

Projected Population of Scotland (2014-based)

Additional variants using alternative European Union migration assumptions

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An Official Statistics Publication for Scotland

These additional variant projections, using alternative European Union migration assumptions, have been created for illustrative purposes only. Unlike the National Population Projections published by the Office for National Statistics (ONS) on [29 October 2015](#) and [26 November 2015](#), these variant projections do not have National Statistics status. This is because the method for creating these additional migration assumptions was not subject to the same rigorous quality assurance and assessment process. National Statistics are assessed by the United Kingdom Statistics Authority as meeting the requirements of the [Code of Practice for Official Statistics](#).

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Uses and limitations of projections

When using a projection it is important to note some key limitations.

- A projection is a calculation showing what happens under certain assumptions about future fertility, mortality and migration.
- The assumptions are based on past trends and do not take account of any future changes that may occur as a result of policy initiatives but may reflect the past impact of policy and economic changes. These projections are not, therefore, forecasts of what the government expects to happen based on policy.
- These additional variants maintain the same assumptions as the principal 2014-based population projection for Scotland for fertility and mortality. The additional variants use alternative assumptions of future migration from the principal projection. The process for creating these migration assumptions was not subject to the same rigorous quality assurance and assessment process as the other 2014-based National Population Projections variants published in October 2015. Therefore they are classed as Official Statistics, and are not considered to have the same status as the previously published other variants that have National Statistics status. However, they have been produced to give an indication of what might happen under certain scenarios to the size and structure of the population of Scotland. National Statistics are assessed by the UK Statistics Authority as meeting the Requirements of the [Code of Practice for Official Statistics](#). The principal projection was published in October 2015 and the full publication is available in the [Population Projections Scotland](#) section of the NRS website.

Main Points

The key points in this report are as follows:

- The three additional variant projections that have been produced are: zero future European Union migration; 50 per cent future European Union migration (50 per cent less future European Union migration); and 150 per cent future European Union migration (50 per cent more future European Union migration). Each of these variants has been produced for both Scotland and the United Kingdom as a whole (including Scotland).
- For the purposes of these projections, the alternative migration assumptions were assumed to start affecting the level of migration from mid-2018 onwards. This is based on the assumption that this might be the first mid-year point prior to the United Kingdom leaving the European Union.
- Each of the variants uses the same assumptions as the principal projection up until mid-2018 and are therefore exactly the same up until this point. However, at this point they diverge as different overseas migration assumptions are applied from mid-2018 onwards. The overseas migration is then adjusted for each of the three additional variants after this point to account for different scenarios regarding future migration between Scotland and European Union countries after the United Kingdom leaves the European Union.

- In the principal projection, if current trends continue then the population Scotland is projected to rise from 5.35 million in 2014 to 5.51 million in 2024. It is then projected to continue to rise to 5.7 million in 2039 – an increase of seven per cent over the 25 year period.
- In the zero future European Union migration variant, the population of Scotland is projected to rise to 5.49 million in 2039 – an increase of three per cent from 2014. However, the population is projected to peak at 5.50 million in 2033 and then decline gradually after that point.
- For the 50 per cent future European Union migration variant, the population of Scotland is projected to rise to 5.59 million in 2039 – an increase of five per cent from 2014. And for the 150 per cent future European Union migration variant, there is a nine per cent rise in population projected, to 5.81 million in 2039.
- As migration is concentrated amongst young adult ages, the effect of varying the level of migration is greater on the number of children and people of working age than on the number of people of pension age.
- Compared to Scotland, the United Kingdom’s projected population increase is more rapid. The principal projection for the United Kingdom suggests that the population may rise from 64.6 million in 2014 to 74.3 million in 2039, an increase of 15 per cent. The more rapid increase projected for the United Kingdom also occurs for each of the additional variants, with an 11 per cent projected increase in population for the zero future European Union migration variant, a 13 per cent increase for the 50 per cent future European Union migration variant and a 17 per cent increase for the 150 per cent future European Union migration variant.
- A summary of the total projected population all of these additional variants and the principal projection for both Scotland and the United Kingdom are shown in Table 1.

Table 1: Total population for the principal and additional European Union migration variant projections, Scotland and the United Kingdom, 2014 and 2039

Variant	Scotland				United Kingdom			
	2014 Population	2039 Population	Population change		2014 Population	2039 Population	Population change	
			Number	%			Number	%
150 per cent future EU migration variant	5,347,600	5,808,200	460,600	8.6	64,596,800	75,705,700	11,108,900	17.2
Principal	5,347,600	5,701,500	353,900	6.6	64,596,800	74,284,400	9,687,600	15.0
50 per cent future EU migration variant	5,347,600	5,594,700	247,100	4.6	64,596,800	72,863,200	8,266,400	12.8
Zero future EU migration variant	5,347,600	5,488,500	140,900	2.6	64,596,800	71,442,300	6,845,500	10.6

