

2. Demographic projections

- 2.1 The population projections which are used as the basis for AR18 are the ESSPOP2015 projections prepared by Eurostat and published in February 2017¹. Eurostat is independent of the political processes associated with the European Council of Ministers and the European Commission but has produced these projections for use by the Commission in preparing the AR18. Some countries argued that previous projections were unreasonable and Eurostat appears to have adopted a more collegiate approach to these projections, involving National Statistical Institutions of the EU Member States more actively in the process (hence the change in terminology from EUROPOP to ESS). However, notwithstanding the extensive consultation, Eurostat appear to have made only relatively minor changes to their methodology for these projections. Some of the differences are the result of taking into account the most recent trends.
- 2.2 It is important to note that the Eurostat projections may differ materially from the population projections prepared each country's own statistical authorities. This means that some caution should be exercised in interpreting results based on the Eurostat projections, although a major virtue of them is that they adopt consistent methodology across all countries, which would not be the case if individual countries' projections were used as the reference point.
- 2.3 The projections seek to blend short-term trends with long-term assumptions and reflect some quite strong assumptions about how the population of the EU will develop in the very long-term future, in particular the following:
- Fertility rates for all member states are assumed broadly to converge to similar levels in the very long term (2150). However, some countries are assumed to change quite quickly relative to others and not all countries converge to the same long-term level. Most countries are projected to have the same or slightly lower fertility in 2060 than in the previous 2013-based projections, although Spain and Slovakia have significantly higher projected fertility, bringing them now more into line with other countries.
 - Expectation of life for member states is projected to increase throughout the projection period, with differentials between countries, and between males and females, narrowing and converging in the very long term to the mortality of a 'leading group' of 12 countries. Most countries are projected to have slightly higher period expectation of life at age 65 in 2060 than in the previous projections.
 - Migration is assumed to converge in the long-term to a position where there is zero net migration between member states (for the total population). Different approaches are used for modelling the short, medium and long term, with time series modelling for the medium term and convergence for the longer term, modified by a modest feed-back adjustment for countries with strongly falling working population. Net migration is a particularly uncertain and politically sensitive assumption, especially in the light of the quite large migratory movements in the last few years, e.g. asylum seekers from outside the EU, which makes projections based on the experience of the recent past hazardous.
- 2.4 Even though the methodology has not changed dramatically, there are quite large differences in the results produced by ESSPOP2015 compared to EUROPOP2013 used

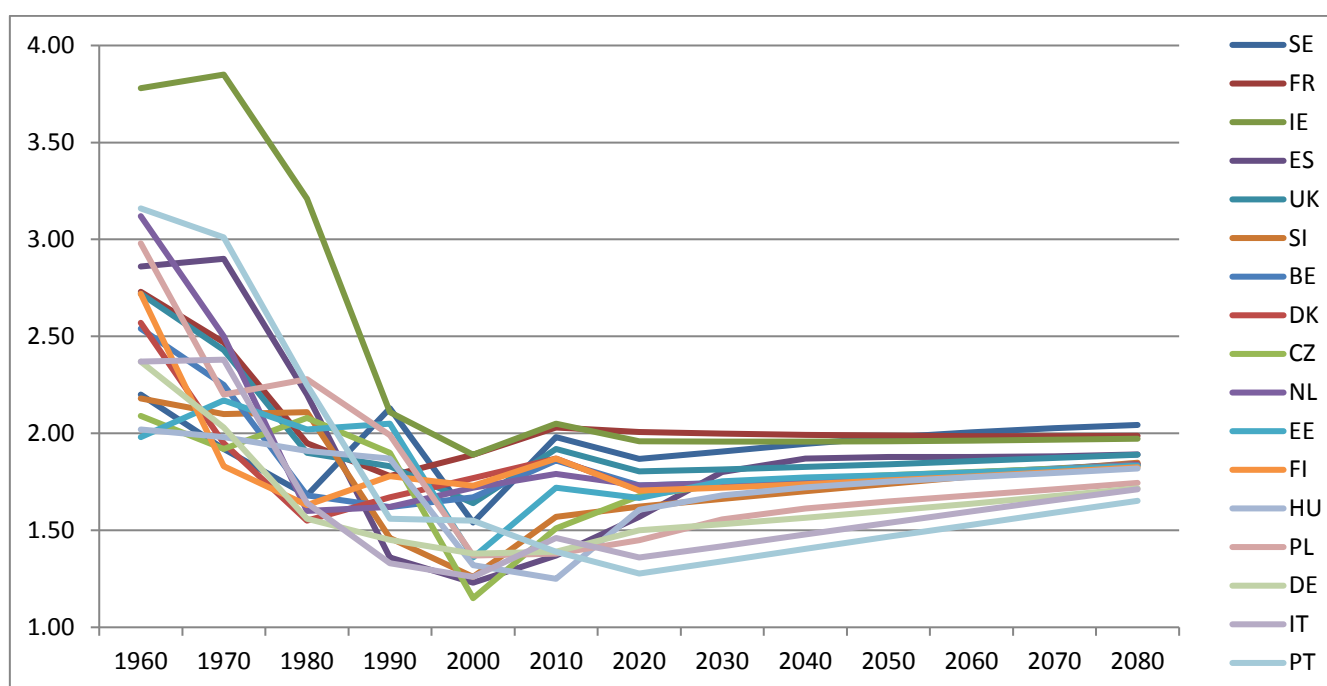
¹ More details of the projections are given in The 2018 Ageing Report: Underlying Assumptions and Projection Methodologies, Institutional Paper 065, published in November 2017 and found at: https://ec.europa.eu/info/publications/economy-finance/2018-ageing-report-underlying-assumptions-and-projection-methodologies_en. Eurostat's summary of the methodology is in Annexes to the Population Projections metadata at http://ec.europa.eu/eurostat/cache/metadata/en/proj_esms.htm

for The Ageing Report 2015. We draw attention to some of the most significant of these in this report. There is considerable uncertainty about the future evolution of the population and the magnitude of some of the forecast changes raises serious questions over whether the assumptions are sustainable. Indeed the trends on which the projections rely may change in response to actions taken in response to what the projections show.

Fertility

- 2.5 Fertility is assumed to be converging over the very long term to a total fertility rate² between 1.9 and 2.1. The long-term convergent position is based on the expected fertility developments in a set of countries considered to be “forerunners”, which for this purpose are taken to be Belgium, Denmark, France, the Netherlands, Finland and the UK. Member states are not all assumed to converge to the same level or at the same speed, although we understand that these differences are driven by extrapolation of recent trends for the short-term. Spain, Romania, Poland, Hungary, Slovakia and Bulgaria are assumed to experience particularly strong increases in total fertility rates between 2015 and 2030, with the increase slowing down thereafter. It is not altogether clear why some countries which were at the same fertility level in 2015 are assumed to experience very different growth patterns of fertility in the future.

Figure 1 Total fertility rates 1960-2080 for selection of EU member states



- 2.6 For some it may be an attempt to correct for what are seen as anomalously low fertility rates in 2015, although the same ‘correction’ does not seem to have been applied to Greece, Italy and Portugal. By 2080 the total fertility rate in Sweden is assumed to have risen to 2.04, whilst that for Portugal has increased only to 1.65. Poland, which shows a very low TFR similar to Portugal in 2015, is expected, on the other hand, to increase to 1.74 and Greece, Croatia and Italy to around 1.70. Apart from Sweden, only France and Ireland are expected to have TFR over 1.90 in all years from 2030 onwards. Figure 1 illustrates this for 17 of the countries, which together account for about 90% of the total population of the EU at ages 15-64. A full table of the underlying figures for all EU

² Total fertility rate (TFR) is an aggregate measure of fertility for a particular population and a particular year. It is the sum of the individual age-specific fertility rates over the child-bearing years.

countries is shown at Annex Table A.1.

- 2.7 Although the assumption about convergence of the fertility levels of all member states is a strong one, there is a fair degree of consensus that fertility levels will remain below the theoretical replacement level of 2.1 children per woman for the foreseeable future, although there are different views on whether current differentials between countries will narrow as much as is projected. Only Sweden is projected to have fertility levels rising above 2.0 in the later years of the projection, although France, which currently has the highest levels of fertility in the EU, is projected to have fertility at or just above 2.0 between 2020 and 2030 and then to fall back slightly. The ESSPOP2015 projections are reasonably consistent with the previous projections for most countries, with TFR in 2060 projected to be no more than 0.1 higher or lower than in the EUROPOP2013 projections. Notable exceptions are Spain and Slovakia, which had fairly low projected fertility in the 2013 projections but have had their projected TFR for 2060 increased by more than 0.25.
- 2.8 Overall the assumptions are probably relatively uncontroversial in broad terms and give a reasonable estimate of future births, although in practice it is likely that fertility will vary from year to year, as it has in the past, and differences will remain between countries, reflecting different social, economic and employment situations and different experience of inwards and outwards migration, which can materially affect fertility levels. It is implicitly assumed that member states do not adopt any different policies to encourage higher levels of fertility, such as higher levels of family benefits, although this may be a factor contributing the currently higher levels of fertility in some countries.
- 2.9 Nevertheless, the assumption that all countries will have fertility below replacement level (2.1) for the next sixty years has a significant impact on the ageing of the population. The combination of this assumption with the migration assumptions can be expected to have a dramatic effect on the future size and structure of the population in many countries. If fertility does not rise as much as is projected, the potential working population in the later years of the projection could be materially lower than indicated by these projections.

Migration

- 2.10 The migration assumptions are more controversial, both because the past experience has been quite volatile and because it is likely to change in the future in ways which are not readily predictable. Although the starting date of the ESSPOP2015 projections is 1 January 2015, actual migration figures were used for 2015 and country estimates for 2016, based on known migration for part of the year. Past migration experience is then taken into account using autoregressive (ARIMA) modelling to extrapolate past trends. ARIMA models are chosen by an automatic process for each country and parametrized on the basis of past migration for 1960 to 2016 with minor modifications to remove the highest and the lowest values over this period. Future migration is then projected using the ARIMA models for the period 2017 to 2080. These trend-based projections are then combined by a linear interpolation process with projections based on an assumption of convergence to zero migration in the very long term, the weights applied to the convergence projections increasing from zero in 2017 to one in 2080. Since for some countries these assumptions give rise to a steady shrinking of the working population, a 'feed-back' correction factor is applied to limit the extent of the shrinkage.
- 2.11 As we have seen recently, migration can vary a great deal, and is very sensitive to differences in economic conditions between member states and to external factors (such as the heavy migration into the EU in recent months from Africa and the Middle East as a result of wars and difficult economic conditions in the migrants' home countries). In 2015

alone net inwards migration into Germany was 1.2 million (1.4% population growth), into Austria 112,000 (1.3%) and into Sweden 80,000 (0.8%). Luxembourg had net inwards migration of almost 2% of the population.

