



Migration: A long-run perspective

by Danny Dorling

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About the author

Danny Dorling was educated at the University of Newcastle upon Tyne in Geography, Mathematics and Statistics leading to a PhD in the Visualization of Spatial Social Structure (1991). He continued studying social science at Newcastle as a Joseph Rowntree Foundation and British Academy Postdoctoral Fellow before moving to the University of Bristol to teach Geography there, next being appointed to a Chair of Quantitative Human Geography at the University of Leeds.

Since 2003 he has been a Professor of Human Geography in the University of Sheffield. He is also Adjunct Professor in the Department of Geography, University of Canterbury, New Zealand, and Visiting Professor in the Department of Social Medicine, University of Bristol. Since 2008 he has been an external expert and specialist in migration on a panel occasionally called to advise the Office of National Statistics Centre for Demography. This research was, however, conducted entirely independently of ONS.

Author's acknowledgements

I am especially grateful to Sarah Mulley of ippr for extensive editing of drafts of this paper. People do not talk of net cohort migration because it is such a difficult thing to imagine. You can never meet a net migrant, let alone hear their life story! I am also grateful to Nissa Finney, Ludi Simpson and Teresa Hayter for their comments on an earlier draft, and to Jan Rigby for helping write the paper from which this then came. I am solely responsible for opinion and error here.

As I was finishing writing the first draft of this paper, many months ago, the cleaner on my floor of the building was talking to her supervisor, a lady from South Yorkshire. It was snowing in Sheffield and the supervisor was asking if she had had any trouble getting into work through the snow. It took me a few minutes to realise that she was referring to the ice storms that had just swept through China, not the problems of getting to work across this city. Our floor's cleaner had been home to see her family. It was the cleaning supervisor of my building talking of ice storms in China as if they were sleet in Sheffield that made me decide that this paper was worth writing. I do not believe anyone in Sheffield in the 1960s would have imagined that conversation I had just heard. To me it says that the world has changed for ever, although I do not think that people will brave ice storms in the future to empty my bin. But I am grateful for that eavesdropping too!

Foreword: The Economics of Migration project

This working paper forms part of ippr's Economics of Migration project. The project aims to shape thinking around how we understand the economic impacts of migration, provide new evidence about the extent and nature of those impacts in the UK, and provide new insights as to how policy might best address migration to maximise economic benefit. We hope that the project will contribute to a better-informed public debate and a more prepared policy community, better able to evaluate migration's economic contributions, and to manage them to the benefit of all.

The publication of new data on quarterly or annual migration rates always sparks debate in the UK, with many commentators taking the view that migration levels are too high, and expressing concerns about the impact on UK population levels. This paper uses a new approach to the data to take a much longer-term view. The results are striking – in the medium to long term, migration rates seem to be strongly predicted by birth rates. The analysis also puts current migration rates in context – the levels of future migration currently predicted by the ONS would represent a sustained increase of a scale never seen in the last 150 years. This demographic shift may occur, but a change of this magnitude requires a very significant explanation. However, the paper also raises a concern – that the UK may not be able to attract the migrants it needs in the future. In the current economic climate, with migration to the UK falling, we believe that this contribution to the debate is both timely and important.

We are grateful to the funders of this project: Business for New Europe, the Commission for Rural Communities, the Trades Union Congress and the UK Border Agency (Home Office). The views expressed here are those of the author and do not necessarily represent those of ippr or the project funders.

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Project Coordinator

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Executive summary

Annual net migration rates (the numbers arriving and leaving in a single year) are not a very useful measure of medium- or long-term migration trends. This paper looks instead at how people come to and leave England and Wales over the course of their lifetimes (cohort measures). This paints a much clearer picture of the history of migration.

Looking at cohort measures of net migration, we can see that net migration levels in the UK are strongly related to birth rates. In aggregate terms, people's behaviour appears to be very predictable over the course of their lifetimes as a group. This process is remarkably consistent given that it occurs over a time frame of huge economic growth and change. This suggests that net migration trends could be predicted by looking at past birth rates.

Current official predictions are that rates of net immigration to the UK will continue to be historically high – leading to significant population growth in the coming decades. If these predictions come true, it would represent a significant turn of events of a kind not seen since near the start of the Industrial Revolution: sustained net cohort migration of more than a fifth of one per cent of the total population a year. A change of this significance requires an explanation of the same magnitude.

UK fertility rates have generally declined in recent years, and look set to remain low. This trend would tend to support the official projections of continued high net immigration. However, the Office for National Statistics may be over-estimating the long-term impact of migration on population – arguably it is drawing strong conclusions about lifetime cohort migration on the basis of recent migration trends which may not be sustained.

In fact, there is a real risk that future economic growth and declining fertility in the UK will create a 'need' for migration that will not be met. The official projections assume that the UK remains an attractive place to live and work, relative to other affluent countries. This assumption is not self-evidently true, something which is perhaps more apparent in the current economic climate than it has been in recent years. This raises the question of who, in the long term, will do the jobs that cannot be done by the children we chose not to have.

1. Introduction

In this paper I argue that levels of net lifetime migration to and from the UK in the last two centuries have largely been determined by UK fertility levels. The data and analysis I report on is for England and Wales, but the story elsewhere in the UK is not sufficiently different to change the main conclusions. I argue that events abroad determine where immigrants come from and where emigrants go. However, events abroad do not greatly influence the total numbers of migrants that come to the UK in the medium to long term.

I concentrate on trying to understand future official projections for population and net immigration to the UK in the light of what we know now about the past trends. The official population projections suggest that greater numbers of people will come to the UK than leave, and that this pattern will be sustained for many years – leading to significant population growth. They also suggest that the rate of net immigration will be sustained at a level higher than at almost any time over the last century and a half.

In this paper, I show that past birth rates in England and Wales have been strongly predictive of future migration levels. If the pattern of declining fertility in the UK we have seen emerge over the last century and a half continues, and economic growth is sustained, we might expect that the official projections will turn out to be correct. In fact it would not be out of line with the trends established since the 1840s if numbers coming *exceeded* those projected, given trends in fertility rates.

However, there is a real risk that declining fertility will create a ‘need’ for migration that will not be met. Over much of the period since the 1840s the UK has been able to ‘balance’ a changing supply and demand for labour with migration because people have (for much of the period) been relatively free to immigrate or emigrate, and the UK has been a relatively attractive place for immigrants. But it is quite possible that the reasons for migrants to come will diminish and other places will become relatively more attractive, both to immigrants and to emigrants from the UK. We might best see current official projections of net migration as projections of the net immigration that the UK *needs* to balance a declining fertility rate if the country remains economically successful. The actual rate of net migration will depend on continued demand for labour in the British economy, and the ability of the UK to continue to attract migrants.

The risk is for the UK, not for immigrants themselves. If people do not come it will be because they have found other places to go, but for them not to come will potentially cause a range of problems for the UK. (The experience of long-term population decline in other countries and regions of Europe, particularly Eastern Europe, is instructive here.)

It is in the centre of Western Europe that immigration has exceeded emigration in recent years. The South East of England is on the edge of that centre. It is part of the attractive core of Europe, largely because of the pulling power of its one great city – London – and its recent economic boom. But we often forget that the Greater London area *lost* population for half a century from the 1930s to 1980s. It is not set in stone that the South East of England will remain in the favoured zone for decades to come, favoured enough to help draw in enough extra people to compensate for our having, on average, much fewer than two children per couple today.

The most recent data (Department for Work and Pensions 2009) suggest immigration rates have declined since the onset of recession. However, it will always be hard to draw conclusions from the most recent migration statistics because there is so much volatility in

short-term migration rates. It is the long-term patterns that are most consistent, and yet they often receive the least attention.