Note

All figures are rounded to the nearest 100

1. Background

- 1.1. The Office for National Statistics, on behalf of the National Records of Scotland, prepares population projections for the United Kingdom and its constituent countries. The latest, 2014-based, projections for Scotland were published in October 2015, the full publication is available in the [Population Projections Scotland](#) section of the National Records of Scotland website.
- 1.2. Three additional variants using alternative European Union migration assumptions have now also been prepared by Office for National Statistics for both Scotland and the United Kingdom as a whole. These additional variants will be the focus of this report, with comparisons also made with the already published principal projection. The publication containing full details of the principal projection is available in the [Population Projections Scotland](#) section of the National Records of Scotland website.
- 1.3. The three additional variants that have been produced are: a zero future European Union migration variant, a 50 per cent future European Union migration variant (50 per cent less future European Union migration) and a 150 per cent future European Union migration variant (50 per cent more future European Union migration). Full details of the assumptions for these three variants and the principal projection are included in [Table 2](#).
- 1.4. The assumptions about future patterns in fertility, mortality and migration are based on analysis of past trends. For these additional variants, the assumptions for fertility and mortality are the same as for the principal projection. However, the process for creating the migration assumptions for these additional variant projections was not subject to the same rigorous quality assurance and assessment process as the 2014-based National Population Projections published in October 2015. For the variants released in October 2015, the final decisions on assumptions take into account the views of a range of groups who are consulted including a UK expert advisory panel and key users in Scotland. More information is available in the [National Population Projections Methodology](#) section of the Office for National Statistics website.
- 1.5. Migration is the most difficult component of population change to estimate; there is no comprehensive system which registers migration in the UK. Estimates of migration therefore have to be based on survey data and the best proxy data that exist. The European Union migration assumptions for these additional variants are based on the International Passenger Survey. The survey data provided estimates of the proportion of migrants coming to and from Scotland with European Union citizenship over the previous three years. This proportion was then applied to the overseas migration assumptions used in the main projection and adjusted for each of the different variants. The overseas migration estimate for Scotland from the International Passenger Survey is based on a very small sample size (around 220 contacts between mid-2014 and mid-2015). Therefore, the past trends in migration used to create the migration assumptions contain a degree of uncertainty. Breaking this down further by citizenship for these additional variants increases this uncertainty further. More information on the quality of [International Passenger Survey](#) is available on the Office for National Statistics website.

- 1.6. These additional variants using alternative European migration assumptions were prepared following the result of the referendum on the United Kingdom's membership of the European Union on 23 June 2016. The United Kingdom leaving the European Union may have an impact on future migration flows between the United Kingdom and the European Union. These additional variants were prepared to illustrate the possible effect of higher and lower European Union migration upon Scotland's population and its structure. However, it must be stressed that the degree of uncertainty around projecting varying levels of migration in the principal projection is only increased by trying to model what the future level of European Union migration might be following the United Kingdom leaving the European Union.
- 1.7. The results in this paper concentrate on the period up to 2039. The Office for National Statistics have published these additional variants using alternative European Union migration assumptions projections up to 2114. However, the projection this far ahead becomes increasingly uncertain.
- 1.8. The base population used in these projections is the 2014 mid-year estimate rolled forward from the 2011 Census. More information on the assumptions used in the projections is available in the full publication available on the [Population Projections Scotland](#) section of the National Records of Scotland website and in the [National Population Projections Methodology](#) section of the Office for National Statistics website.
- 1.9. In October 2015, small errors in the mid-year population estimates for areas in Scotland were found. Whilst these errors do not affect the total population of Scotland, or other parts of the United Kingdom, they do have a small effect on the age and sex distribution of the population. The impact of these errors is much smaller than the uncertainty around the estimates due to sampling error from the 2011 Census. These 2014-based National Population Projections are based on the original release of Scotland's mid-year population estimate published in April 2015 and thus do not reflect the correction to the 2014 mid-year population estimate published in April 2016. These effects are very small compared to other sources of uncertainty in the projections. More information on these errors can be found in the Population section of the National Records of Scotland website.

