Article

Impact of different migration trend lengths: March 2020

Considering the impact of different migration trend lengths in the 2018-based subnational population projections for England.

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1 . Introduction

The purpose of population projections is to provide indications of likely local growth or decline if recent trends continue. Variant projections may also be produced, where alternative trends are considered.

However, what constitutes "recent trends" is not straightforward. There is no definitive definition of how many years of source data are needed to determine a recent trend. A further challenge is that even if a certain definition is preferred, there may not be a consistent series of data available for that length of time.

An area of particular discussion is how many years of data should be used to inform projections of migration at local level. To address these challenges, for the 2018-based subnational population projections we have published variant projections using alternative lengths of migration trend. This article explains these variants and their differing results, and considers the pros and cons of each.

2 . Approaches for our 2018-based projections

Principal projection

We refer to our main projection as our principal projection.

Our usual approach for subnational population projections is to use five years of trend data. What this means is that when we calculate the numbers of births, deaths or migrants at local level, our starting point is the average of what has happened over the past five years. The logic is that five years may be more representative of local patterns than a single, possibly atypical, year of data.

However, for our 2018-based principal projection, we used just two years of trend data for internal (within England) migration. This was because the new improved method for estimating internal migration within England was introduced to the Office for National Statistics's (ONS's) population estimates in the year ending mid-2017, such that by the starting point of the projections in mid-2018 there were only two years of data available using this new method.

This gave us a choice of whether to base our internal migration calculations on either:

- two years of data solely using the new method, which better accounts for moves of graduates after they finish their studies and uses a replacement data source to account for those who moved more than once, or were born, died, immigrated or emigrated during the year

- five years of data: two using the new method, and three using the old method

For some areas the estimates of internal migration changed substantially once the new method was introduced, so our preference was to base our projected internal migration entirely on this new method.

This decision was a trade-off: the new method should offer a better projection of reality and is also consistent with the approach currently used in the population estimates. However, for the purpose of the projections this may be either enhanced or offset by how reflective two years of data (rather than five) are of that reality. There is no right answer to this: in some areas the new method will be more accurate than in others, and everywhere will differ in terms of how typical internal migration levels over the past two years have been.

Variant projections

For the 2018-based subnational population projections we published four different variants:

- a high international migration variant

- a low international migration variant

- an alternative internal migration variant

- a 10-year migration variant

Full details of the method for creating each of these variants is available in our [Methodology used to create the 2018-based subnational population projections for England report](). In summary, however, the differences from the principal projection are as follows.

High international migration variant

The high international migration variant assumes higher levels of net international migration to England as a whole (higher immigration, lower emigration), but the proportional distributions of immigration and emigration at local authority level remain the same. The result is that all areas see correspondingly higher population totals.

Low international migration variant

The low international migration variant assumes lower levels of net international migration to England as a whole (lower immigration, higher emigration), but the proportional distributions of immigration and emigration at local authority level remain the same. The result is that all areas see correspondingly lower population totals.

Alternative internal migration variant

The alternative internal migration variant uses five years of internal migration trend data: two years on the new method and three years on the old method. This was the approach we rejected for our principal projection.

10-year migration variant

The 10-year migration variant uses 10 years of data for all aspects of migration (internal, cross-border and international). The logic of using a 10-year trend is that it may even out a potentially atypical five-year period. However, it also risks dampening the effect of more systemic changes that occurred over the 10 years. Moreover, the data over this period have multiple methodological changes. For example, internal migration estimates have had three different methods over that time period, which will necessarily impact on the quality of the figures.

Table 1 summarises the different trend lengths of internal, cross-border and international migration input data in the 2018-based principal subnational population projection and each of the variant projections.

Table 1: Trend lengths of migration source data in the 2018-based population projections (years)
England

Name of projection	Internal migration	Cross-border migration	International migration
Principal	2	5	5
High international migration	2	5	5
Low international migration	2	5	5
Alternative internal migration	5	5	5
10 year migration	10	10	10

Source: Office for National Statistics – national population projections

For all projections, the figures calculated at local level are also constrained to the national population projections. The principal, alternative internal migration and 10-year migration variants are all constrained to the principal 2018-based national population projection for England. The high and low international migration variants are constrained to the 2018-based high and low international population projections for England. This constraining is important, as it ensures consistency between the subnational and national projections.