I explain below why looking at the statistics from a new angle produces a much clearer picture.

2. The demographic significance of migration

In the debate over immigration and emigration there is often confusion over the significance of the numbers involved.

For example, the general increase in population of receiving industrialised countries as a result of immigration is estimated at about 0.2 per cent per year of their populations (Sutcliffe, cited in Hayter 2004). In an average year, only around 1 per cent of the population of England and Wales die (Shaw *et al* 2008). This is a lower proportion than in many other countries because England and Wales has a disproportionate number of people in early old age and because health in England and Wales is much better than in many other areas of the world. A similar number of babies are born each year in England and Wales – about 1 per cent of the total population. Usual net migration rates to rich countries are therefore equal to about a fifth of the annual number of births and deaths. Is one per cent of the population significant? Is a fifth of a percent?

Of course, such numbers are small in comparison with the total population. But they can be made to seem large – and claims that the demographic effects of immigration are large are often made in the contemporary political debate in the UK. Immigration figures have at one time or another been compared to adding or subtracting a group of people the size of a city like Cambridge or Birmingham (see for example Migration Watch 2008).

The ONS predicted in October 2007 that the 'UK population is set to increase to 65 million over the next ten years' (ONS 2007). Partly in response to these predictions, the House of Lords Economic Affairs Committee produced a report expressing concern about the impact of net migration on the UK population in which it said: 'Given the long-term demographic impacts of, and rising public concern about, the rapid increase in immigration, there is a need for a comprehensive debate about the economic, social and cultural impacts of immigration' (House of Lords Economic Affairs Committee 2008). The report went on to recommend that the Government should set an explicit target for levels of net migration.

Later in 2008, a new 'Balanced Migration' cross-party group was set up by two prominent MPs to argue that 'immigration should be brought down to the level of emigration' (see www.balancedmigration.com).

The numbers of people coming to the UK can seem large or small when viewed from different perspectives. In fact, the net inflow of migrants to the UK of 237,000 in 2007 (ONS figures) was equivalent to around 0.4 per cent of the UK's population, a historically high level. But it is misleading to look at just one year's figures, as annual figures cannot tell us whether migration is significant or not from a demographic point of view. There is something missing from this debate that anyone interested in the history and future of migration to and from the UK could learn from, and that is a consideration of the numbers involved and their *cumulative importance*, not their apparent annual significance or insignificance.

With a colleague, I have in recent years been looking in a new way at the numbers who have come and gone over the last century (Dorling and Rigby 2007). We have looked at how

people come and go to England and Wales over the course of their *lifetimes* rather than the numbers arriving and leaving in a single year. This paints a much clearer picture of the history of migration than the one we are used to looking at. It suggests that the link between trends in fertility and migration is very much stronger than has been supposed before, but also hints at other influences.

Rates of immigration and emigration have been significant in that they have allowed the population of the UK in the long term to grow far more slowly and steadily than it otherwise would have. These rates are strongly influenced by the gap between the demand for labour and the size of the workforce, and thus by past birth rates. This has been the case for a long time, almost certainly approaching a couple of hundred years. It is likely to be the case for at least a century to come. When more people came to England and Wales than left, it was because they were needed by the economy. When more left than arrived it was because they were not needed. How many were needed depended very much on the size and shape of the population at the time, and that in turn depended on birth rates a little time earlier. What was happening in the rest of the world had remarkably little influence other than in determining where immigrants came from and where emigrants went to.

3. A cohort approach to understanding migration

To begin to understand the demographics of immigration you have to go back to when the UK first systematically recorded deaths and births, and forward to as far as current official predictions go. This means considering a 240-year period, from 1840 to 2080. To make the maths easier I will only be looking at England and Wales, though statistical convenience is not the only reason for this choice. Within Britain there are very different migration histories which the separating out of these two countries helps to clarify. In recent decades Scotland has suffered a shortage of labour that provides telling lessons for the rest of the UK. The migratory history of Ireland over this period, including what is now the North, has been the most turbulent of all these countries. There is not enough space here to describe this, save to say that migration from Ireland to England and Wales makes up a large part of the start of this 240-year story.

Finally, it is a central argument of this paper that it is crucial not to consider the rate of migration in any given year, but over whole lifetimes; in other words, to consider what is called 'cohort migration'. This is hardly ever done. When it is, however, the results are very interesting.

Cohort measures are measures that concern people born at a particular time. They often make more sense than measures for a particular time period. For example, you could measure the number of children born to mothers of all ages in a particular year. However, if that year were 1946 or 1919 you would get a very high number due to post-war baby booms. Less extreme events than wars also effect annual (usually called 'period') fertility rates. In contrast, if you count the number of children that all women born in a particular year have over the course of their lives (or usually until their late forties) then you get a far more representative measure of fertility. Cohort measures are also often used to calculate death rates and life expectancy measures, as they are more representative than period rates. For instance, it is better to use projected cohort figures for life expectancy when planning pensions policy.

Cohort measures are used less often in the study of migration, but in fact the choice of period or cohort methods arguably matters more for measuring migration than for measuring either birth or death rates. They are less often used because they are harder to make

operational and to describe. The results, however, are striking, and can tell us some important things about the drivers and significance of migration.

Existing work on cohort migration tends to have an emphasis on the health or social circumstances of particular groups of migrants (Brimblecombe *et al* 1999, 2000, Harding 2004, MacPherson 2001). Wider, structural issues have been identified in an important body of work by Hatton and Williamson (2002, 2004), who observed cohort influences on migration in many countries with their proposition that ‘The birth rate lagged 20 years stands as a proxy for the young adult cohort size. Its effect is positive, and it is large – suggesting that up to half of additional births ultimately spilled over into emigration’ (2004: 11). Recently, the issue of whether increased immigration may substitute for lower birth rates in affluent nations has been raised in international debate (Rauhut 2004, UNDP 2001).

An illustrative example

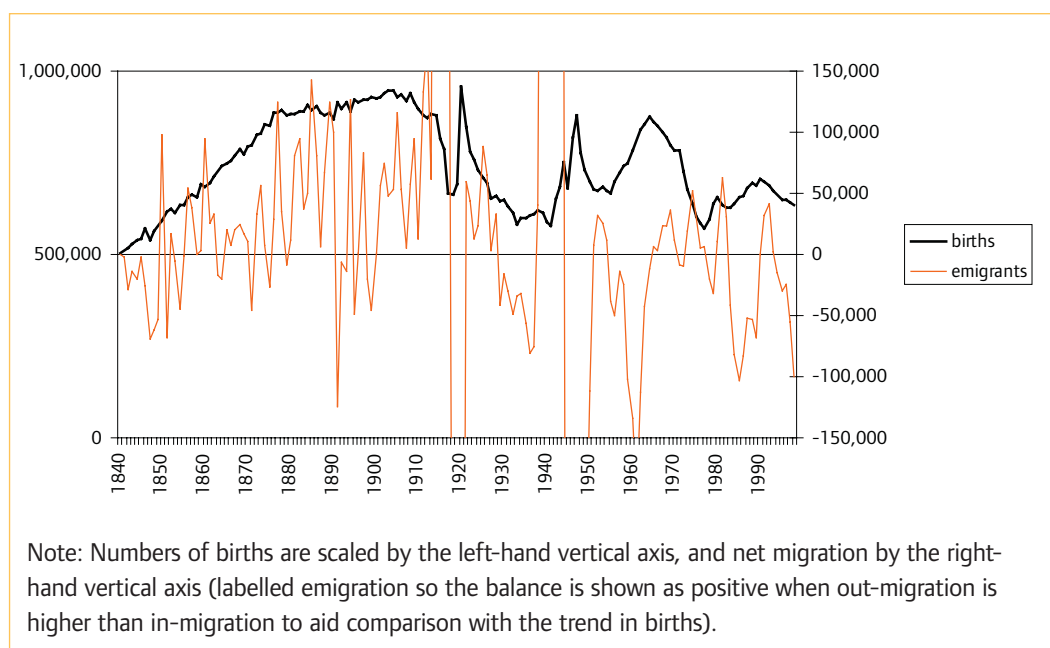
Because the concept of cohort migration may be unfamiliar, I begin with an example for one year and then show the results for all years. Consider the year 1840. In that year about 15.7 million people lived in England and Wales. Almost exactly half a million babies were born alive in that year, or 3.2 per cent of the population. However, over the course of that and all subsequent years 532,500 people who had been born in the year 1840 died in England and Wales. We know the total because since just before 1840 all deaths occurring in England and Wales had the date of birth of the deceased recorded at time of death.

