National Statistics feature

Projections of the UK labour force, 2006 to 2020

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Key points

- The labour force is projected to continue growing and reach 32.1 million people in 2020, an increase of 6.7 per cent from 2005.
- The rate of growth in the labour force will follow a declining trend throughout the projection period.
- The labour force is ageing, with the age distribution showing a distinct shift towards older age groups by 2020.
- The main driver of labour force growth will switch from demographic changes to activity rate changes.
- The economic activity rate of people aged 16 and over is projected to fall to 61.7 per cent in 2020, while the activity rate of people of working age (16 to 59/64) is projected to rise to 79.8 per in 2020.
- The state pension age for women will rise from 60 to 65 by 2020. Accounting for this, the activity rate of people aged 16 to 64 (the future definition of working age) is projected to rise from 76.6 per cent in 2005 to 78.1 per cent in 2020.

Introduction

The future size and composition of the labour force are of significant interest to policy makers, businesses and others making assessments of long-term socio-economic trends. The characteristics of the labour force in the future have important implications for a number of issues, ranging from the productive capacity of the economy to the sustainability of social security and pensions systems. This article presents the results of the latest set of labour force projections produced by the Office for National Statistics (ONS).

Projections of the labour force were last published by ONS in 1998 and referred to Great Britain for the period between 1998 and 2011. Due to various population revisions since (including reweighting of the Labour Force Survey (LFS) data to post-Census population), these projections are now inconsistent with published LFS data.

The latest set of labour force projections refers to the UK, covering the period from 2006 to 2020, and is fully consistent with monthly published labour market data in the labour market statistics First Release. These labour force projections refer to the number and percentage of people who are economically active. Projections of the components of economic activity, namely employment and unemployment, are not produced by ONS (see **Box 1**).

The estimates presented in this article are projections and they do not depend on any forecasts of future economic conditions. They have been produced by using econometric modelling techniques to show the future pattern of age/sex specific labour market activity rates indicated by past trends. These projected rates have been applied to published UK population projections to yield labour force projections by age and sex (see **Technical note**).

This article begins by looking at the two main components that affect the size and composition of the future labour force. These are population movements, capturing demographic ▶

▶ factors, and activity rate movements, capturing structural and cyclical factors. The next section discusses the overall projection of the labour force, which is generated by combining the demographic and activity rate projections. The final section discusses the sensitivity of the overall projections to demographic assumptions.

Household population trends and projections

One of the driving forces of variation in the labour force is changes in the UK population. The size and composition of the labour force in the future are directly linked to the future size and composition of the population.

Projections of the UK population are derived from the Government Actuary's Department's (GAD) 2004-based resident population projections, published 20 October 2005[1]. However, as the LFS population covers only households and excludes most communal establishments (with the exception of nurses in NHS accommodation and students in halls of residence), GAD's population projections are adjusted to exclude the number of people who live in communal establishments not covered by the LFS sampling frame.

GAD produces variant population projections, based on different assumptions on the future levels of fertility, life expectancy and migration. Different demographic assumptions, particularly on migration and life expectancy, have a significant effect on the labour force projections and these are examined in more detail later on.

People aged 16 and over

By definition, people under the age of 16 are not included in the labour

force. As such, the segment of the population that is relevant to the labour force is people aged 16 and over. The household population aged 16 and over is projected to increase from 47.7 million in 2005 to 52.1 million in 2020. This implies an average annual population growth rate of 0.6 per cent throughout the period from 2005 to 2020 (**Figure 1**).

However, the growth in the overall population aged 16 and over conceals significant movements of people within age groups. Such movements directly affect the size and composition of the labour force, as different age groups are associated with different labour market activity rates.
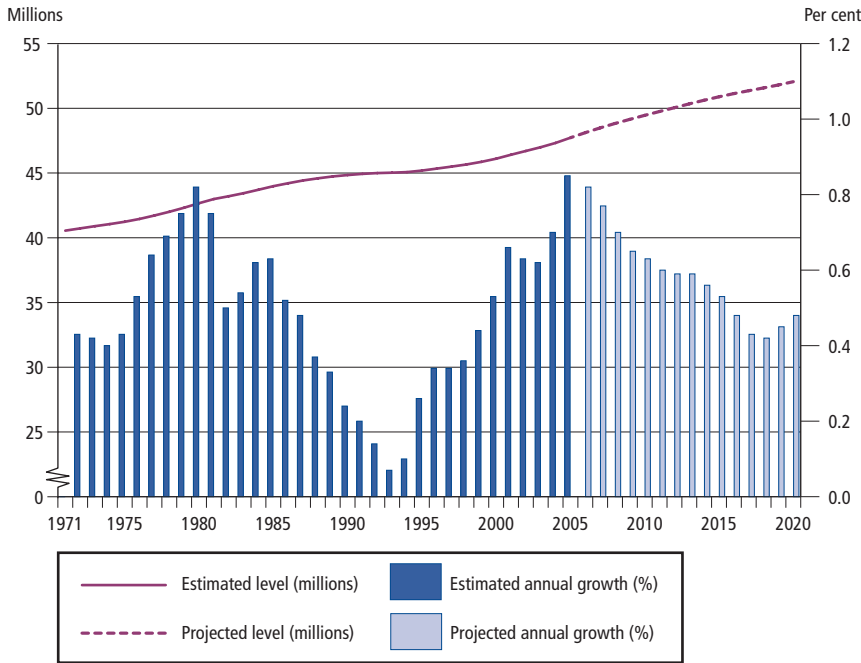
Prime age population

'Prime age' is used to refer to people aged 25 to 49. Historically, this segment of the population has achieved the highest labour market activity rates, for both men and women. The number of people in this age group is projected to rise until 2011 and then decline from 2012 onwards, mainly due to the 'baby boom' generation leaving the 25 to 49 age group. In 2020, there are expected to be 21.0 million people in this age group, the same number as in 2005 (**Figure 2**).

People aged 50 and over

The most significant demographic trend affecting the size and composition of the labour force over the next 15 years will be the rapid increase in the number of people aged 50 and over. The labour market activity rates of people in this age group are lower than average, as men and women aged 50 and over are close to or have already exceeded pensionable age. Therefore, the dynamics in the number of people in this age group have a significant effect on the projected labour force. The number of people aged 50 and over is expected to rise from 19.8 million in 2005 to 24.5 million in 2020, equivalent to an increase of 23.5 per cent (**Figure 3**). This is a combined effect of the overall trend towards higher life expectancy as well as the transition of the 'baby boom' generation to the 50 and over age group.
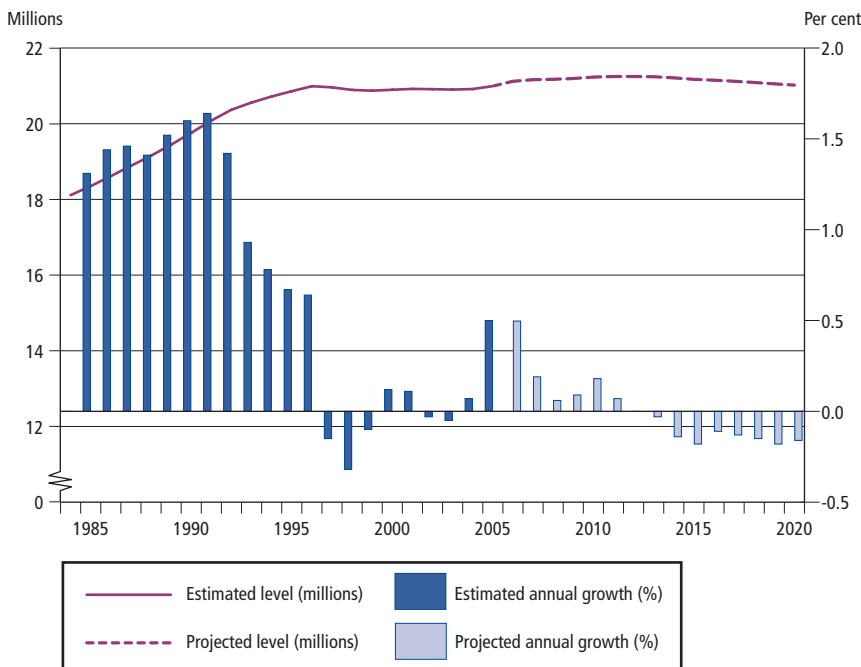
The magnitude of this demographic effect is also evident by looking at the old-age dependency ratio. This is defined as the number of people aged 65 and over as a proportion of the number of people aged 16 to 64[2]. The old-age dependency ratio is expected to grow from 23.8 per cent in 2005 to 29.7 per cent in 2020 and shows the

Figure **1**

Household population aged 16 and over; United Kingdom; 1971 to 2020

Millions   Per cent

Legend:
- Estimated level (millions)
- Projected level (millions)
- Estimated annual growth (%)
- Projected annual growth (%)

Source: Office for National Statistics

Figure **2**

Household population aged 25 to 49; United Kingdom; 1984 to 2020

Millions   Per cent

Legend:
- Estimated level (millions)
- Projected level (millions)
- Estimated annual growth (%)
- Projected annual growth (%)

Source: Office for National Statistics

disproportionate increase in the older population, compared with the population of working age.