- 2.12 The projection assumptions moderate this recent experience of very high migration and net migration into Germany over the whole period up to 2060 is projected only to increase the population by 11.2%.
- 2.13 Table 1 below shows a selection of figures from the migration projections. A more complete table is given in Annex Table A.2. Thirteen countries are projected to experience cumulative immigration of more than 10% of the total 2020 population over a period of forty years, with Luxembourg much higher than the others with a 46.7% increase. At the other extreme, Lithuania is projected to lose 11.6% of its entire population through emigration, with Latvia and Romania also projected to lose a significant proportion of their population. Taking into account that the losses are mostly suffered to the working age population, and combining this migration effect with the impact of low fertility, a substantial majority of EU member states are projected to have quite significant reductions in the size of the working population, as we discuss further in 2.24. Whether or not these are realistic projections only time will tell, but they do have a significant influence on the population projections and hence on the projections of expenditure, as reductions in numbers of contributors to social security (or tax-payers) combined with rising numbers of elderly, will create additional challenges for sustainability.

Table 1 Projection of net migration flows, 2010 and 2020 to 2060

	Cumulative net migration 2001-2015	Cumulative net mign 2001-15 as % of 2016 popn	Projection of net migration flows (000s)			Cumulative net migration 2020-2060	Cumulative net mign 2020-60 as % of 2016 popn
			2020	2040	2060		
LT	-423.3	-14.6%	-23.8	-6.3	0.2	-337.0	-11.6%
LV	-240.9	-12.0%	-8.0	-1.5	0.0	-104.2	-5.2%
RO	-1951.0	-9.9%	-65.1	-8.9	1.6	-840.5	-4.3%
BG	-405.7	-5.7%	-11.9	0.5	0.7	-103.6	-1.5%
PL	-203.6	-0.5%	0.0	16.2	11.6	494.3	1.3%
EL	1.7	0.0%	-16.8	7.9	10.5	139.4	1.3%
EE	-43.4	-3.3%	2.3	1.2	0.1	45.2	3.5%
HR	48.5	1.2%	-1.7	5.0	5.2	169.8	4.0%
SK	5.8	0.1%	5.9	6.8	3.8	230.8	4.3%
FR	1584.1	2.4%	77.0	77.3	62.2	3020.2	4.5%
PT	81.6	0.8%	2.4	18.2	14.6	553.6	5.4%
CZ	336.3	3.2%	21.5	20.5	8.8	672.1	6.3%
HU	205.5	2.1%	19.9	20.8	13.8	692.5	7.1%
SI	72.2	3.4%	4.2	4.3	2.8	156.9	7.5%
FI	181.5	3.3%	15.8	10.7	7.8	447.3	8.1%
IE	251.4	5.3%	9.9	11.4	12.2	436.1	9.3%
NL	287.4	1.7%	66.9	43.7	28.6	1805.0	10.6%
UK	3746.0	5.7%	251.5	181.0	121.1	7215.2	11.0%
DE	3828.3	4.6%	327.3	206.0	175.0	9243.0	11.2%
ES	4681.2	10.1%	51.2	163.4	153.8	5562.5	12.0%
IT	4307.9	7.1%	161.2	217.7	176.7	7937.0	13.1%
DK	248.1	4.4%	33.4	18.9	11.4	787.8	13.8%
BE	755.8	6.7%	53.2	41.5	29.5	1640.1	14.5%
CY	95.9	10.7%	1.7	3.9	4.4	147.1	16.3%
NO	457.1	8.8%	27.3	23.7	18.1	926.0	17.8%
SE	732.2	7.4%	67.9	44.7	27.4	1799.9	18.2%

AT	644.6	7.4%	67.8	40.3	24.8	1683.1	19.3%
MT	30.6	7.7%	3.2	2.0	1.3	82.7	20.7%
LU	108.8	18.1%	10.2	7.0	4.5	280.2	46.7%
EU	18967.2	3.7%	976.3	1363.8	1036.7	55107.0	10.8%

Mortality

- 2.14 Expectations of life in all member states have increased significantly in recent years, some by rather more than others. However, there are still material differences between member states. For example, male expectation of life at birth in 2015 ranged from 69.2 in Lithuania to 80.4 in Sweden and female expectation of life at birth ranged from 78.2 in Bulgaria to 85.8 in Spain. Expectation of life may also differ considerably between local areas of individual countries and between populations with different characteristics.
- 2.15 Expectations of life are projected to continue to improve, with convergence towards the 'forerunner' countries, mortality for which is in turn projected to continue improving on the basis of a modified version of the Lee-Carter model. Most projections of mortality improvement in recent years, whether by actuaries or demographers, have proved too conservative regarding the extent of future improvement and expectations of life have continued to rise faster than expected. Along with most national projections, the Eurostat projections assume there will be a slowing down of improvement in the future. To the extent that this proves to be a false assumption, the numbers in the older age groups could turn out to be higher, and perhaps significantly so, than the projections indicate. There has been relatively little change between the EUROPOP2013 projections and the ESSPOP2015 projections, with expectation of life at birth for the whole EU in 2016 increasing by only 0.2 for both males and females. However, the changes have been more significant for some individual countries, for example an increase of about a year for Cyprus and Malta.
- 2.16 A few countries have recently seen a moderation in the rate of improvement for several years but it is unclear whether they will experience slower improvement in future or whether the previous relatively rapid rate of improvement will resume. It is important for decision-makers to be aware of the considerable uncertainty that there is with all such long-term projections. The published ESSPOP2015 projections include a lower mortality (high life expectancy) variant as well as the main projection.
- 2.17 Figure 2 shows projected period expectations of life at age 65 for males for a selection of member states and Figure 3 the same data for females. Although a projection of expectation of life at 65 as high as 28.2 for females in France in 2080 and 24.8 for males seems impressive, there is projected to be a range of expectations of life down to as low as 25.8 for females and 22.7 for males across the different EU member states. It is worth noting that current period expectations of life in Japan are already about a year higher than in France.
- 2.18 Expectations of life at age 65 are shown for all countries in Annex Table A.3. The projected improvements to 2070 are greatest for those countries with the lowest expectations of life now, resulting in quite a narrowing of the range of results. In 2016 expectations of life at 65 for males ranged from 14.0 in Latvia to 19.5 in France whereas in 2070 they are projected to range from 21.5 in Bulgaria to 24.0 in France. Expectations of life at 65 for females in 2016 ranged from 17.9 in Bulgaria to 23.5 in France whereas in 2070 they are projected to range from 24.7 in Bulgaria to 27.5 in France.
- 2.19 These expectations of life are calculated based on the individual age mortality rates in the particular calendar years (known as a period expectation of life). They are a

measure of mortality levels in that year but they do not provide an estimate of how long those attaining a particular age are expected to live. Cohort expectation of life, by contrast, includes an estimate of projected mortality improvement in the future years through which that generation will live, with the mortality rates assumed at each age in each future year incorporating an allowance for the anticipated reduction in mortality rates from the base year to the year for which an estimate of the mortality rate is required. Thus for someone aged 65 in year 1, the mortality rates used are those for age 65 in year 1, age 66 in year 2, age 67 in year 3 and so on, with the mortality rate in year 2 having one year's improvement, that for year 3 having two years' improvement and so on. The resulting mortality table for this example is a projection of the likely experience of a cohort of people aged 65 in the base year, following them through the rest of their lifespan. The resulting *cohort expectation of life* represents the average number of years which someone aged 65 in the base year can expect to live, allowing for the projected improvements in mortality over the rest of their lifetime.

