

Article

Living longer and old-age dependency – what does the future hold?

Examining the relationship between population ageing, economic dependency and international migration in the UK.

Contact:
Edward Morgan
pop.info@ons.gov.uk
+44 (0)1329 444661

Release date:
24 June 2019

Next release:
To be announced

Table of contents

1. [Main points](#)
2. [Statisticians comment](#)
3. [Overview](#)
4. [The UK's ageing population](#)
5. [An alternative to the Old Age Dependency Ratio?](#)
6. [The role of immigration in an ageing society](#)
7. [Conclusions](#)
8. [References](#)
9. [More about ageing and the population](#)
10. [Glossary](#)

1 . Main points

- The population of the UK is ageing and it is projected to continue to age; by 2050, one in four people in the UK will be aged 65 years or over.
- An increase in the older population has implications for the economy in terms of providing services and state pensions; however, this economic impact will be affected by people living healthier lives for longer and increases in economic activity at older ages.
- Traditional measures of the population age structure such as the Old Age Dependency Ratio may become less useful as more people work up to and beyond State Pension age; alternative measures that include economic activity may provide a more meaningful picture of economic dependency.
- The Old Age Dependency Ratio projects increasing levels of economic dependency in the future; the Active Dependency Ratio, which takes into account projected increases in economic activity levels at older ages in the future, is also projected to increase but at a slower rate than the Old Age Dependency Ratio.
- Higher levels of net migration slow population ageing but will not prevent it; under both measures of dependency, the population is projected to age twice as quickly under zero migration than under a high migration scenario.
- Projected changes in economic activity at older ages have a greater impact on future dependency rates than projected migration scenarios.

2 . Statisticians comment

“Thinking about the implications of our ageing population is complex. There are many different ways to measure these and our analysis considers a new approach that includes how our society is changing as a result of people living longer lives.

“Our ageing population is frequently thought of as a concern, assuming that older people are being economically supported by younger people of working age. But increasingly, this is not the case. People are working until later in life, continuing to contribute economically. International migration adds more people of working age to the population, which slows down the rate that our population is ageing, but it is the rising numbers of older workers that is having the most impact.”

Sarah Crofts, ONS Centre for Ageing and Demography

3 . Overview

The UK population is changing in both size and structure. By 2050, it is projected that one in four people in the UK will be aged 65 years and over – an increase from almost one in five in 2018. This is important since the [ageing population has implications for a number of policy areas](#).

One of these policy areas is the economy and how the changing needs of an older population can be met. To measure the potential impact of an ageing population, traditionally, the Old Age Dependency Ratio (OADR) is used. This is a simple ratio of the number of people of pensionable age and over per 1,000 people aged 16 years to State Pension age (SPA).

An accompanying article looks at how the OADR has changed over time and includes a tool to adjust factors such as the SPA or international immigration to see the likely impact on the OADR (see [How would you support our ageing population?](#)). It is important to note that often the OADR is used as an indicator of the ratio of the non-working to the working population, which is not always a true reflection.

In this article, we present one of many possible alternatives to the OADR, based on the ratio of the economically inactive population compared with the economically active population. We have named this the Active Dependency Ratio (ADR). We look at how this has changed over time and how it might look when projected into the future. Changes in international migration will have an effect, so this article also examines the potential impact of different levels of international migration on the OADR and on the ADR.

4 . The UK’s ageing population

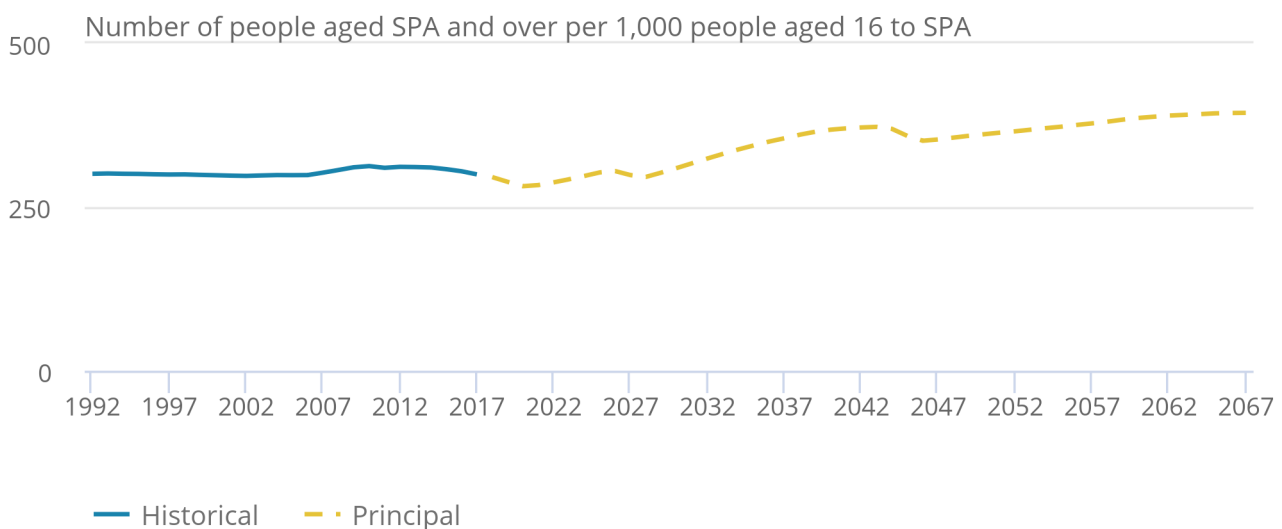
Population ageing refers to the shift in the age-distribution of a population to older ages. For the UK and many other countries, it is the result of a long-term decline in fertility rates, which has coincided with people living longer. The traditional Old Age Dependency Ratio (OADR) shows how the projected increase of the population above State Pension age (SPA) could lead to higher levels of dependency in the future (Figure 1).