Young people

Young people are defined as those between the ages of 16 and 24. Their participation in the labour market is lower than average, primarily due to their participation in further and higher education. The number of people aged between 16 and 24 is projected to fall from 6.9 million in 2005 to 6.6 million in 2020, equivalent to a fall of 4.9 per cent (**Figure 4**).

Population of working age

Traditionally, analysis on economic activity has centred on the segment of the population that is of working age. This is because labour market participation of working age people is significantly higher compared with labour market participation of people exceeding working age. However, the tendency to focus primarily on this age group may become less prevalent in the future. This is because, with increasing life expectancy and a growing number of people exceeding working age, the segment of the population that lies above working age is expected to play an increasingly active role in the labour market. In any case, however, the population of working age remains a particularly relevant segment of the population in terms of the labour force and, as such, is studied as a separate age group.

Working age is defined by the minimum school-leaving age at the lower bound (16) and the age at which people are eligible for state pension age at the higher bound. Currently, the age at which men are eligible for state pension is 65, while for women it is 60. However, the Government has announced that the ▶

▶ state pension age for women will increase to equal that of men by 2020. This will be achieved through a 10-year transition period between 2010 and 2020. For more details see *www.thepensionservice.gov.uk/pdf/ np46/np46apr05.pdf.*

The announced change in state pension age for women therefore implies that, by 2020, working age will be defined as between 16 and 64 for both men and women. **Figure 5** shows the projected number of people of working age under two scenarios. First, under the current definition of working age and not allowing for the equalisation of the state pension age. Second, allowing for the Government's announced plans to gradually increase the state pension age for women between 2010 and 2020. As shown in the graph, under the current definition, the working-age population is projected to grow until 2020, although at a declining rate. This decline, however, is compensated by the equalisation of state pension age, with more women remaining within the bounds of working age between 2010 and 2020. Overall, under the current definition, working-age population is projected to grow by 3.4 per cent between 2005 and 2020. Allowing, however, for the equalisation, the population of working age is projected to increase by 8.6 per cent.

Activity rate trends and projections

The second driving force of changes in the labour force is movements in the activity rates of different groups within the population. Such movements are affected by structural and cyclical factors.

Structural factors include changes in family composition, increased opportunities for the employment of
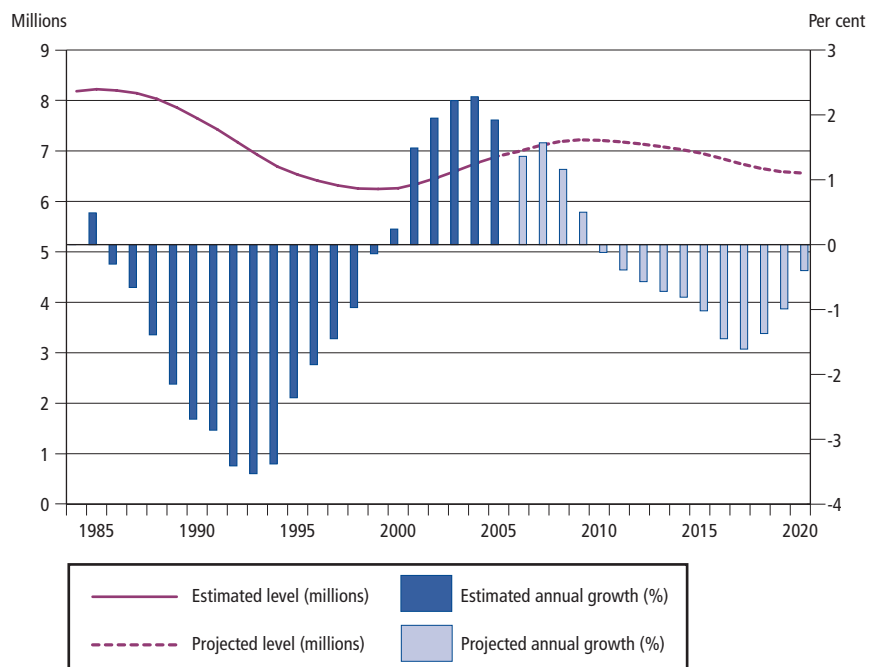
Figure 3

Household population aged 50 and over; United Kingdom; 1984 to 2020
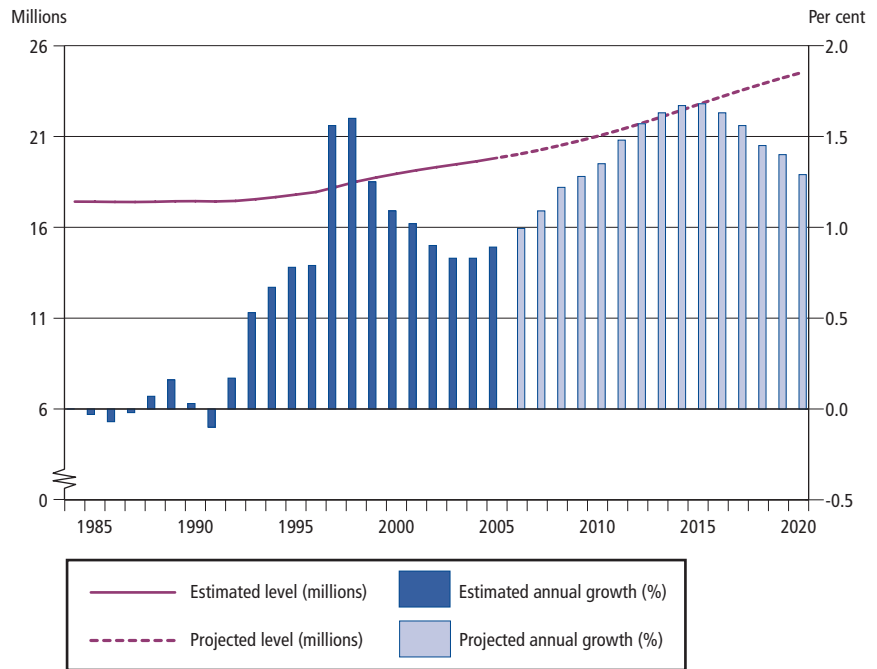
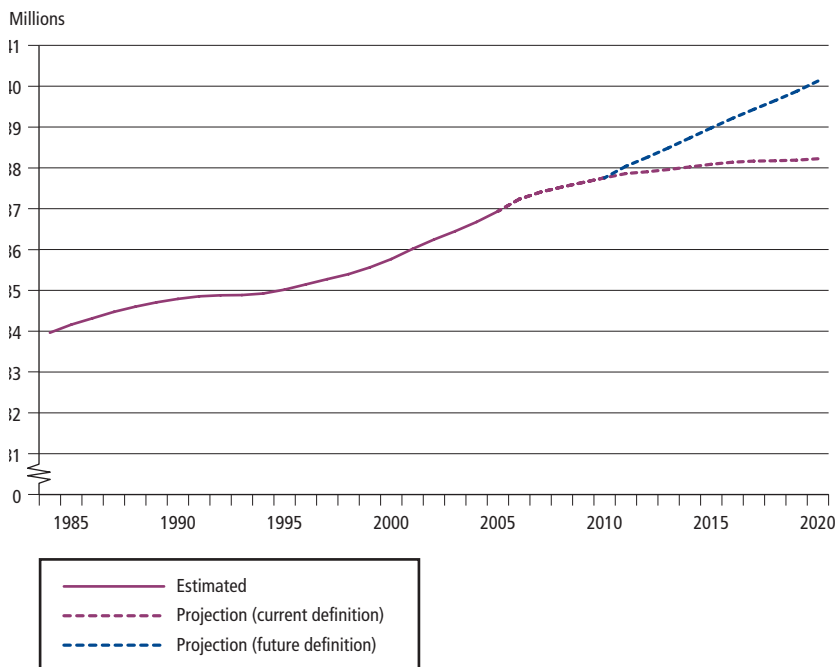*Source: Office for National Statistics*

