



European  
Commission

# The 2012 Ageing Report

Economic and budgetary projections for the  
27 EU Member States (2010-2060)

EUROPEAN ECONOMY 2|2012  
(provisional version)



Economic and  
Financial Affairs

**European Commission**

Directorate-General for Economic and Financial Affairs

**Economic Policy Committee**

Ageing Working Group

# **The 2012 Ageing Report:**

## **Economic and budgetary projections for the EU27 Member States (2010-2060)**

*Joint Report prepared by the European Commission  
(DG ECFIN) and the Economic Policy Committee (AWG)*

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# SUMMARY AND MAIN CONCLUSIONS

## *Overview of the 2012 long-term budgetary projection exercise*

### *Organisation and discharge of the mandate*

An ageing population raises challenges for our societies and economies, culturally, organisationally and from an economic point of view. Policy makers worry about how living standards will be affected as each worker has to provide for the consumption needs of a growing number of elderly dependents. Markets worry about fiscal sustainability and the ability of policy makers to address timely and sufficiently these challenges in several Member States. The seriousness of the challenge depends on how our economies and societies respond and adapt to these changing demographic conditions. Looking ahead, policy makers need to ensure long-term fiscal sustainability in the face of large but predictable challenges, as well as significant uncertainty. This is all the more true as Europe has experienced the deepest recession in decades, which is putting an unprecedented stress on workers and enterprises and has had a major negative impact on public finances.

Already in 2001, the Stockholm European Council emphasised the need for the Council to “regularly review the long term sustainability of public finances, including the expected strains caused by the demographic changes ahead”. In 2009, the ECOFIN Council gave a mandate to the Economic Policy Committee (EPC) to update and further deepen its common exercise of age-related expenditure projections by 2012, on the basis of a new population projection by Eurostat (EUROPOP2010).

In light of this mandate, the EPC and the Commission (Directorate-General for Economic and Financial Affairs - DG ECFIN) developed a work programme with broad arrangements to organise the budgetary projection and reach agreement on its assumptions and methodologies. The projections of all government expenditure items are made on the basis of common macroeconomic assumptions endorsed by the EPC and a "no policy change" assumption, i.e. reflecting only already enacted legislation. Reforms legislated after December 2011 have not been taken into account in the projections.<sup>1</sup> This report presents the expenditure projections covering pensions, health care, long-term care, education and unemployment transfers for all Member States.

The work was carried out by the EPC Working Group on Ageing Populations (AWG), which gathered experts from the 27 Member States and Norway and the European Commission represented by the Directorate-General for Economic and Financial Affairs (DG ECFIN). The European Central Bank and the International Monetary Fund have also contributed. Eurostat has played a key role by preparing demographic projections (EUROPOP2010). The EPC and its AWG coordinated the work with their counterparts in other Council formations, in particular the Social Protection Committee. In the preparation of the population projection, Eurostat actively consulted national statistical institutes in the Member States.

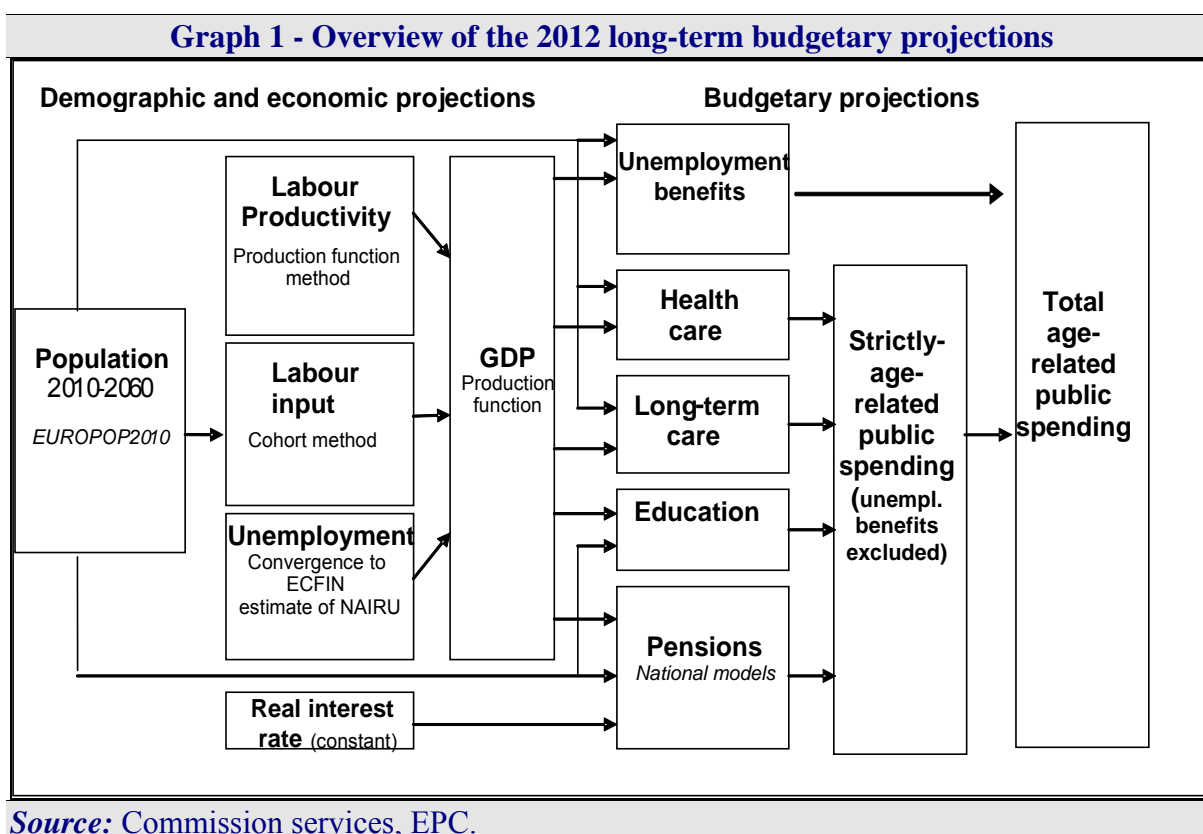
This is the fourth time since 2001 that long-run economic and budgetary projections aimed at assessing the impact of ageing population have been released. This projection exercise builds

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<sup>1</sup> For details, see Box 2: "Latest legislated pension reforms not incorporated in the Ageing Report 2012 projections", in Chapter 2.

on, updates and improves methodologically further the previous exercises so as to enhance overall accuracy, comparability across countries, consistency across expenditure items and the economic basis for the underlying assumptions.

The projections feed into a variety of policy debates at EU level, including the overarching Europe 2020 strategy for smart, sustainable and inclusive growth. In particular, they are used in the annual assessment of the sustainability of public finances carried out as part of the Stability and Growth Pact and in the analysis on the impact of ageing populations on the labour market and potential economic growth.



### *Coverage and general overview*

Graph 1 above presents an overview of the entire public expenditure projection exercise. The starting point is the EUROPOP2010 population projection for the period 2010 to 2060. The EPC agreed on a common set of assumptions and methodologies in order to make projections on a set of exogenous macroeconomic variables, covering the labour force (participation, employment and unemployment rates), labour productivity and the real interest rate. This combined set of economic projections enabled the calculation of GDP for all Member States up to 2060.<sup>2</sup> The macroeconomic assumptions on which this report is based were agreed in the first half of 2011 and published in September 2011; the latest macroeconomic developments may thus not be fully captured.

On the basis of these assumptions, separate budgetary projections were run for the age-related expenditure items (pensions, health care, long-term care, education and

<sup>2</sup> See European Commission and Economic Policy Committee (2011) "2012 Ageing Report: Underlying assumptions and projection methodologies", European Commission, European Economy, No 4.



unemployment benefits). Since unemployment benefits are more affected by cyclical fluctuations, two different scopes of age-related expenditures are considered to present the results for the AWG reference and risk scenarios: including those benefits (“total age-related spending”)<sup>3</sup> and excluding them (“strictly-age-related spending”). The projections for pensions are run by the Member States using their own national model(s). In this way, the projections benefit from capturing the country-specific circumstances prevailing in the different Member States as a result of different pension legislations, while at the same time consistency is ensured by basing the projections on commonly agreed underlying assumptions. The projections for health care, long-term care, education and unemployment are run by the Commission services (DG ECFIN), on the basis of a common projection model for each expenditure item. The results of this set of projections are aggregated to provide an overall projection of age-related public expenditures. In the EU as a whole, strictly-age-related spending (unemployment benefits excluded) was 25% of GDP and unemployment benefit spending was 1.1% of GDP in 2010, which together accounts for about 50% of general government expenditure.

This report is structured in two parts. The first one describes the underlying assumptions: the population projection, the labour force projection and the macroeconomic assumptions used. The second part presents the long-term budgetary projections on pensions, health care, long-term care, education and unemployment benefits. A statistical annex gives an overview of the projection results by country.

### *Use and limitations of long-term economic and budgetary projections*

To grasp the challenges that the future demographic changes in Europe represent, it is necessary to consider the age-structure of the population today and how it will look in coming decades, so as to shed light on the economic challenges that policy-makers will have to face. The long-term projections provide an indication of the timing and scale of economic changes that would result from an ageing population in a "no-policy change" scenario. They show where, when, and to what extent, ageing pressures will accelerate as the baby-boom generation retires and the average life-span continues to increase. Hence, the projections are helpful in highlighting the immediate and future policy challenges posed for governments by demographic trends.

The long-term projections are not forecasts. Projecting economic developments over the next 50 years is one of the most daunting analytical tasks facing policy makers. The uncertainty surrounding the projections is high and the longer the projection period, the higher the degree of uncertainty. Although we know a lot about workers and pension beneficiaries for the next 20 years, substantial uncertainty remains, for example, on productivity developments, unemployment, migration flows, the health status of the elderly or the incidence of disability and the magnitude of the associated fiscal costs. The projection results are strongly influenced by the underlying assumptions. For this reason, a set of sensitivity tests were carried out, to illustrate the extent to which the public expenditure projections are sensitive to key assumptions. For reasons of transparency, the underlying assumptions were published in 2011.<sup>4</sup> Finally, given the current juncture of financial and economic crisis, there is also considerable uncertainty concerning medium-term economic developments.

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<sup>3</sup> By comparison, this was the only definition considered in the 2009 Ageing Report.

<sup>4</sup> See European Commission and Economic Policy Committee (2011) "2012 Ageing Report: Underlying assumptions and projection methodologies", European Commission, European Economy, No 4.

## ***Main results***

### ***Demographic projection***

Demographic change is transforming the EU's population structure. The extent and speed of population ageing depend on future trends in life expectancy, fertility and migration. Demographic factors are subject to less variation than economic factors over the short run, however they have exhibited much less stability over the longer term of say, 25 years.

#### ***Fertility rates expected to rise slightly...***

Only a modest recovery in the total fertility rate, which is the average number of births per woman over her lifetime, is assumed for the EU. The convergence scenario approach employed in the EUROPOP2010 projection entails a process of convergence in the fertility rates across Member States to that of the forerunners countries, currently exhibiting the highest rates (Ireland, France, Sweden and the United Kingdom, Belgium, Denmark and Finland), over the very long-term.<sup>5</sup> For the EU as a whole, the total fertility rate (TFR) is projected to rise from 1.59 in 2010 to 1.64 by 2030 and further to 1.71 by 2060. In the euro area<sup>6</sup>, a slightly lower increase is projected, from 1.57 in 2010 to 1.68 in 2060.<sup>7</sup>

The fertility rate is projected to increase over the projection period in nearly all Member States, with the exception of Ireland, France, Sweden and the United Kingdom where it decreases (though remaining above 1.9), and in Belgium, Denmark and Finland it is projected to remain stable. Hence, in all countries the fertility rates are expected to remain below the natural replacement rate of 2.1 in the period to 2060. As a result of the convergence assumption, the largest increases in fertility rates are projected to take place in Latvia, Hungary and Portugal, which have the lowest fertility rates in the EU in 2010. The increase is projected to occur gradually, with fertility rates in these countries approaching but not reaching the current EU average fertility rate in 2060.

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<sup>5</sup> Member States are assumed to converge to a total fertility rate of 1.85 live births per woman. However, this is only a theoretical convergence level, which for most of the countries is not reached within the time horizon of the projections. For further details, see footnote 7.

<sup>6</sup> BE, DE, EE, IE, EL, ES, FR, IT, CY, LU, MT, NL, AT, PT, SI, SK and FI.

<sup>7</sup> For the specific assumptions concerning population projections, see Eurostat (2011), "EU27 population is expected to peak around 2040", News release 80/2011, 8 June 2011; Lanzieri (2011) "The greying of the baby-boomers: A century-long view of ageing in European populations", Eurostat Statistics in Focus 23/2011 and "Eurostat Population Projections 2010-based 'EUROPOP2010': Methodology and results of a long-term scenario of demographic convergence", (forthcoming).

***...and further life expectancy gains are projected...***

In the EU, life expectancy at birth for males is projected to increase by about 8 years over the projection period, from 76.7 in 2010 to 84.6 in 2060. Life expectancy at birth is projected to increase by 6.5 years for females, from 82.5 in 2010 to 89.1 in 2060, implying a slight convergence of life expectancy between males and females. The largest increases in life expectancy at birth, for both males and females, are projected to take place in the Member States with the lowest life expectancy in 2010. Life expectancy for males in 2010 is the lowest in Bulgaria, Estonia, Latvia, Lithuania, Hungary and Romania, ranging between 67 and 71 years. Some catching-up takes place over the projection period, with increases in life expectancy of more than 11 years up to 2060 for these countries. For females, gains in life expectancy at birth of 8 years or more are projected in Bulgaria, Latvia, Lithuania, Hungary, Romania and Slovakia. Female life expectancy in 2010 in all of these countries is below 80 years.

Given the assumed "convergence hypothesis"<sup>8</sup>, the projection compresses the spread of life expectancy at birth for males across the Member States, from 11.7 years in 2010 (Sweden 79.4 and Lithuania 67.7) to 4.8 years in 2060 (85.5 in Sweden and Italy compared with 80.7 in Lithuania). For females, the reduction of the differential in life expectancy at birth is lower, from 7.2 years in 2010 (84.7 in Spain and 77.5 in Bulgaria and Romania) to 3.4 years in 2060 (90 in France and 86.6 in Bulgaria).

In the EU as a whole, life expectancy at age 65 is projected to increase by 5.2 years for males and by 4.9 years for females over the projection period. In 2060, life expectancy at age 65 will reach 22.4 years for males and 25.6 for females, with the projected difference (3.2 years) being smaller than the projected 4.5 year difference in life expectancy at birth. In 2060, the highest life expectancy at age 65 is expected in France for both males (23 years) and females (26.6 years), while the lowest is expected in Bulgaria for both males (20.6 years) and females (23.6 years).

***...together with continued, but decelerating inward net migration to the EU***

For the EU as a whole, annual net inflows are projected to increase from about 1,043,000 people in 2010 (equivalent to 0.2% of the natural EU population) to 1,332,500 by 2020 and thereafter declining to 945,000 people by 2060.

The cumulated net migration to the EU over the entire projection period is 60.7 million, of which the bulk is in the euro area (45.8 million). Net migration flows are projected to be concentrated to a few destination countries: Italy (15.9 million cumulated up to 2060), Spain (11.2 million) and the United Kingdom (8.6 million). According to the assumptions, Spain and Italy are projected to change from origin countries of migration in the past to destination countries in coming decades.

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<sup>8</sup> Life expectancy increases are assumed to be greater for countries at lower levels of life expectancy and smaller for those at higher levels, thus following convergent trajectories. The countries converge towards a long-term theoretical age pattern of mortality following an exponential interpolation, thus mortality improvements take place at a decreasing pace. Those theoretical levels are not reached within the time horizon of the projections. For further details, see footnote 7.

For countries that are experiencing a net outflow (BG, EE, LV, LT, MT, IE and RO), this is projected to taper off or reverse in the coming decades.<sup>9</sup>

***The EU population is projected to increase up to 2040 and decline thereafter...***

Due to the expected dynamics of fertility, life expectancy and migration rates, the age structure of the EU population is projected to dramatically change in coming decades. The overall size of the population is projected to be slightly larger in 50 years time, but much older than it is now. The EU population is projected to increase (from 502 million in 2010) up to 2040 by almost 5%, when it will peak (at 526 million). Thereafter, a steady decline occurs and the population shrinks by nearly 2% by 2060. Nonetheless, according to the projections, the population in 2060 will be slightly higher than in 2010, at 517 million.

While the EU population is projected to be larger in 2060 compared to 2010, there are wide differences in population trends until 2060 across Member States. Decreases of the total population are projected for about half of the EU Member States (BG, CZ, DE, EE, EL, LV, LT, HU, MT, PL, PT, RO and SK). For the other Member States (BE, DK, IE, ES, FR, IT, CY, LU, NL, AT, SI, FI, SE and UK) an increase is projected. The strongest population growth is projected in Ireland (+46%), Luxembourg (+45%), Cyprus (+41%), the United Kingdom (+27%), Belgium (+24%) and Sweden (+23%), and the sharpest decline in Bulgaria (-27%), Latvia (-26%), Lithuania (-20%), Romania and Germany (both -19%).

In 2010, the Member States with the largest population were: Germany (82 million), France (65 mn), the United Kingdom (62 mn), Italy (60 mn) and Spain (46 mn). In 2060, the United Kingdom would become the most populous EU country (79 mn), followed by France (74 mn), Germany (66 mn), Italy (65 mn) and Spain (52 mn).

***...and undergo significant changes in its age structure***

The age structure of the EU population is projected to change dramatically. The most numerous cohorts in 2010 are around 40 years old for men and women. Elderly people are projected to account for an increasing share of the population. At the same time, the middle of the age pyramid becomes smaller during the projection period due to below natural replacement fertility rates. As a consequence, the shape of the population pyramid gradually changes, increasingly resembling a pillar. A similar development is projected for the euro area.

The proportion of young people (aged 0-14) is projected to remain fairly constant by 2060 in the EU27 and the euro area (around 14%), while those aged 15-64 will become a substantially smaller share, declining from 67% to 56%. Those aged 65 and over will become a much larger share (rising from 17% to 30% of the population), and those aged 80 and over (rising from 5% to 12%) will almost become as numerous as the young population in 2060.

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<sup>9</sup> There is a lot of uncertainty as regards migration flows, making it difficult to project future developments. Migration flows are assumed to subside in the very long-term. The basic assumptions on migration is that immigration and emigration flows tend to converge towards a common level, which is different country by country and dependent on the latest observed values. Additional immigration flows are assumed to take place in case the projected age structure of the countries' population reveals a shrinking number of persons in working age. The theoretical common point for the two flows is not assumed to be reached within the time horizon of the projections. For further details, see footnote 7.

### ***The projections point to a significant reduction in the population aged 15-64 ...***

The population aged 15-64 is estimated to be declining as of 2010 in the EU and, over the whole projection period, it will drop by 14%. This means that there will be 45,600,000 persons less in this age group. This is however not a uniform phenomenon across the EU; it is projected to increase in 7 Member States (Belgium, Ireland, France, Cyprus, Luxembourg, Sweden and the United Kingdom).

### ***... and an increase in persons aged 65 or more...***

The population aged 65 and above will increase very markedly throughout the projection period. This group will almost double, rising from 87.5 million in 2010 to 152.6 million in 2060 in the EU. The number of older people (aged 80 years and above) is projected to increase by even more, almost tripling from 23.7 million in 2010 to 62.4 million in 2060.

### ***... leading to a doubling of the old-age dependency ratio in the EU***

As a result of these different trends among age-groups, the demographic old-age dependency ratio (people aged 65 or above relative to those aged 15-64) is projected to increase from 26% to 52.5% in the EU as a whole over the projection period. This entails that the EU would move from having four working-age people for every person aged over 65 years to two working-age persons. The increase in the total age-dependency ratio (people aged 14 and below and aged 65 and above over the population aged 15-64) is projected to be even larger, rising from 49.3% in 2010 to 77.9% in 2060. The difference is noticeable among individual EU Member States. A relatively small increase in the total age-dependency ratio (20 p.p. or less) is projected in Denmark, Ireland and the United Kingdom, while in Poland, Slovakia, Romania and Latvia an increase of 40 p.p. or more is projected by 2060.

## ***Labour force projections***

### ***Overall participation rates are projected to increase ...***

Using recent trends in labour market behaviour, the total participation rate<sup>10</sup> (for the age group 20 to 64) in the EU27 is projected to increase by about 3 ¼ percentage points (from 75.6% in 2010 to 78.8% in 2060). For the euro area, a similar increase is projected (from 75.9% in 2010 to 79.4% in 2060). For the age group 15-64, the projected increases in participation rates are smaller, with 80% of the total improvement occurring in the period up to 2020.

In the EU27, the biggest increase in participation rates is projected for workers aged 55-64 (around 20 p.p. for women and 10 p.p. for men), positively influenced by structural reforms

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<sup>10</sup> The Cohort Simulation Method (CSM) is used to project participation rates (see Carone, 2005). The CSM makes the following four main assumptions: i) the starting year for the projections is 2010; ii) labour market participation rates are calculated by gender and single age, using average entry/exit rates in the labour market observed over the last ten years (2001-2010); iii) a correction mechanism is applied for young generations (15-24), in order to avoid that any increase in enrolment rates (and the corresponding decline in participation rates) feeds into future declines of participation rates for prime age workers; and iv) the impact of pension reforms is modelled through their estimated impact on the labour market exit rates of older workers (aged 50-74). Specifically, exit rates of older workers (50-74) are adjusted relatively to average historical values (2001-2010) in order to incorporate the expected future effects of legislated pension reforms.

in the field of pensions, leading to a substantial narrowing of the gender gap in terms of participation rates up to 2060.

***... but labour supply will decline because of the projected population trends***

Total labour supply in the EU27 is projected to increase by 1 ½ % from 2010 to 2020 (age group 20 to 64). In terms of persons, this represents an increase in labour force of roughly 3.7 million. In the euro area, the labour force is projected to increase by 2 ¼ % in the same period. The increase in labour supply over the period 2010 to 2020 is mainly due to the increase in women's labour supply, as men's labour force is projected to remain largely unchanged.

The positive trend in labour supply up to 2020 is expected to be reversed during the period 2020 to 2060 when the total labour force is projected to contract by 11 ¾ %, equivalent to 27.7 million people (24 million compared with the 2010 level). In the euro area, the projected fall in labour supply between 2020 and 2060 is 11 ½ %, which represents 17.8 million people (14.3 million compared with the 2010 level).

There is however a wide diversity across Member States, ranging from an increase in the labour force of 24.9% in Ireland to a decrease of 38.5% in Romania. The initially positive trend across most countries in the period 2010-2020 is projected to be reversed after 2020, when a large majority of countries is expected to record a decline (20 Member States in total).

***Assumptions on unemployment***

As a general rule, actual unemployment rates are assumed to converge to structural unemployment rates.<sup>11</sup> In the EU27, the unemployment rate is assumed to decline by 3.2 p.p. (from 9.7% in 2010 to 6.5% in 2060). In the euro area, the unemployment rate is expected to fall from 10.1% in 2010 to 6.7% in 2060.

***The employment rate would increase...***

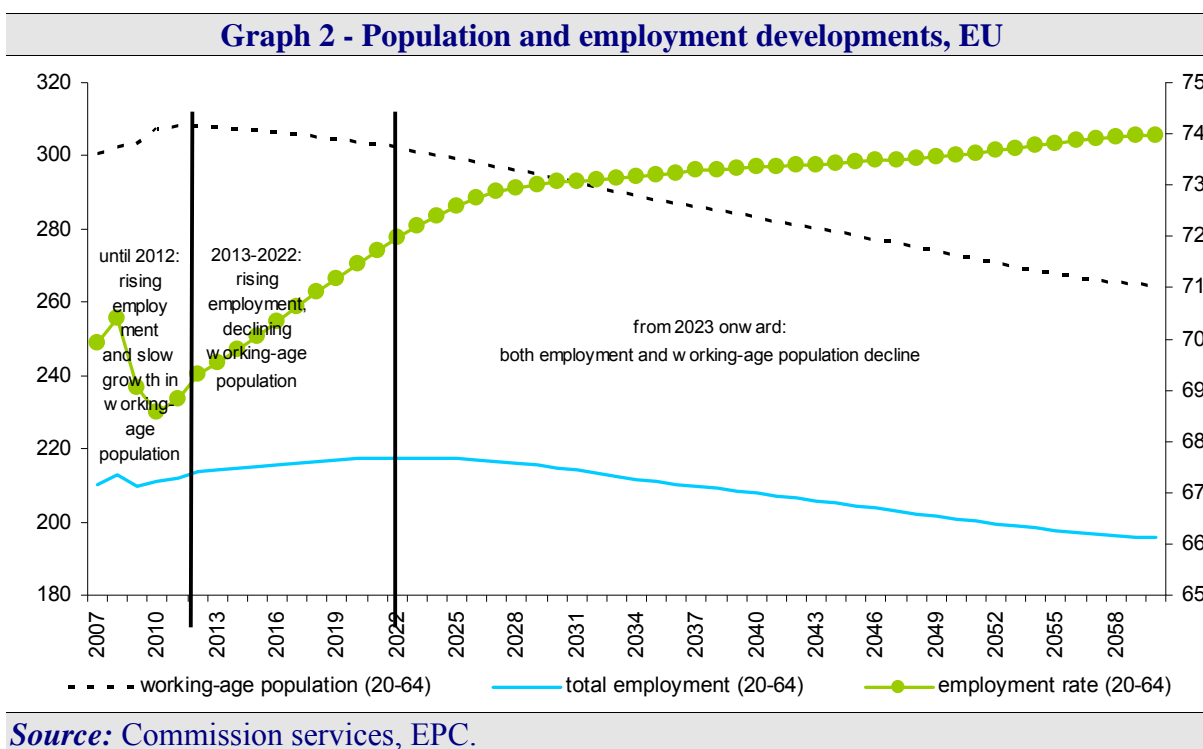
As a result of the population projection, the labour force projection and the unemployment rate assumptions, the total employment rate (for individuals aged 20 to 64) in the EU27 is projected to increase from 68 ½ % in 2010 to 71 ½ % in 2020 and to 74% in 2060. In the euro area, a similar development is projected, with the employment rate attaining 74 ¼ % in 2060. Recent pension reforms that encourage longer working lives contribute to the projected increase in employment rates.

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<sup>11</sup> First convergence by 2015 corresponds to a general rule for closing the (generally negative) output gap by 2015. Second, the structural unemployment rates are assumed to gradually decline towards country-specific historical minima. However, for countries where the lowest historical rates are high, the structural unemployment rates are capped at 7.3%, which corresponds to the EU27 average structural unemployment (based on the spring 2011 DG ECFIN's Economic Forecasts). The assumed decline in effective unemployment rates due to the reduction of structural unemployment is about 2 p.p. between 2020 and 2060 in the EU and in the EA, i.e. larger than the reduction due to the closing of the output gap. For some Member States with high estimated structural unemployment rates currently, the assumed decline of the unemployment rate has a large positive effect on employment and thus on GDP growth over the projection period. For some countries where the unemployment rate was only marginally affected by the crisis, the assumed decline of the unemployment rate, resulting from this assumption, is particularly weak, which in turn contributes to relatively weak increases in employment rates.

**... but the number of workers would shrink.**

In the EU27, the number of persons employed (using the LFS definition) is projected to record an annual growth rate of only  $\frac{1}{4}$  % over the period 2010 to 2020 (compared to almost 1% over the period 2000-2009), which is expected to reverse to a negative annual growth rate of a similar magnitude over the period 2020 to 2060. The outcome of these opposite trends is that employment will peak at 217.6 million in 2022 and go down to 195.6 million in 2060. This implies a decline of about 15.7 million workers over the period 2010 to 2060. The negative prospects stemming from the rapid ageing of the population, will only be partly offset by the increase in (older workers) participation rates migration inflows and the assumed decline in structural unemployment, leading to a reduction in the number of people employed during the period 2022 to 2060 (22 million).



**Source:** Commission services, EPC.

Demographic developments have a major impact on labour market developments. Three distinct periods can be observed for the EU as a whole:

- *2007-2012 – demographic developments still supportive of growth:* both the working-age population and the number of persons employed are projected to increase. However, the increase slows down as the effects of an ageing population take hold, even without incorporating the potential negative impact of the current financial and economic crisis.
- *2013-2021– rising employment rates offset the decline in the working-age population:* the working-age population starts to decline as the baby-boom generation enters retirement. However, the assumed reduction in unemployment rates, the projected increase in the employment rates of women and older workers cushion the impact of demographic change, and the overall number of persons employed would continue to increase, albeit at a slower pace.

- *From 2022 – the ageing effect dominates:* the trend increase in female employment rates will broadly have worked itself through. In the absence of further reforms, the employment rate of older workers is also projected to reach a steady state. Consequently, there is no counter-balancing factor to ageing, and both the working-age population and the number of persons employed enter a downward trajectory.

***Labour input (hours worked) is projected to decline***

These employment trends and compositional effects, namely the rising share of part-time work, will bring about a medium to long term decline in total hours worked.<sup>12</sup> Nevertheless, annual average growth in total hours worked is projected to be 0.3% in the period 2010 to 2020 in the EU27. However from 2020 onwards, the rising trend is projected to be reversed and annual average total hours worked are expected to fall by 0.1% between 2021 and 2040 and by 0.3% between 2040 and 2060. Over the entire projection period (i.e. 2010-2060), annual average growth in total hours worked is projected to be negative; down by 0.1% in the EU27 as well as in the euro area.

There are major differences across Member States, reflecting different demographic outlooks. In terms of annual average growth rate, a fall of 0.8% or more is projected for Romania, Latvia and Bulgaria. By contrast, an increase of 0.4% or more on average is expected in Ireland, Luxembourg and Cyprus.

***The ratio of elderly non-workers to workers will rise steeply***

The effective economic old-age dependency ratio is an important indicator to assess the impact of ageing on budgetary expenditure, particularly on its pension component. This indicator is calculated as the ratio between the inactive elderly (65+) and total employment (15-64). The effective economic old age dependency ratio is projected to rise significantly from around 39% in 2010 to 71% in 2060 in the EU27. In the euro area, a similar increase is projected from 42% in 2010 to 72% in 2060.

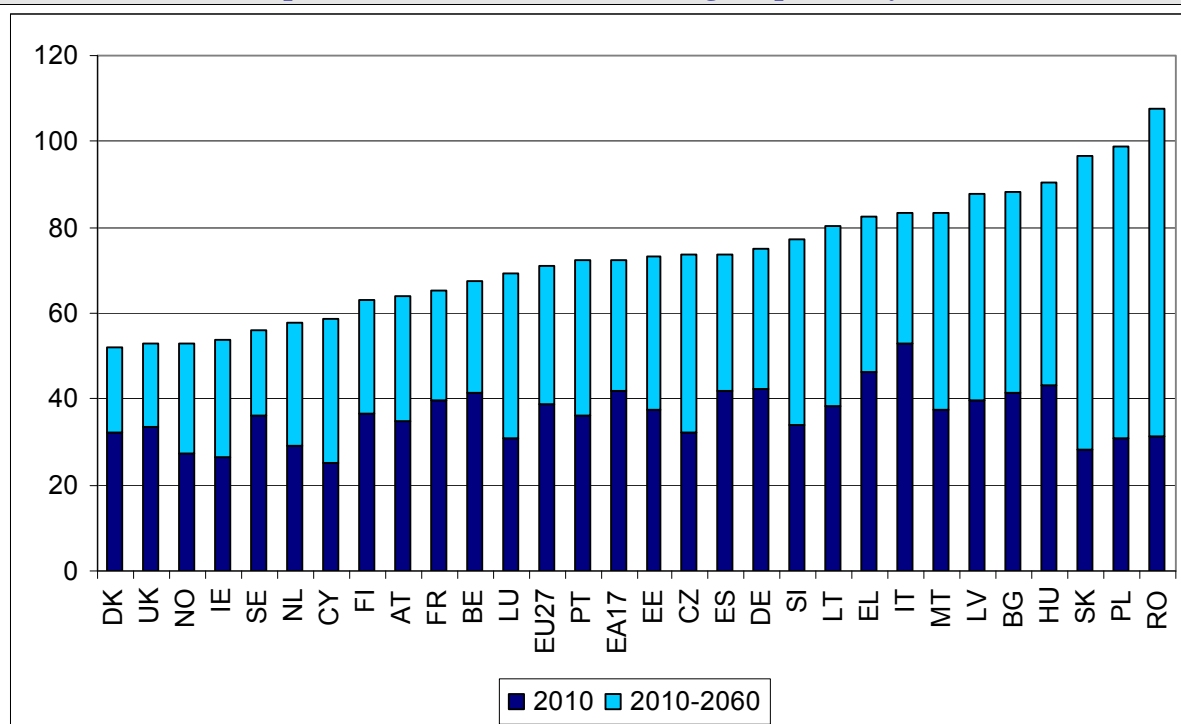
Across EU Member States, the effective economic old age dependency ratio is projected to range from less than 55% in Denmark, the United Kingdom, Norway and Ireland to more than 90% in Hungary, Slovakia, Poland and Romania in 2060.

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<sup>12</sup> The projection of hours worked is made under the assumption that the average hours worked and the proportion of part-time and full-time by gender and age-bracket is kept unchanged over the projection period. For further details, see European Commission and Economic Policy Committee (2012) "2012 Ageing Report: Underlying assumptions and projection methodologies", European Economy, No. 4.



**Graph 3 - Effective economic old-age dependency ratio**



*Source:* Commission services, EPC.

*Note:* Inactive population aged 65 and above as a percentage of the employed population aged 15 to 64.

## Macroeconomic projections: labour productivity and potential growth rates

### *Total factor productivity growth is assumed to converge to 1%*

Total factor productivity (TFP) drives labour productivity growth in the long-run. A prudent assumption was set: Member States' TFP growth rates are assumed to converge to a long-term historical average in the EU<sup>13</sup> of 1% (which represents a downward revision of 0.1 p.p. relative to the assumption made in the previous round).<sup>14</sup> As a result of this assumption, the growth rate in labour productivity is projected to be 1.5% in the long-term, reflecting a contribution from capital deepening to output growth of 0.5%. The speed of convergence to this long-run TFP growth rate has been determined by the relative country-specific income position in the different Member States. Specifically, it is assumed that the lower the GDP per capita of a country compared to the EU average at present, the higher its catching up potential.

<sup>13</sup> Annual average TFP growth in the EU, proxied by EU15, over 1971-2010.

<sup>14</sup> For some Member States, a 1% TFP growth rate entails an acceleration in growth compared with recent trends, while for others it would imply a deceleration. It should be stressed that TFP growth in many countries, notably in the euro area, has been on a falling trend, with a declining TFP growth rate to around 0.6-0.7% already well before the financial crisis in 2008-09. The baseline therefore assumes an increase in TFP growth over the forecast horizon.

### ***Taking account of the cyclical position of the economy in the long-term projections***

Over a short-to-medium term horizon, there is a need to take account of the cyclical position of the economy, so as to bridge the current situation and the longer-term prospects. This is of particular importance at the current juncture, where nearly all Member States have large output gaps.

In order to produce actual, as opposed to potential, growth rate projections, the following operational rules are applied for closing the output gap. Firstly, the default rule is that the output gap is closed at the end of the medium term (i.e. 2015 based on the spring 2011 Commission forecast). Secondly, in circumstances where the output gap is small at the end of the short term forecasts, the gap could be closed by 0.5 p.p. a year until the gap is closed. Finally, when an output gap is particularly large (i.e. more than double the EU average), a longer period of closure would be allowed, up to a maximum of two additional years. Specifically, on the basis of the Commission's spring 2011 forecast, all Member States are assumed to close the output gap in 2015 except Greece, where it is assumed to be closed in 2017.

### ***Low potential growth rates projected for the EU***

In the EU as a whole, the annual average potential GDP growth rate is projected to remain quite stable over the long-term. After an average potential growth of 1.5% up to 2020, a slight rebound to 1.6% is projected in the period 2021-30, primarily on account of the assumption of the catching up potential in terms of labour productivity in those EU Member States where it currently is relatively low<sup>15</sup>, while over the remainder of the projection period (2031-2060) a slowdown to 1.3% emerges. Over the whole period 2010-2060, output growth rates in the euro area are very close to those in the EU27, as the former represents more than 2/3 of the EU27 total output. Notwithstanding this, the potential growth rate in the euro area is projected to be consistently slightly lower (by about 0.1 percentage point) than for the EU27 throughout the entire projection period.

### ***Labour productivity will become the key driver of growth in the EU***

For the EU and for the euro area, labour input acts as a drag on growth over the projection period (2010-2060), as the working-age population is projected to decline. As a result, labour input contributes negatively to annual output growth on average over the projection period (by about 0.1 p.p. both in the EU and in the euro area). Hence, labour productivity growth becomes the sole source for potential output growth in both the EU and the euro area starting from 2028.

### ***The crisis weighs on potential growth in the EU***

Following the largest economic crisis in many decades, potential GDP growth has been revised downwards in 2010 and the surrounding years, compared with the baseline projection in the 2009 Ageing Report (see [Graph 4](#)). The current projections indicate that potential growth in the EU as a whole should only very gradually approach the growth rates projected in the 2009 Ageing Report, just before the economic and financial crisis. As a consequence, the GDP level is lower throughout the projection period in the current projection.

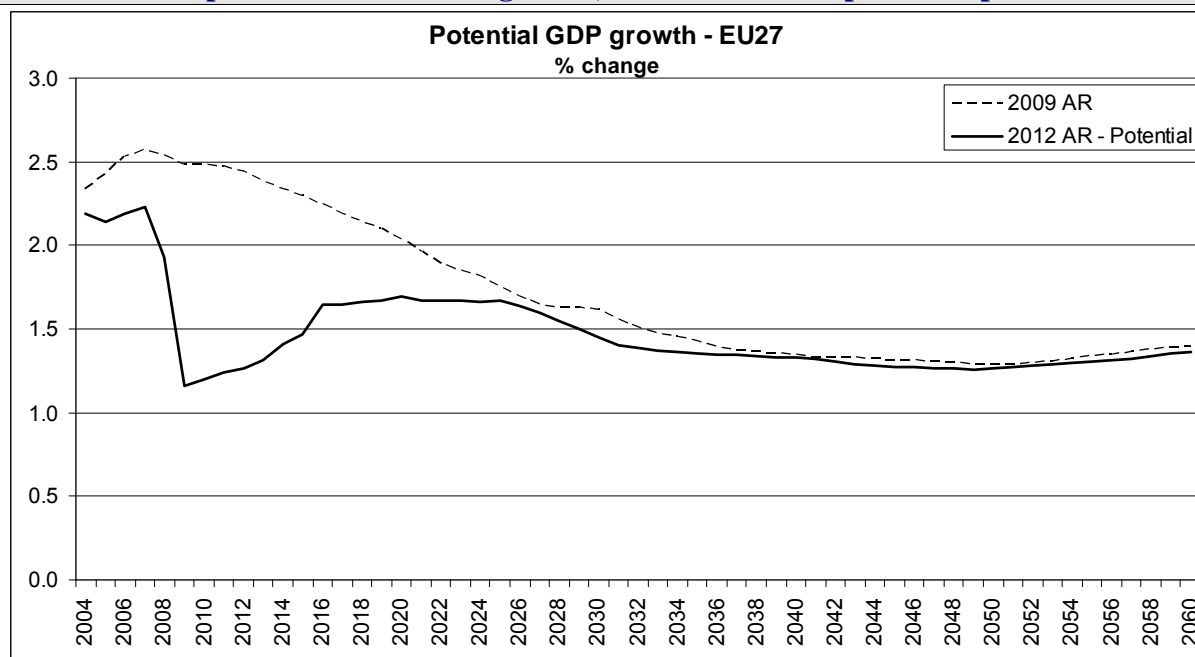
Potential growth is projected to be 1.5 % on average up to 2020 in the EU as a whole, which is about  $\frac{3}{4}$  p.p. lower than the 2009 Ageing Report projection. For the euro area, a slightly

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<sup>15</sup> In addition, the assumption of a future reduction in structural unemployment leads to higher employment, which in turn contributes to GDP growth.

lower average potential growth rate of 1 ¼ % is projected, (almost 1 p.p. lower compared with the 2009 Ageing Report). Over the period 2010-2060, annual average potential GDP growth in the EU27 is projected to be about 1 ½ %, which is slightly lower than in the 2009 projection. A similar picture emerges for the euro area. The lower average potential growth rate over the entire projection period in the EU can mainly be attributed to the new more prudent projection of convergence to a labour productivity growth rate of 1.5%, compared with 1.7% in the 2009 Ageing Report.

**Graph 4 - Potential GDP growth, 2012 and 2009 reports compared**



**Source:** Commission services, EPC.

## ***Budgetary projections***

### ***The long-term public expenditure projections reveal a daunting challenge for policy makers in the EU...***

The fiscal impact of ageing is projected to be substantial in almost all Member States, with effects becoming apparent already during the next decade. The current projection results indeed confirm, overall, that population ageing is posing a major challenge for public finance sustainability, as identified in previous projection exercises. They also show that age-related spending in 2010 was higher than projected in the 2009 Ageing Report, reflecting the crisis. If growth prospects in the medium-term should turn out to be different than projected, this would have a budgetary impact (positive or negative). However, there are noteworthy changes in the current projection. As regards pensions, reforms were implemented since the completion of the 2009 Ageing Report in some Member States (in FR, EL, IT, CZ, ES). They are having visible positive impacts, being very large in Greece, Italy, the Czech Republic and Spain. They have sharply reduced the projected increase in public pension expenditure, diminishing the budgetary impact of ageing. Nonetheless, in some countries, the scale of reforms has been insufficient to stabilise public finance trends and they need to be pursued further to cope with the inexorable increasing share of older persons in Europe. A key policy response, already implemented in some Member States, is to increase the retirement age and link it with changes in life expectancy (as in e.g. CZ, EL, ES and IT). At the same time, there may be a need to implement other, additional measures that enable higher employment rates of older workers as well as putting in place policies that support higher labour productivity, thus contributing further to fiscal sustainability as well as to more adequate retirement incomes in the future. In some Member States, new pension reforms have been legislated after the finalisation of the 2012 projections, thus too late to be incorporated in the projections.<sup>16</sup>

As in previous long-term projection exercise, the AWG reference scenario focuses on the budgetary impact mostly due to demographic developments.

As noted above, there is considerable uncertainty as to future developments of age-related public expenditure, in particular related to the challenge to cope with trend increases in public spending and in particular on health care and long-term care. For this reason and in order to contribute to the wider policy debate on fiscal challenges the EU will be facing in the future, an AWG risk scenario was prepared for this exercise. The AWG risk scenario, in addition to the impact of demographic changes, reflects the impact of additional non-demographic drivers of costs for health care and long-term care expenditure.<sup>17</sup>

Strictly-age-related public expenditure is projected to increase on average by 4.1 percentage points of GDP by 2060 in the EU - and by 4.5 percentage points in the euro area (see [Table 1](#)) in the AWG reference scenario. Most of the projected increase in public spending over the period 2010-2060 will be on pensions (+1.5 p.p. of GDP), long-term care (+1.5 p.p. of GDP) and health care (+1.1 p.p. of GDP) in the EU. In the euro area, spending on pensions and long-term care will be higher, rising by 2 p.p. and 1.7 p.p. of GDP, respectively (see [Table 2](#)).

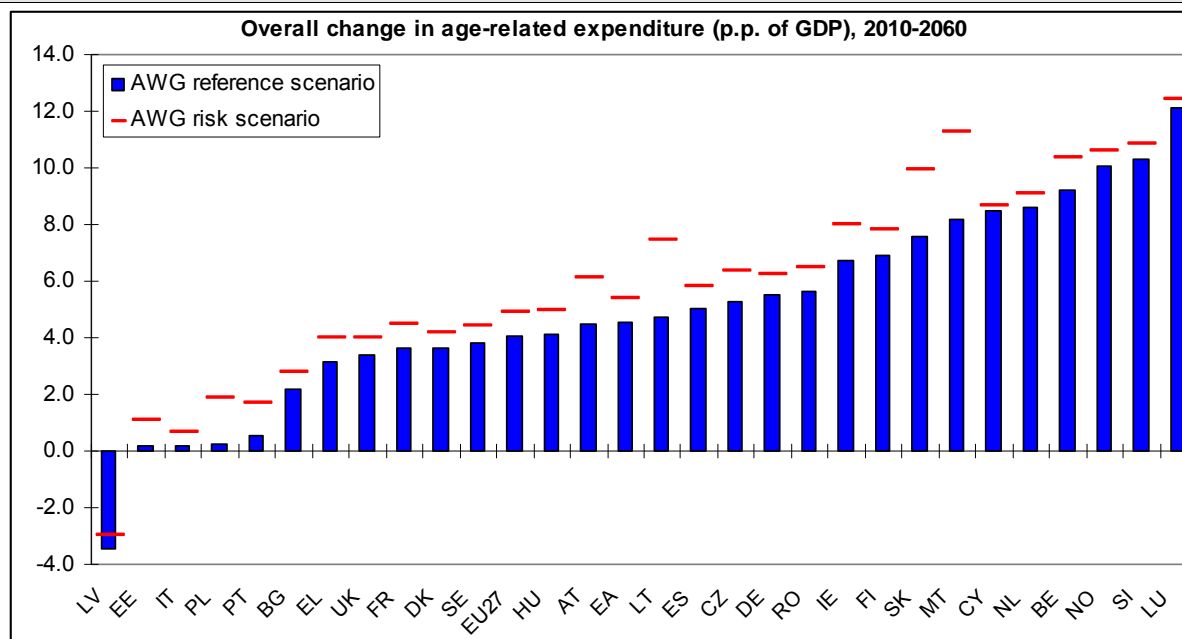
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<sup>16</sup> In BE, BG, DK, FR, HU and NL - see Box "*Latest legislated pension reforms after the finalisation of Ageing Report 2012 projections*" in Chapter 2.

<sup>17</sup> See the sections on health care and long-term care below.

In the AWG risk scenario, the overall increase in strictly-age-related expenditure by 2060 would be about 5 percentage points of GDP in the EU - and 5 ½ percentage points in the euro area (see Table 1 and Graph 5). This higher projected increase is mainly due to public expenditure on health care and long-term care rising, in each case, by 1.7 p.p. of GDP by 2060 in the EU (and respectively by 1.7 p.p. and 1.9 p.p. of GDP in the euro area).

**Graph 5 - Projected change in strictly-age-related expenditure  
AWG reference and risk scenarios, 2010-60**



**Source:** Commission services, EPC.

In terms of the different Member States situation, the following points can be made:

- The strictly-age-related increase in public spending in the AWG reference scenario will be very significant in seven Member States (Belgium, Cyprus, Luxembourg, Malta, the Netherlands, Slovenia and Slovakia) with a projected increase of 7 p.p. of GDP or more. In terms of the AWG risk scenario, coping with the future prospects is deemed to be even more challenging for these countries.
- For a second group of countries – the Czech Republic, Germany, Ireland, Spain, Lithuania, Hungary, Austria, Romania and Finland - the strictly-age-related increase in public spending is more limited, ranging from 4 p.p. to 7 p.p. of GDP. In terms of the AWG risk scenario, coping with the future prospects is deemed to be more challenging, and especially so in Ireland, Lithuania and Finland where the increase would be in excess of 7 p.p. of GDP.
- Finally, the increase will be more moderate, 4 p.p. of GDP or less, in Bulgaria, Denmark, Estonia, Greece, France, Italy, Latvia<sup>18</sup>, Poland, Portugal, Sweden and the United Kingdom. However, in terms of the AWG risk scenario, coping with the future prospects is deemed to be more demanding, especially in Denmark, Greece, France, Sweden and

<sup>18</sup> Age-related spending is projected to fall in Latvia, reflecting *inter alia* recent measures taken by the Latvian authorities to ensure sustainability of the pension system.

the United Kingdom where the increase would be 4 p.p. of GDP or more, but the overall change in strictly-age-related expenditures remains below the EU average.

**Table 1 – Age-related spending, p.p. of GDP, 2010-2060**

	Strictly age-related items, 2010-2060, percentage points of GDP					Total age-related items, 2010-2060, percentage points of GDP					
		AWG reference scenario		AWG risk scenario			AWG reference scenario		AWG risk scenario		
	Level	Change		Change		Level	Change		Change		
	2010	2010-2020	2010-2060	2010-2020	2010-2060	2010	2010-2020	2010-2060	2010-2020	2010-2060	
BE	25.4	2.6	9.2	2.8	10.4	27.5	2.5	9.1	2.7	10.3	BE
BG	18.2	-0.5	2.2	-0.2	2.8	18.7	-0.6	2.0	-0.4	2.6	BG
CZ	20.2	0.1	5.3	0.3	6.4	20.6	0.0	5.2	0.2	6.3	CZ
DK	29.6	1.4	3.7	1.6	4.2	30.3	1.4	3.6	1.6	4.2	DK
DE	24.2	0.5	5.5	0.7	6.2	25.2	0.2	5.2	0.5	6.0	DE
EE	19.7	-0.9	0.2	-0.7	1.1	20.3	-1.0	0.0	-0.7	0.9	EE
IE	22.2	2.3	6.8	2.6	8.0	24.9	2.9	5.4	3.1	6.7	IE
EL	25.3	0.0	3.2	0.1	4.0	25.9	0.0	2.9	0.2	3.8	EL
ES	21.6	0.3	5.0	0.5	5.8	23.6	0.8	3.9	1.0	4.7	ES
FR	29.7	0.4	3.7	0.7	4.5	31.4	0.1	3.1	0.3	3.9	FR
IT	27.9	-1.1	0.2	-0.9	0.6	28.6	-1.3	-0.1	-1.2	0.4	IT
CY	17.1	1.1	8.5	1.1	8.7	17.5	1.1	8.4	1.2	8.5	CY
LV	18.5	-2.6	-3.5	-2.5	-3.0	19.2	-2.6	-3.8	-2.4	-3.3	LV
LT	19.2	-1.3	4.7	-0.9	7.4	19.6	-1.2	4.5	-0.9	7.2	LT
LU	17.1	1.5	12.1	1.6	12.4	17.7	1.4	12.0	1.5	12.3	LU
HU	22.0	-0.5	4.1	-0.3	5.0	22.4	-0.5	4.0	-0.3	4.8	HU
MT	21.5	0.2	8.2	0.6	11.3	21.9	0.2	8.2	0.6	11.3	MT
NL	23.0	1.4	8.6	1.5	9.1	24.6	1.2	8.2	1.4	8.8	NL
AT	28.0	1.2	4.5	1.5	6.1	28.8	1.1	4.4	1.4	6.0	AT
PL	21.4	-0.9	0.2	-0.5	1.9	21.6	-1.0	0.1	-0.6	1.8	PL
PT	24.7	-0.2	0.5	-0.1	1.7	26.0	-0.1	0.1	0.0	1.3	PT
RO	17.6	-0.8	5.6	-0.6	6.5	18.1	-1.0	5.4	-0.9	6.3	RO
SI	23.5	1.7	10.3	1.9	10.8	23.8	1.8	10.3	2.0	10.8	SI
SK	17.6	1.0	7.6	1.4	9.9	17.8	0.9	7.5	1.3	9.8	SK
FI	26.5	2.8	6.9	3.1	7.8	28.1	2.6	6.7	2.8	7.5	FI
SE	27.3	0.1	3.8	0.3	4.4	27.9	0.1	3.8	0.3	4.3	SE
UK	21.9	-0.3	3.4	0.0	4.0	22.1	-0.2	3.3	0.0	4.0	UK
NO	27.4	2.4	10.1	2.6	10.6	27.9	2.2	9.9	2.4	10.4	NO
EU27	25.0	0.2	4.1	0.4	4.8	26.0	0.1	3.7	0.3	4.5	EU27
EA	25.7	0.4	4.5	0.7	5.3	27.0	0.3	4.1	0.5	4.9	EA

**Source:** Commission services, EPC.

**Note:** In the 2009 Ageing Report, age-related spending included unemployment benefits in addition to pensions, health care, long-term care and education. Since unemployment benefits are more affected by cyclical fluctuations, the results for the AWG reference and risk scenarios are presented both with and without unemployment benefits.<sup>19</sup>

Reforms legislated after December 2011 have not been taken into account in the projections (see Box 2 on page 97).

