

The effect of reweighting on the Annual Population Survey estimates of the UK population by country of birth and nationality

This article looks at the impact of the reweighting on the estimate of the resident population of the UK by country of birth and nationality between 2004 and 2013.

27 August 2015

Migration Statistics Unit

Foreword

In March 2015, the Office for National Statistics (ONS) completed the reweighting of the Annual Population Survey (APS) aggregates and microdata, using revised UK and sub-national population estimates consistent with results of the 2011 Census and population projections. Further detail can be found [here](#).

In July 2015, ONS published reweighted data tables of the UK population by country of birth and nationality for calendar years 2004 to 2013. The reweighted estimates can be found [here](#).

This article looks at the impact of the reweighting on the estimate of the resident population of the UK by country of birth and nationality between 2004 and 2013.

Main Findings

- Over the 10 year period 2004 to 2013, the reweighting of the Annual Population Survey increased the estimate of the resident population of the UK.
- The highest increase in the estimate of the resident population due to reweighting was in 2011, where there was an increase of 706,000 between the original and reweighted estimates (an increase of 1.1% on the original estimate).
- Between 2004 and 2013, the estimate of the non-UK born resident population increased by 2,663,000 due to reweighting, compared to an original increase of 2,547,000.
- Between 2004 and 2013, the estimate of the non-British nationals population increased by 2,023,000 due to reweighting, compared to an original increase of 1,956,000.
- Between 2004 and 2013, the region with the largest increase in estimates of non-UK born and non-British nationals due to reweighting was London.
- Between 2004 and 2013, the region with the largest decrease in estimates of non-UK born and non-British nationals due to reweighting was Yorkshire and The Humber.
- In 2013, the local authority with the largest increase in non-UK born and non-British nationals due to reweighting was Newham.
- In 2013, the local authority with the largest decrease in non-UK born and non-British nationals due to reweighting was Westminster.

It should be noted that whilst some of the changes quoted in this article appear to be large changes, the percentage change from the original estimate is small.

Introduction

In March 2015, the Office for National Statistics (ONS) completed the reweighting of the Annual Population Survey (APS) aggregates and microdata, using revised UK and sub-national population estimates consistent with results of the 2011 Census and population projections. The reweighted datasets covered the period 2004 to 2013. Further detail can be found [here](#). Prior to this, in October 2014, ONS also completed the reweighting of the Labour Force Survey (LFS) aggregates and microdata. Further detail can be found [here](#).

In July 2015, ONS published reweighted data tables of the UK population by country of birth and nationality. The reweighted estimates can be found [here](#).

This article looks at the impact of this reweighting on the estimate of the resident population of the UK, both in terms of the country of birth and nationality of residents over time, and also how the data have affected the population of the UK by country, region, and local authority. Since the new population estimates used were sub-national, the impact of this reweighting varies across the country.

The APS datasets were weighted to reflect the size and composition of the general population, by using official population data. Weighting factors take into account the design of the survey and the composition of the local population by age and sex.

The APS estimates are produced by weighting survey data to the resident population for each local authority. The survey data is collected in the reference period, meaning that for any reweighting exercises it remains unchanged. It is only the population estimates that change. Therefore, changes in APS estimates will be driven purely by how the profile of Census-based population estimates compares with that of the projections used for weighting prior to the Census. Specifically, if the reweighted estimates are lower than the previous projections in areas where the proportion of non-UK born or non-British nationals is high it is expected there will be a fall in these estimates.

The results of the 2011 Census for England and Wales found that the Census-based mid-year population estimate was 464,000 higher than the mid-year population estimates rolled-forward from the 2001 Census base. Hence when the APS has been reweighted to be in line with the Census results, there have been changes to the estimates of the population of the UK from 2004.

It is important to note that the revisions discussed in this article relate to changes to an existing estimate of population as a result of information from the 2011 Census. The existing population estimates showed that the population of the UK was increasing. The reweighted estimates still show the population is increasing, but Census information has increased the rate of population change.

What is the Annual Population Survey (APS)?

The APS, which began in 2004, is a continuous household survey, comprising wave 1 and wave 5 of the Labour Force Survey (LFS), supplemented by sample boosts in England, Wales, and

Scotland to ensure small areas are sufficiently sampled. The APS is a survey of households in the UK, so does not include most types of communal establishments.

The estimates from the APS are different from the standard ONS [mid-year population estimates](#), which cover all usual residents. The mid-year population estimates provide a more comprehensive estimate of the UK population.