2. Assumptions

- 2.1. Most of the assumptions that these additional variants use are the same as those used for the principal projection. [Table 2](#) provides full details of the assumptions used by each additional variant and the principal projection. Alternative European Union migration assumptions are used which affect the overseas migration component of the additional variants.
- 2.2. In these additional projections, any change in European Union in or out migration will be reflected uniformly across all single years of age and sex, this is a 50 per cent reduction will result in a 50 per cent reduction in migration across all ages and both sexes. The age and sex distributions that have been adjusted by these additional variants are the same age and sex distributions that were assumed in the principal projection for overseas migration.
- 2.3. For all of these additional variant projections, we assume that there is no change in non-European Union migration or cross border migration between the rest of the United Kingdom and Scotland.
- 2.4. We also assume that the migration of British citizens to and from Scotland remains the same. This includes people moving to and from the European Union who would also possibly be affected by any changes that affected the movement of European Union citizens to and from Scotland.
- 2.5. The changes in European Union migration were calculated by examining recent trends (over the previous three years) in the proportion of European Union citizens in the International Passenger Survey migrating to and from Scotland. This proportion was then either removed from the overseas migration assumption (zero future European Union migration variant), 50 per cent of it removed (50 per cent future European Union migration variant) or 50 per cent of it added to the overseas migration assumption (150 per cent future European Union migration variant).
- 2.6. The outputs from the projections only provide a breakdown of migration into cross-border (to and from the rest of the United Kingdom) and overseas components. There is no further detail available of the origin and destination of migrants that move between Scotland and overseas. However, in [Table 2](#) you can observe that the overseas migration component is different from the principal projection in each of the additional variants due to the adjustment that was applied to this component to account for different levels of migration to and from the European Union. This then has a knock-on effect on the total net migration assumption for each variant.
- 2.7. We have applied the changes to European Union migration from mid-2018 onwards. This date has been used as a current best-guess of the first mid-year point prior to the date that the United Kingdom will most likely leave the European Union, assuming that the United Kingdom Government triggers the process to leave the European Union in early 2017. This means that each of these additional variants is exactly the same as the principal projection until mid-2018. They then diverge due to the different assumptions of future European Union migration.
- 2.8. The fertility and mortality assumptions are assumed to be the same as for the principal projection for each of the additional variants.

2.9. The effect of the changes in the migration assumptions are reflected in the projected number of births and deaths, this is if there are fewer women of child-bearing ages, then we would expect fewer births.

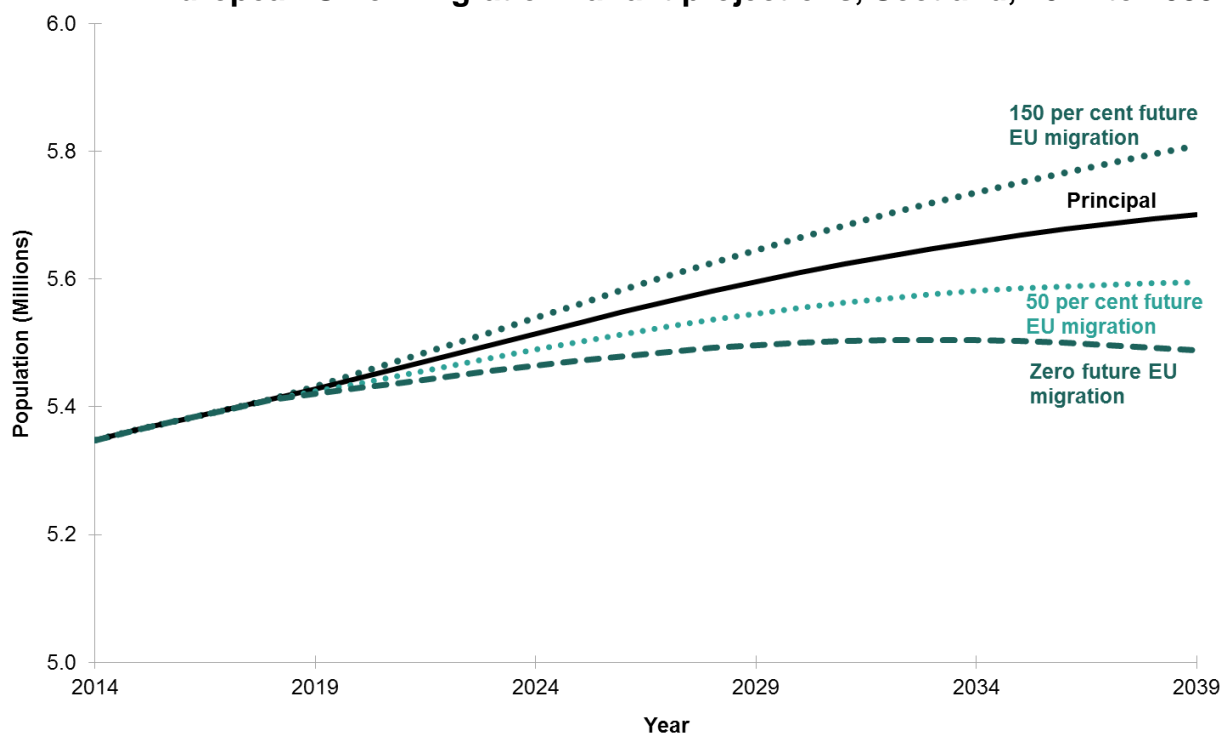
Table 2: Assumptions for the 2014-based principal and additional European Union migration variant projections for Scotland

Assumptions	Long-term fertility (Total Fertility rate - TFR)	Life expectancy males (2039)	Life expectancy females (2039)	Net migration from the Rest of the UK (2039) (rounded to the nearest 100)	Net migration from overseas (2039) (rounded to the nearest 100)	Total Net migration (2039) (rounded to the nearest 100)
150 per cent future EU migration variant	1.70	82.3	85.0	5,500	13,400	18,900
Principal	1.70	82.3	85.0	5,500	9,500	15,000
50 per cent future EU migration variant	1.70	82.3	85.0	5,500	5,600	11,100
Zero future EU migration variant	1.70	82.3	85.0	5,500	1,800	7,300