These results reveal that in some countries, there is a need to take due account of future increases in government expenditure, including through modernisation of social expenditure systems. In others, policy action has already been taken, significantly limiting the future increase in government expenditure. A comprehensive assessment of risks to the sustainability of public finances, including the identification of relevant policy responses, will be made in the 2012 update of the Commission's Sustainability Report.

<sup>19</sup> For budgetary surveillance purposes, in the case of France and Germany current legislation in the area of long-term care is relevant. See Box 2 in chapter 4 on page 206.

*...influenced by the future prospects for public spending on pensions...*

Public pension expenditure in the EU27 is projected to increase by 1.5 p.p. of GDP over the period 2010-2060 to a level of 12.9% of GDP. In the euro area, an increase by 2.0 p.p. of GDP is projected. Yet, the range of projected changes in public pension expenditure is very large across Member States. On the one hand, an increase of 9.4 p.p. of GDP is projected for Luxembourg, while Slovenia and Cyprus project a public pension expenditure increase by more than 7 p.p. of GDP. In another three Member States (Slovakia, Belgium and Malta) spending to GDP is projected to grow between 5 to 7 p.p. of GDP. On the contrary, the ratio decreases over the projection horizon in Latvia, with a projected decline of -3.8 p.p. of GDP; it also decreases in Denmark, Italy, Estonia and Poland. For the remaining Member States, an increase of less than 5 p.p. of GDP is expected.

The timing of the fiscal challenge to pension systems also differs markedly across the Member States. Public pension spending is estimated to rise by more than 1 ½ p.p. of GDP already by 2020 in Belgium, Cyprus, Luxembourg and Finland - alternatively put, an increase of between 15 and 25% of public pension spending over this period. By contrast, in about a third of the Member States (Bulgaria, the Czech Republic, Estonia, France, Italy, Latvia, Lithuania, Hungary, Poland, Romania, Sweden, and the United Kingdom) pension spending as a share of GDP is either stable or falling over the medium-term (to 2020).

Many countries have introduced pension reforms that will increase the retirement age. In all Member States, the share of public pensioners in the age group below 65 is constantly decreasing over the whole projection horizon. For the EU27, the share of pensioners younger than 55 of age drops by 3.3 p.p. over time. As of 2050 it becomes stable, reflecting that the share of younger people receiving disability and other pensions is assumed to be constant over the projection horizon. The shares for age groups 55-59 and 60-64 are also projected to decrease by 3.2 p.p. and 9.9 p.p., respectively. This mostly reflects increasing retirement ages over time and the evolution of the demographic structure. Over the entire projection horizon, the share of pensioners in age group 65-69 is decreasing as well (-5.8 p.p. on the EU27 level), reflecting a rising number of persons in this age group already during this decade onwards, but the increase in statutory retirement ages in many Member States takes effect only gradually.

**Table 2 – Projected age-related expenditure, 2010-2060, percentage points of GDP**

Projected public spending, 2010-2060, percentage points of GDP																
Strictly-age-related items																
Pensions			Health care			Long-term care			Education			Unemployment benefits			Total age-related items	
Level	Change		Level	Reference scenario	Risk scenario	Level	Reference scenario	Risk scenario	Level	Change		Level	Change		2012 AR* 2009 AR*	
	2010-2020	2010-2060		2010-2020	2010-2060		2010-2020	2010-2060		2010-2020	2010-2060		2010-2020	2010-2060	Change 2010-2060	
BE	11.0	2.1	5.6	6.3	0.1	0.4	7.3	0.4	2.7	0.5	3.5	5.7	0.0	0.5	2.1	9.1
BG	9.9	-0.7	1.1	4.3	0.2	0.5	1.1	0.5	0.3	0.0	0.4	3.5	-0.1	0.2	0.4	2.0
CZ	9.1	-0.4	2.7	6.9	0.4	1.7	0.7	2.4	0.1	0.7	1.0	3.4	0.0	0.2	0.4	5.2
DK	10.1	0.7	-0.6	7.4	0.4	0.9	4.5	0.3	3.5	0.3	3.5	7.6	0.0	-0.2	0.7	3.6
DE	10.8	0.1	2.6	8.0	0.6	1.4	0.3	1.7	0.3	1.8	1.8	3.9	-0.5	-0.2	1.0	5.2
EE	8.9	-1.2	-1.1	5.2	0.2	1.1	0.5	0.0	0.3	0.1	0.5	5.2	0.0	0.0	0.6	0.0
IE	7.5	1.4	4.1	7.3	0.0	1.1	1.1	0.2	1.5	0.2	2.1	6.3	0.8	0.0	2.6	5.4
EL	13.6	0.2	1.0	6.5	-0.1	0.9	1.2	0.2	1.2	0.2	1.8	3.9	-0.2	0.1	0.6	2.9
ES	10.1	0.5	3.6	6.5	0.0	1.3	0.2	1.9	0.8	0.7	0.1	4.2	-0.1	-0.5	2.0	3.9
FR	14.6	-0.2	0.5	8.0	0.4	1.4	0.7	2.1	0.4	2.2	5.0	5.0	-0.2	-0.4	1.7	3.1
IT	15.3	-0.8	-0.9	6.6	0.0	0.6	0.1	1.0	0.9	0.1	0.9	4.1	-0.4	-0.5	0.7	-0.1
CY	7.6	1.9	8.7	2.6	0.1	0.4	0.1	0.5	0.0	0.1	0.0	6.7	-0.9	-0.7	0.5	8.4
LV	9.7	-2.5	-3.8	3.7	0.1	0.5	0.3	1.1	0.4	0.1	0.4	4.4	-0.3	-0.6	0.7	-3.8
LT	8.6	-1.1	3.5	4.9	0.3	0.7	0.5	1.3	1.2	0.1	0.3	4.4	-0.6	-0.5	0.4	4.5
LU	9.2	1.6	9.4	3.8	-0.1	0.7	0.1	1.0	0.3	2.1	2.1	3.2	-0.3	-0.1	0.6	12.0
HU	11.9	-0.4	2.8	4.9	0.2	1.1	0.3	1.6	0.1	0.6	1.0	4.3	-0.3	-0.4	0.4	4.0
MT	10.4	0.2	5.5	5.4	0.8	2.9	1.0	3.6	0.7	0.1	0.9	5.1	-0.9	-1.1	0.4	8.2
NL	6.8	0.6	3.6	7.0	0.5	1.0	0.7	1.5	3.8	0.6	4.1	5.3	-0.3	-0.1	1.6	8.2
AT	14.1	1.0	2.0	7.4	0.5	1.6	0.8	2.2	1.6	0.2	1.2	4.9	-0.6	-0.4	0.8	4.4
PL	11.8	-0.9	-2.2	4.9	0.4	1.9	0.7	2.6	0.7	0.1	1.0	3.9	-0.6	-0.5	0.2	0.1
PT	12.5	1.0	0.2	7.2	-0.4	1.1	-0.4	1.6	0.3	0.0	0.3	4.7	-0.8	-1.1	1.2	0.1
RO	9.8	-0.6	3.7	3.7	0.0	1.0	0.2	1.4	0.6	0.1	1.1	3.5	-0.3	-0.1	0.5	5.4
SI	11.2	1.0	7.1	6.1	0.3	1.1	0.5	1.7	1.4	0.3	1.6	4.7	0.1	0.5	0.3	10.3
SK	8.0	0.6	5.2	6.2	0.6	2.1	0.9	3.0	0.3	0.0	0.4	3.1	-0.3	-0.1	0.2	7.5
FI	12.0	1.9	3.2	6.0	0.4	1.0	0.6	1.5	2.5	0.6	2.6	5.9	0.0	0.2	1.6	6.7
SE	9.6	0.0	0.6	7.5	0.2	0.7	0.4	1.2	3.9	0.2	2.5	6.3	-0.2	0.0	0.6	3.8
UK	7.7	-0.7	1.5	7.2	0.3	1.1	0.5	1.8	2.0	0.2	0.7	5.0	-0.1	0.0	0.3	3.3
NO	9.3	2.3	4.9	5.8	0.3	1.2	0.5	1.7	3.8	0.1	3.9	8.5	-0.3	0.0	0.5	-0.2
EU27	11.3	-0.1	1.5	7.1	0.3	1.1	0.5	1.7	1.8	0.2	1.5	4.6	-0.3	-0.1	1.1	3.7
EA	12.2	0.2	2.0	7.3	0.3	1.1	0.5	1.7	1.8	0.3	1.7	4.5	-0.3	-0.2	1.3	4.1

*Source:* Commission services, EPC.

*Note:* Reforms legislated after December 2011 have not been taken into account in the projections (see Box 2 on page 97).



The demographic transition to an older population is the main driver behind the projected increase in public pension expenditure. This effect alone pushes up expenditures significantly in all Member States (ranging from +3.1 p.p. in the United Kingdom to as much as +14.0 p.p. in Poland (EU27: +8.5 p.p. of GDP). However, some factors, also related to past reforms of pension systems, are expected to mitigate the increase:

- A tightening of the eligibility for a public pension (through higher retirement age and/or reduced access to early retirement and better control of alternatives to early retirement like disability pensions) would constrain public pension expenditure in nearly every Member State. A strong downward effect of lower coverage ratios (i.e. fewer pensioners in relation to the population aged 65 and over) on public pension expenditure of at least 3 p.p. of GDP is projected in 12 Member States (Slovenia, Finland, Greece, France, Slovakia, Bulgaria, Denmark, Hungary, the Czech Republic, Romania, Poland and Italy). In the remaining Member States the declining coverage rate will also contribute to limit the impact of demographic factors on pension spending, although to a less pronounced extent. The overall EU27 contribution is -2.9 p.p. over the period 2010 to 2060.
- On average for the EU27, increasing employment leads to a reduction in the public pension expenditure over GDP ratio (-0.9 p.p. over the projection period).
- Reduced pensions relative to wages over time. The pension benefit ratio – i.e. the average pension as a share of the average wage – is projected to decrease, partly on account of pension reforms. In the EU27, the benefit ratio effect will contribute to push down the increasing impact of the demographic effect on the pension expenditure/GDP ratio over the projection horizon by 2.8 p.p. of GDP. In the majority of Member States, a reduction in the relative value of public pension benefits (compared to the gross average wage) is projected. In 9 Member States (France, Estonia, Cyprus, Greece, Romania, Austria, Portugal, Latvia and Poland) the contribution of a decreasing benefit ratio is in absolute terms significant (i.e. above 3 p.p.). Only in 2 Member States (the United Kingdom and Ireland), the contribution of the change in the benefit ratio is supposed to push the expenditure level further upwards.

In sum, the projections reveal that pension policies in a majority of EU Member States will lead to a containment of the increase in old-age and early pensions spending through: (i) reducing the generosity of public pension schemes to make these programmes financially more sustainable in view of the demographic trends; (ii) pushing up the retirement ages, including the statutory retirement age, in a gradually phased way for old-age pensions; (iii) restricting access to early retirement schemes.

### *...and substantive pressures on health care spending ...*

Projecting public spending on health care over the long-run for EU Member States (and Norway) is a highly complex exercise, given the uncertainties regarding future trends in the drivers of spending and the complex institutional settings of national health care systems. The simulation model used in the exercise attempts to quantify in a comparable way the impact of demographic changes and, in addition, the possible evolution of non-demographic drivers on public health care expenditure.

According to the "AWG reference scenario", health care expenditures are driven by a combination of changes in the population structure, an assumption that half of the future gains in life expectancy are spent in good health and a moderate impact of income.<sup>20</sup> The joint impact of those factors is a projected increase in spending from 7.1% of GDP in 2010 to 8.3% of GDP in 2060 for the EU27 (from 7.3% to 8.4% of GDP for the EA). Individual countries' increases range between 0.4 p.p. (Belgium and Cyprus) and 2.9 p.p. of GDP (Malta).

The "AWG risk scenario"<sup>21</sup> keeps the assumption that half of the future gains in life expectancy are spent in good health, as in the "AWG reference scenario". However, it departs from it by assuming more dynamic spending growth in the beginning of the projection period in line with past trends for the EU as a whole.<sup>22</sup> In comparison to the AWG reference scenario, this scenario captures the impact of additional non-demographic cost drivers, i.e. technological changes (e.g. development of new treatments and new diagnostic equipment) and institutional mechanisms (e.g. universalization of coverage or devolution to regions) which may stimulate expenditure growth in excess of what can be expected due to purely demographic factors. According to this AWG risk scenario, public spending is projected in the EU27 to be 8.9% of GDP by 2060, i.e. an increase of 1.7 p.p. of GDP relative to 2010. The projected excess cost growth therefore adds around 0.6 p.p. of GDP to the AWG reference scenario for the EU27.

### *...and on public spending on long-term care*

An ageing population will have a strong upward impact on public spending for long-term care. This is because frailty and disability rise sharply at older ages, especially amongst the very old (aged 80+) which will be the fastest growing segment of the population in the decades to come.

According to the "AWG reference scenario"<sup>23</sup> based on current policy settings, public spending on long-term care is projected to double, increasing from 1.8% of GDP in 2010 to 3.4% of GDP in 2060 in the EU as a whole (to 3.4% of GDP in the EA). The projected absolute changes range from less than ½ % of GDP in Bulgaria, Estonia, Cyprus, Latvia, Portugal and Slovakia to more than 2 ½ % of GDP in Belgium, Denmark, the Netherlands, Finland and Sweden, reflecting very different approaches to the provision/financing of formal care.

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<sup>20</sup> The AWG reference scenario assumes that: (i) half of the increase in life expectancy is spent in good health; and (ii) the elasticity of health care spending with respect to income converges from 1.1 in 2010 to unity in 2060.

<sup>21</sup> Specifically, the AWG risk scenario assumes that: (i) half of the increase in life expectancy is spent in good health; and (ii) the impact of non-demographic drivers on future trends is captured by using an elasticity of health care spending to GDP of 1.3 in 2010 converging to unity in 2060.

<sup>22</sup> The situation differs across the Member States, with recent health care spending trends observed to be growing both faster and slower than GDP, depending on the different characteristics and reforms of health care systems.

<sup>23</sup> The AWG reference scenario assumes that half of the increase in life expectancy is spent in good health.

The "AWG risk scenario" is a new scenario that combines the assumption that half of the future gains in life expectancy are spent in good health (as for health care) with the cost convergence scenario, aimed at capturing the possible effect of a convergence in real living standards on LTC spending.<sup>24</sup> This scenario puts more pressure on public budgets, and costs are projected to increase by 1.7 p.p. of GDP over 2010-60 in the EU as a whole, and by 1.9 p.p. of GDP in the EA. The projected increase in terms of p.p. of GDP over 2010-60 is less than 1 p.p. of GDP in Bulgaria, Estonia, Spain, Italy, Cyprus, Latvia and the United Kingdom. By contrast, an increase of 3 p.p. of GDP or more is projected for Belgium, Denmark, Lithuania, Malta and the Netherlands.

### **The projection results for public spending on education**

The ratio of children and young people to the working-age population is expected to shrink over the coming decades, pointing to fewer students relative to the working population. The baseline scenario estimating the pure consequences of expected demographic changes indicates a potential for a small decline in public expenditure on education in the EU as a whole (from 4.6% of GDP in 2010 to 4.5% of GDP in 2060).

However, the baseline projection does not take into account that public expenditure on education as a share of GDP could instead increase, when incorporating changes in education policy aiming at the necessary improvement in education. Specifically, a "EU2020 scenario" was carried out, defined in terms of its two education-related objectives to be achieved by 2020, namely:<sup>25</sup> (i) the share of early leavers from education and training should be less than 10%; (ii) the share of 30 to 34-year-olds with tertiary or equivalent educational attainment should be at least 40%. In this scenario where attainment of the EU2020 education targets is assumed to be met, the increase in costs is projected to be 0.2 p.p. of GDP for the EU over 2010-60.

### **The projection results for public spending on unemployment transfers**

The number of unemployed persons in relation to the number of people who are working is expected to shrink over the projection period. On this basis, unemployment benefit spending in the EU is projected to be slightly lower over the long run (moving from 1.1% of GDP in 2010 to 0.7% in 2060 in the EU and from 1.3% of GDP in 2010 to 0.9 % in the EA).

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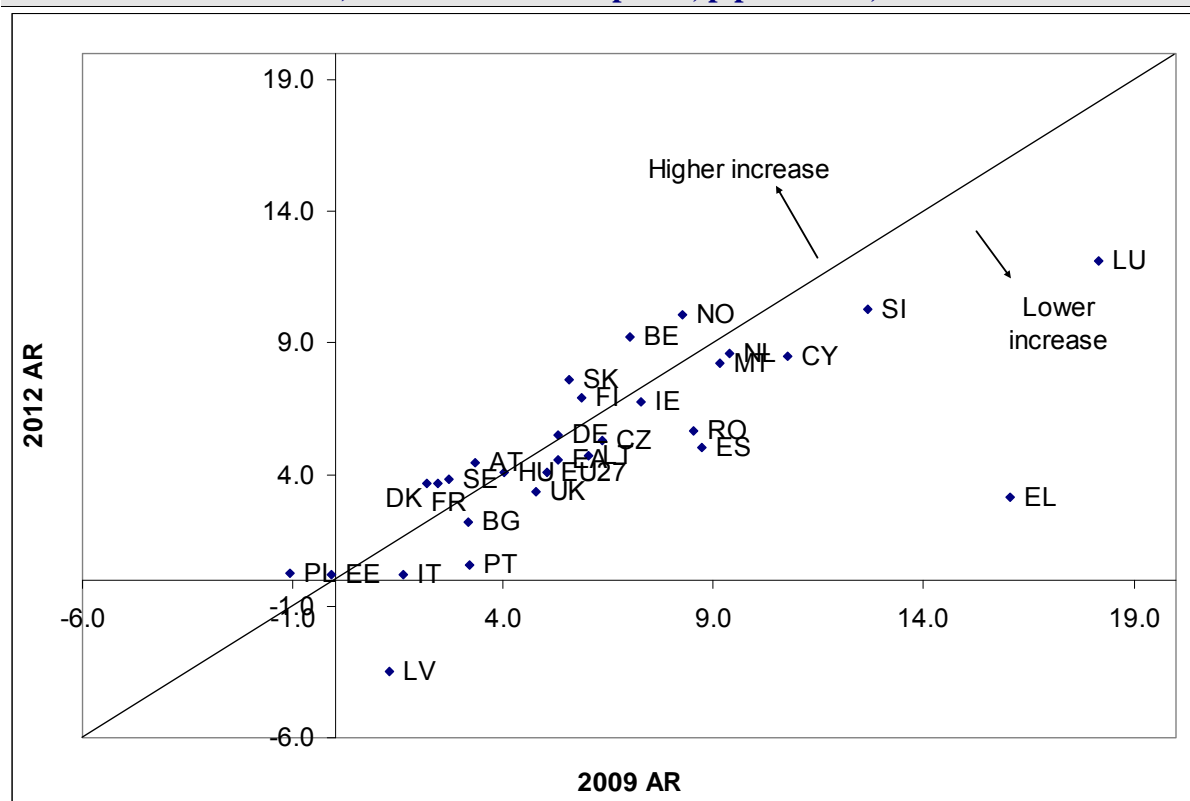
<sup>24</sup> The AWG risk scenario assumes that: (i) half of the increase in life expectancy is spent in good health; and (ii) there is an upward convergence of the relative age-gender specific expenditure profiles per beneficiary (as percentage of GDP per capita) of all countries below the corresponding EU27 average to the EU27 average.

<sup>25</sup> See [http://ec.europa.eu/education/lifelong-learning-policy/doc34\\_en.htm](http://ec.europa.eu/education/lifelong-learning-policy/doc34_en.htm).

*The 2012 projections indicate a lower increase in strictly-age-related public spending in the AWG reference scenario than in the 2009 round...*

The increase in the strictly-age-related public expenditure/GDP ratio for the EU27 and the EA is slightly lower compared with the previous projections in the 2009 Ageing Report. Over the period 2010-2060, the increase in the EU is 4.1 p.p. of GDP and in the EA 4.5 p.p., compared with an estimated increase of 4.8 and 5.3 p.p. of GDP, respectively, in the previous 2009 Ageing Report (see [Graph 6](#) and [Graph 7](#)).

**Graph 6 – Projected change in strictly-age-related expenditure (AWG reference scenario) in '12 and '09 compared, p.p. of GDP, 2010-60**



**Source:** Commission services, EPC.

Compared with the projections in the 2009 Ageing Report, strictly-age-related public expenditure according to the AWG reference scenario is now projected to increase more over the period 2010-2060 in 11 Member States (Belgium, Denmark, Germany, Estonia, France, Hungary, Austria, Poland, Slovakia, Finland and Sweden). By contrast, it is now projected to increase less in 16 Member States (Bulgaria, the Czech Republic, Ireland, Greece, Spain, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Romania, Slovenia, and the United Kingdom). In some cases, the results are almost identical and the - positive or negative difference - is rather small. This is the case for all those countries where the observed rates are depicted on the line shown in the graph or very close to it ([Graph 6](#)).

The largest downward revisions have occurred in Greece, Luxembourg, Latvia and Spain, reflecting large expenditure-reducing pension reforms in Greece and Spain. Large upward revisions (2 p.p. of GDP or more) are reported in Belgium and Slovakia, reflecting, among others, the impact of the weaker economic developments (lower GDP growth), which is not matched by lower expenditure over the projection period.

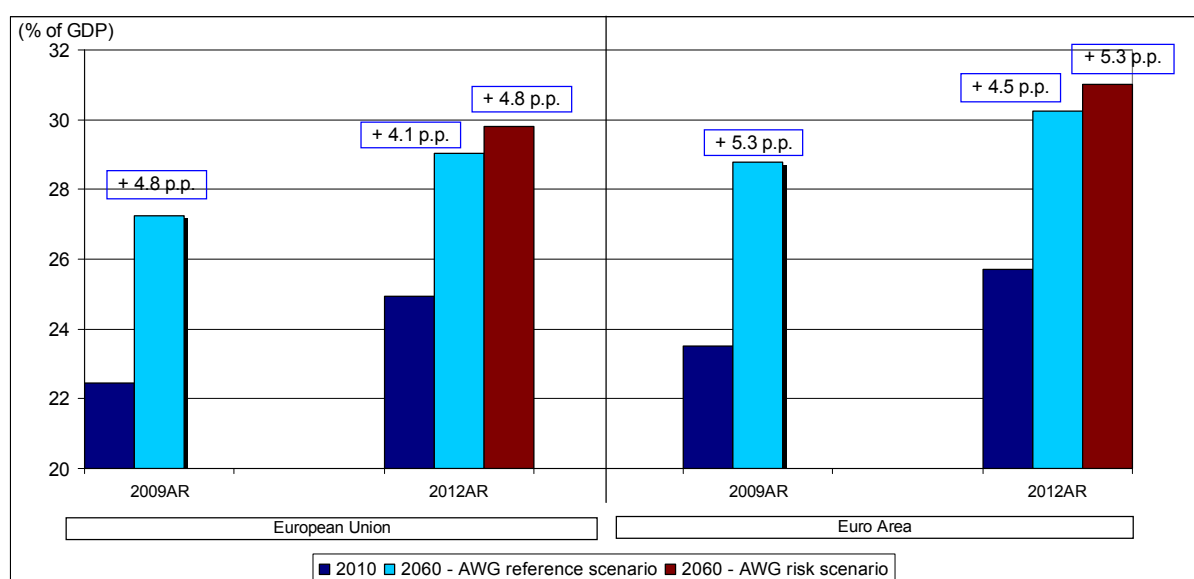
*...but from a much higher level after the crisis...*

The strictly-age-related spending as a share of GDP turned out to be substantially higher in 2010 than projected in the 2009 Ageing Report (at 25% of GDP in the EU compared with 22 ½ % estimated in the 2009 Ageing Report), influenced notably by lower economic growth (see Graph 7). In fact, strictly-age-related spending as a share of GDP for the EU would have reached 25% only in 2033, according to the AWG reference scenario in the 2009 Ageing Report. Going forward, the new projections show even larger public spending as a share of GDP at the end of the projection horizon (in 2060), estimated at 29% of GDP in the "AWG reference scenario" in the EU and at 30 ¼% of GDP in the EA, i.e. about 1 ¾ p.p. of GDP higher than in the previous 2009 Ageing Report. A number of Member States have announced plans to return stability to the public finances in the medium-term and efforts have been made to include those changes that have been legislated for into these projections. However, some of the downward pressure on age-related spending over the next decade may not be fully captured in the projections in cases where plans are not sufficiently detailed or fully legislated to be incorporated. Fiscal prudence in the medium-term is a necessary step to tackle the long-term challenge of the increasing burden of age-related spending, but it will not be sufficient unless reforms also tackle the impact of demographic change on the public finances.

*...and a broadly unchanged outstanding challenge when considering the AWG risk scenario*

When looking at the "AWG risk scenario" introduced in this projection round, the increase is in fact as high as in the previous projection. Given the higher level of public expenditure now and projected for the future, an even larger share of spending would need to be financed in the future (30% of GDP for the EU and 31% of GDP in the EA), unless the long-term spending trends can be curbed durably.

**Graph 7 – Strictly-age-related expenditure, EU and EA, % of GDP, 2010 and 2060**



**Source:** Commission services, EPC.

***The budgetary projections provide the basis for assessing risks to the long-term sustainability of public finances at the EU level***

The updated long-term budgetary projections provide a considerably enhanced basis for the assessment of the risks to the sustainability of Member States' public finances. In the latter half of 2012, the Commission intends to present the second update of the Sustainability Report, making use of this updated, enlarged and improved set of budgetary projection results.

The AWG reference scenario indicates the scale of the sustainability challenge EU Member States are facing that can be primarily attributed to demographic changes. The AWG reference scenario is suited for the evaluation of intergenerational aspects since, according to this scenario, future quality gains in health care are not considered in the current generations' budget constraint. This scenario should be used in the multilateral budgetary surveillance at EU level.

Complementing the AWG reference scenario, the AWG risk scenario indicates the overall scale of the challenge EU Member States are facing if health care cost increases faster than is motivated by demography, as observed in past decades in the EU as a whole. As such, it represents a possible scenario, reflecting the extrapolation of past dynamic trend increases in health care spending in the EU as a whole into the future, i.e. technological changes and institutional mechanisms. At the same time, the extrapolated trend growth of health care spending in excess of the demographic changes remains bounded in a longer term perspective, as the projected excess growth eventually approaches zero (by 2060). This scenario, therefore, provides additional information which should be taken into consideration in the comprehensive analysis of medium and long-term policy challenges in the EU. None of these scenarios means that the long-term challenge of the increasing burden of age-related spending should be dealt with only by frontloaded fiscal policies (i.e. pre-financing of the projected future health care and long-term care spending trends above that due to demographic changes). By contrast, the policy response needs to be comprehensive, and should comprise a vigorous structural reform agenda and appropriate policies to enhance the cost-effectiveness of care systems.

In sum, the updated long-term economic and budgetary projections confirm that coping with the challenge posed by an ageing population and trend increases in age-related spending will require determined policy action in the EU, along the comprehensive approach of the Europe 2020 strategy for smart, sustainable and inclusive growth, updating the three-pronged strategy decided by the Stockholm European Council in 2001, i.e.: (i) reducing debt at a fast pace; (ii) raising employment rates and productivity; and (iii) reforming pension, health care and long-term care systems.

# 1. Underlying demographic and macroeconomic assumptions

## 1.1. Population projection

Demographic factors are subject to less variation than economic factors over the short run. However, they have exhibited much less stability over the medium/long term of about 25 years. Eurostat's population projection EUROPOP2010, released in April 2011<sup>26</sup> was the basis for the 2012 long-term budgetary projection for the 27 EU Member States. As was the case with the EUROPOP2008 demographic projection, the EUROPOP2010 was made using a "convergence" approach. This means that the key demographic determinants are assumed to converge over the very long-term. These demographic determinants are: (i) the fertility rate; (ii) the mortality rate and (iii) the level of net migration.

### 1.1.1. Fertility

#### 1.1.1.1. Past trends

Total fertility rates (TFR<sup>27</sup>) have declined sharply in the EU Member States since the post-war "baby boom" peak above 2.5 in the second half of the 1960s, to below the natural replacement level of 2.1 (see [Graph 1. 1](#)). This decline was relatively fast and completely unexpected.

The trend of falling fertility rates differed across countries in size and timing. Fertility rates fell below replacement levels in the late 1960s in Sweden, Denmark, Finland, Luxembourg and Germany Hungary, Latvia and the Czech Republic. The fall took place somewhat later in Belgium, the Netherlands, Austria, the United Kingdom, France (1972-

73) and Italy (1975).<sup>28</sup> Declines in fertility rates occurred much later in Greece, Spain, Portugal (1981-82) and Ireland (2000) Malta (1980), Poland (1983) and Slovakia (in 1989).

However, more recent trends over the last decade indicate a trend shift. On average in the EU27, fertility rates have increased since 2000. In particular, increases are noted in almost all Member States, with total fertility rates above 1.8 in Ireland, France, Sweden, the United Kingdom, Finland, Belgium and Denmark. By contrast, fertility rates have continued to fall in Luxembourg and Portugal, while in Cyprus and Malta it has increased since 2005.

Several forces will shape the future trends in fertility, e.g. the trend in ideal family size and the strength of the desire to have children as compared to other goals in life, the trend in education and work, changing government policies and macro-level conditions such as child care facilities and housing, the changing nature and stability of partnerships and changing bio-medical conditions.

#### 1.1.1.2. The EUROPOP2010 projection

The convergence scenario approach employed in the EUROPOP2010 projection entails a process of convergence of fertility rates across Member States to that of the forerunners over the projection period over the very long-term. For the EU as a whole, the total fertility rate (TFR) is projected to rise from 1.59 in 2010 to 1.64 by 2030 and further to 1.71 by 2060. In the euro area, a similar increase is projected, from 1.57 in 2010 to 1.68 in 2060 (see [Graph 1. 2](#)).

<sup>26</sup> See Eurostat (2011), News release 80/2011, 8 June 2011.

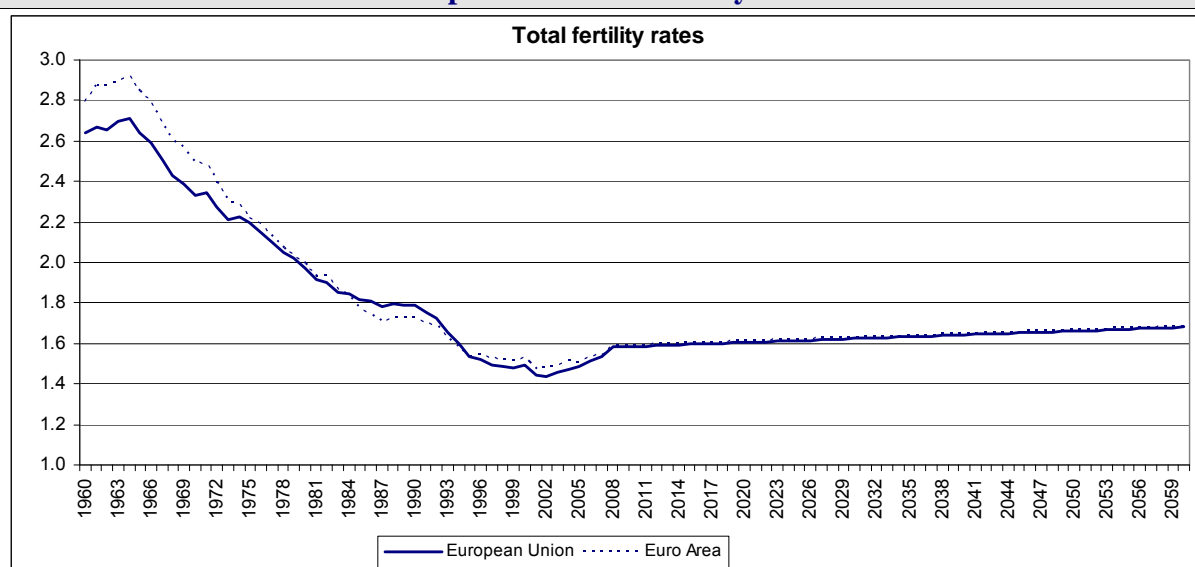
<sup>27</sup> Fertility rates are reflected by the average number of children a woman would have, should she at each bearing age have the fertility rates of the year under review (this number is obtained by summing the fertility rates by age and is called the Total Fertility Rate, or TFR).

<sup>28</sup> The time series for Germany (DE) exclude the former GDR before 1991 and refer to the Federal Republic starting with 1991 reference year.

The fertility rate is projected to increase over the projection period in nearly all Member States, with the exception of Ireland, France, Sweden and the United Kingdom (though remaining above 1.9). In Belgium, Denmark and Finland it is projected to remain stable. Hence, in all countries the fertility rates are expected to remain below the natural replacement rate of 2.1 in the period up to

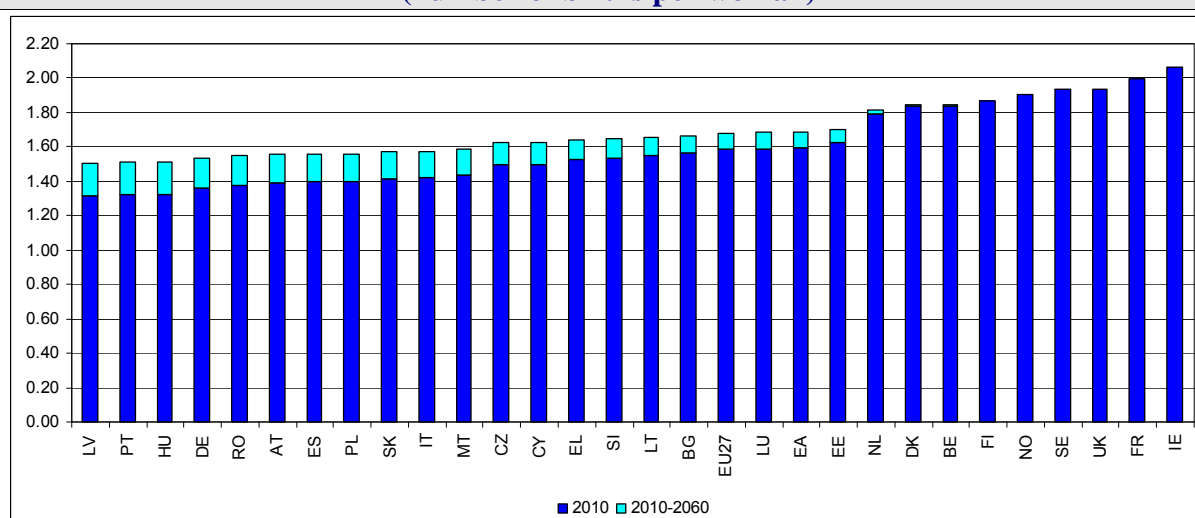
2060. As a result of the convergence assumption, the largest increases in fertility rates are projected to take place in Latvia, Hungary and Portugal, which have the lowest fertility rates in the EU in 2010. The increase is projected to occur gradually, with fertility rates in these countries approaching but not reaching the current EU average fertility rate in 2060.

**Graph 1.1 - Total fertility rates**



**Source:** Commission services, Eurostat, EUROPOP2010.

**Graph 1.2 - Projection of total fertility rates in EUROPOP2010  
(number of births per woman)**



**Source:** Commission services, Eurostat, EUROPOP2010.

**Note:** A slight reduction is projected for IE, FR, UK, SE and NO by 2060.



## **1.1.2. Life expectancy**

### *1.1.2.1. Past trends*

Life expectancy has been increasing in most developed countries worldwide over very long periods of time.<sup>29</sup> Since 1960, there have been significant increases in life expectancy at birth in all Member States (see [Graph 1. 3](#) and [Graph 1. 4](#)). Between 1960 and 2009, life expectancy at birth has increased significantly, especially for women. In euro-area Member States, the increase is even more pronounced where the life expectancy at birth increased with up to three months each year.

In the EU, the gap between female and male life expectancy has diminished since 1990, due to faster improvements in life expectancy for males relative to females. In the euro area, this process started in 1980, and the difference between males and females is also smaller than in the EU as a whole. Since 2000, the increase in life expectancy has been 2.2 for females and 2.6 for males.

The gains in life expectancy at birth have differed across countries between 1960 and 2009. Women have gained 11 years or more in Germany, Spain, France, Italy, Luxembourg, Malta, Portugal and Finland. Smaller increases of 8 years or less were observed in Bulgaria, the Czech Republic, Denmark, Latvia and Slovakia.

Gains in the life expectancy over the same period for men have been 11 years or more in Germany, Spain, France, Italy, Luxembourg, Malta, Austria, Portugal and Finland, while increases of 7 years or less have occurred in Bulgaria, the Czech Republic, Denmark, Estonia, Latvia, Lithuania, Hungary, Poland and Slovakia.

There is no consensus among demographers on trends over the very long term, e.g. whether there is a natural biological limit to longevity, the impact of future medical breakthroughs, long-term impact of public health programmes and societal behaviour such as reduction of smoking rates or increased prevalence of obesity. Past population projections from official sources have, however, generally underestimated the gains in life expectancy at birth as it was difficult to imagine that the reduction of mortality would continue at the same pace in the long run.

Official projections generally assume that gains in life expectancy at birth will slow down in comparison to historical trends. This is because mortality rates at younger ages are already very low and future gains in life expectancy would require reductions in mortality rates at older ages (which statistically have a smaller impact on life expectancy at birth). On the other hand, the wide range of life expectancies across EU Member States, and also compared with other countries, points to considerable scope for future gains. In 2009, life expectancy at birth for females ranged from 77.4 in Romania and Bulgaria to 85 years in France, and for males from 67.5 in Lithuania to 79.4 in Sweden.

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<sup>29</sup> Since the 19<sup>th</sup> century, improvements in living conditions and medical advances have led to increases in life expectancy at birth. Several stages have been identified in the decline in mortality, starting in northwest Europe around 1700 to 1800 with a reduction of variations in mortality rates as famine-related mortality was reduced (UN, 2004). Mortality levels began to decline in a second stage that started in the early 19<sup>th</sup> century in England and Northern European countries, due to vaccination and public health measures as well as improved personal hygiene. The decline in mortality rates accelerated during the third stage in the early years of the 20<sup>th</sup> century, with significant improvements made in reduction of infant and child mortality and in survival rates of young adults.

### 1.1.2.2. The EUROPOP2010 projection

The EUROPOP2010 projection shows large increases in life expectancy at birth being sustained during the projection period, albeit with a considerable degree of diversity across Member States.

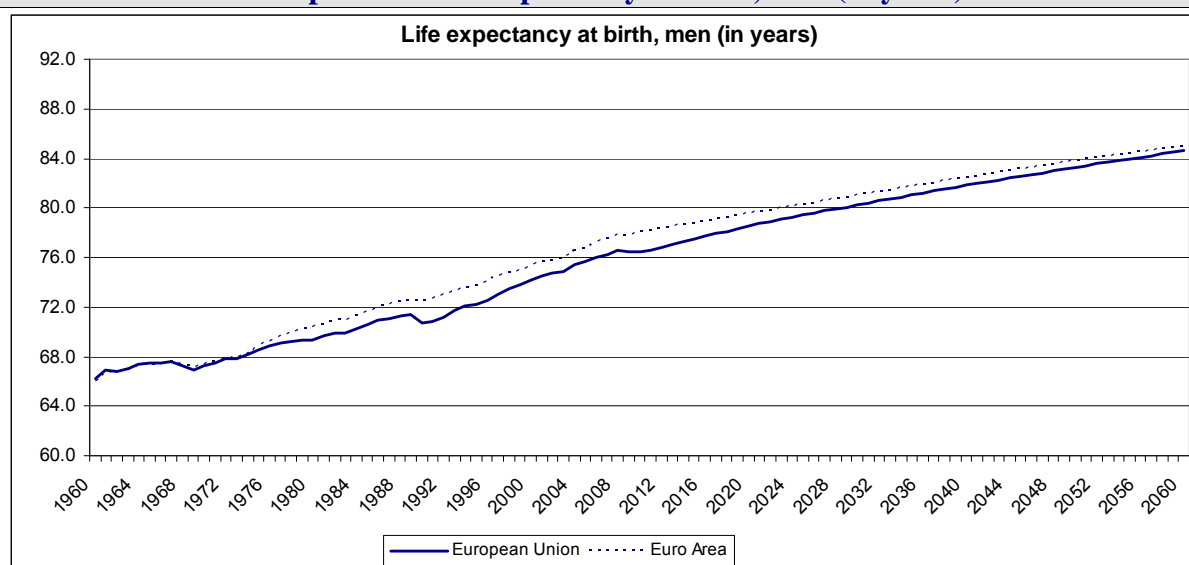
In the EU, life expectancy at birth for males is projected to increase by 7.9 years over the projection period, from 76.7 in 2008 to 84.6 in 2060. For females, life expectancy at birth is projected to increase by 6.5 years, from 82.5 in 2008 to 89.1 in 2060, implying a convergence of life expectancy between males and females. The largest increases in life expectancy at birth, for both males and females, are projected to take place in the Member States with the lowest life expectancy in 2010. Life expectancy for males in 2010 is the lowest in Bulgaria, Estonia, Latvia, Lithuania, Hungary and Romania, ranging between 67 and 71 years. Some catching-up takes place over the projection period, with increases in life expectancy of more than 11 years up to 2060 for these countries. For females, the largest gains in life expectancy at birth of 8 years or more are projected in Bulgaria, Latvia, Lithuania, Hungary, Romania and Slovakia.

Female life expectancy in 2010 in all of these countries is below 80 years (see [Graph 1. 5](#) and [Graph 1. 6](#)).

Given the assumed ‘convergence hypothesis’, the projection compresses the spread of life expectancy at birth for males across the Member States, from 11.7 years in 2008 (Sweden 79.4 and Lithuania 67.7) to 4.8 years in 2060 (85.5 in Sweden and Italy compared with 80.7 in Lithuania). For females, the reduction of the differential in life expectancy at birth is lower, from 7.2 years in 2008 (84.7 in Spain and 77.5 in Bulgaria and Romania) to 3.4 year in 2060 (90 in France and 86.6 in Bulgaria).

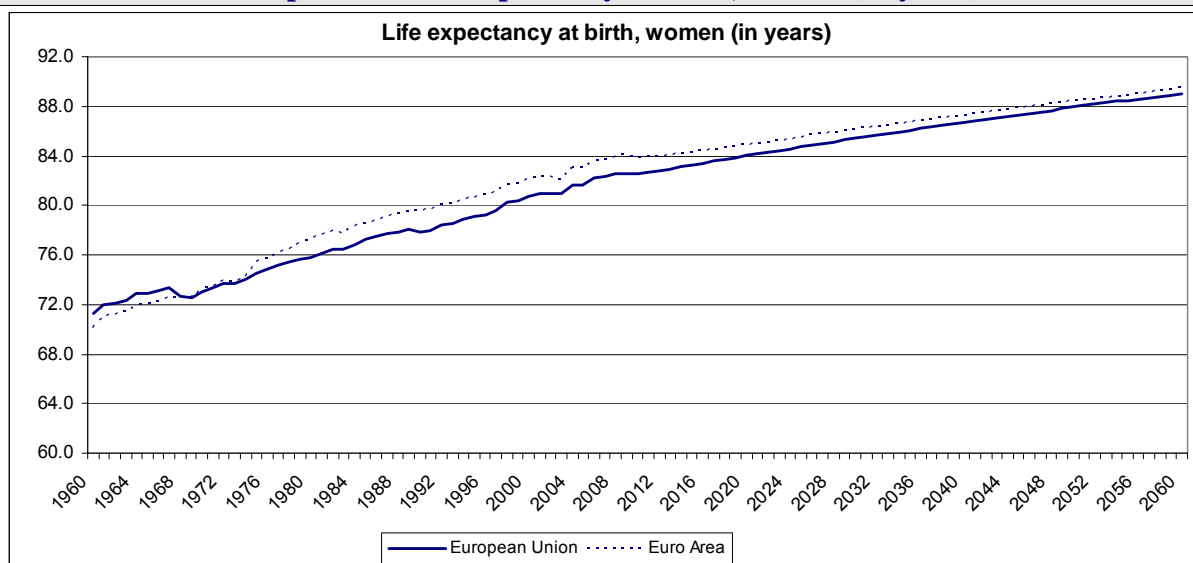
In the EU as a whole, life expectancy at age 65 is projected to increase by 5.2 years for males and by 4.9 years for females over the projection period. In 2060, life expectancy at age 65 will reach 22.4 years for males and 25.6 for females and the projected difference (3.2 years) is smaller than the 4.5 year difference in life expectancy at birth. In 2060, the highest life expectancy at age 65 is expected in France for both males (23 years) and females (26.6 years), while the lowest is expected in Bulgaria for both males (20.6 years) and females (23.6 years) (see [Graph 1. 7](#) and [Graph 1. 8](#)).

**Graph 1. 3 - Life expectancy at birth, men (in years)**



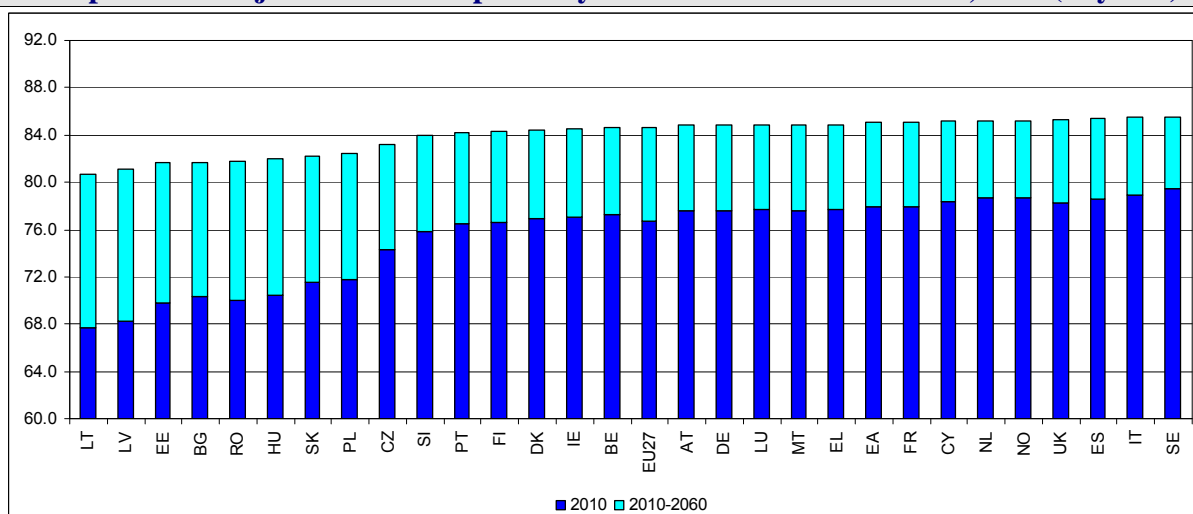
**Source:** Commission services, Eurostat, EUROPOP2010.

**Graph 1. 4 - Life expectancy at birth, women (in years)**



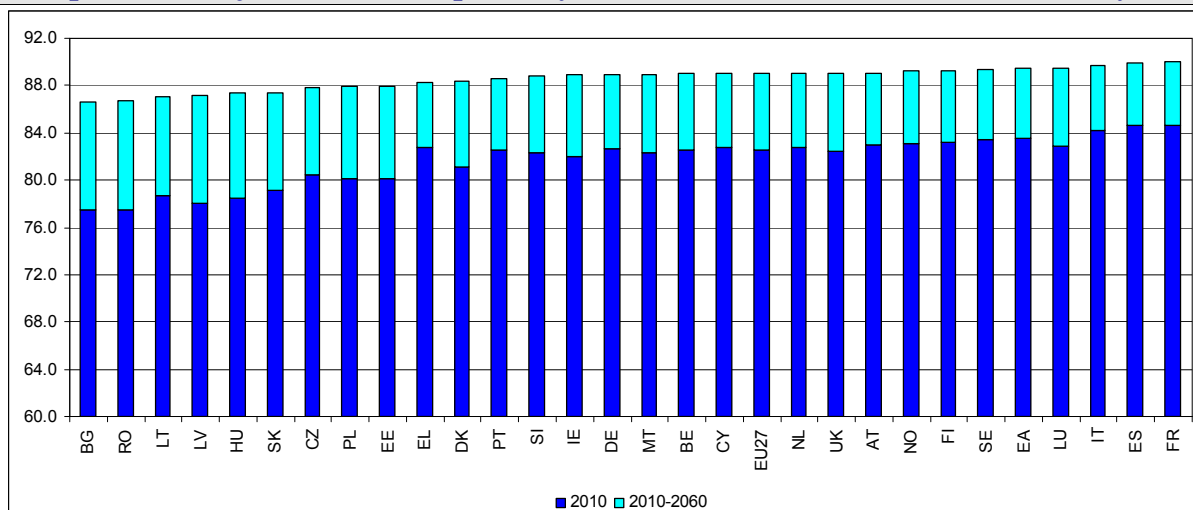
**Source:** Commission services, Eurostat, EUROPOP2010.

**Graph 1. 5 - Projection of life expectancy at birth in EUROPOP2010, men (in years)**



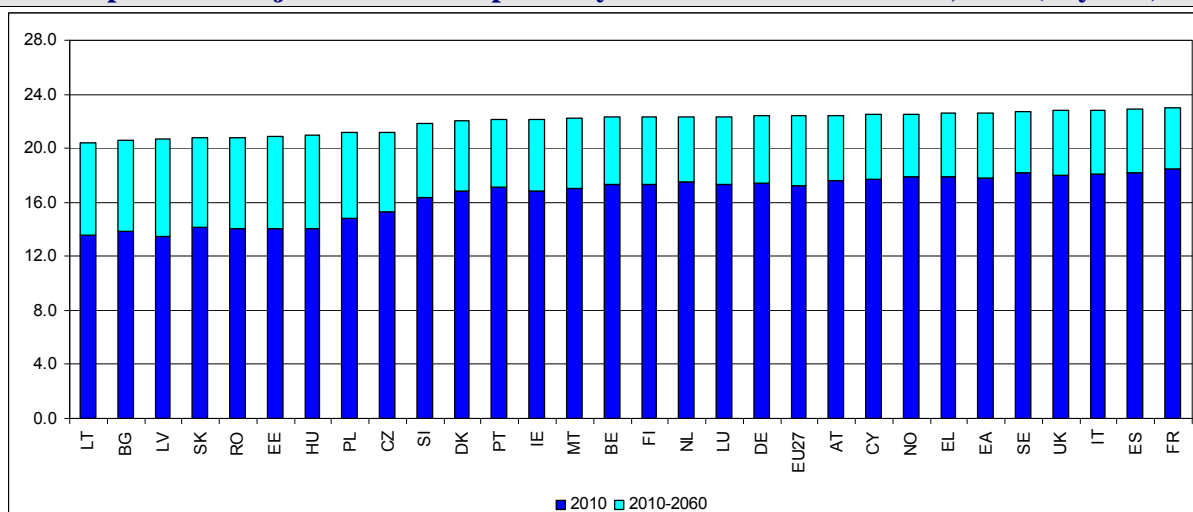
**Source:** Commission services, Eurostat, EUROPOP2010.