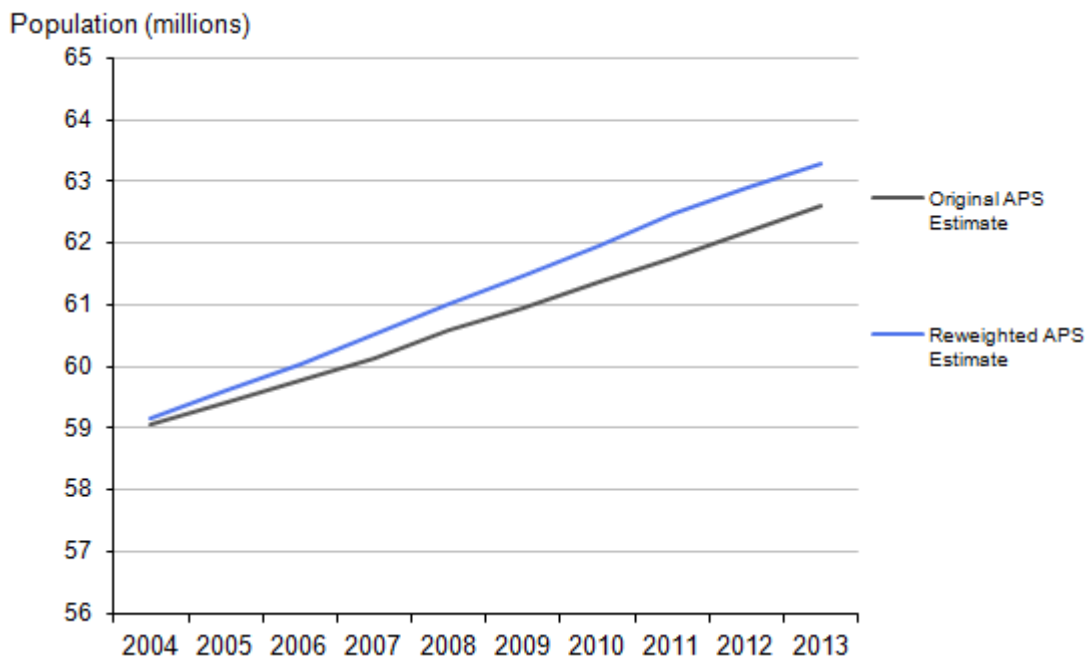
How has the reweighting affected the resident population of the UK?

The impact of the APS reweighting on the resident population of the UK has been to increase the estimate of the population in each year since the APS began in 2004. Over the 10 year period covered by the reweighting (2004 to 2013), the estimate of the resident population of the UK has increased by 4,094,000 (from 59,176,000 in 2004 to 63,270,000 in 2013). This compares to an increase between 2004 and 2013 of 3,556,000 in the pre-reweighted estimates.

Looking at individual years, the peak increase due to reweighting can be seen in calendar year 2011, where the estimate of the resident population of the UK increased by 706,000 due to reweighting (from 61,774,000 in the pre-reweighted estimates to 62,480,000 in the reweighted estimates - an increase of 1.1% on the original population total for that year).

Figure 1 shows the original population estimates, using the APS, alongside the reweighted estimates. As you can see, the larger increases are seen towards the end of the intercensal period, which is due to the fact that population estimates become less robust as you move further away from a Census year.

Figure 1: Comparison of UK resident population, pre- and post-reweighted APS estimates, 2004 to 2013



Source: Annual Population Survey (APS), ONS

The paper will now look in more detail at how the reweighting has affected the estimates of the non-UK born and the non-British national resident population at the UK level as well as by country of the UK, region of England, and at local authority level. It will show that estimates for the non-UK born population and non-British national population resident in the UK have increased, with London seeing the greatest increase in estimates when compared by region. Within London, the local authorities of Newham and Brent have seen the biggest increases in estimates.