3. Results

3.1. The results of these additional variants using alternative European Union migration assumptions are illustrated in Figure 1, showing the total population of Scotland. Please note that the scale is not set to zero. The results of the principal projection for total population are also included for comparison. All of the variants show a population increase from 2014 to 2039, ranging from 141,000 (three per cent) for the zero future European Union migration variant to a rise of 461,000 (nine per cent) for the 150 per cent future European Union migration variant. You can notice that the projected total population for the zero future European Union migration variant peaks in 2033 then slowly declines after that point until 2039. For this variant, the decrease after 2033 is due to negative natural change (more deaths than births) as net migration remains positive for the whole projection period.

Figure 1: Projected total population for the 2014-based principal and alternative European Union migration variant projections, Scotland, 2014 to 2039



3.2. [Table 3](#) provides information on the projected components of change between 2014 and 2039 for each of the variants. The table shows that for each of the variants, including the zero future European Union migration variant, net migration between Scotland and the rest of the UK and overseas is projected to be positive. Under each of these projections the fertility and mortality assumptions are the same but the number of births and deaths change. This highlights the fact that the numbers of births and deaths are partly dependent on the assumed level of net migration. For the 150 per cent future European Union migration variant the increase in the population over the 25 year period due to natural change is 2,500 whereas with the principal projection natural change results in a decrease of 22,900. Because migration is concentrated at younger ages, the effect of migration on births is much greater than on the number of deaths. For this reason, the number of deaths is fairly similar between each of the variants, but the number of births varies a lot more.

Table 3: Components of change for the 2014-based principal and additional European Union migration variant projections for Scotland, 2014 to 2039

Variant	Estimated population 30 June 2014	Total Births 2014-2039	Total Deaths 2014-2039	Natural change (births minus deaths) 2014-2039	Net migration between Scotland and the rest of the UK 2014-2039	Net migration between Scotland and overseas 2014-2039	Estimated population 30 June 2039	Population change	
								Number	%
150 per cent future EU migration	5,347,600	1,436,700	1,434,200	2,500	138,400	319,700	5,808,200	460,600	8.6
Principal	5,347,600	1,410,300	1,433,200	-22,900	138,400	238,400	5,701,500	353,900	6.6
50 per cent future EU migration	5,347,600	1,384,000	1,432,300	-48,300	138,400	157,100	5,594,700	247,100	4.6
Zero future EU migration	5,347,600	1,357,600	1,431,400	-73,800	138,400	76,300	5,488,500	140,900	2.6