**Graph 1. 6 - Projection of life expectancy at birth in EUROPOP2010, women (in years)**



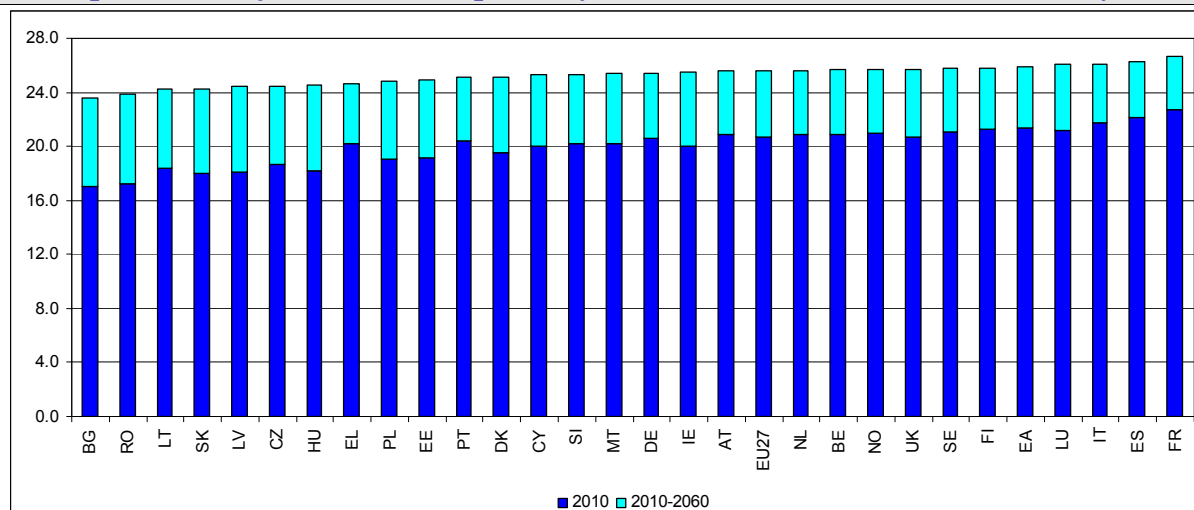
**Source:** Commission services, Eurostat, EUROPOP2010.

**Graph 1. 7 - Projection of life expectancy at 65 in EUROPOP2010, men (in years)**



**Source:** Commission services, Eurostat, EUROPOP2010.

**Graph 1. 8 - Projection of life expectancy at 65 in EUROPOP2010, women (in years)**



**Source:** Commission services, Eurostat, EUROPOP2010.

### 1.1.3. Net migration flows

#### 1.1.3.1. Past trends

European countries have gradually become a destination for migrants, starting in the 1950s in countries with post-war labour recruitment needs and with colonial past. Southern European countries became net receiving countries during the 1990s and several countries in Central and Eastern Europe are currently both source and destination of migrants (see [Graph 1. 9](#)).

Net inflows dropped significantly between 1992 and 1997, partly due to tighter controls over migratory flows in the main receiving countries, but they resumed their growth at the end of the 1990s. Overall, the average annual net entries for the EU25 more than tripled from around 198,000 people per year during the 1980s to around 750,000 people per year during the 1990s. High clandestine migration also marks the decade of the 1990s. In the beginning of the 2000s the net migration flows to the EU27 countries encountered a vigorous increase, totalling more than 2,000,000 in 2003.

Net migration flows<sup>30</sup> per country are characterised by high variability. Traditionally, Germany, France and the United Kingdom record the largest number of arrivals in the EU, but in the last decade there has been a rise of migration flows to Italy, Spain and Ireland that have switched from countries of origin to destination countries. After high migration inflows to the EU in the first half of the 2000s, flows were reduced drastically and even turned into outflows in some countries that previously had experienced sharp increases. For the EU as a whole, annual inward migration more than halved between 2005 and 2009 (from +1,760,933 in 2005 to +879,644 in 2009). In terms of persons, the largest declines in annual inflows were recorded in ES, FR, DE, IE and UK (between 590,000 and 48,000 less). By contrast, higher inflows were noted

<sup>30</sup> As it was difficult to get good data on migration flows for each Member State, net migration is measured as the difference between the total population on 31 December and 1 January for a given calendar year, minus the difference between births and deaths (or natural increase). The approach is different from that of subtracting recorded emigration flows from immigration flows. Notably, "net migration" on this basis not only records errors due to the difficulty of registering the migration moves, it also includes all possible errors and adjustments in the other demographic variables.

in NL, SE, BE and IT (between 61,000 and 14,000 more) (see [Graph 1. 10](#)). However, net migration flows do not show the size of inward and outward movements – due to temporary and return migration. Therefore, in general, net migration flows are much smaller than gross flows.

#### 1.1.3.2. *The EUROPOP2010 projection*

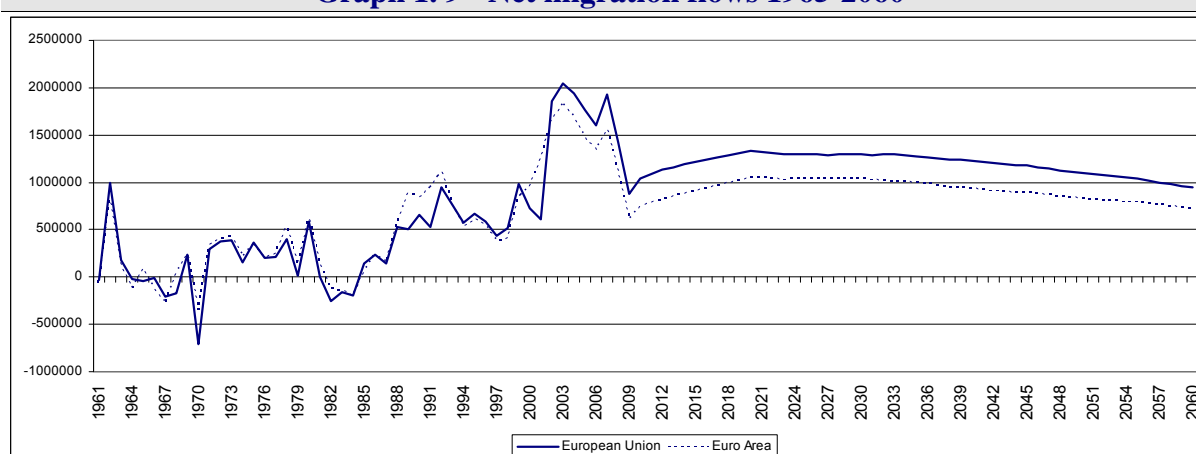
Over the projection period, annual net inflows to the EU as a whole are projected to increase from about 1,043,000 people in 2010 (equivalent to 0.21% of the EU population) to 1,332,500 by 2020 and thereafter declining to 945,000 people by 2060.

Over the entire projection period, the cumulated net migration to the EU is 60 million, of which the bulk is concentrated in the euro area (45.8 million). Net migration flows are projected to be concentrated to a few destination countries: Italy (15.9 million cumulated up to 2060), Spain (11.2 million) and the United Kingdom (8.6 million). According to the assumptions, the change of Spain and Italy from origin in the past to destination countries would be confirmed in coming decades. For countries that currently

experience a net outflow (BG, EE, LV, LT, MT and RO), this is projected to taper off or reverse in the coming decades (see [Graph 1. 11](#)).

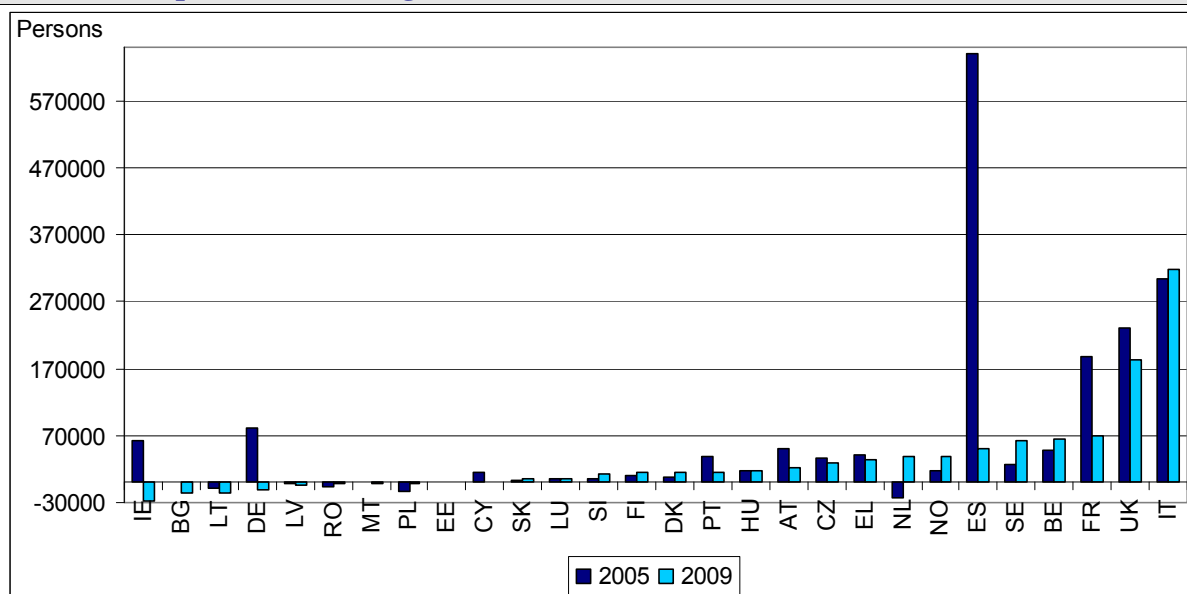
The estimation of the net migration necessary to keep the ratios of working-age population-to total population constant at their 2010 level indicates that the EU as a whole would need significant net immigration. It would amount to over 11 million additional inflows over the period 2010 to 2020, which would bring the total immigration flows, including the inflows which are already incorporated in the population projection, to nearly 25 million or 5% of the population in 2010 (see [Table 1. 1](#)). The Czech Republic, Ireland, Slovenia and Finland would need additional net immigration flows above 4% of their 2010 population to maintain their current labour force-to-population ratios, bringing the total immigration flows to 7 ½ % or more (with the exception of Ireland). This illustrates the magnitude of the migration inflows that would be necessary as a supply of labour, in absence of other changes such as increases in the labour force participation rates.

**Graph 1. 9 - Net migration flows 1965-2060**



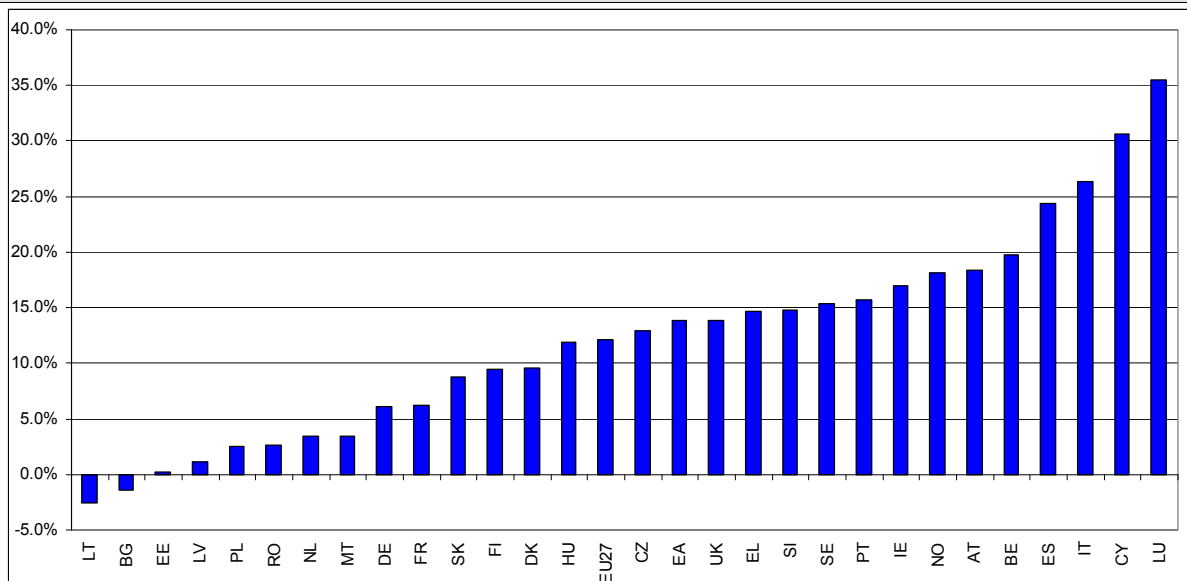
**Source:** Commission services, Eurostat.

**Graph 1. 10 - Net migration flows in EU Member States, 2005 and 2009**



*Source:* Commission services, Eurostat.

**Graph 1. 11 - Projection of cumulated net migration flows in EUROPOP2010 over the period 2010-2060, as a percentage of the population in 2010**



*Source:* Commission services, Eurostat, EUROPOP2010.

**Table 1. 1 - Estimation of net migration needs by 2020**

In order to keep the ratio labour force to population in 2020 at 2010 level									
	WAP 2020	of which: cumulated migration since 2010		WAP as % 2010 POP	WAP needed	Additional migrants needed		Total migrants	
	000s	000s	in % WAP		000s	000s	as % 2010POP	000s	as % 2010POP
BE	6729	591	8.8	60	6967	239	2.2	830	7.6
BG	4215	-129	-3.1	63	4496	282	3.7	153	2.0
CZ	6484	347	5.4	65	6996	512	4.9	859	8.2
DK	3279	130	4.0	59	3385	105	1.9	235	4.2
DE	47678	918	1.9	61	48646	969	1.2	1886	2.3
EE	775	-7	-0.8	62	818	43	3.2	37	2.7
IE	2735	0	0.0	61	2947	212	4.7	212	4.7
EL	6847	348	5.1	62	7094	248	2.2	596	5.3
ES	29252	1892	6.5	63	30382	1130	2.5	3022	6.6
FR	37790	928	2.5	59	39888	2098	3.2	3027	4.7
IT	37344	3877	10.4	61	38293	948	1.6	4826	8.0
CY	544	45	8.3	63	561	17	2.1	62	7.6
LV	1308	-19	-1.4	63	1340	32	1.4	13	0.6
LT	1948	-99	-5.1	62	1963	15	0.5	-84	-2.5
LU	357	55	15.4	62	360	2	0.4	57	11.3
HU	6005	283	4.7	63	6202	197	2.0	480	4.8
MT	247	-3	-1.4	63	261	14	3.4	11	2.6
NL	10005	244	2.4	61	10510	504	3.0	748	4.5
AT	5270	298	5.7	62	5306	36	0.4	334	4.0
PL	23636	196	0.8	65	24896	1260	3.3	1457	3.8
PT	6476	302	4.7	62	6605	130	1.2	432	4.1
RO	13119	64	0.5	64	13468	349	1.6	413	1.9
SI	1295	95	7.3	64	1380	85	4.1	180	8.8
SK	3533	116	3.3	66	3670	137	2.5	253	4.6
FI	3103	151	4.9	60	3350	246	4.6	397	7.4
SE	5661	484	8.6	58	5901	241	2.6	725	7.7
UK	38340	2150	5.6	60	39737	1397	2.2	3547	5.7
NO	3129	299	9.5	60	3219	89	1.8	388	7.9
EU27	303976	13259	4.4	61	315571	11596	2.3	24854	5.0
EA17	199980	9850	4.9	61	207051	7070	2.1	16921	5.1

**Source:** Commission services, Eurostat, EUROPOP2010.

**Note:** WAP is the working-age population (20-64).

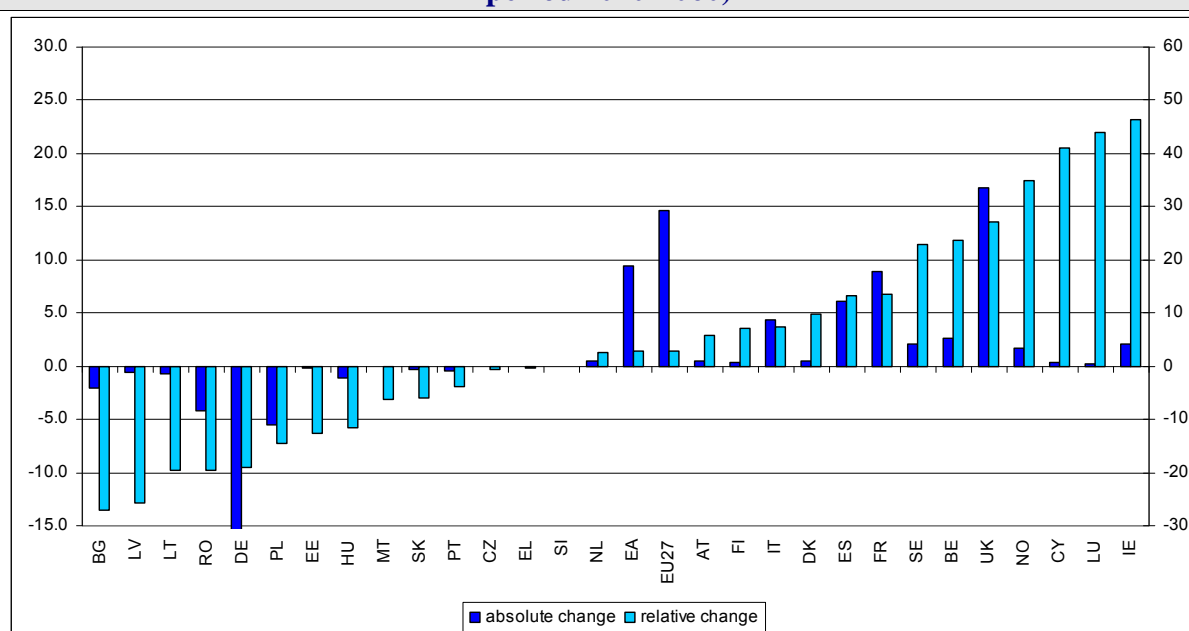
#### 1.1.4. Overall results of the EUROPOP2010 population projection

The age structure of the EU population will dramatically change in the coming decades due to the dynamics of fertility, life expectancy and migration. The overall size of the population is projected to be slightly larger in 50 years time, but much older than it is now. The EU population is projected to increase (from 501 million in 2010) up to 2040 by almost 5%, when it will peak (at 526 million). Thereafter, a steady decline occurs and the population shrinks by nearly 2%. Nonetheless, according to the projections, the population in 2060 will be slightly higher than in 2008, at 517 million (see [Graph 1. 12](#)).

While the EU population as a whole would be slightly larger in 2060 compared to 2010, there are wide differences in population trends until 2060 across Member States. Decreases of the total population are projected for about half of the EU Member States (BG, CZ, DE, EE, EL, LV, LT, HU, MT, PL, PT, RO and SK). For the remaining Member States (BE, DK, IE, ES, FR, IT, CY, LU, NL, AT, SI, FI, SE and UK) an increase is projected. The strongest population growth is projected for Ireland (+46%), Luxembourg (+45%), Cyprus (+41%), the United Kingdom (+27%), Belgium (+24%) and Sweden (+23%), and the sharpest declines in Bulgaria (-27%), Latvia (-26%), Lithuania (-20%), Romania and Germany (both -19%) (see [Table 1. 6](#)).



**Graph 1. 12 - Projection of the total population (percentage and absolute change for the period 2010-2060)**



**Source:** Commission services, Eurostat, EUROPOP2010.

In 2010, the Member States with the largest population were Germany (82 million), France (65 mn), the United Kingdom (62 mn), Italy (60 mn) and Spain (46 mn). In 2060, the United Kingdom is projected to be the most populous EU country (79 million), followed by France (74 mn), Germany (66 mn), Italy (65 mn) and Spain (52 mn). In the case of Germany, the main driver for the significant decrease of the projected population is the very low net migration that results from the underlying migration assumptions.<sup>31</sup>

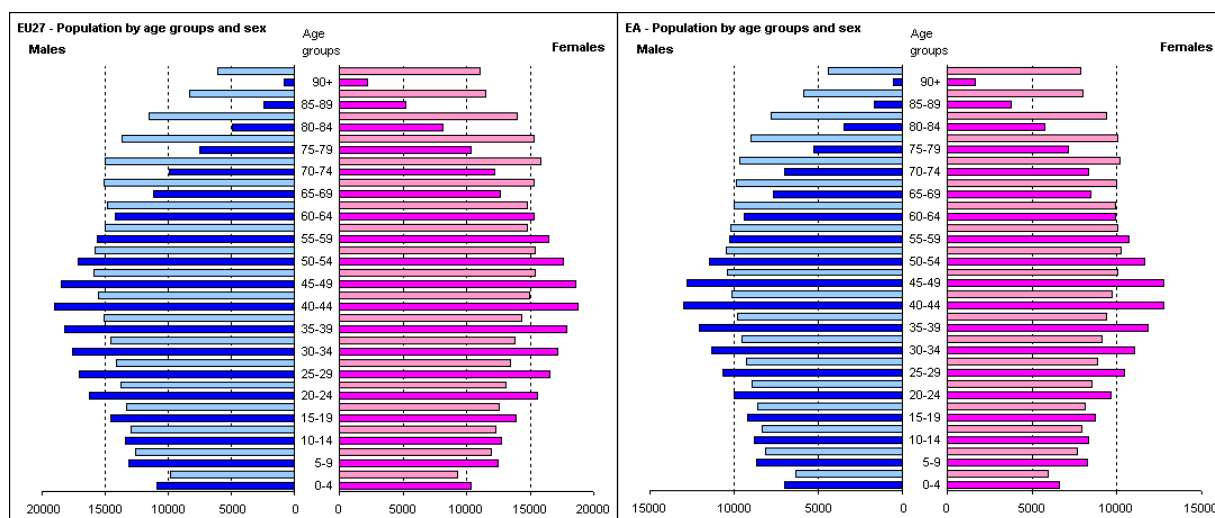
The age structure of the EU population is projected to change dramatically, as shown in the population pyramids presented in [Graph 1. 13](#). The most numerous cohorts in 2010 are around 40 years old for men and women. Elderly people are projected to account for an

increasing share of the population; this is due to the combination of the arrival at age 65 and more of the numerous cohorts born in the 1950s and 1960s with gains in life expectancy continuing over the projection period. At the same time, the base of the age pyramid becomes smaller during the projection period due to below replacement fertility rates. As a consequence, the shape of the age pyramids gradually changes from pyramids to pillars. A similar development is projected for the euro area.

The proportion of young people (aged 0-19) is projected to remain fairly constant until 2060 in the EU27 and the euro area (around 20%), while those aged 20-64 will become a substantially smaller share, declining from 61% to 51%. Those aged 65 and over will become a much larger share (rising from 17% to 30% of the population), as will those aged 80 and over (rising from 5% to 12%) (see [Graph 1. 14](#), [Graph 1. 15](#) and [Graph 1. 16](#)).

<sup>31</sup> During the next 50 years, net immigration to Germany is projected to be about 5 million, while in other Member States (e.g. ES and IT), it is between two and three times higher. Reflecting these assumptions, German population shrinks considerably. In 2060, Germany will no longer be the most populous Member States in the EU, but it is projected to become the third most populous Member State.

**Graph 1. 13 - Population pyramids (in thousands), EU27 and EA, in 2010 and 2060**



**Source:** Commission services, Eurostat, EUROPOP2010.

The magnitude of changes in the share of the population in different age groups, according to the projection, would make the population in 2060 hard to recognise for a present observer. In 2010, the number of children was about three and a half times as large as the number of elderly aged 80 years and above. In 2060, children would still outnumber very old persons, but only by a small margin: the number of oldest-old would amount to 80% of the number of children. Today, the number of persons aged 65 or above already surpasses the number of children, but their numbers are relatively close. In 2060, the number of elderly would more than double the number of children. Another notable aspect of population ageing is the progressive ageing of the older population itself, as the oldest-old are growing faster than any other segment of the population.

As a result of these different trends among age groups, the demographic old-age dependency ratio (people aged 65 or above

relative to those aged 20-64) is projected to increase from 28% to 58% in the EU as a whole over the projection period (see [Graph 1. 17](#)). This entails that the EU would move from having four working-age people for every person aged over 65 years to two working-age persons. For the EU as a whole, the working-age population peaks in 2012, and steadily declines thereafter (see [Table 1. 2](#)).

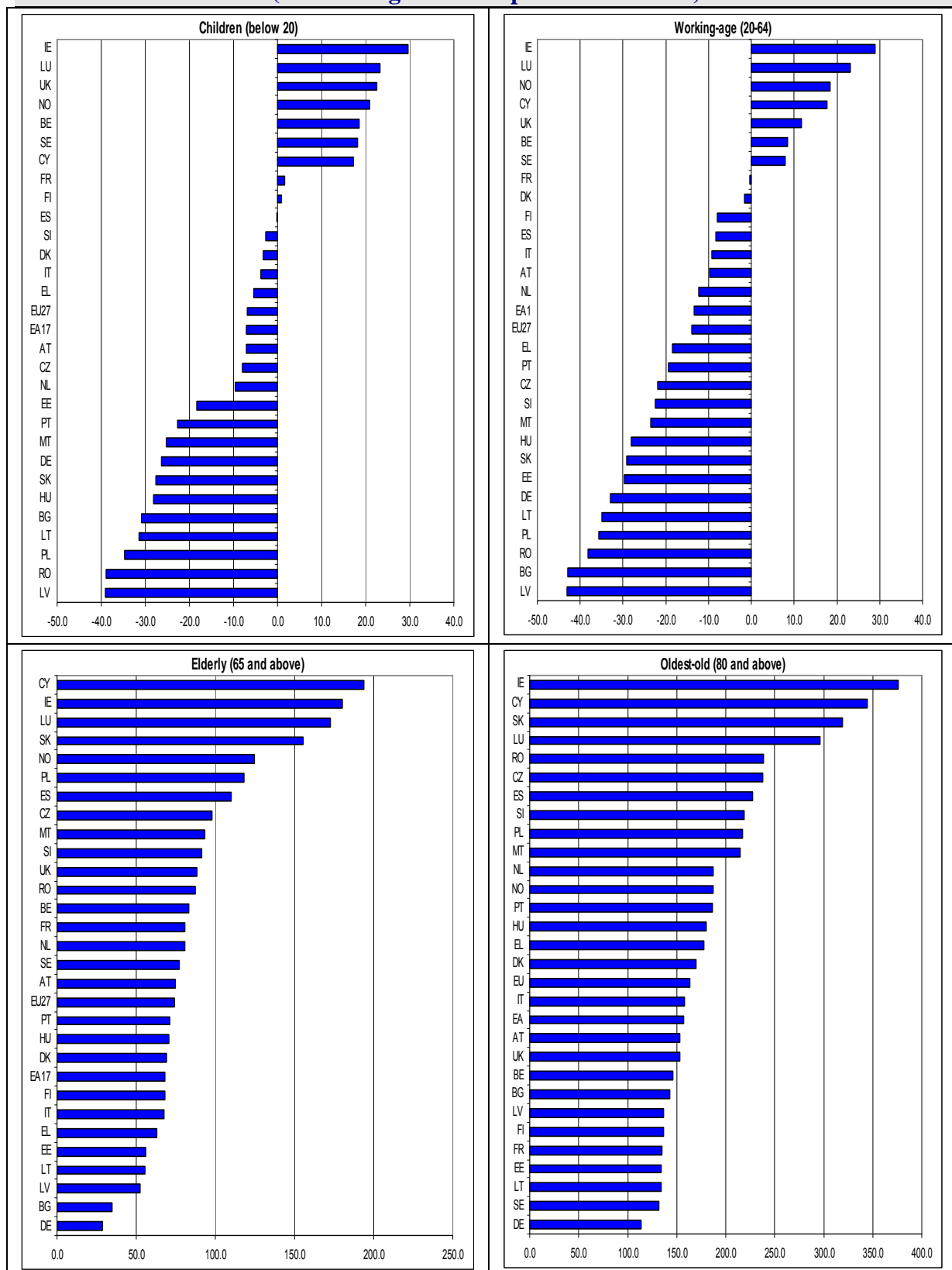
The increase in the total age-dependency ratio (people aged 19 and below and aged 65 and above over the population aged 20-64) is projected to be even larger, rising from 63% to 95%. The difference is noticeable among individual EU Member States. A relatively small increase in the total age-dependency ratio (less than 25 p.p.) is projected in Belgium, Denmark, Ireland, France, Sweden and the United Kingdom, while in Latvia, Poland, Romania, Slovenia and Slovakia, an increase of 45 percentage points or more is projected by 2060 (see [Graph 1. 17](#)).

**Table 1. 2 - Peaks and troughs for the size of the total population and the working-age population**

	Total population (in millions)						Working-age population 20-64 (in millions)					
	2010 - value	Peak	year	2010 - peak	value	Trough	2010 - value	Peak	year	2010 - peak	value	Trough
				% change						% change		
				peak - trough						peak - trough		
BE	10.9	13.5	2060	23.7%	10.9	2010	6.5	7.1	2060	8.5%	6.5	2010
BG	7.5	7.5	2010	0.0%	5.5	2060	4.8	4.8	2010	0.0%	2.7	2060
CZ	10.5	10.9	2025	3.2%	10.5	2060	6.8	6.8	2010	0.0%	5.3	2060
DK	5.5	6.1	2060	9.7%	5.5	2010	3.3	3.3	2021	0.1%	3.2	2041
DE	81.7	81.7	2010	0.0%	66.2	2060	49.7	49.8	2011	0.2%	33.3	2060
EE	1.3	1.3	2010	0.0%	1.2	2060	0.8	0.8	2011	0.2%	0.6	2060
IE	4.5	6.6	2060	46.5%	4.5	2010	2.7	3.5	2060	28.9%	2.7	2015
EL	11.3	11.6	2042	2.8%	11.3	2060	7.0	7.0	2010	0.0%	5.7	2060
ES	46.1	52.7	2051	14.4%	46.1	2010	29.1	29.5	2029	1.4%	26.7	2056
FR	64.9	73.7	2060	13.7%	64.9	2010	38.1	38.2	2011	0.2%	37.5	2038
IT	60.5	66.0	2046	9.1%	60.5	2010	36.8	37.4	2023	1.6%	33.4	2060
CY	0.8	1.1	2060	40.9%	0.8	2010	0.5	0.6	2045	21.2%	0.5	2010
LV	2.2	2.2	2010	0.0%	1.7	2060	1.4	1.4	2011	0.2%	0.8	2060
LT	3.3	3.3	2010	0.0%	2.7	2060	2.1	2.1	2012	0.0%	1.3	2060
LU	0.5	0.7	2060	44.0%	0.5	2010	0.3	0.4	2060	23.2%	0.3	2010
HU	10.0	10.0	2010	0.0%	8.8	2060	6.3	6.3	2011	0.1%	4.5	2060
MT	0.4	0.4	2026	1.2%	0.4	2060	0.3	0.3	2010	0.0%	0.2	2060
NL	16.6	17.7	2036	6.2%	16.6	2010	10.1	10.1	2011	0.1%	8.9	2060
AT	8.4	9.0	2043	7.2%	8.4	2010	5.2	5.3	2019	2.0%	4.7	2060
PL	38.2	38.4	2018	0.6%	32.6	2060	24.8	24.9	2012	0.4%	15.9	2060
PT	10.6	10.8	2034	1.3%	10.2	2060	6.6	6.6	2010	0.0%	5.3	2060
RO	21.4	21.4	2010	0.0%	17.2	2060	13.8	13.8	2011	0.1%	8.5	2060
SI	2.1	2.2	2027	5.0%	2.1	2010	1.3	1.3	2013	0.9%	1.0	2060
SK	5.4	5.6	2024	3.0%	5.1	2060	3.6	3.6	2014	1.4%	2.5	2060
FI	5.4	5.7	2060	7.1%	5.4	2010	3.2	3.2	2010	0.0%	3.0	2060
SE	9.4	11.5	2060	23.0%	9.4	2010	5.5	6.0	2050	9.2%	5.5	2010
UK	62.2	79.0	2060	27.0%	62.2	2010	37.2	41.5	2060	11.8%	37.2	2010
NO	4.9	6.6	2060	35.0%	4.9	2010	2.9	3.4	2060	18.4%	2.9	2010
EU27	501.8	525.8	2042	4.8%	501.8	2010	307.5	308.2	2012	0.2%	264.5	2060
EA17	331.4	348.7	2041	5.2%	331.4	2010	201.7	202.1	2011	0.2%	174.7	2060

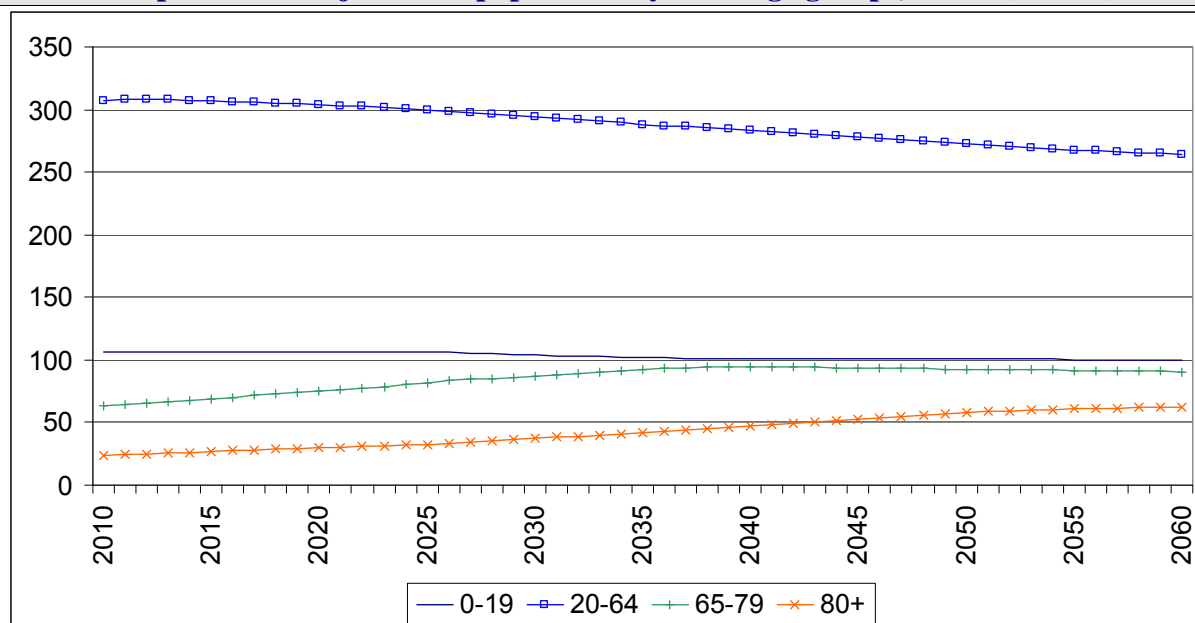
*Source:* Commission services, Eurostat, EUROPOP2010.

**Graph 1. 14 - Projected change of main population groups  
(in % change over the period 2010-2060)**



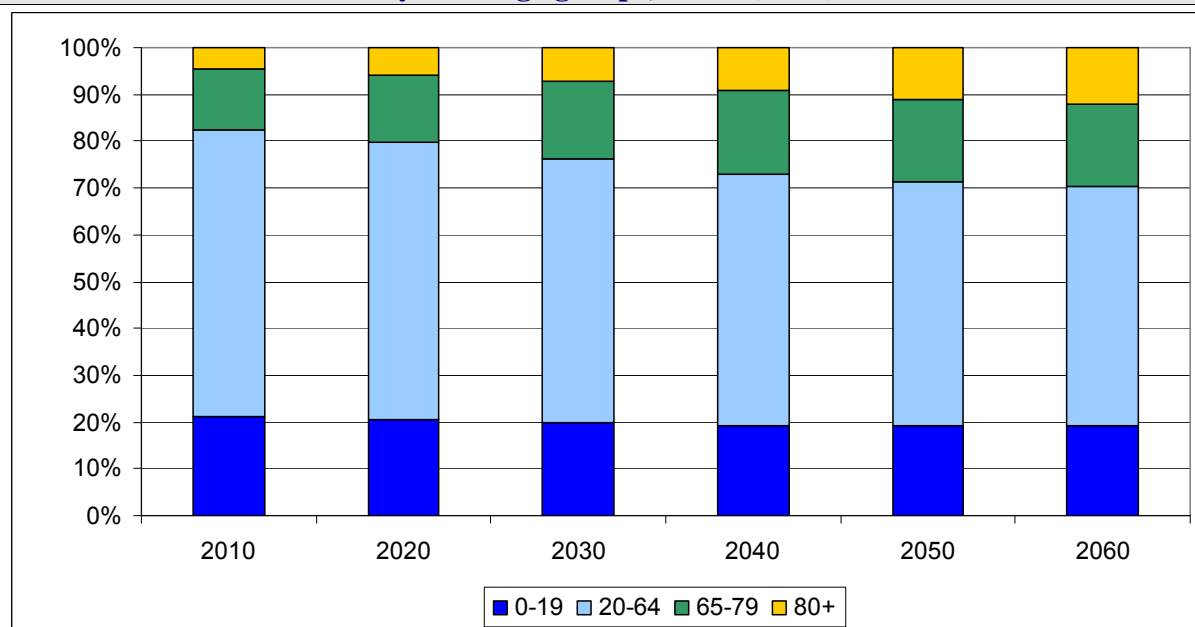
*Source:* Commission services, Eurostat, EUROPOP2010.

**Graph 1. 15 - Projection of population by main age groups, EU27 (in 000s)**



*Source:* Commission services, Eurostat, EUROPOP2010.

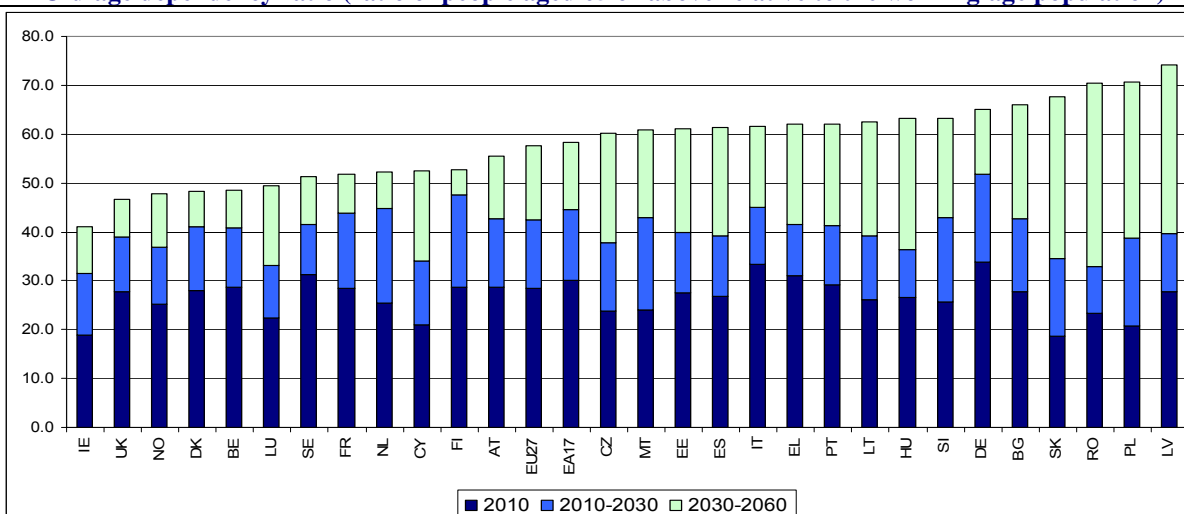
**Graph 1. 16 - Projection of changes in the structure of the population by main age groups, EU27 (in %)**



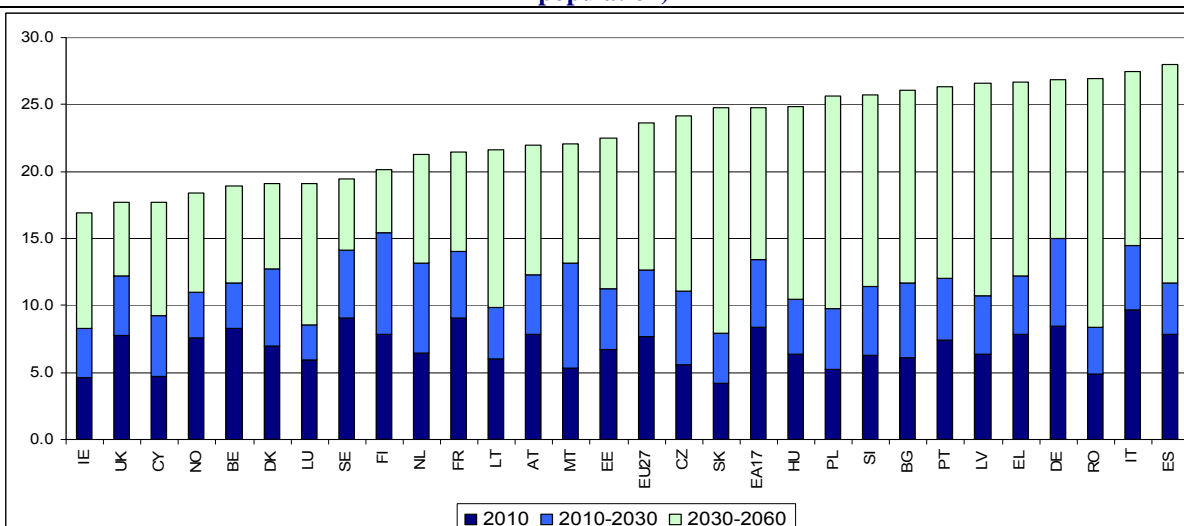
*Source:* Commission services, Eurostat, EUROPOP2010.

**Graph 1. 17 - Dependency ratios (in percentage)**

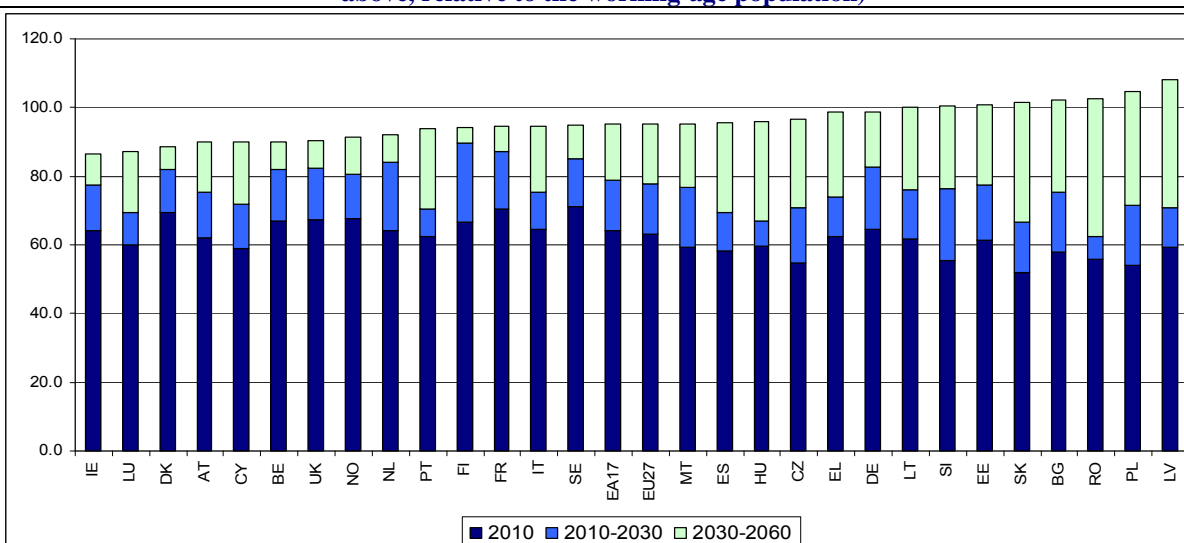
**Old-age dependency ratio (ratio of people aged 65 or above relative to the working-age population)**



**Dependency ratio of the oldest-old (ratio of people aged 80 or above relative to the working-age population)**



**Total dependency ratio (ratio of dependent people, both children aged below 15 and elderly aged 65 or above, relative to the working-age population)**



**Source:** Commission services, Eurostat, EUROPOP2010.

### **1.1.5. Population ageing is a global phenomenon**

Although population ageing is a well-known phenomenon and challenge in the EU, it is not an exclusive facet of Europe. Similar trends are presents also in other parts of the world, but to varying degrees.

Looking at demographic trends from a global perspective, using the UN statistics and projections, the share of the population of what is the EU today halved from 14.7% of the world population in 1950 to 7.9% in 2000 (see [Graph 1. 18](#)). It is projected to drop to close to 5.5% in 2050, despite the projected net migration flows.<sup>32</sup> The share of the populations of Japan, China and the US was also declining over the last five decades. This declining trend over the period 1950 to 2010 is in contrast to opposing trends in Africa, Asia or Latin America, whose share of the world population was rising.

Going to 2100, continuous declines are projected for the EU, Japan and China, while a rebound is projected for the United States (US).

Over the period 2000 to 2050, the share of the population in Africa is projected to increase fast, exceeding 20% of the world population in 2050. In Asia as a whole, a decline is projected, accounting for about 55% of the world population in 2050. The decline is particularly evident for China, where the share of the world population is projected to fall from 20.7% to 13.9% between 2000 and 2050. The population of the European continent will become relatively smaller by 2050 with its share shrinking by 3 p.p. (from 11.9% to 7.7%). The Northern America and the US shares (5.2% and 4.7%, respectively) will decline less (to 4.8% and 4.3%). The other regions of the world will roughly keep their shares.

Overall, the world population is continuing to grow sharply and planet earth, hosting 6,895,889,000 inhabitants in 2010, will be the habitat for 9,306,128,000 persons in 2050, which translates into an increase of 35% over forty years.

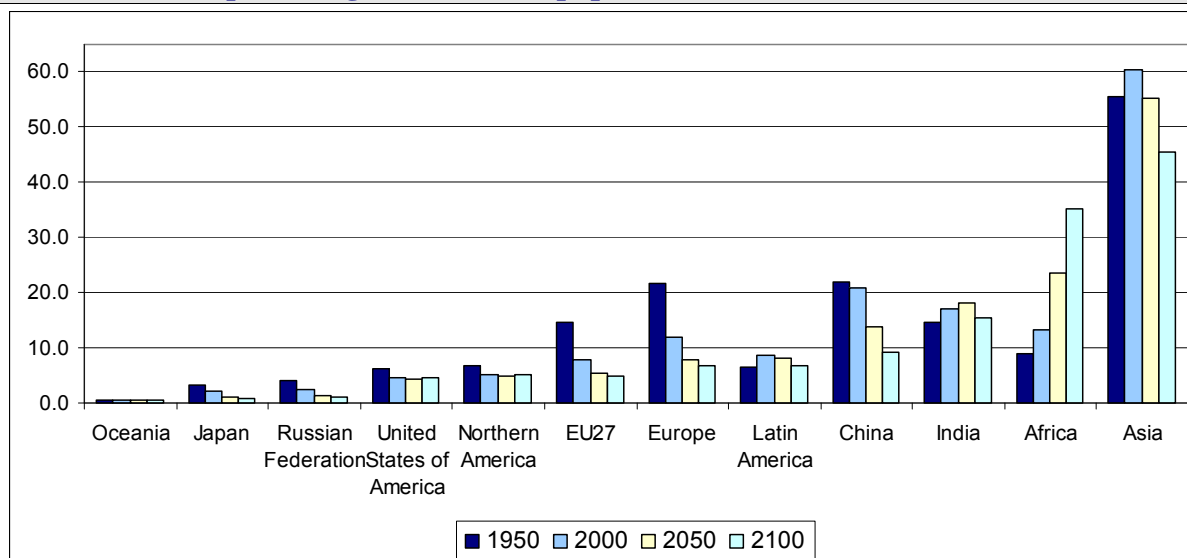
By 2100, nearly another billion persons (818,798,000) would be added to the world population.

[Graph 1. 19](#) shows the old-age dependency ratio in the world (people aged 65 and above over the working-age population). The UN projects an old-age dependency ratio of 50 in the EU in 2050 (compared with 50.3 according to EUROPOP2010), which is much larger than in the rest of the world with the exception of Japan, where it is projected to reach 69.6. The EU of today had the highest old-age dependency ratio already in 1950, slightly higher than in the US, but its increase has been faster over the period 1950 to 2000 (up by 10 percentage points in the EU compared with only about 6 percentage points in the US). Everywhere, sharper increases in the old-age dependency ratio are projected during the period 2000-2050 than between 1950 and 2000. The largest increases are projected to take place in Japan (by almost 45 p.p.) and in China, the EU and the euro area (by about 30 p.p.).

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<sup>32</sup> The United Nations Population Division produces global population projections every two years. The latest projections are the 2010 Revision.

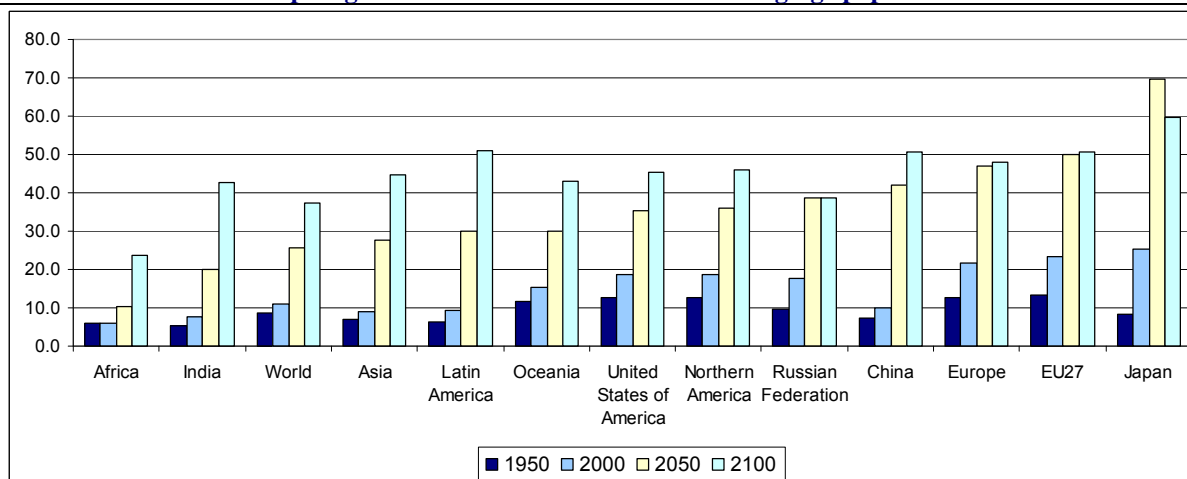
**Graph 1. 18 - Population of main geographic areas and selected countries as percentage of the world population, 1950, 2000, 2050, 2100**



**Source:** UN World Population Prospects: The 2010 Revision.

**Graph 1. 19 - Old-age dependency ratios by main geographic areas and selected countries (in percentage), 1950, 2000, 2050, 2100**

**People aged 65 or above relative to the working-age population**



**Source:** UN World Population Prospects: The 2010 Revision.



## 1.2. Labour force projections

### 1.2.1. Overview

Despite large cross-country labour force variability in the EU, some common features can be identified and summarised as follows:

- participation rates of prime-age male workers (aged 25 to 54), at around 90%, remain the highest of all groups. The participation rates of men aged 55 to 64 years, which had recorded a steady decline in the past twenty-five years, are showing clear signs of a reversal in most countries since the turn of the century, mostly due to pension reforms raising the statutory retirement age;
- women participation rates have steadily increased over the past twenty-five years;
- participation rates of young people (aged 15 to 24 years) have declined, mostly due to a longer stay in school.