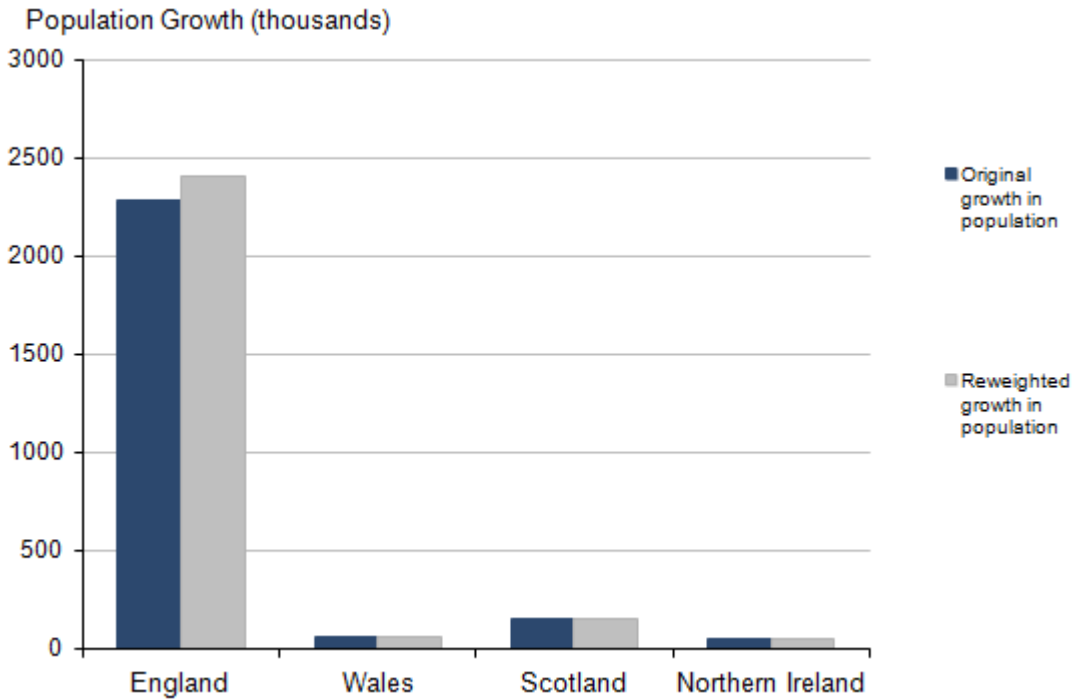
How has the non-UK born population changed due to reweighting?

The impact of the APS reweighting on the estimate of non-UK born residents in the UK has been to increase the estimate of non-UK born residents in each year since the APS began in 2004. Over the 10 year period covered by the reweighting (2004 to 2013), the estimate of the resident population of non-UK born has increased by 2,663,000 (from 5,258,000 in 2004 to 7,921,000 in 2013). This compares to an increase between 2004 and 2013 of 2,547,000 in the pre-reweighted estimates (an overall increase over the 10 years of 116,000 due to reweighting).

Looking at individual years, the peak increase due to reweighting can be seen in calendar year 2011, where the estimate of the resident population of non-UK born in the UK increased by 152,000 due to reweighting (from 7,509,000 in the pre-reweighted estimates to 7,661,000 in the reweighted estimates - an increase of 2.0% on the original non-UK born population total for that year).

Figure 2 shows that the majority of the increase in the estimate of non-UK born residents in the UK due to reweighting occurred in England, with minimal changes in Wales, Scotland, and Northern Ireland.

Figure 2: Effect of reweighting on non-UK born population, by country of the UK, 2004 to 2013