So, how can more people who were born in 1840 have died in England and Wales than were actually born in 1840 in England and Wales? The only explanation is that in the subsequent years a greater number of people born in 1840 elsewhere in the world later came to live in England and Wales and died here, than those who had been born in England and Wales in 1840 but left and died elsewhere. This net additional 32,500 people is the net immigration that contributed to the *final size* of the birth cohort of 1840. It is almost exactly 0.2 per cent of the existing population of England and Wales in 1840. Thus, births and net immigration combined to raise the existing 1840 population of England and Wales by 3.4 per cent over the lifetime of the cohort born in that year and just 0.2 per cent of that was due to immigration.

Figure 1 shows the annual counts of births and net emigration for England and Wales for 1840 to 2000. Details of the methods used to derive all figures can be found in Appendix A.

Figure 1. Annual births and net emigration, England and Wales, 1840–2000

Based on official historical population estimates of ONS and the projections of ONS. All data sources reported in Dorling and Rigby 2007



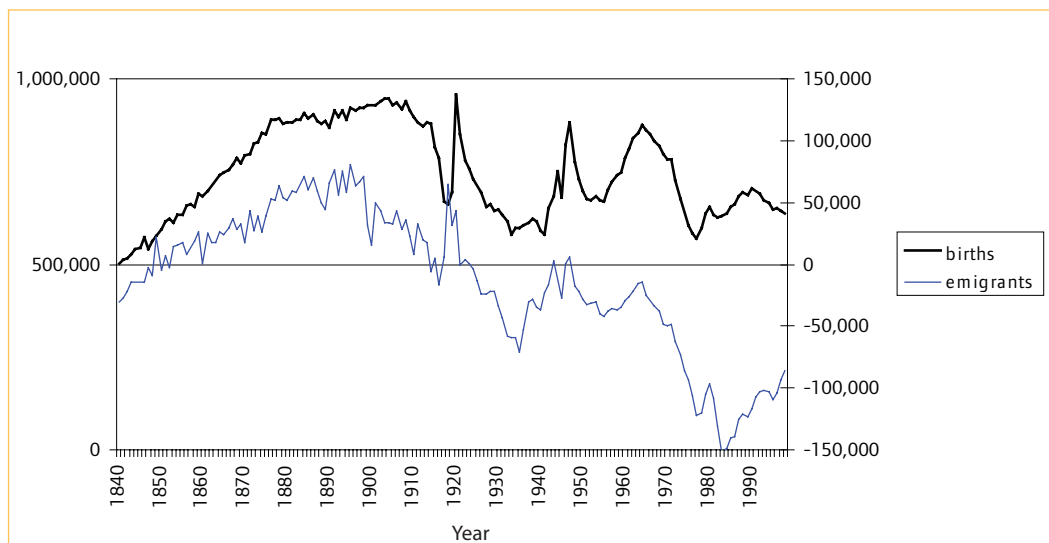
Net emigration, as shown in Figure 1, is the excess of emigrants over immigrants arriving/leaving in any given year. Scaled by the right-hand axis of the figure, this trend is not amenable to simple description, occasionally even extending beyond the bounds of the graph as it apparently fluctuates wildly. We can see an upward trend in the nineteenth century pattern with emigration peaking in the years 1850, 1852, 1856, 1860, 1865, 1873, 1877, 1882, 1885, 1889 and 1897. Net emigration often very quickly became negative between these dates as more people entered the country than left it. The dates themselves are somewhat arbitrary as this trend of net migration has a fractal quality whereby, on closer inspection, between each local maximum and minimum there appear others (Mandelbrot 1982). In only one year in peacetime in the twentieth century were the flows as large (in either direction) as nineteenth century flows – an influx of 202,000 people in 1961. However, it is particularly timely to note that this record was exceeded with a figure of 223,000 for 2004 (Chappell 2005), and may be exceeded by the 2007 figure of 237,000 for the UK as a whole unless Scotland accounts for 35,000 or more of that estimate.

Note that the most recent peaks in net emigration in 1974, 1981 and 1992 coincide with periods of economic recession. These were all recessions that affected many countries, but nevertheless more people left the UK than entered it during those years. Note that current official projections did not anticipate the current recession and its likely effects.

Figure 2 is similar to Figure 1 but here net migration, labelled on the figure as ‘emigrants’, has not been measured over the course of a single year but over the lifetimes of the people born in each year, as described above. Net cohort emigration is the count of emigration less immigration over the lifetime of a birth cohort. For estimates of net cohort migration after 1900 we rely (to increasing extents for later years) on official predictions of the population (see Appendix A for methods used where a full cohort history is unavailable). Note that cohort migration measures are concerned with long-term demographic and population impacts, and do not capture temporary migration. British-born people who live abroad for some time but who return before death, or foreign-born people who come to England and Wales for some time but leave before death are not measured.

Figure 2 shows a strong link between birth rates and cohort migration rates. In aggregate terms, people’s behaviour appears to be very predictable over the course of their lifetimes as

Figure 2. Annual births and net cohort emigration, England and Wales, 1840–2000
Data sources as for Figure 1



Note: Read as for Figure 1, but with cohort replacing net period emigration. Years on the x axis now signify the year of birth for migrants

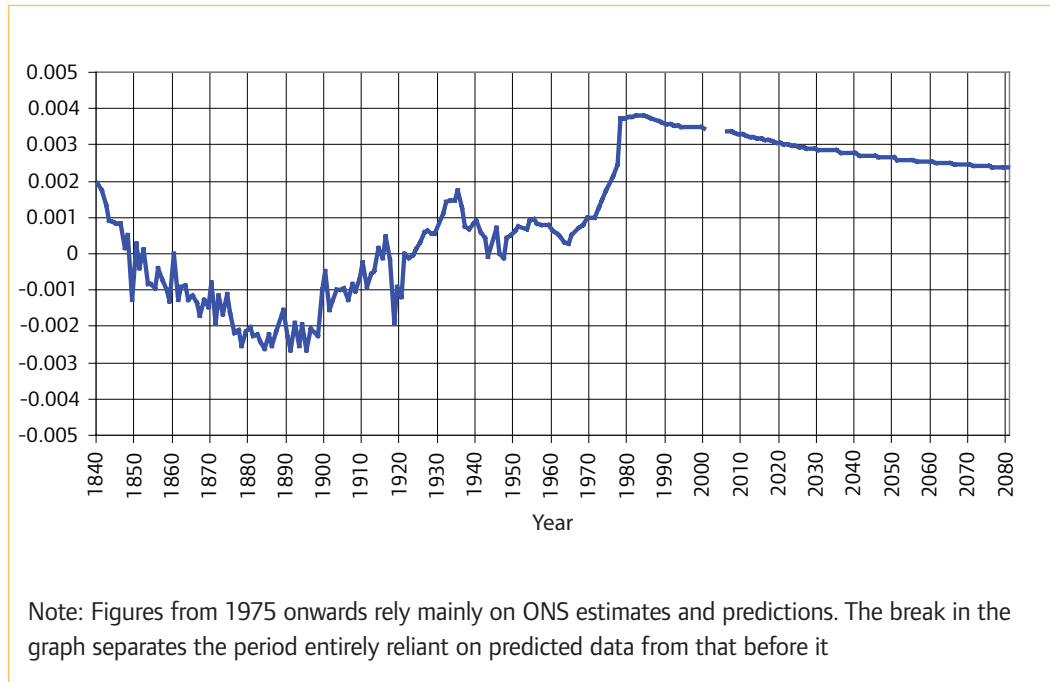
a group – the size of birth cohort very closely predicts net migratory behaviour. This process is remarkably consistent given that it occurs over a period characterised by huge economic growth and change. The apparent random fluctuations in annual net migration trends seen in Figure 1 are due to short term events, and their aggregate influence over the lifetime of a cohort tends to be cancelled out to produce a more predictable history driven by longer-term factors. For example, recently immigrants to England and Wales have been fewer in number because there is less demand for their labour in a recession, but we should not confuse these short-term factors with the long-term drivers of migration.