Figure 4

Household population aged 16 to 24; United Kingdom; 1984 to 2020

Source: Office for National Statistics

Household population of working age, under current and future definitions; United Kingdom; 1984 to 2020

Millions

Legend:
— Estimated
----- Projection (current definition)
----- Projection (future definition)

Source: Office for National Statistics

mothers, technological changes, shifts in government policies as well as changes in occupational pension schemes. For example, increased provision of childcare is viewed as a structural factor that increases the labour market activity of women of childbearing age.

Cyclical factors are those associated with the economic cycle. Labour market participation is affected by the economic cycle, although to a lesser degree than employment. The equilibrium in the labour market, just as in any other market, is determined by the interaction of demand and supply. A rise in overall demand in the economy will spur an increase in the demand for labour by firms, which will affect the overall level of labour supply in the market. From the point of view of an individual, consider the case of a

woman who looks after her family and is not active in the labour market. If there is an economic expansion, with the demand for labour rising, unemployment falling and real wages rising, the probability that this woman will decide to enter the labour market is higher, compared with an environment where the demand for labour is low, unemployment is high and real wages are falling. These projections control for the effect of the economic cycle on past activity rates but make no forecast of future economic conditions and, essentially, treat the future as acyclical.

Prime age men

The economic activity rates for prime age men (25 to 49) are among the highest observed in the labour market. However, they have seen a

significant decline since the 1980s. The literature on the labour supply of men has proposed a number of explanations for this decline. These include the declining number of jobs in manufacturing industry, which typically employs a larger proportion of men, the shift of labour demand against unskilled labour and the administration of the social benefit system throughout the 1980s and early 1990s. For men aged 25 to 34, this trend is projected to continue into the future, although at a declining rate. For men aged 35 to 49, a clear structural break is evident in the activity rate series in the mid-1990s, coinciding with key labour market reforms such as the introduction of Jobseeker's Allowance in 1996 and Incapacity Benefit in 1995. The activity rate of this group is projected to continue falling but at a lower rate than that observed in the 1980s and early 1990s (**Figure 6**).

Prime age women

The activity rates of prime age women (25 to 49) have seen a significant increase throughout the period of observation, although the rate of increase has slowed in the late 1990s and early 2000s. Reasons put forward for this increase are changes in social attitudes towards the employment of women, increased opportunities for the employment of mothers (part-time jobs, teleworking, etc.), improvements in the provision of childcare, as well as changes in family structure. The activity rates for both the 25 to 34 and 35 to 49 age groups are expected to increase, but at a declining rate (**Figure 7**). The rate of increase of the 35 to 49 age group is lower than that of the 25 to 34 age group, which is in line with a trend towards childbearing later in life.

Men aged 50 and over

Looking at the activity rate of men aged 50 and over, there was a decline in the 1980s and the mid-1990s but the trend has since reversed. The labour supply literature has put forward a number of possible explanations for this reversal in the trend, including reforms in the administration of disability benefits, changes in occupational pension schemes as well as the adoption of anti-discriminatory policies for the employment of older people. For men aged 50 to 64, the upward trend is projected to continue into the future, confirming the increasingly important role that older people are expected to play in the labour market in the future (**Figure 8**).[3] For men aged 65 and over, the activity rate has been fluctuating around the same level throughout the period of observation (**Figure 9**). It is projected to remain around this level, with small fluctuations driven mostly by population movements between two age groups: those aged between 65 and 70 and those aged 70 and above.

Women aged 50 and over

The activity rates of women aged 50 and over have seen a strong increase throughout the period of observation. For women aged 50 to 59 this rise is showing no signs of levelling off and is projected to continue rising at the same rate in the future. This is in line with the view that, as younger cohorts of women, who have been more active throughout their lifetime, enter older age groups, the activity rate of these older age groups will rise (**Figure 8**). Similar trends are evident for women aged 60 and over. In addition, however, this age group will be directly affected by the equalisation of the state pension age,
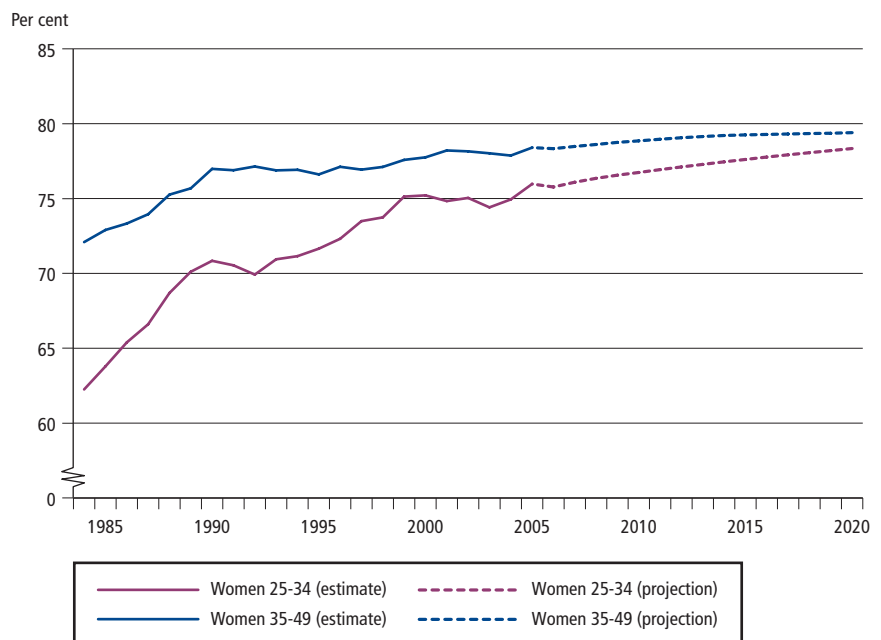
Figure 6