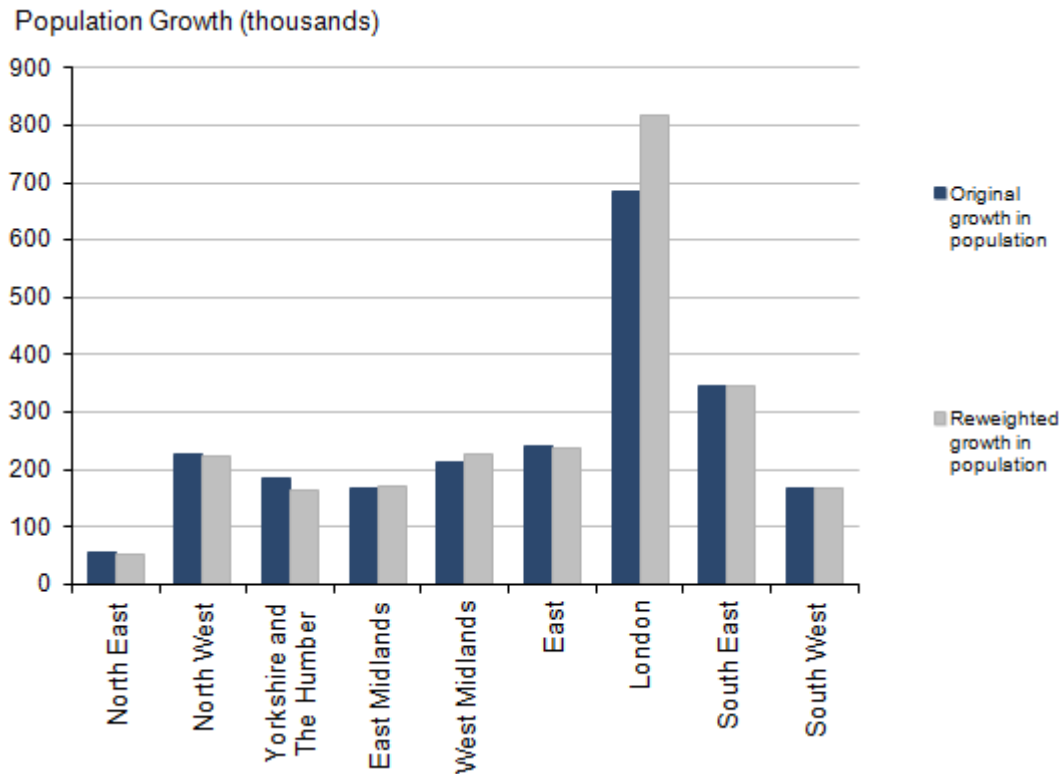


Source: Annual Population Survey (APS), ONS

Within England, at the regional level, the estimate of the non-UK born resident population has seen different patterns of growth within different regions due to reweighting.

Figure 3 compares how the growth in the estimate of the non-UK born resident population due to reweighting has been affected at the regional level.

Figure 3: Effect of reweighting on non-UK born population of the UK, by region of England, 2004 to 2013



Source: Annual Population Survey (APS), ONS

Figure 3 shows, for some regions, in particular London and the West Midlands, the reweighted estimates of non-UK born population growth are much higher than the estimates previously published. The original growth in London, for example, of non-UK born was 684,000 between 2004 and 2013, whereas the reweighted APS data shows growth of 818,000 between 2004 and 2013 (an increase of 134,000 due to reweighting). For other regions, such as the North East and Yorkshire and The Humber, the reweighted estimates show lower growth. Using Yorkshire and The Humber as an example, the original growth in this region was 184,000 between 2004 and 2013, whereas the reweighted APS estimates shows growth of 164,000 (a decline of 20,000 due to reweighting).

Using the latest calendar year dataset that was reweighted (2013), changes at the local authority level shows areas with an increase in the estimate of non-UK born residents, and some with a decrease in the estimate of non-UK born residents. Table 1 below shows the top 5 local authorities seeing the biggest increases in estimates of non-UK born residents as a result of the APS reweighting. Table 2 shows the biggest decreases in estimates of non-UK born residents as a result of the APS reweighting.

Table 1: Top 5 local authorities with increases in non-UK born population due to reweighting, 2013

Local Authority	Original APS Estimate	Reweighted APS Estimate	Absolute difference	% Difference
Newham	117	164	47	40.2
Brent	137	170	33	24.1
Haringey	81	94	13	16.0
Waltham	92	105	13	14.1
Hackney	88	100	12	13.6

Data in thousands

Source: Annual Population Survey (APS), ONS

Table 2: Top 5 local authorities with decreases in non-UK born population due to reweighting, 2013

Local Authority	Original APS Estimate	Reweighted APS Estimate	Absolute difference	% Difference
Westminster	138	114	-24	-17.4
Leeds	112	100	-12	-10.7
Camden	107	98	-9	-8.4
Bristol, City of	75	68	-7	-9.3
Kensington and	86	79	-7	-8.1

Data in thousands

Source: Annual Population Survey (APS), ONS

How have the EU and non-EU born population changed due to reweighting?

Breaking the non-UK born down further, the impact of the APS reweighting on the estimate of EU born residents in the UK has been to increase the estimate of EU born residents in each year since the APS began, except for 2004, where there was a slight decrease. Over the 10 year period covered by the reweighting (2004 to 2013), the estimate of the resident population of EU born has increased by 1,252,000 (from 1,491,000 in 2004 to 2,743,000 in 2013). This compares to an increase between 2004 and 2013 of 1,182,000 in the pre-reweighted estimates (an overall increase over the 10 years of 70,000 due to reweighting).

Looking at individual years, the peak increase due to reweighting can be seen in calendar year 2013, where the estimate of the resident population of EU born in the UK increased by 69,000 due to reweighting (from 2,674,000 in the pre-reweighted estimates to 2,743,000 in the reweighted estimates - an increase of 2.6% on the original EU born population total for that year).