Figure 2 Male expectation of life at age 65 to 2080 for selected member states

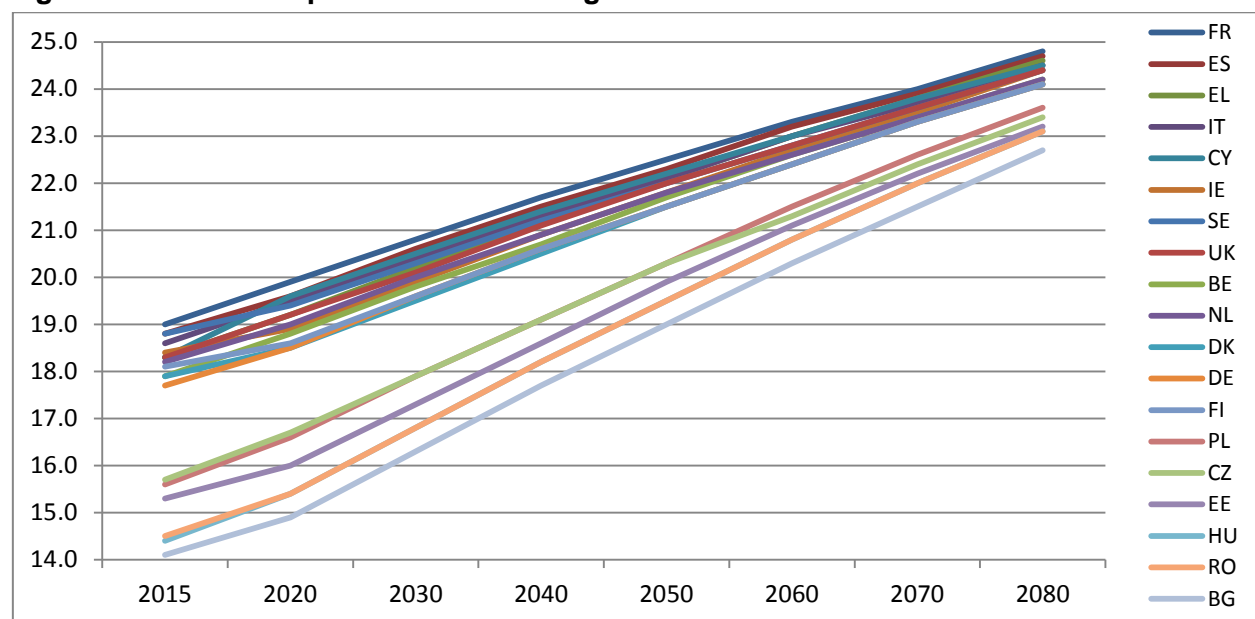
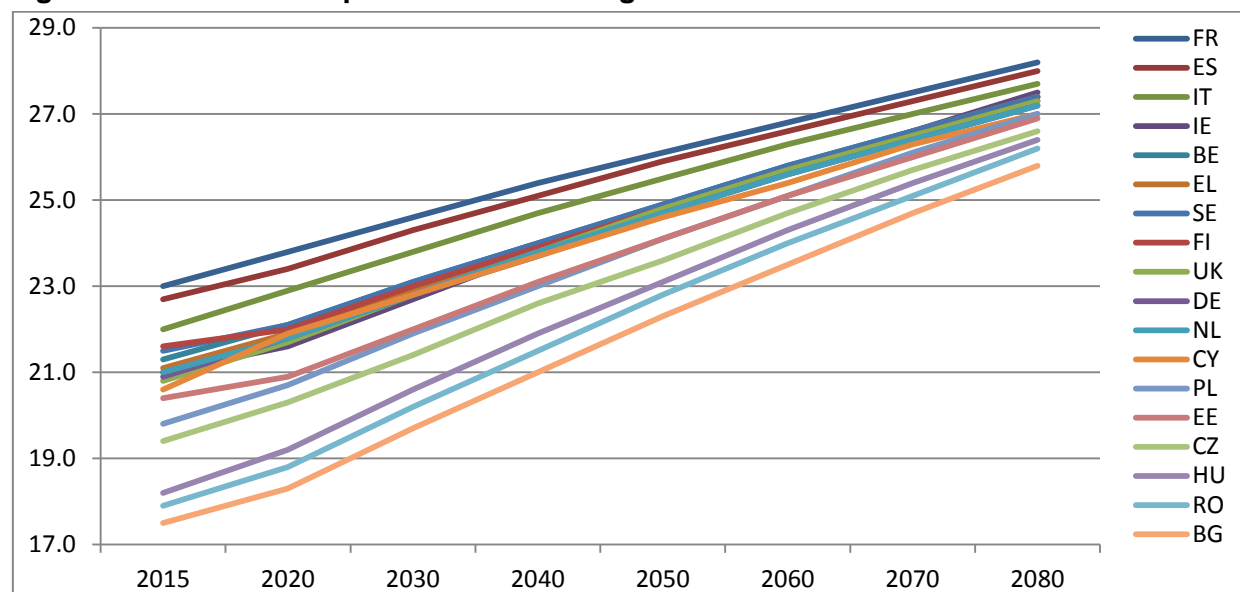


Figure 3 Female expectation of life at age 65 to 2080 for selected member states



- 2.20 For a male aged 65 in 2015 the most recent UK national population projections estimate 18.4 as the period expectation and 20.4 as the cohort expectation for those attaining age 65 in 2015. The equivalent figures for females are 20.8 as the period expectation of life and 22.6 as the cohort expectation of life. Cohort and period expectations of life at various ages in 2015 and 2060 (for the UK) are shown in Table 2. It is important to emphasize the considerable uncertainty implicit in cohort expectations for 2060, which take into account projected mortality up to 2110.

Table 2 Cohort and period expectations of life for 2015 and 2060 in the UK

Age	Males 2015		Males 2060		Females 2015		Females 2060	
	Cohort	Period	Cohort	Period	Cohort	Period	Cohort	Period
60	24.9	22.4	29.9	27.7	27.3	25.0	32.0	29.7
65	20.4	18.4	25.1	23.3	22.6	20.8	27.0	25.1
70	16.1	14.6	20.4	19.1	18.0	16.7	22.1	20.7
75	12.2	11.2	16.1	15.2	13.8	12.9	17.6	16.6
80	8.8	8.2	12.2	11.6	10.0	9.5	13.4	12.7

Source: Principal 2016-based population projections of the United Kingdom

- 2.21 Cohort expectations at age 65 are not published by Eurostat in the results of the ESSPOP2015 projections, or referred to in the Commission's paper on assumptions and methodology, even though they are more useful for determining the true expectation of life for a group of pensioners. However, projected mortality rates by single year of age are published³ and we have used these to estimate consistent cohort expectations of life at 65. The results for a selection of member states are shown in Table 3 (see also paragraph 3.42 regarding the use of period instead of cohort expectations in the context of proposals to raise the eligibility age for social security pensions).

Table 3 Period and cohort expectations life, Males, 2015-2045

	<u>Period expectation of life</u>			<u>Cohort expectation of life</u>				Difference
	2015	2020	2045	2015	2025	2035	2045	
Bulgaria	14.1	14.9	18.4	15.6	17.2	18.7	20.1	1.5
Hungary	14.4	15.4	18.9	16.1	17.7	19.2	20.6	1.7
Poland	15.6	16.6	19.7	17.3	18.7	20.1	21.3	1.7
Czech Rep.	15.7	16.7	19.7	17.4	18.8	20.1	21.3	1.7
Germany	17.7	18.5	21.1	19.4	20.5	21.5	22.5	1.7
Belgium	17.9	18.8	21.2	19.6	20.7	21.7	22.7	1.7
Portugal	17.9	18.6	21.1	19.4	20.5	21.5	22.5	1.5
Netherlands	18.2	19.0	21.4	19.9	20.9	21.9	22.8	1.7
Greece	18.3	19.2	21.7	19.9	21.0	22.1	23.0	1.6
Cyprus	18.3	19.6	21.8	20.4	21.5	22.4	23.2	2.1
UK	18.3	19.2	21.6	20.0	21.1	22.0	23.0	1.7
Italy	18.6	19.5	21.7	20.3	21.3	22.3	23.1	1.7
Spain	18.8	19.6	21.9	20.4	21.4	22.4	23.3	1.6
Sweden	18.8	19.4	21.6	20.3	21.2	22.2	23.0	1.5
France	19.0	19.9	22.1	20.6	21.6	22.5	23.4	1.6

³ Up to age 100

Table 4 Period and cohort expectations life, Females, 2015-2045

	<u>Period expectation of life</u>			<u>Cohort expectation of life</u>				Difference
	2015	2020	2045	2015	2025	2035	2045	
Bulgaria	17.5	18.3	21.7	19.6	21.1	22.5	23.8	2.1
Hungary	18.2	19.2	22.5	20.4	21.9	23.2	24.5	2.2
Poland	19.4	20.3	23.1	21.5	22.8	23.9	25.0	2.1
Czech Rep.	19.8	20.7	23.6	22.1	23.5	24.6	25.4	2.3
Germany	20.6	21.9	24.2	23.1	24.1	25.0	25.9	2.5
Belgium	20.8	21.7	24.3	22.9	24.0	25.0	26.0	2.1
Portugal	20.9	21.8	24.2	22.9	24.0	25.0	25.9	2.0
Netherlands	21.0	21.8	24.3	22.9	24.0	25.0	26.0	1.9
Greece	21.1	21.9	24.4	23.1	24.2	25.1	26.1	2.0
Cyprus	21.3	22.1	24.5	23.2	24.3	25.2	26.1	1.9
UK	21.5	22.1	24.5	23.3	24.3	25.2	26.1	1.8
Italy	21.6	22.2	24.3	23.4	24.4	25.4	26.2	1.8
Spain	22.0	22.9	25.1	24.0	25.0	25.8	26.6	2.0
Sweden	22.7	23.4	25.5	24.6	25.4	26.2	27.0	1.9
France	23.0	23.8	25.8	24.8	25.7	26.4	27.2	1.8

2.22 In general member states rank in the same order of increasing expectation of life on both the period and the cohort measures, with cohort expectations of life averaging about 1.7 years higher for males and 2.0 years higher for females.

2.23 One useful measure of the ageing of the population from improving expectation of life (apart from the changing structure arising from low fertility and from migration) is given by the increase in the pension entitlement age which would be necessary to maintain a constant expectation of life after that age for successive cohorts or generations. Table 5 shows the way in which the pension entitlement age would change for the UK (for which the cohort expectations at all ages in all years are readily available) in order to maintain expectations of life at the entitlement age of 22.6 for females and 20.4 for males.

Table 5 Evolution of pension entitlement age for the UK to maintain the cohort life expectancy at that age (20.4 for males and 22.6 for females)

Year	Pension entitlement age for males	Pension entitlement age for females
2015	65.0	65.0
2020	65.6	65.6
2030	66.8	66.6
2040	67.9	67.6
2050	69.0	68.6
2060	70.0	69.5

2.24 This is equivalent to an increase of the pension entitlement age of 1.0 years per decade for females and 1.1 years per decade for males. These estimates are based on the Principal 2016-based population projections for the UK. However, there is considerable uncertainty about future mortality improvement and the UK also publishes High Life Expectancy and Low Life Expectancy projections to give a range around the Principal projections.

