



# The combined impact of fertility and migration on population in the UK

Using a recently proposed measure; the overall replacement ratio or ORR, we assess the extent to which migration alters intergenerational replacement within the United Kingdom. The UK as a whole can be seen to experience “replacement migration” as immigration compensates for fertility below the replacement level. However, we find the impact of migration differs radically in the different regions of the country. South East England experiences very substantially immigration from both the rest of the UK and overseas, far more than is needed for intergenerational replacement, whereas most of the rest of the UK sees little or no net immigration and the ORR remains below the replacement level. *This briefing summarises research published in Population Trends no. 145.*

## Key Points

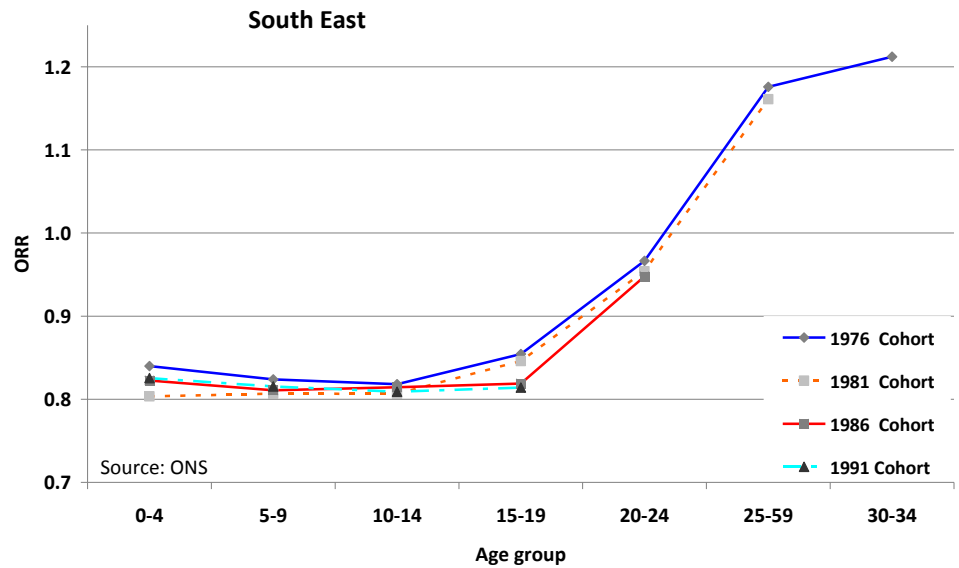
- For the UK as a whole the inflow of migrants makes up for the shortfall in births.
- There are large differences in the extent to which migration makes up for births between regions of the UK.
- Only a few regions of the UK have combined levels of fertility and migration required to achieve intergenerational replacement
- Migration has the largest impact on intergenerational replacement in South East England (including London)

## Introduction

Populations can grow in two ways – either through a surplus of births over deaths or because there is net immigration. Most demographic analysis focuses on one or other of these two dimensions, fertility or migration. However, it is possible to assess the combined impact of the two processes on the size of a population.

This research uses a recently proposed new index, the Overall Replacement Ratio or ORR, to do just this. The ORR compares the size of a given female birth cohort (i.e. the individuals born in a particular year) to the size of the cohorts of mothers in that year. So, for example, we compare the number of baby girls born in 1980 to the number of women in childbearing ages in 1980. The ORR is scaled so as to be exactly 1.0 if

Figure 1: Overall Replacement Ratio (ORR), South-East England (including London), cohorts born 1976-1991



the cohorts of mothers and daughters are the same size. ORR values below one show that the mothers' cohorts are not being fully replaced. In contrast, a value of the ORR above one indicates implicit population growth. At birth the ORR yields the same results as a widely quoted index, the gross reproduction rate. However, as migration takes place the value of the ORR changes: net-immigration sends the ORR up, while net-emigration reduces it. Thus the ORR is a convenient way to track the way in which migration alters the size of any given birth cohort. In this article we study female cohorts because it is easier to compare the ORR with conventional indices that also analyse the female population. However, the ORR can be calculated for either females or males, or both together.

### The study

Mid-year population estimates for the period 1971-2009 published by the Office for National Statistics (ONS) and National Records of Scotland (NRS) were used to calculate the Overall Replacement Ratio.