Figure 1: The Old Age Dependency Ratio is projected to increase over the next 40 years

Historical and principal projection of the Old Age Dependency Ratio, UK, 1992 to 2067

Figure 1: The Old Age Dependency Ratio is projected to increase over the next 40 years

Historical and principal projection of the Old Age Dependency Ratio, UK, 1992 to 2067



Source: Office for National Statistics – Mid-year population estimates (1992 to 2017), National population projections 2016 (2018 to 2067)

During the 1990s, the OADR remained broadly steady at around 300. It then rose just above 300 from 2007 to 2016, peaking in 2010 before starting to decrease, reflecting changes in the SPA for women. Figure 1 incorporates planned future rises in the SPA. Despite these future increases, the projected numbers of people aged SPA or over will continue to rise, resulting in an increasing proportion of the UK's population above SPA compared with those below SPA.

People can be economically active or inactive regardless of whether they have reached SPA, however, the OADR does not account for the evolving economic circumstances of the population.

5 . An alternative to the Old Age Dependency Ratio?

There are a number of possible alternatives to the Old Age Dependency Ratio (OADR) that take better account of people living healthier lives for longer and being economically active at older ages¹. In this article, we consider an alternative measure that takes economic activity by age into account. This proposed Active Dependency Ratio (ADR) calculates the size of the economically inactive population² against the size of the economically active population³, which can then be applied to population projections.

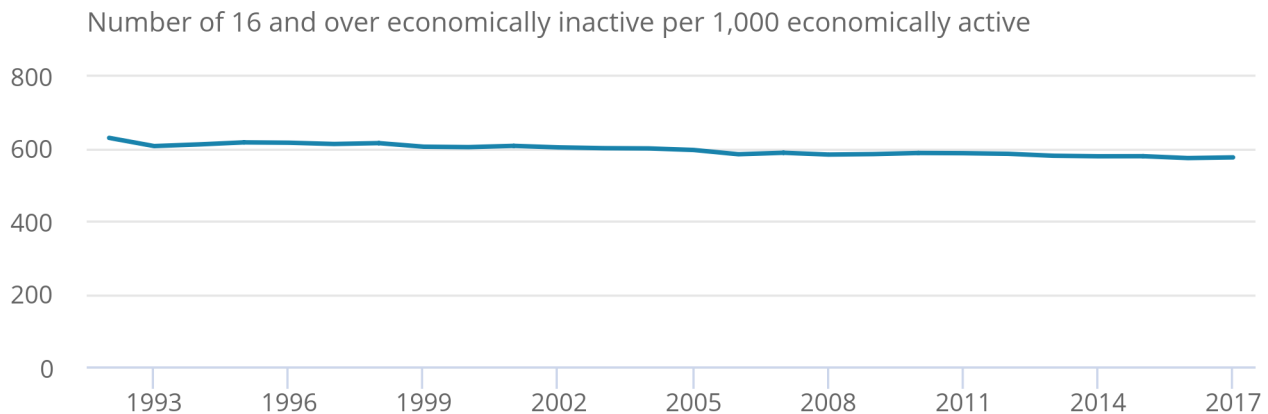
The ADR has a ratio approximately double the size of the OADR. This is because it includes people of working age who are economically inactive, and people of pensionable age who are economically active. (The number of people of working age who are economically inactive is far larger than the number of economically active people of pensionable age.)