Activity rates for men aged 25 to 34 and 35 to 49; United Kingdom; 1984 to 2020
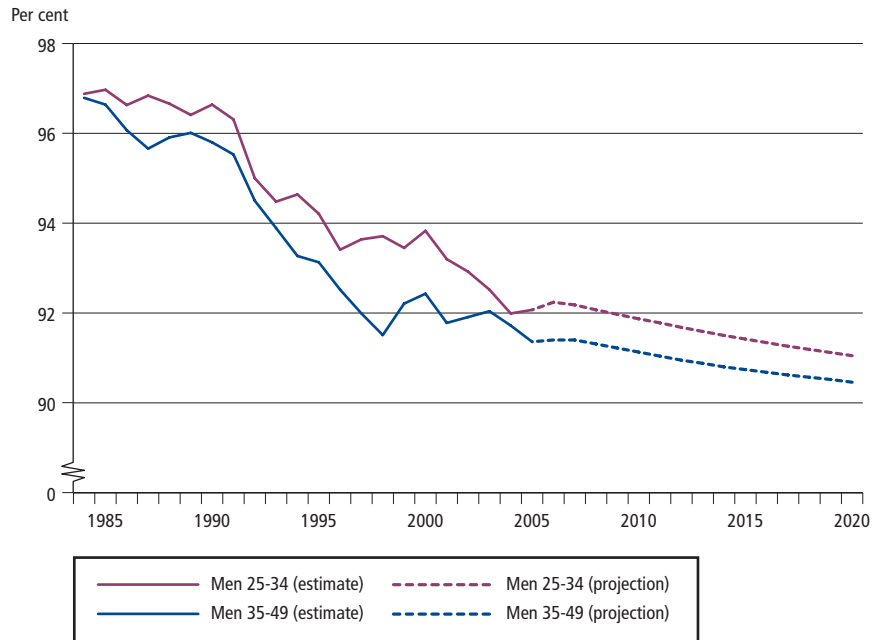
Source: Office for National Statistics
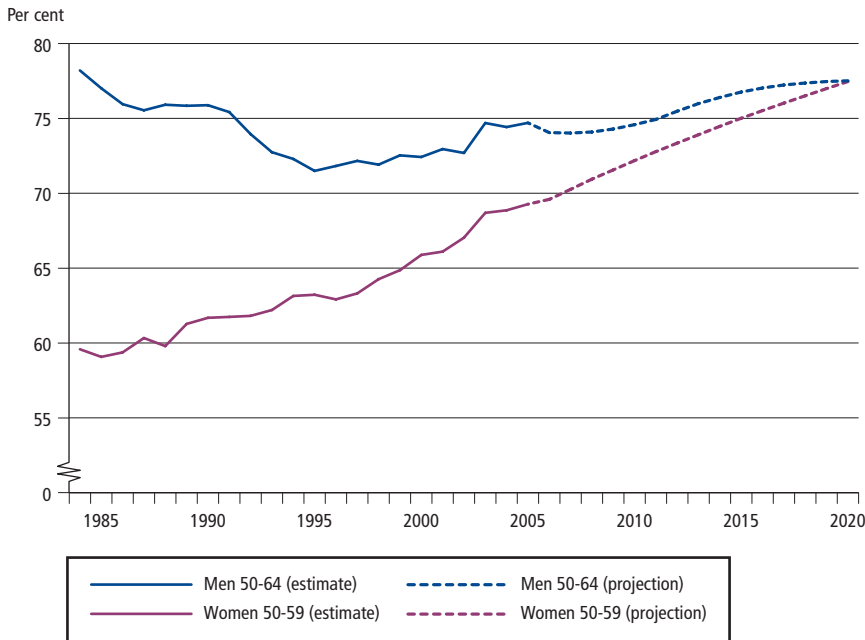
Figure 7

Activity rates for women aged 25 to 34 and 35 to 49; United Kingdom; 1984 to 2020

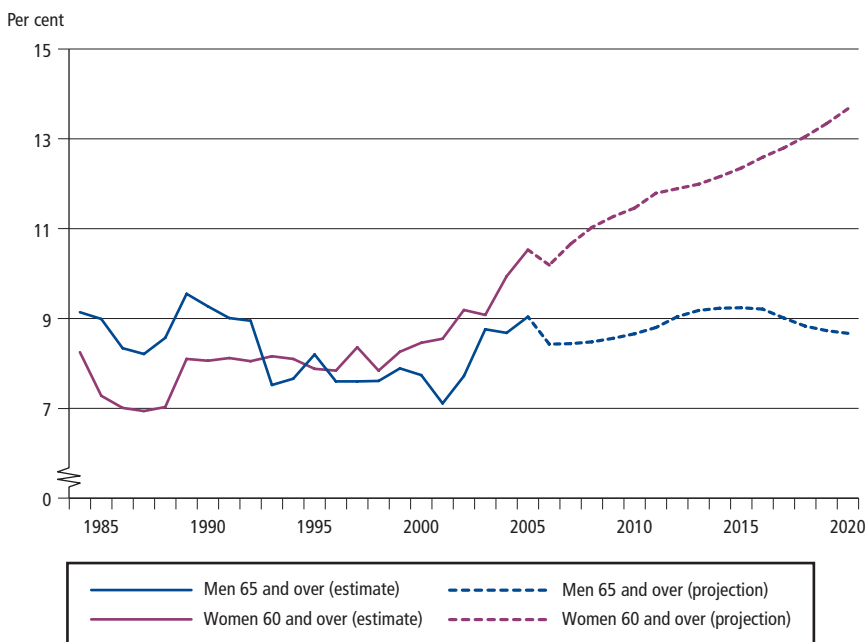*Source: Office for National Statistics*

Figure 8

Activity rates for men aged 50 to 64 and women aged 50 to 59; United Kingdom; 1984 to 2020

Source: Office for National Statistics

Figure 9

Activity rates for men aged 65 and over and women aged 60 and over; United Kingdom; 1984 to 2020

Source: Office for National Statistics

as it includes women aged between 60 and 64. These women will not be eligible for state pension in 2020 and are thus expected to retire at a later age, generating a stronger increase in the future activity rate (**Figure 9**).

Young men

The activity rate series for young men have been more volatile throughout the period from 1984 to 2005, although there are evident trends in the series. In both the 16 to 17 and 18 to 24 age groups, there is a downward trend throughout the period of observation. This can be attributed both to the increasing participation of young men in further and higher education as well as an overall downward trend in the participation of men in the labour market, which is consistent with what is observed in other age groups. These downward trends are projected to continue into the future, although the fall for men aged 16 to 17 is more marked than that of men aged 18 to 24 (**Figure 10**).

Young women

In a similar way to young men, the activity rate series for young women show significant volatility throughout the period of observation. For women aged 16 to 17 there is a clear downward trend which is projected to continue into the future. This is partly due to the increasing proportion of young women participating in further education, but also due to a decline in labour market activity both for students and non-students. For women aged 18 to 24, the activity rate series has been fluctuating around the same level since 1994 and is projected to remain around that level until 2020 (**Figure 11**).

Labour force projections

Projections of the labour force are derived by combining population projections and activity rate projections. The labour force is projected to grow continuously, although at a declining rate throughout the period from 2006 and 2020. The number of economically active people aged 16 and over is expected to reach 32.1 million in 2020, which is equivalent to an increase of 6.7 per cent from 2005 (see **Table 1**). However, the growth rate in the labour force is projected to follow a declining rate. In particular, the average annual growth rate for the five-year period 2006 to 2010 is expected to be 0.62 per cent, compared with 0.43 per cent for the period 2011 to 2015 and 0.26 per cent for the period 2016 to 2020 (**Figure 12**).

Looking at the composition of the labour force, the rising trend in female participation in the labour market is expected to continue, although at a declining rate. By 2020, the labour force will comprise 53.3 per cent men and 46.7 per cent women. The respective figures for 1971 are 62.9 per cent and 37.1 per cent and for 2005 they are 54.2 per cent and 45.8 per cent. The data suggest that the highest rate of 'catching up' by women was observed throughout the 1970s and 1980s.

In terms of age structure, the dominant feature is that of an ageing labour force. By 2020, the proportion of the labour force that lies below the age of 50 will fall to 69 per cent, compared with 75 per cent in 2005. As shown in **Figure 13**, the age distribution is shifting towards older age groups, with the largest proportion of economically active people belonging to the 50 to 54 age group in 2020,
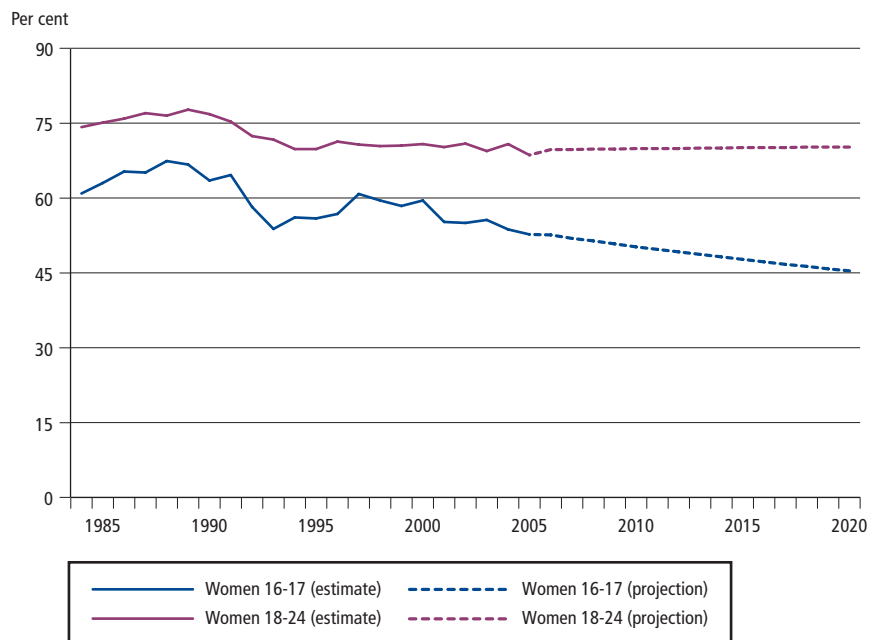
Figure 10