Population

- 2.25 Overall the population of the current member states of the EU is projected to grow from 508 million in 2015 to 529 million in 2050 and then to fall back a little. Leaving out the UK reduces the total population of the EU in 2015 to 444 million, which is projected to rise to 451 million in 2050, falling thereafter to 436 million in 2080. A summary of the projections by member state is given at Annex Table A.3. About half of the member states are expected to grow in overall population size and half to reduce, with three countries (Bulgaria, Latvia and Lithuania) projected to experience a reduction of more than a third by 2080, whereas three countries (Ireland, Luxembourg and Sweden) are projected to grow by more than a third by 2080. The population of the largest seven countries in 2013 and 2060, accounting for about 75% of the total EU population, is projected to change as follows:

Table 6 Member states with the largest populations in 2015 and 2080

<u>2015 (millions)</u>		<u>2080 (millions)</u>		<u>Increase 2015-2080</u>
Germany	81.2	France	78.7	+18.5%
France	66.4	Germany	77.8	-4.2%
UK	64.9	Italy	53.8	-11.5%
Italy	60.8	Spain	51.0	9.8%
Spain	46.4	Poland	29.0	-23.6%
Poland	38.0	Netherlands	19.7	16.7%
Romania	19.9	Romania	14.5	-26.9%
Total EU	508.4	Total EU	436.4	-14.2%

Working age population

- 2.26 The population of the EU between the aged from 15 to 64 is projected to fall by 17% between 2015 and 2080 (excluding the UK). A summary of the projections by member state is given at Annex Table A.5. 20 member states are projected to have a decline in the population aged from 15 to 64 by 2080, 12 of them by more than 25% and 8 by more than 35%. Only 7 member states are projected to have an increase in this age group, which characterises the potential working population, although in practice the younger part of this age group will have a significant proportion still in education and employment rates over age 55 are modest in some countries. Table 7 shows the projected change in 'working age' population by member state and for the EU as a whole.

Table 7 Projected change in population aged from 15 to 64, 2015 to 2080

% Change		% Change		% Change	
LT	-52.0	EE	-26.9	MT	-0.7
BG	-47.2	HU	-26.7	NL	0.3
EL	-45.7	CZ	-22.3	DK	4.8
LV	-45.5	SI	-22.2	FR	6.4
PT	-42.2	DE	-19.2	BE	11.0
PL	-41.2	EU*	-16.9	IE	17.8
RO	-39.7	FI	-11.7	SE	33.3
HR	-36.3	CY	-6.5	LU	55.2
SK	-32.8	ES	-5.8		
IT	-26.9	AT	-3.0	[UK	10.9]

*EU excluding UK in both 2015 and 2080

- 2.27 While such changes are possible, they would represent a major diminution of the size of the potential working population in many countries, which could be expected to provide a significant headwind to economic growth. In practice the projected decline could be offset by increased levels of net inwards migration or by a significant increase in the proportion employed at younger and older ages and, in particular, over the age of 65. Another possibility is that fertility rates may increase in response to declining population, perhaps encouraged by family friendly employment policies, including higher family benefits and better child care arrangements.

Younger population

- 2.28 The younger age population (defined as up to the age of 15) is also projected to decline

for the EU as a whole (excluding the UK throughout), with a decrease of 3.1% between 2015 and 2080. A summary of the projections by member state is given at Annex Table A.4. 16 member states are projected to have a fall of more than one third in this section of the population and another 4 member states by more than one quarter. Whilst a fall in the younger population may result in cost savings on education, health care and financial support for dependants, the reduction in population at these ages does not bode well for the working population in years beyond the end of these projections.

Older population

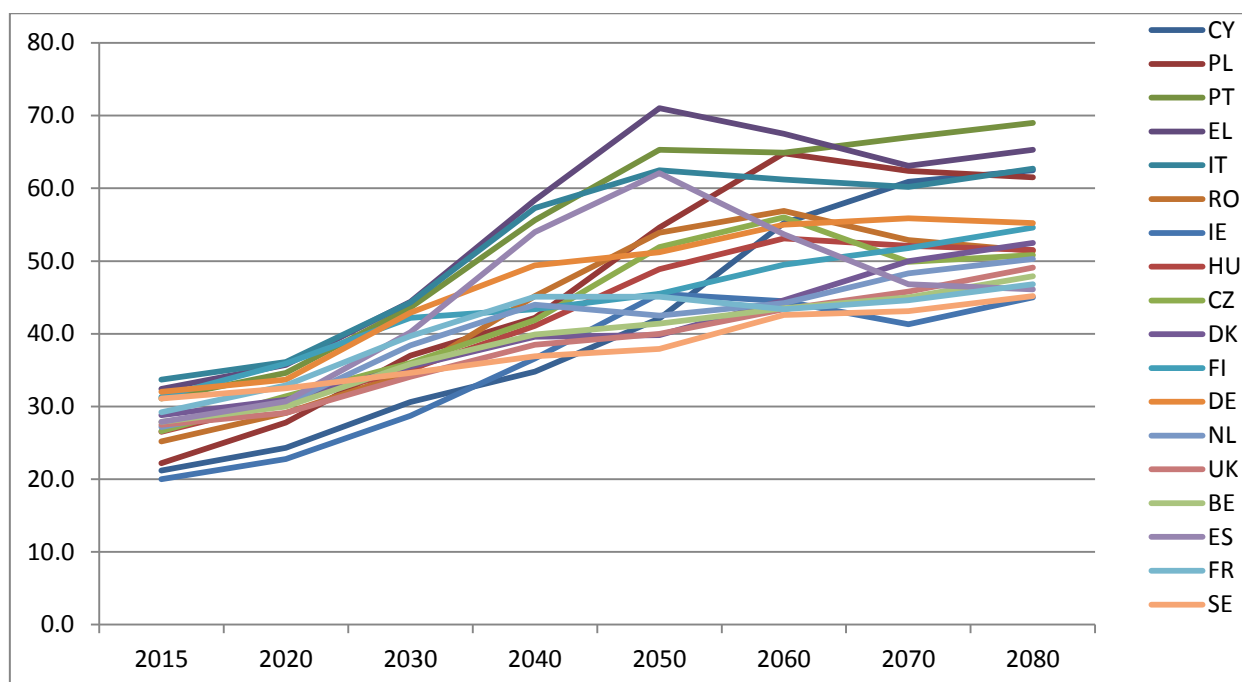
- 2.29 On the other hand, the population aged 65 and over is projected to grow by more than 50% for the EU as a whole (excluding the UK), from 84.6 million to 128.1 million. A summary of the projections by member state is given at Annex Table A.6. The older population is projected to increase by more than 90% in 9 member states and by more than 150% in three countries (Ireland, Cyprus and Luxembourg). Clearly this represents a major increase in dependency at older ages, with the situation being exacerbated for old-age dependency ratios⁴ by the fall in the working population, as we will see in later paragraphs.
- 2.30 The rates of growth of the very elderly are significantly higher. For the EU as a whole (excluding the UK) the population aged 80 and over is projected to grow by 135%, from 23.8 million to 56.1 million. A summary of the projections by member state is given at Annex Table A.7. The projections show 13 member states with increases of more than 150% and 4 with more than 300% (Ireland, Cyprus, Luxembourg and Malta). The growth in the numbers of the very elderly has important implications for the costs of healthcare and long-term care, for which utilisation rates typically rise quite steeply at ages 80 and above.
- 2.31 The population aged 90 and over is projected to grow even more dramatically. For the EU as a whole (excluding the UK) the population aged 90 and over is projected to grow by 388%, from 3.7 million to 18.0 million. A summary of the projections by member state is given at Annex Table A.8. The projections show 13 member states with increases of more than 500% and 6 with more than 750% (Cyprus, Luxembourg, Slovakia, Malta, Ireland and Poland).
- 2.32 At present there are relatively few centenarians in the EU, with an estimate of 108,326 in 2015 (excluding the UK). However, this number is projected to rise by 1262% over the 65 years to 2080, by which time the number is projected to be 1.48 million. A summary of the projections by member state is given at Annex Table A.9. For 5 countries the rise is projected to be more than 3000% (Luxembourg, Czech Republic, Slovakia, Malta and Bulgaria).

Old-age Dependency Ratios

- 2.33 Of more significance perhaps than total population is the shape of the population pyramid and the relationship between numbers in the productive working ages and numbers over retirement age. This can be measured using the old-age dependency ratio. Figure 4 shows the development of this ratio for a selection of member states. The data for all member states is given in Annex Table A.10.

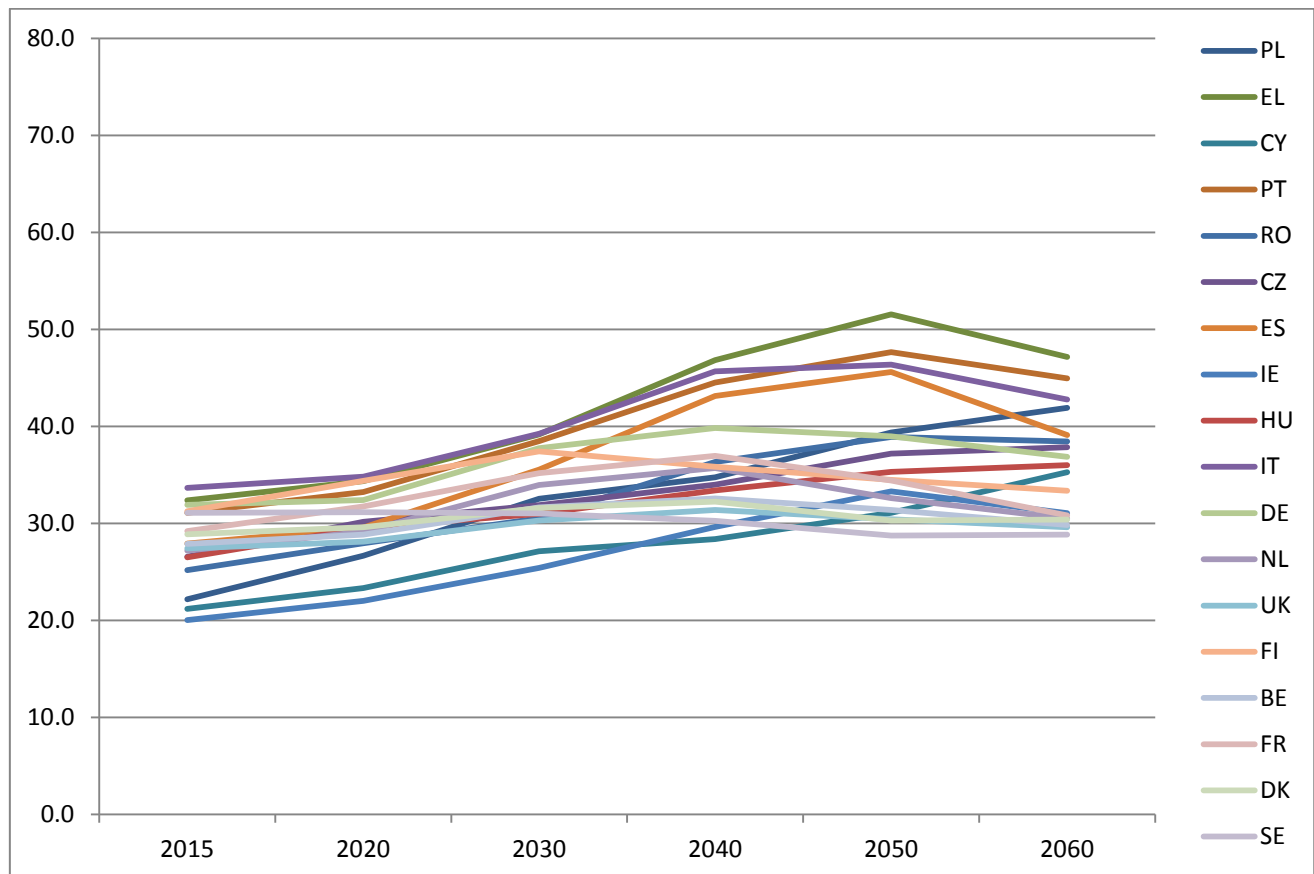
Figure 4 Ratio of projected population aged 65 and over to projected population aged 15 to 64 from 2015 to 2080 for selected member states