4. Using a cohort approach to judge the significance of migration

So is the 0.2 per cent added to the 1840 birth cohort by net immigration significant or not significant? As Figure 3 shows, historically for England and Wales it is unusually large. Over the time that records have been kept net cohort immigration has only ever added that much to the cohort born in 1840, almost (but not quite) to the 1935 cohort, and is not recorded again as high until 1975. In fact for 73 (a majority) of the years between 1840 and 1980 more people born in each year left England and Wales than arrived over the course of their lifetimes.

Figure 3.
Proportion added to the population due to net cohort immigration to England and Wales, 1840–2080

Data sources as for Figure 1



One key reason why those interested in migration rarely consider net cohort migration is that you cannot be completely sure what the rate for a particular year is until almost everyone born in that year has died. This takes a little over a century, which means that cohort measures from around 1910 onwards cannot yet be complete. However, we can draw some conclusions for the twentieth and twenty-first centuries. Historically, the large majority of lifetime migratory moves are made by the time people are aged 33 so we can have a high degree of confidence in the series shown above up to around the year 1975. From then onwards the series relies upon the accuracy of those who make official predictions.

What Figure 3 illustrates most clearly is how insignificant migration seems, if looked at in this particular way. It is the case that in particular years many more people have arrived in England and Wales than left, and also true that in other years many more have left than arrived. The gross flows are even larger. But never, up to the point around 1975 when we can rely (more or less) on historical data, has net cohort migration added more than 0.2 per cent to the population of the country. Official projections now suggest that, at least for the foreseeable future, that proportion will never be as low again. If this is true, and I go on to explain that it is not inevitable that it is, then why is it so?

If official predictions turn out to be true, then something has changed dramatically since 1975, such that for the 1980-born cohort almost twice the level of net cohort migration ever recorded is predicted. That is, the net extra people born in the year 1980 predicted to come to England and Wales over their lifetimes is equivalent to almost 0.4 per cent of the 1980 population; and the proportion is predicted never to fall to 0.2 per cent again, at least as far forward as such predictions are made. Is this plausible? The answer, in short, is: only if England and Wales remains an attractive place for migrants compared with other affluent countries. Official statisticians have been assuming an unprecedented period of such attraction.

5. The long-term determinants of migration

When we look at cohort migration across the last two hundred years or so, it is clear that fertility levels in England and Wales were key determinants of net migration levels. The underlying reason for this was that throughout this period Britain has been a disproportionately rich country.

When there is a demand for more labour within England and Wales, people in England and Wales can afford to pay others to come. When there is a lack of demand for labour in England and Wales, some of those already here can relatively easily afford to leave, or their passage out can even be subsidised. If England and Wales were poorer countries then we would need to better understand the pulls and pushes from elsewhere in the world to understand migration in and out. As it is, the strengths of the pushes and pulls from within are sufficient to account for most of what is significant about the history of net migration.

Figure 4.
Proportion added to the population due to net cohort immigration and births to England and Wales, 1840–2080