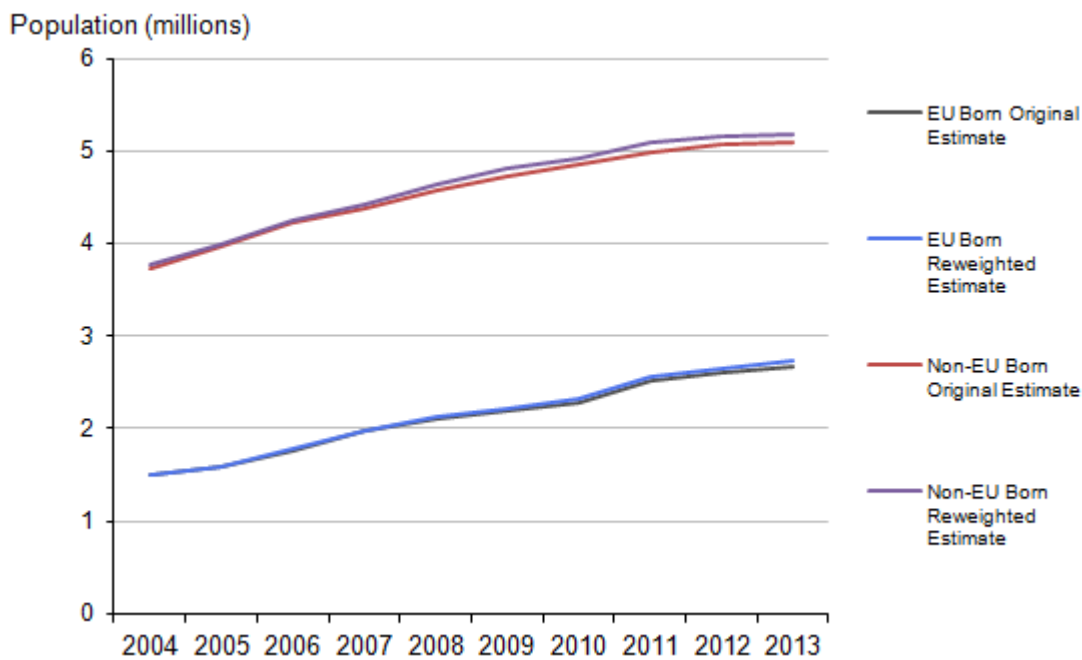
Breaking the non-UK born down further, the impact of the APS reweighting on the estimate of non-EU born residents in the UK has been to increase the estimate of non-EU born residents in each year since the APS began in 2004. Over the 10 year period covered by the reweighting (2004 to

2013), the estimate of the resident population of non-EU born has increased by 1,411,000 (from 3,767,000 in 2004 to 5,178,000 in 2013). This compares to an increase between 2004 and 2013 of 1,365,000 in the pre-reweighted estimates (an overall increase over the 10 years of 46,000 due to reweighting).

Looking at individual years, the peak increase due to reweighting can be seen in calendar year 2011, where the estimate of the resident population of non-EU born in the UK increased by 105,000 due to reweighting (from 4,992,000 in the pre-reweighted estimates to 5,097,000 in the reweighted estimates - an increase of 2.1% on the original non-EU born population total for that year).

Figure 4 shows how the estimates for those born within the EU and outside of the EU have been affected by the reweighting.

Figure 4: Effect of reweighting on the population of the UK, EU and non-EU born, 2004 to 2013



Source: Annual Population Survey (APS), ONS

How has the reweighting affected the most common countries of birth in 2013?

Using the latest calendar year dataset that was reweighted (2013), it can be seen that the reweighting of the data has only caused a small change in the top 10 most common non-UK countries of birth in the UK. South Africa and Bangladesh swapped places (between 6th and 7th). The remaining top 10 countries retained their position.