⁴ The old-age dependency ratio is traditionally taken to be the ratio of the population aged 65 and over divided by the population aged 15 to 64. However, with pension eligibility ages likely to rise, this may be a rather artificial measure.



- 2.34 For the EU as a whole the old-age dependency ratio defined in this way is projected to increase rapidly from 28.8% in 2015 to 50.3% in 2050 and then more slowly to 52.3% in 2080. In other words the population structure will go from roughly three working age people per person over 65 to only two. This phenomenon, which is often described as the ageing of the population, is the combined result of four factors: increased expectation of life over age 65, low fertility leading to slow growth of the population from natural increase, the current age structure of the population (reflecting past peaks and troughs in births and migration) and future net migration, for most countries principally affecting working ages.
- 2.35 Both the increased expectation of life at older ages and the projected evolution of the size of the work-force point in the direction of needing to increase the eligibility age for pensions and social security benefits, probably by at least five years over the period to 2060. If we rework the old-age dependency ratios to reflect the ratio of those aged 70 or more to those aged from 15 to 69 in 2060, with a gradual transition from the definition based on age 65 in 2015, the rises illustrated in Figure 5 are much more modest than shown in Figure 4, although still quite significant for some countries. Figures for the evolution of the dependency ratios on this basis are shown for all countries in Annex Table A.11.
- 2.36 Some member states would need to increase the eligibility age faster to offset the rising old-age dependency ratio, but then might be able to level off by the 2040s. For others this would not be an adequate policy instrument to offset the decline in working age population. It should be emphasized also that true financial dependency will depend on how many people stay in work to older ages in the light of rising eligibility ages.

Figure 5 Ratio of projected population aged X and over to projected population aged 15 to X from 2015 to 2060, where X increases linearly from 65 to 70 by 2060



Demographic Projections – Summary

- 2.37 In this section we have examined some key aspects of the Eurostat population projections which are used as the basis for the projections of future public expenditure in The Ageing Report 2018. It is important to remember that these are projections based on a set of plausible assumptions, rather than forecasts. Population projections made by individual member states may differ significantly from these EU-wide projections. In order to be consistent between member states, some of the assumptions are rather formulaic and may not be entirely realistic. In practice the future is likely to differ, possibly materially, from the assumptions made. Particularly significant in terms of the conclusions to be drawn would be continuing faster growth in life expectancy at older ages and changing patterns of net migration at working ages. One of the challenges of achieving sustainability of pension costs is to find ways of reducing the impact of uncertainty about future mortality improvement through design features. The AAE would emphasize the importance of looking at the sensitivity of the projections to key assumptions in order to understand better the resilience of pension systems to a wide range of possible future outcomes.

Annex Table A.1 Fertility rates, 1960-2080

	Births per woman													
	1960	1970	1980	1990	2000	2010	2015	2020	2030	2040	2050	2060	2070	2080
BE	2.54	2.25	1.68	1.62	1.67	1.86	1.70	1.73	1.75	1.76	1.78	1.80	1.82	1.84
BG	2.31	2.17	2.05	1.82	1.26	1.57	1.52	1.62	1.69	1.73	1.76	1.78	1.80	1.82
CZ	2.09	1.92	2.08	1.90	1.15	1.51	1.57	1.68	1.74	1.76	1.78	1.80	1.82	1.84
DK	2.57	1.95	1.55	1.67	1.77	1.87	1.71	1.71	1.73	1.75	1.77	1.79	1.82	1.84
DE	2.37	2.03	1.56	1.45	1.38	1.39	1.49	1.50	1.53	1.57	1.60	1.64	1.68	1.72
EE	1.98	2.17	2.02	2.05	1.36	1.72	1.59	1.67	1.75	1.77	1.78	1.80	1.81	1.83
IE	3.78	3.85	3.21	2.11	1.89	2.05	1.92	1.96	1.96	1.96	1.96	1.96	1.97	1.97
EL	2.23	2.40	2.23	1.40	1.27	1.51	1.33	1.33	1.40	1.46	1.52	1.58	1.64	1.70
ES	2.86	2.90	2.20	1.36	1.23	1.37	1.33	1.57	1.80	1.87	1.88	1.88	1.88	1.89
FR	2.73	2.47	1.95	1.78	1.89	2.03	1.96	2.01	2.00	1.99	1.99	1.99	1.99	1.99
HR						1.55	1.40	1.47	1.51	1.54	1.58	1.61	1.65	1.70
IT	2.37	2.38	1.64	1.33	1.26	1.46	1.34	1.36	1.42	1.48	1.54	1.60	1.66	1.71
CY	3.51	2.54	2.47	2.41	1.64	1.44	1.30	1.35	1.40	1.45	1.51	1.56	1.62	1.67
LV		2.00	1.88	2.01	1.25	1.36	1.70	1.83	1.85	1.85	1.85	1.86	1.87	1.88
LT	2.60	2.40	1.99	2.03	1.39	1.50	1.70	1.71	1.76	1.79	1.81	1.82	1.84	1.85
LU	2.29	1.97	1.50	1.60	1.76	1.63	1.47	1.54	1.57	1.60	1.63	1.66	1.69	1.73
HU	2.02	1.98	1.91	1.87	1.32	1.25	1.45	1.61	1.68	1.72	1.75	1.77	1.80	1.82
MT	3.62	2.02	1.99	2.04	1.70	1.36	1.45	1.54	1.62	1.67	1.70	1.72	1.75	1.77
NL	3.12	2.50	1.60	1.62	1.72	1.79	1.65	1.73	1.74	1.76	1.77	1.79	1.81	1.84
AT	2.69	2.29	1.65	1.46	1.36	1.44	1.49	1.49	1.53	1.56	1.59	1.62	1.66	1.70
PL	2.98	2.20	2.28	1.99	1.37	1.38	1.32	1.45	1.56	1.61	1.65	1.68	1.71	1.74
PT	3.16	3.01	2.25	1.56	1.55	1.39	1.31	1.28	1.34	1.40	1.47	1.53	1.59	1.65
RO			2.43	1.83	1.31	1.54	1.47	1.72	1.81	1.85	1.87	1.88	1.89	1.90
SI	2.18	2.10	2.11	1.46	1.26	1.57	1.57	1.62	1.66	1.70	1.74	1.78	1.81	1.85
SK	3.04	2.41	2.32	2.09	1.30	1.43	1.40	1.47	1.60	1.68	1.74	1.79	1.82	1.85
FI	2.72	1.83	1.63	1.78	1.73	1.87	1.65	1.71	1.72	1.74	1.76	1.78	1.80	1.83
SE	2.20	1.92	1.68	2.13	1.54	1.98	1.85	1.87	1.91	1.95	1.98	2.01	2.03	2.04
UK	2.72	2.43	1.90	1.83	1.64	1.92	1.80	1.80	1.81	1.83	1.84	1.86	1.87	1.89
NO	2.90	2.50	1.72	1.93	1.85	1.95	1.73	1.74	1.76	1.77	1.79	1.81	1.83	1.85