Data source as for Figure 1

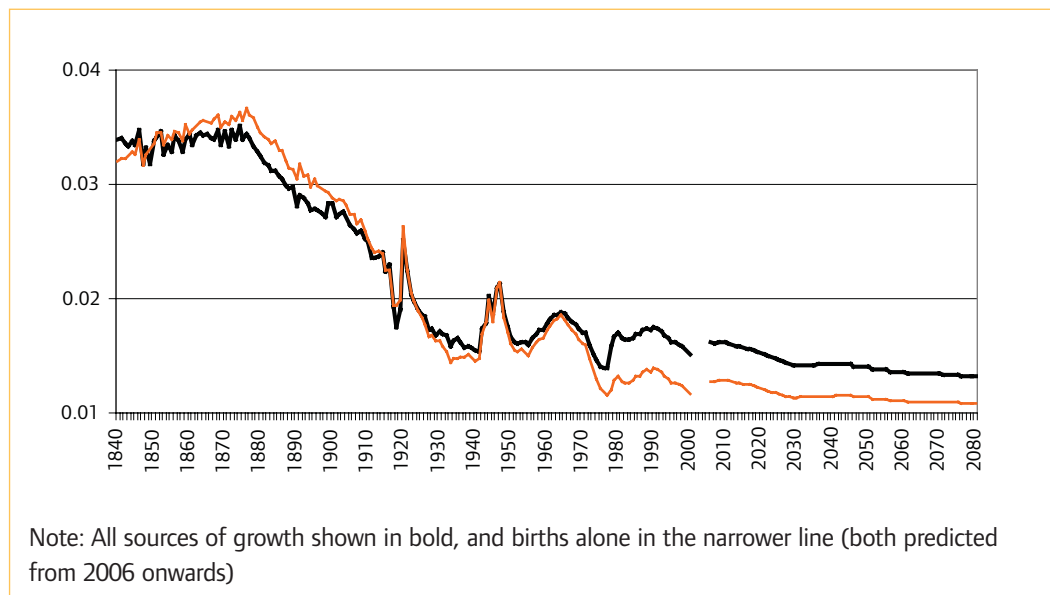


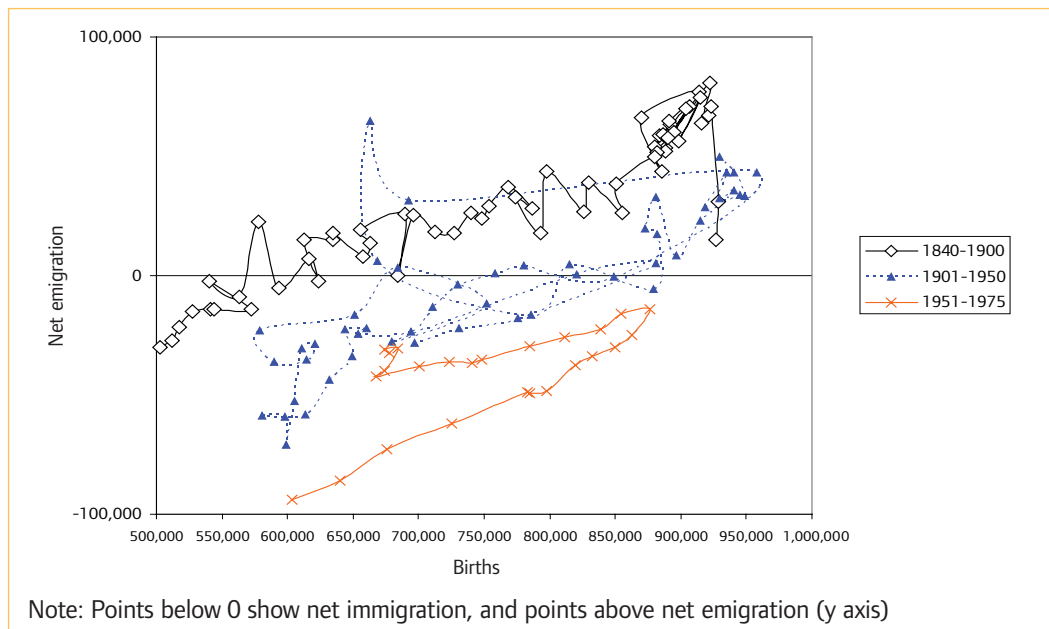
Figure 4 is derived from Figure 3. So, the line shown in Figure 3 represents the size of the gap between the two lines shown in Figure 4. The thinner (orange) line in Figure 4 is easily understood: it is simply the number of births that occurred in each year as a proportion of the population already alive in that year. It was 3.2 per cent in 1840, rose to a peak of 3.7 per cent in 1876, and is predicted to fall below 1.1 per cent for the first time in history in 2061, then heading slowly and steadily down towards that asymptote of there being one birth a year in England and Wales for every one hundred people living here. (Incidentally, such a rate is only sustainable in the long term for a species that lives on average to a hundred years if that species is well equipped to care for itself into extended old age. We are not yet that species.)

The thicker (black) line in Figure 4 is the rate at which the population is expected to grow for each birth cohort once the net effect of immigration is included. For most of the nineteenth century that thicker line falls below the thinner line as larger numbers of people born in these years left England and Wales to die elsewhere, than came from elsewhere and died here. The two lines do not cross until 1914 and do not stop crossing until 1924. The children born in 1914 reached the age of 18 in 1932, those born in 1924 in 1942. 1914 and the subsequent decade were neutral years for those cohorts – with those leaving and entering cancelling each other out. It was not until the cohort who came of age in 1942 that there was a surplus demand for labour in Britain – for the first time in almost a century.

It is becoming clearer and clearer across a wide range of areas that the size of the birth cohort a person falls in, and whether the cohort size is rising or falling around them, has strong and subtle influences on their later life chances. From year-on-year variations in the Government’s ability to hit university participation targets (Dorling 2009) to finding a place to retire – just how many people are before you ‘in the queue’, or competing with you at the present, matters. This is just as much the case with immigration and emigration. If you were born abroad between 1942 and 1960, and turned 18 between 1960 and 1976, your chances of emigrating to England and Wales and staying were greatly increased. Whether you came from particular Caribbean islands, from Ireland, from Scotland or from further afield depended more on the precise year, the turn of economic events at home, and the particular incentives being offered. But a strong influence on whether people from this birth cohort came, and whether they stayed, was that there was not much competition with people born in England and Wales at around the same time. If we look at birth rates and net migration since 1840, we see some striking correlations.

Figure 5. Births and net-cohort-emigration England and Wales, 1840–1975

Source:
Figure 2 above



The left-most diamond in Figure 5 represents the year 1840, when just over half a million babies were born in England and Wales (x-axis). That birth cohort was, over the course of their lifetime, joined by 32,000 people (net) who were born elsewhere then came to England and Wales and subsequently died here (y-axis). The years 1841, 1842, 1843 and so on are the diamonds progressively to the right of that initial point. In general, as the years went on, more babies were born each year, fewer people entered England and Wales, and more left, until around 1898.

The last two diamonds in the series represent births in 1899 and 1900. The trend abruptly ends in 1899 because some of the net 'emigration' recorded for the birth cohorts in the years prior to this actually represents the deceased of World War I. This is clear when rates for men and women are compared (results not shown). Boys born after 1899 and 1900 were, in general, too young to 'migrate' to France in 1914 and die there (Brittain 1933), which explains the sharp change in the trend line.

The next period shown in the graph, as solid triangles, is of those children born between 1901 and 1950. There are more atypical years in this period (due partly to peaks in births a year after men returned from war in 1919 and 1946/7) but, in general, the solid triangles of births from 1901 to 1950 lie on a line that shows a similar relationship between birth cohort size and net cohort migration to that seen for 1840–1900 births. However, for a given birth cohort size, there were on average some 50,000 fewer emigrants (or 50,000 more immigrants) in these birth cohorts than in the period 1840 to 1900. Hence it would be possible to create two very simple equations: one that predicted lifetime net emigration from births for the period 1840 to 1898; and the other from 1899 to 1950. Both would be of the form:

$$\text{Emigrants} = (\text{births} - \text{constant}) * \text{fraction}$$

Given that the slopes of the lines are so similar, the fraction would stay the same and the constant would vary by about 50,000. This variation in the constant may be explained by the impact on the labour force of war deaths, and the influenza pandemic at the end of World War I.

Finally, the crosses in Figure 5 show the period from 1950 to 1975. As the birth rate rose from 1955 to 1965, net lifetime immigration decreased each year, and then as the number of births fell successively each year from 1965, net lifetime immigration increased. The most recent trend moves down the y axis to suggest net immigration (over the course of their lifetimes) of almost 100,000 people born in 1975; however this trend becomes heavily dependent upon actuarial estimates of future population numbers and deaths (see below).

A miniature baby-boom occurred in the mid 1960s. Partly as a result of this, many of the babies conceived in 1963 (mostly born in 1964) who had their eighteenth birthdays in 1982 ended up joining the unprecedented ranks of youth unemployed in the early 1980s. Net across their lifetime, those born in 1964 were joined by only 14,000 others born abroad that year. This was the lowest level of net cohort immigration since the migration tide turned positive in 1948. These 1964-born immigrants who came to Britain in the 1980s and early 1990s encountered a particularly chilly economic climate and so many left again. Many of those born in Britain in the early 1960s chose to emigrate for the same reasons.

The 1960s baby boom came to an end as contraception became ever more widespread, as the baby boomers of the 1940s stopped having their 'two perfect specimens' (as the archetypal Peter and Jane family were described), and as abortion was legalised. As the UK fertility rate declined in the late 1960s, net cohort migration increased.

The result of all this was that the birth cohort of 1970 was the first since that of 1936 to find themselves later living alongside a group of people born abroad in the same year, numbering over 0.1 per cent of the population of England and Wales (as a proportion of the population measured at the time of their birth). And from then until 1975, the reduction in the size of the birth cohort from the 1964 peak was offset by about a third by net immigration – for every three fewer babies born in the UK, one migrant was in effect imported. That importation almost always happened later in life, usually when the child had grown up to be a young adult (so for the cohorts of the early 1970s most migration occurred in the 1990s or early 2000s, for example), but the demographic effect was the same as having one more baby born in England and Wales in their birth year.

It is only in the medium term that migration responds to the demand and supply for labour. Political decisions can determine much of the short-term pattern. Within a single year, the Government can decide that it will allow in more refugees from a humanitarian disaster (or fewer); universities might decide to try to recruit more students from overseas; or the Government may offer £10 tickets to people to encourage them to go to Australia. Year on year migration patterns appear strongly influenced by such short-term events and stimuli.

The human side of emigration and immigration is not a simple story of the supply and demand for people being met by a well-oiled transit system. Rather it is a story of how attempting to stop people coming in, or indeed encouraging them to leave, does not seem to affect migration flows in the medium term when there is a demand for labour in the economy. (And in the same way, attempts to stop people leaving and to encourage people to come will not work if the economic demand is not there.)