Given these trends, the main drivers of change in the total participation rates will be changes in the labour force attachment of prime-age women, older workers (especially men) and, to a lesser extent, young people.

An estimation of the effects of pension reforms highlights the following stylised fact. Although the age profiles of the probability of retirement vary across countries, reflecting the heterogeneity of pension systems, a common feature is that the distribution of retirement decisions is markedly skewed towards the earliest possible retirement age. In fact, a typical distribution of the retirement age tends to be most prevalent both at the minimum age for (early) retirement and the normal (statutory) retirement ages. In a few Member States, new pension reforms have been legislated after the finalisation of the 2012 projections, thus too late to be

incorporated (BE, BG, CZ, EL, DK, FR, HU, NL and AT - see Box on "*Latest legislated pension reforms not incorporated in the Ageing Report 2012 projections*" in Chapter 2).

The *average exit age* from the labour force (in 2060) is influenced by the long-term impact of all currently legislated pension reforms (see [Graph 1. 20](#)). This report deals with the impact of enacted pension reforms in 23 Member States.<sup>33</sup> In Italy and Malta, the expected increase exceeds three years, while it is between two and three years in the Czech Republic, Germany, France, Hungary, Poland, Slovenia and Spain. The expected increase in the retirement age for women is in general higher. In SK, SI, HU, CZ, DK and IT, it rises by three years or more, and in AT, FR, EL, LT, PL, ES, DE and UK, the increase is between two and three years, reflecting in a number of countries the progressive convergence of the retirement age of women to that of men.

[Graph 1. 21](#) and [Graph 1. 22](#) show the estimated impact of pension reforms on participation rates. In most of the 23 EU Member States that have legislated pension reforms with a lasting impact on the labour force, they are projected to have a sizeable impact on the labour market participation of older workers (aged 55 to 64 and 55 to 74), which depends on their magnitude and phasing-in.

Overall in the EU27, the participation rate of older people (55-64) is estimated to be higher by about 8.3 p.p. in 2020 and by 14.8 p.p. in 2060 due to the projected impact of pension reforms. In the euro area, the impact is estimated to be even larger: 10 p.p. and 16.7 p.p., respectively, in 2020 and 2060. A sizeable increase is projected for those aged 55 to 74 too: 5.1 p.p. by 2020 and 10.7 p.p. by 2060 in the EU as a whole.

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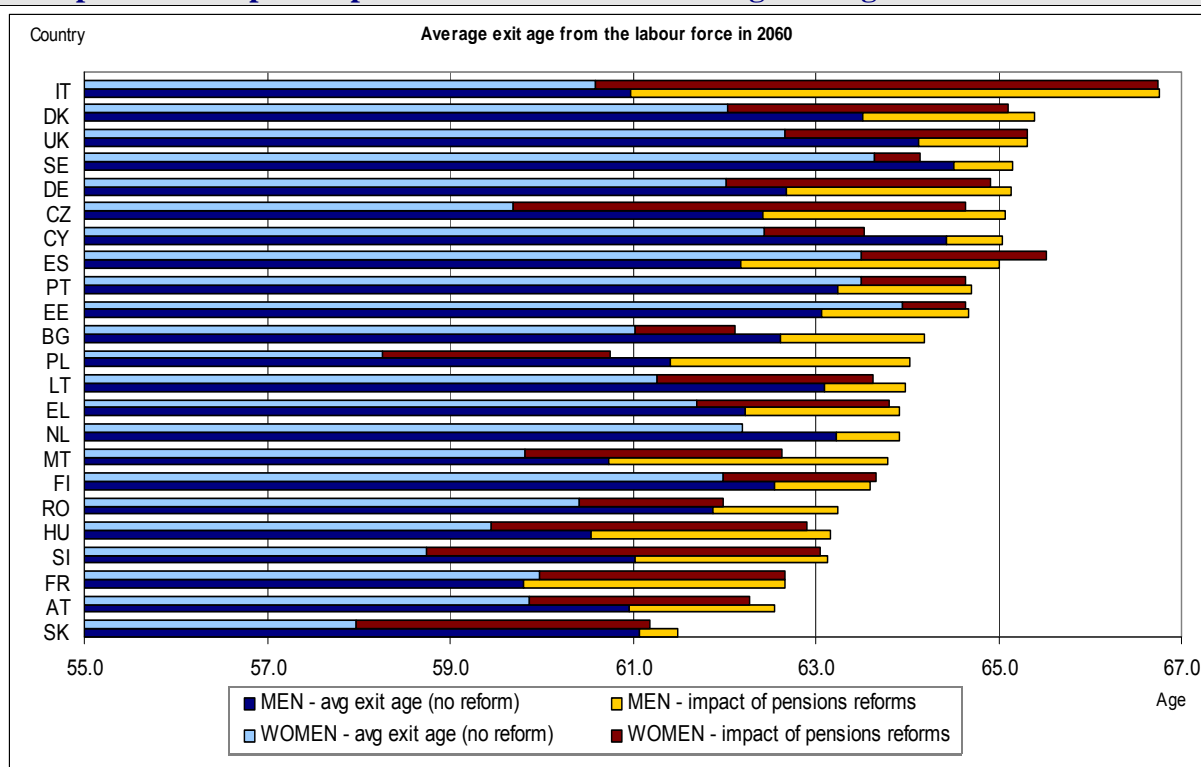
<sup>33</sup> IT, DK, UK, SE, DE, CZ, CY, ES, PT, EE, BG, PL, LT, EL, NL, MT, FI, RO, HU, SI, FR, AT and SK.

In Germany, Slovakia, France, Slovenia, Italy and Hungary, the impact on participation rates (aged 55 to 64) is estimated to be more than 10 p.p. by 2020. By 2060, Spain, Lithuania, Denmark, Poland, Austria, Greece, Malta and the Czech Republic join this group of countries.

It should be recalled that total participation rates (20-64) are mainly driven by changes in the participation rate of prime-age workers (25-55), as this group accounts for almost two thirds of the total labour force. Therefore, even these significant projected

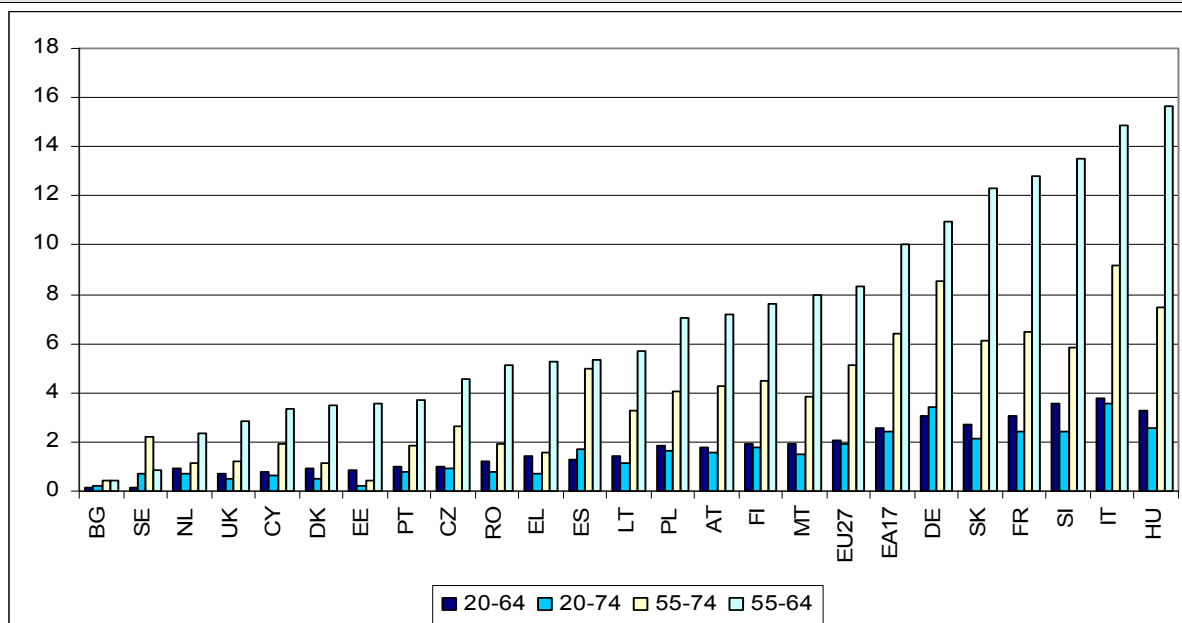
risks in participation rates for older workers will only have a rather limited impact on the total participation rate. For example, the 14.8 p.p. increase in the participation rate of workers aged 55 to 64 years in the EU will lead to an increase in the total participation rate (20 to 64) of only 3.5 p.p. by 2060 (up by 4.1 p.p. when considering those aged 20-74).

**Graph 1. 20 - Impact of pension reforms on the average exit age from the labour force**



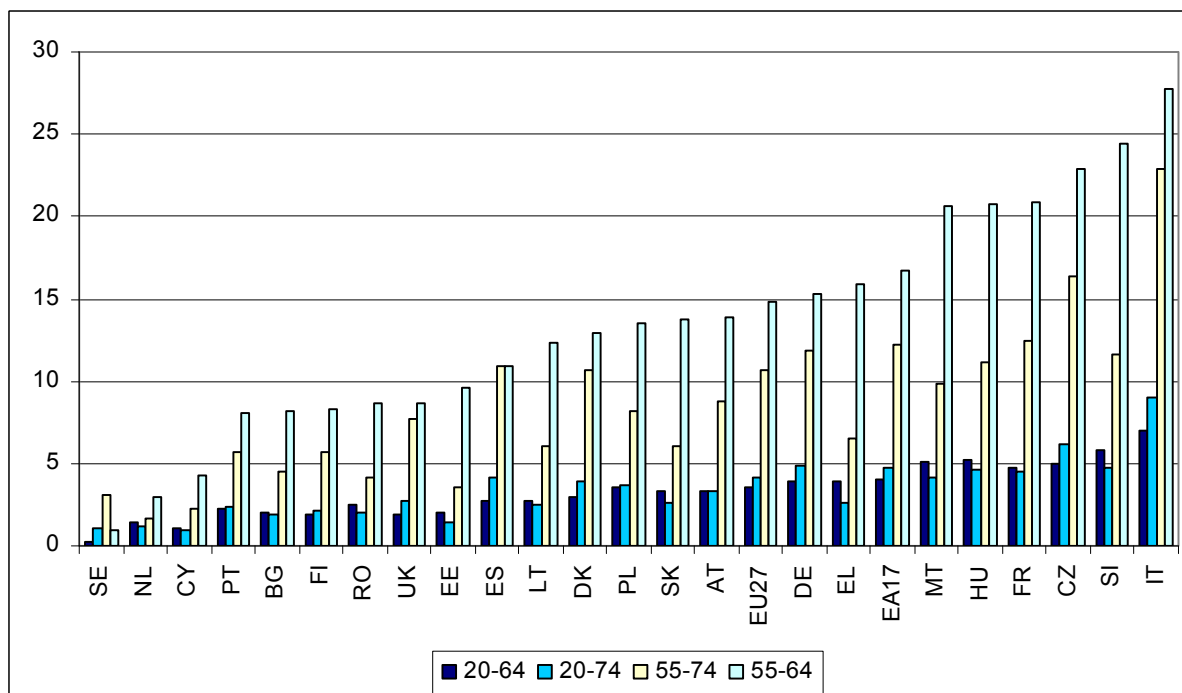
**Source:** Commission services, EPC.

**Graph 1. 21 - Estimated impact of pension reforms on participation rates (2020)  
in percentage points  
(comparison of projections with and without incorporating recent pension reforms)**



*Source:* Commission services, EPC.

**Graph 1. 22 -Estimated impact of pension reforms on participation rates (2060)  
in percentage points  
(comparison of projections with and without incorporating recent pension reforms)**



*Source:* Commission services, EPC.

## 1.2.2. Main results of the projection of labour market participation rates

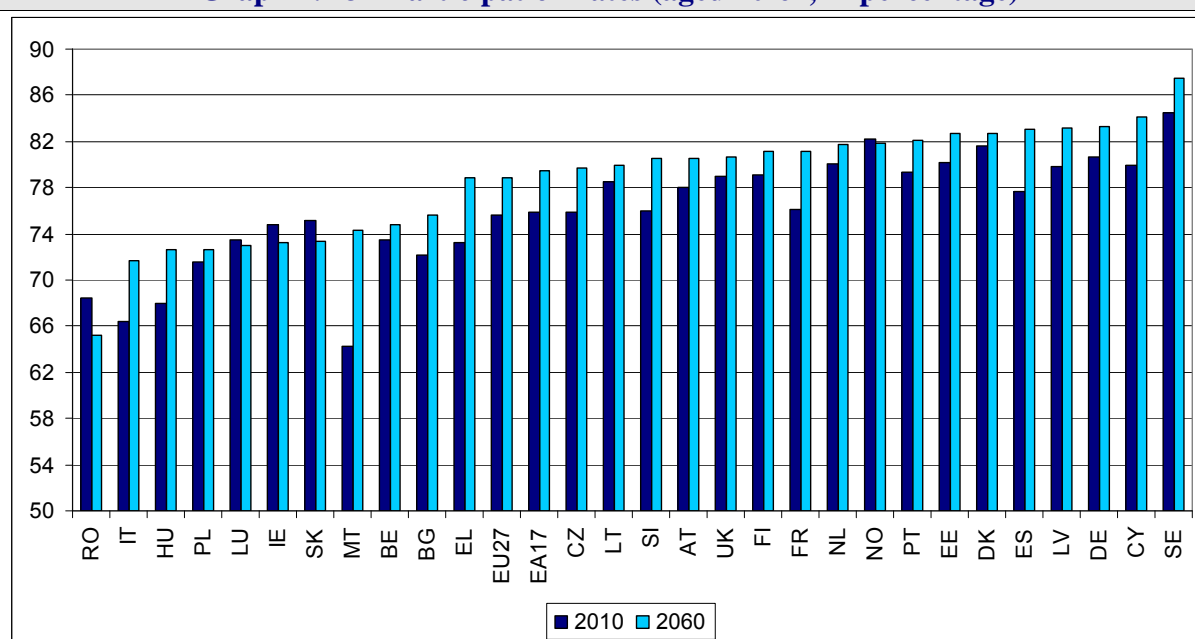
### 1.2.2.1. Projection of participation rates

The methodology leads to a projected rightward shift in the age profiles of participation rates, meaning that older individuals (aged 50 years and more) tend to stay longer in the labour market, particularly women.

participation rate (for the age group 20 to 64) in the EU27 is projected to increase by 3.2 percentage points (from 75.6% in 2010 to 78.8% in 2060). For the euro area, a slightly higher increase of 3.6 p.p. is projected (from 75.9% in 2010 to 79.4% in 2060).

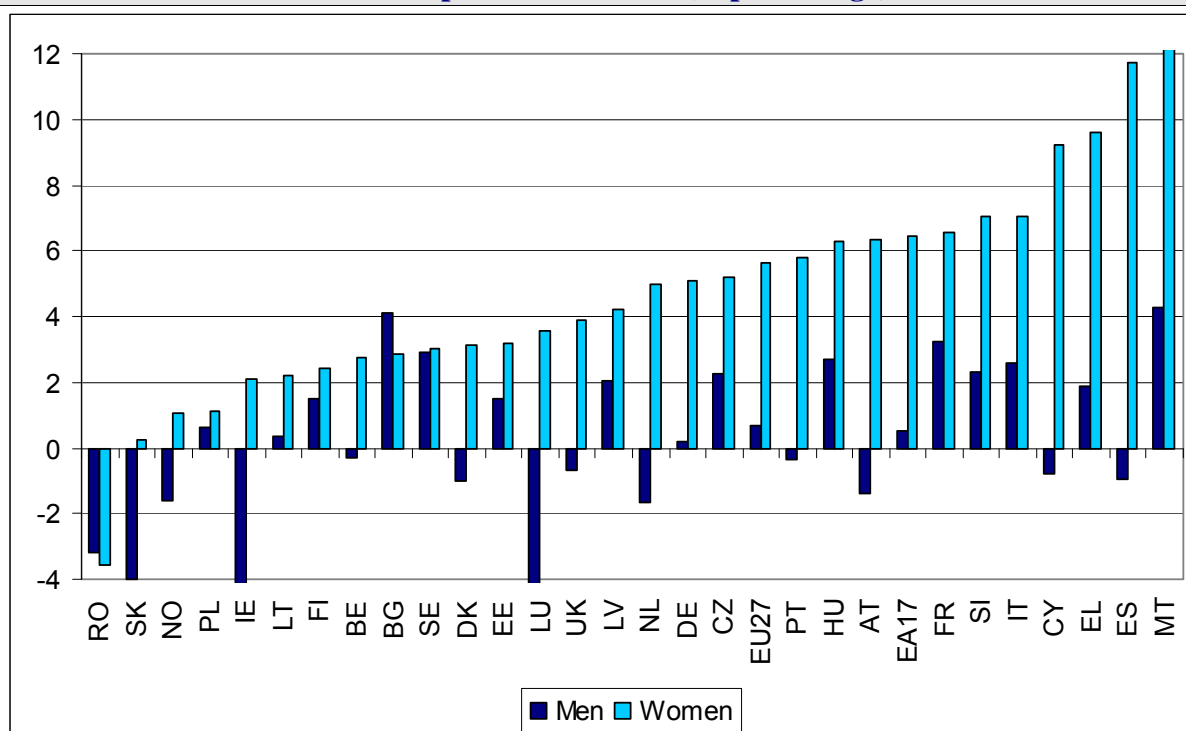
Graph 1. 23 presents the outcome of participation rate projections. The total

**Graph 1. 23 - Participation rates (aged 20-64, in percentage)**



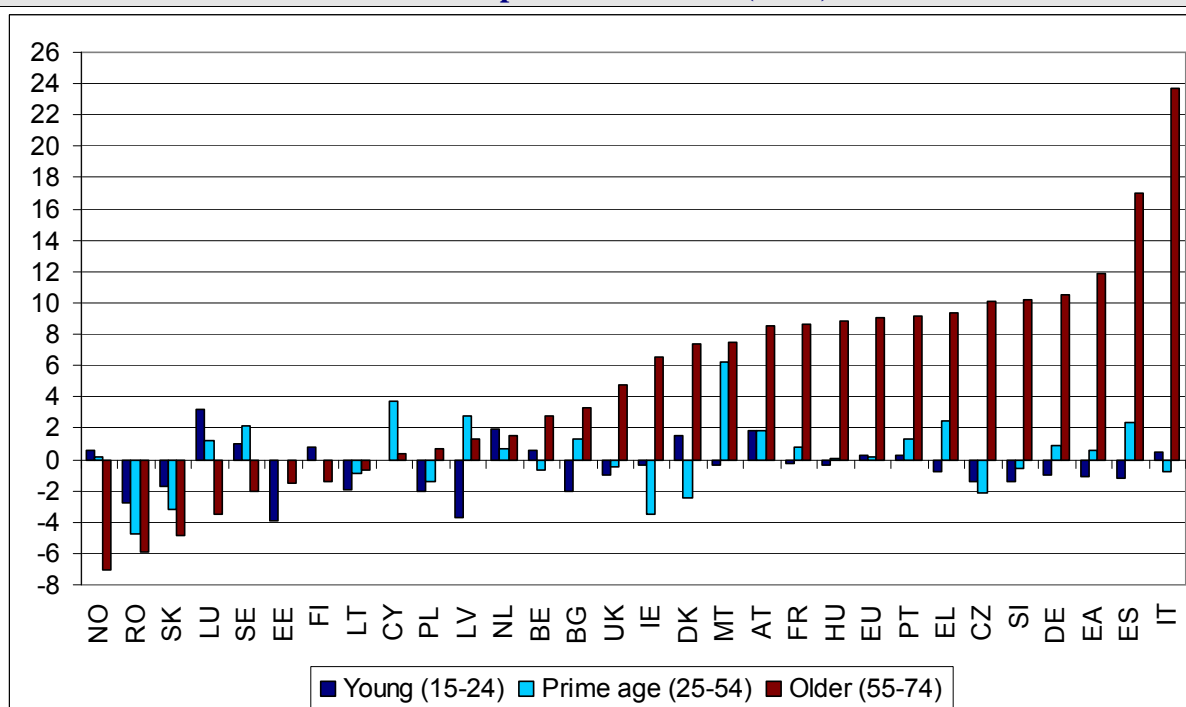
**Source:** Commission services, EPC.

**Graph 1. 24 - Participation rates by gender (20-64), projected change over the period 2010-2060 (in percentage)**



*Source:* Commission services, EPC.

**Graph 1. 25 - Participation rates by main age groups, projected change over the period 2010-2060 (in %)**



*Source:* Commission services, EPC.

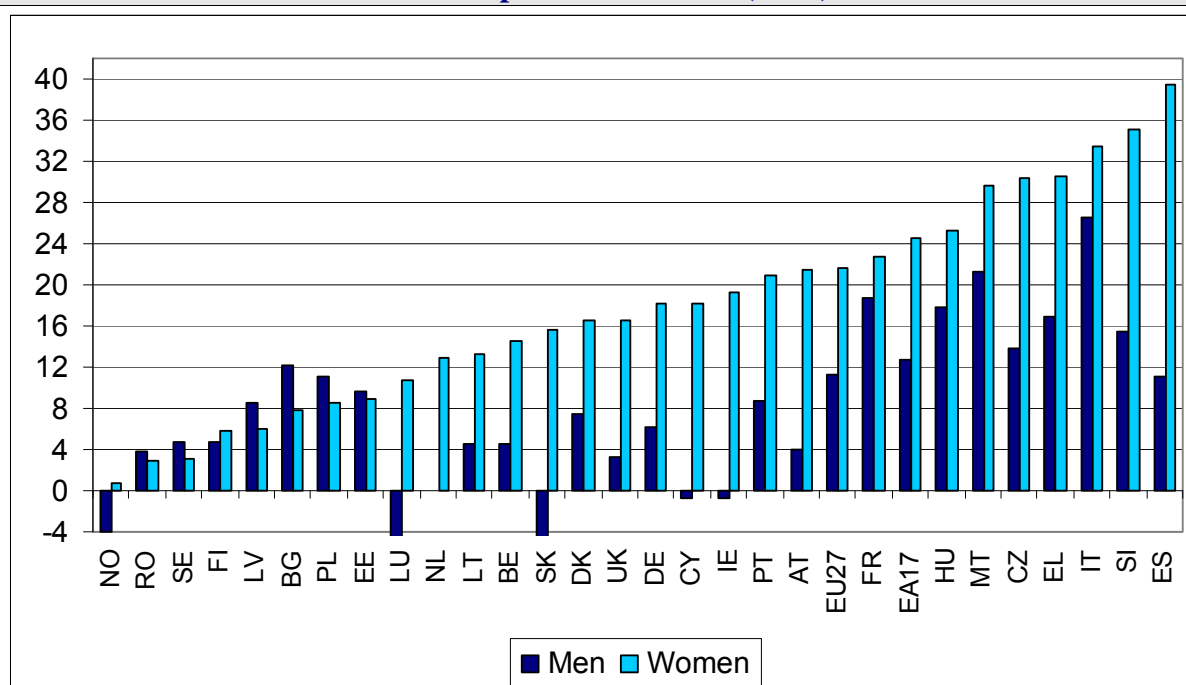
By large in the EU27, the biggest increase in participation rates by 2060 is projected for women, up by 5.6 p.p. compared with 0.7 p.p. for men (see [Graph 1. 24](#)). Consequently, the gender gap in terms of participation rates is projected to narrow substantially in the period up to 2060.

Although the participation rate of total prime age workers (25-54) in the EU27 is projected to remain almost unchanged at about 85% between 2010 and 2060, this results from

opposite trends by gender. In fact, women's participation rate is projected to rise, while men's participation rate is projected to decline (see [Graph 1. 25](#)).

Influenced by pension reforms, the participation rate of older workers is projected to rise very substantially over the coming 50 years. For men aged 55 to 64, the rise will be 11.2 p.p. and for women it will be 21.7 p.p. by 2060 (see [Graph 1. 26](#)).

**Graph 1. 26 - Participation rates of the older workers (55-64), projected change over the period 2010-2060 (in %)**



**Source:** Commission services, EPC.

### 1.2.2.2. Projection of labour supply

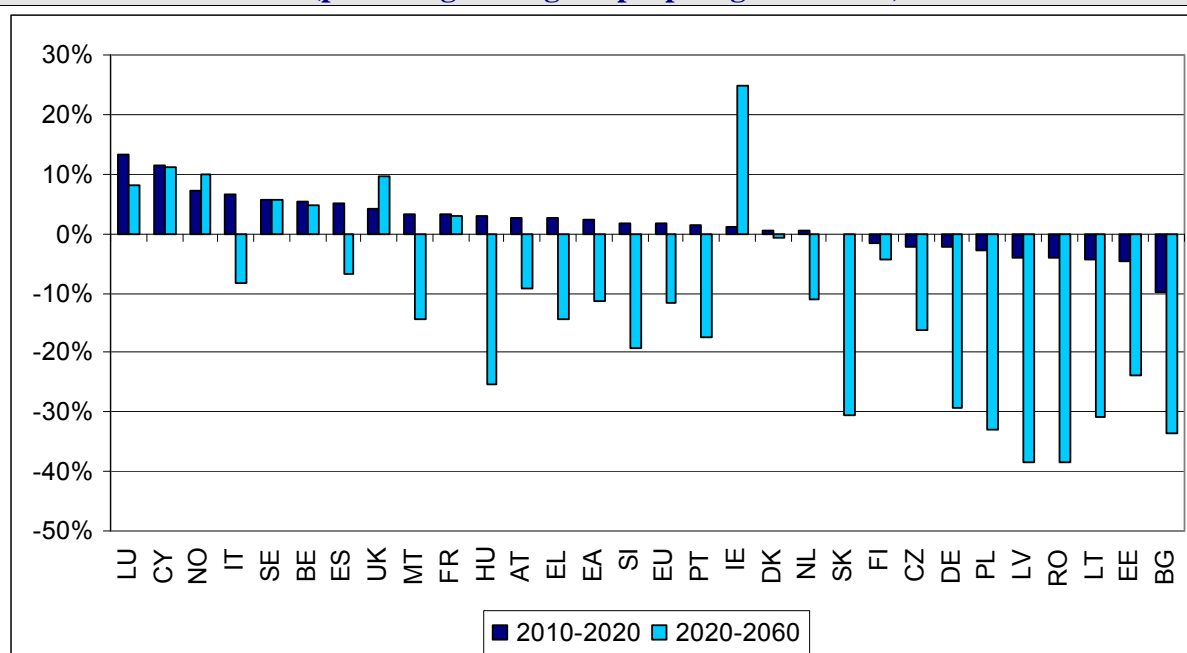
Total labour supply is calculated by single age and gender, by multiplying participation rates by population values. It is projected to increase by 1.6% from 2010 to 2020 in the EU27 (age group 20 to 64). In terms of persons, this represents an increase in the labour force of roughly 3.7 million. In the euro area, the labour force is projected to increase by 2.3% over the same period. The increase in labour supply over the period 2010 to 2020 is mainly due to the increase in women's labour supply, as men's labour force is projected to remain largely unchanged.

The positive trend in labour supply up to 2020 is expected to be reversed during the period 2020 to 2060 when the total labour

force is projected to contract by 11.7%, equivalent to 27.7 million people (24 million compared with the 2010 level) in the EU as a whole. In the euro area, the projected fall in labour supply between 2020 and 2060 is 11.4%, which represents 17.8 million people (14.3 million compared with the 2010 level).

Graph 1. 27 highlights the wide diversity of labour supply projections across Member States, ranging from an increase of 25% in Ireland to a decrease of 38.5% in Romania (2020-2060). The initial positive trend across most countries in the period 2010-2020 is projected to be reversed after 2020, when a large majority of countries is expected to record a decline (20 Member States in total).

**Graph 1. 27 - Labour force projections, 2010-2060  
(percentage change of people aged 20 to 64)**



**Source:** Commission services, EPC.

### **1.2.3. Assumptions on structural unemployment**

As in previous rounds of the long-term budgetary exercise, DG ECFIN's structural unemployment rate estimates (NAWRU) are used as a proxy for the structural unemployment rate under a "no policy change" scenario.

As a general rule, actual unemployment rates are assumed to converge to structural unemployment rates<sup>34</sup>. In the EU27, the unemployment rate is assumed to decline by 3.2 p.p. (from 9.7% in 2010 to 6.5% in 2060). In the euro area, the unemployment rate is expected to fall from 10.1% in 2010 to 6.7% in 2060.

### **1.2.4. Employment projections**

The total employment rate (for persons aged 20 to 64) in the EU27 is projected to increase from 68.6% in 2010 to 71.5% in 2020 and to 74% in 2060 (see [Graph 1. 28](#)). In the euro area, a similar development is projected, with the employment rate attaining 74.3% in 2060.

The number of persons employed (using the LFS definition) is projected to record an annual growth rate of only 0.3% over the period 2010 to 2020 (compared to 0.9% over the period 2000-2009), which is expected to

reverse to a negative annual growth rate of a similar magnitude over the period 2020 to 2060. The number of employed persons peaks in 2022 in the EU as a whole (see [Table 1. 3](#)).

The outcome of these opposite trends is an overall significant decline of about 15.7 million workers over the period 2010 to 2060. The negative prospects for population developments, including the rapid ageing of the population, will only be partly offset by the increase in (older workers) participation rates and migration inflows, leading to an overall sharp reduction in employment levels during the period 2020 to 2060.

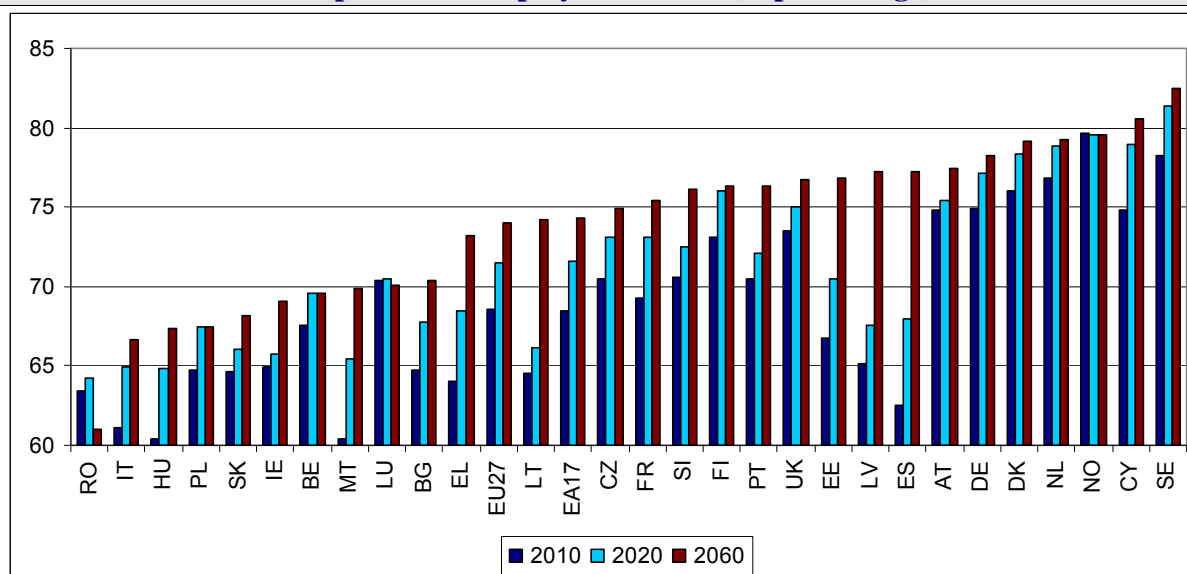
Mainly as a result of the ageing process, the age structure of the working-age population is projected to undergo a number of relevant changes. The share of older workers (aged 55 to 64) in the labour force (aged 15 to 64) is projected to rise by around 50%, from 15% in 2010 to 23% in 2060 in the EU27 (see [Graph 1. 29](#)). In the euro area, it is projected to rise by slightly more, also reaching 23% in 2060. A similar picture emerges when looking at the labour force aged 20 to 74 (see [Graph 1. 30](#)).

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<sup>34</sup> First, convergence by 2015 corresponds to a general rule for closing the (generally negative) output gap by 2015. Second, structural unemployment rates are assumed to gradually decline towards country-specific historical minima. However, for countries where the lowest historical rates are high, the structural unemployment rates are capped at 7.3%, which corresponds to the EU27 average structural unemployment rate (based on the spring 2011 DG ECFIN Economic Forecasts). The assumed decline in effective unemployment rates due to the reduction of structural unemployment is about 2 p.p. between 2020 and 2060 in the EU and in the EA, i.e. larger than the reduction due to the closing of the output gap. For some Member States with currently high estimated structural unemployment rates, the assumed decline of the unemployment rate has a large positive effect on employment and thus on GDP growth over the projection period.



**Graph 1. 28 - Employment rates (in percentage)**



*Source: Commission services, EPC.*

### 1.2.5. The balance of non-workers to workers: economic dependency ratios emerging from the labour force projections

The trends described above are mirrored in the ratios of non-workers to workers. The effective economic old-age dependency ratio is an important indicator to assess the impact of ageing on budgetary expenditure, particularly on its pension component. This indicator is calculated as the ratio between the inactive elderly (65+) and total employment (20-64). The effective economic old-age dependency ratio is projected to rise significantly from around 40% in 2010 to 71% in 2060 in the EU27. In the euro area, a similar deterioration is projected, from 42% in 2010 to 72% in 2060.

Across EU Member States, the effective economic old-age dependency ratio is projected to range from less than 55% in Denmark, the United Kingdom, Norway and Ireland, to more than 90% in Hungary, Slovakia, Poland and Romania in 2060 (see [Graph 1. 31](#)).

The total economic dependency ratio is calculated as the ratio between the total inactive population and employed persons aged 15 to 64. It provides a measure of the average number of individuals that each employed person "supports", being relevant when considering prospects for potential GDP per capita growth. It is expected to be fairly stable at around 115% in the period up to 2020 in the EU27, and then to rise to 145% by 2060 (see [Graph 1. 32](#)). A similar evolution is projected in the euro area. The projected development of this indicator reflects the strong impact of the ageing process after 2020 in most EU Member States.

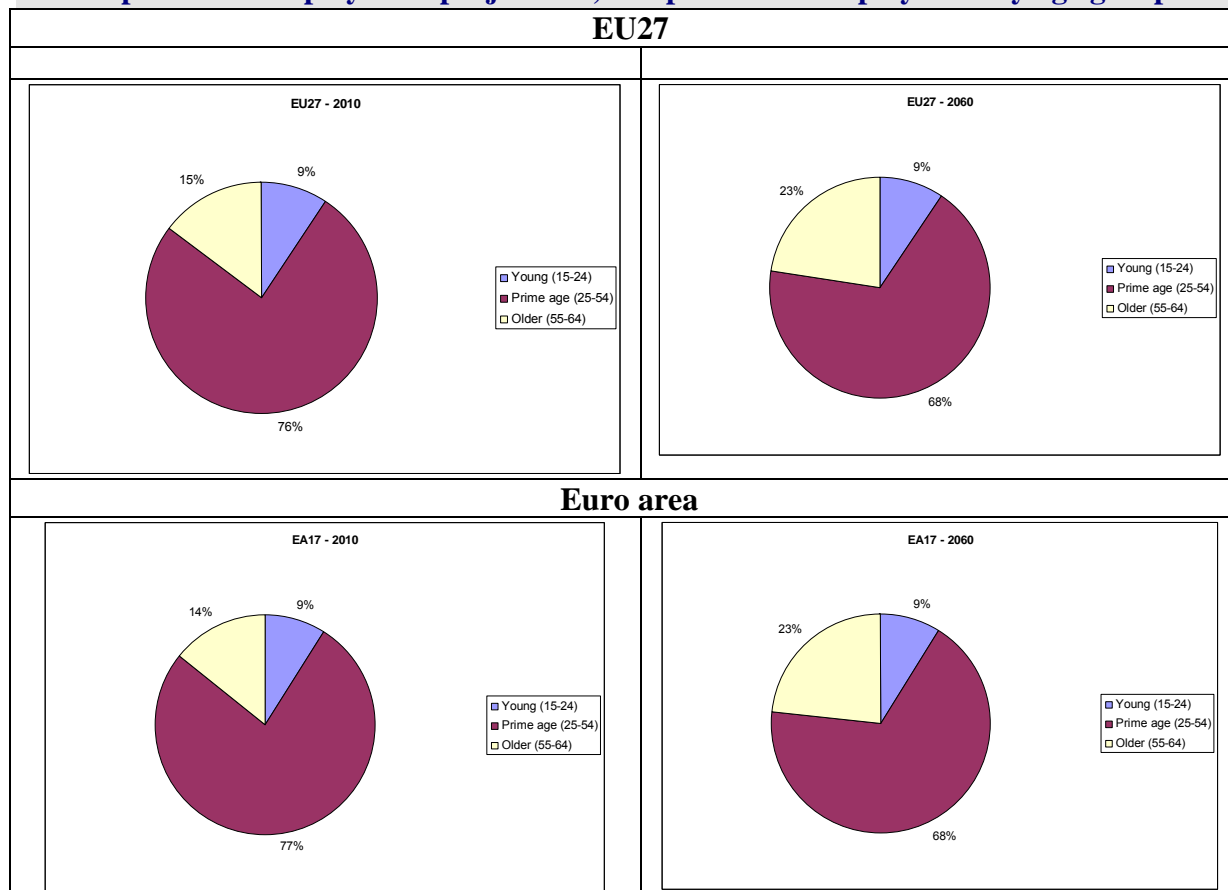
There are however large cross-country differences. In Romania, Poland, Slovenia and Slovakia, it is projected to be more than 180% in 2060, while in other countries (Denmark, Norway and the Netherlands), it is projected to rise to less than 120% by 2060.

**Table 1. 3 - Peaks and troughs for the size of the working-age population and the total number of persons employed**

	Working-age population 20-64 (in millions)						Employment 20-64 (in millions)					
	2010 - value	Peak	year	% change 2010 - peak	Trough	% change peak - trough	2010 - value	Peak	year	% change 2010 - peak	Trough	% change peak - trough
BE	6.5	7.1	2060	8.5%	6.5	-7.9%	4.4	4.9	2060	11.7%	4.4	-10.5%
BG	4.8	4.8	2010	0.0%	2.7	-43.0%	3.1	3.1	2012	1.1%	1.9	-38.8%
CZ	6.8	6.8	2010	0.0%	5.3	-21.9%	4.8	4.8	2012	1.0%	4.0	-17.8%
DK	3.3	3.3	2021	0.1%	3.2	-3.2%	2.5	2.6	2025	3.7%	2.5	-3.5%
DE	49.7	49.8	2011	0.2%	33.3	-33.1%	37.2	37.9	2012	1.9%	26.0	-31.3%
EE	0.8	0.8	2011	0.2%	0.6	-29.8%	0.6	0.6	2012	7.0%	0.4	-24.4%
IE	2.7	3.5	2060	28.9%	2.7	-23.8%	1.8	2.4	2060	37.1%	1.7	-28.4%
EL	7.0	7.0	2010	0.0%	5.7	-18.5%	4.5	4.7	2024	5.8%	4.2	-12.0%
ES	29.1	29.5	2029	1.4%	26.7	-9.7%	18.2	22.4	2033	22.7%	18.2	-18.5%
FR	38.1	38.2	2011	0.2%	37.5	-1.9%	26.4	28.6	2060	8.5%	26.4	-7.8%
IT	36.8	37.4	2023	1.6%	33.4	-10.8%	22.5	24.5	2024	9.0%	22.3	-9.2%
CY	0.5	0.6	2045	21.2%	0.5	-17.5%	0.4	0.5	2044	29.6%	0.4	-22.8%
LV	1.4	1.4	2011	0.2%	0.8	-43.2%	0.9	1.0	2012	5.1%	0.6	-35.9%
LT	2.1	2.1	2012	0.0%	1.3	-35.0%	1.3	1.4	2012	6.5%	1.0	-29.9%
LU	0.3	0.4	2060	23.2%	0.3	-18.8%	0.2	0.3	2060	22.6%	0.2	-18.5%
HU	6.3	6.3	2011	0.1%	4.5	-28.2%	3.8	4.0	2027	4.5%	3.0	-23.3%
MT	0.3	0.3	2010	0.0%	0.2	-23.6%	0.2	0.2	2033	5.2%	0.1	-16.0%
NL	10.1	10.1	2011	0.1%	8.9	-12.5%	7.8	7.9	2015	2.0%	7.0	-11.5%
AT	5.2	5.3	2019	2.0%	4.7	-11.5%	3.9	4.0	2018	3.0%	3.6	-9.3%
PL	24.8	24.9	2012	0.4%	15.9	-35.9%	16.0	16.3	2014	1.5%	10.8	-33.9%
PT	6.6	6.6	2010	0.0%	5.3	-19.4%	4.6	4.8	2028	4.0%	4.0	-16.0%
RO	13.8	13.8	2011	0.1%	8.5	-38.3%	8.7	8.8	2012	0.6%	5.2	-40.9%
SI	1.3	1.3	2013	0.9%	1.0	-23.2%	0.9	0.9	2020	0.7%	0.8	-17.0%
SK	3.6	3.6	2014	1.4%	2.5	-30.2%	2.3	2.3	2012	1.5%	1.7	-26.4%
FI	3.2	3.2	2010	0.0%	3.0	-8.1%	2.4	2.4	2016	1.3%	2.3	-5.2%
SE	5.5	6.0	2050	9.2%	5.5	-8.5%	4.3	4.9	2050	14.4%	4.3	-12.6%
UK	37.2	41.5	2060	11.8%	37.2	-10.5%	27.3	31.9	2060	16.7%	27.3	-14.3%
NO	2.9	3.4	2060	18.4%	2.9	-15.5%	2.3	2.7	2060	18.2%	2.3	-15.4%
EU27	307.5	308.2	2012	0.2%	264.5	-14.2%	210.9	217.6	2022	3.2%	195.6	-10.1%
EA	201.7	202.1	2011	0.2%	174.7	-13.6%	138.1	143.9	2024	4.2%	129.8	-9.8%

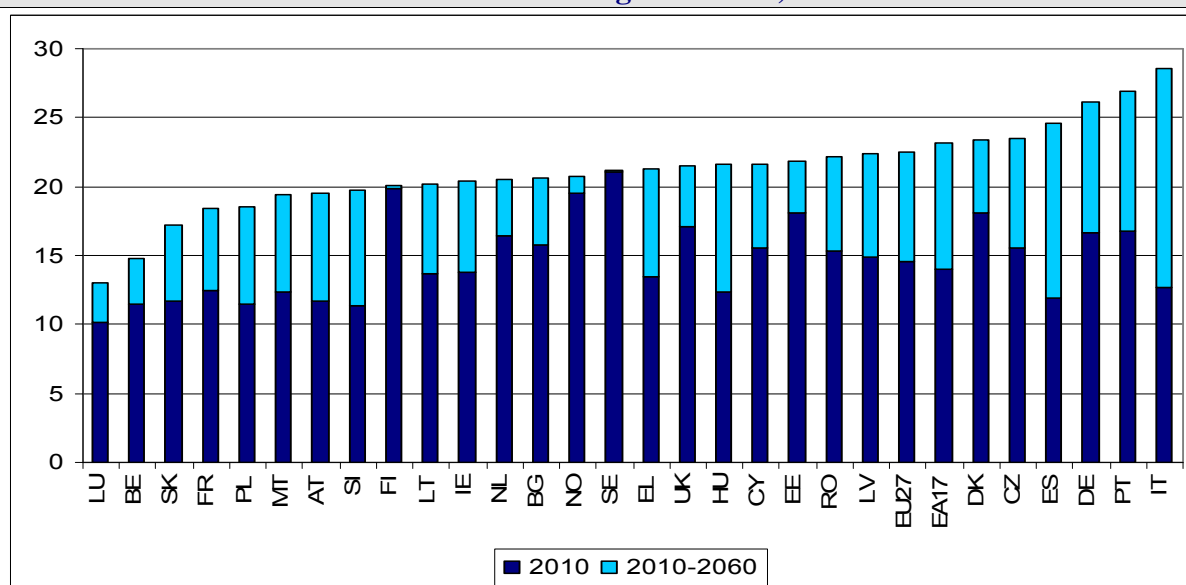
*Source:* Commission services, Eurostat, EUROPOP2010.

**Graph 1. 29 - Employment projections, composition of employment by age groups**



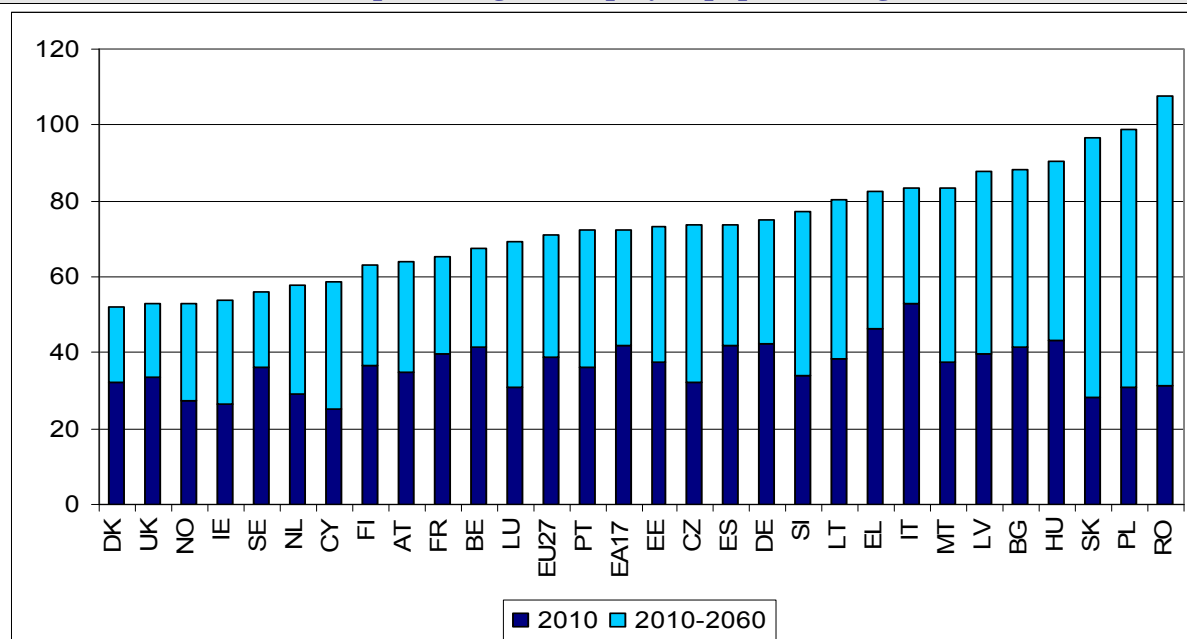
*Source:* Commission services, EPC.

**Graph 1. 30 - Share of older workers (labour force aged 55 to 74 as a percentage of the labour force aged 20 to 74)**



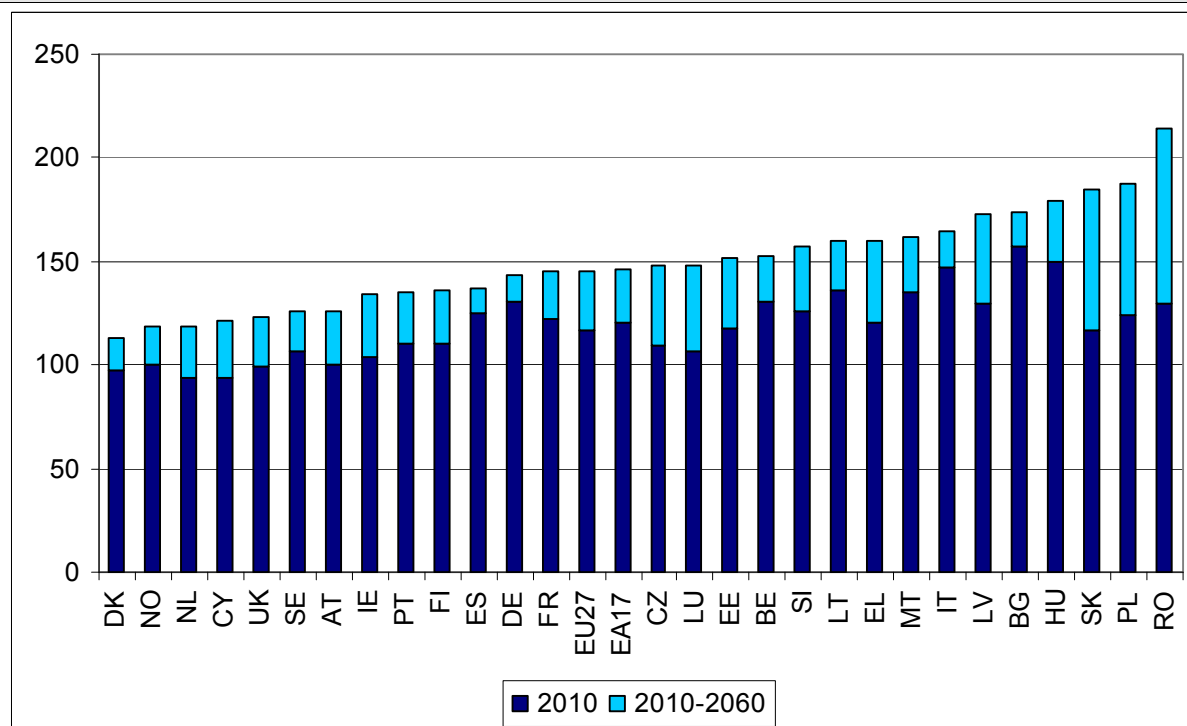
*Source:* Commission services, EPC.

**Graph 1. 31 - Effective economic old-age dependency ratio (inactive population aged 65 and above as a percentage of employed population aged 15 to 64)**



*Source:* Commission services, EPC.

**Graph 1. 32 - Total inactive population (all ages) as a percentage of employed population aged 15 to 64)**



*Source:* Commission services, EPC.

### **1.2.6. Total hours worked projected to decline**

Total hours worked are projected to rise by 0.3% (annual average growth rate) in the period 2010 to 2020 in the EU27.<sup>35</sup> However, from 2020 onwards, this upward trend is projected to be reversed and total hours worked are expected to decline: by an average of 0.1% between 2021 and 2040 and by 0.3% on average between 2041 and 2060. Over the entire projection period (2010-2060), total hours worked are projected to fall by 0.1% on average in the EU. For the euro area, similar developments are projected (see [Graph 1. 33](#)).

There are major differences across Member States, reflecting different demographic outlooks. In terms of the annual average growth rate, a fall of 0.8% or more is projected for Romania, Latvia and Bulgaria. By contrast, an increase of 0.4% or more on average is expected in Ireland, Luxembourg and Cyprus.

## **1.3. Labour productivity and GDP**

### **1.3.1. Main results of the projections**

In the EU as a whole, the annual average potential GDP growth rate is projected to remain quite stable over the long-term (see [Graph 1. 34](#)). After an average potential growth of 1.5% up to 2020, a slight increase to 1.6% is projected in the period 2021-30. Over the remainder of the projection period up to 2060, a slow down to 1.3% emerges. Over the whole period 2010-2060, output

growth rates in the euro area are very close to those in the EU27 (though consistently lower by about 0.1 p. p.), as the former represents more than 2/3 of the EU27 total output. Notwithstanding this, the potential growth rate in the euro area is projected to be slightly lower than for the EU27 throughout the projection period.