Annex Table A.2 Projection of net migration flows, 1961-2060

	Net migration flows (000s)				Projection of net migration flows (000s)						Cumulative	2016 popn (millions)	Cumulative
	Average	Average	Average	2015	2020	2030	2040	2050	2060	net migration 2020-2060	net mign as % of 2016 popn		
	1961-1980	1981-2000	2001-2015										
LT	4.7	-6.6	-28.2	-22.4	-23.8	-17.0	-6.3	1.3	0.2	-337.0	2.9	-11.6%	
LV	11.5	-5.5	-16.1	-10.6	-8.0	-6.1	-1.5	1.2	0.0	-104.2	2.0	-5.2%	
RO	-7.7	-43.4	-130.1	-46.5	-65.1	-51.1	-8.9	7.7	1.6	-840.5	19.7	-4.3%	
BG	-7.7	-25.0	-27.0	-4.2	-11.9	-9.1	0.5	3.9	0.7	-103.6	7.1	-1.5%	
PL	-30.4	-23.3	-13.6	-12.8	0.0	-2.4	16.2	29.7	11.6	494.3	38.0	1.3%	
EL	-7.0	42.1	0.1	-44.9	-16.8	-4.1	7.9	13.3	10.5	139.4	10.8	1.3%	
EE	7.8	-4.4	-2.9	2.4	2.3	1.4	1.2	0.7	0.1	45.2	1.3	3.5%	
HR	-1.4	-11.5	3.2	-17.9	-1.7	4.2	5.0	6.0	5.2	169.8	4.2	4.0%	
SK	-6.6	-4.2	0.4	3.1	5.9	5.0	6.8	6.5	3.8	230.8	5.4	4.3%	
FR	131.9	42.4	105.6	65.9	77.0	85.9	77.3	69.2	62.2	3020.2	66.8	4.5%	
PT	-46.2	3.0	5.4	-10.5	2.4	12.8	18.2	15.8	14.6	553.6	10.3	5.4%	
CZ	-5.8	0.7	22.4	16.0	21.5	17.5	20.5	14.0	8.8	672.1	10.6	6.3%	
HU	-0.2	0.1	13.7	14.4	19.9	16.2	20.8	15.3	13.8	692.5	9.8	7.1%	
SI	3.8	0.8	4.8	0.9	4.2	4.1	4.3	3.8	2.8	156.9	2.1	7.5%	
FI	-8.7	5.2	12.1	12.6	15.8	13.7	10.7	8.5	7.8	447.3	5.5	8.1%	
IE	-1.8	-4.6	16.8	-0.3	9.9	7.5	11.4	13.7	12.2	436.1	4.7	9.3%	
NL	22.2	28.8	19.2	55.0	66.9	59.5	43.7	29.6	28.6	1805.0	17.0	10.6%	
UK	-14.7	31.8	249.7	331.9	251.5	220.1	181.0	134.2	121.1	7215.2	65.6	11.0%	
DE	149.6	268.4	255.2	1165.8	327.3	268.1	206.0	199.0	175.0	9243.0	82.5	11.2%	
ES	-23.2	63.2	312.1	-7.5	51.2	119.4	163.4	170.9	153.8	5562.5	46.4	12.0%	
IT	-41.6	10.5	287.2	31.7	161.2	209.7	217.7	197.4	176.7	7937.0	60.8	13.1%	
DK	2.8	8.9	16.5	41.9	33.4	26.8	18.9	10.7	11.4	787.8	5.7	13.8%	
BE	11.3	8.5	50.4	62.1	53.2	48.3	41.5	32.8	29.5	1640.1	11.3	14.5%	
CY	-3.5	4.0	6.4	-2.0	1.7	2.9	3.9	4.9	4.4	147.1	0.9	16.3%	
NO	2.1	8.0	30.5	29.4	27.3	26.0	23.7	20.2	18.1	926.0	5.2	17.8%	
SE	15.4	18.6	48.8	79.7	67.9	57.2	44.7	30.5	27.4	1799.9	9.9	18.2%	
AT	7.3	18.8	43.0	112.5	67.8	55.4	40.3	26.3	24.8	1683.1	8.7	19.3%	
MT	-3.2	1.1	2.0	4.2	3.2	2.6	2.0	1.4	1.3	82.7	0.4	20.7%	
LU	2.1	2.7	7.3	11.2	10.2	8.7	7.0	5.0	4.5	280.2	0.6	46.7%	
EU	160.5	431.4	1264.5	1831.2	976.3	1244.1	1363.8	1188.3	1036.7	55107.0	510.9	10.8%	

Annex Table A.3 Period life expectancy at age 65, 2016-2070

Expectation of life at 65 (males)						Expectation of life at 65 (females)					
	2016	2030	2050	2070	Change 2016-2070		2016	2030	2050	2070	Change 2016-2070
BE	18.3	19.8	21.7	23.4	5.1	BE	21.7	23.1	24.9	26.6	4.9
BG	14.5	16.3	19.0	21.5	7.0	BG	17.9	19.7	22.3	24.7	6.8
CZ	16.3	17.9	20.3	22.4	6.1	CZ	19.9	21.4	23.6	25.7	5.8
DK	18.1	19.5	21.5	23.3	5.2	DK	20.8	22.4	24.5	26.4	5.6
DE	18.1	19.6	21.5	23.3	5.2	DE	21.3	22.8	24.7	26.4	5.1
EE	15.4	17.3	19.9	22.2	6.8	EE	20.4	22.0	24.1	26.0	5.6
IE	18.5	19.9	21.8	23.5	5.0	IE	21.1	22.7	24.8	26.6	5.5
EL	18.7	20.2	22.1	23.8	5.1	EL	21.4	22.9	24.8	26.6	5.2
ES	19.3	20.6	22.3	23.9	4.6	ES	23.2	24.3	25.9	27.3	4.1
FR	19.5	20.8	22.5	24.0	4.5	FR	23.5	24.6	26.1	27.5	4.0
HR	15.6	17.4	19.8	22.0	6.4	HR	19.1	20.8	23.2	25.3	6.2
IT	19.1	20.4	22.1	23.7	4.6	IT	22.5	23.8	25.5	27.0	4.5
CY	19.0	20.5	22.2	23.8	4.8	CY	21.3	22.8	24.6	26.3	5.0
LV	14.0	16.2	19.0	21.6	7.6	LV	19.0	20.9	23.3	25.4	6.4
LT	14.3	16.6	19.3	21.8	7.5	LT	19.3	21.2	23.5	25.6	6.3
LU	18.5	20.0	21.8	23.5	5.0	LU	22.4	23.8	25.6	27.1	4.7
HU	14.9	16.8	19.5	22.0	7.1	HU	18.7	20.6	23.1	25.4	6.7
MT	19.3	20.6	22.3	23.9	4.6	MT	22.2	23.5	25.3	26.9	4.7
NL	18.4	20.0	21.8	23.4	5.0	NL	21.2	22.8	24.7	26.4	5.2
AT	18.3	19.9	21.7	23.5	5.2	AT	21.6	23.1	24.9	26.5	4.9
PL	16.0	17.9	20.3	22.6	6.6	PL	20.2	21.9	24.1	26.1	5.9
PT	18.1	19.6	21.5	23.3	5.2	PT	21.8	23.2	25.0	26.7	4.9
RO	14.8	16.8	19.5	22.0	7.2	RO	18.2	20.2	22.8	25.1	6.9
SI	17.7	19.2	21.3	23.1	5.4	SI	21.4	22.8	24.7	26.4	5.0
SK	15.3	17.2	19.8	22.1	6.8	SK	19.1	21.0	23.4	25.6	6.5
FI	18.2	19.6	21.5	23.3	5.1	FI	21.7	23.0	24.8	26.5	4.8
SE	19.0	20.3	22.0	23.6	4.6	SE	21.7	23.1	24.9	26.6	4.9
UK	18.8	20.1	22.0	23.6	4.8	UK	21.3	22.8	24.8	26.5	5.2
NO	18.8	20.1	21.9	23.5	4.7	NO	21.7	23.1	25.0	26.6	4.9

Annex Table A.4 Projection of total population, 2015-2080, millions

	2015	2020	2030	2040	2050	2060	2070	2080	% Change 2015-2060	% Change 2015-2080
BE	11.2	11.6	12.3	12.8	13.3	13.6	13.9	14.2	21.2	26.6
BG	7.2	7.0	6.4	5.9	5.6	5.2	4.9	4.6	-27.4	-36.2
CZ	10.5	10.7	10.7	10.6	10.5	10.3	10.0	9.8	-2.2	-7.2
DK	5.7	5.9	6.3	6.6	6.7	6.8	6.8	6.9	19.4	21.2
DE	81.2	83.8	84.6	84.1	82.7	80.8	79.3	77.8	-0.5	-4.2
EE	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.1	-7.0	-13.2
IE	4.6	4.9	5.1	5.4	5.7	5.9	6.0	6.2	27.4	34.4
EL	10.9	10.6	9.9	9.4	8.9	8.3	7.7	7.3	-23.6	-33.1
ES	46.4	46.6	47.1	48.2	49.3	49.6	49.8	51.0	6.7	9.8
FR	66.4	67.8	70.5	72.9	74.4	75.5	76.9	78.7	13.7	18.5
HR	4.2	4.1	4.0	3.8	3.7	3.5	3.4	3.3	-16.4	-22.5
IT	60.8	60.7	60.4	60.0	59.0	56.9	54.9	53.8	-6.3	-11.5
CY	0.8	0.9	0.9	1.0	1.0	1.0	1.0	1.0	19.5	18.6
LV	2.0	1.9	1.7	1.6	1.5	1.4	1.3	1.3	-28.2	-35.3
LT	2.9	2.7	2.4	2.1	2.0	1.8	1.7	1.7	-37.1	-43.2
LU	0.6	0.6	0.8	0.9	0.9	1.0	1.0	1.1	76.4	89.4
HU	9.9	9.8	9.7	9.5	9.3	9.1	8.9	8.7	-7.5	-11.8
MT	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	20.9	20.5
NL	16.9	17.4	18.4	19.0	19.2	19.3	19.5	19.7	14.3	16.7
AT	8.6	9.0	9.7	10.1	10.2	10.2	10.2	10.1	19.3	17.4
PL	38.0	37.9	37.2	35.8	34.4	32.8	31.0	29.0	-13.6	-23.6
PT	10.4	10.2	9.9	9.6	9.1	8.6	8.0	7.6	-17.6	-26.9
RO	19.9	19.3	18.0	17.1	16.3	15.7	15.0	14.5	-21.0	-26.9
SI	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	-3.0	-6.0
SK	5.4	5.5	5.5	5.4	5.3	5.1	4.9	4.7	-5.7	-13.0
FI	5.5	5.6	5.7	5.7	5.7	5.7	5.6	5.6	3.3	1.9
SE	9.7	10.3	11.2	12.0	12.7	13.3	13.8	14.4	36.3	47.6
UK	64.9	67.2	71.6	75.0	77.6	79.3	81.0	82.4	22.3	27.1
NO	5.2	5.4	5.9	6.3	6.6	6.8	7.0	7.2	31.8	38.7
EU	508.4	515.6	523.8	528.4	528.6	524.6	520.4	518.8	3.2	2.0
EU ex UK	443.5	448.4	452.3	453.4	451.0	445.3	439.4	436.4	0.4	-1.6