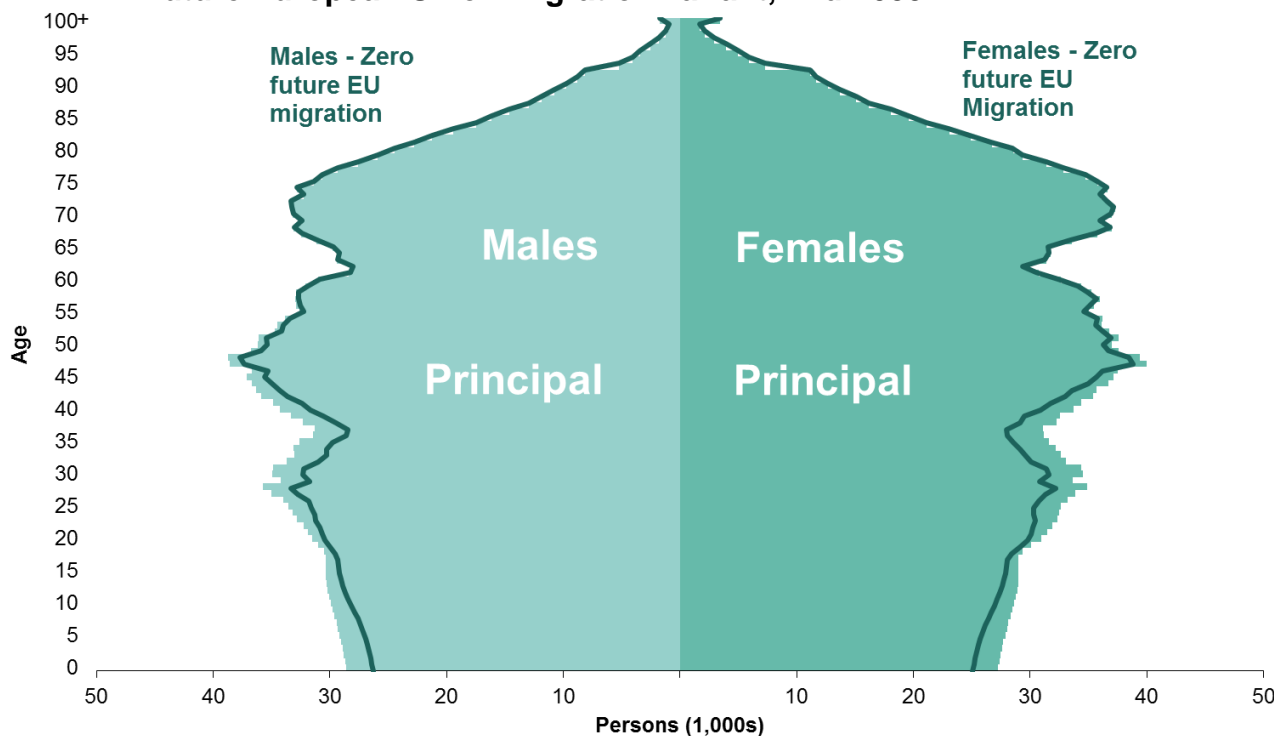
Note

All figures relate to the cumulative projected totals from 2014 to 2039 and are summed to the nearest 100

Totals may not sum due to rounding

3.3. A population pyramid is a good way of illustrating the age and sex structure of the population. Figure 2 represents the population of Scotland as projected by the zero future European Union migration variant compared against the principal projection in mid-2039. Each bar in the pyramid represents a single year of age and the length of the bar relates to the number of people of that age in the population. The size and composition of the population is determined by the pattern of births, deaths and migration which have taken place in previous years. The solid bars represent the principal projection and the lines represent the zero future European Union migration variant. The reduction in the number of young adults compared to the principal projection is clearly visible for this additional variant. It is also possible to see the effect of the reduction in the number of women of childbearing age on the number of children, which is lower for the zero future European Union migration variant.

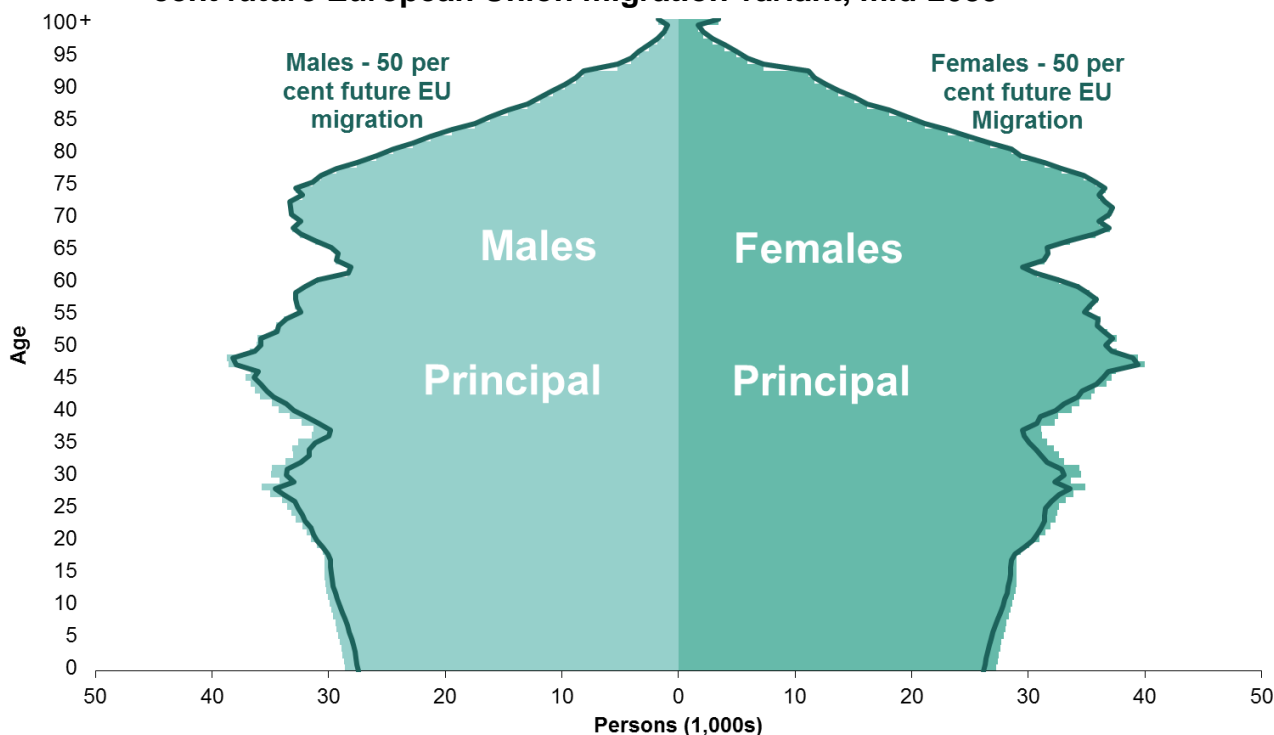
Figure 2: Projected age structure of the Scottish population, principal and zero future European Union migration variant, mid-2039