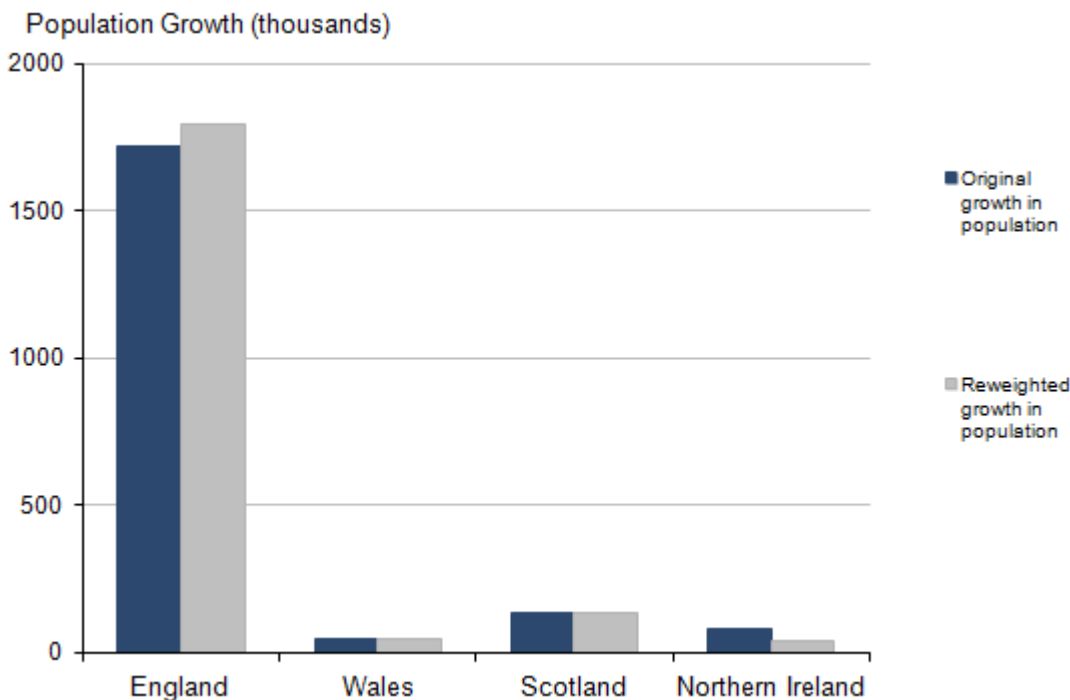
How has the non-British national population changed due to reweighting?

The impact of the APS reweighting on the estimate of non-British nationals resident in the UK has been to increase the estimate of non-British nationals resident in each year since the APS began in 2004. Over the 10 year period covered by the reweighting (2004 to 2013), the estimate of the resident population of non-British nationals has increased by 2,023,000 (from 2,964,000 in 2004 to 4,987,000 in 2013). This compares to an increase between 2004 and 2013 of 1,956,000 in the pre-reweighted estimates (an overall increase over the 10 years of 67,000 due to reweighting).

Looking at individual years, the peak increase due to reweighting can be seen in calendar year 2013, where the estimate of the resident population of non-British nationals in the UK increased by 85,000 due to reweighting (from 4,902,000 in the pre-reweighted estimates to 4,987,000 in the reweighted estimates - an increase of 1.7% on the original non-British nationals population total for that year).

Figure 5 shows that the majority of the increase in the estimate of non-British nationals resident in the UK due to reweighting occurred in England, with minimal changes in Wales and Scotland. There was a reduction in the estimate of non-British nationals resident in Northern Ireland.

Figure 5: Effect of reweighting on the non-British national population, by country of the UK, 2004 to 2013