A particularly important aspect of the process is that for international migration and cross-border migration, the five- or 10-year trends are used to determine the geographic distribution at local authority level, and not the absolute number of migrants, which is calculated in the national population projections.

So, for example, if a local authority received 2% of the total number of immigrants to England over the trend period, it will receive 2% of the total number of immigrants to England in each year of the projection. Because the projected numbers of immigrants to England are less than actual estimates from recent years, the actual number of immigrants to each local authority will also be less.

3 . The results: impact of the different migration trend lengths

Impact on the largest local authorities

Table 2 presents the 10 largest local authorities in England as at mid-2018, comparing the principal projection for mid-2028 with the two variant projections that have different migration trend lengths.

Table 2: Mid-2018 population compared with projected mid-2028 population
England

	Mid-2018	Principal projection mid-2028	Alternative internal migration variant mid-2028	10 year migration variant mid-2028
Birmingham	1,141,000	1,186,000	1,210,000	1,205,000
Leeds	789,000	814,000	827,000	826,000
Sheffield	583,000	612,000	613,000	610,000
Cornwall	566,000	619,000	607,000	601,000
Manchester	548,000	570,000	584,000	580,000
Bradford	537,000	550,000	547,000	550,000
County Durham	527,000	546,000	544,000	539,000
Wiltshire	498,000	528,000	526,000	523,000
Liverpool	495,000	525,000	524,000	515,000
City of Bristol	463,000	493,000	499,000	498,000

Source: Office for National Statistics – national population projections

Although all the areas listed grow between mid-2018 and mid-2028, the amount of growth varies between the projections. This will reflect both the different combinations of methodology in the source data, as well as actual differences in recent growth patterns.

Comparing the mid-2028 principal projection with the alternative internal migration variant, some areas have a higher projection, some a lower projection, and some have very similar figures. Manchester's growth in the principal projection is 39% less than in the alternative migration variant. Conversely, in Bradford the growth in the principal projection is 35% greater.

In all but one of the areas in Table 2, the 10-year migration variant leads to a lower mid-2028 population than the alternative internal migration variant. The outcome is also usually closer to the alternative migration variant than it is to the principal projection.

Note, however, both the alternative internal migration variant and the 10-year migration variant include the two years of new method internal migration data. In other words, the internal migration components of each of the calculations are not mutually exclusive.

Areas with greatest percentage impact

As a proportion of the mid-2018 population, most local authorities see less than 2% difference in projected population change between the principal projection and the alternative internal migration variant. There is also usually less than 2% difference in proportional change between the alternative internal migration variant and the 10-year migration variant.

Looking at the areas with the biggest differences between the principal projection and the alternative internal migration variant, there is some geographic clustering (see Table 3). The areas with the biggest positive percentage differences – meaning those where the principal projection is higher – tend to be comparatively rural areas with low numbers of students, and are mostly in the Midlands. The areas with the biggest negative percentage differences are mostly within or close to the northern and north-eastern parts of London.

Although one aspect of the change to internal migration methods focused on moves of graduates, the areas with the biggest negative differences also mostly have only moderate student populations: none of the areas with the 10 highest proportions of full-time students in the 2011 Census feature.

Table 3: Percentage difference in population growth between principal projection and alternative internal migration variant
England

Local Authority	Mid-2018	Principal mid-2028	Alternative internal migration mid-2028	Difference in growth (%)
Stratford-on-Avon	127,600	145,400	137,300	6.3
Cotswold	89,000	101,500	96,700	5.4
Daventry	84,500	97,300	92,900	5.2
South Derbyshire	104,500	120,300	115,200	4.9
Boston	69,400	76,400	73,000	4.9
Blaby	100,400	114,600	110,200	4.4
Welwyn Hatfield	122,700	129,500	134,700	-4.2
Redbridge	303,900	310,200	323,600	-4.4
Brentwood	76,600	76,400	79,900	-4.5
Luton	214,100	206,800	219,400	-5.9
Barking and Dagenham	212,000	220,000	233,300	-6.3
Isles of Scilly	2,200	1,700	1900	-8.4

Source: Office for National Statistics – national population projections

The areas where the 10-year migration variant results show the biggest proportional growth relative to the alternative internal migration variant are all in or just outside of London (see Table 4). The areas where the growth in the 10-year migration variant is most restricted compared with the alternative internal migration variant are more varied, although the majority are comparatively rural and most are in the Midlands.