3.4. Figure 3 also shows the projected age and sex structure of the population in mid-2039, comparing the 50 per cent future European Union migration variant to

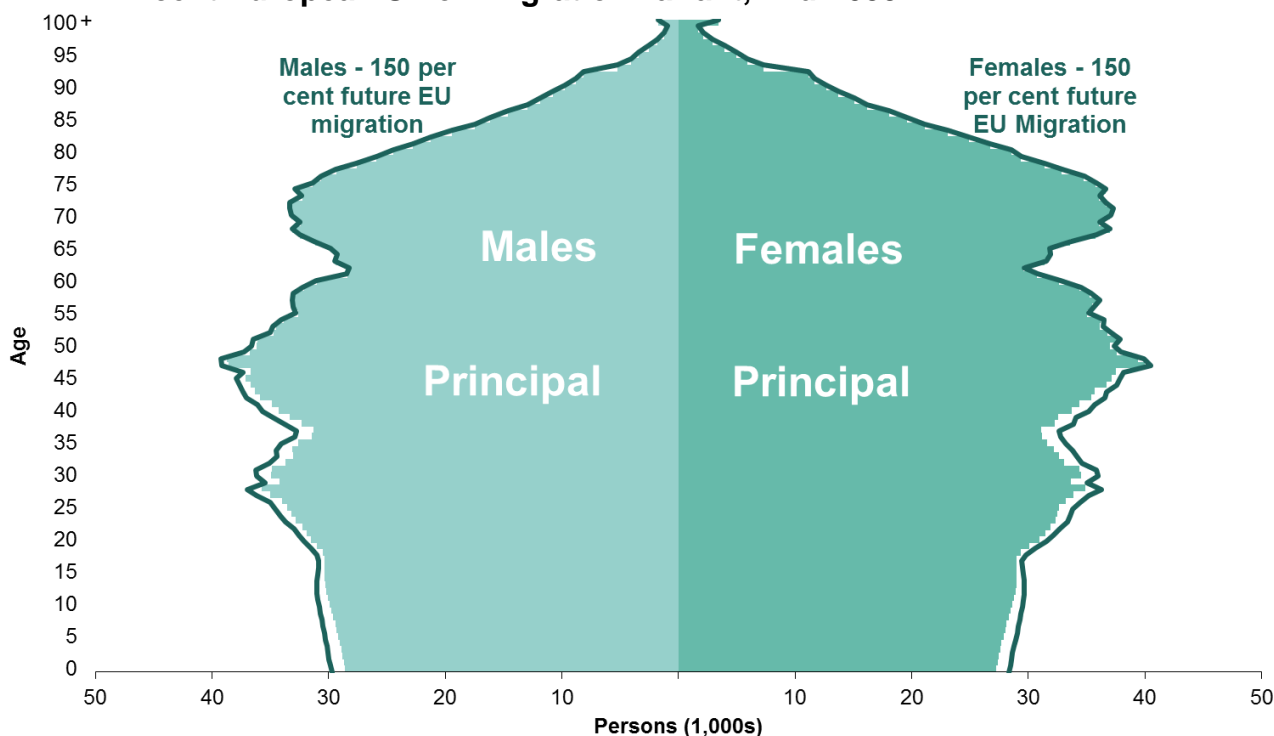
the principal projection. The differences in the projected populations can be seen clearly as in [Figure 2](#), where there were fewer people in the additional variant especially at younger ages. This is because migrants tend to be younger than the rest of the population.

Figure 3: Projected age structure of the Scottish population, principal and 50 per cent future European Union migration variant, mid-2039