Activity rates for men aged 16 to 17 and 18 to 24; United Kingdom; 1984 to 2020
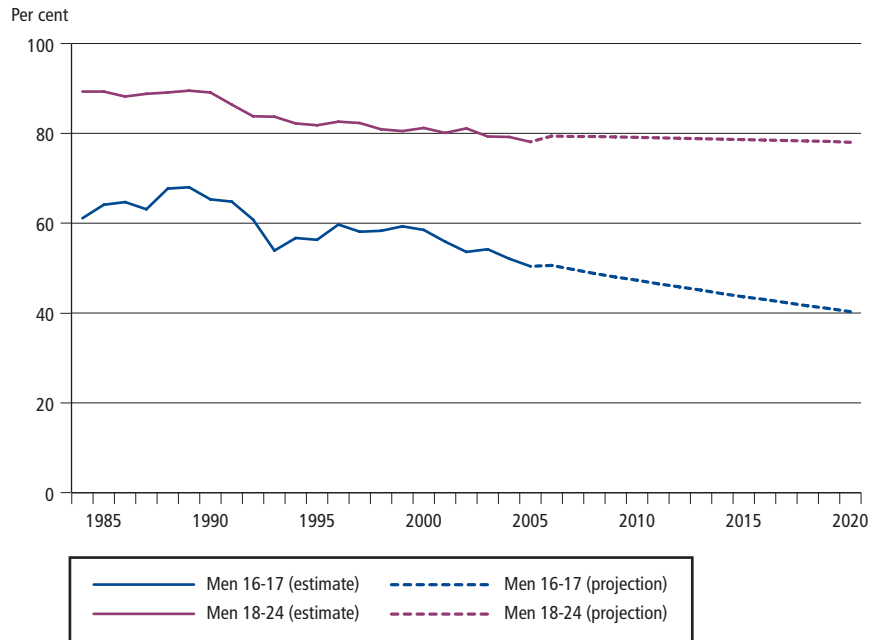
Source: Office for National Statistics

Figure 11

Activity rates for women aged 16 to 17 and 18 to 24; United Kingdom; 1984 to 2020

Source: Office for National Statistics

Table 1

| | Estimates and projections of economic activity level, household population and economic activity rates; United Kingdom; 1990 to 2020 level[a] | | | | | | | |

	People aged 16 and over	People aged 16-59/64	People aged 16-64	Men aged 16 and over	Men aged 16-64	Women aged 16 and over	Women aged 16-59	Women aged 16-64
Economic activity level (thousands)								
1990	28,925	28,073	28,423	16,357	16,034	12,569	12,039	12,389
1995	28,202	27,389	27,745	15,682	15,385	12,520	12,004	12,360
2000	29,071	28,223	28,606	15,882	15,590	13,189	12,633	13,016
2005	30,101	29,027	29,518	16,301	15,937	13,800	13,090	13,581
2010	31,038	29,821	30,430	16,770	16,388	14,269	13,433	14,042
2015	31,708	30,285	30,955	17,003	16,533	14,706	13,752	14,421
2020	32,125	30,510	31,350	17,115	16,634	15,010	13,876	14,716
Household population (thousands)								
1990	44,844	34,791	36,293	21,547	18,068	23,297	16,723	18,225
1995	45,189	35,018	36,446	21,710	18,090	23,479	16,928	18,356
2000	46,107	35,766	37,235	22,202	18,437	23,905	17,328	18,797
2005	47,727	36,961	38,537	23,136	19,117	24,591	17,845	19,421
2010	49,457	37,756	39,667	24,110	19,707	25,347	18,049	19,960
2015	50,890	38,088	39,847	24,907	19,829	25,983	18,258	20,018
2020	52,056	38,223	40,126	25,538	19,994	26,518	18,229	20,132
Activity rate (per cent)								
1990	*64.5*	*80.7*	*78.3*	*75.9*	*88.7*	*54.0*	*72.0*	*68.0*
1995	*62.4*	*78.2*	*76.1*	*72.2*	*85.0*	*53.3*	*70.9*	*67.3*
2000	*63.1*	*78.9*	*76.8*	*71.5*	*84.6*	*55.2*	*72.9*	*69.2*
2005	*63.1*	*78.5*	*76.6*	*70.5*	*83.4*	*56.1*	*73.4*	*69.9*
2010	*62.8*	*79.0*	*76.7*	*69.6*	*83.2*	*56.3*	*74.4*	*70.4*
2015	*62.3*	*79.5*	*77.7*	*68.3*	*83.4*	*56.6*	*75.3*	*72.0*
2020	*61.7*	*79.8*	*78.1*	*67.0*	*83.2*	*56.6*	*76.1*	*73.1*

Source: Office for National Statistics

a Figures refer to the spring quarter (March-May) of each year.

compared with the 40 to 44 age group in 2005.

As a corollary to this, an interesting characteristic of the future labour force relates to the number of people exceeding pensionable age but remaining economically active. In particular, there are projected to be 775,000 economically active people above the age of 65 in 2020. This compares with 582,000 in 2005 and represents an increase of around 33 per cent. This is a combined effect of the increasing number of people in older age groups due to demographic trends as well as the rise in labour market participation rates of older people.

An interesting question is whether the future variation in the labour force is driven by the demographic or the activity rate effect. **Figure 14** decomposes the annual change in the labour force into the change due to the demographic effect and the change due to the activity rate effect.

The figure shows that the activity rate effect is positive and remains relatively constant throughout most of the projection period[4], while the demographic effect is declining throughout the projection period, mainly due to ageing of the population. From 2006 to 2015, the largest contribution to growth in the labour force will come from demographic trends. From 2016 onwards, however, labour force growth will be driven by changes in ▶

▶ activity rates within different age groups.

Projections of overall economic activity rates

The working-age economic activity rate refers to those people who, due to their age, are most likely to participate in the labour market. As explained earlier, the equalisation of the state pension age will affect the definition of the population of working age. Given this definitional change, it is not possible to make meaningful comparisons of the working-age activity rate over time, so the two definitions are discussed separately.

Given the current definition of the working-age population, the activity rate for people of working age is projected to reach 79.8 per cent in 2020, an increase of 1.3 percentage points from 2005. Within this, the working-age activity rate for men is projected to fall to 83.2 per cent in 2020 compared to 83.4 per cent in 2005, while for women it is projected to increase to 76.1 per cent in 2020 from 73.4 per cent in 2005 (**Figure 15**).

Given the new definition of working-age population, the activity rate for people aged 16 to 64 is projected to reach 78.1 per cent, an increase of 1.5 percentage points from 2005. Within this, the working-age activity rate for men is projected to fall to 83.2 per cent in 2020 compared to 83.4 per cent in 2005, while for women it is projected to increase to 73.1 per cent in 2020 from 69.9 per cent in 2005 (**Figure 16**).