Figure 2: There has been a decreasing number of people who are economically inactive per 1,000 economically active

Active Dependency Ratio for the aged 16 years and over population, UK, 1992 to 2017

Figure 2: There has been a decreasing number of people who are economically inactive per 1,000 economically active

Active Dependency Ratio for the aged 16 years and over population, UK, 1992 to 2017



Source: Office for National Statistics – Mid-year population estimates (1992 to 2017), Office for Budget Responsibility – Participation rates

Over the period 1992 to 2017, economic dependency has shown an overall improvement, despite the population becoming older (Figure 2). However, the ADR should not be used as a precise measure of economic dependency since the relationship between economic activity and dependency is complex.

Those who are economically active are not always entirely economically independent, for example, unemployed people seeking work are more likely to be in receipt of benefits, and those working in low-paid jobs or part-time may be in receipt of working tax credits or, if working past State Pension age (SPA), may be in receipt of State Pension. Additionally, some people who are economically inactive may be economically independent.

The ADR also does not account for the publicly funded services that people use compared with their contribution in taxes. Therefore, it is perhaps a better indicator of economic dependency, but it is not a complete measure.

So, why has there been an overall decrease in the ADR since the early 1990s, despite the growth in the number of older people? While a change in economic activity levels at any age can have an effect, there are two possibilities that we will consider: immigration of workers; and greater economic activity at older ages linking with changes to the SPA.

Firstly, relatively high immigration rates since the late 1990s have brought to the UK a [migrant population that is younger than the overall UK population](#). This will affect the proportions of the population by different age groups ([Section 6](#)).

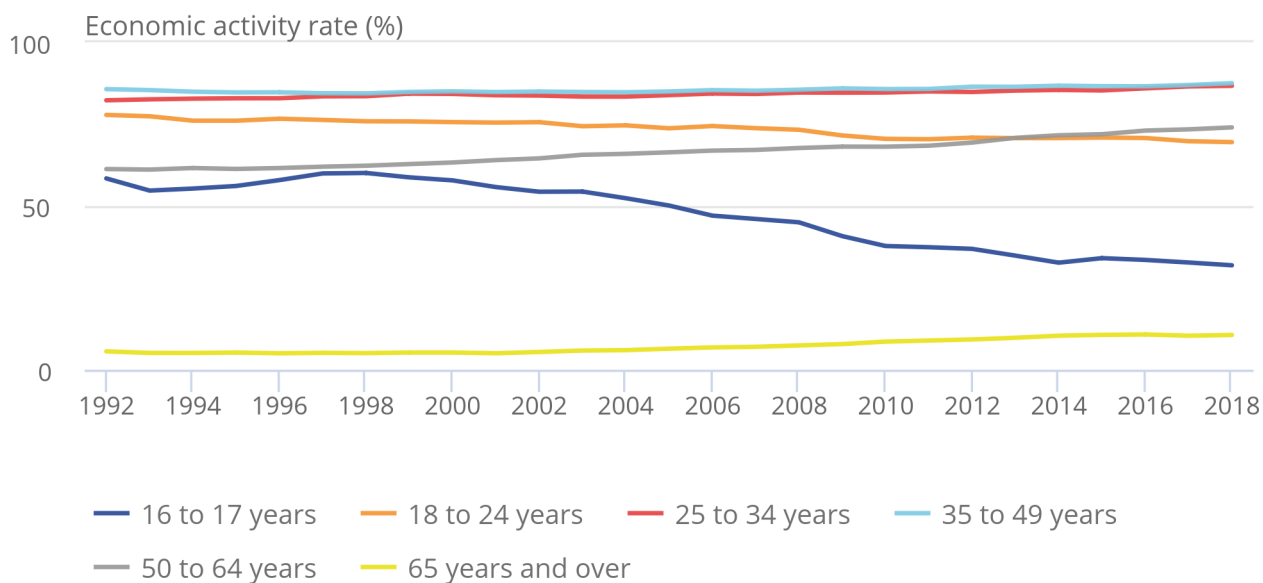
Secondly, the UK has observed greater economic activity at older ages (see Figure 3). In particular, the growth of economic activity among 50- to 64-year-olds and the aged 65 years and over population has outpaced the growth in other age groups.

Figure 3: Economic activity has grown substantially at older ages

Percentage of population economically active by age group, UK, 1992 to 2018

Figure 3: Economic activity has grown substantially at older ages

Percentage of population economically active by age group, UK, 1992 to 2018



Source: Office for National Statistics – Labour Force Survey

Most of the growth of economic activity at older ages can be attributed to the growth of women participating in the labour force, particularly at older ages and working part-time. The incremental increase of SPA from age 60 to 65 for women since 2010 is likely to have been a contributory factor.