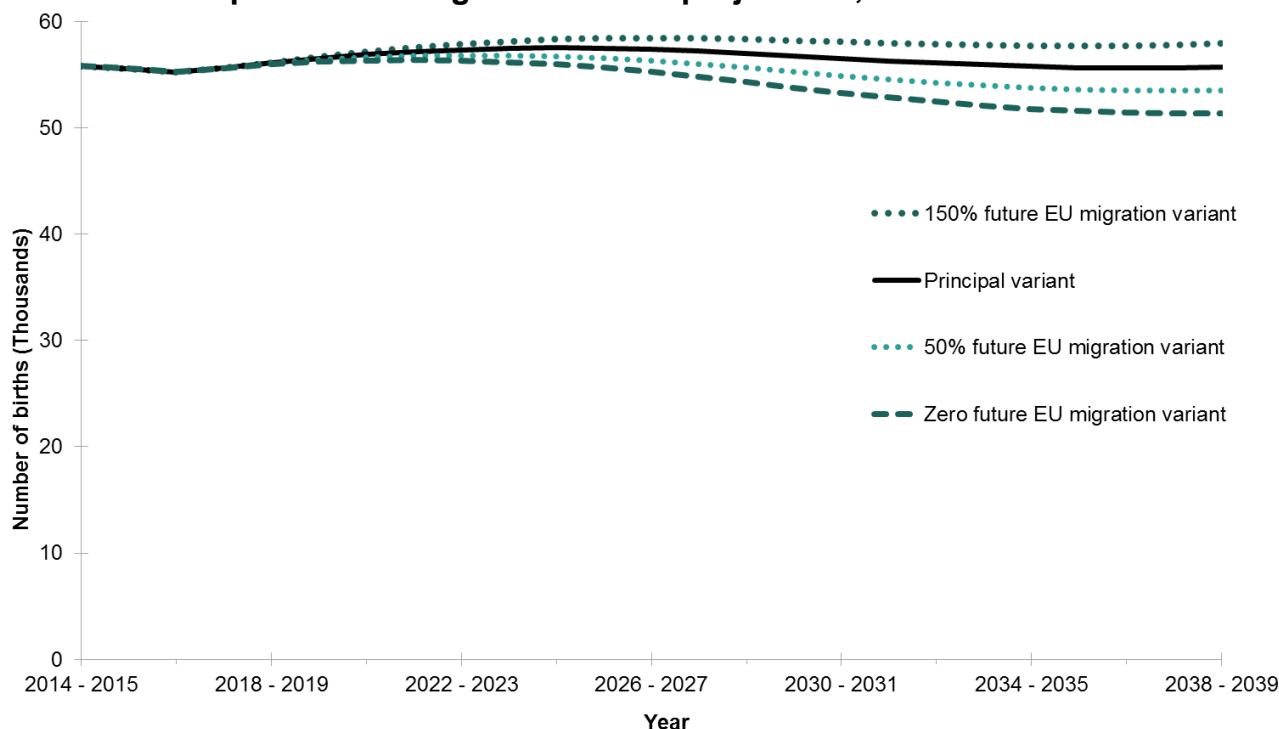
3.5. [Figure 4](#) also shows a population pyramid, this time comparing the 150 per cent future European Union migration variant with the principal projection. The increase in the number of young adults and children compared to the principal projection is visible for this variant. This is due to migration being concentrated at young adult ages, increasing the female population of childbearing age who are then projected to have children.

Figure 4: Projected age structure of the Scottish population, principal and 150 per cent European Union migration variant, mid-2039



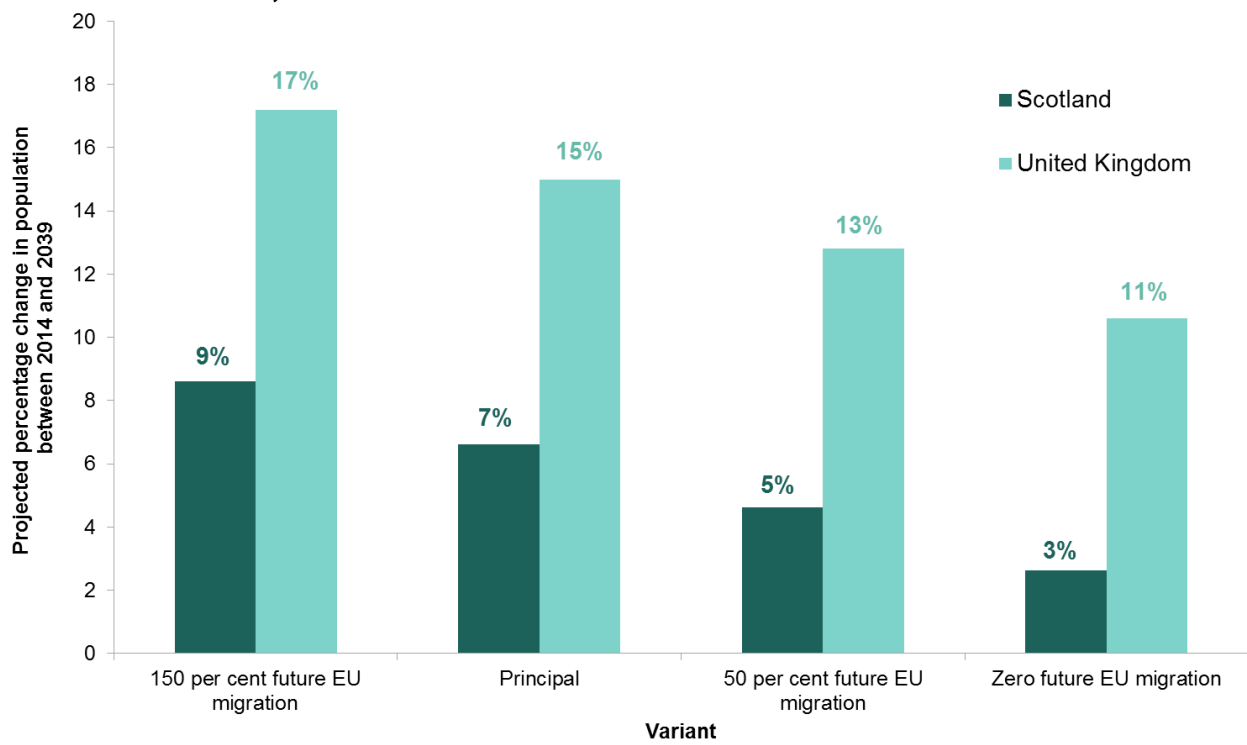
- 3.6. The projected number of births in each of these additional variants and the principal projection is shown in [Figure 5](#). Although the assumed fertility rates are the same for each of the variants, the number of births varies due to there being a different number of women aged between 15 and 45 in each of the variants. These are the ages to which the fertility rates are applied to calculate the births. Because migration is concentrated at young adult ages, the assumed level of future net migration has a relatively large effect on the projected number of women of childbearing age, and hence the projected number of births.
- 3.7. [Figure 5](#) also shows that in the year to mid-2039, the 150 per cent future European Union migration variant projects 57,900 births. This is 2,200 (four per cent) more than the principal projection, 4,400 (eight per cent) more than the 50 per cent future European Union migration variant and 6,600 (13 per cent) more than the zero future European Union migration variant.