Looking at the economic activity rate for people aged 16 and over, this is projected to fall by 1.4 percentage points, from 63.1 per cent in 2005 to 61.7 per cent in 2020. The activity rate for men in this age group is projected to fall to 67.0 per cent in 2020 from 70.5 in 2005, while for
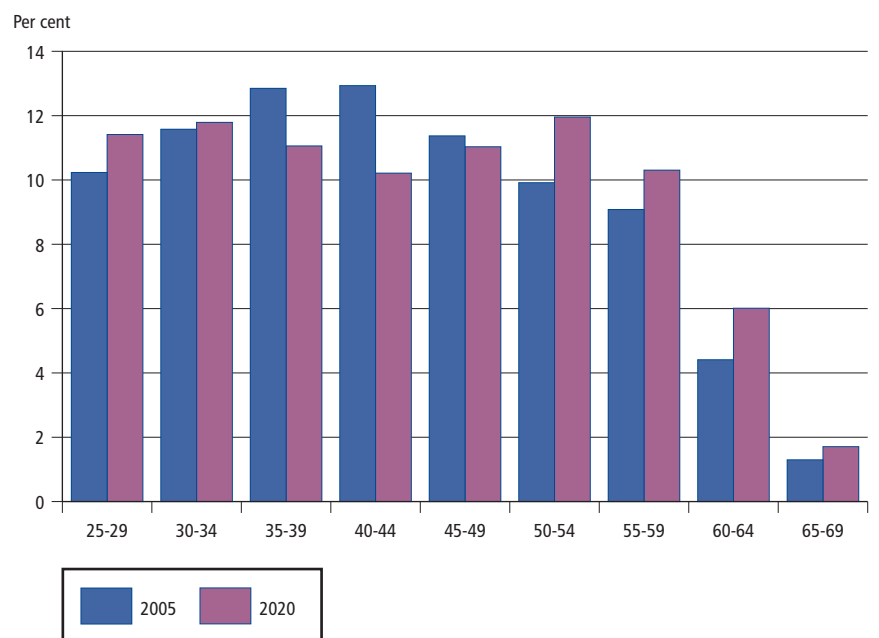
Figure 12

Labour force level and annual growth rate; United Kingdom; 1971 to 2020
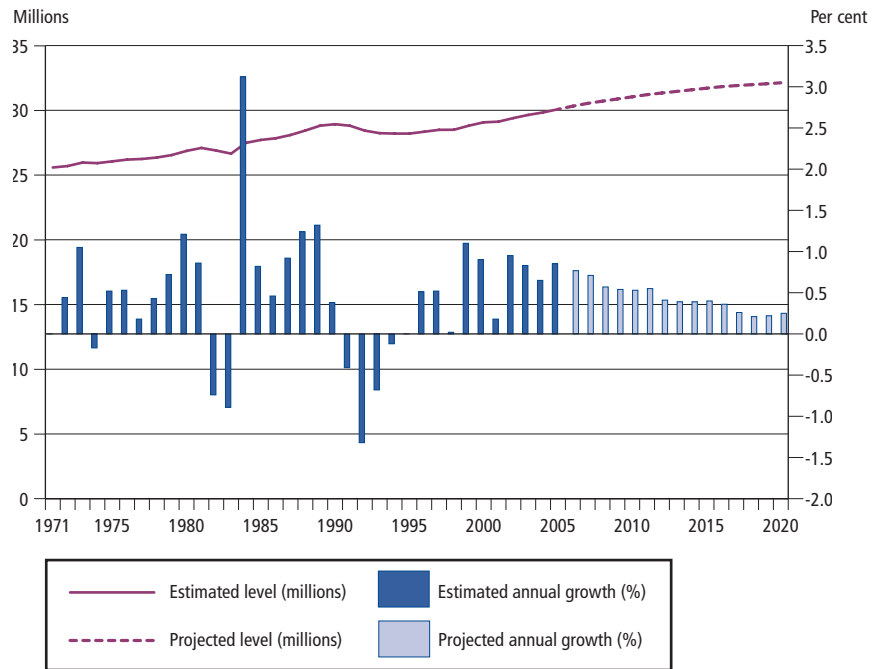
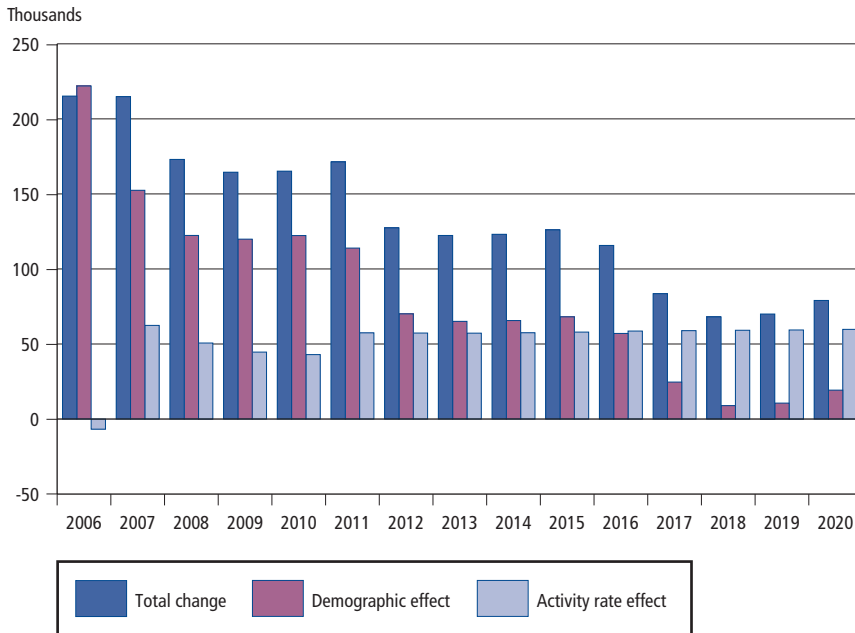*Source: Office for National Statistics*

Figure 13

Estimates and projections of the number of people in age group as a proportion of the entire labour force; United Kingdom; 2005 and 2020

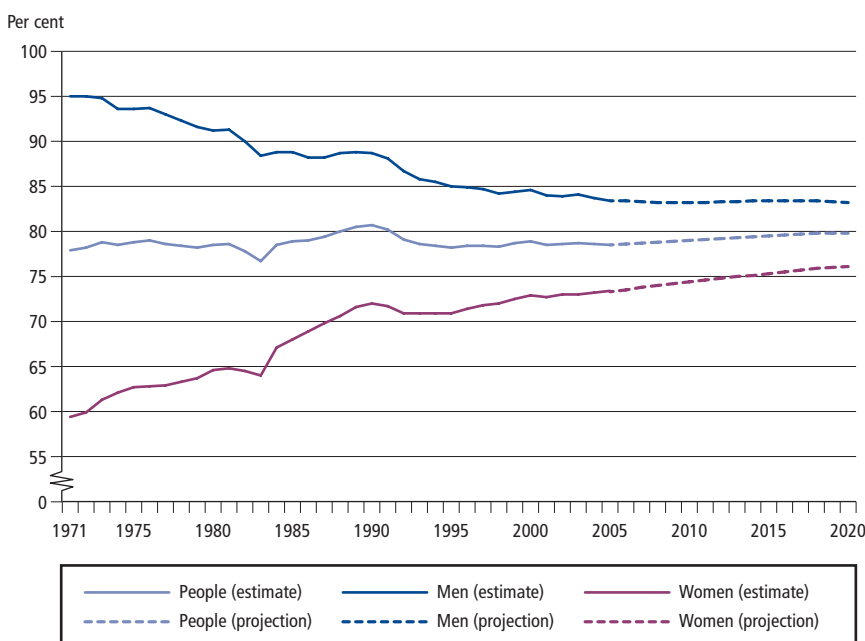*Source: Office for National Statistics*

Figure **14**

Decomposition of annual projected change in the labour force into demographic and activity rate effect; United Kingdom; 2006 to 2020

Thousands

Source: Office for National Statistics

Figure **15**

Working-age (current definition) activity rates; United Kingdom; 1971 to 2020

Per cent

Source: Office for National Statistics

women it is projected to increase to 56.6 per cent in 2020 from 56.1 per cent in 2005 (**Figure 17**).

The driving forces behind the decrease in the activity rate of people aged 16 and over are demographic movements, with more people entering older age groups, for which labour market participation is lower than average. Although these demographic forces affect both men and women, the 16 and over activity rate for men is declining, while for women it is increasing. This occurs for two reasons: first, because for men the demographic effect is compounded by the overall declining trend in labour market participation. On the contrary, for women, the demographic effect is partially offset by the trend towards increased participation in the labour market. The second reason is the expected effect of the equalisation of the state pension age. With state pension age for women increasing to 65 by 2020, the activity of women in the 60 to 64 age group is expected to rise significantly. Overall, the demographic effect for women is offset by increasing trends in labour market participation and the equalisation of the state pension age.