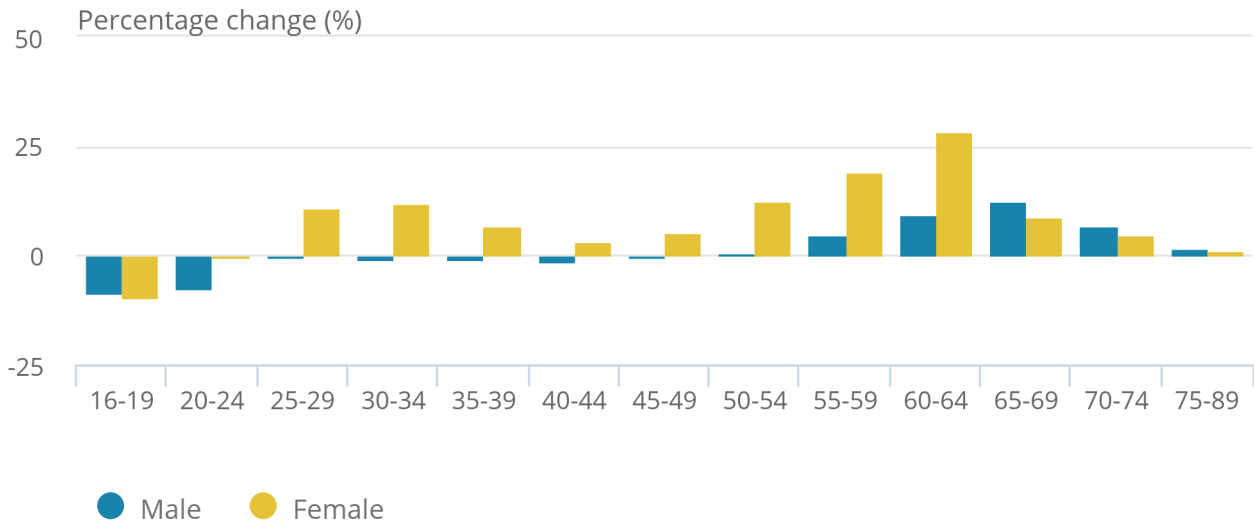
Likewise, the abolishment of the Default Pension Age in 2011 (where older workers were forced to retire at age 65 years) could also have contributed to greater economic activity rates in the aged 65 years and over population.

Figure 4: The shift in economic activity patterns at older ages has been driven mostly by changes in women’s age-related patterns of economic activity

Percentage change in economic activity by age category and sex, UK, 1992 to 2018

Figure 4: The shift in economic activity patterns at older ages has been driven mostly by changes in women’s age-related patterns of economic activity

Percentage change in economic activity by age category and sex, UK, 1992 to 2018



Source: Office for Budget Responsibility

Notes for: An alternative to the Old Age Dependency Ratio?

1. For more information, please see [Population ageing: the timebomb that isn't? \(PDF, 523KB\)](#), [Alternative indicators of population ageing: an inventory \(PDF, 780KB\)](#) and [Better tools to deal with longevity: a new approach to evaluate data about getting old](#).
2. The number of economically inactive people in the UK is measured by the Labour Force Survey (LFS) and consists of people aged 16 years and over who are not actively employed and those without a job who have not sought work in the last four weeks and/or are not available to start work in the next two weeks. The main economically inactive groups are students, people looking after family and home, long-term sick and disabled, temporarily sick and disabled, retired people and discouraged workers.
3. Employed people and unemployed people who are actively seeking work in the past four weeks and are available to start work in the next two weeks are classed as economically active. The most recent unemployment rate (unemployed as a percentage of the economically active population) is around 4%. For more information, please see [Labour market overview, UK: June 2019](#).

6 . The role of immigration in an ageing society

Migrants coming to the UK are typically young adults and families of whom most come to the UK to work or study. Given the age profiles of immigrants, does immigration better balance the proportions of the working age and retired populations?

It is worth noting that immigrants also age and if they remain in the UK¹ then they will eventually contribute to the older-age population. However, immigrants also tend to have higher fertility rates², which over time become more closely aligned with fertility rates of UK-born mothers for subsequent generations³. Therefore, the role of immigration on the structure of the population impacts all age groups in the long-term and this changes over time.

Although not included in calculations of the resident population, short-term migrants (who are in the UK for between 1 and 12 months) also affect the numbers of workers living in the UK temporarily. Latest estimates for England and Wales show that on average, in the year to June 2017, there were [50,000 short-term immigrants working in England and Wales](#) and [22,000 short-term emigrants working abroad](#). Since they are not part of the resident UK population, short-term migrants have not been included in this analysis.