Immigration controls have long-term effects on individuals and on the particular patterns of migration we see, but only a short-term effect on the aggregate numbers. For instance, the imposition of stricter immigration controls in the early 1960s encouraged many people from the Caribbean Islands and from parts of South Asia to come to Britain in the years up to and before 1962 (Hayter 2004). Many stayed permanently and later brought over family. This would not have happened quite as and when it did had these controls not been imposed. However, my argument is that other people would have come from other places to have made up the numbers. They would have been spread out over a few more years, come later, and would have been a little older on average, but they would have come.

If, in the short term, migration is unpredictable in nature, and in the medium term it is largely predictable and unstoppable (either out or in), what about the long term? My argument about the determinants of migration ends by suggesting that it is in the long term that people have most influence over migration. Mortality and fertility rates are altered by human action. It is not due to an act of God that in the more affluent counties we now have infant mortality rates that are almost a hundred times lower than levels recorded only a century ago. It is not a matter of chance that in the UK we now have fewer than two children per couple. And it is (at least to some extent) a reflection of economic and public policy over many decades that the demand for labour in the UK has remained high.

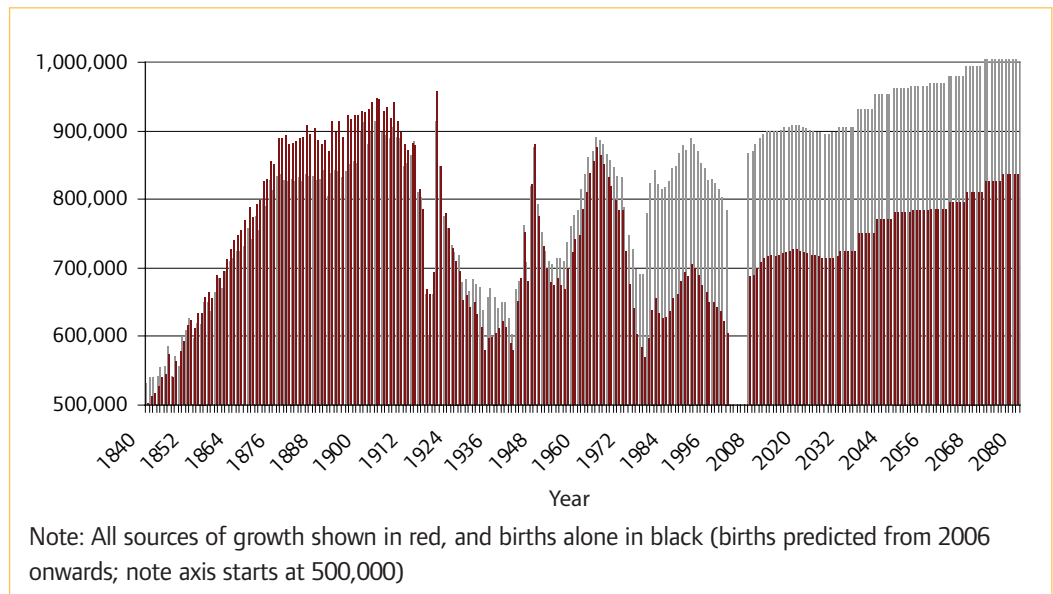
The impact of migration on demographic patterns is a story of the slow and steady cumulative effects of myriad prods, pushes and pulls (social, economic and political) on people which result in millions of movements, which average out to result in smooth lines drawn on graphs. I am not arguing that a perfect balance is achieved between net immigration and fertility trends, but that rich countries like England and Wales have seen balance achieved roughly over time – and much closer to balance than in poorer places (a good example being much of Eastern Europe with its low fertility rates and high net emigration).

6. Will net immigration to England and Wales in the future be higher than in the past?

The scenario shown in Figure 6 for the year 2006 onwards is based on current official predictions. These predictions are that the absolute number of births will rise throughout most of the next 70 years, and that rates of net immigration will continue to be historically high, resulting in net population growth of around a million people a year by around 2070. However, it may well be that the levels of migration for those born in 1980 and afterwards do not turn out to be as high as predicted over the course of a lifetime. The ONS may be over-estimating the long-term impact of migration on population – it is arguably drawing strong conclusions about lifetime cohort migration on the basis of recent migration trends which may not be sustained, or which may have only temporary population impacts (for example, if many recent migrants from Eastern Europe return home). Fertility rates could also fall, as they have before.

Figure 6.
Numbers added to the population due to net cohort immigration and births to England and Wales, 1840–2080

Based on official historical population estimates of ONS and the projections of ONS; sources as for Figure 1



Official predictions are that 2028 will see an annual addition of 178,000 people to the population due to there being more births than deaths in England and Wales; and that for the first time (possibly since 1066) this will be exceeded by change due to net migration of an additional 181,000 people. The annual rise due to natural change (births less deaths) is predicted to fall to just 84,000 by 2056; less than half the contribution from net immigration. But this might not happen. Compare Figure 7 below with Figure 8.

Figure 7. Where people have come from (proportion in each decade who had been born abroad), England and Wales

Sources: Censuses from 1841 to 2001 and Sriskandarajah *et al* 2007

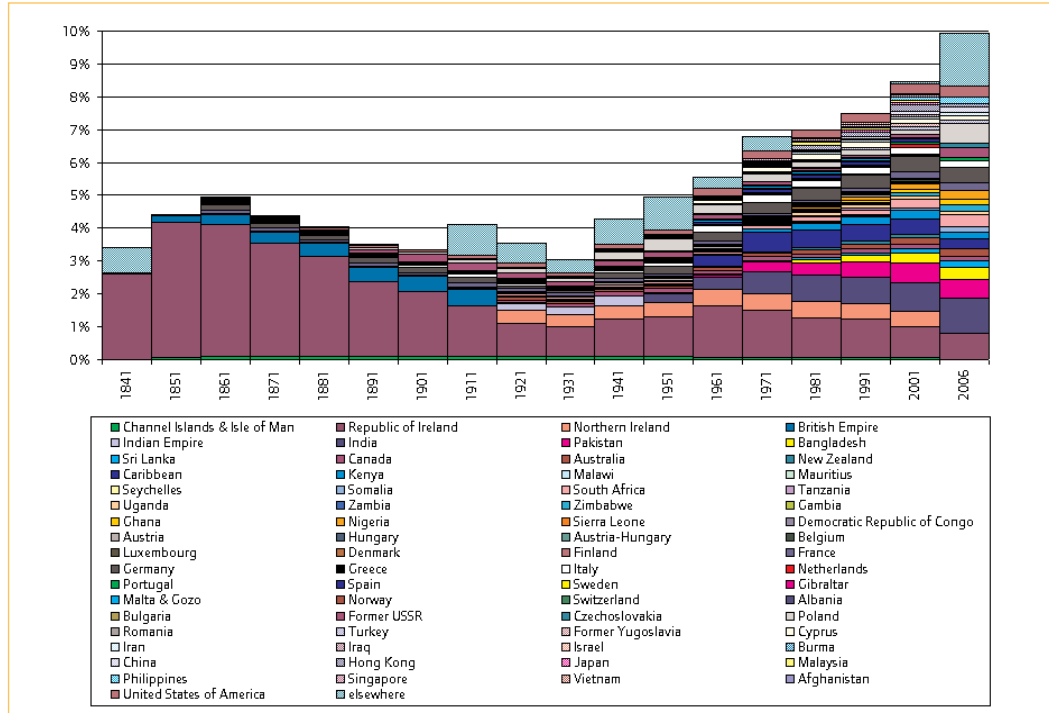
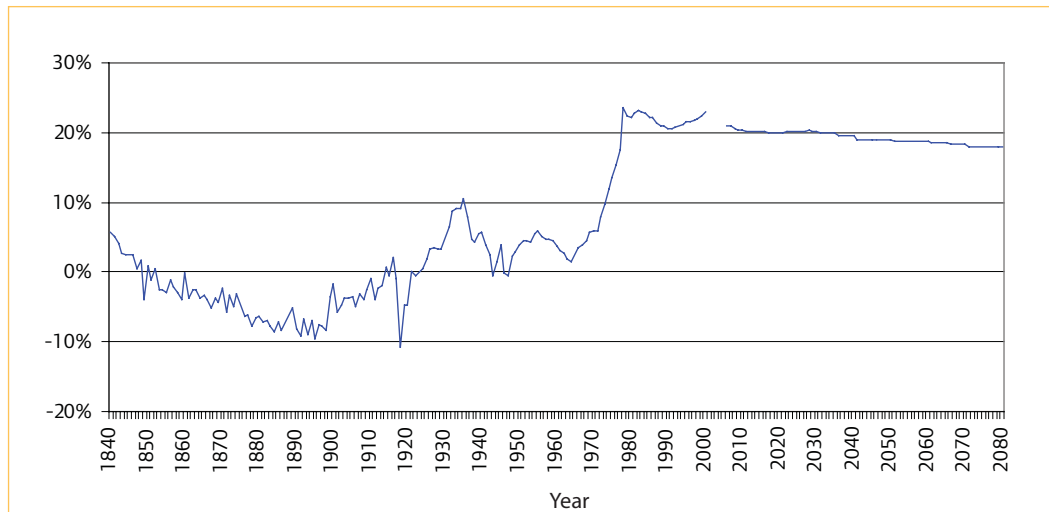