Taking account of the negative output gaps prevailing in the EU Member States, GDP growth is assumed to be higher than the potential growth rates until the output gap is closed (in 2015 as a general rule).<sup>36</sup> For the EU as a whole and the euro area, GDP growth is assumed to be 0.4 p.p. higher than the potential growth rates over the period 2010-2020. There are however significant differences across Member States (see [Graph 1. 35](#)).

For the EU as a whole, labour productivity growth is projected to increase in the period to the 2020s and remains fairly stable at around 1.5% thereafter throughout the projection period (see [Graph 1. 36](#)). The small increase in the period up to the 2040s is due to the assumed higher productivity growth in those MS with an assumed catching-up potential. Eventually, in 2060, all MS are assumed to reach the same productivity growth of 1.5%. Since the starting point of productivity growth in the euro area is below the assumed long-term EU average annual growth of 1.5%, this leads to a higher assumed increase in productivity growth up to the 2030s.

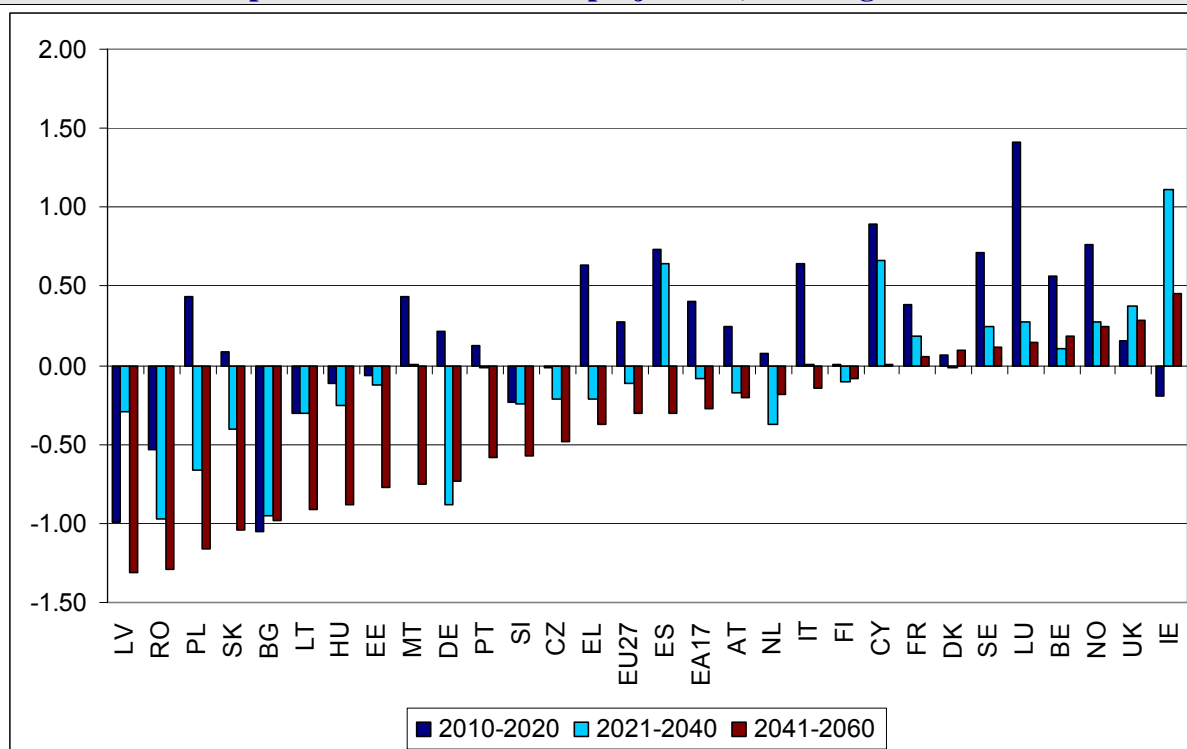
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<sup>35</sup> For the purpose of calculating potential GDP, the estimated potential hours worked using the production function approach were used. Specifically, for the potential GDP projections, until 2015, the growth rates of hours worked estimated using the production function approach are used and thereafter the growth rates are estimated with the Cohort Simulation Model (CSM).

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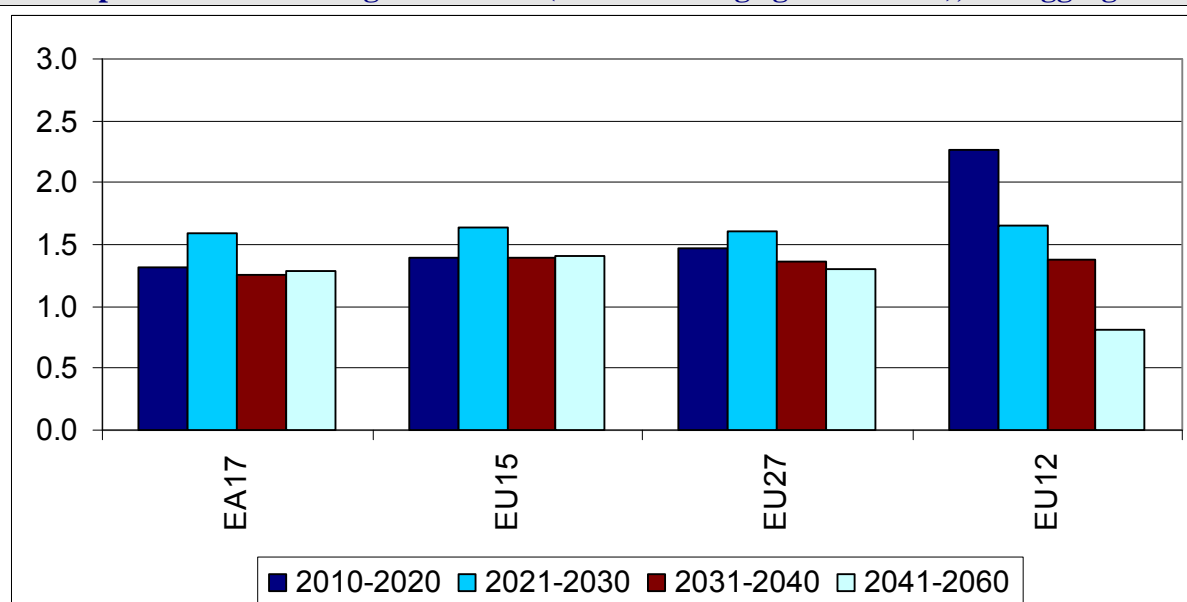
<sup>36</sup> For the medium-term outlook (until 2015), the forecasts and estimates of GDP growth are based on the Commission services economic forecast of Spring 2011 and subsequent data revisions are not included in the projections. For details on the underlying assumptions, see European Commission and Economic Policy Committee (2011) "2012 Ageing Report: Underlying assumptions and projection methodologies", European Commission, European Economy, No 4.

**Graph 1. 33 - Hours worked projections, annual growth rate**



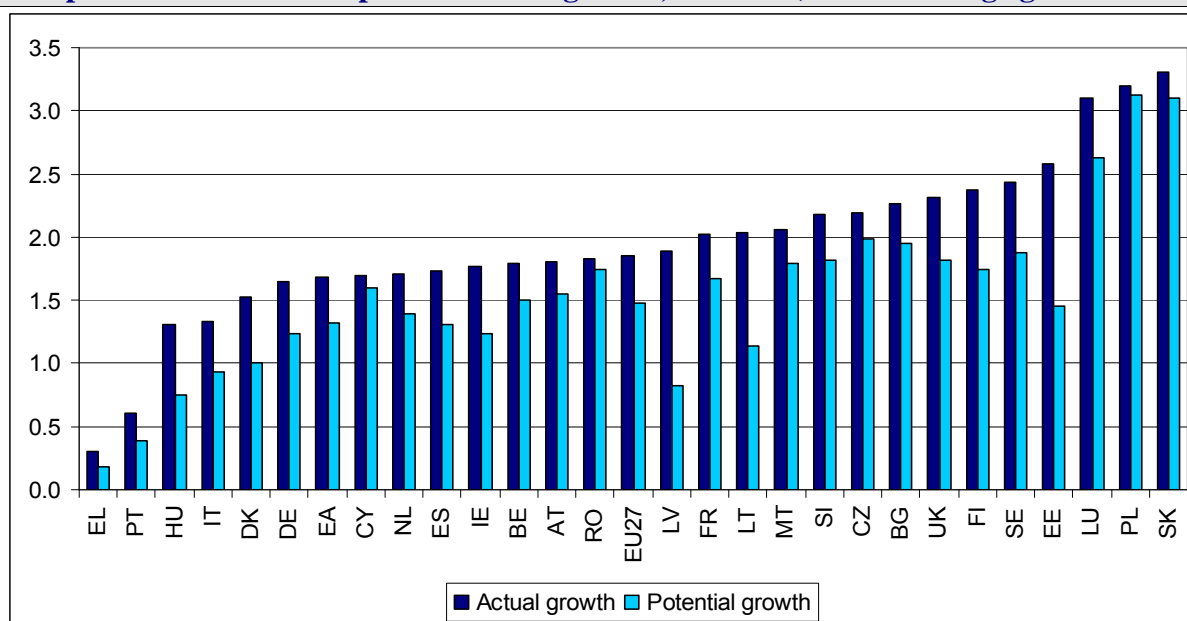
*Source:* Commission services, EPC.

**Graph 1. 34 - Potential growth rates (annual average growth rates), EU aggregates**



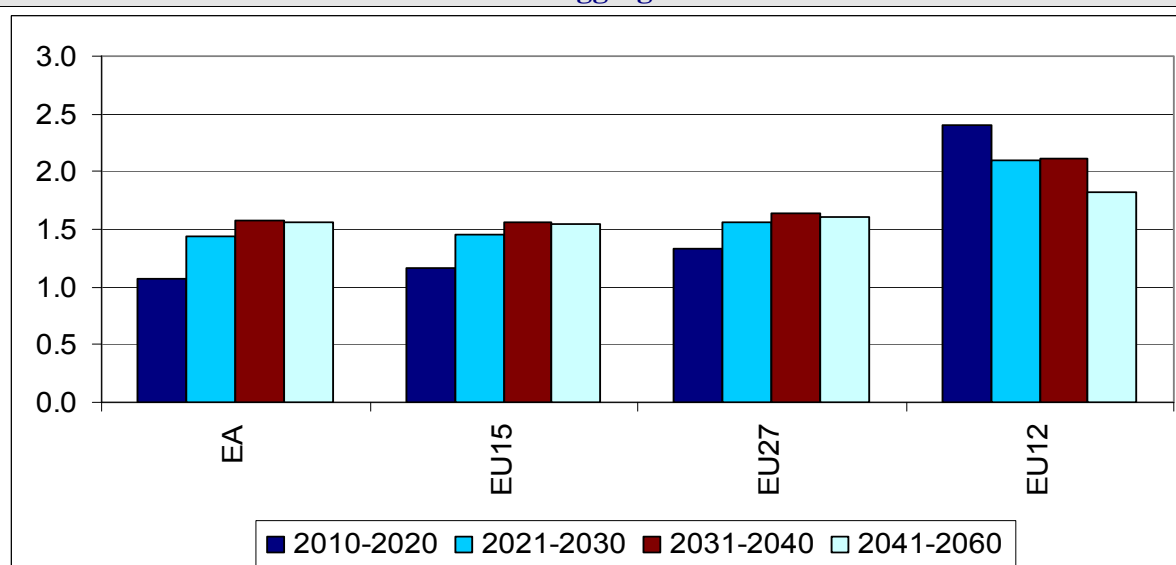
*Source:* Commission services, EPC.

**Graph 1. 35 - Actual and potential GDP growth, 2010-20 (annual average growth rates)**



*Source:* Commission services, EPC.

**Graph 1. 36 - Labour productivity per hour, annual average growth rates  
EU aggregates**

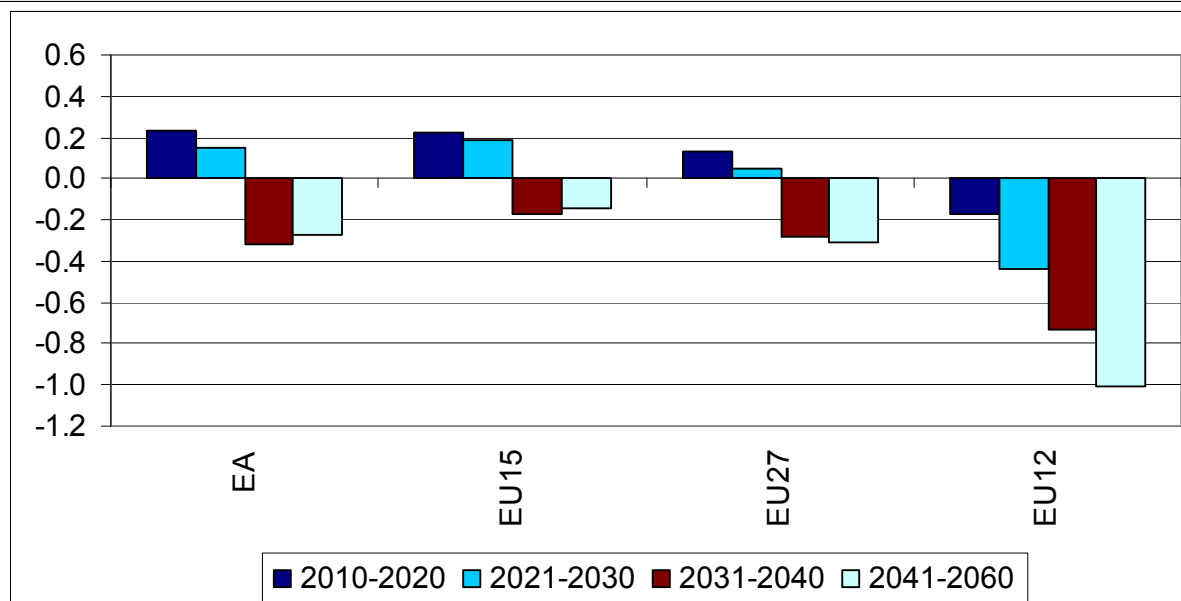


*Source:* Commission services, EPC.

Labour input – total hours worked – in the EU and in the euro area is projected to be positive up to the late 2020s (see [Graph 1. 37](#)). Thereafter, the projected demographic changes, with a reduction in the size of the labour force stemming from the decline in the working-age population, are projected to lead to negative labour growth for the

remainder of the projection period up to 2060. Hence, labour will act as a drag on growth in both the EU and the euro area, and most Member States, from 2030 onwards. The only exceptions are Belgium, Ireland, Spain, France, Cyprus, Luxembourg (thanks to cross-border workers), Sweden, and the United Kingdom.

**Graph 1. 37 - Labour input (total hours worked), annual average growth rates  
EU aggregates**



*Source:* Commission services, EPC.

Trends in TFP growth explain most of the productivity growth per hours worked. The increase in TFP growth in the EU as a whole follows from the assumption that countries with a catching-up potential are assumed to experience a period of higher TFP growth during the projection period, primarily between 2030 and 2040. This follows from the fact that in the long-run, the capital deepening contribution follows TFP growth (times the labour share), as shown in [Graph 1. 38](#). By assumption, TFP growth converges towards the rate of 1% by 2060 for all Member States. Given the use of the "capital rule", this implies a labour productivity growth rate of 1.5% for all Member States in 2060.

For countries with a relatively low GDP per capita, the capital deepening contribution is very high in the first part of the projection period, reflecting the assumed catching-up process of converging economies. Then, the contribution gradually declines to the steady state value of 0.5 p.p., as the growth in the capital stock adjusts to growth in hours worked.

As expected, following the projected increase in output per capita in both the EU27 and the euro area up to the late 2030s, the projected per capita growth is somewhat higher than the projected potential output growth, since the total population is projected to become smaller from that point onwards.

The sources of GDP growth will alter dramatically. Labour will make a positive contribution to growth in both the EU and the euro area only up to the 2020s, turning significantly negative thereafter (see [Graph 1. 40](#)). Over time, productivity will become the dominant source of growth.

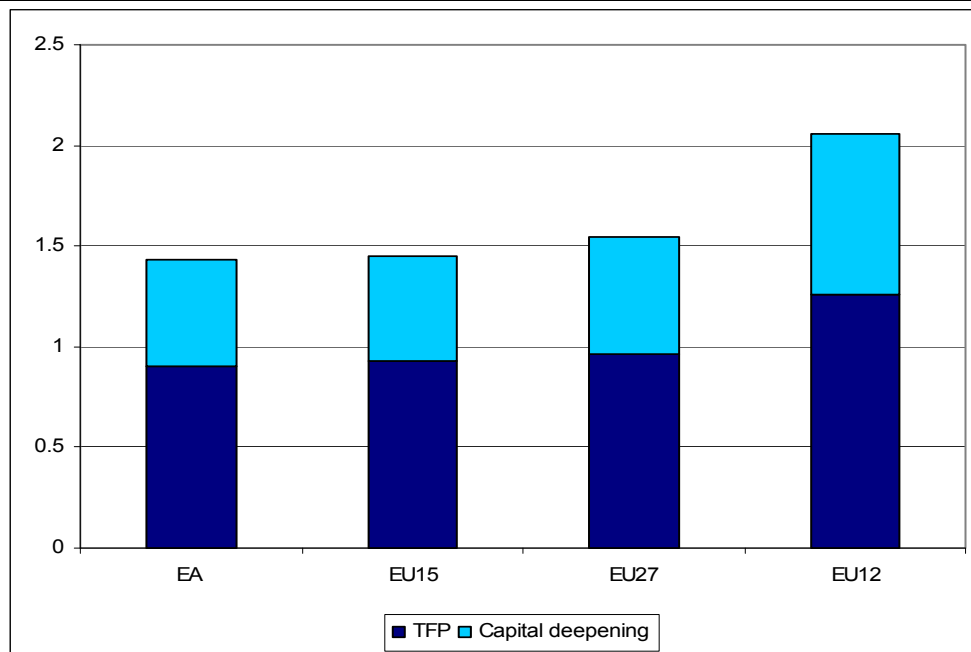
In order to assess the relative contribution to GDP growth of its two main components, labour productivity and labour utilisation, the standard growth accounting framework is shown in [Table 1. 4](#). For the EU and for the euro area, a slight increase in the size of the total population over the entire projection period makes a positive contribution to average potential GDP growth. However, this is more than offset by a decline in the share of the working-age population, which is a negative drag on growth (by an annual



average of -0.2 percentage points). As a result, labour input contributes negatively to output growth on average over the projection period (by 0.15 p.p. and 0.1 p.p., respectively

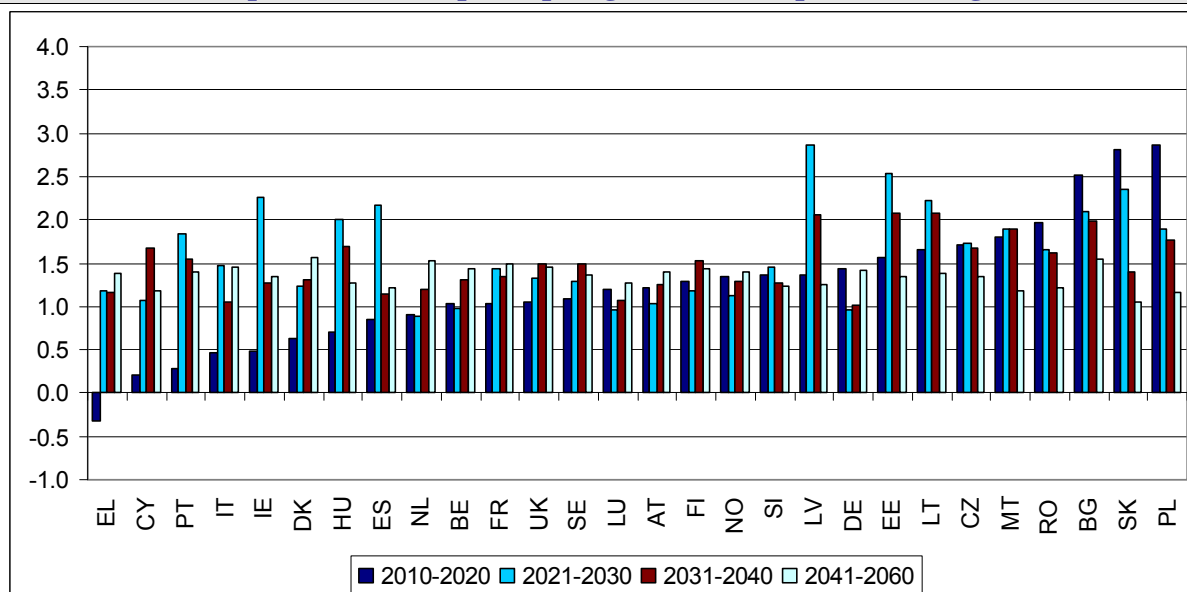
in the EU and in the euro area). Hence, labour productivity growth becomes the sole source for potential output growth in both the EU and the euro area.

**Graph 1. 38 - Determinants of labour productivity: Total factor productivity (annual average growth rates) and capital deepening (contribution in p.p.) EU aggregates, 2010-2060**



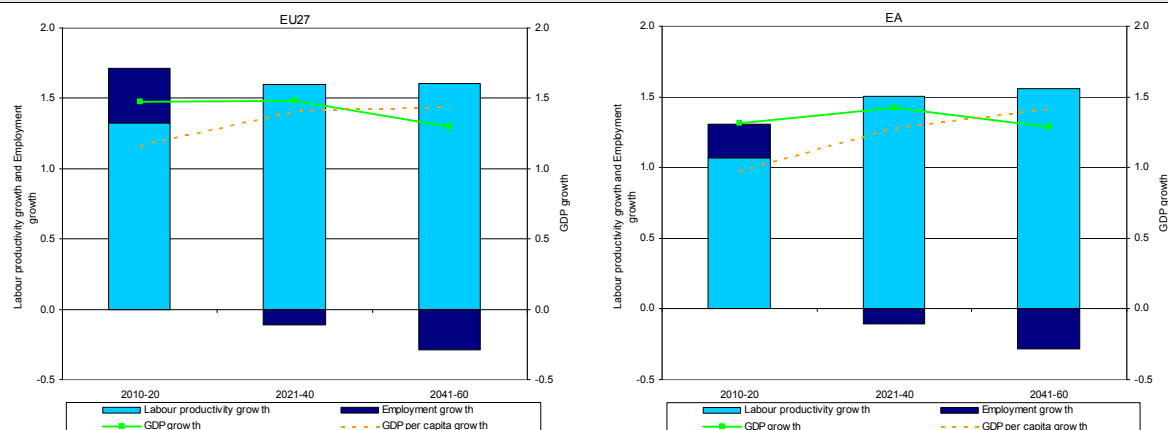
*Source:* Commission services, EPC.

**Graph 1. 39 - GDP per capita growth rates (period averages)**



*Source:* Commission services, EPC.

**Graph 1. 40 - Decomposition of GDP growth, EU, EA  
(2010-20, 2021-40, 2041-60, annual average growth rate)**



*Source:* Commission services, EPC.

**Table 1. 4 - Decomposition of GDP growth, 2010-60 (in percentage)**

		EU27	EA
1	<b>GDP growth in 2010-2060</b>	1.4	1.3
	<i>Due to % change in:</i>		
2=3+4	<b>Productivity</b>	1.5	1.4
	(GDP per hour worked)		
	<i>of which:</i>		
3	TFP	1.0	0.9
4	Capital deepening	0.6	0.5
5=6+7+8+9	<b>Labour input</b>	-0.1	-0.1
	<i>of which:</i>		
6	Total population	0.1	0.1
7	Employment rate	0.1	0.0
8	Share of working age population	-0.2	-0.2
9	change in average hours worked	-0.1	0.0
10=1-6	<b>GDP per capita growth in 2010-2060</b>	1.3	1.3

*Source:* Commission services, EPC.

### 1.3.2. Comparison with the 2009 long-term projections

#### *Demographic developments*

*Total fertility rates* in the EU as a whole are higher in the EUROPOP2010 projection compared with the previous 2008 projection, and in particular in the beginning of the projection period (up by 0.05 in 2010). This pattern is especially the case in BG, CZ, IE, EL, PL, SI, SK and UK (higher by 0.1 or more in 2010). By contrast, the total fertility rate is lower in 2010 compared with

EUROPOP2008 in DK, LV, LU, HU, AT and PT. Over the projection period to 2060, the increase is now expected to be slightly lower in the EU (see Table 1. 5).

*Life expectancy* at birth in 2010 in the EU as a whole is assumed to be higher in EUROPOP2010 than in EUROPOP2008 for both males (+0.2 years) and females (+0.1 years). The largest increases in 2010 (of 0.5 years of more) for males occur in EE, ES, LV, LT, LU, MT, SI, and UK and for females in EE, ES, CY, LV, LT, LU, MT and UK. Over the projection period to 2060, the increase is now expected to be slightly lower

in the EU, with a rise lower by 0.1 year for both males and females.

In light of the recent observed decreases in *net migration* inflows to the EU, especially in some Member States (ES, DE, IE), net migration flows in the EU are lower in the EUROPOP2010 projection compared with EUROPOP2008 in 2010 by about 520,000 people. Overall, EU net inward migration is projected to be 1.8 million higher over the entire projection period (see [Table 1. 1](#)).

Based on these key assumptions, the population in 2010 was 2,403,000 larger compared with the EUROPOP2008 projection in the EU as a whole. By 2030, the population is projected to be about 2.6 million larger and by 2060 about 10.7 million larger (+2.1%). The higher population in 2060 is mostly concentrated to the working-age population (15-64), but both more young persons and older persons are projected, too.

Because of the differences between the two rounds of population projections, the increase in the old-age dependency ratio (persons aged 65 and over in relation to persons aged 15-64) is lower in the EUROPOP2010 projection compared with EUROPOP2008. The new projection shows a smaller increase: up by 26.5 percentage points between 2010 and 2060 (compared with 27.6 percentage points in the previous projection over the same period). Due to diverging changes of assumptions, the projected increase in the old-age dependency ratio is significantly lower in LT, IE, SK and CZ, and significantly higher in LU, LV, CY and PT (see [Table 1. 6](#)).

### ***Labor force developments***

The impact of the 2008-2009 economic recession is clearly visible in the downward revision of the 2010 labour force, employment values and employment rates, compared with the 2009 Ageing Report

projections.<sup>37</sup> In the EU27, the employment rate was revised downwards by 2.4 p.p. in 2010 for the age group 15-64.

In addition, given the assumed rise of 0.8 p.p. in the structural unemployment rate in the EU27 by 2060, the employment rate in 2060 is also lowered by 0.9 p.p. (15-64).<sup>38</sup> By contrast, the participation rate of older workers (55-64) is increased by 3.9 p.p. in 2060, reflecting the positive effect of (further) legislated pension reforms in many Member States. This effect is also evident from a higher employment rate of older workers, up by 3.5 p.p. in 2060 compared with the 2009 Ageing Report projections (see [Table 1. 7](#)).

### ***Productivity and GDP developments***

Following the largest economic crisis in many decades, potential GDP growth has been revised downwards in 2009 and the surrounding years, compared with the baseline projection in the 2009 Ageing Report. The current projections indicate that potential growth in the EU as a whole should only gradually approach the growth rates projected in 2009 before the crisis. Overall, potential GDP growth is expected to be 1.4% on average over the entire projection period 2010-60. A similar picture emerges for the euro area (with slightly lower average potential growth of 1.3% currently being projected, i.e. 0.2 p.p. lower compared with the projection in the 2009 Ageing Report).

The lower average potential growth rate in the EU can mainly be attributed to the new

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<sup>37</sup> Also visible in the age profile of participation rates, including a downward revision of participation rates for young (male) cohorts.

<sup>38</sup> However, in some countries (e.g. Belgium) where the unemployment rate in 2010 has increased relatively little compared with the previous projection report, the decline in the unemployment rate now projected by 2060 (at 7.3% for countries where the structural unemployment rate is higher initially) is smaller than in the 2009 Ageing Report. This also contributes to a lower increase in the employment rate in the current projection compared with the previous projections.

assumption of convergence to a labour productivity growth rate of 1.5%, compared with an assumption of 1.7% in the 2009 Ageing Report. As regards labour input (total hours worked), although there are differences between Member States, the different trends cancel out at the EU aggregate level. Overall, this entails that the projected labour input trends over the entire projection period are on average less of a drag on potential growth (by 0.1 p.p.) in the current projection compared with the 2009 Ageing Report (see [Table 1. 8](#)).



**Table 1. 6 - Long-term projections compared (2012 and 2009 projections): demographic developments**

	Projection exercise 2012 (EUROPOP2010)					Projection exercise 2012 - Projection exercise 2009				
	Total population (millions)		Demographic dependency ratio (65+/(15-64))			Total dependency ratio		Total population (millions)		
	2010	2060	% change	2010	2060	p.p change	2010	2060	2010	p.p change
BE	10.9	13.5	23.7	26.1	43.8	17.7	51.8	71.9	0.10	1.17
BG	7.5	5.5	-26.9	25.7	60.0	34.3	45.6	84.1	-0.02	0.03
CZ	10.5	10.5	-0.7	21.8	54.9	33.0	42.2	79.1	0.13	0.94
DK	5.5	6.1	9.7	25.3	43.7	18.4	52.8	71.3	0.03	0.16
DE	81.7	66.2	-19.0	31.2	59.8	28.6	51.6	82.6	-0.48	-4.61
EE	1.3	1.2	-12.6	25.2	55.3	30.1	47.7	81.5	0.01	0.04
IE	4.5	6.6	46.5	17.1	36.5	19.4	49.3	66.5	-0.14	-0.19
EL	11.3	11.3	-0.4	28.6	56.5	27.9	50.3	81.0	0.01	0.16
ES	46.1	52.2	13.4	24.9	56.2	31.3	47.0	79.0	-0.59	0.32
FR	64.9	73.7	13.7	25.8	46.6	20.8	54.3	75.3	2.30	1.95
IT	60.5	64.9	7.3	30.8	56.6	25.8	52.2	78.9	0.48	5.53
CY	0.8	1.1	40.9	18.9	47.8	29.0	42.9	73.6	-0.01	-0.18
LV	2.2	1.7	-25.8	25.2	67.9	42.7	45.2	90.5	0.00	-0.02
LT	3.3	2.7	-19.6	23.4	56.7	33.3	45.1	81.7	-0.02	0.12
LU	0.5	0.7	44.0	20.4	45.2	24.8	46.2	71.0	0.01	0.00
HU	10.0	8.8	-11.7	24.3	58.1	33.8	45.7	80.3	-0.02	0.12
MT	0.4	0.4	-6.3	21.8	55.9	34.1	44.2	79.3	0.00	-0.02
NL	16.6	17.1	2.7	23.0	47.5	24.5	49.2	74.6	0.11	0.46
AT	8.4	8.9	5.7	26.1	50.8	24.8	47.9	74.4	-0.02	-0.17
PL	38.2	32.6	-14.6	19.0	64.8	45.8	40.2	87.3	0.10	1.47
PT	10.6	10.2	-3.7	26.9	57.2	30.3	49.6	78.7	-0.08	-1.02
RO	21.4	17.2	-19.6	21.3	64.8	43.5	43.0	86.3	0.11	0.32
SI	2.1	2.1	0.0	23.7	57.5	33.7	44.0	82.4	0.02	0.28
SK	5.4	5.1	-6.1	17.0	61.9	44.9	38.2	84.7	0.03	0.56
FI	5.4	5.7	7.1	26.1	47.6	21.5	51.1	75.7	0.03	0.34
SE	9.4	11.5	23.0	28.1	46.2	18.2	53.6	75.7	0.08	0.66
UK	62.2	79.0	27.0	25.0	42.1	17.1	51.5	71.5	0.24	2.37
NO	4.9	6.6	35.0	22.7	43.1	20.4	51.1	72.6	0.07	0.56
EU27	501.8	516.5	2.9	26.0	52.5	26.5	49.3	77.9	2.40	10.78
EA	331.4	340.8	2.9	27.6	53.3	25.7	50.9	78.0	0.1	-0.9

**Source:** Commission services, EPC.

**Table 1. 7 - Long-term projections compared (2012 and 2009 projections): labour force developments**

	Projection exercise 2012										Projection exercise 2009									
	Employment rate (15-64)					Participation rate (15-64)					Unemployment rate (15-64)					Participation rate (55-64)				
	2010	2060	p.p.	change	p.p.	2010	2060	p.p.	change	p.p.	2010	2060	p.p.	change	p.p.	2010	2060	p.p.	change	p.p.
BE	62.0	63.5	1.5	37.3	46.8	9.5	67.7	68.5	0.8	39.1	48.7	9.6	67.7	68.5	0.8	39.1	48.7	9.6	67.7	68.5
BG	60.0	64.4	4.4	44.7	56.0	11.3	67.1	69.4	2.4	49.3	59.8	10.5	73.3	73.3	0.0	49.3	59.8	10.5	73.3	73.3
CZ	65.1	68.6	3.5	46.8	69.1	22.3	70.3	73.1	2.8	50.1	72.6	22.5	73.3	6.1	-1.2	50.1	72.6	22.5	73.3	6.1
DK	73.5	76.8	3.3	57.6	70.7	13.1	79.5	80.6	1.1	61.1	73.2	12.1	75.5	4.8	-2.8	61.1	73.2	12.1	75.5	4.8
DE	71.2	74.0	2.9	57.7	70.0	12.3	76.7	78.9	2.2	62.5	74.8	12.3	72.2	6.1	-1.0	62.5	74.8	12.3	72.2	6.1
EE	61.3	70.1	8.7	54.0	68.7	14.7	74.1	75.6	1.5	64.4	73.6	9.2	72.2	7.3	-10.0	64.4	73.6	9.2	72.2	7.3
IE	60.0	63.2	3.2	49.9	61.7	11.7	69.6	67.3	-2.3	54.7	63.9	9.3	13.7	6.0	-7.7	54.7	63.9	9.3	13.7	6.0
EL	59.6	67.3	7.7	42.6	67.1	24.5	68.4	72.6	4.2	45.5	69.6	24.1	12.8	7.3	-5.5	45.5	69.6	24.1	12.8	7.3
ES	58.6	71.8	13.2	43.6	72.5	28.9	73.4	77.5	4.0	50.8	76.4	25.6	20.2	7.3	-12.9	50.8	76.4	25.6	20.2	7.3
FR	63.8	69.2	5.4	39.7	60.2	20.4	70.4	74.7	4.2	42.5	63.3	20.8	9.4	7.3	-2.1	42.5	63.3	20.8	9.4	7.3
IT	56.9	61.7	4.9	36.4	66.2	29.7	62.2	66.6	4.4	37.8	68.3	30.5	8.5	7.3	-1.2	37.8	68.3	30.5	8.5	7.3
CY	68.3	74.5	6.2	56.8	66.5	9.7	73.2	78.0	4.8	59.6	68.8	9.2	6.8	4.5	-2.3	59.6	68.8	9.2	6.8	4.5
LV	59.7	71.3	11.6	48.2	60.7	12.5	73.7	76.9	3.2	57.1	64.7	7.5	19.0	7.3	-11.7	57.1	64.7	7.5	19.0	7.3
LT	58.2	67.7	9.5	48.3	62.7	14.4	71.0	73.0	2.0	56.5	66.1	9.7	18.1	7.3	-10.8	56.5	66.1	9.7	18.1	7.3
LU	64.9	64.6	-0.2	39.2	40.7	1.5	67.9	67.5	-0.4	40.1	41.6	1.5	4.4	4.2	-0.2	40.1	41.6	1.5	4.4	4.2
HU	55.4	62.2	6.8	34.2	56.6	22.4	62.4	67.1	4.7	37.1	59.1	22.0	11.3	7.3	-4.0	37.1	59.1	22.0	11.3	7.3
MT	56.5	65.6	9.2	31.1	56.4	25.2	60.7	70.3	9.6	32.6	58.5	26.0	6.9	6.6	-0.3	32.6	58.5	26.0	6.9	6.6
NL	74.7	77.1	2.4	53.7	60.6	6.8	78.2	79.9	1.7	56.0	62.4	6.5	4.5	3.4	-1.1	56.0	62.4	6.5	4.5	3.4
AT	71.7	74.4	2.7	42.2	55.1	12.9	75.0	77.6	2.5	43.1	56.1	12.9	4.5	4.1	-0.4	43.1	56.1	12.9	4.5	4.1
PL	59.3	62.3	3.0	34.2	44.8	10.6	65.8	67.2	1.4	36.8	47.4	10.5	9.8	7.3	-2.5	36.8	47.4	10.5	9.8	7.3
PT	65.6	71.1	5.5	49.4	65.5	16.1	74.1	76.7	2.6	54.2	69.4	15.2	11.4	7.3	-4.2	54.2	69.4	15.2	11.4	7.3
RO	58.9	56.8	-2.1	40.9	45.0	4.1	63.8	60.9	-2.9	42.3	46.3	4.0	7.6	7.0	-0.5	42.3	46.3	4.0	7.6	7.0
SI	66.4	70.5	4.1	34.9	59.9	25.0	71.7	74.7	3.0	36.3	61.6	25.3	7.4	5.7	-1.7	36.3	61.6	25.3	7.4	5.7
SK	59.0	62.8	3.8	40.6	48.3	7.8	68.9	67.8	-1.1	45.1	50.7	5.5	14.4	7.3	-7.1	45.1	50.7	5.5	14.4	7.3
FI	68.2	71.2	3.0	56.6	62.6	6.0	74.6	76.2	1.7	60.5	65.8	5.3	8.6	6.6	-2.0	60.5	65.8	5.3	8.6	6.6
SE	72.4	76.5	4.2	70.0	74.7	4.6	79.1	81.9	2.8	73.9	77.9	3.9	8.5	6.5	-2.0	73.9	77.9	3.9	8.5	6.5
UK	69.4	72.4	3.0	57.1	67.8	10.7	75.4	76.7	1.3	59.9	70.1	10.2	8.0	5.6	-2.4	59.9	70.1	10.2	8.0	5.6
NO	75.4	75.4	0.0	68.9	67.3	-1.6	78.2	78.0	-0.2	69.8	68.2	-1.7	3.6	3.3	-0.3	69.8	68.2	-1.7	3.6	3.3
EU27	64.1	69.0	4.9	46.3	63.5	17.2	71.1	73.8	2.8	49.7	66.5	16.8	9.7	6.5	-3.2	49.7	66.5	16.8	9.7	6.5
EA17	64.2	69.2	5.1	45.7	64.9	19.2	71.4	74.2	2.8	49.3	68.1	18.8	10.1	6.7	-3.4	49.3	68.1	18.8	10.1	6.7

*Source:* Commission services, EPC.

**Table 1. 8 - Long-term projections compared (2012 and 2009 projections): potential GDP growth developments**

Projection exercise 2012 - Projection exercise 2009													
Due to growth in:													
GDP growth in 2010-2060	Productivity (GDP per hour worked)	TFP	Capital deepening	Labour input	Total pop.	Empl. rate	Share of Working age pop.	change in average hours worked	GDP per capita growth in 2010-2060				
1=2+5	2=3+4	3	4	5=6+7+8+9	6	7	8	9	10=1+6				
BE	-0.2	-0.3	-0.2	-0.1	0.1	-0.1	0.1	0.0	-0.3				
BG	-0.3	-0.4	-0.1	-0.3	0.1	0.0	0.0	0.0	-0.3				
CZ	0.0	-0.2	-0.1	-0.1	0.2	0.2	-0.1	0.1	-0.2				
DK	-0.3	-0.3	-0.2	-0.1	0.0	0.0	-0.1	0.0	-0.3				
DE	-0.4	-0.2	-0.2	-0.1	-0.1	-0.1	0.0	0.0	-0.2				
EE	-0.3	-0.4	-0.2	-0.2	0.1	0.1	0.0	0.0	-0.3				
IE	-0.2	-0.1	-0.1	0.0	-0.1	0.0	-0.1	0.1	-0.2				
EL	-0.6	-0.8	-0.4	-0.4	0.2	0.1	0.0	0.0	-0.7				
ES	-0.3	-0.5	-0.4	-0.1	0.2	0.0	0.1	0.1	-0.3				
FR	-0.2	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.2				
IT	-0.1	-0.3	-0.3	-0.1	0.2	0.2	0.0	0.0	-0.3				
CY	-0.9	-0.5	-0.4	-0.2	-0.3	-0.2	0.1	0.0	-0.7				
LV	-0.3	-0.4	-0.2	-0.2	0.1	0.0	0.1	-0.1	-0.2				
LT	-0.2	-0.5	-0.3	-0.2	0.3	0.1	0.0	0.1	-0.3				
LU	-0.6	-0.3	-0.2	-0.1	-0.4	0.0	-0.3	0.0	-0.6				
HU	-0.5	-0.5	-0.4	-0.1	0.0	0.1	-0.1	0.1	-0.6				
MT	-0.2	-0.2	-0.1	-0.1	0.1	-0.1	0.2	0.1	-0.1				
NL	-0.2	-0.2	-0.1	-0.1	0.0	0.1	-0.1	0.0	-0.3				
AT	-0.2	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	0.1	-0.2				
PL	0.0	-0.2	-0.1	-0.2	0.2	0.1	0.0	0.1	-0.1				
PT	-0.6	-0.5	-0.3	-0.2	-0.1	-0.2	0.0	0.0	-0.4				
RO	-0.7	-0.6	-0.3	-0.3	-0.1	0.0	-0.2	0.1	-0.7				
SI	-0.1	-0.5	-0.3	-0.2	0.4	0.3	0.0	0.1	-0.4				
SK	-0.1	-0.1	-0.1	-0.1	0.1	0.2	-0.3	0.1	-0.3				
FI	-0.1	-0.1	0.0	-0.1	0.0	0.1	-0.1	0.0	-0.2				
SE	-0.1	-0.2	-0.1	-0.1	0.1	0.1	-0.1	0.0	-0.2				
UK	-0.2	-0.2	-0.1	-0.1	0.0	0.1	-0.1	0.0	-0.3				
NO	0.1	-0.1	0.0	0.0	0.2	0.2	0.0	0.0	-0.1				
EA	-0.2	-0.3	-0.2	-0.1	0.1	0.0	0.0	0.0	-0.3				
EU27	-0.2	-0.3	-0.2	-0.1	0.1	0.0	0.0	0.0	-0.3				

Source: Commission services, EPC.



## 2. Pensions

### 2.1. Introduction

A strong public sector involvement in the pension system is a common feature for almost every EU Member State. Statutory earnings-related old-age pension schemes, in the form of either a common scheme for all employees or several parallel schemes in different sectors or occupational groups, are the core of the public pension system in most countries. The public pension system often provides also a (quasi-) minimum guarantee pension to those who do not qualify for the earnings-related scheme or have accrued only a small earnings-related pension. Minimum guarantee pensions are either provided through earnings-related schemes or are means-tested and provided by a specific minimum pension scheme or through a general social assistance scheme.

In general, public schemes and other public pensions are those schemes that are statutory and that the general government sector administers. Public pension schemes affect public finances as they are considered to belong to the general government sector in the national account system. Ultimately, the government bears the costs and risks attached to the scheme.

Public old-age pension arrangements are however very diverse in the EU, due to both different traditions on how to provide retirement income, and Member States being in different phases of the reform process of pension systems. Most common are defined-benefit, notional defined contribution as well as point systems, in which (earnings-related) pension entitlements are accumulated (see Table 2. 1). In a few Member States, notably in Denmark, the Netherlands, Ireland and the United Kingdom, the public pension system provides in the first instance a flat-rate pension, which can be supplemented by earnings-related private occupational pension

schemes (in the United Kingdom, also by a public earnings-related pension scheme – State Second Pension – and in Ireland by an earnings-related pension scheme for public service employees). Pensions provided by occupational schemes are those that, rather than being statutory by law, are linked to an employment relationship with the scheme provider. However, in the mentioned countries, the occupational pension provision is broadly equivalent to the earnings-related public pension schemes in most of the other EU countries.

**Table 2. 1 – Main pension schemes across Member States**

Country	Type	Country	Type
BE	DB	LU	DB
BG	DB	HU	DB
CZ	DB	MT	Flat rate + DB
DK	DB	NL	DB
DE	PS	AT	DB
EE	DB	PL	NDC
IE	Flat rate + DB	PT	DB
EL	Flat rate + DB	RO	PS
ES	DB	SI	DB
FR	DB + PS	SK	PS
IT	NDC	FI	DB
CY	DB	SE	NDC
LV	NDC	UK	DB
LT	DB	NO	NDC

**Source:** Commission services.

**Note:**

DB: Defined benefit system.

NDC: Notional defined contribution system.

PS: Point system.

A number of Member States, including Sweden and some new Member States such as Bulgaria, Estonia, Latvia, Lithuania, Hungary, Poland and Slovakia, have switched part of their public pension schemes into (quasi-) mandatory private funded schemes. Typically, this provision is statutory but the insurance policy is made between the individual and the pension fund.

As a consequence, the insured persons have the ownership of pension assets. This means that the owner enjoys the rewards and bears the risks regarding the value of the assets. Participation in a funded scheme is conditional on participation in the public pension scheme and is mandatory for new entrants to the labour market (in Sweden for all employees), while it is voluntary for older workers (in Lithuania it is voluntary for all). However some of these countries (Hungary, Slovakia and Poland) have recently decided to shift back a part of the private schemes to public schemes.

The type of benefits provided by the public pension systems diverge across countries. Most pension schemes provide not only old-age pensions but also early retirement, disability and survivors' pensions. Some countries, however, have specific schemes for some of these benefit types; in particular, some (e.g. United Kingdom, France<sup>39</sup> and Belgium) do not consider disability benefits as pensions (despite the fact that they are granted for long periods), and in some cases they are covered by the sickness insurance scheme.

The financing method of the pension systems also differs across countries. Most public pension schemes are financed on a pay-as-you-go (PAYG) basis, whereby current contribution revenues are used for the payments of current pensions.<sup>40</sup> In addition, there is a considerable variation between countries regarding the extent to which contribution revenues cover all pension expenditures or just a certain extent of it. In most countries, minimum guarantee pensions are covered by general taxes. Earnings-related schemes are often subsidised to varying degrees from general government funds. Some specific schemes, notably public sector employees' pensions sometimes do not

constitute a well-identified pension scheme but, instead, disbursements for pensions appear directly as expenditure in the government budget. On the other hand, some predominantly PAYG pension schemes have statutory requirements for partial pre-funding and, in view of the increasing pension expenditure, many governments have started to collect reserve funds for their public pension schemes.

While occupational and private pension schemes are usually funded, the degree of their funding relative to the pension promises may differ, due to the fact that future pension benefits can be related either to the salary and career length (defined-benefit system) or to paid contributions.

## 2.2. Coverage of pension projections

One of the most crucial parts of the EC-EPC budgetary projection exercise is the assessment of the impact of ageing populations on pension expenditure. As for the past exercises, national pension models were used in order to be able to incorporate the institutional characteristics prevailing in each Member State, so as to gauge the degree of the challenge posed by population ageing that the different Member States are facing. At the same time, there is a need to ensure that the projections are comparable in terms of assumptions used. The commonly agreed underlying assumptions are described in Chapter 1 of this report.

The core of the projection exercise is *the government expenditure on pensions for both the private and public sectors*, as in the 2009 pension projection exercise. The reporting sheet consists of 156 variables to be projected; of which 65 to be provided on a voluntary base (e.g. data on occupational schemes, private schemes (mandatory and non-mandatory), benefit ratio and net pension expenditures) and 5 are input data provided by the Commission (DG ECFIN).

<sup>39</sup> At least before retirement age. After retirement, disability pensions cease to be paid by the sickness insurance scheme.

<sup>40</sup> Some countries have however accumulated significant public pension funds (Cyprus, Luxembourg and Finland).

Overall, Member States agreed to provide data for the following nine categories:<sup>41</sup>

- Pension expenditures (gross and net)
- Benefit ratios
- Gross average replacement rates (at retirement)
- Number of pensions
- Number of pensioners
- Contributions (employees+employers)
- Number of contributors to pension schemes (employees)
- Assets of pension funds and reserves
- Decomposition of new public pension expenditures (earnings-related)

Using different, country-specific, projection models may introduce an element of non-comparability of the projection results. Nevertheless, this approach was agreed between EC and EPC because pension systems and arrangements are very diverse in the EU Member States, making it extremely difficult to project pension expenditure on the basis of one common model, to be used for all the 27 EU Member States.<sup>42</sup>

In order to still ensure high quality and comparability across country-specific pension projection results, an in-depth peer review was carried out for all pension projections provided by the Member States. The projection results were discussed and revised where deemed necessary by the

AWG and the European Commission during the projection exercise.

It was found that in some cases there was a need for providing additional information in the country fiches as well as the projection questionnaires so as to better understand the different pension systems and notably the dynamics of the projection results.<sup>43</sup>

### **2.3. Characteristics of pension systems in Europe**

In most Member States, the main part of pension entitlements is accrued in the (first) public pension pillar. Consequently, the projection exercise has a major focus on public pension expenditure in the first pillar with its main components (minimum, old-age, early retirement, disability and survivors' pensions). On top of that, several Member States have introduced occupational pension schemes and/or private mandatory and voluntary schemes in the 2nd and/or 3rd pillar of their pension systems.

Table 2. 2 gives an overview of the existing pension schemes in Member States and their main characteristics. It also shows whether pensions are provided on a flat-rate or earnings-related basis, etc. Moreover, it informs about the coverage of Member States' current pension projections.

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<sup>41</sup> A detailed description of the coverage of this projection round including the data questionnaire as well as a comparison to the 2009 Ageing Report coverage is provided in Annex I and Annex II.

<sup>42</sup> For further details: EC-EPC (2011) "The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies", European Economy, No.4, [http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2011/pdf/ee-2011-4\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-4_en.pdf)

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<sup>43</sup> Annex II provides an overview of those Member States with remaining open issues in their pension projections that have not been addressed after the peer review and before the finalisation of the 2012 Ageing Report.