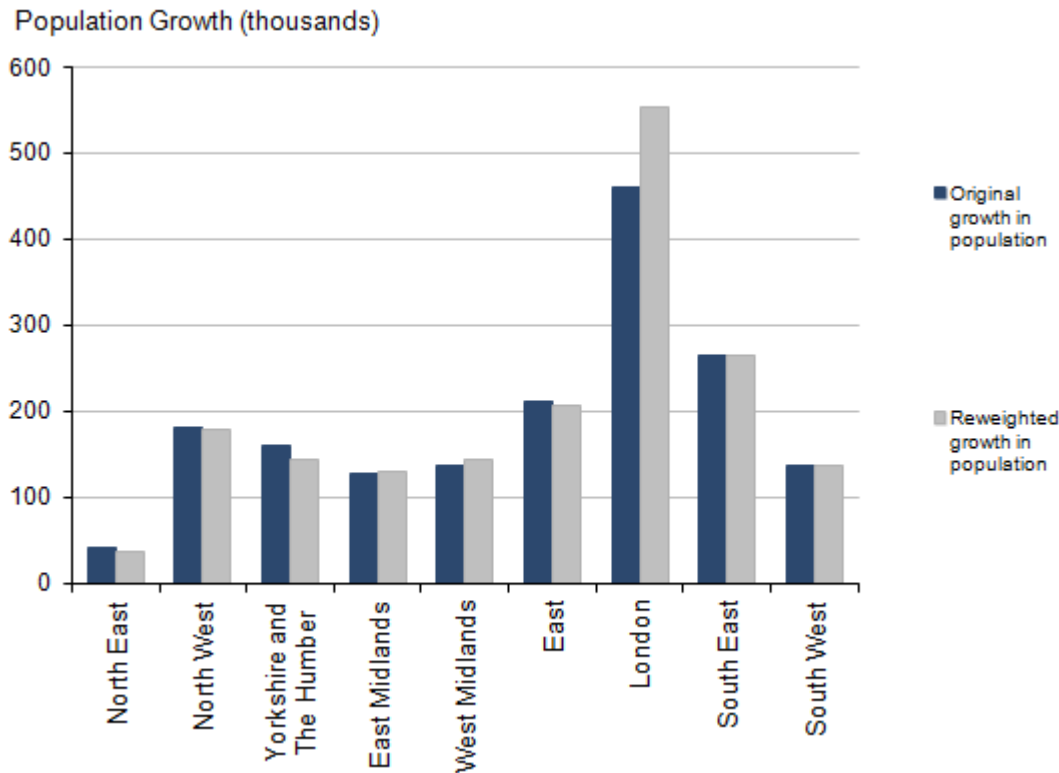


Source: Annual Population Survey (APS), ONS

Within England, at the regional level, the estimate of the non-British national resident population has seen different patterns of growth within different regions due to reweighting.

Figure 6 compares how the growth in the estimate of the non-British national resident population due to reweighting has been affected at the regional level.

Figure 6: Effect of reweighting on non-British national population of the UK, by region of England, 2004 to 2013



Source: Annual Population Survey (APS), ONS

Figure 6 shows, for some regions, in particular London and the West Midlands, the reweighted estimates of non-British national population growth are much higher than the estimates previously published. The original growth in London, for example, of non-British nationals was 461,000 between 2004 and 2013, whereas the reweighted APS data shows growth of 553,000 between 2004 and 2013 (an increase of 92,000 due to reweighting). For other regions, such as the North East and Yorkshire and The Humber, the reweighted estimates show lower growth. Using Yorkshire and The Humber as an example, the original growth in this region was 160,000 between 2004 and 2013, whereas the reweighted APS estimates shows growth of 144,000 (a decline of 16,000 due to reweighting).

Using the latest calendar year dataset that was reweighted (2013), changes at the local authority level shows areas with an increase in the estimate of non-British nationals, and some with a decrease in the estimate of non-British nationals. Table 3 below shows the top 5 local authorities seeing the biggest increases in estimates of non-British nationals as a result of the APS reweighting. Table 4 shows the biggest decreases in estimates of non-British nationals as a result of the APS reweighting.

Table 3: Top 5 local authorities with increases in non-British population due to reweighting, 2013

Local Authority	Original APS Estimate	Reweight APS Estimate	Absolute difference	% Difference
Newham	77	105	28	36.4
Brent	94	117	23	24.5
Waltham Forest	63	73	10	15.9
Haringey	53	62	9	17.0
Lambeth	78	85	7	9.0

Data in thousands

Source: Annual Population Survey (APS), ONS

Table 4: Top 5 local authorities with decreases in non-British population due to reweighting, 2013

Local Authority	Original APS Estimate	Reweight APS Estimate	Absolute difference	% Difference
Westminster	92	76	-16	-17.4
Leeds	73	65	-8	-11.0
Camden	64	58	-6	-9.4
Bristol, City of	62	57	-5	-8.1
Kensington and Chelsea	62	58	-4	-6.5

Data in thousands

Source: Annual Population Survey (APS), ONS

How have the EU and non-EU nationals population changed due to reweighting?

Breaking the non-British national population down further, the impact of the APS reweighting on the estimate of EU nationals resident in the UK has been to increase the estimate of EU nationals resident in each year since the APS began, except for 2004, where the estimate remained the same. Over the 10 year period covered by the reweighting (2004 to 2013), the estimate of the resident population of EU nationals has increased by 1,472,000 (from 1,094,000 in 2004 to 2,566,000 in 2013). This compares to an increase between 2004 and 2013 of 1,413,000 in the pre-reweighted estimates (an overall increase over the 10 years of 59,000 due to reweighting).

Looking at individual years, the peak increase due to reweighting can be seen in calendar year 2011, where the estimate of the resident population of EU nationals in the UK increased by 65,000 due to reweighting (from 2,283,000 in the pre-reweighted estimates to 2,348,000 in the reweighted estimates - an increase of 2.8% on the original EU nationals population total for that year).

