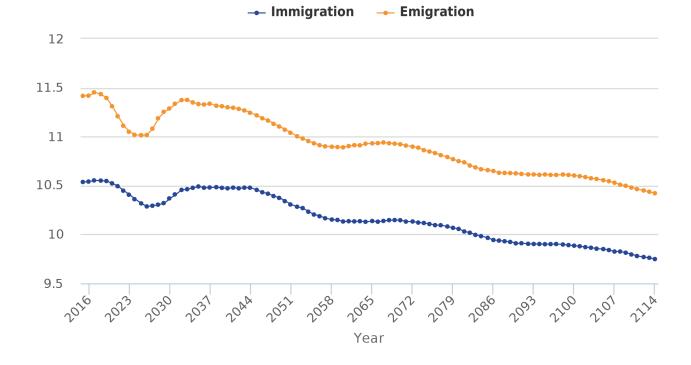


Figure 5.6: Cross-border migration assumptions, Northern Ireland, year ending mid-2015 to year ending mid-2114

Source: Office for National Statistics

For each country, the assumptions show fluctuations in the early years reflecting the impact of the underlying age and sex structure and population sizes of the respective countries. In the long-term the trends stabilise.

Table 5.4 shows the net cross-border migration assumptions for selected years compared with those from the 2012-based projections.

Table 5.4: Long-term annual net cross-border migration assumptions, UK constituent countries, selected	
years	

2014-based assumptions						2012-based assumptions
Country Mid-2024 Mid-2039 Mid-2064 Mid-2089 Mid-2114						
England	-6,200	-6,000	-6,200	-6,300	-6,400	-6,500
Wales	1,400	1,300	1,400	1,500	1,400	3,000
Scotland	5,500	5,500	5,600	5,600	5,700	3,500
Northern Ireland	-700	-800	-800	-700	-700	0

Source: Office for National Statistics

For the 2014-based projections, England and Northern Ireland have a projected net outflow of migrants to other countries of the UK, whereas Wales and Scotland have a projected net inflow.

The long-term net cross-border assumptions for England are broadly consistent with the 2012-based projections. Wales and Northern Ireland assume a lower level of net cross-border migration in the 2014-based projections whereas the assumption for Scotland is approximately 2,000 per year higher than the 2012-based projections.

6 . Assumptions for the short-term

Special international migration assumptions have been applied for the first few years of the projection (mid-2015 to mid-2020). The breakdown of these assumptions is shown in Table 5.5. 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, with an adjustment made in the first year of the projection to take into account provisional extrapolated migration estimates for the year to mid-2015. The run-in also includes 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.

For cross-border migration, rates are applied in the first few years of the projection in the same way that they are applied throughout the projection period. No distinction is made between the short- and long-term.

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 mid-2018. The flow is set to zero in the long term.

					thousands
	United Kingdom	England	Wales	Scotland	Northern Ireland
Total net international migration					
2014-15	329.0	304.7	7.7	13.6	3.0
2015-16	256.0	239.5	5.4	8.4	2.7
2016-17	232.0	216.0	5.1	8.6	2.3
2017-18	226.0	210.3	4.8	8.9	2.0
2018-19	206.5	191.1	4.6	9.1	1.7
2019-20	195.5	180.7	4.2	9.3	1.3
Long term assumption (2020-21 onwards)	185.0	170.5	4.0	9.5	1.0
International migration assumption ¹					
2014-15	329.0	304.7	7.7	13.6	3.0
2015-16	238.5	222.0	5.4	8.4	2.7
2016-17	227.5	211.5	5.1	8.6	2.3
2017-18	217.0	201.3	4.8	8.9	2.0
2018-19	206.5	191.1	4.6	9.1	1.7
2019-20	195.5	180.7	4.2	9.3	1.3
Long term assumption (2020-21 onwards)	185.0	170.5	4.0	9.5	1.0
Returning armed forces from Germany (includi	ng dependants)				
2014-15	0.0	0.0	0.0	0.0	0.0
2015-16	17.5	17.5	0.0	0.0	0.0
2016-17	4.5	4.5	0.0	0.0	0.0
2017-18	9.0	9.0	0.0	0.0	0.0
2018-19	0.0	0.0	0.0	0.0	0.0
2019-20	0.0	0.0	0.0	0.0	0.0
Long term assumption (2020-21 onwards)	0.0	0.0	0.0	0.0	0.0

Table 5.5: Short-term annual net international migration assumptions, UK and constituent countries, year ending mid-2015 onwards

Source: Office for National Statistics

Notes:

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

7. Other considerations

Illegal migration

In line with our 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 were considered separately for immigrants and emigrants and are based on averages of the last 5 years' data (mid-2010 to mid-2014). The international distributions are also applied to the asylum seeker flows because single year of age distributions are not available for this data source.