**Table 2. 2 - Pension schemes in EU Member States and projection coverage**

	COVERAGE									
	Public pensions						Occupational pension scheme		Private pension scheme	
	Minimum pension / social allowance	Old-age pensions	Early retirement pensions	Disability pensions	Survivors' pensions				Mandatory private scheme	Voluntary Pension scheme
BE	MT - SA	ER	ER	ER (private sector); FR (self-employed)	ER		V*		X	V*
BG	MT-SA (as of 2013; before social pension)	ER	ER (until 2015)	ER	ER		V*		M* young (1960)	V*
									M* (prof)	
CZ	FR	ER	ER	ER	ER		X		X	V*
DK	FR & MT suppl.	FR & MT suppl.	V	FR	FR		quasi M		X	V
DE	MT - SA*	ER	ER	ER	ER		V*		X	V*
EE	FR	FR + suppl. (before 1999); ER (after)	ER	FR + suppl. (before 1999); ER (after)	FR + suppl. (before 1999); ER (after)		X		M - young (1983)	V - old*
IE	MT - FR & SA	FR	MT – FR & SA	SA: MT – FR; Contributory: FR	SA: MT – FR; Contributory: FR		M - pub; V* - priv		X	V*
EL	MT - FR	ER	ER	ER	ER		X		X	V*
ES	MT	ER – priv ; FRw - pub.	ER – priv ; FRw - pub.	ER - priv; FRw - pub.	ER - priv; FRw - pub.		V - priv; M - pub.		X	V
FR	ER/ MT - SA	ER	ER	ER	ER - MT		V*		X	V*
IT	MT & SA	ER	ER	ER	ER		V*		X	V*
CY	MT & ER	ER	ER	ER	ER		M - pub; V* - priv		X	X
LV	MT - SA	ER	ER	ER	ER		X		M - young (1971); V - old	V*
LT	SA	ER	ER	SA or ER	SA or ER		X		V	V*
LU	MT - SA*	ER	ER	ER	ER		V*		X	V*
HU	MT - SA	ER	ER	ER	ER		X		V	V*
MT	MT - SA	FR & ER	X	FR & ER	FR & ER		M - pub (before 1979)		X	V*
NL	SA*	FR	X	ER	FR		M		X	V*
AT	MT - SA	ER	ER	ER	ER		M*		X	V*
PL	MT*	ER	ER	ER	ER		V*		M - young (1969+)/V - old	V*
PT	MT - SA	ER	ER	ER	ER		M - prof; V - others		X	V*
RO	SA	ER	ER	ER	ER		X		M	V*
SI	MT - SA	ER	ER	ER	ER		M* - prof; V* - others		X	V
SK	MT - SA	ER	ER	ER	ER		X		M/V new	V*
FI	MT	ER	ER	ER	ER		V*		X	V*
SE	MT	ER	ER	ER	ER		quasi-M		M	V
UK	FR & MT - SA	ER - V	X	ER (HC*)	ER		V*		X	V*
NO	FR	FR	X	ER	FR		M*		X*	V*

Key:

MT	...	Means tested
FR	...	Flat rate
FRw	...	Flat rate by wage categories
ER	...	Earnings related
HC	...	Partly covered by health care expenditure
SA	...	Social allowance/assistance
X	...	Does not exist
V	...	Voluntary participation in the scheme
M	...	Mandatory participation in the scheme
*	...	Is not covered by the projection
public	...	Public sector employees
private	...	Private sector employees
new	...	New labour market entrants
prof	...	Only for selected professions
other	...	Other than selected professions
young(X)	...	Only for people born in year X and after
old	...	Only for people other than young

**Source:** Commission services, EPC.

With the exception of some specific public pension schemes for some countries, highlighted in grey, the coverage of public pensions is nearly complete. Concretely, 3 countries (Germany, the Netherlands and Poland) do not include projections of minimum pension and/or social allowance expenditure for a variety of different reasons (in the 2009 Ageing Report, there were 9 countries that did not cover minimum pensions in their projections). Yet, at least a rough estimate of the current and future expenditure of this part of the public pension scheme is provided by all of these countries separate from their projection questionnaire. In addition, only the United Kingdom does not fully cover disability pensions as they are partly covered by the projections of health care expenditure in this Ageing Report.

The size and development of public pension expenditure in the future is not only depending on demographic factors, but also, especially, on the generosity of the system. Three important drivers of future spending are the pensionable earnings reference, the valorisation rule as well as the indexation rule (see Table 2. 3).<sup>44</sup>

A large number of Member States apply pension benefit formulas in which full career earnings are taken as a reference to calculate pension entitlements. In terms of financial sustainability, this leads – *ceteris paribus* – to lower pension expenditures in comparison to countries that calculate pension benefits with a pensionable earnings reference that is restricted to a specific amount of best earnings years or only years at a rather mature stage of the career. If no flat-wage is assumed to be applied over the whole career, one can assume that a selection of best years or late career years leads to higher pension entitlements as wages are generally higher at the end of the career in comparison to the starting wage. In countries with flat-rate pensions, the pensionable earnings reference

is irrelevant (Denmark, the Netherlands and the United Kingdom).

Valorisation rules show how pension contributions paid during the working life are indexed before retirement. Several countries valorise pension contributions in relation to wage developments (the Czech Republic, Germany, Spain, Cyprus, Hungary, Austria, Slovenia, Slovakia and Sweden). Other countries apply a mix of wages and prices (e.g. Luxembourg, Romania and Finland), a mix of wages (or comparable variables) and GDP growth (Italy), or a pure price valorisation.

Indexation rules applied in the Member States are on average slightly less generous than valorisation rules. A majority of countries (19) in the EU applies indexation rules for pensions in payment that do not fully reflect a 1:1 relationship with nominal wage increases; they either apply a price indexation rule (Spain, France, Italy, Latvia<sup>45</sup> and Austria), an indexation mix of wages (or comparable variables) and prices (Belgium, Bulgaria, the Czech Republic, Estonia, Cyprus, Luxembourg, Hungary, Malta, Poland, Romania, Slovakia, Finland and Sweden) or a mix of GDP growth and prices (Greece, Portugal). The United Kingdom applies a "triple guarantee", with pensions being increased by the highest of wage growth, inflation or 2.5%.<sup>46</sup>

<sup>44</sup> Two further decisive drivers are retirement ages and accrual rates. Both aspects will be discussed separately at a later stage in this chapter.

<sup>45</sup> As of 2014.

<sup>46</sup> A detailed overview of indexation rules is provided in Annex III.

**Table 2. 3 – Key parameters of pension systems in Europe (old-age pensions)**

Country	Pensionable earnings reference	General valorisation variable(s)	General indexation variable(s)
BE	Full career	Prices	Prices and living standard
BG	Full career	Wages	Prices and wages
CZ	Full career	Wages	Prices and wages
DK	Years of residence	Not applicable	Wages
DE	Full career	Wages	Wages
EE	Full career	Social taxes	Prices and social taxes
IE	Career average contributions	Not applicable	No rule
EL	Full career	Yearly decree	Prices and GDP (max 100% prices)
ES	Last 25 years (as of 2022)	Wages (with maximum value closer to prices)	Prices
FR	25 best years (CNAV)	Prices	Prices
IT	Full career	GDP	Prices
CY	Full career	Wages	Wages and Prices
LV	Full career	Contribution wage sum index	Prices (as of 2014)
LT	5 best from the period 1984-1993 and 25 best years after 1994	Yearly discretionary decision	Yearly discretionary decision
LU	Full career	Prices and wages	Prices and wages
HU	Full career	Wages	Prices and wages
MT	10 best of last 40 years (for people born as of 1962)	Cost of living	Prices and wages
NL	Years of residence	Not applicable	Wages
AT	2010: 22 best years, as of 2028: 40 best years	Wages	Prices
PL	Full career	NDC 1st: Wages, NDC 2nd: GDP	Prices and wages
PT	Full career (as of 2042, max 40); Weighted average between full career and 10 best out of last 15 (before 2042)	Prices (and wages 2002-2011)	Prices and GDP
RO	Full career	Prices (and wages until 2030)	Prices (and wages until 2030)
SI	Best consecutive 18 years	Wages	Wages
SK	Full career as of 1984	Wages	Prices and wages
FI	Full career	Prices and wages	Prices and wages
SE	Wages	Wages	Wages
UK	Years of insurance contributions	Prices, wages and GDP	Prices, wages and GDP
NO	Full career	Wages	Wages

**Source:** Commission services, EPC.

**Note:** A detailed overview of legal indexation rules as well as indexation rules applied in projections is provided in Annex III.

In addition, some countries (Germany, Finland, Italy, Portugal, Sweden and Norway) have implemented a "sustainability factor" and/or other "reduction coefficients" into the calculation mechanism that determines the exact amount of pension entitlements.

These factors change the size of the pension benefit e.g. depending on expected demographic changes such as the life expectancy at the time of retirement or the ratio between contributions and pensions (see also the box on sustainability factors in pension systems, below).

**Box 1: Sustainability factors in pension systems and links to life expectancy**

A few Member States that reformed their pension systems in the recent past have formally introduced a "sustainability factor" and/or other "reduction coefficients" into the specification that determines the amount of pension benefits. This approach introduces a component that changes the size of the pension benefit depending on expected demographic changes such as the life expectancy at the time of retirement. In most of the cases, this leads to a reduction in pension entitlements, having a positive impact on the sustainability of the public pension system as well as on public finances.

In addition, several countries have introduced a link between retirement ages and life expectancy (or age) in their pension system legislation. This approach – which is fully in line with the Commission's recommendations in the Annual Growth Survey 2012<sup>47</sup> – presents one effective form of increasing sustainability in public pension systems. Moreover, by increasing retirement ages, people are assumed to accrue more pension rights and thus a higher pension provided that the labour market allows for working longer. Thus, there is also in the end a positive effect on pension adequacy.

Country	Sustainability factor	Retirement age linked to life expectancy
Germany	X	
Finland	X	
Spain	X	X
Italy	X	X
France	X	
Latvia	X	
Poland	X	
Portugal	X	
Sweden	X	
Norway	X	
the Czech Republic		X
Denmark		X*
Greece		X
the Netherlands		X**

\*: Depending on parliamentary decision.

\*\*: Not included in pension projections.

**Germany:** The pension point value which is generally adjusted annually in relation to the gross wage growth can be altered further on (mainly lowered) by two additional factors: the contribution factor and the sustainability factor:

- The "*contribution factor*" accounts for changes of the contribution rate to the statutory pension scheme and to the subsidised (voluntary) private pension schemes. An increase of contribution rates will reduce the adjustment of the pension point value.
- The "*sustainability factor*" that measures the change of the number of standardized contributors in relation to the number of standardized pensioners, links the adjustment of the pension point value to the changes in the statutory pension scheme's dependency ratio, the ratio of pensioners to contributors.

<sup>47</sup> [http://ec.europa.eu/europe2020/pdf/ags2012\\_en.pdf](http://ec.europa.eu/europe2020/pdf/ags2012_en.pdf)



Additionally, Germany introduced a specific "*pension assurance law*". The pension point value will not decrease in case of decreasing wages. Theoretical decreases of the pension point value are temporarily frozen and will be counterbalanced with future increases of the pension point value starting from the year 2011.

**Finland:** The *life-expectancy coefficient* adjusts the pensions upon retirement to the changes in longevity as of 2010. The life expectancy coefficient is the difference of the remaining expected lifetime at age 62 in a particular year compared to the base year 2009, based on population statistics. It cuts the initial pension benefit accordingly. It is possible to counteract the effect of the life expectancy coefficient by postponing retirement.

**Spain:** Beginning in 2027, the fundamental parameters of the pension system including the retirement age will be adjusted every 5 years to changes in life expectancy (at the age of 67) between the year of revision and 2027.<sup>48</sup>

**Italy:** Under the NDC regime the amount of pension is calculated as a product of two factors: the total lifelong contributions, capitalised with the nominal GDP growth rate (five-year geometric average) and the *transformation coefficient*, the calculation of which is mainly based on the probability of death, the probability of leaving a widow or widower, and the average number of years for which a survivor's benefit will be drawn. As a consequence, pension amount is proportional to the contribution rate and inversely related to retirement age - the lower the age, the lower the pension and vice-versa. The transformation coefficients are currently available for the age bracket 57-65. As of 2013, the upper limit is extended to 70. For retirement ages falling below (i.e. disability pensions) or above the range, the lowest and the highest transformation coefficients are respectively applied. Transformation coefficients are updated every three years (every two years as of 2021).

*Contribution and age requirements* for early and old age pensions, and old age allowances are indexed to changes in life expectancy at 65, as measured by the National Statistical Institute over the preceding three years. Indexation to life expectancy will be first applied in 2013 by a purely administrative procedure. Subsequent retirement age indexations are envisaged every 3 years in line with the timing for the revision of the transformation coefficients (every 2 years as of 2021).

**France:** The amount of pensions in the basic private sector (CNAVTS) is partly depending on the "*coefficient de proratisation*": " $\text{Min}(1, D/T)$ " with D being the contributory period and T the reference length. The pension is reduced in due proportion whenever  $D < T$ . For people born in 1950 (who are 60 years old in 2010), T equals 40.5 years, but *this value will increase in line with life expectancy*. In the projections, the contributory period to receive a full pension is however kept at 41.5 years in the middle and long run.

**Latvia, Poland, Sweden and Norway:** The NDC pension systems in Latvia, Poland, Sweden and Norway work on an actuarial basis. At the time of retirement an annuity is calculated by dividing the individual's account value by a *divisor reflecting life expectancy* at the specific date of retirement. An *increase in life expectancy reduces the annual benefit* so that the present value of total expected pension benefits is nearly invariant to changes in the cohort's remaining life expectancy and the individual's retirement age.

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<sup>48</sup> Increases in retirement age in line with changes in life expectancy are not included in the baseline projections for Spain.



In general, the individual can counteract the negative effect on the annuity caused by increasing life expectancy by postponing the date of retirement, i.e. strong incentives to prolong the working career.

Moreover, regardless of the demographic or economic development, the Swedish pension system ensures that it will be able to finance its obligations with a fixed contribution rate and fixed rules for calculation of benefits. This is done via an *automatic balancing mechanism* that is activated if the current liabilities of the system are greater than the calculated assets. In this case the indexation is reduced until the financial stability of the system is restored.

**Portugal:** The sustainability factor adjusts pensions upon retirement to changes in life expectancy. The sustainability factor is given by the ratio between the average life expectancy at the age of 65 in 2006 and that same indicator in the year before pension entitlement, as measured by the National Statistics Institute. This ratio is applied to new old-age pensions since the beginning of 2008 and is updated on an annual basis.

**The Czech Republic:** There is a continuous increase of the statutory retirement age for people born after 1936. The retirement age will not be specified *per se*, but only with regard to the date of birth. After the unification of retirement ages for men and women, the statutory retirement age will be increased by 2 additional months in comparison to the precedent generation.

**Denmark:** Changes in the statutory retirement age due to increases in life expectancy have to be confirmed by Parliament 10 years before they take effect. In the projection, it is assumed that Parliament confirms these increases in the retirement age.<sup>49</sup> A specific formula for calculating the pension age on the basis of future observed mean life expectancy for 60 year olds is enshrined in the legislation. Changes in the pension age shall be calculated every 5 years – based on the latest observed life expectancy – and confirmed by Parliament 10 years before they take effect.

**Greece:** As from 2021, the minimum and statutory *retirement ages* will be *adjusted in line with changes in life expectancy* every three years. Upon its first implementation the change within the 2010-2020 ten-year period shall be taken into account.

**The Netherlands:** The retirement age for the state pension – AOW – will be increased from 65 to 66 in 2020 and linked to life expectancy afterwards. Moreover, the increase in the eligibility age for occupational pensions will also be linked to life expectancy, using the same formula as is used for the first pillar pensions.<sup>50</sup>

Source: Commission service, EPC (information provided by Member States).

<sup>49</sup> In case the parliament does not confirm the change in retirement age based on an increase in life expectancy, this would imply an underestimation of public pension expenditure in the Danish projections.

<sup>50</sup> Pension reform legislated after finalisation of pension projections. Further details in the box on latest pension reforms below.

Despite existing legal indexation rules, several Member States decided to diverge from these rules in their projections and used an indexation rule that is more in line with current and past political practices. Moreover, in a few countries there is no explicitly legislated rule guiding the indexation of (minimum) pension benefits. In these cases, an approximation of the expected indexation has been made for the purpose of the long-term projection so as to reflect effective constant policy.<sup>51</sup>

For instance, Spain, Italy, Austria, Slovakia, Finland and Sweden have assumed an indexation of public minimum pension/old age allowance benefits to wages in the projection (at least partially). Their legal indexation rule describes an indexation to prices which, when applied in long-term projections, would virtually lead to a gradual disappearance of minimum pensions in the future. In the Czech Republic, Ireland and Lithuania, indexation to wages has been assumed in the projection of public (minimum) pension benefits, while there is no legal indexation rule.

Large differences in pension legislations can be observed not only with respect to indexation rules but also concerning official retirement ages. Table 2. 4 shows the statutory retirement age in 2010 and the effective exit age from the labour market in 2005 and in 2009.<sup>52</sup> In most of the countries, latter figures are lower than the statutory retirement age. This is often related to existing early retirement schemes and/or other government measures that provide pension income even before reaching the official retirement age threshold. One way to increase the effective exit age from the labour market (and also the effective

retirement age) in line with an increase in the statutory retirement would hence be to extend the required years of contributions or to improve incentives to stay longer on the labour market, e.g. by restricting early retirement as well as increasing employment opportunities for older workers.<sup>53</sup> Another way is to introduce flexible retirement ages (Finland, Sweden), so that an incentive is created to stay longer in the labour market to be entitled to a substantially higher amount of pensions after retirement.

Table 2. 4 also shows the change in the statutory retirement age under current legislation as well as the change in the effective exit age from the labour market, split by gender.<sup>54,55</sup> As a result of recent reforms in many Member States, retirement ages for males and females will gradually converge for all Member States except for Bulgaria, Poland, Romania and Slovenia. In almost every Member State, statutory retirement ages and effective exit ages from the labour market will rise substantially until 2060, with major steps often taking place within this decade. This is either due to already legislated pension reforms setting a specific retirement age in the future, or to the fact that Member States have introduced a connection between retirement ages and life expectancy in their legislations (the Czech Republic, Denmark, Greece and Italy).<sup>56</sup>

<sup>53</sup> All these possible measures are also stressed in the European Commission Annual Growth Survey 2012: [http://ec.europa.eu/europe2020/pdf/ags2012\\_en.pdf](http://ec.europa.eu/europe2020/pdf/ags2012_en.pdf)

<sup>54</sup> Statutory retirement ages applied in projections. Effective exit ages from the labour market in 2005 and 2009 are consolidated Eurostat figures. Figures for 2020 and 2060 are projected figures based on the commonly agreed macroeconomic assumptions for this projection round.

<sup>55</sup> After the finalisation of projections, several countries have implemented further pension reforms with an effect on retirement ages. See the corresponding box on latest pension reforms. These reforms are also supposed to have a decreasing impact on pension expenditure and thus a positive impact on sustainability.

<sup>56</sup> See also the box on sustainability factors in pension systems, above.

<sup>51</sup> Annex III provides an overview of those cases where the legal indexation rule either does not exist or differs from the rules applied in the projection.

<sup>52</sup> The statutory retirement age is not necessarily the compulsory age of retirement but can also be a legislative reference age beyond which it is still possible to continue working.

Yet, as can also be seen from Table 2. 4, in most of the Member States, the rise in statutory retirement ages does not fully reflect the total expected change in life expectancy.

**Box 2: Latest legislated pension reforms, not incorporated in the Ageing Report 2012 projections**

After the finalisation of the pension expenditure projections for the Ageing Report 2012, several countries have legislated further pension reforms that would have additional effects on expenditure figures.

**Belgium:** Pension reform legislated in December 2011 subject to minor changes until April 30th, 2012. The minimum early retirement age and the minimum number of career years required for eligibility will gradually be increased between 2013 and 2016 from 60 to 62 years and from 35 to 40 years, respectively. People with a 42-year career will still be eligible for early retirement at 60 (and at 61 with a 41-year career). In the civil servant scheme, the pension amount will take into account the earnings over the last 10 years instead of the last 5 years (not applicable to those who reached the age of 50 on January, 1st 2012). For "*prépensions*", the minimum career length requirement will be gradually increased to 40 years. The minimum age will remain 60 years in general, and be increased to 60 years for specific cases to which a lower age presently applies. Pension entitlements for "*prépension*" before the age of 60 years as well as entitlements for certain periods of unemployment and certain career interruptions will be reduced.

**Bulgaria:** The retirement age increase starts as of 2012 instead of 2021 for both genders and all work categories. The increase is by 4 months each year until reaching 65 years of age for men in 2017 and 63 years of age for women in 2020. As of 1 January 2012, the required length of service for military forces is raised by two years from 25 to 27 years. As of 2013, old-age pensions will not be indexed according to the "Swiss Rule", but only to the CPI for the respective year. In addition, as of 2017 the increase of the accrual rate will be applied only to the new pensions and the already granted pensions will not be recalculated.

**The Czech Republic:** A reform to introduce a 2nd pillar was approved in November 2011 (published in Collection of Laws on the 28th of December 2011). The reform should be set off on the 1st of January 2013. However, due to the current consolidation efforts, the start of the reform could be postponed. The new system is based on an opt-out principle. Workers may decide to lower their contribution to the PAYG system by 3 p.p. and transfer these contributions to the 2nd pillar with the addition of 2 p.p. of gross wage. As a consequence, the contribution rate to the 1st pillar would become 25% (instead of 28%) and the contribution rate to the 2nd pillar would be 5% (hence, 30% in total). People aged 35 and older can decide to opt-in until the 1st of July 2013. Everyone aged less than 35 has to make a decision up to the end of the calendar year when the age of 35 is reached.

**Denmark:** The retirement age increase specified in the 2006 Welfare Agreement is accelerated. The retirement age for voluntary early retirement pensions (VERP) will be increased from 60 to 62 years from 2014-2017 (formerly 2019-2022 in the Welfare Agreement), while the public old-age pension age will be increased from 65 to 67 years in 2019-2022 (as opposed to 2024-2027 before). VERP is reduced from 5 to 3 years from 2018-2023. The basic amount for VERP is increased, while private pension wealth lowers the VERP amount to a higher degree than now.

Furthermore, the system of automatic enrolment for members of the unemployment insurance scheme into the VERP is cancelled. A new senior disability pension is introduced as an administrative fast track into the disability pension for persons 5 years before the statutory retirement age.

**Greece:** According to the auxiliary pension reform legislated in March 2012 (L. 4052), many of the larger auxiliary pension funds of employees are merged into one and the old Defined Benefit system is turned into a balanced Notional Defined Contribution system, precluding any kind of fund transfer from the National Budget. In addition, more pension funds can be added in the future upon their contributors' request.

**France:** The retirement age increase specified in the 2010 pension reform is accelerated. Retirement ages for both men and women will increase by 5 months a generation, instead of 4 months initially, from age 60 to 62 (legal retirement) and from age 65 to 67 (full rate retirement). The new age boundaries will be reached for the 1955 generation instead of the 1956 generation, a year earlier than what was scheduled in the 2010 law.

**Hungary:** From January 2012, early retirement schemes are gradually eliminated by either phasing out several forms of entitlements or by transformation into non-pension benefits (167/2011 Act). These measures will contribute to the increase of the average retirement age. From January 2012, pensions are moreover indexed only to inflation.

**The Netherlands:** The retirement age for the state pension AOW will be increased from 65 to 66 in 2020 and linked to life expectancy afterwards. Further increases in the retirement age will be announced 11 years before they are being implemented. This procedure will take place by the end of each period of five calendar years, and for the first time on January 1<sup>st</sup>, 2014. Based on current projections on rising life expectancy, it is expected that in 2014 an increase to 67 in 2025 will be announced. An increase of the retirement age to 68 will, according to current estimates, be announced in 2024, and take place in 2035. Within the 2060 time horizon of the AWG pension projections, a fourth step, to the age of 69, is envisaged in 2050. Moreover, the increase in the eligibility age for occupational pensions will also be linked to life expectancy, using the same formula as is used for the first pillar pensions.

**Austria:** The pension reform, coming into force on April 1<sup>st</sup>, 2012 as part of the Stability Law, extends the number of contributory years entitling for the corridor pension and the long term insurance pension from 37.5 to 40 years; restricts access to disability pension by raising the eligibility for job protection within a business sector from 57 to 60 years and by strengthening "fit2work" – initiative aiming to maintain and improve the employability and the ability to work of citizens; abolishes the system of parallel accounting to accrue the replacement rate between old and new law in a budgetary neutral way (leveraging transparency about actual individual pension entitlements); increases the deductions in case of early retirement from currently 4.2% to 5.1%; adjusts pension benefits by 1 p.p. and 0.8 p.p. lower than CPI in 2013 and 2014, respectively and raises the maximal ceiling of the contributory base and the contribution rate of farmers and self-employed.

Source: Commission services, EPC (information provided by Member States).

**Table 2.4 - Average labour market exit age, life expectancy and statutory retirement age**

	Average age of exit from the labour market										Life expectancy at the age of 65										Statutory retirement age									
	TOTAL					MALE					FEMALE					MALE					MALE					FEMALE				
	2005	2009	2020 (i)	2060 (i)		2005	2009	2020 (i)	2060 (i)		2005	2009	2020 (i)	2060 (i)		2010	2020	2060			2010	2020	2060		2010	2020	2060			
BE	60.6	61.6 (e)	61.5	61.5	61.6	61.2 (e)	61.4	61.4	61.4	59.6	61.9 (e)	61.5	61.5	61.5	17.4	18.4	22.3	20.9	21.9	25.7	65	65	65	65	65	65	65	65	65	65
BG	58.6 (e)	60.2 (e)	62.1	63.2	59.3 (e)	60.6 (e)	64.2	64.2	64.2	57.6 (e)	59.9 (e)	61.2	62.1	62.1	13.8	15.3	20.6	17.0	18.4	23.6	63	63	65	65	60	60	60	60	60	63
CZ	60.6	60.5	62.0	64.9	62.3	61.5	65.1	65.1	65.1	59.1	59.6	60.9	64.6	64.6	15.3	16.5	21.2	18.7	19.9	24.5	62y2m (f)	63y8m (f)	69y4m (g)	69y4m (g)	58y8m (g)	61y8m (g)	61y8m (g)	69y4m (g)	69y4m (g)	69y4m (g)
DK	61	62.3	63.5	65.3	61.2	63.2	64.2	65.4	65.4	60.7	61.4	62.8	65.1	65.1	16.8	17.9	22.0	19.5	20.8	25.1	65	65	72.5	72.5	65	65	65	65	65	72.5
DE	61.3 (a)	62.2	64.6	65.0	61.4 (a)	62.6	64.9	65.1	65.1	61.1 (a)	61.9	64.3	64.9	64.9	17.4	18.5	22.4	20.6	21.6	25.4	65	65y9m	67	67	65	65	65y9m	65	65	67
EE	61.7	62.6	64.1	64.7	;	;	63.9	64.7	;	;	;	64.3	64.6	64.6	14.1	15.5	20.9	19.1	20.4	24.9	63	63y9m	65	61	61	63y9m	65	61	63y9m	65
IE	64.1	64.1 (b)	65.0	65.0	63.6	63.5 (b)	64.4	64.4	64.4	64.6	64.7 (b)	65.7	65.7	65.7	16.8	18.0	22.2	20.0	21.2	25.5	66	66	68	68	66	66	66	66	66	68
EL	61.7	61.5	62.7	63.9	62.5	61.3	62.7	63.9	61	61.6	62.7	63.8	63.8	63.8	17.9	18.9	22.6	20.2	21.1	24.6	65	65	69.4 (h)	60	65	65	65	65	65	69.4 (h)
ES	62.4	62.3	64.5	65.3	62	61.2	64.1	65.0	62.8	62.8	63.4	65.1	65.5	65.5	18.2	19.2	22.9	22.1	23.0	26.3	65	65.8	67	65	65	65	65	65.8	67	67
FR	59	60	62.1	62.7	58.7	60.3	62.1	62.7	59.3	59.3	59.8	62.1	62.7	62.7	18.5	19.5	23.0	22.7	23.6	26.6	60-65	62-67	62-67	60-65	62-67	62-67	62-67	62-67	62-67	62-67
IT	59.7	60.1	65.2	66.7	60.7	60.8	65.4	66.8	58.8	58.8	59.4	64.9	66.7	66.7	18.1	19.1	22.8	21.7	22.7	26.1	65y4m	66y11m	70y3m	60y4m	66y11m	66y11m	66y11m	66y11m	66y11m	70y3m
CY	62.7 (a)	62.8	64.3	64.3	;	;	65.0	65.0	;	;	;	63.5	63.5	63.5	17.8	18.8	22.5	20.0	21.1	25.3	65	65	65	65	65	65	65	65	65	65
LV	62.1	62.7 (d)	63.3	63.3	;	;	63.6	63.6	;	;	;	63.1	63.1	63.1	13.5	15.0	20.6	18.1	19.5	24.4	62	62	62	62	62	62	62	62	62	62
LT	60	59.9 (b)	63.1	63.8	;	;	63.7	64.0	;	;	;	62.7	63.6	63.6	13.5	15.0	20.4	18.4	19.6	24.2	62.5	64	65	65	60	60	60	63	65	65
LU	59.4	;	59.9	59.9	;	;	59.5	59.5	;	;	;	60.5	60.4	60.4	17.3	18.4	22.4	21.1	22.2	26.1	65	65	65	65	65	65	65	65	65	65
HU	59.8	59.3	62.6	63.0	61.2	60.1	62.8	63.2	58.7	58.7	58.7	62.5	62.9	62.9	14.0	15.5	20.9	18.1	19.5	24.6	62	65	65	65	62	62	62	65	65	65
MT	58.8	60.3	62.4	63.3	;	;	62.8	63.8	;	;	;	61.7	62.6	62.6	17.0	18.1	22.2	20.2	21.3	25.4	61	63	65	60	63	65	65	65	65	65
NL	61.5	63.5	63.1	63.1	61.6	63.9	63.9	63.9	61.4	63.1	63.1	62.2	62.2	62.2	17.5	18.5	22.3	20.9	21.9	25.6	65	65	65	65	65	65	65	65	65	65
AT	59.9	60.9 (e)	61.8	62.4	60.3	62.6 (e)	62.4	62.5	59.4	59.4	59.4 (e)	61.2	62.3	62.3	17.6	18.6	22.4	20.9	21.9	25.6	65	65	65	65	60	60	60	60	60	65
PL	59.5	59.3 (e)	62.0	62.5	62	61.4 (e)	63.6	64.0	57.4	57.4	57.5 (e)	60.3	60.7	60.7	14.8	16.2	21.2	19.1	20.3	24.8	65	65	65	65	60	60	60	60	60	60
PT	63.3 (e)	63.5 (e)	64.3	64.7	62.7 (e)	63.1 (e)	64.3	64.7	64.1 (e)	64.1	63.9 (e)	64.4	64.6	64.6	17.1	18.1	22.1	20.4	21.4	25.1	65	65	65	65	65	65	65	65	65	65
RO	63	64.3 (b)	62.3	62.7	64.7	65.5 (b)	63.2	63.2	61.5	61.5	63.2 (b)	61.2	62.0	62.0	14.1	15.5	20.8	17.2	18.6	23.8	64	65	65	65	59	61	63	63	63	63
SI	58.5	59.8 (b)	62.5	63.1	;	;	63.1	63.1	;	;	;	62.0	63.1	63.1	16.4	17.6	21.9	20.2	21.3	25.3	63	63	63	61	61	61	61	61	61	61
SK	59.2	58.8	61.3	61.3	61.1	60.4	61.5	61.5	57.6	57.6	57.5	61.2	61.2	61.2	14.1	15.5	20.8	18.0	19.3	24.3	62	62	62	57.9 (g)	61.7 (g)	61.7 (g)	62	62	62	62
FI	61.7	61.7	63.6	63.6	61.8	62.3	63.6	63.6	61.7	61.1	61.1	63.7	63.7	63.7	17.3	18.3	22.3	21.3	22.2	25.8	63-68	63-68	63-68	63-68	63-68	63-68	63-68	63-68	63-68	63-68
SE	63.6	64.3	64.7	64.7	64.3	64.7	65.1	65.1	63	63	64	64.1	64.1	64.1	18.2	19.2	22.7	21.1	22.1	25.7	61-67 (i)	61-67 (i)	61-67 (i)	61-67 (i)	61-67 (i)	61-67 (i)	61-67 (i)	61-67 (i)	61-67 (i)	61-67 (i)
UK	62.6	63	64.1	65.3	63.4	64.1	64.3	65.3	61.9	62	63.9	65.3	65.3	65.3	18.0	19.0	22.8	20.7	21.8	25.7	65	66	68	60	66	66	66	66	66	68
NO	63.1	63.2	64.3	64.3	63.1	63	64.6	64.6	63.1	63.1	63.3	64.1	64.1	64.1	17.9	18.9	22.5	21.0	22.0	25.7	67	67	67	67	67	67	67	67	67	67
EU27	61	61.4	63.5	64.3	61.6	61.8	63.9	64.5	60.4	60.4	61	63.2	64.2	64.2	17.2	18.3	22.4	20.7	21.8	25.6	;	;	;	;	;	;	;	;	;	;
EA	60.7	61.2	63.8	64.4	60.9	61.4	63.9	64.4	60.5	60.5	61	63.7	64.4	64.4	17.8	18.8	22.6	21.4	22.4	25.9	;	;	;	;	;	;	;	;	;	;

Source: Eurostat (Average Exit age 2005, 2009, status quo February 2012, life expectancy based on EUROPOP 2010), Underlying assumptions report (average exit age 2020 and 2060), information provided by AWG delegates.

Note: (a) represents 2004, (b) represents 2006, (c) represents 2007 and (d) represents 2008.

(e): Figures provided by National Statistics Authorities.

(f): Retirement age depending on generation; example presented for calendar year with high amount of pensioners.

(g): Depending on the number of children.

(h): Estimated according to the EUROPOP 2010 life expectancy projections.

(i): Flexible from age of 61 without any upper limit. Under the Employment Protection Act, an employee is entitled to stay in employment until his/her 67th birthday.

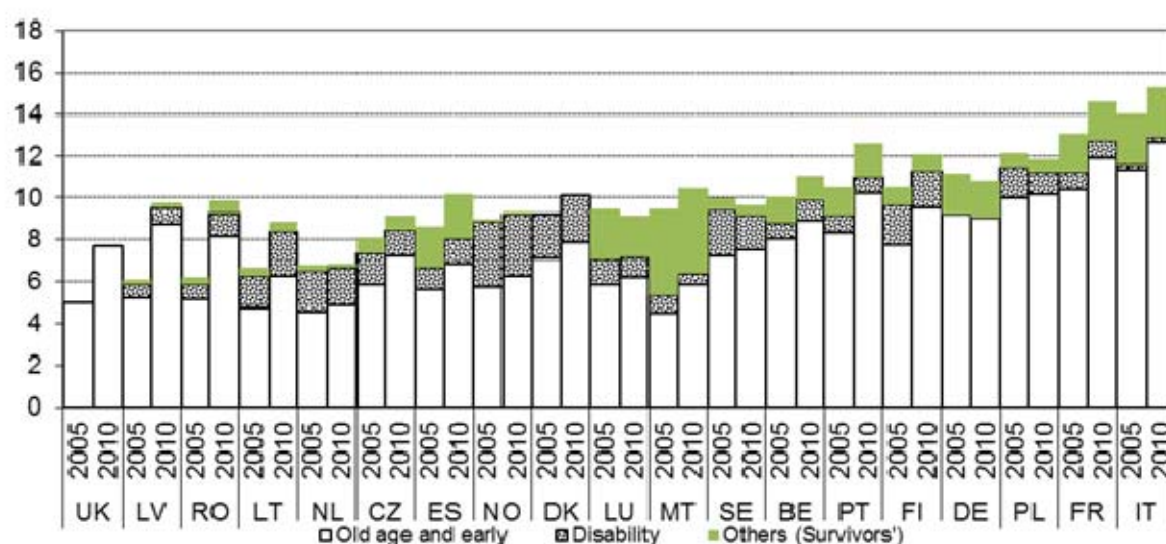
(j): The average effective exit age calculation for 2020 and 2060 is based on the reference age group 50-70.

**Source: Commission services, EPC.**

Different indexation rules, different retirement ages, different demographic situations as well as different ways of pension provision in the public pillar are automatically translated into non-uniform levels of public pension expenditure in the Member States. Between 2005 and 2010, the public pension expenditure/GDP ratio has increased in all countries that provided information for both years, except for Germany, Luxembourg and Sweden (Graph 2. 1). In most cases, however, such an increase is heavily influenced by the impact of the crisis on the GDP level in the denominator.

Yet, the level of public pension spending in 2005 varied a lot among Member States. Expenditures amounting to 6% of GDP or below could be observed in the United Kingdom, Latvia and Romania. The highest level was reached in Italy with 14%. The largest increases in the pension/GDP ratio between 2005 and 2010 can be observed for Latvia and Romania (3.7 p.p. and 3.6 p.p. of GDP, respectively), countries that were severely hit by the economic crisis in 2010. In 2010, the highest levels are recorded for France and Italy (both above 14% of GDP), while the lowest level is observed for the Netherlands (6.8% of GDP).

**Graph 2. 1 - Gross public pension expenditure 2005 and 2010 compared (as % of GDP)**



**Source:** Commission services, EPC.

**Note:** The graph presents only the countries which provided information for both years in at least one of the three categories.

DK: No separate survivors' pensions exist in Denmark.

DE: Disability pensions are part of old age and early pension expenditures.

FR: Disability pensions paid after the retirement age are part of old age and early pension expenditures.

MT: Other pensions include treasury pensions.

UK: Benefits paid to disabled persons below state pension age are not included in the projection, but disability benefits for persons above state pension age are included in public pension expenditure. The United Kingdom does not have survivor pensions. Figures for 2005 do not include public service pensions.



## 2.4. Pension expenditure projections

### 2.4.1. Public pensions

Large differences in pension expenditures across countries will remain also over the whole projection horizon (see Table 2. 5 and Graph 2. 2). Public pension expenditure in the EU27 is projected to increase by 1.5 p.p. of GDP over the period 2010-2060 to a level of 12.9% of GDP. In the euro area, an increase by 2.0 p.p. of GDP is projected. Yet, the range of projected changes in public pension expenditure is very large across

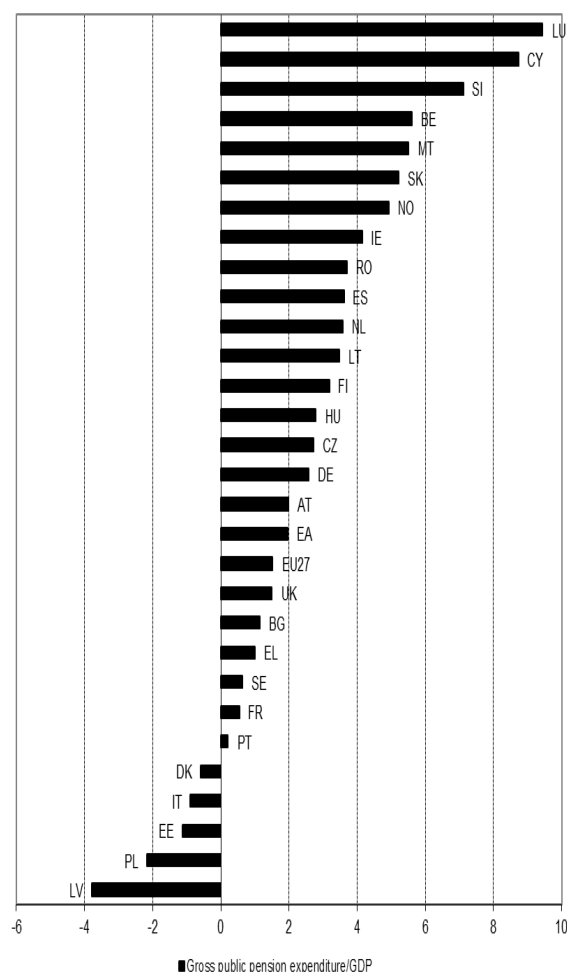
Member States. On the one hand, Latvia projects a decline of -3.8 p.p. of GDP. On the other hand, an increase of 9.4 p.p. of GDP can be observed for Luxembourg. Slovenia and Cyprus project a public pension expenditure increase by more than 7 p.p. of GDP. In three additional Member States (Slovakia, Belgium, Malta) spending to GDP will grow between 5 and 7 p.p. of GDP. On the contrary, the ratio decreases over the projection horizon between 2010 and 2060 in Denmark, Italy, Estonia, Poland and Latvia. For the remaining countries, an increase of less than 5 p.p. of GDP is expected, ranging from +0.2 p.p. in Portugal to +4.9 p.p. in Norway.

**Table 2. 5 - Change in gross public pension expenditure over 2010-2060 (in p.p. of GDP)**

Country	2010	2020	2040	2060	Change 2010-2060
BE	11.0	13.1	16.5	16.6	5.6
BG	9.9	9.2	10.1	11.1	1.1
CZ	9.1	8.7	9.7	11.8	2.7
DK	10.1	10.8	10.3	9.5	-0.6
DE	10.8	10.9	12.7	13.4	2.6
EE	8.9	7.7	8.1	7.7	-1.1
IE	7.5	9.0	10.0	11.7	4.1
EL	13.6	13.7	14.9	14.6	1.0
ES	10.1	10.6	12.3	13.7	3.6
FR	14.6	14.4	15.2	15.1	0.5
IT	15.3	14.5	15.6	14.4	-0.9
CY	7.6	9.5	12.1	16.4	8.7
LV	9.7	7.3	6.3	5.9	-3.8
LT	8.6	7.6	9.6	12.1	3.5
LU	9.2	10.8	16.5	18.6	9.4
HU	11.9	11.5	12.1	14.7	2.8
MT	10.4	10.6	11.4	15.9	5.5
NL	6.8	7.4	10.4	10.4	3.6
AT	14.1	15.1	16.5	16.1	2.0
PL	11.8	10.9	10.3	9.6	-2.2
PT	12.5	13.5	13.1	12.7	0.2
RO	9.8	9.2	11.6	13.5	3.7
SI	11.2	12.2	15.8	18.3	7.1
SK	8.0	8.6	10.6	13.2	5.2
FI	12.0	14.0	15.2	15.2	3.2
SE	9.6	9.6	10.2	10.2	0.6
UK	7.7	7.0	8.2	9.2	1.5
NO	9.3	11.6	13.7	14.2	4.9
<b>EU27</b>	<b>11.3</b>	<b>11.3</b>	<b>12.6</b>	<b>12.9</b>	<b>1.5</b>
<b>EA</b>	<b>12.2</b>	<b>12.3</b>	<b>13.9</b>	<b>14.1</b>	<b>2.0</b>

Source: Commission services, EPC.

**Graph 2. 2 - Change in gross public pension expenditure over 2010-2060 (in p.p. of GDP)**

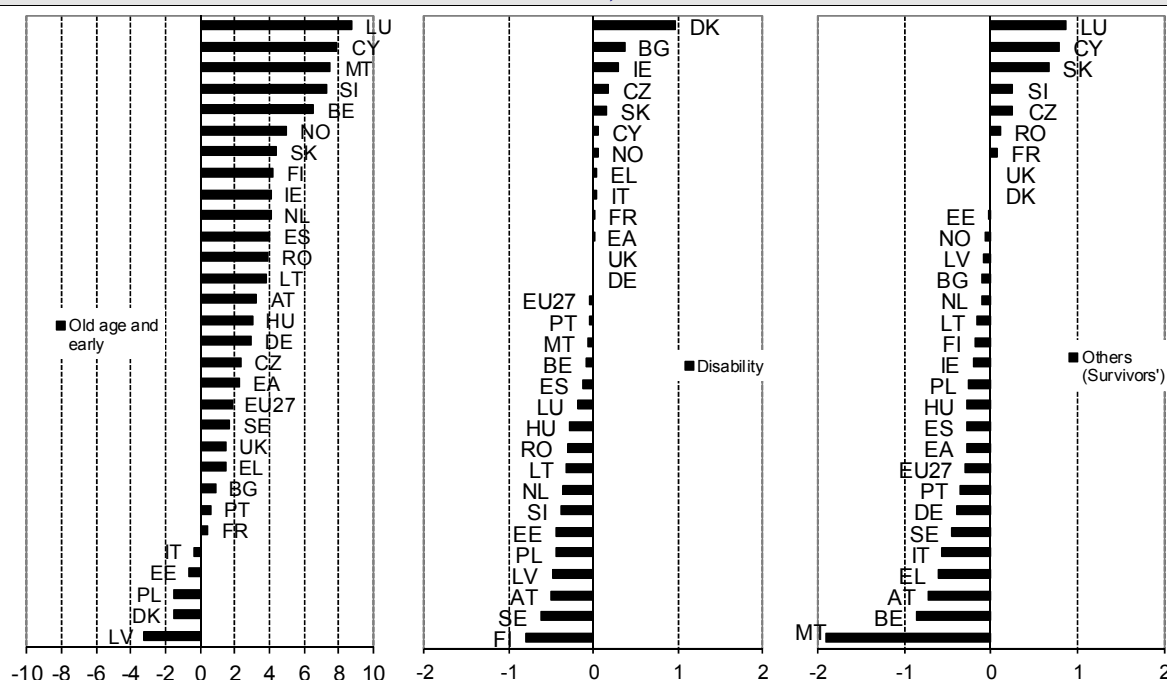


Source: Commission services, EPC.

When looking at the contributions of the different general schemes to the projected increase in public pension expenditure, the increase for old-age and early pensions by 1.9 p.p. of GDP between 2010 and 2060 in the EU27 is the essential one (see Graph 2.

3). In the euro area, the increase is projected to be slightly higher at 2.2 p.p. of GDP. An offsetting effect of -0.3 p.p. of GDP in total is projected for disability and other pension expenditure, mainly survivors' pensions, in the EU27 as well as in the euro area.

**Graph 2. 3 - Gross public pension expenditure 2010-2060 by scheme (change in p.p. of GDP)**



**Source:** Commission services, EPC.

**Note:**

DK: No separate survivors' pensions exist in Denmark.

DE: Disability pensions are part of old age and early pension expenditures.

IE: Old age and early pensions include pension expenditure of public service occupational schemes.

EL: Figures without small supplementary funds (1.2% of GDP in 2010, 1.3% in 2060).

MT: Other pensions include treasury pensions.

UK: Benefits paid to disabled persons below state pension age are not included in the projection, but disability benefits for persons above state pension age are included in public pension expenditure. The United Kingdom does not have separate survivor pensions as they are part of old-age and early pensions. Old-age and early pensions include public service pensions.

Old-age and early pension spending decreases in only 5 Member States over the projection horizon (Italy, Estonia, Poland, Denmark and Latvia). The latter country shows the strongest downward trend of old-age and early pension expenditure (-3.2 p.p.

of GDP). In all the other countries, expenditure in this category is increasing, with Luxembourg and Cyprus showing the highest upward trend (+8.8 p.p. and +7.9 p.p. of GDP, respectively). Disability pension spending is projected to decrease in the vast



majority of countries. Only in 10 states (Bulgaria, the Czech Republic, Denmark, Ireland, Greece, France, Italy, Cyprus, Slovakia and Norway) it is projected to increase, yet only slightly (except for Denmark). The same holds for other pensions (mainly survivors'). They are as well projected to increase in 7 Member States only (the Czech Republic, France, Cyprus, Luxembourg, Romania, Slovenia, and Slovakia). Hence, one can assume that take-up rates for both types of pensions are lowering over the projection horizon, both due to restricted eligibility criteria as well as demographic and health trends.<sup>57</sup>

#### *2.4.1.1. Expenditure development by age group*

Many countries have introduced pension reforms that will increase the retirement age. To better understand the impact of these reforms, pension expenditures disaggregated by age groups between -54 and 75+ were provided by Member States. [Graph 2. 4](#) depicts the share of public pensioners in different age groups in 2010 and 2060 as % of the total number of public pensioners. Countries that lie above the 45 degree line show an increasing share of public pensioners in the respective age group over the projection horizon. In all Member States, the share of public pensioners in age groups below 65 is constantly decreasing over the whole projection horizon.

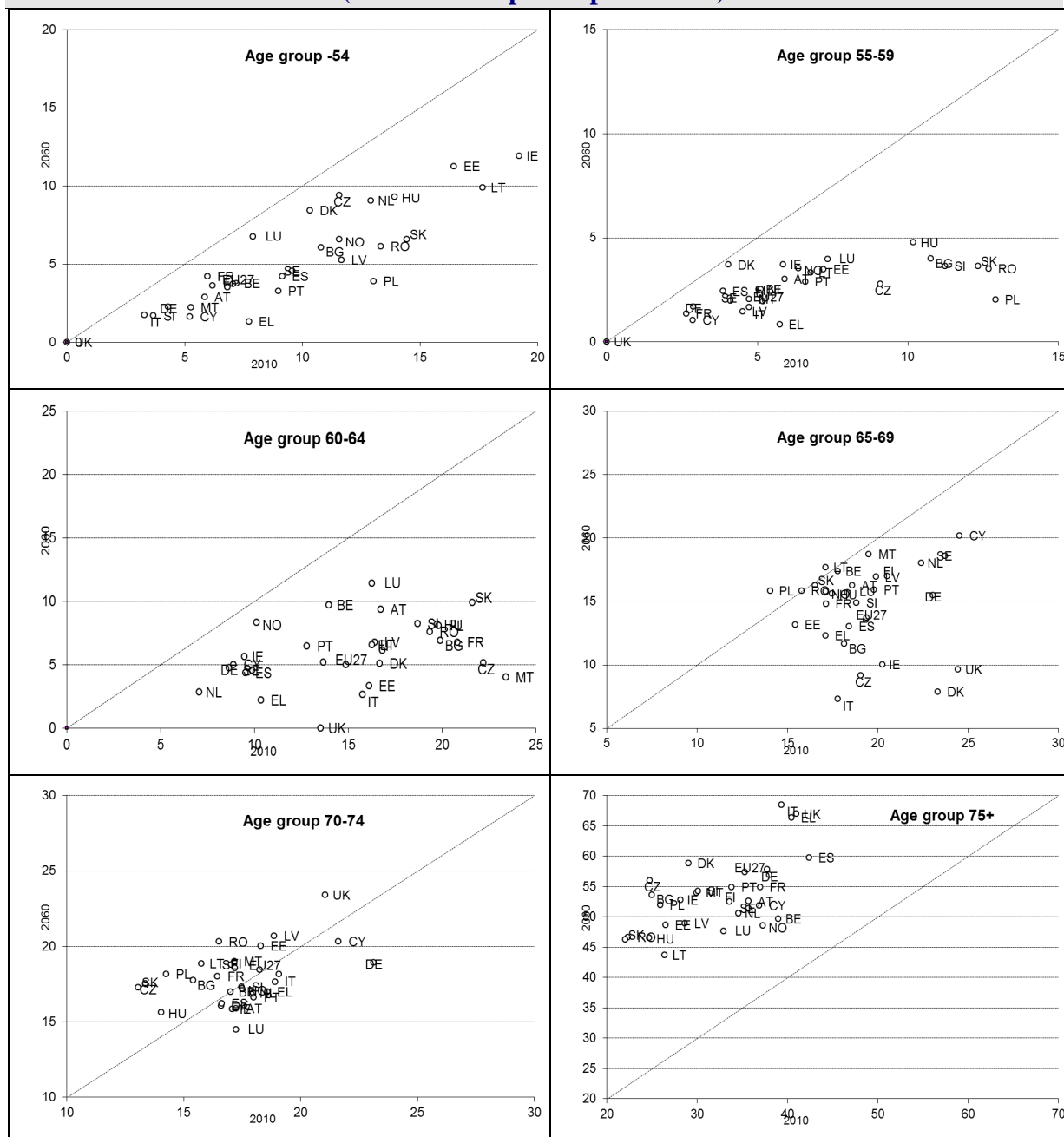
On the EU27 level, the share for the age group -54 goes down by 3.3 p.p. over time, although being stable as of 2050 (see [Table 2. 6](#)). An interpretation could be that a constant share of younger persons receiving disability and other pensions will exist over the entire projection horizon. The shares for age groups 55-59 and 60-64 are also projected to decrease by 3.2 p.p. and 9.9 p.p. at the EU27 level, respectively. This mostly

reflects increasing retirement ages over time. Over the entire projection horizon, the share of pensioners in age group 65-69 is decreasing as well (-5.8 p.p. on the EU27 level), although there is a rising trend in the beginning of the projection horizon reflecting the increase in statutory retirement ages in many Member States during this decade.