To examine the potential impact of long-term international immigration on an ageing population, it is helpful to consider different long-term net migration scenarios on both the projected Old Age Dependency Ratio (OADR) and the Active Dependency Ratio (ADR) measures.

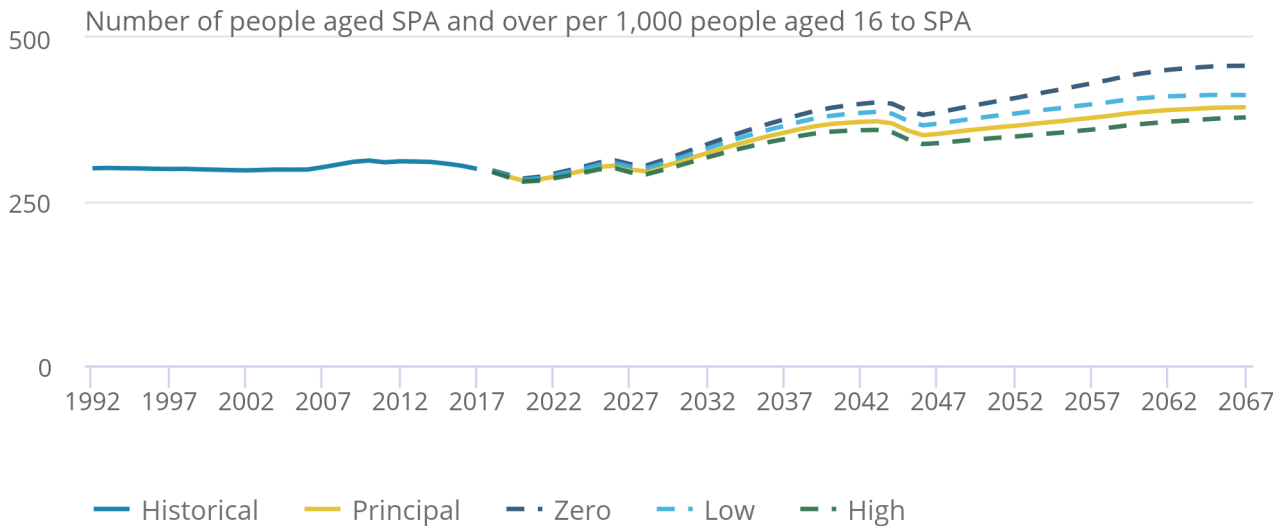
Figure 5 (OADR) shows a zero-migration scenario (navy dashed line), which demonstrates the effects of future fertility and mortality patterns⁴ without the influence of future (net) migration⁵. For comparison, other net migration scenarios are presented. To explore the effects of other long-term net migration scenarios on the OADR, see our tool in the article [How would you support our ageing population?](#).

Figure 5: The Old Age Dependency Ratio is projected to increase under a variety of migration scenarios

Historical and projected Old Age Dependency Ratio under four migration scenarios: principal, zero-migration, low migration and high migration, UK, 1992 to 2067

Figure 5: The Old Age Dependency Ratio is projected to increase under a variety of migration scenarios

Historical and projected Old Age Dependency Ratio under four migration scenarios: principal, zero-migration, low migration and high migration, UK, 1992 to 2067



Source: Office for National Statistics – Mid-year population estimates (1992 to 2017), National population projections 2016 (2018 to 2067)

In all four scenarios, from zero to high net migration, the OADR is shown to be increasing into the future, so the population will age regardless of future net migration levels. Under the principal projection, the OADR will increase from around 290 today to 395 by 2067. However, the population will age less rapidly in higher net migration scenarios.

Higher net migration acts as a downward pressure on the OADR, which has the effect of slowing down the increase in the OADR. The OADR under zero migration in 2067 is around 460, compared with 380 resulting from the high migration variant at that time.

Another way of looking at the impact of migration on population ageing is to compare the speed at which the projected OADR increases from 2017 under different migration scenarios. After some initial fluctuation, over the time period shown, the projected OADR would increase twice as quickly under zero migration than under a high net migration scenario of 245,000 per year.

So how does net migration affect the ADR, which measures the projected number of economically active people compared with economically inactive? This is more complex since it needs to consider future economic activity.