Annex Table A.5 Projection of population aged 0-14, 2015-2080, millions

	2015	2020	2030	2040	2050	2060	2070	2080	% Change 2015-2080
BE	1.9	2.0	2.0	2.1	2.2	2.2	2.2	2.3	18.4
BG	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	-33.5
CZ	1.6	1.7	1.6	1.5	1.6	1.6	1.5	1.5	-6.0
DK	1.0	1.0	1.0	1.1	1.0	1.0	1.1	1.0	7.6
DE	10.7	11.2	11.8	11.2	10.8	11.2	11.0	10.7	0.2
EE	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-18.1
IE	1.0	1.1	1.0	0.9	1.0	1.1	1.0	1.1	7.0
EL	1.6	1.5	1.2	1.1	1.1	1.0	0.9	1.0	-38.6
ES	7.1	6.9	6.5	7.0	7.7	7.8	8.1	8.6	22.0
FR	12.4	12.3	12.4	12.8	13.0	12.9	13.2	13.3	7.7
HR	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	-29.3
IT	8.4	8.0	7.0	7.1	7.1	6.9	6.9	7.1	-15.4
CY	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-16.8
LV	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	-30.6
LT	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	-40.5
LU	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	67.9
HU	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	-9.4
MT	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	23.0
NL	2.8	2.8	2.9	3.1	3.0	3.0	3.1	3.0	7.6
AT	1.2	1.3	1.4	1.4	1.4	1.4	1.4	1.4	12.5
PL	5.7	5.8	5.2	4.6	4.5	4.4	4.1	4.0	-30.2
PT	1.5	1.3	1.1	1.1	1.1	1.0	0.9	0.9	-36.6
RO	3.1	2.9	2.7	2.5	2.4	2.4	2.3	2.3	-25.5
SI	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-0.3
SK	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	-17.0
FI	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	-8.6
SE	1.7	1.8	2.0	2.1	2.2	2.3	2.4	2.5	47.6
UK	11.5	11.9	12.2	12.5	12.7	12.9	13.0	13.1	14.1
NO	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	19.4
EU	79.3	79.9	78.1	77.7	78.2	78.2	78.1	78.9	-0.6
EU ex UK	67.8	68.0	65.9	65.1	65.5	65.3	65.1	65.8	-3.1

Annex Table A.6 Projection of population aged 15-64, 2015-2080, millions

	2015	2020	2030	2040	2050	2060	2070	2080	% Change 2015-2080
BE	7.3	7.4	7.5	7.7	7.9	7.9	8.1	8.1	11.0
BG	4.8	4.4	3.9	3.5	3.0	2.8	2.7	2.5	-47.2
CZ	7.1	6.8	6.7	6.4	5.9	5.6	5.7	5.5	-22.3
DK	3.6	3.8	3.9	3.9	4.0	4.0	3.8	3.8	4.8
DE	53.4	54.3	50.9	48.8	47.5	44.9	43.8	43.2	-19.2
EE	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.6	-26.9
IE	3.0	3.1	3.2	3.3	3.2	3.4	3.5	3.5	17.8
EL	7.0	6.7	6.1	5.3	4.6	4.4	4.1	3.8	-45.7
ES	30.8	30.4	29.0	26.7	25.6	27.2	28.4	29.0	-5.8
FR	41.8	41.8	41.6	41.4	42.3	43.7	44.1	44.5	6.4
HR	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	-36.3
IT	39.2	38.8	36.9	33.6	31.9	31.0	30.0	28.7	-26.9
CY	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	-6.5
LV	1.3	1.2	1.0	0.9	0.8	0.7	0.7	0.7	-45.5
LT	1.9	1.8	1.4	1.2	1.1	0.9	1.0	0.9	-52.0
LU	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	55.2
HU	6.7	6.4	6.1	5.7	5.3	5.1	5.0	4.9	-26.7
MT	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-0.7
NL	11.1	11.2	11.2	11.1	11.4	11.3	11.1	11.1	0.3
AT	5.8	6.0	6.1	6.1	6.1	5.8	5.7	5.6	-3.0
PL	26.4	25.1	23.3	22.0	19.3	17.3	16.6	15.5	-41.2
PT	6.8	6.6	6.1	5.4	4.9	4.6	4.2	3.9	-42.2
RO	13.4	12.7	11.4	10.1	9.0	8.5	8.3	8.1	-39.7
SI	1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.1	-22.2
SK	3.8	3.7	3.5	3.3	3.0	2.8	2.7	2.6	-32.8
FI	3.5	3.4	3.4	3.4	3.3	3.2	3.2	3.1	-11.7
SE	6.2	6.4	6.9	7.2	7.6	7.7	8.0	8.2	33.3
UK	41.9	42.8	44.3	45.2	46.3	46.4	46.6	46.5	10.9
NO	3.4	3.5	3.7	3.8	4.0	4.0	4.0	4.0	19.1
EU	333.0	331.0	320.6	308.0	299.7	294.3	292.5	288.5	-13.4
EU ex UK	291.1	288.2	276.3	262.9	253.4	247.9	245.8	242.0	-16.9

Annex Table A.7 Projection of population aged 65 and over, 2015-2080, millions

	2015	2020	2030	2040	2050	2060	2070	2080	% Change 2015-2080
BE	2.0	2.2	2.7	3.1	3.3	3.4	3.6	3.9	90.2
BG	1.4	1.5	1.6	1.7	1.8	1.7	1.5	1.4	-1.5
CZ	1.9	2.1	2.4	2.7	3.0	3.1	2.8	2.8	48.6
DK	1.1	1.2	1.4	1.6	1.6	1.8	1.9	2.0	90.2
DE	17.1	18.3	21.8	24.1	24.3	24.7	24.5	23.9	40.1
EE	0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.3	38.1
IE	0.6	0.7	0.9	1.2	1.5	1.5	1.5	1.6	164.6
EL	2.3	2.4	2.7	3.1	3.3	2.9	2.6	2.5	9.5
ES	8.6	9.3	11.6	14.4	15.9	14.6	13.3	13.4	55.5
FR	12.2	13.8	16.5	18.7	19.0	19.0	19.7	20.9	70.6
HR	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.0	32.0
IT	13.2	14.0	16.4	19.3	19.9	19.0	18.0	18.0	36.2
CY	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	176.3
LV	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4	-4.7
LT	0.5	0.6	0.6	0.7	0.6	0.6	0.5	0.5	-14.1
LU	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	280.2
HU	1.8	2.0	2.1	2.4	2.6	2.7	2.6	2.5	42.4
MT	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	95.4
NL	3.0	3.4	4.3	4.9	4.8	5.0	5.4	5.6	85.6
AT	1.6	1.7	2.2	2.6	2.8	3.0	3.1	3.1	94.9
PL	5.9	7.0	8.6	9.3	10.5	11.2	10.3	9.6	63.3
PT	2.1	2.3	2.7	3.0	3.2	3.0	2.8	2.7	28.5
RO	3.4	3.7	3.9	4.5	4.9	4.8	4.4	4.2	23.0
SI	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	50.1
SK	0.8	0.9	1.1	1.3	1.5	1.6	1.5	1.5	91.3
FI	1.1	1.2	1.4	1.5	1.5	1.6	1.6	1.7	54.2
SE	1.9	2.1	2.4	2.7	2.9	3.3	3.4	3.7	94.3
UK	11.5	12.5	15.1	17.4	18.5	20.2	21.4	22.8	98.8
NO	0.8	0.9	1.2	1.4	1.6	1.7	1.9	2.0	141.2
EU	96.1	105.2	125.2	142.7	150.6	152.1	149.9	151.0	57.1
EU ex UK	84.6	92.7	110.1	125.3	132.1	132.0	128.5	128.1	51.5

Annex Table A.8 Projection of population aged 80 and over, 2015-2080, millions

	2015	2020	2030	2040	2050	2060	2070	2080	% Change 2015-2080
BE	0.6	0.7	0.8	1.0	1.3	1.3	1.5	1.6	164.7
BG	0.3	0.3	0.4	0.5	0.6	0.7	0.7	0.6	83.0
CZ	0.4	0.4	0.7	0.9	0.9	1.3	1.3	1.2	178.3
DK	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.9	272.2
DE	4.5	5.8	6.3	7.9	10.4	9.6	10.5	11.1	144.7
EE	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	127.5
IE	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.6	329.2
EL	0.7	0.8	0.9	1.0	1.3	1.4	1.3	1.1	60.4
ES	2.7	2.9	3.6	4.6	6.2	7.3	6.4	5.5	100.9
FR	3.9	4.1	5.3	6.9	8.0	8.3	8.3	8.8	128.8
HR	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5	129.3
IT	4.0	4.5	5.4	6.3	8.1	8.8	8.0	7.9	98.7
CY	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	485.8
LV	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	68.9
LT	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	52.5
LU	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	491.9
HU	0.4	0.5	0.6	0.8	0.8	1.1	1.1	1.1	166.7
MT	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	336.7
NL	0.7	0.8	1.3	1.6	2.0	2.0	2.1	2.4	231.2
AT	0.4	0.5	0.6	0.8	1.1	1.1	1.3	1.4	231.2
PL	1.5	1.7	2.2	3.4	3.5	4.1	5.0	4.5	198.0
PT	0.6	0.7	0.8	1.0	1.2	1.4	1.3	1.2	103.8
RO	0.8	0.9	1.0	1.4	1.6	2.0	2.0	1.8	119.4
SI	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.2	138.8
SK	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	292.8
FI	0.3	0.3	0.5	0.6	0.6	0.6	0.7	0.7	163.8
SE	0.5	0.5	0.8	0.9	1.1	1.2	1.4	1.6	215.5
UK	3.1	3.4	4.7	5.7	7.2	7.6	8.6	9.8	215.0
NO	0.2	0.2	0.4	0.5	0.6	0.7	0.7	0.9	287.1
EU	26.9	30.4	37.7	48.1	58.7	63.5	65.0	65.9	144.5
EU ex UK	23.8	27.0	33.1	42.4	51.5	55.9	56.5	56.1	135.3