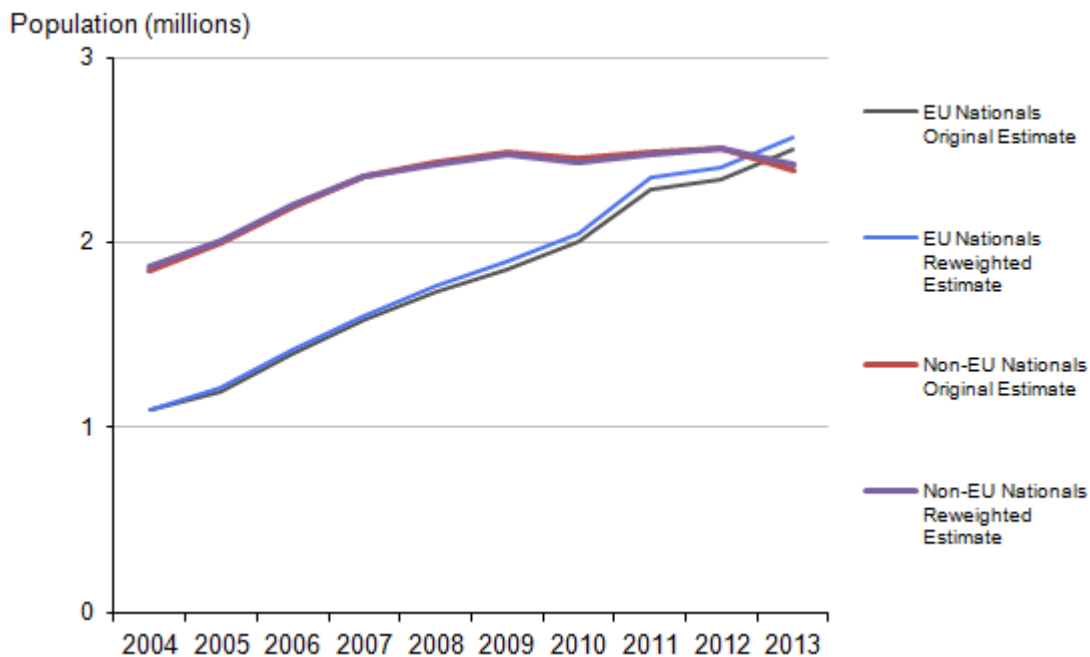
Breaking the non-British nationals down further, the impact of the APS reweighting on the estimate of non-EU nationals resident in the UK has been to increase the estimate of non-EU nationals resident in each year since the APS began in 2004, apart from between 2008 and 2011, where the

reweighting caused the estimates to decrease. Over the 10 year period covered by the reweighting (2004 to 2013), the estimate of the resident population of non-EU nationals has increased by 551,000 (from 1,870,000 in 2004 to 2,421,000 in 2013). This compares to an increase between 2004 and 2013 of 542,000 in the pre-reweighted estimates (an overall increase over the 10 years of 9,000 due to reweighting).

Looking at individual years, the peak increase due to reweighting can be seen in calendar year 2013, where the estimate of the resident population of non-EU nationals resident in the UK increased by 27,000 due to reweighting (from 2,394,000 in the pre-reweighted estimates to 2,421,000 in the reweighted estimates - an increase of 1.1% on the original non-EU nationals population total for that year). Incidentally, the peak decrease due to reweighting can be seen in calendar year 2010, where the estimate of the resident population of non-EU nationals resident in the UK decreased by 18,000 due to reweighting (from 2,457,000 in the pre-reweighted estimates to 2,439,000 in the reweighted estimates – a decrease of 0.7% on the original non-EU nationals population total for that year).

Figure 7 shows how the estimates for nationals from within the EU and outside of the EU have been affected by the reweighting.

Figure 7: Effect of reweighting on the population of the UK, EU and non-EU nationals, 2004 to 2013



Source: Annual Population Survey (APS), ONS

How has the reweighting affected the most common non-British nationalities in 2013?

Using the latest calendar year dataset that was reweighted (2013), it can be seen that the reweighting of the data has only caused a small change in the top 10 most common non-British nationalities in the UK. The top 10 countries are the same, but the bottom 4 countries (USA, Portugal, Italy, and Romania – positions 7 to 10) have had slight changes to their ranking.

Further information and links

Articles have been written by the labour market team on the effect of reweighting of both the Labour Force Survey (LFS) and the Annual Population Survey (APS). The LFS paper can be accessed [here](#), and the APS paper can be accessed [here](#).

Access to the reweighted 'Population by Country of Birth and Nationality' publication for calendar years 2004 to 2013 can be found [here](#).