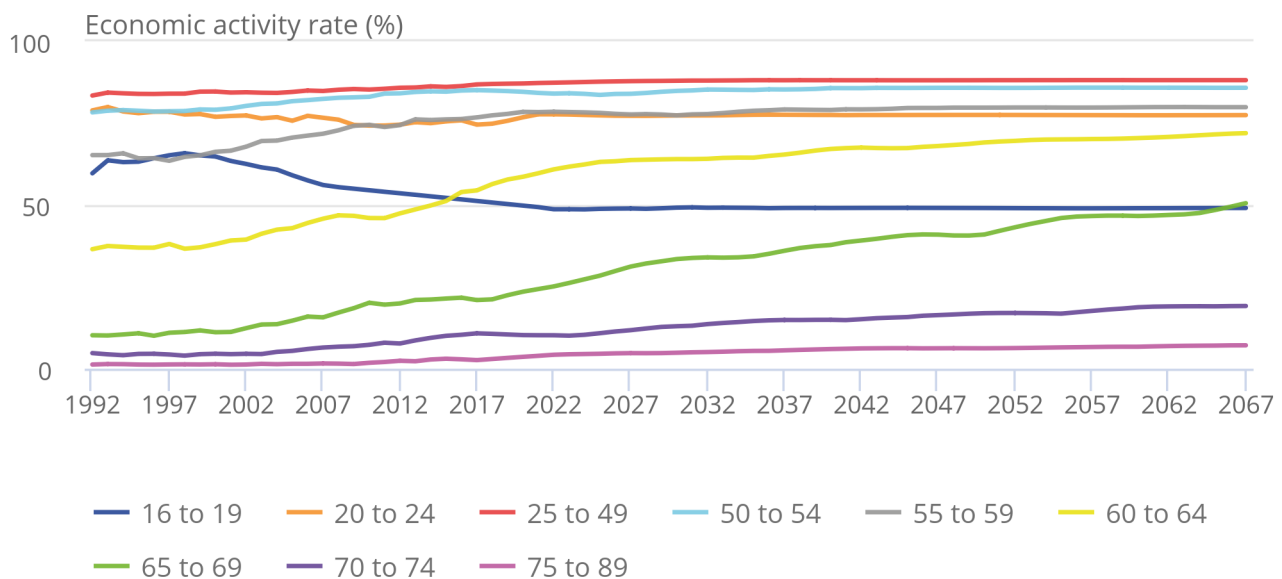
One possibility is to project the ADR assuming that 2018 age-specific economic participation rates continue. However, this is a potentially misleading assumption to make since future economic participation can be affected by a number of factors. Another is to use [projections of future economic participation rates](#) produced by the Office for Budget Responsibility (OBR), which uses the assumption that economic activity rates will continue to rise in line with rises in State Pension age (SPA) (Figures 6 and 7).

Figure 6: Economic activity rates are projected to increase most for those aged 60 to 69 years¹

Historical and projected economic activity rates by age group, UK, 1992 to 2067

Figure 6: Economic activity rates are projected to increase most for those aged 60 to 69 years¹

Historical and projected economic activity rates by age group, UK, 1992 to 2067



Source: Office for Budget Responsibility

Notes:

1. These projected economic activity rates are exploratory. They should not be interpreted as official statistics.

These projected trends should be interpreted with caution⁶ since future economic participation can be influenced by a wide range of factors, such as further changes in SPA, the value of the State Pension, future economic performance, attitudes to work and many others.

For ages 60 years and over, future rises have been projected, but to levels that are historically unprecedented. The recent rise in economic participation of those aged 60 to 69 years could have been driven by SPA changes, which may result in a short-term effect and not continue.

Improvements in public health and particularly longer healthy life expectancies also have an impact on economic participation of older people, but this varies across parts of the UK. The [Grand Challenge on Ageing](#) aims to add five extra healthy independent years of life by 2035, which may further influence economic participation of older people.