Annex Table A.9 Projection of population aged 90 and over, 2015-2080, millions

	2015	2020	2030	2040	2050	2060	2070	2080	% Change 2015-2080
BE	0.10	0.12	0.16	0.21	0.30	0.37	0.40	0.48	406.2
BG	0.03	0.04	0.05	0.08	0.11	0.13	0.18	0.20	568.8
CZ	0.05	0.07	0.09	0.17	0.20	0.25	0.38	0.39	660.2
DK	0.04	0.05	0.07	0.12	0.14	0.18	0.20	0.24	451.5
DE	0.69	0.86	1.40	1.49	2.20	3.01	2.70	3.43	396.9
EE	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.05	571.3
IE	0.02	0.03	0.04	0.07	0.10	0.15	0.20	0.22	823.0
EL	0.09	0.13	0.19	0.23	0.30	0.39	0.45	0.39	331.2
ES	0.45	0.59	0.74	1.04	1.44	2.00	2.41	1.96	334.1
FR	0.72	0.91	1.13	1.66	2.15	2.52	2.63	2.79	288.5
HR	0.02	0.03	0.04	0.05	0.08	0.09	0.11	0.13	586.7
IT	0.67	0.83	1.15	1.46	1.83	2.56	2.69	2.51	276.4
CY	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.05	1281.9
LV	0.01	0.02	0.02	0.03	0.04	0.05	0.05	0.06	474.9
LT	0.02	0.02	0.03	0.04	0.06	0.07	0.06	0.07	330.6
LU	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.04	1189.4
HU	0.05	0.07	0.09	0.14	0.19	0.22	0.33	0.33	505.3
MT	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	918.6
NL	0.12	0.14	0.20	0.34	0.45	0.58	0.56	0.66	469.0
AT	0.07	0.09	0.11	0.16	0.23	0.33	0.32	0.41	465.6
PL	0.19	0.27	0.39	0.59	0.97	0.95	1.34	1.62	757.6
PT	0.08	0.10	0.16	0.21	0.28	0.35	0.42	0.38	357.4
RO	0.09	0.12	0.18	0.23	0.35	0.45	0.57	0.61	615.8
SI	0.01	0.02	0.03	0.04	0.05	0.07	0.08	0.08	551.3
SK	0.02	0.03	0.04	0.07	0.11	0.13	0.19	0.22	971.7
FI	0.04	0.05	0.07	0.12	0.15	0.17	0.18	0.22	410.3
SE	0.09	0.10	0.13	0.22	0.24	0.32	0.36	0.46	386.2
UK	0.55	0.63	0.84	1.30	1.61	2.21	2.31	2.88	419.9
NO	0.04	0.05	0.05	0.10	0.13	0.17	0.20	0.25	468.1
EU	4.25	5.30	7.35	10.10	13.66	17.63	19.29	20.90	392.1
EU ex UK	4.13	5.17	7.16	9.76	13.21	17.05	18.72	20.24	389.9

Annex Table A.10 Projection of population aged 100 and over, 2015-2080

	2015	2020	2030	2040	2050	2060	2070	2080	% Change 2015-2080
BE	2001	1957	5071	7394	11883	18673	25409	31321	1465
BG	358	339	907	1550	3277	4855	7353	11483	3108
CZ	798	668	2112	3320	8023	10562	15177	27250	3315
DK	1022	1318	2016	3327	6532	8641	12772	15488	1415
DE	17474	15025	35119	68188	80284	137541	204829	207043	1085
EE	136	141	431	750	1068	1640	2086	2859	2002
IE	964	1621	2420	3823	7055	11106	16795	24253	2416
EL	6130	6137	11369	17540	22836	31907	43745	51730	744
ES	15479	21492	45421	57842	92355	137084	199635	250123	1516
FR	24458	20856	54218	71579	123939	166200	210321	234742	860
HR	314	225	699	1353	2183	3845	5158	7280	2218
IT	19095	17586	43077	66360	94021	130468	200072	221839	1062
CY	76	60	111	241	516	836	1243	2023	2562
LV	194	176	527	945	1288	2144	2783	3515	1712
LT	368	249	748	1260	1749	3153	4078	4335	1078
LU	67	84	290	437	689	1210	1997	2702	3933
HU	1448	1497	3558	5462	9604	14536	19288	30722	2022
MT	57	92	227	451	935	1225	1308	1851	3147
NL	2170	2460	4772	8017	16455	24520	36190	38617	1680
AT	1404	1192	2932	4953	7638	12725	20462	22579	1508
PL	5118	5467	16710	25790	45653	78674	81735	129374	2428
PT	4066	3769	6837	11317	16620	24187	32941	42142	936
RO	1558	1827	5094	8962	13889	22587	35122	46532	2887
SI	236	224	713	1198	1944	3271	4358	5905	2402
SK	641	805	2153	3337	6332	10993	13617	21773	3297
FI	741	912	1879	2949	6087	7840	10028	12846	1634
SE	1953	2273	3509	5304	10414	13229	19951	25482	1205
UK	14504	17051	30456	45859	81399	112002	167845	191798	1222
NO	887	1159	1731	2424	5105	7519	11595	14516	1537
EU	122830	125503	283376	429508	674668	995654	1396298	1667607	1258
EU ex UK	108326	108452	252920	383649	593269	883652	1228453	1475809	1262

Annex Table A.11 Projection of old-age dependency ratios based on ratio of those over 65 to those aged 15-64, 2015-2080

	Population aged 65+/Population 15-64								
	2015	2020	2030	2040	2050	2060	2070	2080	Change 2015-2080
CY	21.2	24.3	30.6	34.8	42.1	55.2	60.9	62.5	41.3
PL	22.2	27.8	37.0	42.2	54.6	64.8	62.4	61.5	39.3
PT	31.1	34.6	43.6	55.6	65.3	64.9	67.0	69.0	37.9
SK	19.7	24.4	32.6	39.1	50.9	59.4	57.0	56.4	36.7
EL	32.4	35.7	44.4	58.4	71.0	67.5	63.1	65.3	32.9
HR	28.3	32.3	39.9	44.8	50.1	53.5	56.1	58.6	30.3
LU	20.5	21.5	26.6	32.7	38.2	44.3	48.7	50.2	29.7
IT	33.7	36.1	44.3	57.3	62.5	61.2	60.2	62.7	29.0
AT	27.5	28.4	35.7	42.2	45.3	51.0	54.4	55.3	27.8
MT	27.6	32.5	40.3	41.2	45.7	53.6	55.9	54.2	26.6
BG	30.2	34.0	40.1	47.5	57.7	63.3	56.4	56.4	26.2
RO	25.2	29.1	34.7	45.2	53.9	56.9	52.9	51.4	26.2
EE	28.7	31.8	37.6	42.3	48.8	55.8	52.7	54.3	25.6
NO	24.5	26.8	31.8	37.1	39.5	43.9	47.1	49.6	25.1
IE	20.0	22.8	28.7	36.6	45.5	44.5	41.3	45.0	25.0
HU	26.5	30.7	35.1	41.1	48.9	53.1	52.1	51.5	25.0
SI	26.6	31.8	40.8	48.2	55.7	55.3	50.4	51.3	24.7
CZ	26.6	31.4	36.0	41.9	51.9	56.0	49.9	50.8	24.2
DK	28.8	30.9	35.5	39.6	39.8	44.6	50.0	52.5	23.7
FI	31.3	35.9	42.2	43.4	45.5	49.5	51.8	54.6	23.3
DE	32.0	33.7	42.9	49.4	51.2	55.0	55.9	55.2	23.2
NL	27.2	30.4	38.4	44.0	42.5	44.2	48.3	50.3	23.1
LV	29.5	32.7	43.2	51.0	59.3	65.7	54.1	51.7	22.2
LT	28.1	31.5	45.8	56.9	60.1	64.2	53.6	50.3	22.2
UK	27.5	29.1	34.1	38.5	40.0	43.4	45.8	49.1	21.6
BE	27.9	30.0	35.8	39.9	41.4	43.5	45.0	47.9	20.0
ES	27.9	30.7	40.2	54.0	62.1	53.7	46.8	46.1	18.2
FR	29.2	32.9	39.7	45.1	45.1	43.4	44.6	46.8	17.6
SE	31.1	32.5	34.6	36.9	37.9	42.6	43.1	45.2	14.1
EU	28.8	31.7	39.1	46.4	50.3	51.6	51.2	52.3	23.5

Annex Table A.12 Projection of old-age dependency ratios based on ratio of those over 65 to those aged 15-64 in 2015, transitioning to the ratio of those over 70 to those aged 15-69 in 2060

	2015	2020	2030	2040	2050	2060	Change 2015-2060
BE	27.9	28.8	31.7	32.6	31.4	29.8	1.9
BG	30.3	32.6	35.3	38.1	41.1	41.6	11.3
CZ	26.6	30.1	31.9	34.0	37.2	37.9	11.3
DK	28.9	29.6	31.6	32.2	30.3	30.4	1.5
DE	31.9	32.4	37.8	39.8	39.0	36.8	4.9
EE	28.8	30.7	33.2	34.5	35.9	36.8	8.0
IE	20.0	22.0	25.4	29.6	33.3	31.0	11.0
EL	32.4	34.3	39.2	46.8	51.5	47.1	14.8
ES	27.9	29.6	35.5	43.1	45.6	39.1	11.2
FR	29.2	31.7	35.2	36.9	34.4	30.8	1.6
HR	28.3	31.1	35.0	36.2	36.9	35.6	7.4
IT	33.6	34.8	39.2	45.7	46.4	42.8	9.1
CY	21.2	23.3	27.1	28.4	31.1	35.3	14.1
LV	29.6	31.6	38.0	41.0	43.2	42.7	13.2
LT	28.0	30.3	40.1	45.4	44.9	42.6	14.5
LU	20.5	20.7	23.6	26.5	28.5	29.8	9.3
HU	26.5	29.5	31.0	33.4	35.3	36.0	9.5
MT	27.5	31.2	35.8	34.2	34.1	35.5	8.0
NL	27.2	29.1	33.9	35.7	32.6	30.5	3.3
AT	27.5	27.3	31.6	34.1	34.3	34.2	6.6
PL	22.2	26.7	32.5	34.7	39.4	41.9	19.7
PT	31.1	33.2	38.5	44.5	47.6	45.0	13.9
RO	25.2	27.9	30.5	36.3	38.9	38.4	13.2
SI	26.6	30.5	35.8	39.0	41.1	37.8	11.2
SK	19.8	23.5	28.6	31.7	36.5	38.9	19.1
FI	31.2	34.4	37.4	35.8	34.5	33.4	2.1
SE	31.1	31.1	31.0	30.2	28.8	28.8	-2.2
UK	27.4	28.1	30.3	31.4	30.4	29.6	2.2
NO	24.5	25.7	28.2	30.2	29.7	29.8	5.3
EU	28.9	30.6	34.5	37.5	37.6	35.6	6.7