Figure 5: Projected number of births for the 2014-based principal and alternative European Union migration variant projections, mid-2014 to mid-2039



3.8. Additional variants using alternative European Union migration assumptions have also been prepared for the United Kingdom as a whole (including Scotland). [Figure 6](#) compares the projected population for each of the variants for both Scotland and the United Kingdom as a whole. As the United Kingdom has experienced more rapid population growth in recent years, this trend is projected to continue for each of the variants. However, for each of the additional variants the adjustment in the assumptions of European Union migration has a similar effect in percentage terms on the population of Scotland and the United Kingdom as a whole. The principal projection for Scotland shows a population increase of seven per cent from 2014 to 2039, whereas this figure is 15 per cent for the United Kingdom. The population increase projected by the zero future European Union migration variant is three per cent for Scotland and 11 per cent for the United Kingdom, four per cent lower than the principal projection for each.

Figure 6: Percentage change in population from 2014, principal and alternative European Union migration variant projections, United Kingdom and Scotland, 2014 to 2039



4. Notes on statistical publications

An Official Statistics publication for Scotland

Official and National Statistics are produced to high professional standards set out in the Code of Practice for Official Statistics. Both undergo regular quality assurance reviews to ensure that they meet customer needs and are produced free from any political interference.

Information on background and source data

Further details on data source(s), timeframe of data and timeliness, continuity of data, accuracy, etc. can be found in the About this Publication document that is published alongside this publication on the [National Records of Scotland](#) website.

National Records of Scotland

We, the National Records of Scotland, are a non-ministerial department of the devolved Scottish Administration. Our aim is to provide relevant and reliable information, analysis and advice that meets the needs of government, business and the people of Scotland. We do this as follows:

- Preserving the past – We look after Scotland’s national archives so that they are available for current and future generations and we make available important information for family history.
- Recording the present – At our network of local offices, we register births, marriages, civil partnerships, deaths, divorces and adoptions in Scotland.
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We also provide information about [future publications](#) on our website. If you would like us to tell you about future statistical publications, you can register your interest on the Scottish Government [ScotStat website](#).

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We, the National Records of Scotland, label any revisions and corrections that we have applied to any of our statistics. These revisions and corrections are clearly marked on the webpage of the publication as well on our [revisions and corrections](#) page available on the National Records of Scotland website.

Where applicable, revisions will also be carried out in accordance with the [revisions policy for population, migration and life events](#) statistics available on the Office for National Statistics website.

Enquiries and suggestions

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5. Related organisations

Organisation	Contact
<p>The Scottish Government (SG) forms the bulk of the devolved Scottish Administration. The aim of the statistical service in the SG is to provide relevant and reliable statistical information, analysis and advice that meets the needs of government, business and the people of Scotland.</p>	<p>Office of the Chief Statistician Scottish Government 3WR, St Andrews House Edinburgh EH1 3DG</p> <p>Phone: 0131 244 0442</p> <p>Email: statistics.enquiries@scotland.gsi.gov.uk</p> <p>Website: www.gov.scot/Topics/Statistics</p>
<p>The Office for National Statistics (ONS) is responsible for producing a wide range of economic and social statistics. It also carries out the Census of Population for England and Wales</p>	<p>Customer Contact Centre Office for National Statistics Room 1.101 Government Buildings Cardiff Road Newport NP10 8XG</p> <p>Phone: 0845 601 3034 Minicom: 01633 815044</p> <p>Email: info@ons.gsi.gov.uk</p> <p>Website: www.ons.gov.uk/</p>
<p>The Northern Ireland Statistics and Research Agency (NISRA) is Northern Ireland's official statistics organisation. The agency is also responsible for registering births, marriages, adoptions and deaths in Northern Ireland, and the Census of Population.</p>	<p>Northern Ireland Statistics and Research Agency McAuley House 2-14 Castle Street Belfast BT1 1SA</p> <p>Phone: 028 9034 8100</p> <p>Email: info.nisra@dfpni.gov.uk</p> <p>Website: www.nisra.gov.uk</p>

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