Table 4: Percentage difference in population growth between 10-year migration variant and alternative migration variant
England

Local Authority	Mid-2018	10 year migration mid-2028	Alternative internal migration mid-2028	Difference in growth (%)
Ealing	342,000	357,500	339,000	5.4
Merton	206,200	220,200	209,500	5.2
Watford	96,800	103,800	99,400	4.6
Hounslow	270,800	290,600	278,700	4.4
Redbridge	303,900	335,800	323,600	4.0
Harrow	250,100	265,200	255,400	3.9
Daventry	84,500	89,600	92,900	-3.9
Wychavon	127,300	135,500	140,800	-4.2
Coventry	366,800	406,300	422,200	-4.3
East Devon	144,300	155,500	161,900	-4.4
North West Leicestershire	102,100	109100	114,500	-5.3
City of London	8,700	8,500	9,400	-9.8

Source: Office for National Statistics – national population projections

Discussion

For any area, there are multiple factors that will cause differences between the 2018-based and 2016-based population projections:

- the different starting population

- changes to the underlying trend data for each of births, deaths and migration

- changes to the national population projections to which the subnational population projections are constrained

- changes to the methods for internal migration and prisoners

Because of the way all factors interrelate, it is not practicable to quantify the exact proportion of change in any area that is caused by each factor. However, it is possible for analysts to look closely into the data to understand what factors will have contributed to a changed projection for their area. This requires an understanding both of the projections methodology but also the components of population change that feed into the projections.

The same approach applies to understanding the differences between variant projections. In the 2018-based subnational projections all the variants take different approaches to aspects of migration, as described in this article.

For example, take the case of Stratford-on-Avon, the local authority where the principal projection saw the proportionally fastest growth to mid-2028 compared with the alternative internal migration variant.

Table 5: Net internal migration
Stratford-on-Avon

Year ending mid-	Method	Net internal migration (people)
2014	Old	400
2015	Old	600
2016	Old	700
2017	New	1,700
2018	New	2,400

Source: Office for National Statistics – national population projections

Over this period, net internal migration has been consistently positive. However, although the figure varies from year to year, there is a sharp increase in the two most recent years of data. This may be a combination both of the new method, but also a real change in net inflows between 2014 to 2016 and 2017 to 2018.

In the principal projection, using the two more recent years of new method data, average annual net internal migration is 2,100. However, in the alternative internal migration variant, using the full five years of data, average annual internal migration is 1,200. The substantially higher annual average in the principal projection causes the much greater projected population growth.

The same approach of looking at the time series of trend data, most of which is available with the mid-year population estimates, can be used for any area. This will explain the differences, but ultimately which length of trend data is most appropriate is necessarily subjective, and will vary by area.

Aspects to consider

Having input data that are based on a consistent method seems desirable. We consider our current internal migration method to be an improvement on the previous one, so it would diminish the quality of the figures to mix them with older data based on a different method.

We recognise that the new method for estimating internal migration may be more accurate in some areas than in others. However, we do not have a definitive data source to quantify that. To avoid subjective biases, it is also fundamental that we apply the same approach for all local authorities in England.

It is also debatable how many years of input data would be optimal if a longer time series of new method data were available. A longer series will even out short-term fluctuations, but may also mask systemic changes. For example, if a local authority has recently entered a new era of likely sustained growth, incorporating older data from a period of stagnation or decline may be misleading.

It is also important to remember that a projection is not intended to be a prediction, but is rather intended to show what could happen if recent trends continue. This is useful as it sets a baseline against which planned changes (or as yet unplanned changes) can be considered. Therefore any expectations based on scheduled developments should not be a factor.

As indicated, the approach we have taken for the principal projection is one of consistency based on the latest improved data source. However, the variant projections are available as an alternative for anyone who considers that the respective outcomes are more likely, or are more helpful for their specific purposes.