The share of public pensioners in age group 70-74 is more or less constant between 2010 and 2060 in the EU27 (+0.2 p.p.). However, the share of this age group is rising between 2010 and 2020 (+2.2 p.p.) and stays rather constant until 2040 before it shrinks to its starting level again until 2050. By then, the demographic trend leads to a permanently increasing share of pensioners in the oldest age group and hence to lower shares in all the other age groups. Accordingly, the share of age group 75+ increases constantly and sharply by 22.1 p.p. over the entire projection horizon.

<sup>57</sup> This last component shall, in principle, not play a major role in the projections, as the basic assumption - as for the health and long-term care projections - is that disability rates remain constant over the projection horizon.

**Graph 2. 4 - Share of public pensioners by age group in 2010 and 2060 compared  
(as % of total public pensioners)**



**Source:** Commission services, EPC.

**Note:** Data on the share of public pensions is presented in case the number of pensioners by age group was not provided.

**Table 2. 6 - Share of public pensioners in the EU27 by age groups  
(as % of total public pensioners)**

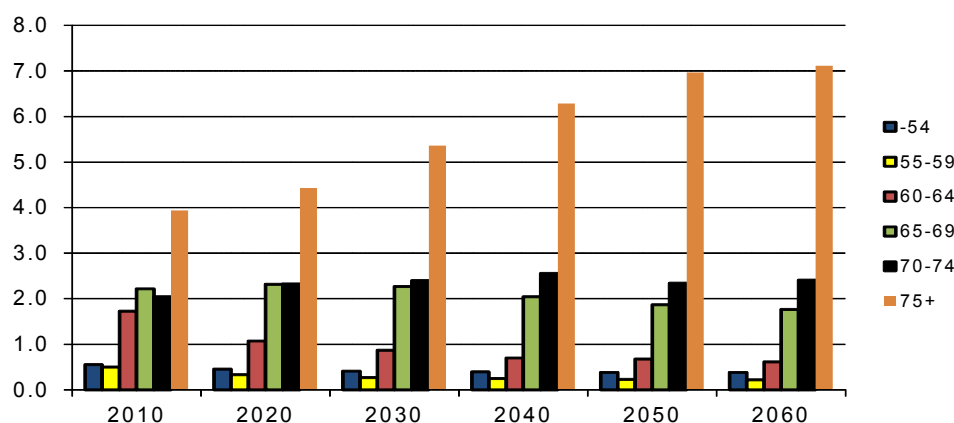
Age group	Share of public pensioners in the EU27						2010-60 change
	2010	2020	2030	2040	2050	2060	
-54	7.1	6.0	5.1	4.3	3.8	3.7	-3.3
55-59	5.2	3.4	3.0	2.5	2.2	1.9	-3.2
60-64	14.9	9.6	7.7	6.5	5.9	5.0	-9.9
65-69	19.4	20.8	19.3	16.6	14.9	13.5	-5.8
70-74	18.3	20.5	20.2	20.2	18.4	18.5	0.2
75+	35.3	39.6	44.7	49.9	54.9	57.3	22.1

*Source:* Commission services, EPC.

Changes in pensioners by age groups are also reflected in the expenditure figures. Expenditure for age groups younger than 65 are decreasing drastically, due to increased retirement ages, increased restrictions for early and disability pensions as well as demographic factors (see [Graph 2. 5](#) and [Table 2. 7](#)). Even age group 65-69 shows on average a downward trend in pension expenditure for the EU27 (from 2.2 p.p. of GDP in 2010 to 1.8 p.p. in 2060), although in several Member States expenditure for this group as a share of total expenditures is still

rising. This especially holds for the beginning of the projection period when the increased statutory retirement age in many Member States during this decade as well as the retirement of the post-war baby boom generation translate into higher expenditures for age group 65-69. Expenditure for age groups 70+ are increasing as retirement ages increase and the majority of pensioners reaches higher ages. Age group 75+ shows the highest expenditure increase from 3.9 p.p. to 7.1 p.p. of GDP at the end of the projection period.

**Graph 2. 5 - Public pension expenditure in the EU27 by age groups between 2010 and 2060 (as % of GDP)**



*Source:* Commission services, EPC.

*Note:* The sum of expenditures per age group is not equal to overall gross public pension expenditure due to a lack of country coverage in age split expenditures. See also note for [Table 2. 7](#).

**Table 2. 7 - Gross public pension expenditure development by age group, 2010-2060  
(as % of GDP)**

	Year	Age group					
		-54	55-59	60-64	65-69	70-74	75+
BE	2010	0.8	0.7	1.9	2.0	1.8	3.9
	2060	0.6	0.5	1.9	2.9	2.8	7.9
BG	2010	0.8	1.1	2.0	1.9	1.6	2.5
	2060	0.4	0.4	0.7	1.3	2.2	6.0
CZ	2010	0.8	0.7	2.1	1.9	1.3	2.4
	2060	0.8	0.2	0.5	1.0	2.4	7.0
DK	2010	1.2	0.5	2.1	2.1	1.5	2.6
	2060	1.1	0.5	0.7	1.0	1.6	4.7
DE	2010	0.4	0.4	1.0	2.4	2.5	4.1
	2060	0.2	0.2	0.7	2.0	2.5	7.7
EE	2010	1.0	0.5	1.5	1.5	1.8	2.6
	2060	0.6	0.2	0.2	1.0	1.5	4.1
IE	2010	1.1	0.3	0.5	1.2	1.0	1.6
	2060	1.0	0.3	0.5	0.8	1.3	4.4
EL	2010	1.0	1.0	1.8	2.3	2.2	4.0
	2060	0.1	0.1	0.3	1.7	2.6	8.5
ES	2010	0.7	0.4	1.2	2.1	1.7	3.9
	2060	0.5	0.3	0.6	1.9	2.4	8.0
FR	2010	0.6	0.4	2.9	2.6	2.4	5.6
	2060	0.6	0.2	0.9	2.3	2.9	8.2
IT	2010	0.3	0.9	3.0	2.9	2.9	5.3
	2060	0.1	0.2	0.3	1.3	2.8	9.7
CY	2010	0.3	0.3	1.1	2.1	1.6	2.2
	2060	0.2	0.2	0.9	3.5	3.4	8.3
LV	2010	0.6	0.3	1.3	1.7	1.9	3.0
	2060	0.3	0.1	0.4	0.9	1.2	3.1
LT	2010	1.0	0.5	1.4	1.5	1.4	2.3
	2060	0.8	0.3	0.7	2.3	2.4	5.7
LU	2010	0.5	0.7	1.8	1.7	1.5	3.0
	2060	0.5	0.7	2.2	3.2	2.9	9.1
HU	2010	1.7	1.2	2.4	2.1	1.7	2.9
	2060	1.4	0.7	1.2	2.3	2.3	6.9
MT	2010	:	:	:	:	:	:
	2060	:	:	:	:	:	:
NL	2010	1.0	0.4	0.6	1.4	1.1	2.3
	2060	1.0	0.3	0.3	1.7	1.7	5.5
AT	2010	0.6	1.2	2.6	2.8	2.4	4.1
	2060	0.5	0.7	1.9	2.9	2.7	7.1
PL	2010	1.2	1.6	2.5	1.8	1.8	2.9
	2060	0.5	0.3	0.8	1.5	1.7	4.9
PT	2010	0.5	0.9	2.1	2.7	2.3	4.0
	2060	0.3	0.4	1.0	2.2	2.1	6.8
RO	2010	1.3	1.2	1.9	1.6	1.6	2.2
	2060	0.8	0.5	1.0	2.1	2.7	6.3
SI	2010	0.3	1.2	2.1	2.1	1.9	3.5
	2060	0.2	0.4	1.2	2.3	3.1	11.0
SK	2010	0.7	0.8	1.8	1.4	1.2	2.0
	2060	0.7	0.4	1.2	2.1	2.5	6.1
FI	2010	0.6	0.6	2.2	2.9	2.2	3.6
	2060	0.4	0.3	1.0	2.7	2.9	7.9
SE	2010	0.8	0.4	0.9	2.2	1.7	3.5
	2060	0.5	0.3	0.5	1.9	2.0	5.0
UK	2010	0.0	0.0	0.7	1.4	1.2	2.3
	2060	0.0	0.0	0.0	0.9	2.0	4.8
NO	2010	1.1	0.6	1.0	1.7	1.7	3.3
	2060	1.0	0.6	1.3	2.2	2.4	6.7
EU27	2010	0.6	0.5	1.7	2.2	2.0	3.9
	2060	0.4	0.2	0.6	1.8	2.4	7.1
EA	2010	0.6	0.5	1.9	2.4	2.3	4.4
	2060	0.4	0.3	0.8	2.0	2.6	8.0

**Source:** Commission services, EPC.

**Note:** No MT data available for expenditures by age group.

LV and LT: 2011 data is used as a starting value.

UK: Without public service pensions.

AT: Only earnings-related expenditure is covered.

EL: Without small supplementary funds.

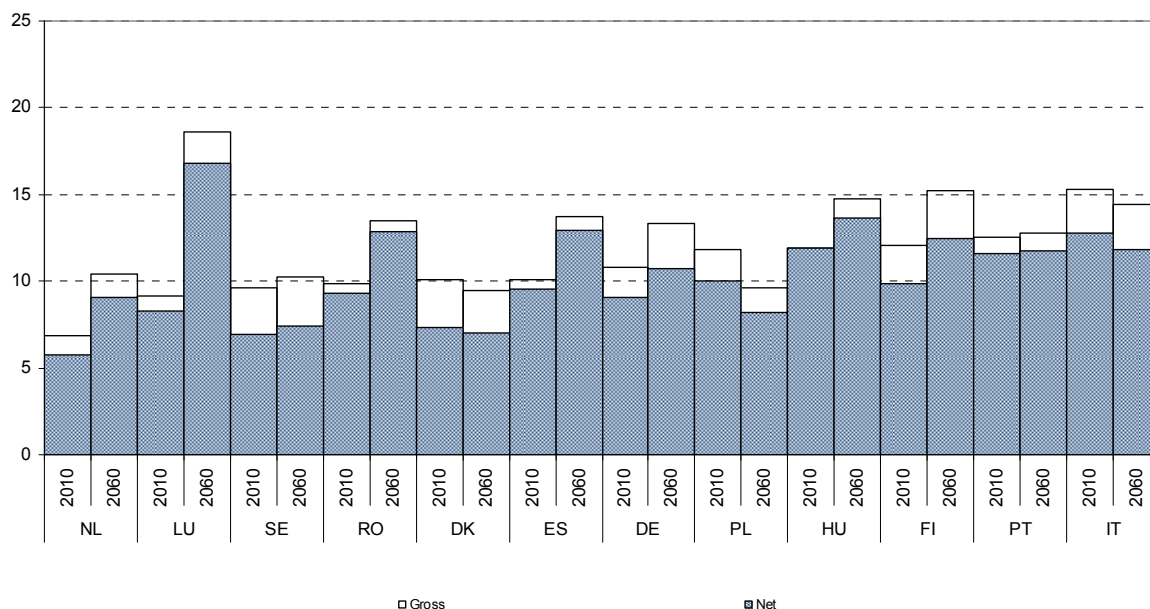
IE: Without public service occupational schemes.

#### 2.4.1.2. Gross vs. net pension expenditure

Only a few Member States (The Netherlands, Luxembourg, Sweden, Romania, Denmark, Spain, Germany, Poland, Hungary, Finland, Portugal and Italy) have projected net public

pension expenditure, making a comparable examination across the EU rather difficult. The projected increase of these taxes is rather small in most of the countries over the period 2010-2060 (see Graph 2. 6).

**Graph 2. 6 - Gross vs. net public pension expenditure 2010 and 2060 (as % of GDP)**



**Source:** Commission services, EPC.

**Note:** The graph presents only the countries which provided data for both years and where a tax on pension is non-zero. In Hungary, taxes on pensions are only introduced as of 2013.

On average, the gap between gross and net public pension amounts to around 1.5 p.p. of GDP in 2010 and 1.8 p.p. of GDP in 2060<sup>58</sup>.

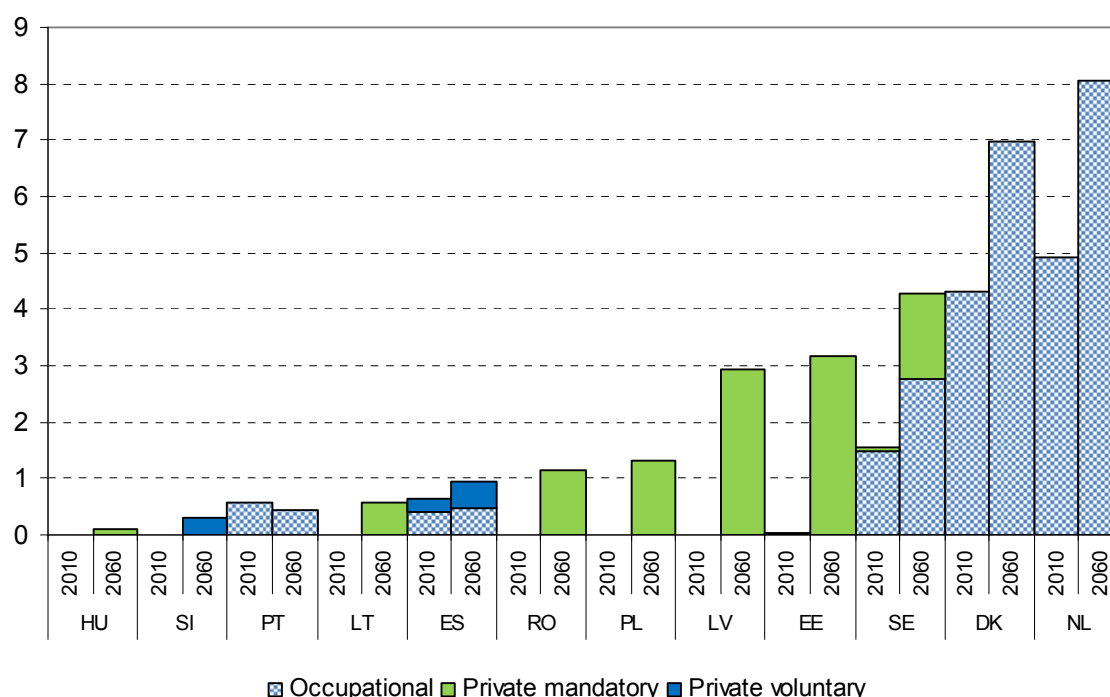
#### 2.4.2. Occupational and private pensions

The relevance of occupational and private schemes in total pension provision has increased in many Member States in recent years. Participation in second- and third-pillar schemes has been encouraged or even made mandatory to decrease the financial

burden of ageing populations in public pension schemes. However, the major part of pension income is still accrued in the latter schemes, as privately managed pension schemes are rather young and their contribution to pensions in payment rather low. Nevertheless, pension expenditure in these privately managed schemes is projected to increase over the projection horizon, sometimes even remarkably (Denmark, the Netherlands, Estonia and Latvia; see Graph 2. 7).

<sup>58</sup> Contrary to the previous projection round, it was decided to exclude taxes on pensions in the current projection round. Moreover, projections on net public pension expenditure that is different from gross public pension expenditure due to these taxes could be provided on a voluntary basis.

**Graph 2. 7 - Expenditure for non-public occupational, private mandatory and private voluntary pensions 2010 and 2060 (as % of GDP)**



**Source:** Commission services, EPC.

**Note:** The graph presents only the countries which provided data for occupational and/or private pension schemes and its value is non-zero.

HU: The private mandatory pillar has been quasi-closed with the latest pension reform.

Only 5 Member States provided projections on pension expenditure in occupational schemes (Portugal, Spain, Sweden, Denmark and the Netherlands). According to 9 Member States (the Czech Republic, Estonia, Greece, Latvia, Lithuania, Hungary, Malta, Romania and Slovakia) occupational pension schemes do not exist (or are irrelevant). In Sweden, Denmark and the Netherlands, occupational pensions with high coverage rate and substantial additional pension provisions on top of public pensions already exist for quite a long time. In Denmark, pension expenditures paid by occupational pension schemes amounted to 4.3% of GDP in 2010 and are expected to increase to 7.0% of GDP until 2060. In the Netherlands, the projected increase is even higher, from 4.9% of GDP in 2010 up to 8.1% GDP in 2060. For Sweden, Spain and Portugal the current level of occupational pension expenditure to GDP is relatively low

(below 2.0% of GDP) and is projected to increase only by 1.25 p.p. of GDP in Sweden and even less in Spain. In Portugal, expenditures are even expected to decrease slightly.

In order to decrease the financial burden on first-pillar public pension schemes, several countries have made the participation in private pension schemes mandatory: Bulgaria, Estonia, Latvia, Lithuania (quasi-mandatory), Poland, Romania, Slovakia and Sweden. Seven Member States (Hungary, Lithuania, Romania, Poland, Latvia, Estonia and Sweden) have provided projections on expenditure developments in private mandatory schemes. Eighteen further Member States (Belgium, the Czech Republic, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Cyprus, Luxembourg, Malta, the Netherlands, Austria, Portugal, Slovenia, Finland and the United Kingdom) have announced that these

kinds of pensions do not exist in their systems. Comparable to second pillar occupational schemes, the relevance of private mandatory pensions is very low at the moment, but increasing in the future (see [Graph 2. 7](#)). As most of the funds will start to pay out pensions only in a few years, only Sweden, Romania, Estonia and Lithuania provided a – very low – level of pension expenditures by mandatory private funds for 2010. At the end of the projection horizon, mandatory private pensions are however supposed to pay out a substantial amount of pensions in these countries. The level of pension to GDP ratio in case of private mandatory schemes in 2060 is projected to vary from 0.1% GDP in Hungary to 3.2% in Estonia.

Projections for non-mandatory private pension funds were only made by Spain and Slovenia. Yet, their influence on the total amount of pension entitlements seems to be rather marginal. In 2010, the voluntary pension expenditure to GDP ratio reached only 0.2% in both countries. In 2060, the projected level is expected to reach 0.5% and 0.3% of GDP for Spain and Slovenia, respectively.

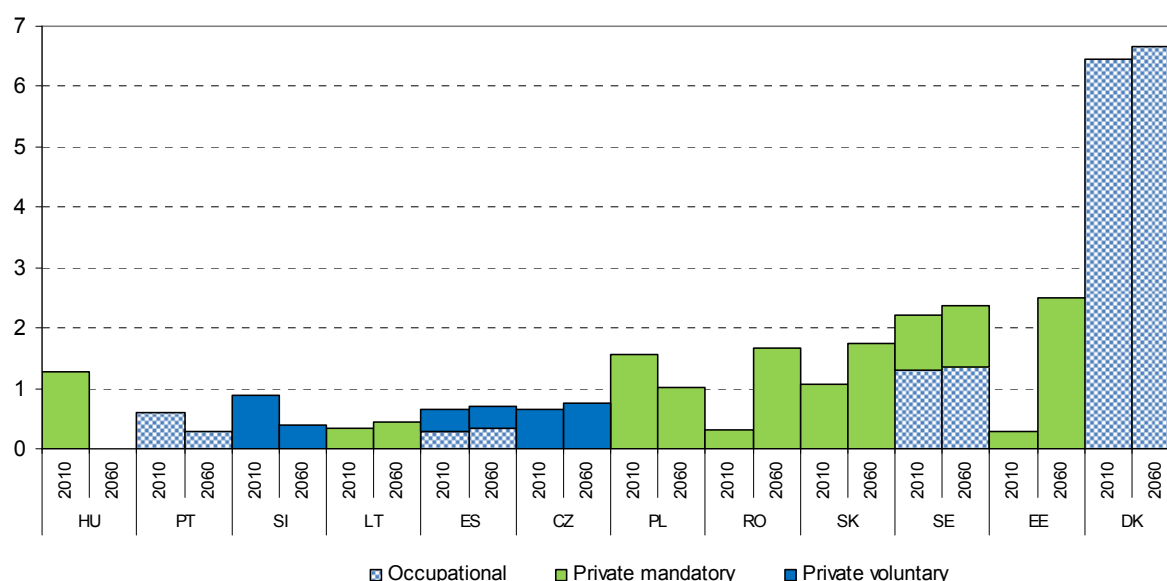
Not only pension expenditure in occupational and private pension schemes shows an upward trend between 2010 and 2060, but also inflows of contributions in these funds are increasing over time – except for Hungary, Portugal, Slovenia and Poland (see [Graph 2. 8](#)). Yet, as most of the funds are still not mature and the paying-out phase to the first pensioners in these schemes will often only start in the future, there are only a few countries with large numbers of pensioners or people who will retire soon and will rely on funded pensions. In 2010, occupational pension schemes covered more than half of the retired people in Denmark (66%).<sup>59</sup>

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<sup>59</sup> Coverage calculated as the ratio of the total number of pensioners within the specific scheme and the total number of pensioners (including disability and survivors') in the country.



**Graph 2.8 – Pension contributions to non-public occupational, private mandatory and private voluntary pension schemes 2010 and 2060 (as % of GDP)**



**Source:** Commission services, EPC.

**Note:** The graph presents only the countries which provided data for occupational and/or private pension schemes and its value is non-zero.

HU: The private mandatory pillar has been quasi-closed with the latest pension reform.

## 2.5. Pension expenditure development over time

After having presented the main results for changes in public pension expenditure between 2010 and 2060, it is relevant to examine more in detail the underlying dynamics of these projections. Table 2.8 shows the projected peaks and troughs in the public pension expenditure over GDP ratio. In 16 countries (Bulgaria, the Czech Republic, Germany, Estonia, France, Italy, Lithuania, Hungary, Malta, the Netherlands, Romania, Slovenia, Slovakia, Finland, Sweden and the United Kingdom) public pension expenditure as a share of GDP is decreasing during the current decade, reaching the lowest expenditure level in the period between 2010 and 2020 (Hungary, Malta and Italy reach the trough value only in the following decade), but then it increases to reach a peak at the end of the projection period in 7 of them (the Czech Republic, Germany, Estonia, Lithuania, Hungary,

Romania and the United Kingdom) or before in 9 of them (Bulgaria, Ireland, France, Italy, the Netherlands, Slovenia, Slovakia, Finland and Sweden). In 8 countries (Belgium, Denmark, Ireland, Greece, Spain, Luxembourg, Austria and Portugal) the public pension ratio peaks before the end of the projection period. In another 2 countries (Cyprus and Norway) the public pension ratio is projected to increase over the entire projection period.<sup>60</sup> In Latvia and Poland, the ratio decreases over the whole projection horizon.

<sup>60</sup> In the case of Luxembourg, the pension projection is affected by the considerable number of cross border workers who will in the future years receive a pension from the Luxembourg social security scheme, but at the same time will not be registered as Luxembourg inhabitants. Due to this peculiar circumstance, Luxembourg cannot be, in some cases, strictly compared with other Member States.



**Table 2. 8 - Projected trough and peak years and values for gross public pension expenditure (as % of GDP)**

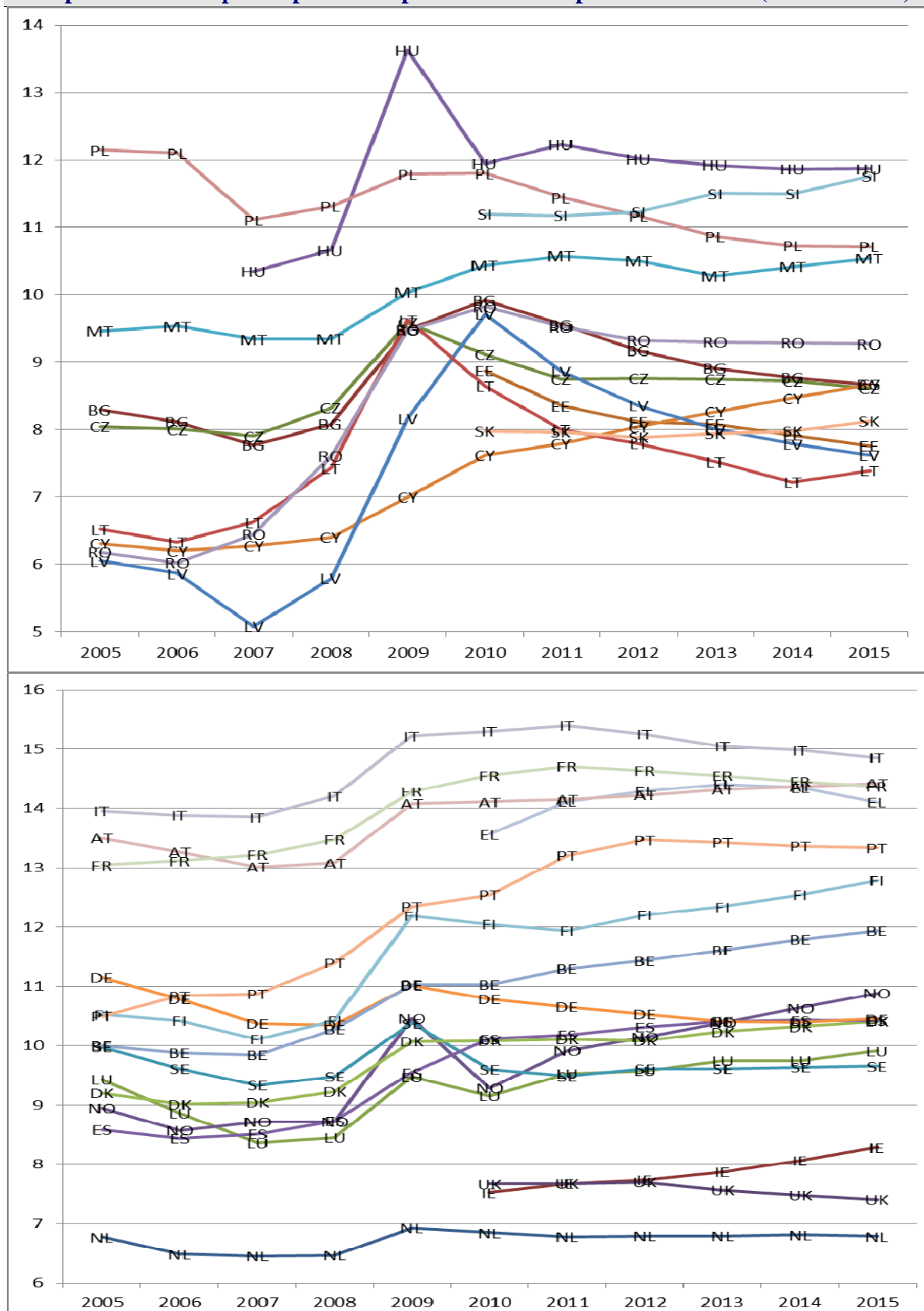
	Start year 2010	Trough year (before peak)	Trough value	Decrease from 2010 to trough	Peak year	Peak value	Increase from trough to peak	Decrease from peak to 2060	End year 2060	Change 2010 - 2060
BE	11.0				2053	16.8		-0.2	16.6	5.6
BG	9.9	2016	8.6	-1.3	2054	11.3	2.7	-0.2	11.1	1.1
CZ	9.1	2016	8.6	-0.5					11.8	2.7
DK	10.1				2020	10.8	1.3	-1.3	9.5	-0.6
DE	10.8	2014	10.4	-0.4					13.4	2.6
EE	8.9	2017	7.6	-1.2					7.7	-1.1
IE	7.5				2058	11.7		0.0	11.7	4.1
EL	13.6				2049	15.5		-0.9	14.6	1.0
ES	10.1				2053	14.0		-0.3	13.7	3.6
FR	14.6	2018	14.3	-0.2	2037	15.2	0.9	-0.1	15.1	0.5
IT	15.3	2027	14.3	-1.0	2046	15.9	1.6	-1.5	14.4	-0.9
CY	7.6								16.4	8.7
LV	9.7								5.9	-3.8
LT	8.6	2014	7.2	-1.4					12.1	3.5
LU	9.2				2057	18.8		-0.2	18.6	9.4
HU	11.9	2030	11.1	-0.8					14.7	2.8
MT	10.4	2026	10.1	-0.3					15.9	5.5
NL	6.8	2011	6.8	-0.1	2046	10.5	3.7	-0.1	10.4	3.6
AT	14.1				2032	16.7		-0.6	16.1	2.0
PL	11.8								9.6	-2.2
PT	12.5				2019	13.5		-0.8	12.7	0.2
RO	9.8	2018	9.1	-0.7					13.5	3.7
SI	11.2	2011	11.2	0.0	2057	18.4	7.2	-0.1	18.3	7.1
SK	8.0	2012	7.9	-0.1	2057	13.2	5.4	-0.1	13.2	5.2
FI	12.0	2011	11.9	-0.1	2032	15.6	3.7	-0.4	15.2	3.2
SE	9.6	2011	9.5	-0.1	2059	10.2	0.8	0.0	10.2	0.6
UK	7.7	2020	7.0	-0.7					9.2	1.5
NO	9.3								14.2	4.9
EU27	11.3	2015	11.2	-0.2	2058	12.9	1.7	0.0	12.9	1.5
EA	12.2	2015	12.1	-0.1	2051	14.3	2.2	-0.2	14.1	2.0

**Source:** Commission services, EPC.

For those countries with trough values within a short period of time after the start of the projection horizon, one has to take into account that possible GDP base effects due to the economic crisis might influence the pension to GDP ratio heavily (see also [Graph 2. 9](#)). This especially holds for Latvia, Romania, Lithuania, Hungary, the Czech Republic and Bulgaria. In all these countries,

a sharp increase of the pension expenditure over GDP ratio can be observed during the crisis years. The base year of the projection (2010) is also affected by the huge drop in GDP. In line with the economic recovery in the following years, the pension expenditure to GDP ratio is decreasing again in the mentioned countries.

**Graph 2.9 - Gross public pension expenditure development 2005-2015 (as % of GDP)**



**Source:** Commission services, EPC.

**Note:** Upper graph presents EU12 countries, lower graph EU15 countries.

Yet, observed decreases might also be the effect of recently legislated pension reforms. It is thus necessary to decompose the evolution of pension expenditure into its main components.

As shown in [Table 2. 8](#), the evolution of the pension to GDP ratio is far from increasing monotonically between 2010 and 2060, as more than half of the countries reach the peak before 2060. The examination of the development in different sub-periods can provide relevant information on expenditure trends over time. In [Table 2. 9](#), changes in the public pension spending to GDP ratio in five sub-periods of the whole projection horizon can be observed.

Public pension spending as percentage of GDP in the EU27 is projected to slightly decrease by 0.1 p.p. between 2010 and 2020, ranging from a maximum decrease in Latvia (-2.5 p.p.) to a maximum increase in Belgium as well as Norway (+2.1 and +2.3 p.p., respectively). In the following decade, upward pressure on pension expenditure becomes visible, i.e. the EU27 average rises by +0.6 p.p., with a maximum increase of +3.2 p.p. in Luxembourg.<sup>61</sup> Negative changes are only projected for 5 countries. Between 2030 and 2040, the dynamic of the spending is comparable to the previous decade (2020-2030). The EU27 average grows as much as during the previous decade (+0.6 p.p.) with the largest negative change in Poland (-0.6 p.p.) and the maximum increase in Luxembourg and Slovenia (+2.5 p.p.). During the last two decades of the projection horizon, the situation improves slightly. During 2040-2050 the EU27 average change is just + 0.2 p.p. with a maximum increase in Cyprus (+2.2 p.p.) and a minimum in Denmark (-0.7 p.p.). This tendency is even more pronounced during 2050-2060 when

the increase in the EU27 should almost come to a halt with the range of a maximum increase in Malta (+2.5 p.p.) and a substantial drop in Italy (-1.3 p.p.).

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<sup>61</sup> For Luxembourg, the projected change in the public pension expenditure to GDP ratio may be biased upwards due to country specific situation, i.e. the cross-border workers effect.

**Table 2. 9 – Change in gross public pension expenditure 2010-2060 (in p.p. of GDP)**

	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60
BE	2.1	2.4	1.0	0.2	-0.1	5.6
BG	-0.7	0.3	0.5	1.1	-0.1	1.1
CZ	-0.4	0.2	0.8	1.4	0.8	2.7
DK	0.7	-0.1	-0.4	-0.7	-0.1	-0.6
DE	0.1	1.1	0.7	0.3	0.4	2.6
EE	-1.2	0.5	-0.1	-0.1	-0.3	-1.1
IE	1.4	0.0	1.0	1.4	0.3	4.1
EL	0.2	0.4	0.8	0.5	-0.9	1.0
ES	0.5	0.0	1.7	1.6	-0.2	3.6
FR	-0.2	0.5	0.3	-0.1	0.0	0.5
IT	-0.8	0.0	1.1	0.1	-1.3	-0.9
CY	1.9	1.6	1.1	2.2	2.0	8.7
LV	-2.5	-0.8	-0.2	0.1	-0.4	-3.8
LT	-1.1	0.8	1.1	1.2	1.4	3.5
LU	1.6	3.2	2.5	1.6	0.5	9.4
HU	-0.4	-0.4	1.0	1.4	1.3	2.8
MT	0.2	-0.2	1.0	2.0	2.5	5.5
NL	0.6	1.7	1.3	0.0	0.0	3.6
AT	1.0	1.6	-0.2	0.0	-0.4	2.0
PL	-0.9	0.0	-0.6	-0.3	-0.4	-2.2
PT	1.0	-0.3	-0.1	0.0	-0.3	0.2
RO	-0.6	1.0	1.4	1.1	0.8	3.7
SI	1.0	1.1	2.5	2.1	0.4	7.1
SK	0.6	0.9	1.1	1.6	1.0	5.2
FI	1.9	1.6	-0.4	-0.2	0.3	3.2
SE	0.0	0.5	0.1	-0.3	0.4	0.6
UK	-0.7	0.7	0.5	0.0	1.0	1.5
NO	2.3	1.3	0.7	0.2	0.3	4.9
EU27	-0.1	0.6	0.6	0.2	0.1	1.5
EA	0.2	0.7	0.8	0.4	-0.2	2.0

*Source:* Commission services, EPC.

## 2.6. Drivers of pension expenditure

### 2.6.1. Decomposition of the projected pension expenditure

To be able to analyse the main underlying drivers of the pension expenditure development, the pension expenditure over GDP ratio is decomposed into 5 different sub-components as outlined in the Box below. Table 2. 10 decomposes the overall change in gross public pension expenditure over the projection horizon 2010-2060 into the main influencing factors (dependency ratio, coverage ratio, employment rate, benefit ratio and labour intensity).

As expected, the demographic factor has the most severe influence on the increase in public pension expenditure over the period 2010-2060 (EU27: +8.5 p.p. of GDP), ranging from +3.1 p.p. in the United Kingdom to as much as +14.0 p.p. in Poland.<sup>62</sup>

It is relevant to mention that for a large number of Member States the dependency ratio is the only factor contributing to increasing the pension expenditure over GDP, while in the majority of cases the coverage ratio, the employment effect as well as the benefit ratio contribute to tone down the upward trend in pension expenditure.

However, the negative budgetary effect of demographic factors is only partly offset by the other sub-components, as – in absolute terms – the upwards contribution of the ageing population is the largest one. As a

consequence, gross public pension expenditure is increasing up to 2060.

Among the factors contributing to a lowering of the expenditure trend, the employment rate effect is the least pronounced. In the majority of the Member States, increasing employment only leads to a reduction in the public pension expenditure over GDP ratio by less than 1.5 p.p. over the projection period (-0.8 p.p. on average for the EU27).<sup>63</sup> In Romania, even an increasing effect is projected. Projected figures range from +0.4 p.p. of GDP in Romania to -2.2 p.p. of GDP in Spain.<sup>64</sup>

Both the effects of the coverage rate as well as of the benefit ratio are more pronounced than the employment rate effect in leading to downward pressure on the expenditure ratio, although, in most of the cases, they are not large enough to stabilise the pension expenditure to GDP ratio at the initial level. The overall EU27 effect of these two factors seems to be comparable, about -2.9 p.p. for the coverage ratio effect and -2.7 p.p. for the benefit ratio effect. However, large variations can be observed among Member States. Only Cyprus (+2.8 p.p.) projects a substantial increase in the coverage ratio and hence an increasing contribution to the pension expenditure/GDP ratio.<sup>65</sup> On the opposite, strong downward effects of the coverage ratio on public pension expenditure are projected in Poland (-5.0 p.p.), Italy (-5.5 p.p.) and Romania (-4.7 p.p.) – in the latter two countries due to legislated increases in retirement ages.

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<sup>62</sup> Please note that due to a lack of necessary data IE public service occupational pensions as well as UK public service pensions are not included in the analysis of the decomposed pension expenditure drivers throughout the whole chapter. This also affects the decomposed EU27 and EA figures. All respective residual values are corrected accordingly in order to be consistent with the overall expenditure figures as a share of GDP which include these two components.

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<sup>63</sup> As cross-border workers in Luxembourg are not covered in the labour force projections for the pension projection exercise, a deeper analysis of the employment effect contribution as well as the coverage ratio contribution is not meaningful.

<sup>64</sup> In the case of Spain, this is due to the assumed strong decline in the unemployment rate (from 19.5% to 7% for age group 20-64) over the projection horizon.

<sup>65</sup> Number of pensions are used to calculate CY expenditure drivers. As a result, the coverage ratio effect is overestimated due to double counting effects of pensioners receiving more than one pension.

### Box 3: Decomposition of pension expenditure

In order to analyse the dynamics and the factors of the pension spending to GDP ratio, the following decomposition is used:

$$\begin{aligned}
 \frac{\text{Pension Exp.}}{\text{GDP}} &= \overbrace{\frac{\text{Population 65+}}{\text{Population 20-64}}}^{\text{Dependency Ratio}} \times \overbrace{\frac{\text{Number of Pensioners}}{\text{Population 65+}}}^{\text{Coverage Ratio}} \\
 &\times \overbrace{\frac{\text{Population 20-64}}{\text{Working People 20-64}}}^{1/\text{Employment Rate}} \times \overbrace{\frac{\text{Average Pension}}{\text{GDP}}}^{\text{Benefit Ratio}} \times \\
 &\times \underbrace{\frac{\text{Working People 20-64}}{\text{Hours Worked 20-64}}}_{1/\text{Labour intensity}} \times \underbrace{\frac{\text{Hours Worked 20-64}}{\text{Hours Worked 20-74}}}_{\text{Residual}}
 \end{aligned}$$

The overall percentage change in the public pension expenditure to GDP ratio can be expressed as a sum of the contribution of the five main factors, i.e. the dependency ratio contribution, the coverage ratio contribution, the employment rate contribution, the benefit ratio contribution as well as the labour intensity contribution.

The dependency ratio effect/contribution quantifies the impact of the change in the old age dependency ratio on the pension to GDP ratio. The dependency ratio is defined as a ratio of the population aged over 65 to the population aged from 20 to 64. An increase in this ratio indicates a higher proportion of older individuals with respect to working age population, i.e. an ageing population. As the dependency ratio increases, the pension to GDP ratio moves in the same direction.

The coverage ratio effect is defined as the number of pensioners (of all ages) to population over 65 years. Development in the coverage ratio provides information about developments of the effective exit age from the labour market and the percentage of population covered. As the coverage ratio increases, the pension expenditure to GDP ratio increases as well.

The employment rate effect is defined as a ratio of population aged 20-64 to the number of working people aged 20-64 (i.e. 1/employment rate). As the employment rate increases, the ratio of pension expenditure to GDP falls down.

The benefit ratio effect captures the development of the relative value of the average pension (public pension spending / number of pensioners) with respect to the average wage (proxied by the change in the GDP per hours worked).

The labour intensity effect is defined as a ratio of the working people 20-64 to the hours worked of the population 20-64 (i.e. 1/labour intensity). As labour intensity increases, the ratio of pension expenditure to GDP falls down.

**Table 2. 10 - Decomposition of gross public pension expenditure change over 2010-2060  
(in p.p. of GDP)**

	2010 level	Dependency ratio contribution	Coverage ratio contribution	Employment effect contribution	Benefit ratio contribution	Labour intensity contribution	Interaction + residual effect	2060 level
BE	11.0	7.6	-0.9	-0.3	-0.6	0.0	-0.2	16.6
BG	9.9	8.8	-3.9	-0.8	-2.1	0.0	-0.8	11.1
CZ	9.1	9.3	-4.6	-0.6	-0.2	0.0	-1.1	11.8
DK	10.1	5.9	-4.2	-0.4	-1.2	0.0	-0.6	9.5
DE	10.8	7.9	-1.8	-0.5	-2.2	0.0	-0.9	13.4
EE	8.9	6.7	-2.7	-1.1	-3.3	0.0	-0.6	7.7
IE*	7.5	5.3	-2.0	-0.4	0.1	0.0	1.2	11.7
EL	13.6	10.4	-3.4	-1.9	-3.6	0.1	-0.6	14.6
ES	10.1	9.7	-0.8	-2.2	-2.3	0.1	-0.9	13.7
FR	14.6	9.1	-3.5	-1.2	-3.1	0.0	-0.8	15.1
IT	15.3	9.5	-5.5	-1.3	-2.9	0.0	-0.8	14.4
CY	7.6	10.6	2.8	-0.6	-3.4	0.0	-0.6	16.4
LV	9.7	7.0	-1.9	-1.2	-6.8	0.0	-0.9	5.9
LT	8.6	8.2	-2.9	-1.1	-0.2	0.0	-0.5	12.1
LU	9.2	11.2	0.3	0.1	-2.1	0.1	-0.1	18.6
HU	11.9	11.1	-4.3	-1.3	-1.8	0.0	-0.9	14.7
MT	10.4	11.3	-2.6	-1.5	-1.0	0.1	-0.8	15.9
NL	6.8	6.0	-1.0	-0.2	-0.8	0.0	-0.4	10.4
AT	14.1	11.0	-2.9	-0.6	-4.5	0.1	-1.1	16.1
PL	11.8	14.0	-5.0	-0.4	-8.7	0.0	-2.0	9.6
PT	12.5	10.4	-2.5	-1.0	-5.5	0.0	-1.1	12.7
RO	9.8	12.9	-4.7	0.4	-3.7	0.0	-1.2	13.5
SI	11.2	12.8	-3.1	-1.0	-0.9	0.0	-0.8	18.3
SK	8.0	13.5	-3.9	-0.5	-2.8	0.0	-1.0	13.2
FI	12.0	8.6	-3.2	-0.5	-0.9	0.0	-0.7	15.2
SE	9.6	5.0	-0.8	-0.5	-2.7	0.0	-0.4	10.2
UK*	7.7	3.1	-1.4	-0.2	0.8	0.0	-0.8	9.2
NO	9.3	8.0	-1.1	0.0	-1.6	0.0	-0.3	14.2
EA	12.2	8.9	-2.6	-1.0	-2.7	0.0	-0.6	14.1
EU27	11.3	8.5	-2.9	-0.8	-2.7	0.1	-0.6	12.9

**Source:** Commission services, EPC.

**Note:** \*IE, UK: Decomposition excluding IE public service occupational and UK public service pensions. Residual values corrected accordingly to match with overall expenditure change.

A comparable picture can be observed for the benefit ratio effect. Only two countries project upward pressure on expenditure due to an increasing benefit ratio effect (the United Kingdom with +0.8 p.p. and Ireland with +0.1 p.p.) while in countries like Poland (-8.7 p.p.) and Latvia (-6.8 p.p.) a strong reverse trend can be observed. The mentioned differences among countries – both for the coverage ratio as well as the benefit ratio effect – are in most of the cases due to different degree of reforms affecting both the access to pensions (e.g. set up or shift to secondary pillars not classified in the

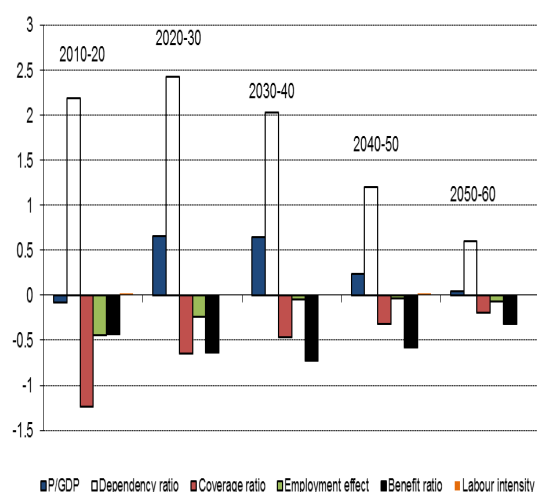
public sector) and the generosity of future pension benefits.<sup>66</sup>

Next to the overall decomposed effects over the entire projection horizon, it is important to analyse how the different decomposition factors influence the pension expenditure/GDP ratio over time. As seen before, in the different sub-periods of the

<sup>66</sup> As a result of the macroeconomic assumptions used in the projections, the labour intensity contribution has more or less no impact on the change in the pension expenditure/GDP ratio (EU27 average: +0.1 p.p.). Only Greece, Spain, Luxembourg, Malta and Austria project an increasing effect of 0.1 p.p. of GDP. In all other Member States, the labour intensity effect is negligible.

projection horizon 2010-2060 important differences in the respective ratio are projected. Graph 2. 10 below shows the decomposition of the percentage change of the public pension expenditure to GDP ratio in the EU27 into the five main factors during 5 sub-periods. The sum of the contributions of each particular effect over the 5 sub-periods gives the total contribution over the entire projection period 2010-2060 presented in Table 2. 10.

**Graph 2. 10 - Decomposition of gross public pension expenditure change in the EU27, 2010-2060 (in p.p. of GDP)**



**Source:** Commission services, EPC.

The only effect that significantly increases the overall expenditure/GDP level at the EU27 level is the demographic effect. In the three decades between 2010 and 2040, the upward pushing effect is constantly above 2 p.p. of GDP. In the last 20 years of the projection horizon, the contribution of the dependency ratio effect decreases to +0.6 p.p. of GDP.

The coverage ratio effect at EU27 level is projected to diminish the dependency ratio effect especially at the beginning of the projection horizon. Initially, the downward contribution to the change in expenditures is at -1.2 p.p. between 2010 and 2020. Yet, it is

estimated to converge over the next 50 years towards zero (-0.2 p.p. in 2050-2060).

A comparable development can be observed for the employment rate effect at the EU27 level. The strongest diminishing contribution to the overall expenditure change is supposed to take place in the first two decades of the projections (-0.4 p.p. in 2010-2020 and -0.2 p.p. in 2020-2030). Afterwards, the effect is negligible.

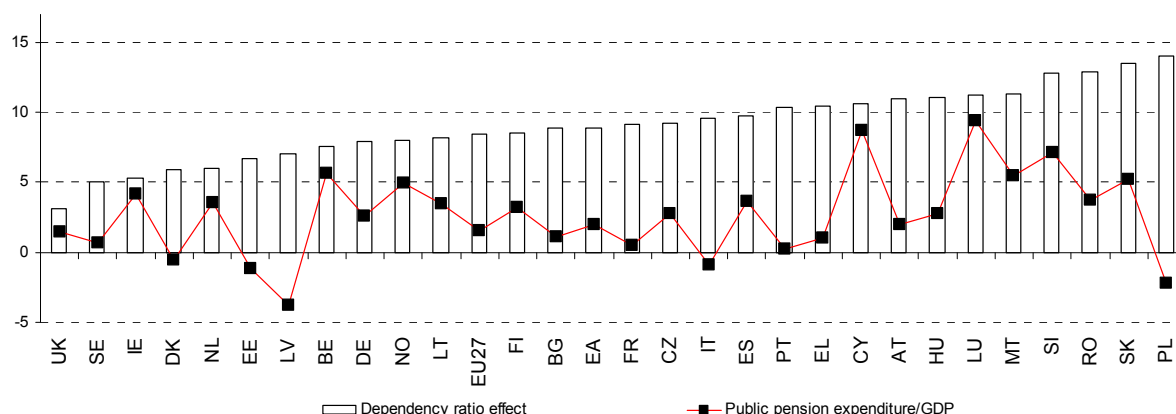
The benefit ratio effect at the EU27 level is projected to be the strongest in the middle of the projection horizon. Starting from an initial downward contribution of -0.4 p.p. (2010-2020), its effect increases to its maximum value (-0.7 p.p.) in 2030-2040. Thereafter, the effect decreases again to a contribution of -0.3 p.p. in 2050-2060. The expected maximum contribution of the benefit ratio development around 2040 seems to be affected mainly by a typical feature of most pension system reforms, which even though enacted nowadays, will affect mainly individuals retiring in the long term.

### *Old-age dependency effect*

The overall picture of the old-age dependency ratio effect on public pension expenditure is shown in Graph 2. 11. Without any exception, the contribution of the old-age dependency ratio is bigger than the total change in the public pension to GDP in all Member States. Due to ageing populations, demographic factors are projected to be the main (and often the only) increasing driver of public pension expenditure in the upcoming decades. Recent pension reforms leading to increased retirement ages, higher employment rates (of older workers) and less generous pension entitlements have strengthened the counterbalancing impact on pension expenditure. However, they cannot totally offset the increasing effect of the dependency ratio on public spending.



**Graph 2. 11 - Contribution of the dependency ratio effect to the change in gross public pension expenditure over 2010-2060 (in p.p. of GDP)**



**Source:** Commission services, EPC.

Table 2. 11 splits the contribution of the demographic factors to the change in public pension spending into the five decades over the projection horizon. The strongest effect of the demographic factors is recorded in the first 20 years of the projections (2010-2030), when the post-war baby-boom generation reaches the retirement age. Lithuania projects the least severe impact over the 2010-2020 period (+0.8 p.p.) while the demographic impact is the largest in Finland (+4.5 p.p.). The impact for the EU27 is 2.2 p.p. over the same period. Between 2020 and 2030, the impact slightly increases (+2.4 p.p.). In that period, the minimum value is projected for the United Kingdom (+1.0 p.p.) while the maximum impact is recorded for Austria (+4.6 p.p.).

As of 2030, the situation starts to improve slightly, i.e. the upward contribution of the demographic effect becomes less pronounced. The EU27 average contribution drops from 2.0 p.p. over the period 2030 to 2040 to 0.6 p.p. between 2050 and 2060. In 7 Member States (Denmark, Germany, France, the Netherlands, Finland, Sweden and the United Kingdom) the increasing contribution of the demographic change will become less than 0.5 p.p. over the period 2040 to 2050. Between 2050 and 2060 the number even increases to 9 countries (Denmark, Germany, Ireland, Greece, Spain, France, Italy, the Netherlands and Portugal) where the contribution of the dependency ratio is rather limited, i.e. below 0.5 p.p. of GDP.

**Table 2. 11 - Contribution of the dependency ratio effect to the change in gross public pension expenditure by decades (in p.p. of GDP)**

	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60
BE	1.8	2.9	1.7	0.6	0.6	7.6
BG	2.4	1.8	1.7	2.2	0.8	8.8
CZ	3.2	1.2	1.5	2.3	1.1	9.3
DK	2.4	1.8	1.4	-0.1	0.4	5.9
DE	1.5	3.4	2.1	0.4	0.4	7.9
EE	1.5	1.5	0.9	1.5	1.2	6.7
IE	2.0	1.4	1.1	1.5	-0.7	5.3
EL	1.9	2.3	3.6	2.9	-0.2	10.4
ES	1.7	2.4	3.1	2.6	-0.1	9.7
FR	3.9	2.7	1.8	0.4	0.4	9.1
IT	2.0	2.7	3.5	1.3	0.1	9.5
CY	2.3	2.3	0.8	2.4	2.8	10.6
LV	1.1	1.8	1.2	1.5	1.5	7.0
LT	0.8	2.5	1.4	1.2	2.2	8.2
LU	1.3	3.3	3.2	2.1	1.4	11.2
HU	2.7	1.2	2.1	3.0	2.0	11.1
MT	4.3	2.3	0.3	1.8	2.7	11.3
NL	2.2	2.2	1.5	-0.2	0.2	6.0
AT	1.9	4.6	3.2	0.6	0.8	11.0
PL	4.3	3.2	1.3	3.1	2.1	14.0
PT	2.2	2.6	2.9	2.3	0.3	10.4
RO	1.9	1.5	3.5	3.6	2.5	12.9
SI	3.2	3.4	2.3	3.0	0.9	12.8
SK	2.8	2.8	1.9	3.5	2.4	13.5
FI	4.5	2.6	0.2	0.4	0.9	8.6
SE	1.7	1.2	0.8	0.2	1.1	5.0
UK	1.0	1.0	0.6	0.1	0.5	3.1
NO	2.0	2.4	2.1	0.6	1.0	8.0
EA17	2.2	2.9	2.5	1.1	0.2	8.9
EU27	2.2	2.4	2.0	1.2	0.6	8.5

*Source:* Commission services, EPC.