The long-term net international migration distribution for the UK is summarised in Table 5.6. The table shows that the projections assume slightly more male than female international migrants.

For cross-border migration, age and sex-specific rates were calculated for each cross-border flow (England to Northern Ireland and so on) based on an average of the past 5 years' data. These rates were adjusted year on year to take into account the change in the destination country's proportion of the UK population relative to the reference period (mid-2010 to mid-2014). As adjustments are calculated and applied by age and sex, unlike the long-term international migration assumptions, the age-sex distributions for cross-border migration do not remain constant in the long-term and can vary year on year.

Table 5.6: Assumed annual long-term net international migration by age and sex, UK, 2020 to 2021 onwards

	thousands					
	2020-21 onwards					
Age group	Persons Males Female					
0 - 4	17.0	9.4	7.6			
5 - 9	10.6	5.5	5.0			
10 - 14	11.0	5.8	5.2			
15 - 19	31.4	17.0	14.4			
20 - 24	65.1	35.4	29.8			
25 - 29	28.5	16.1	12.4			
30 - 34	6.1	1.8	4.4			
35 - 39	0.7	0.3	0.4			
40 - 44	-0.7	-2.3	1.6			
45 - 49	3.5	2.0	1.5			
50 - 54	2.1	0.3	1.8			
55 - 59	2.3	0.5	1.8			
60 - 64	2.3	0.6	1.6			
65 - 69	1.9	0.8	1.1			
70 - 74	1.1	0.4	0.7			
75 and over	2.1	1.0	1.1			
All ages	185.0	94.7	90.3			

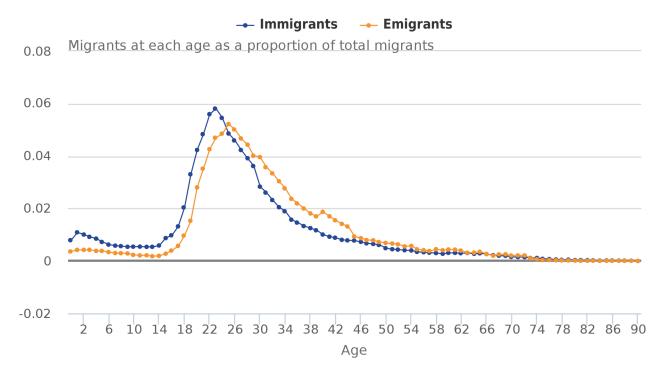
Source: Office for National Statistics

Notes:

1. Figures may not sum due to rounding

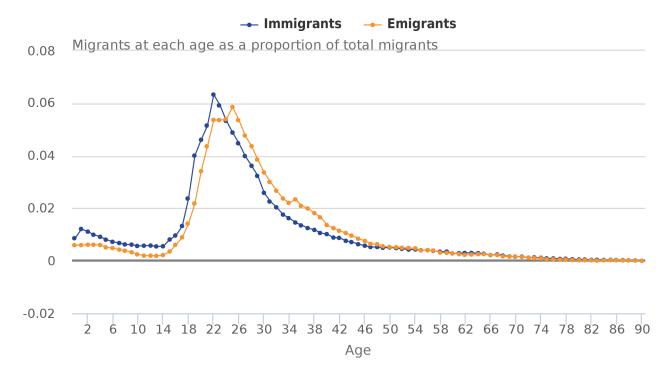
The assumed age distributions for international migration to and from the UK are shown in Figures 5.7 and 5.8. All these distributions are highly peaked at the young working ages





Source: Office for National Statistics

Figure 5.8: Assumed long-term age distribution for international migration to or from the UK, females



Source: Office for National Statistics

8. Views on future migration levels

The National Population Projections Expert Advisory Panel of 9 academic demographic experts met in April 2015. In an accompanying questionnaire, the experts were asked for their opinions on the likely levels of international migration to and from the UK in 2018 and 2038 (that is, 5 years and 25 years into the future from the latest 2013 population estimates). A note of the meeting and an analysis of the questionnaire are included in the 2014-based projections October 2015 release, in <u>Appendices A and B of the Background and Methodology paper</u>.