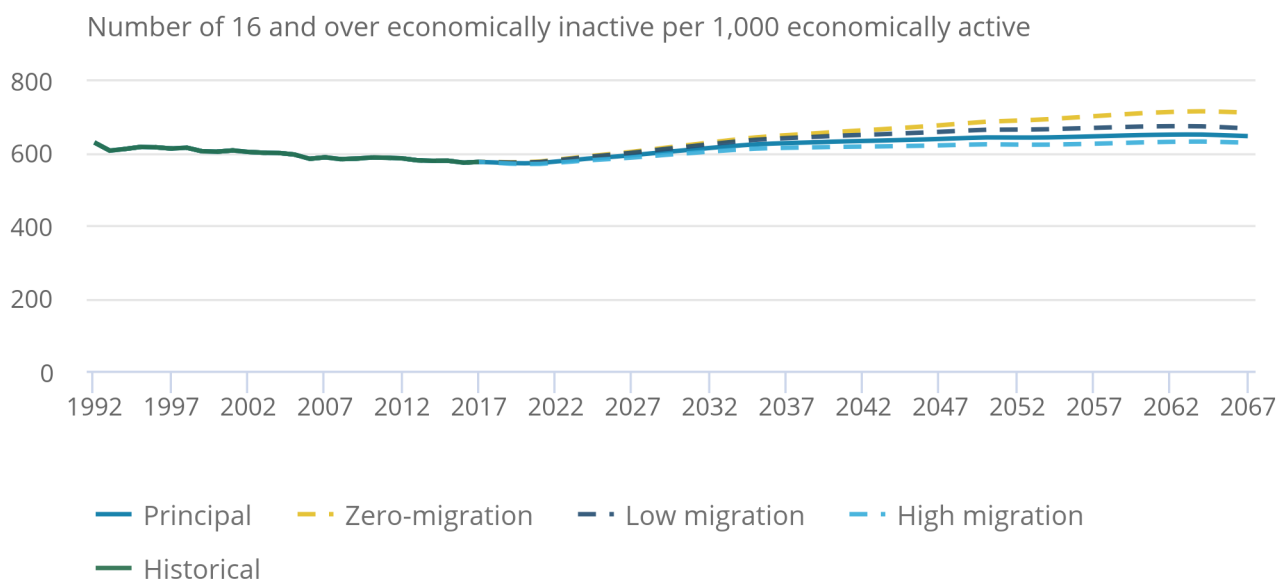
Figure 7 shows the ADR using these projected economic activity rates for different migration scenarios.

Figure 7: If age-specific economic activity rates are projected forward, the Active Dependency Ratio is likely to show a slight increase

Historical and projected Active Dependency Ratio for the aged 16 years and over population, projected economic activity scenario, UK, 1992 to 2067

Figure 7: If age-specific economic activity rates are projected forward, the Active Dependency Ratio is likely to show a slight increase

Historical and projected Active Dependency Ratio for the aged 16 years and over population, projected economic activity scenario, UK, 1992 to 2067



Source: Office for National Statistics – Mid-year population estimates (1992 to 2017), National population projections 2016 (2018 to 2067); Office for Budget Responsibility

In 2067, the ADR will be 645 based on the principal projection, which is an increase of around 75 from current levels (571). This represents an increase of 12%. In comparison, the OADR is projected to increase by 31% over the same time period.

Under all migration variants, the ADR is projected to level off towards the end of the time period. (The OADR also begins to level off towards the end of the time period.) This levelling off is a result of several small birth cohorts reaching older ages in the 2060s, and in the longer-term both the OADR and the ADR would be expected to resume increasing.

Under the high migration scenario, the ADR would reach around 627 by 2067, while under zero migration the ADR would be higher, at 710. Similarly to the OADR, after some initial fluctuation, over the time period shown the projected ADR would increase twice as quickly under zero than under high migration. Non-zero migration scenarios dampen the increases in the ADR resulting from an ageing population, and the higher the migration the greater the effect.

These results incorporate OBR projections of economic activity⁷, which assumes increasing participation in the labour market at older ages. For comparison, if the 2018 economic activity rates were to be held constant into the future, the principal projected ADR would increase to 783. This is notably higher than even the zero migration scenario under the OBR projections of future economic activity (710).

This illustrates how sensitive the projected ADR is to changes in projected economic participation rates. The affect of migration on the ADR is similar regardless of whether economic activity rates at older ages are assumed to remain constant or increase in the future. The level of the ADR is more impacted by the OBR projected increases in economic activity rates at older ages than by the migration scenarios shown⁸.

Notes for: The role of immigration in an ageing society

1. In 2017, [61% of foreign-born residents had lived in the UK for more than 10 years](#) and 200,000 people who emigrated from the UK had been resident for 1 to 10 years, representing 60% of all emigrants.
2. In 2017, the estimated Total Fertility Rate (TFR) for foreign-born women decreased to 1.95. The estimated TFR for UK-born women decreased in 2017 to 1.71 children per woman. For more information, please see [Births by parents' country of birth, England and Wales: 2017](#).
3. For more information, please see Dubuc S (2016), '[Immigrants and ethnic fertility convergence in the UK: the role of global fertility transition and intergenerational social integration](#)'.
4. Fertility and mortality assumptions have not been adjusted in line with different net migration scenarios. These remain the same as the assumptions driving the principal projection, which are based on recent trends of fertility and mortality for all UK residents regardless of whether they are former immigrants to the UK.
5. The [principal projection](#) assumes that annual net migration will fall from current levels to 165,000 by the year ending mid-2023. The latest high and low migration variants assume, on the same timescale, levels of 245,000 and 85,000 per year respectively.
6. For more information, see paragraph 3.20 of the Office for Budget Responsibility's [Fiscal sustainability report \(PDF, 1.7MB\)](#).
7. Future economic activity is likely to be influenced by a wide range of factors. Projected OBR participation rates represent one possible future scenario.
8. The migration variants shown here are those used in the national population projections. They are not forecasts and will inevitably differ to a greater or lesser extent from actual future net migration. Assumptions about future migration are always liable to change and can be influenced by many factors. Future net migration could be outside the range represented by these variants, that is, higher than the high variant or negative (below zero).