The results presented provide a new insight into population dynamics in the regions and countries of the United Kingdom. We focus on cohorts born in the 1970s and 1980s as they were born when fertility was at its lowest and have also had time for migration to play a role. Most migration happens to young adults (say, between 15 and 35), so cohorts born more recently have not yet had time to be significantly affected by migration. It should also be noted that the ORR does not distinguish between internal and international migration, only indicating the combined effect of the two.

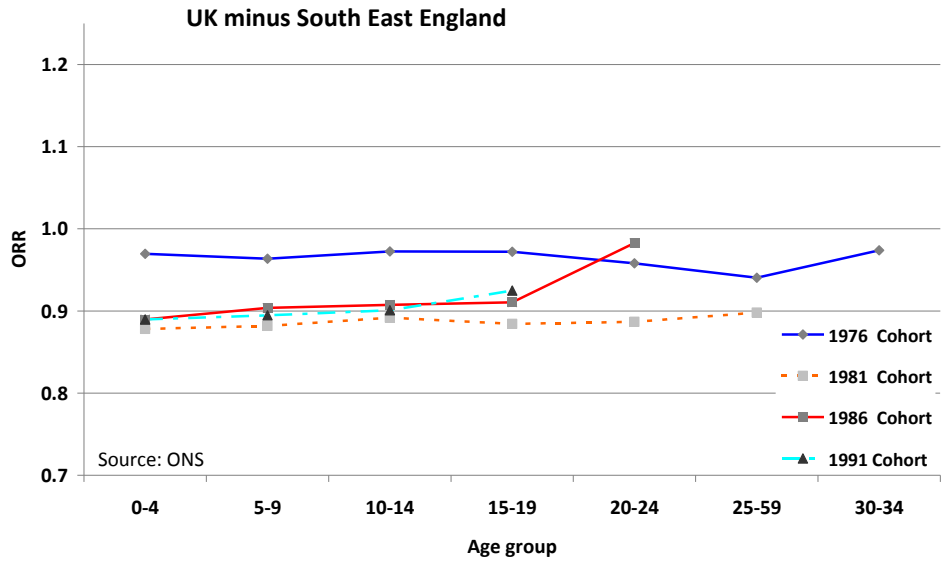
### Patterns of replacement

Fertility in most of the UK (Northern Ireland is the only exception) has been below the level needed for inter-generational replacement for almost 40 years. However, the UK is a net receiver of migrants and for the country as a whole the inflow of migrants makes up for the shortfall in births. However, there are very marked differences in the various parts of the country.

Our analysis shows very clearly the extent to which the South-East of England (including London) differs from most of the rest of the UK. In most regions of England, as well as in Wales and Scotland, the ORR shows that for cohorts born 1976-1991 the ORR is consistently below 1.0, indicating that the generations are not being replaced. In Northern Ireland, it is relatively high fertility in the past that ensures that the ORR is above 1.0, even though there is significant net emigration. In three regions, the East Midlands, East Anglia and the South-West, the ORR does rise above one, though only modestly. However, by far the most striking finding is that for South East England (Figure 1), where from the late teens on the ORR rises sharply for all cohorts, and far exceeds replacement level by the late twenties. The scale of increase is substantial by any standards: both the 1976 and 1981 cohorts increased their numbers by over 40 per cent between the ages 10-14 and 25-29. The scale of migration into South East England, both from elsewhere in the UK and overseas, clearly goes well beyond replacement migration.

To provide a contrast with the South East, Figure 2 shows the ORR for the United Kingdom minus the South East. The contrast is clear; once the South East is removed the

Figure 2: Overall Replacement Ratio (ORR), United Kingdom minus South-East England, cohorts born 1976-1991



UK does not experience replacement migration; the lines for the rest of the UK run more or less horizontally across the graph, indicating zero net migration.

**Discussion and policy implications**

Our findings reveal that when considering the impact of migration on intergenerational replacement, we must distinguish South East England (including London) from the rest of the United Kingdom. Roughly one third of the UK’s population live in South East England, yet

this region absorbs the lion’s share of net immigration for the whole country. Only in a few other regions of England (East Anglia, the East Midlands and the South West) and in Northern Ireland (where fertility was high in the 1970s and 1980s) does the ORR exceed 1.0 by age 30, indicating that inter-generational replacement has been achieved. Policy makers should consider how these different contexts influence, among other things, attitudes towards migration in the different regions and countries of the UK.

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