Looking at the two indicators, the working-age activity rate and the activity rate of people aged 16 and over, the latter more closely reflects the dominant demographic trends, as it includes people above pensionable age. The downward trend followed by the activity rate of people aged 16 and over implies that by 2020 a smaller proportion of the population will be participating in the labour market and, as such, be part of actual labour supply.

Sensitivity to demographic assumptions

As discussed earlier, one of the key components of the labour force ▶

▶ projections are population projections produced by GAD. These are based on a particular set of assumptions, which are discussed in more detail on the Government Actuary's Department website at *www.gad.gov.uk*. GAD also produces variant population projections based on alternative demographic assumptions. It is, thus, sensible to assess the sensitivity of the labour force projections to these variant assumptions.

In terms of the future size and composition of the population (and, as such, the labour force), there are three sources of uncertainty: the future fertility rate, the future level of life expectancy and the future level of migration.

As the entirety of the people who will be reaching the age of 16 by 2020 have already been born, uncertainty about the future fertility rate does not affect the projected population of working age and, thus, the projections of the labour force. Looking at life expectancy, GAD produces two variants of the principal population projections for the UK: a high life expectancy scenario and a low life expectancy scenario. By feeding the two variant population projections into the projected activity rates it is possible to examine the sensitivity of the labour force projections to different levels of life expectancy in the future. In terms of the activity rate of people aged 16 to 59/64 (people of working age, under the current definition), the effects are negligible. This is because any changes to the life expectancy assumption affect primarily the segment of the population that has already exceeded the ages of 59 and 64. Looking at the activity rate of people aged 16 and over, the different assumptions
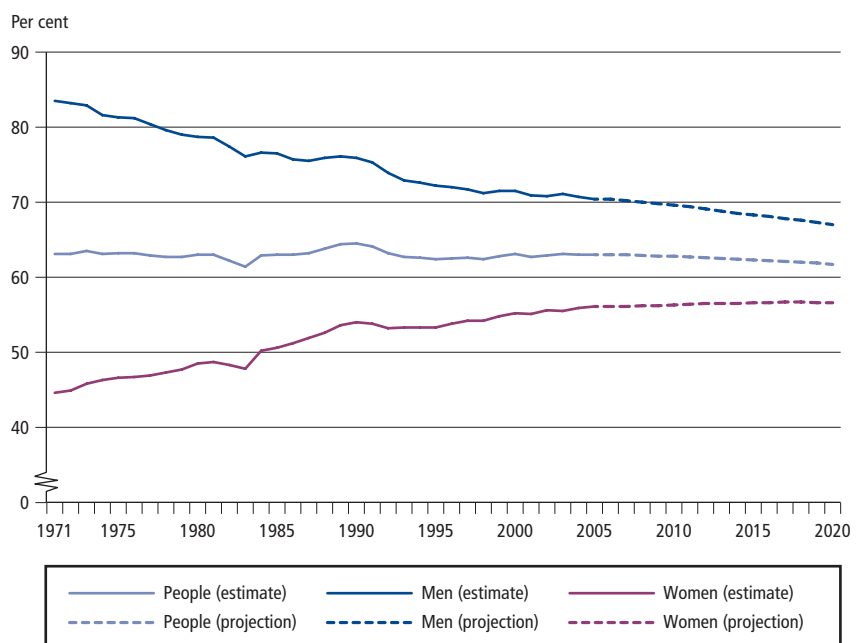
Figure 16

Working-age (future definition) activity rates; United Kingdom; 1984 to 2020
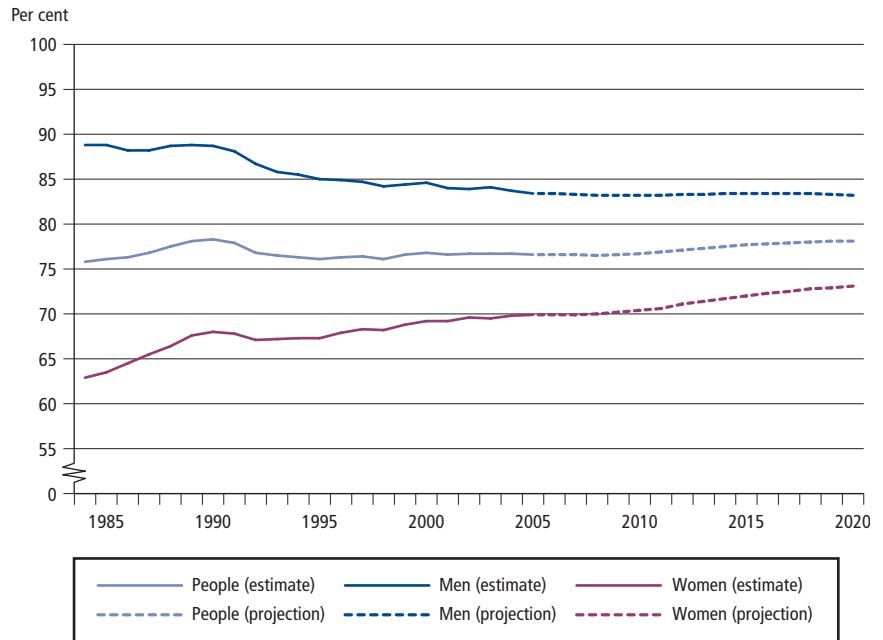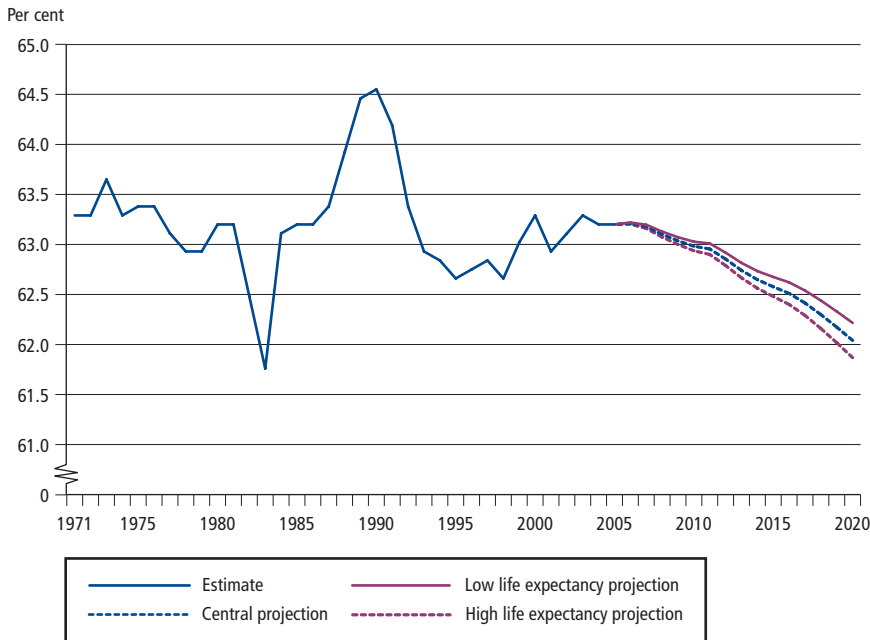

Source: Office for National Statistics

Figure 17

Activity rates for those aged 16 and over; United Kingdom; 1971 to 2020

Source: Office for National Statistics

Figure 18

| Sensitivity of projections to life expectancy assumptions: activity rate for those aged 16 and over; United Kingdom; 1971 to 2020 |