7 . Conclusions

Population ageing in the UK remains a source of concern. Much of the concern has been generated by examining the Old Age Dependency Ratio (OADR), a measure of old-age dependency that provides a demographic measure and does not take into account changes in age-specific economic activity rates over time.

While the OADR indicates a UK population with increased dependency in the future, a different story can be told by the "Active Dependency Ratio" (ADR), an alternative measure that takes projected age-specific economic activity levels into account. The ADR is also projected to increase, but more slowly than the OADR.

This suggests that increases in economic activity at older ages may help to offset the impact of population ageing on the economy in the future. Traditional measures of the population age structure such as the OADR may become less useful as the transition between work and retirement becomes more fluid, with more people working (often part-time) up to and past State Pension age (SPA). Measures that compare economically active and inactive groups may become more relevant.

Both the OADR and the ADR show that while higher levels of net migration lessen future dependency in the population, outcomes are more affected by projected increased economic activity rates of older workers and demographic change than by projected migration scenarios.

8 . References

Dubuc S (2016), 'Immigrants and ethnic fertility convergence in the UK: the role of global fertility transition and intergenerational social integration'.

Kone, Z, Sumption, M (2019), '[Permanent or Temporary: How Long do Migrants stay in the UK?](#)', Migration Observatory briefing, COMPAS, University of Oxford, UK

9 . More about ageing and the population

Bermingham, JR (2001), 'Immigration: Not a solution to problems of population decline and aging', Population and Environment, Volume 22, Issue 4, pages 355 to 363

Coleman, DA (2002), '[Replacement migration, or why everyone is going to have to live in Korea: a fable for our times from the United Nations \(PDF, 310KB\)](#)', Philosophical Transactions of the Royal Society of London, Series B: Biological Sciences, Volume 357, Issue 1,420, pages 583 to 598

Falkingham, J (1989), '[Dependency and ageing in Britain: a re-examination of the evidence](#)', Journal of Social Policy 18, pages 211 to 233

Heleniak T, Sanchez Gaussen N (2016), '[The impact of migration on projected population trends in Denmark, Finland, Iceland, Norway and Sweden: 2015 to 2080](#)', Nordregio Working Paper 2016:5

HM Treasury (2005), '[Long-term public finance report: an analysis of fiscal sustainability \(PDF, 514KB\)](#)', BBC News

Shaw C (2001), 'United Kingdom population trends in the 21st century', Population Trends, 103, pages 37 to 46

Simpson L (2017), '[National and local labour force projections for the UK \(PDF, 806KB\)](#)', Local Economy, Volume 32, Issue 2, pages 129 to 149

United Nations (2001), 'Replacement migration: is it a solution to declining and ageing populations?' Number 206, United Nations Publications

10 . Glossary

Old Age Dependency Ratio

The Old Age Dependency Ratio (OADR) is a ratio of the population who are of current State Pension age (SPA) and higher relative to the size of the population aged 16 years and over and under SPA. Given that SPA shifts in line with legislation, the OADR is expressed as follows:

$$\text{OADR} = \frac{\text{number of people aged SPA and over at time point}}{\text{number of people aged 16 to SPA - 1 at time point}} \times 1000$$

Active Dependency Ratio

The Active Dependency Ratio (ADR) is a ratio of the adult population who are economically inactive relative to the size of the adult population who are economically active. The ADR is expressed as follows:

$$\text{ADR} = \frac{\text{number of people 16 years and over economically inactive}}{\text{number of people aged 16 years and over economically active}} \times 1000$$

The measure is used to evaluate the extent to which the economically inactive adult population are dependent on the economically active population. Unlike the OADR, the ADR does not account for planned legislative changes.

Economically active

The economically active population refers to people who are aged 16 years and over who are employed, and unemployed people, who have sought work in the last four weeks and/or who are available to start work in the next two weeks.

Economic dependency

Economic dependency is defined here as the extent a given population is supported by members of the adult population who are economically active.

Net migration

Net migration refers to the difference between the number of long-term international immigrants coming into a population and the number of long-term international emigrants leaving a population. A long-term migrant is someone who changes their country of residence for a period of one year or more.