Experts' views on migration in the long-term

Over the last 5 years (2009 to 2013), international in-migration to the UK averaged about 550,000, out-migration 339,000 and net migration (taking into account revisions after the 2011 Census) 215,000 per year. Experts were asked their views on the expected level of migration to and from the UK in the future.

The average response for the expected level of annual immigration to the UK in 2038 was 530,000, with an average 95% confidence interval of 309,000 to 750,000.

With respect to emigration from the UK, the average response for the expected level of annual emigration in 2038 was 383,000, with an average 95% confidence interval of 256,000 to 531,000.

The average annual net migration derived from the experts' responses for 2038 was a net inflow of +153,000 per year, with an average confidence interval of 0 to 377,000.

Three experts responded with a lower confidence interval level that was less than zero suggesting they thought it possible there could be negative UK net migration in the future.

The experts' average long-term net migration figure to the UK (+153,000) is lower than the 2014-based long-term assumption of +185,000 per year. The difference is due predominantly to the emigration estimate which experts on average predicted to be 383,000 per annum, compared with an assumption of 333,500.

Experts' views on migration in the short-term

The average response for the expected level of annual immigration to the UK in 2018 was 535,000, with an average 95% confidence interval of 360,000 to 660,000.

With respect to emigration from the UK, the average response for the expected level of annual emigration in 2018 was 355,000, with an average 95% confidence interval of 280,000 to 438,000.

The average annual net migration derived from the experts' responses for 2018 was a net inflow of +188,000 per year, with an average confidence interval of 78,000 to 321,000.

The experts' averages show a small decrease in immigration and an increase in emigration between the shortterm and long-term. This gives an overall fall of the experts' average net migration figure of 35,000 between 2018 and 2038. The experts' short-term in, out and net figures are broadly in line with the 2014-based long-term assumptions of 518,500, 333,500 and +185,000 respectively.

Specific scenarios

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

Continuing instability of Syria, the Ukraine and other regions

When asked about the impact of political instability around the world, 3 experts felt that this will have little or no impact, 4 felt it would result in a small upwards movement and 2 a large upwards movement in the level of net migration in the short- and long-term.

Environmental change

In the short-term, 6 experts anticipate little or no change and 3 a small upwards movement in the level of UK net migration due to environmental change. In the long-term, responses were very similar to the short-term, with the exception of 1 expert anticipating a large upwards movement.

Changing global economy

There were mixed views on the effects of the changing global economy on migration patterns. The majority of experts suggested an upwards movement in the level of UK net migration over the next 5 years. Five felt this increase would be relatively small, whereas 2 felt it would be large.

In the long-term, responses were more evenly spread between an anticipated small downwards movement, little or no movement and a small upwards movement, with just 1 expert suggesting a large upwards movement in UK net migration over the next 25 years.

Other factors

Experts were asked to suggest other factors which could impact on international and cross-border migration over the next 5 and 25 years. Factors suggested included changes to government policy, further debate regarding devolution, EU membership, the need for labour to support the elderly population, an increase in alternatives to a UK higher education and a reduction in the demand from other countries for migrants from the UK.

9. References

- 1. For further information see Migration Assumptions in the UK National Population Projections: Methodology Review, available at: <u>http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/methodologies/nationalpopulationprojectionsmigrationassumptionsmethodologyreview</u>
- 2. For further information see Revised methodology for setting the migration assumptions for the 2012-based national population projections, available at: http://www.ons.gov.uk/peoplepopulationandcommunity/populationandcommunity/populationandmigration/populationprojections/methodologies/nationalpopulationprojectionsmigrationassumptionsmethodologyreview
- 3. For further information see Method for incorporating cross border migration rates into the UK National Population Projections, available at: <a href="http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/methodologies/metho
- 4. For the latest migration statistics data see the Migration Statistics Quarterly Report available at: <u>http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins</u>/migrationstatisticsquarterlyreport/previousReleases
- 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.

6. Minutes of the 2014-based National Population Projections Expert Academic Advisory Panel, available at: http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/compendium/nationalpopulationprojections/2015-10-29/backgroundandmethodology#appendix-a-minutes-of-expert-panel

10. Background notes

1. These <u>National Statistics</u> are produced to high professional standards and released according to the arrangements approved by the <u>UK Statistics Authority</u>.