Figure 8. Impact of net cohort migration on birth cohort size (including official predictions)

Based on official historical population estimates of ONS and the projections of ONS



Note: The line is below zero when more people over the course of their lifetimes left Britain than entered, and above zero when more people over the course of their lifetimes came to Britain than left. It rises to 20 per cent when it is predicted that for every five babies born an extra person (net over the course of their lifetimes) will come and stay.

Figure 7 shows the proportion of the population living in England and Wales who were born abroad and where they were born. The proportions are shown as fractions of the contemporary England and Wales populations to aid comparison with Figure 8. The people living in Britain who were born elsewhere reached a nineteenth century peak in 1861 (Figure 7), due partly to the high proportion of the 1840 cohort and a fewer earlier cohorts who were migrants to Britain (Figure 8). Ireland was the most common area of origin in this period. The low point in Figure 7 is 1931, some thirty years after a low point for birth cohort immigration (shown in Figure 8). People lived on average a little longer in 1931 than they did in 1861 which is partly why the length of lag rose by a decade between cause and effect. From 1931 onwards the trend shown in Figure 7 is up, and an ever wider range of countries of origin feature as Britain searched the furthest reaches of what had been its Empire, and

then the wider world, for labour. The peak of around a tenth of the population being born abroad by 2006 (Figure 7) coincides with the 10 per cent mark reached for the 1973 cohort (Figure 8), and the mostly net positive cohort immigration seen from the 1920s cohorts onwards.

7. Reasons to believe that current migration predictions are too high

What happens next – from the mid 1970s birth cohorts onwards – is a matter of informed guesswork. What the official predictions present is a mid point between two extremes. It is highly unlikely that a mid point as smooth as that shown on Figure 8 will occur. It has never happened before that such a trend has been as smooth as suggested by the ONS 2006-based estimates. It is worth considering two extreme scenarios of the future. The reality is likely to lie somewhere between the two, but not to sit neatly in the middle, as suggested by current official predictions.

The first scenario is a return to historically normal net immigration rates of below 0.2 per cent of each birth cohort. Depending on the levels of emigration, at some point in the near future population levels in England and Wales would begin to fall. They would then fall more rapidly as the two post-World War II baby boom bulges reached their peak years of mortality. If emigration was driven up by the same factors that reduced net immigration, the impact on population might be even more dramatic. For example, if the current recession leads to a sustained decline in London's financial sector, and no replacement industry of a similar magnitude and with similar multiplier effects emerges, we might expect to see this kind of double migration impact on population. It occurred a century ago in South Wales, when an area famed for drawing immigrants to the Valleys began a slow, steady and very prolonged population decline.

The second scenario is that the trend of rising net immigration seen in the 1970s and 1980s cohorts shown in Figure 6 continues to rise. Suppose England remains a place that more people wish to come to than leave for the next few decades, then we will have a significant turn of events of a kind not seen since near the start of the Industrial Revolution: sustained net cohort immigration of more than a fifth of a percent of the total population a year. This would imply that the proportion of people living in Britain who had been born abroad would, for the foreseeable future, always be over 10 per cent of the population and would not fall again below that level. The proportion of future cohorts born abroad would rise well above a tenth when the demand for labour is high under this scenario.

It is possible that the official predictions of sustained high levels of net immigration in the coming years will come true, or at least be near the mark. But it is also the case that the predecessor of the Office for National Statistics – the Office of Population Censuses and Surveys – made predictions that turned out to be way off the mark. Official statisticians have a long record of making predictions for population growth that are millions too high. You have to go back to the pessimism of the 1930s (and a few years in the 1970s) to last find a time when our officials did not systematically overestimate the popularity of coming to these shores.

So how realistic are current predictions? In short, they are optimistic about the UK's ability to attract migrants, but with some reason and not a little hope.

We saw above that from 1970 until 1975, the reduction in the size of the birth cohort from the 1964 peak was offset by about a third by net immigration – for every three fewer babies born in the UK, one migrant was in effect imported. Figure 4, based on the official predictions from the ONS, suggests that this ‘importation rate’ will rise for cohorts born between 1979 and 1993 to two net migrants for every three fewer births compared to the 1964 peak. Most of that rise is a prediction; it has yet to occur. The net importation rate is then predicted to fall again towards one net migrant for every two fewer births compared to the 1964 peak, and is set to remain at that rate until about 2030, after which it falls again to its 1970s levels of one net migrant for every three fewer births compared to the 1964 peak.

If the predictions are correct, what net immigration is allowing us to achieve in demographic terms is to maintain, in effect, the fertility rate that we had around 1970 (just above the fertility replacement level of 2.1, at 2.5 children per woman) up through to the year 2000. After that, the rate declines slowly towards equilibrium and – if all the projections work out – we will reach a point where England and Wales slowly settle down to having a stable population. At about the same time – also in the second half of the current century – the average number of children per couple in the world will also settle down to just over two (based on the United Nations’ central projections).

Of course it is never that easy to predict these things, but my fear is that we are likely to undershoot this demographically attractive scenario. If net immigration is to be sustained there needs to be work here, but we also have to be attractive in other ways – such as having a good reputation abroad, being seen as socially tolerant, accepting and safe. It is not so much that we need new younger people to look after an ageing population, although that would be a fortuitous outcome of net immigration in the coming years. Certainly migrants will not come simply *because* the population is ageing. Populations are currently ageing in more than half the countries of the world and, within a lifetime, the same will be true for the most of the other half of the world too.

As a final point of discussion it is worth noting that many of these migration flows both ways are influenced by fairly unpredictable human responses. Young people from Britain travel abroad for a year, meet someone, come back, but then go back overseas to live with their new foreign partner. Meanwhile foreigners come here just for a short time – but like it and a few stay. At the same time there are placards in Britain telling immigrants to ‘go home’, while in New Zealand broadcasters discuss the merits of government policy to channel the sudden surplus of immigrants from Britain into a town called Hamilton. It is this nature of migration that makes it so susceptible to the forces I describe above. Human agency is important. It is human agency that decides who moves when, and migrants are the most energetic and able of human beings.