Source: Office for National Statistics

Figure 19

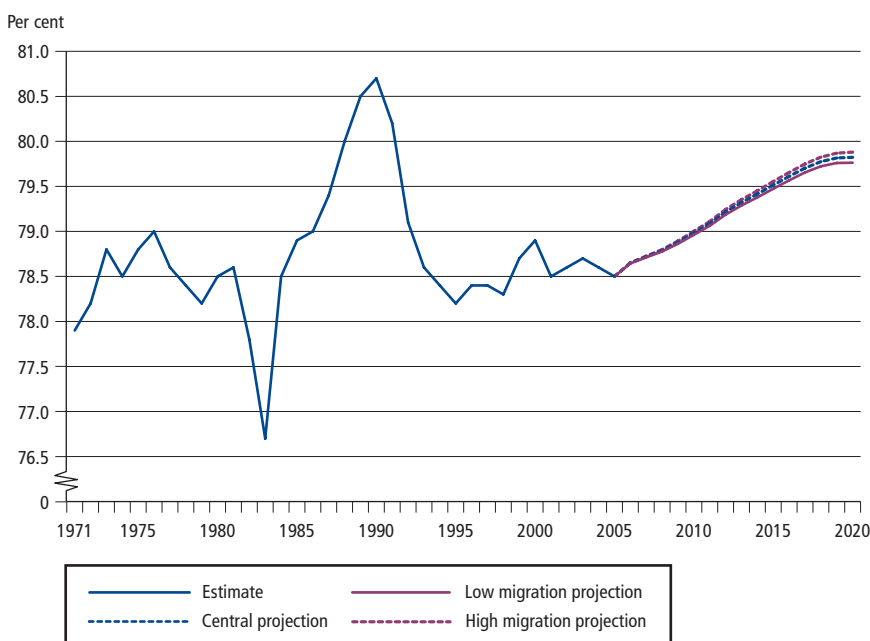| Sensitivity of projections to migration assumptions: activity rate for those of working age; United Kingdom; 1971 to 2020 |

Source: Office for National Statistics

concerning life expectancy affect the labour force projections more markedly. In particular, higher life expectancy is associated with a lower projected activity rate of people aged 16 and over. This is because, keeping everything else constant, higher life expectancy implies a larger proportion of the population in older age groups. As labour market participation of older people is lower than average, the overall activity rate of those aged 16 and over falls. This effect is illustrated in **Figure 18**.

In a similar way, the effects of different migration assumptions on the labour force projections can be examined using the migration variants produced by GAD, based on a low migration and a high migration scenario. In terms of the activity rate of people aged 16 to 59/64, an increase in the future level of migration results in a higher projected activity rate for people in this age group. This is because the majority of migrants coming into the country are between the ages of 15 and 34, and as such, are more likely to participate in the labour market, pushing the overall activity rate higher. This effect is illustrated in **Figure 19**.

Looking at the activity rate of people aged 16 and over, a higher level of migration in the future is associated with a higher projected activity rate. From a demographic point of view, a higher level of migration partially offsets the ageing of the population, as most migrants belong to younger age groups. As such, higher migration in the future results in a younger population, whose probability of being active is higher, thus pushing the overall activity rate higher. This effect is illustrated in **Figure 20**.

It may appear surprising that the migration variant has a larger effect ▶

▶ on the activity rate of people aged 16 and over, compared with the activity rate of people of working-age. This is because the activity rate of the age groups to which the majority of migrants belongs is slightly higher than the working-age activity rate (giving a small positive effect of higher future migration), but significantly higher than the 16 and over activity rate (giving a larger positive effect of higher future migration). Overall, the migration variants clearly portray the beneficial effects of migration from a demographic point of view, by partially offsetting the process of population ageing.

Future work

Updating the projections of the labour force is an important aspect of the project. This is due to the significant degree of uncertainty involved in producing labour force projections so far into the future. Labour force projections are expected to be updated every two years. This is in line with the current

Figure 20

Sensitivity of projections to migration assumptions: activity rate for those aged 16 and over; United Kingdom; 1971 to 2020
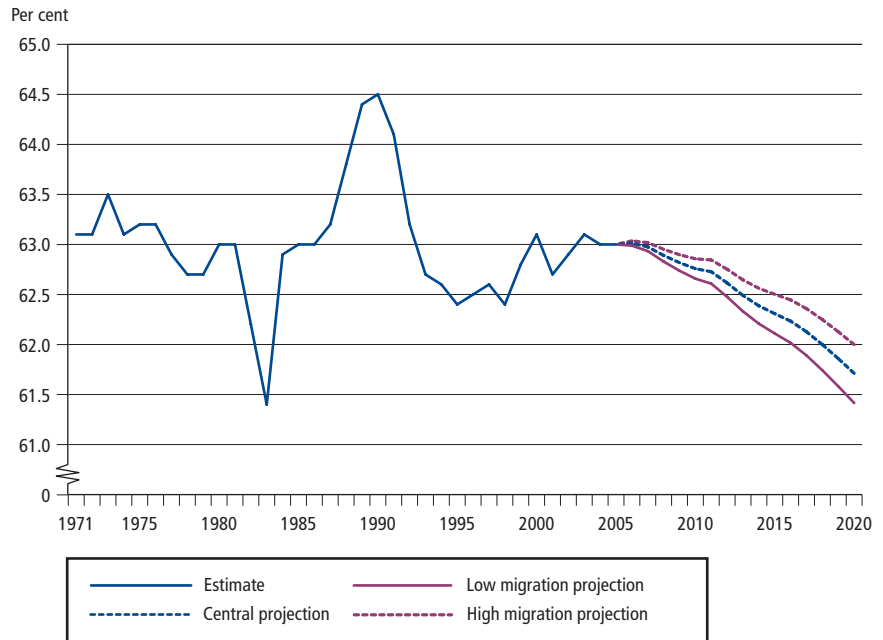
Source: Office for National Statistics

policy for updating the UK population projections biennially. In this way, the updated set of labour force projections will be able to

incorporate the latest population projections, as well as the latest activity rate data from the LFS.

Notes

1 Following the recommendations of the Morris Review of the Actuarial Profession, the responsibility for producing national population projections has transferred from GAD to the new Centre for Demography at the ONS. For more details see: *www.statistics.gov.uk/pdfdir/ndp1105.pdf*.

2. There are different definitions of the old-age dependency ratio. This definition was chosen because by 2020, when state pension age will be defined as 65 for both men and women, it will be equivalent to the ratio of the number of people exceeding state pension age over the number of people of working age.

3. Note that in **Figures 8** and **9** the male and female age groups are not identical and, as such, are not directly comparable.

4. The activity rate effect is only negative in 2006 and this is purely an effect of the modelling exercise. For more information see the link at the end of **Technical note**.

Technical note

A brief overview of the methodology

The projections of the labour force are based on two key components. First, projections of the population and, second, projections of labour market activity rates.

The first component refers to the purely demographic effect and is captured through the 2004-based population projections published by the Government Actuary's Department (GAD).

The second component refers to non-demographic factors that affect labour market participation and is captured through the modelling of activity rates. The population is disaggregated into 28 subgroups according to sex, age and student status and econometric modelling is used to project the activity rates of each subgroup into the future. In this way, the demographic effect is removed and the analysis focuses on long-term trends due to structural socio-economic factors. In addition, an attempt is made to capture the effect of the economic cycle on past activity and the future is essentially projected as acyclical.

The modelling of activity rates is based on time-trend regressions. The activity rate series of most of the population subgroups exhibit clear trends over time and econometric modelling is used to estimate these trends and extrapolate them into the future. The long-term movements in the activity rate series can be attributed to a combination of structural factors, such as changes in the composition of family structure, shifts in government policies, changes in occupational pension schemes,

technological advances, etc. For the purposes of this project, however, these factors are not modelled individually. Instead, a purely statistical technique is employed by capturing the net effect of these structural factors through a time trend.

In addition to the time trend, the 'output gap' is included as an explanatory variable in the equations, to account for any cyclical movements around the long-term trend. The activity rate of most population subgroups appears to be affected by the degree of spare capacity in the economy (the output gap). However, in some cases, particularly for older female groups, the activity rate does not seem to be significantly affected by movements in the output gap.

For each population subgroup, ordinary least squares (OLS) regression is used to estimate the relationship between the activity rate and a time trend, the output gap and the activity rate in previous years. Based on the estimated coefficients and an explicit assumption that the output gap will equal zero throughout the projection period, projections of the activity rate series are generated.

Finally, by applying the projected activity rate series to the population projections, the demographic and activity rate effects are combined to give projections of the labour force up to 2020.

Readers who are interested in the detailed methodology behind these projections can find this on the National Statistics website at *www.statistics.gov.uk/StatBase/ Product.asp?vlnk=1945*.

Further information

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