8. Conclusion

In demographic terms this paper has illustrated a method of measuring cohort migration by its implied alteration of the crude birth rate. Net cohort migration has influenced the birth cohort and population with remarkable regularity compared with measures of migration in a particular year or period. When we look at the data in this way, we see that the size of the UK birth cohort has been a strong predictor of net migration over the lifetime of that cohort.

This paper has shown that for people in England and Wales the size of their birth cohort affects the probability of whether they will emigrate, or will be joined by immigrants of the same age. People born within smaller (and shrinking) cohorts are likely to stay and to be

joined by others of around their age from abroad. Those born in larger (and growing) cohorts are more likely to emigrate and tend to be joined by fewer immigrants. So low birth rates are followed by relatively high net cohort migration, and vice versa.

ONS projections suggest that the impact of migration on population is about to increase far above historical levels and remain high. To summarise, jumping 40 years at a time, this is what has happened and is expected to happen (according to official projections) to net-cohort migration in England and Wales from 1840 to 2080:

- The children born in 1840 were joined by 30,000 more than those who left.
- The children born in 1880 saw some 52,000 more leave than entered.
- The children born in 1920 saw 43,000 more leave than entered.
- The children born in 1960 will have been joined by 29,000 more than those who left by the time they die (barring accelerated emigration in old age).
- The children born in 2000 are predicted to be joined by 180,000 more than those who leave if the 2006-based official population predictions are to come true.
- The children predicted to be born in 2040 are forecast for almost exactly the same, and so are those in 2080... after which the official crystal ball glazes over.

As a proportion of the birth cohorts these numbers of net immigrants equate, for 1840, 1880, 1920, 1960, 2000, 2040 and 2080 respectively, to: 6, -6, -5, 4, 23, 19, and 18 per cent of the population.

Official predictions thus suggest that a change of some order of magnitude has occurred for cohorts born somewhere between 1960 and 2000. If it has, this is highly significant.

The size of the UK birth cohort, measured as a proportion of population alive at the time the cohort was born, has reduced in recent years and will continue to do so. So, we might plausibly expect more net immigration for decades to come if labour demand is unmet by UK births. However, this is contingent on continued demand for labour, and Britain being able to attract migrants when they are needed.

We will know for sure sometime in the middle of the current century if the significant change predicted by the ONS has in fact occurred. Just at around that time the United Nations forecasts world population to stabilise at around 9 billion people. That 9 billion ceiling is a global prediction that looks increasingly reliable as fertility rates around the world continue to fall. Unless the future is very different to the past it will be those places that are prospering economically and socially that will attract immigrants, while those places that are stagnating and failing will see people leaving.

In the past, migration to England and Wales has tended to be from places where the population was growing quickly due to a high birth rate. This was because most places had a high birth rate, and birth rates fell in England and Wales more quickly than in most of the rest of the world. Soon this will no longer be the case. Migration will increasingly be from parts of the world experiencing absolute declines in population. As migrants increasingly come from countries with declining populations, pull factors will become ever more important in relation to push factors.

If the UK is to see the levels of net migration predicted by the ONS, and continue to use migration to balance changes in the birth rate, it will have to ensure that it remains a prosperous and attractive place for migrants. If we consider the choices available to today's international migrants, particularly in the context of the current recession, it is not self-evident that the UK will continue to be that place. This raises the question of who, in the long term, will do the jobs that cannot be done by the children we chose not to have.

Appendix A: Data and methods

Data

For England and Wales annual data was collected from 1840 to 2000 by calendar year of births, deaths and population by single year of age (up to age 101+) and sex, and population, births and deaths projections to 2027 (mid-year estimates were projected to start of year for the period 1991–2003). Similar exercises have been carried out, but not shown here, for Scotland using data from 1855 to 2080; and for Sweden to ensure the method is replicable. For Sweden the same data was collected but for single years of age up to age 111+ extending back to 1750 and forward to 2050.

Net emigration in England and Wales in the year 1990 is set to zero for all age and sex groups as the official series of statistics break due to the revision of population estimates back to 1991 following the 2001 Census. This has a negligible effect on the overall trends.

References

1. Historical series

Human Mortality Database: University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany). Available at www.mortality.org or www.humanmortality.de

2. Population projections

United Kingdom Government Actuary's Department (GAD), www.gad.gov.uk and Statistiska Centralbyrån (Statistics Sweden), www.scb.se

Methods

Net cohort immigration is the number of people who have entered an area, born in a particular year, less the number of people who have left that area born in that year. It can be estimated from annual births, deaths and population counts.

Given that births (and deaths) are recorded over a time period of usually one year and that population is usually recorded at one time point, usually of age last birthday, the following method allows net cohort immigration to be estimated in such a way that the lack of exact correspondence between groups enumerated at one point in time and entering or leaving the population over a period of time is greatly reduced.

To estimate net cohort immigration between years t and $t+1$ and ages 0 and 1 given:

B_t = births occurring in year t
 B_{t-1} = births occurring in year $t-1$
 $D_{0,t}$ = deaths of babies aged 0 in year t
 $P_{0,t+1}$ = population aged 0 on January 1 of year $t+1$
 $P_{1,t+1}$ = population aged 1 on January 1 of year $t+1$

$I_{0,t}$: net migration estimate in year t of children aged 0 is given by:

$$I_{0,t} = (P_{0,t+1} + P_{1,t+1})/2 - (B_t + B_{t-1})/2 + D_{0,t} \quad (1)$$

For ages 1 and above net migration estimate in year t of people aged a is given by:

$$I_{a,t} = (P_{a,t+1} + P_{a+1,t+1})/2 - (P_{a-1,t} + P_{a,t})/2 + D_{a,t} \quad (2)$$

Thus net lifetime immigration is approximated by:

$$I_t = \frac{(P_{0,t+1} + P_{1,t+1})}{2} - \frac{(B_t + B_{t-1})}{2} + D_{0,t} + \sum_{a=1 \text{ to } 100} [\frac{(P_{a,a+t+1} + P_{a+1,a+t+1})}{2} - \frac{(P_{a-1,a+t} + P_{a,a+t})}{2} + D_{a,a+t}] \quad (3)$$

$$= \frac{(P_{0,t+1} + P_{1,t+1})}{2} - \frac{(B_t + B_{t-1})}{2} + D_{0,t} + \frac{(P_{1,t+2} + P_{2,t+2})}{2} - \frac{(P_{0,t+1} + P_{1,t+1})}{2} + D_{1,t+1} + \frac{(P_{2,t+3} + P_{3,t+3})}{2} - \frac{(P_{1,t+2} + P_{2,t+2})}{2} + D_{2,t+2} + \dots$$

$$\frac{(P_{100,t+101} + P_{101,t+101})}{2} - \frac{(P_{99,t+100} + P_{100,t+100})}{2} + D_{100,t+100}$$

$$= \frac{(P_{100,t+101} + P_{101,t+101})}{2} - \frac{(B_t + B_{t-1})}{2} + \sum_{a=0 \text{ to } 100} D_{a,a+t} \quad (4)$$

$$\equiv (\sum_{a=0 \text{ to } 100} D_{a,a+t}) - \frac{(B_t + B_{t-1})}{2} \quad (5)$$

Net lifetime immigration for people born in year t is approximated by the sum of number of people of age t dying in year $t+1$ for each year from t to $t+100$ less the mean number of births in years t and $t-1$. When a full cohort of data is not available net lifetime immigration can be approximated by equation 3 above (assuming net immigration from older ages is 0). Instead of summing to age 100 the sum is to the highest age for which data or projected data are available.

[By inserting a subscript for women and men above, net cohort migration by sex can be calculated.]

Net cohort emigration is simply: $-I_t$

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