### *Coverage effect*

In order to diminish the increasing effect of an ageing society on public pension expenditure, several reform steps have been taken by the Member States in recent years and/or will be implemented within a short period of time. In many cases, these reforms were related to the abolishment or restriction of early retirement schemes, the increase in statutory retirement ages or the incentive to

stay longer in the labour market on a voluntary basis, i.e. exiting labour markets beyond the legal retirement age. All these measures are reflected in a lower level of the coverage ratio (the number of pension benefit recipients as % of the pensionable population, here measured as persons aged 65 or more, see [Table 2. 12](#)).

**Table 2. 12 - Coverage ratio development 2010-2060  
(as % of population aged 65 and older)**

	2010	2020	2030	2040	2050	2060	Change 2010 - 2060 in p.p.
BE	145.3	145.1	140.0	137.3	137.9	136.7	-8.5
BG	165.3	143.1	128.8	117.6	110.4	108.7	-56.7
CZ	175.3	134.2	125.2	115.5	106.5	103.4	-71.9
DK	137.8	127.2	109.7	99.7	96.6	90.8	-47.0
DE	119.6	116.0	107.9	103.6	102.9	102.3	-17.4
EE	168.8	148.1	134.0	128.9	122.4	118.8	-50.0
IE	162.9	143.1	125.2	118.7	112.6	116.5	-46.4
EL	128.3	117.2	109.3	102.9	99.7	100.0	-28.2
ES	110.6	105.7	103.2	101.1	99.9	101.8	-8.8
FR	149.0	129.0	121.9	116.6	116.9	116.1	-32.8
IT	128.1	106.9	98.0	92.2	90.6	87.4	-40.7
CY	118.4	115.7	118.9	133.4	144.7	147.7	29.3
LV	147.1	134.1	126.6	123.3	122.0	113.8	-33.3
LT	175.2	165.1	144.8	136.5	133.2	124.9	-50.2
LU	220.3	228.9	226.5	220.9	224.0	226.0	5.7
HU	175.5	147.3	144.0	138.3	126.8	121.5	-54.0
MT	136.2	115.9	105.7	107.5	105.1	105.7	-30.5
NL	135.9	126.7	122.1	120.7	121.0	119.4	-16.5
AT	149.9	149.2	134.5	122.8	126.7	124.3	-25.6
PL	183.0	140.5	126.2	128.6	121.0	112.8	-70.2
PT	137.5	129.5	123.9	119.0	113.3	113.0	-24.5
RO	183.5	167.9	161.6	141.8	124.2	116.9	-66.6
SI	169.3	163.1	146.6	143.9	137.9	134.7	-34.6
SK	192.6	161.2	150.5	148.4	135.2	126.5	-66.1
FI	142.7	122.2	115.9	114.4	112.7	111.2	-31.5
SE	136.4	128.3	131.7	130.3	129.6	126.0	-10.4
UK	122.3	102.2	102.4	100.5	94.9	95.2	-27.2
NO	134.6	137.9	131.9	125.5	125.4	123.9	-10.8
EA	130.6	119.5	112.4	107.8	106.7	106.0	-24.6
EU27	137.4	122.3	115.3	110.7	107.9	106.2	-31.2

**Source:** Commission services, EPC.

**Note:** The "Coverage Ratio 65" is calculated as the total number of public pensioners as a share of the population aged 65 and older. In case the number of pensioners was not provided, in order to quantify the coverage ratio, the number of pensioners was proxied by the number of pensions, as the dynamics of the two variables should be comparable at least in the long run. Projected numbers of pensions and pensioners are identical for BE, IE, CY, LU, NL, RO and SI.

Except for Luxembourg and Cyprus, the coverage ratio at age 65 is projected to be reduced over the projection period in all countries.<sup>67,68</sup> This is firstly the effect of

increasing statutory and as a consequence also effective retirement ages. Secondly, this might often also be due to stricter conditions for pension eligibility below the official retirement age (e.g. getting disability or early retirement pensions). With the exception of Denmark, Italy and the United Kingdom, the coverage ratio for the population aged 65 and older will remain above 100% in all Member States. On the EU27 level, the coverage ratio is projected to fall by 31 p.p. from an initial level of 137% to 106%.

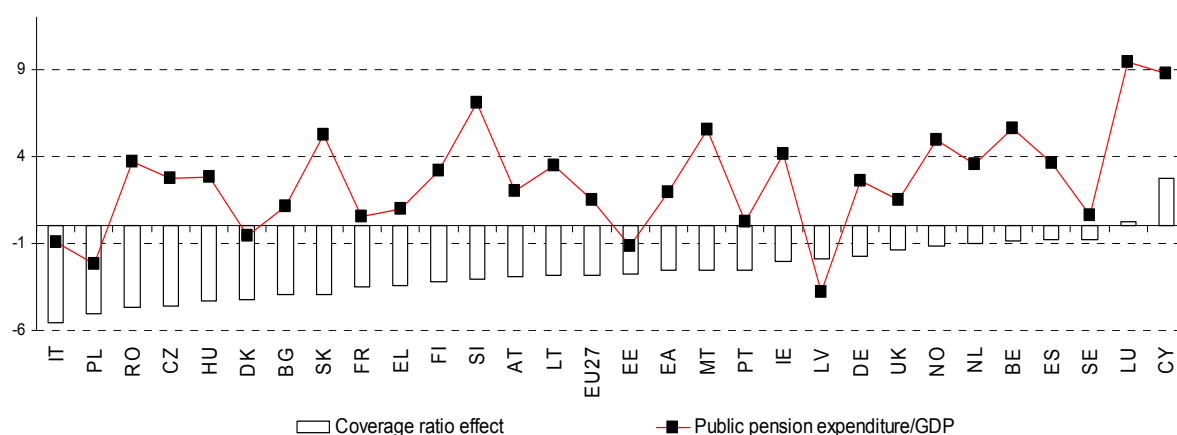
<sup>67</sup> The case of Luxembourg is special, due to the country-specific situation concerning the development of the number of foreign pensioners receiving a pension from the Luxembourg pension scheme.

<sup>68</sup> Due to the fact that numbers of pensions are used to calculate CY expenditure drivers, the coverage ratio effect is overestimated due to double counting effects of pensioners receiving more than pension.

Decreasing coverage ratios in general translate into a downward pushing effect on pension expenditure/GDP with the exception of Luxembourg and Cyprus (Graph 2. 12). A strong downward effect of lower coverage ratios on public pension expenditure of at least 3 p.p. of GDP is projected in 12 Member States (Slovenia, Finland, Greece, France, Slovakia, Bulgaria, Denmark,

Hungary, the Czech Republic, Romania, Poland and Italy). In the remaining Member States the declining coverage rate will also contribute to limit the impact of demographic factors on pension spending, although to a less pronounced extent. The overall EU27 contribution is -2.9 p.p. over the period 2010 to 2060.

**Graph 2. 12 - Contribution of the coverage ratio effect to the change in gross public pension expenditure over 2010-2060 (in p.p. of GDP)**



**Source:** Commission services, EPC.

Table 2. 13 depicts the coverage ratio contribution to public pension expenditure over the five sub-decades of the projection period. In general, the effect of the coverage rate tends to decrease over time, meaning that a large part of pension (and labour market) reforms with an effect on the coverage ratio will take place in the upcoming years. Concretely, the EU27 coverage contribution drops down in absolute terms from -1.2 p.p. in 2010-2020 to -0.2 p.p. in 2050-2060.

Positive contributions of the coverage ratio on public pension spending in the first projection decade are only recorded for Luxembourg (+0.4 p.p.) and Norway (+0.2 p.p.).<sup>69</sup> The strongest downward contribution

is projected for Poland (-2.8 p.p.).<sup>70</sup> Between 2020 and 2030, the reducing effect of shrinking coverage ratios in the EU27 falls to a value of -0.6 p.p., with the biggest negative contribution projected for Austria (-1.6 p.p.). Only in Cyprus (+0.3 p.p.) and Sweden (+0.3 p.p.) the coverage ratio contribution to the expenditure ratio is positive. The decreasing contribution of the coverage ratio development is further shrinking between 2030 and 2060, with the highest contribution in the last projection decade in Romania and Slovakia (-0.8 p.p.) and a slightly upward impact on pension spending in Ireland, Spain, Cyprus, Luxembourg and Malta (up to +0.3 p.p.).

<sup>69</sup> A steadily high value of the coverage contribution in the case of Luxembourg is affected by a country-specific situation concerning cross-border workers and foreign pensioners.

<sup>70</sup> The initial drop in the coverage ratio for Poland can at least partially be explained by a shift of pensioners to the second (private) pillar.

**Table 2. 13 - Contribution of the coverage ratio effect to the change in gross public pension expenditure by decades (in p.p. of GDP)**

	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60
BE	0.0	-0.5	-0.3	0.1	-0.1	-0.9
BG	-1.3	-1.0	-0.9	-0.6	-0.2	-3.9
CZ	-2.2	-0.6	-0.7	-0.8	-0.3	-4.6
DK	-0.8	-1.5	-1.0	-0.3	-0.6	-4.2
DE	-0.3	-0.8	-0.5	-0.1	-0.1	-1.8
EE	-1.0	-0.8	-0.3	-0.4	-0.2	-2.7
IE	-0.7	-0.8	-0.4	-0.4	0.3	-2.0
EL	-1.2	-0.9	-0.8	-0.5	0.0	-3.4
ES	-0.5	-0.3	-0.2	-0.1	0.3	-0.8
FR	-2.0	-0.8	-0.7	0.0	-0.1	-3.5
IT	-2.6	-1.2	-0.9	-0.3	-0.6	-5.5
CY	-0.2	0.3	1.3	1.0	0.3	2.8
LV	-0.8	-0.4	-0.2	-0.1	-0.4	-1.9
LT	-0.4	-1.0	-0.5	-0.2	-0.7	-2.9
LU	0.4	-0.1	-0.3	0.2	0.2	0.3
HU	-2.0	-0.3	-0.4	-1.0	-0.6	-4.3
MT	-1.6	-1.0	0.2	-0.3	0.1	-2.6
NL	-0.5	-0.3	-0.1	0.0	-0.1	-1.0
AT	-0.1	-1.6	-1.5	0.5	-0.3	-2.9
PL	-2.8	-1.1	0.2	-0.6	-0.7	-5.0
PT	-0.8	-0.6	-0.5	-0.6	0.0	-2.5
RO	-0.8	-0.3	-1.3	-1.5	-0.8	-4.7
SI	-0.4	-1.3	-0.2	-0.7	-0.4	-3.1
SK	-1.4	-0.6	-0.1	-1.0	-0.8	-3.9
FI	-1.8	-0.7	-0.2	-0.2	-0.2	-3.2
SE	-0.6	0.3	-0.1	-0.1	-0.3	-0.8
UK	-1.0	0.0	-0.1	-0.4	0.0	-1.4
NO	0.2	-0.5	-0.6	0.0	-0.2	-1.1
EA17	-1.0	-0.8	-0.5	-0.1	-0.1	-2.6
EU27	-1.2	-0.6	-0.5	-0.3	-0.2	-2.9

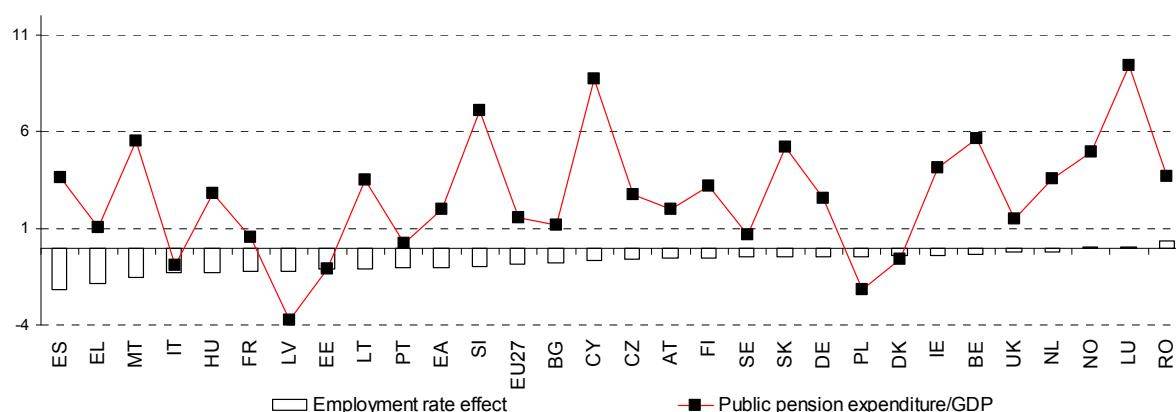
*Source:* Commission services, EPC.

### ***Employment effect***

Increasing employment rates is one of the most effective measures to improve the financial sustainability of the Member States' pension systems. Firstly, higher employment has a positive effect on GDP. Secondly, an increasing employment rate for older people, and hence a postponed exit of the labour market, decreases pension spending while at the same time supporting the adequacy of pension benefits, as people accrue more rights during their working life. Although the

decreasing effect is less pronounced than the coverage ratio and benefit ratio effect, the projected increase in the employment rate will nevertheless contribute to push downward the increase in public pension spending to GDP over 2010-2060 in all Member States (-0.8 p.p. in the EU27), as shown in [Graph 2. 13](#) (except for Romania where the employment rate development has an increasing effect on public pension expenditure).

**Graph 2. 13 - Contribution of the employment rate effect to the change in gross public pension expenditure over 2010-2060 (in p.p. of GDP)**



**Source:** Commission services, EPC.

The most significant employment contribution to a reduced expenditure ratio can only be observed between 2010 and 2030 (see Table 2. 14). It remains however below 1 p.p. in absolute terms. The overall EU27 employment contribution to reduce public pension expenditure between 2010 and 2020 is only -0.4 p.p. and -0.2 p.p. of GDP between 2020 and 2030. Greece and Italy project the largest contribution within 2010-2020 (both -0.9 p.p.). In the subsequent period (2020-2030), the strongest decreasing effect is observed for Spain (-1.1 p.p.). As of 2030, the average contribution is negligible for the EU27. This reflects mostly the assumption of a constant structural unemployment rate in the Member States from that point onwards and only moderate increases in the participation rates.

### ***Benefit ratio effect***

Reducing the generosity of pension benefits, e.g. by increasing eligibility criteria for certain benefits, by decreasing accrual rates or by limiting indexation rules, can have a substantial decreasing or at least stabilising impact on public pension expenditure. In the EU27, the benefit ratio effect will contribute to push down the increasing demographic effect on the pension expenditure/GDP ratio over the projection horizon by 2.7 p.p. of GDP (see Graph 2. 14). Consequently, in the

majority of Member States, a reduction in the relative value of public pension benefits (compared to the gross average wage) is projected. In 9 Member States (France, Estonia, Cyprus, Greece, Romania, Austria, Portugal, Latvia and Poland) the contribution of a decreasing benefit ratio is quite significant in absolute terms (i.e. above 3 p.p.).<sup>71</sup> In 2 Member States only (the United Kingdom and Ireland), the contribution of the change in the benefit ratio is supposed to push the expenditure level further upwards.

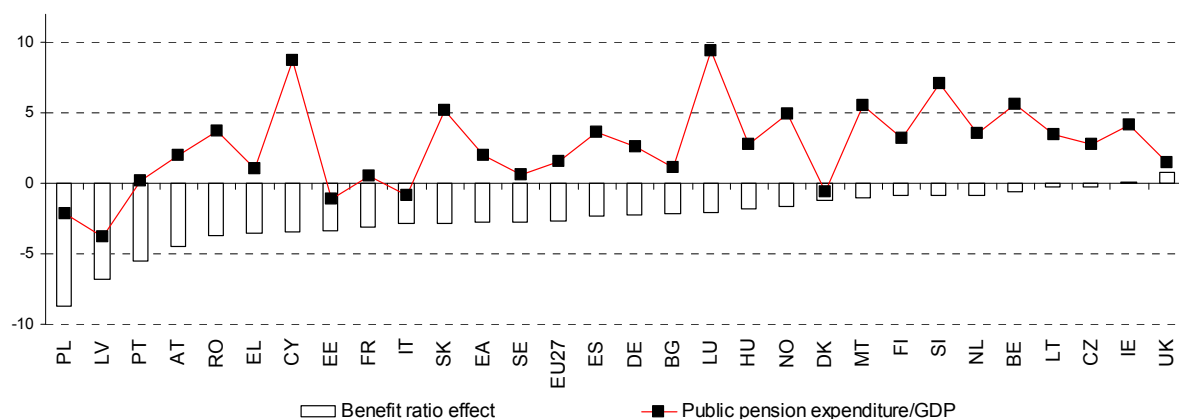
<sup>71</sup> In Poland and Latvia, this is due to a partial shift of pension entitlement accumulation to private pillars. Number of pensions are used to calculate expenditure drivers for Cyprus. As a result, the benefit ratio effect is overestimated due to double counting effects of pensioners receiving more than pension.

**Table 2. 14 - Contribution of the employment rate effect to the change in gross public pension expenditure by decades (in p.p. of GDP)**

	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60
BE	-0.3	0.0	0.0	0.0	-0.1	-0.3
BG	-0.4	-0.1	0.1	-0.1	-0.2	-0.8
CZ	-0.3	0.0	0.1	-0.2	-0.1	-0.6
DK	-0.3	0.0	0.0	0.0	0.0	-0.4
DE	-0.3	-0.1	-0.1	0.1	0.0	-0.5
EE	-0.5	-0.6	0.0	0.0	-0.1	-1.1
IE	-0.1	-0.4	0.0	0.0	0.0	-0.4
EL	-0.9	-0.3	-0.2	-0.4	0.0	-1.9
ES	-0.8	-1.1	-0.2	-0.1	0.0	-2.2
FR	-0.8	-0.4	-0.1	0.0	0.0	-1.2
IT	-0.9	-0.1	-0.1	-0.1	0.0	-1.3
CY	-0.4	-0.2	0.1	0.1	-0.1	-0.6
LV	-0.3	-0.7	0.0	0.1	-0.2	-1.2
LT	-0.2	-0.7	-0.1	0.0	-0.1	-1.1
LU	0.0	0.0	0.0	0.0	0.0	0.1
HU	-0.8	-0.5	0.2	0.0	-0.1	-1.3
MT	-0.8	-0.7	0.0	0.0	-0.1	-1.5
NL	-0.2	0.0	-0.1	0.1	0.0	-0.2
AT	-0.1	-0.1	-0.4	0.1	0.0	-0.6
PL	-0.5	-0.2	0.4	0.0	-0.2	-0.4
PT	-0.3	-0.7	-0.1	-0.1	0.0	-1.0
RO	-0.1	0.3	0.3	0.1	-0.2	0.4
SI	-0.3	-0.5	0.1	-0.2	-0.2	-1.0
SK	-0.2	-0.4	0.4	0.0	-0.3	-0.5
FI	-0.5	0.0	0.0	0.0	0.0	-0.5
SE	-0.4	0.0	0.0	0.0	-0.1	-0.5
UK	-0.1	-0.1	-0.1	0.0	0.0	-0.2
NO	0.0	0.0	0.0	0.0	0.0	0.0
EA17	-0.5	-0.3	-0.1	0.0	0.0	-1.0
EU27	-0.4	-0.2	0.0	0.0	-0.1	-0.8

*Source:* Commission services, EPC.

**Graph 2. 14 - Contribution of the benefit ratio effect to the change in gross public pension expenditure over 2010-2060 (in p.p. of GDP)**



**Source:** Commission services, EPC.

Contrary to the short-term employment effect of labour market reforms, changes in the parameters of pension schemes tend to have an impact with a medium- to long-term perspective. Consequently, the impact of the latter reforms affecting the amount of pension entitlements will become visible only in future years, as reflected by the strongest benefit ratio effect at the EU27 level only in the long run (see Table 2. 15).

In the first decade of the projection period (2010-2020), the contribution of a change in the benefit ratio to the change in the overall pension expenditure to GDP ratio is rather low (-0.4 p.p. in the EU27). Nevertheless, the divergence between Member States is rather large: Belgium projects the highest upward pressure from the benefit ratio (+0.6 p.p.), while the largest negative contribution is registered in Latvia (-2.2 p.p.) and Romania (-1.5 p.p.). The largest positive contribution falls down to 0.4 p.p. in case of

Estonia in the subsequent period (2020-2030). The largest negative benefit contribution is projected in Poland (-1.5 p.p.). As current pension reforms which change the amount of pension entitlements will impact primarily individuals retiring in thirty to forty years, the largest contribution of the fall in benefit ratios is projected to show up over the period 2030-2040 (-0.7 p.p. in the EU27). Here, the largest positive contribution is recorded in Malta (+0.5 p.p.), the largest negative one again in Poland (with -2.3 p.p.), due to the fact that an increasing share of pensioners receives pensions from the second (private) pillar. The overall contribution of the benefit ratio in the EU27 diminishes towards the end of the projection horizon (-0.3 p.p. in 2050-2060). In the last decade of the projection period, the largest positive contribution is projected for the United Kingdom (+0.5 p.p.). The strongest negative contribution is shown for Poland (-1.5 p.p.).



**Table 2. 15 - Contribution of the benefit ratio effect to the change in gross public pension expenditure by decades (in p.p. of GDP)**

	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60
BE	0.6	0.0	-0.3	-0.4	-0.4	-0.6
BG	-0.9	-0.3	-0.2	-0.2	-0.5	-2.1
CZ	-0.6	-0.3	0.2	0.3	0.1	-0.2
DK	-0.5	-0.1	-0.5	-0.3	0.1	-1.2
DE	-0.6	-0.9	-0.9	0.0	0.1	-2.2
EE	-1.1	0.4	-0.6	-1.0	-1.0	-3.3
IE	-0.3	0.1	0.1	0.0	0.1	0.1
EL	0.4	-0.5	-1.4	-1.4	-0.7	-3.6
ES	0.2	-0.6	-0.7	-0.6	-0.5	-2.3
FR	-0.9	-0.8	-0.6	-0.5	-0.3	-3.1
IT	-0.2	-1.1	-0.5	-0.5	-0.5	-2.9
CY	0.4	-0.7	-1.1	-1.0	-0.9	-3.4
LV	-2.2	-1.2	-1.0	-1.2	-1.1	-6.8
LT	-1.2	0.3	0.3	0.2	0.1	-0.2
LU	-0.1	0.0	-0.3	-0.7	-1.0	-2.1
HU	0.0	-0.7	-0.6	-0.4	-0.1	-1.8
MT	-1.2	-0.7	0.5	0.5	-0.2	-1.0
NL	-0.7	-0.1	0.0	0.1	0.0	-0.8
AT	-0.6	-0.8	-1.3	-1.2	-0.7	-4.5
PL	-1.2	-1.5	-2.3	-2.2	-1.5	-8.7
PT	0.0	-1.3	-2.0	-1.4	-0.8	-5.5
RO	-1.5	-0.4	-0.6	-0.7	-0.6	-3.7
SI	-1.2	-0.2	0.4	0.1	0.0	-0.9
SK	-0.3	-0.6	-0.9	-0.7	-0.3	-2.8
FI	0.3	-0.1	-0.5	-0.4	-0.3	-0.9
SE	-0.6	-0.8	-0.6	-0.5	-0.3	-2.7
UK	-0.4	0.0	0.2	0.4	0.5	0.8
NO	0.1	-0.5	-0.5	-0.4	-0.3	-1.6
EA17	-0.3	-0.7	-0.8	-0.6	-0.3	-2.7
EU27	-0.4	-0.6	-0.7	-0.6	-0.3	-2.7

*Source:* Commission services, EPC.

### ***Labour intensity effect***

Increasing the intensity of work, i.e. working more hours per day, could have a decreasing effect on the public pension expenditure over GDP comparable to the effect of higher employment rates (yet, not in terms of size). However, the contribution of the labour intensity effect to a decrease in public pension expenditure is only marginal, due to the macroeconomic assumption of unchanged per-capita-hours worked by gender and age.

### **2.6.2. Benefit ratio and replacement rates**

Sizable decreases in the pension generosity are projected over the coming decades in many countries (see Table 2. 15), since pension reforms in recent years were mostly related to strengthening the financial sustainability of pensions systems by decreasing coverage and benefits. It is therefore relevant to assess what effect these reforms will have in terms of pension adequacy, although it is very difficult to gauge to what extent future pension benefits

will be "adequate" in the future.<sup>72</sup> Two indicators that can shed some light on that question are the benefit ratio (the ratio between the average pension benefit and the economy-wide average wage) and the replacement rate (the average first pension as a share of the economy-wide average wage at retirement). Both figures, as projected by the Member States, are depicted in Table 2. 16 below.

For most of the Member States, a rather substantial decline in the public pension benefit ratio over the period 2010 to 2060 is projected, amounting to 20% or more in 7 Member States (Estonia, Greece, France, Poland, Romania, Slovakia and Sweden). Only Cyprus projects a slightly increasing public benefit ratio over the projection horizon. At the aggregated EU27 level, this would result in a benefit ratio decrease of 19% (both GDP-weighted and simple average). Yet, the decline in the total pension benefit ratio is smaller in 6 Member States (Estonia, Spain, Lithuania, Poland, Romania and Sweden) when taking into consideration also the influence of occupational and private schemes on pension entitlements. Notwithstanding this, the total benefit ratio still declines by 20% or more in Estonia, Poland and Romania. A substantial increase of 14% in the total benefit ratio is only reported in Denmark.<sup>73</sup>

Replacement rates at retirement can provide information on whether a projected reduction in average pension benefit over time (i.e. a decreasing benefit ratio) is influenced by declining newly awarded pensions (as reflected in the replacement rate at retirement), or due to a decline in previously

awarded "old" or stock pensions, mostly due to stricter indexation rules. The decline in the public pension replacement rate between 2010 and 2060 is quite extensive, being 20% or more in Estonia, Spain, Latvia, Luxembourg, Austria, Poland, Romania, Slovakia, Sweden and Norway.<sup>74</sup> In these countries, the valorisation of the average first pension is lower than the average wage growth. As shown above, this partly reflects the impact of sustainability factors applied in pension benefit formulas. Only 4 Member States – Ireland, Cyprus, Hungary and the United Kingdom – project an increasing public replacement rate.<sup>75</sup> At the aggregated EU27 level, projected figures would result in a drop in replacement rates of 18% (GDP weighted; -20% if simple average is applied). For 4 Member States that have provided data, the decline in the gross average replacement rate for public pensions is partly offset by entitlements from 2nd and 3rd pillar schemes (Estonia, Poland, Slovakia and Sweden). The total replacement rate increases in Lithuania.

<sup>72</sup> A "Pension Adequacy Report" will be published by the Social Protection Committee (SPC) in the course of 2012, dealing with the issue of adequacy of pension levels.

<sup>73</sup> Unfortunately, not all countries have reported projections on benefit ratios and replacement rates in occupational and private schemes. As a consequence, only a partial analysis of pension adequacy is possible as second and third pillar schemes can provide a substantial premium on public pension entitlements.

<sup>74</sup> The substantial drop in the Polish benefit ratio and replacement rate can partially be explained by a shift of pension entitlement accumulation to the private pillar as well as the connection of pension benefit calculation to life expectancy.

<sup>75</sup> UK replacement rates only cover State Second Pensions.

**Table 2. 16 - Benefit ratios and replacement rates in 2010 and 2060 (in %)**

	Benefit Ratio (%)						Gross Average Replacement Rate (%)					
	Public pensions			All pensions			Public pensions			All pensions		
	2010	2060	% change	2010	2060	% change	2010	2060	% change	2010	2060	% change
BE	39	37	-5									
BG	46	38	-18				50	47	-6			
CZ	26	25	-3				29	27	-5			
DK	36	31	-14	59	67	14						
DE	47	38	-18				41	35	-13			
EE	39	20	-48	39	29	-26	36	20	-43	37	36	-3
IE							37	38	2			
EL	36	28	-23				59	50	-16			
ES	55	45	-19	59	48	-18	72	56	-23			
FR	40	32	-20				59	53	-10			
IT	49	44	-10				80	68	-14			
CY	43	44	2				45	53	18			
LV							48	15	-68			
LT	39	35	-9	39	37	-4	38	36	-6	38	39	2
LU	59	51	-14				78	58	-26			
HU	31	26	-15	31	26	-16	38	41	6			
MT	51	47	-7				59	51	-13			
NL												
AT	42	36	-16				48	37	-22			
PL	47	19	-59	47	22	-53	49	19	-62	49	22	-55
PT							57	49	-13			
RO	39	27	-30	37	28	-25	42	29	-31			
SI	19	17	-10									
SK	44	29	-34				51	30	-42	51	46	-9
FI	49	44	-11				52	44	-16			
SE	35	26	-28	45	37	-17	35	23	-36	52	44	-15
UK							5	7	35			
NO	48	41	-15				49	38	-23			
EU 27*	45	36	-19				48	39	-18			
EA*	46	38	-17				58	51	-13			
EU27**	41	34	-19				48	38	-20			
EA**	44	37	-16				55	46	-17			

**Source:** Commission services, EPC.

**Note:**

\*: Weighted average (GDP).

\*\*: Simple average.

The "Benefit Ratio" is the average benefit of public pensions and public and private pensions, respectively, as a share of the economy-wide average wage (gross wages and salaries in relation to employees), as calculated by the Commission services. The "Gross Average Replacement Rate" is calculated as the average first pension as a share of the economy-wide average wage at retirement, as reported by the Member States in the pension questionnaire. The (economy-wide) average wage of old people at their retirement usually differs from the overall economy-wide average wage, unless a flat wage profile over the entire working career is assumed in the projection exercise. Public pensions used to calculate the benefit ratio include old-age and early pensions and other pensions, while public pensions used to calculate the gross average replacement rate only include earnings related pensions. In general, the earnings-related pensions are the major part of pension expenditure, so this difference is unlikely to affect the results substantially. The benefit ratio and the gross average replacement rate convey different information. In particular, due to differences in wage concepts used when calculating the benefit ratio and the replacement rate, the two indicators (and especially their level) are not strictly comparable and should be interpreted with caution.

Values for "all pensions" are only presented if different from the values for "public pensions".

Benefit ratio projections were provided on a voluntary basis.

EL and MT: 2011 values taken as starting replacement rate.

UK: Replacement rates only cover State Second Pensions. Estimates by the Institute for Fiscal Studies suggest a replacement rate of around 40% at present from State Pension provision for median earners. Occupational pensions will further increase replacement rates for some earners.

Yet, next to the change in replacement rates over time, it is also necessary to observe the level of replacement rates at the beginning and the end of the projection horizon. If the replacement rate is very high both in comparison to the reference wage as well as

in comparison to other Member States (e.g. in Spain, Italy or Luxembourg) at the beginning of the projection period, countries might even have the political goal of reducing public pension replacement rates over time. This would in the short term

reduce pressure on the financial sustainability of the respective pension systems. However, this could also have a possible negative effect on pension adequacy, if the long-term levels of replacement rates fall below a minimum threshold and no other sources of pension entitlements are created by the governments.

The latter argument holds in general for all Member States with relatively low projected replacement rates in the future. There are several ways to increase pension entitlements:

(1) It has become common practice in several Member States to either shift pension accumulation from public first pillar schemes to second and third pillar schemes or to build up additional entitlement in these schemes (Denmark, Estonia, Spain, Latvia, Lithuania, Hungary, the Netherlands, Poland, Portugal, Romania, Slovenia and Sweden have provided data on expenditures for second and third pillar schemes, see [Graph 2. 7](#) and [Table 2. 17](#)).<sup>76</sup>

(2) People are encouraged to start saving privately for their retirement income so that a part of future pension income is created by drawing down on accumulated assets and savings.

(3) Being aware of declining public replacement rates over time, people might take the deliberate decision to expand working lives and thus, by increasing the contributory period, they might increase their pensionable incomes as well. The latter aspect is especially supported in those Member States with flexible retirement ages (e.g. Finland and Sweden).

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<sup>76</sup> Possible transaction costs due to the re-allocation of one part of the former pension contributions to the PAYG scheme towards funded schemes need to be taken into account.

**Table 2. 17 - Decomposition of total pension expenditure over 2010-2060  
(in p.p. of GDP)**

	2010 level	Dependency ratio contribution	Coverage ratio contribution	Employment effect contribution	Benefit ratio contribution	Labour intensity contribution	Interaction + residual effect	2060 level
DK	14.4	8.8	-6.5	-0.6	1.2	0.0	-0.9	16.5
EE	8.9	7.5	-2.9	-1.2	-0.8	0.0	-0.5	10.9
ES	10.8	10.5	-0.9	-2.3	-2.5	0.1	-1.0	14.7
LV	9.7	7.9	-2.1	-1.3	-4.7	0.0	-0.7	8.9
LT	8.6	8.4	-2.9	-1.1	0.2	0.0	-0.5	12.7
HU	11.9	11.1	-4.2	-1.3	-1.9	0.0	-0.9	14.8
NL	11.8	10.3	-1.7	-0.4	-0.9	0.0	-0.7	18.5
PL	11.8	14.6	-5.2	-0.5	-7.9	0.0	-1.9	10.9
PT	13.1	10.8	-2.5	-1.1	-6.0	0.0	-1.1	13.2
RO	9.8	13.8	-5.0	0.4	-3.1	0.0	-1.2	14.7
SI	11.2	13.0	-3.1	-1.0	-0.7	0.0	-0.8	18.6
SE	11.8	6.7	-1.0	-0.6	-1.6	0.0	-0.4	14.9

**Source:** Commission services, EPC.

**Note:** Total pension expenditure covers public, occupational and private pensions. This table only includes Member States that have provided non-zero private pillar pension expenditure projections in addition to public pension projections, and does consequently not include all Member States.

### 2.6.3. Pension indexation

Replacement rates at retirement give a hint on whether a projected reduction in average pension benefit over time (i.e. a decreasing benefit ratio) is influenced by declining newly awarded pensions (as reflected by this indicator), or due to a decline in previously awarded "old" or stock pensions. The latter argument is heavily influenced by the applied indexation rules that determine the evolution of pension income after retirement. Thereby, any indexation rule that deviates in a less generous way from wage indexation (i.e. especially a pure price indexation rule), reduces the pension benefits of an individual relative to the average earnings increase and thus may increase the risk of pension inadequacy over time. This especially holds for countries with low levels of replacement rates at retirement and for those people that are depending on the social safety net after retirement (i.e. minimum pensions and/or social assistance).

As shown in the indexation overview tables in Annex III, several countries apply minimum pension and social assistance indexation rules above prices (Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Spain, Ireland, Italy, Cyprus,

Lithuania, the Netherlands, Poland, Portugal, Slovenia, Slovakia, Finland, Sweden, the United Kingdom and Norway). Moreover, some of these Member States (Spain, Italy, Austria, Slovakia, Finland and Sweden) apply indexation rules in their projections that are higher than legislated (i.e. wage indexation instead of price indexation or indexation in general where no legal minimum pension/social assistance indexation rule exists).

Yet, there are also Member States that apply a pure price indexation rule in their pension projections (e.g. France, Romania and Latvia; the latter two countries start to apply this rule not from the beginning of the projection period). Having in mind that minimum pensions and social assistance for old people should in general have the function of providing a basic social safety net, this may underestimate the future actual spending on minimum pension income.<sup>77</sup>

<sup>77</sup> It should be noted that Germany, the Netherlands and Poland have not provided a projection for minimum pensions or social allowances and therefore underestimate their future old-age expenditures. However, all of these countries have at least provided information about the status quo level of minimum pension expenditures in their country fiches, thereby showing a rather small share of overall expenditures.

Concretely, minimum pensions have been discretionarily uprated in the past for several times e.g. in France in order to re-align the minimum income to the increased living standards and the old-age (earnings-related) pension development. Still, since in almost all Member States the proportion of public minimum pensions in relation to total public pension expenditure is currently small, the size of this possible underestimation may not be very important.

## 2.7. Decomposition of new pensions

Next to the indexation rule applied to the stock of "old pensions", it is also relevant to assess the development of new pensions when analysing public pension expenditure over time. The disaggregation of the projected annual flow of earnings-related pensions to new pensions in their main drivers was introduced in the projection questionnaire for the first time in this projection round. It contributes to the understanding of the future functioning of pension systems and is a value added to the transparency of the projection exercise. It was agreed to introduce some flexibility in the reporting of the breakdown of the expenditure drivers for new pensions and coverage rates to cater for country specificities. In general, new pensions expenditures can be decomposed as follows:

$$P_{new} = \bar{C}_{new} \bar{A}_{new} \bar{PE}_{new} N_{new}$$

where  $P_{new}$  is the overall spending on new pensions,  $\bar{C}_{new}$  is the average contributory period or the average years of service of the new pensions,  $\bar{A}_{new}$  is the average accrual rate of the new pensions,  $\bar{PE}_{new}$  is the average pensionable earning over the contributory period related to the new pensions and  $N_{new}$  is the number of new pensions (pensioners).

Projections on contribution years and accrual rates help providing a clearer picture of the future drivers of (new) pension expenditure and the viability of the pension system as projected accrual rates might change over time and across different types of pensions.

Contributory periods can increase for several reasons, such as rising statutory retirement ages that forces employees to extend their working life to receive full pensions. The abolishment of early retirement schemes or the tightening of eligibility criteria for certain pension benefits (e.g. disability pensions or additional contributory years for military service periods or number of children) can be other reasons.

### *Contributory period*

Table 2. 18 below shows the development of the average contributory period (or average years of service) for new pensions over time. Almost all countries show an increase of the contributory period over the projection horizon.<sup>78</sup> At aggregate EU27 level, where the average contributory period is increasing by 3.1 years (GDP-weighted average; +2.6 years if simple average is applied). Only Estonia and Slovakia (-3.3 years and -2.8 years, respectively) show a clear downward trend. In Estonia, this is due to the fact that the possibility to "earn" additional contributory years e.g. via the number of children expires over time. In the Czech Republic, Latvia, the Netherlands and Sweden, the contributory period stays more or less constant. The highest increases in the average contributory periods can be observed in Greece (+8.8 years) due to the rather low starting point and the recently legislated increase in retirement ages as well as in Luxembourg (+9.7 years) due to an increasing impact of resident female and cross-border contributors on the total contributory period.

<sup>78</sup> No data provided by DK and IE, as new pensions in their flat-rate systems are not depending on the contributory period.



Several countries show an increasing trend for the average contributory period over (practically) the whole projection horizon 2010-2060 (Italy, Spain, Cyprus, Portugal), where the major part of the increasing effect is often reached already at the beginning of the projection horizon due to legislated increases in retirement ages. In other countries, the development is rather volatile (e.g. Hungary, Sweden or Bulgaria), reflecting e.g. cohort effect or counterbalancing effects of different pension reforms.

In general, an increasing trend in the average contributory period can have a decreasing effect on public pension as a longer working life translates into a shorter period of time during which a person receives pension benefits and on higher GDP growth due to higher employment rates. At the same time, one can however also accumulate a higher amount of pension entitlements during a longer career span, which has an increasing effect on pension expenditure. This can be counterbalanced if average yearly accrual rates are decreased at the same time.

**Table 2. 18 - Average contributory period or average years of service for new pensions**

	2010	2020	2030	2040	2050	2060	2010-60
BE	38.3	38.4	38.6	38.6	38.6	38.6	0.3
BG	34.0	38.7	38.1	37.5	38.5	38.8	4.8
CZ	43.2	43.2	43.2	43.2	43.2	43.2	0.0
DK	:	:	:	:	:	:	
DE	36.3	37.2	37.8	36.8	38.8	40.1	3.8
EE	42.3	41.4	41.8	38.5	38.8	38.9	-3.3
IE	:	:	:	:	:	:	
EL	29.3	28.9	31.0	33.2	36.6	38.1	8.8
ES	35.4	36.6	37.6	38.0	38.4	38.7	3.3
FR	37.6	39.7	40.3	40.3	40.3	40.3	2.7
IT	33.5	34.5	34.8	35.7	36.4	37.5	4.0
CY	34.1	36.2	37.1	38.2	38.7	38.8	4.8
LV	35.7	34.8	35.0	35.5	35.7	35.6	-0.1
LT	36.6	41.1	42.7	42.8	42.8	43.1	6.5
LU	27.0	29.3	32.5	34.5	36.3	36.7	9.7
HU	37.6	41.1	40.0	39.2	38.8	38.8	1.2
MT	:	:	:	:	:	:	
NL	48.0	48.0	48.0	48.0	48.0	48.0	0.0
AT	36.0	37.2	37.6	37.5	37.7	37.7	1.7
PL	:	:	:	:	:	:	
PT	30.9	31.8	32.5	33.2	33.8	35.0	4.1
RO	31.3	35.0	35.7	36.0	36.1	36.1	4.8
SI	35.2	37.1	37.6	37.6	37.6	37.6	2.4
SK	40.0	40.4	39.4	38.5	37.4	37.2	-2.8
FI	32.0	32.6	32.9	33.2	33.4	33.4	1.4
SE	36.6	35.1	36.5	35.0	35.7	36.7	0.0
UK	:	:	:	:	:	:	
NO	34.8	40.1	40.2	39.9	39.4	41.0	6.3
EU 27*	36.1	37.4	37.9	37.9	38.6	39.2	3.1
EA*	36.1	37.2	37.8	37.9	38.7	39.3	3.1
EU27**	36.0	37.2	37.8	37.8	38.3	38.6	2.6
EA**	35.7	36.6	37.3	37.5	38.1	38.4	2.7

**Source:** Commission services, EPC.

**Note:**

\*: Weighted average (GDP).

\*\*: Simple average.

DK and IE: Flat-rate system with new pensions not depending on contributory period.

DE: Average pension points, calculated as average monthly pension of new pensioners divided by pension point value per month.

ES: Excluding influence of sustainability factor on contributory period (increase from 35.4 years in 2010 to 40.0 years in 2060).

MT, PL and UK: No data provided.

NL: Average years of residence.

SE: Figures for the NDC system.

### *Accrual rates*

Indeed, in the vast majority of Member States, accrual rates are going down over the period 2010-2060 (see [Table 2. 19](#)).<sup>79</sup> Only Bulgaria (+9.1%), Hungary (+32.0%), Portugal (+11.9%) and Finland (+2.5%) show an increase in the average accrual rate over the projection horizon. In the latter two countries, the increasing effect is however (more than) counterbalanced by the sustainability factor. This is also the case for Spain. On the EU27 level, accrual rates are decreasing by around 12%. The sharpest decreases are projected in Latvia, (-47.1%), Estonia (-45.7%), Greece (-41.7%) and Slovakia (-37.6%). Next to the fact that accrual rates are adjusted to increasing contributory periods and retirement ages, there are other reasons for these sharp declines: stricter eligibility criteria for pension entitlements or shifting parts of the accrual to the second and third pillar (e.g. Estonia, Latvia, Lithuania and Slovakia). The latter two aspects are, as shown above, also coherently reflected in a downward trend in public benefit ratios (see [Table 2. 16](#) and [Table 2. 19](#)).

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<sup>79</sup> No data provided by DK and IE, as new pensions in their flat-rate systems are not depending on the contributory period. DE and RO point systems are not depending on accrual rates but on point value and average pension point development. Respective alternative decomposition provided during peer review process.



**Table 2. 19 - Average accrual rates for new pensions over 2010-2060**

	2010	2020	2030	2040	2050	2060	2010-60 (change in %)
BE	1.5	1.5	1.4	1.4	1.4	1.4	-6.7
BG	1.1	1.2	1.2	1.2	1.2	1.2	9.1
CZ	1.7	1.7	1.7	1.6	1.5	1.6	-7.7
DK	:	:	:	:	:	:	
DE	:	:	:	:	:	:	
EE	2.0	1.6	1.4	1.4	1.2	1.1	-45.7
IE	:	:	:	:	:	:	
EL	2.5	2.1	1.7	1.5	1.4	1.5	-41.7
ES	2.4	2.3	2.3	2.3	2.2	2.2	-8.6
ES SF	2.4	2.3	2.3	2.2	2.2	2.1	-12.5
FR	2.0	1.7	1.7	1.6	1.7	1.7	-15.6
IT	1.9	1.9	1.7	1.7	1.7	1.7	-13.9
CY	1.5	1.5	1.4	1.4	1.4	1.4	-3.1
LV	1.1	0.9	0.8	0.7	0.6	0.6	-47.1
LT	0.5	0.5	0.4	0.4	0.4	0.4	-16.0
LU	1.9	1.9	1.9	1.9	1.9	1.9	0.0
HU	1.3	1.7	1.7	1.7	1.7	1.7	32.0
MT	:	:	:	:	:	:	
NL	2.0	2.0	2.0	2.0	2.0	2.0	0.0
AT	1.3	1.3	1.2	1.1	1.1	1.0	-25.3
PL	:	:	:	:	:	:	
PT	2.0	2.2	2.2	2.3	2.3	2.3	11.9
PT SF	2.0	2.0	2.0	1.9	1.8	1.8	-11.4
RO	:	:	:	:	:	:	
SI	1.5	1.4	1.3	1.3	1.3	1.3	-9.1
SK	1.3	1.2	1.0	0.8	1.1	0.8	-37.6
FI	1.6	1.6	1.6	1.6	1.6	1.6	2.5
FI SF	1.6	1.5	1.5	1.4	1.4	1.4	-14.7
SE	1.0	1.0	0.9	0.9	0.9	0.8	-13.4
UK	:	:	:	:	:	:	
NO	1.1	0.9	1.1	1.1	1.0	1.0	-7.5
EU 27*	1.9	1.8	1.7	1.7	1.7	1.7	-12.0
EA*	2.0	1.9	1.8	1.8	1.7	1.7	-12.3
EU27**	1.6	1.5	1.5	1.4	1.4	1.4	-12.2
EA**	1.8	1.7	1.6	1.6	1.6	1.6	-14.0

**Source:** Commission services, EPC.

**Note:**

\*: Weighted average (population) without sustainability factor.

\*\*: Simple average without sustainability factor.

DK and IE: Flat-rate system with new pensions not depending on accrual rates.

DE and RO: Point systems are not depending on accrual rates but on point value and average pension point development. Respective alternative decomposition provided during peer review process.

ES, PT and FI: Accrual rates are ex-post downsized via the sustainability factor (see respective "SF" lines). No data available for remaining countries mentioned in box on sustainability factors above.

CY: Accrual rate decrease mainly due to the increasing share of female insured persons, who, compared to male pensioners, are entitled to a lower effective accrual rate under the basic part of the GSIS (general social insurance scheme) since they are not typically entitled to a dependants' increase in their basic pension.

MT, PL and UK: No data provided.

NL: Average years of residence.

SE: Figures for the NDC system.

## 2.8. Sensitivity tests

The pension projections are sensitive to a number of underlying assumptions that are necessary to project developments in government expenditure over a long period of time (see chapter 1 for detailed descriptions). Given the uncertainties surrounding these assumptions, it is important to test the robustness of the overall projection results. A series of sensitivity tests were thus carried out in addition to the "baseline" projections. Concretely, changes

to the demographic (assumptions on life expectancy and migration flows) and macro-economic (productivity growth, employment rates and the interest rate) variables were applied (see Table 2. 20 for details). When comparing the outcome of the sensitivity tests with the baseline scenario, the relative impact can also be interpreted as a kind of "elasticity" parameter. Thus, the sensitivity tests enable an ex-ante assessment of the impact of similar policy changes of different size with an effect on key assumption variables.

**Table 2. 20 - Overview of sensitivity tests: difference in assumptions compared with the baseline scenario**

Population		Labour force		Productivity	Interest rate
High life expectancy	Lower migration	Higher employment rate	Higher employment rate older workers	Higher/lower labour productivity	Higher/lower interest rate
A scenario with an increase of life expectancy at birth of one year by 2060 compared with the baseline projection.	A scenario with 10% less migration compared with the baseline projection	A scenario with the employment rate being 1 p.p. higher compared with the baseline projection for the age-group 20-64. The increase is introduced linearly over the period 2016-2025 and remains 1 p.p. higher thereafter. The higher employment rate is assumed to be achieved by lowering the rate of structural unemployment (the NAWRU).	A scenario with the employment rate of older workers (55-64) being 5 p.p. higher compared with the baseline projection. The increase is introduced linearly over the period 2016-2025 and remains 5 p.p. higher thereafter. The higher employment rate of this group of workers is assumed to be achieved through a reduction of the inactive population.	Higher/lower labour productivity A scenario with labour productivity growth being assumed to converge, to a productivity growth rate which is 0.1 percentage points higher/lower than in the baseline scenario. The increase is introduced linearly during the period 2016-2025, and remains 0.1 p.p. above/below the baseline thereafter.	A scenario with the real interest being 0.5 percentage point above/below that in the baseline scenario, i.e. 2.5% and 3.5%.

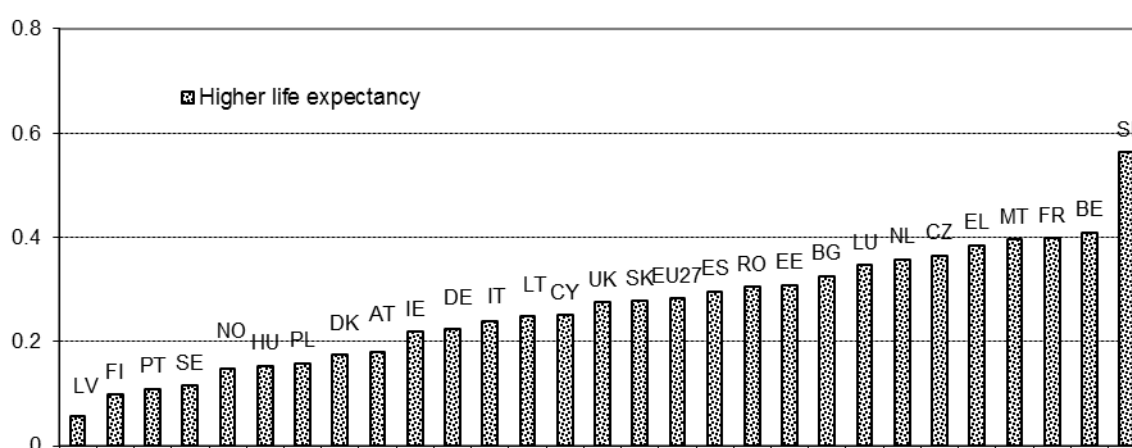
**Source:** Commission services, EPC.

### Higher life expectancy

An increase in life expectancy (of 1 year at birth by 2060) would result in a higher level of public pension expenditure. As people live longer, they are receiving pension benefits for a longer time span, which has an increasing spending effect. However, the drop in mortality at all ages also leads to a larger labour force, which might therefore also increase GDP and pension contributions. Assuming higher life expectancy, the increase of the pension-to-GDP ratio in the EU27 on average would be almost +0.3 p.p. (see Graph 2. 15). The lowest reaction to a change in life expectancy is projected for

Latvia (+0.1 p.p. of GDP), the strongest effect is recorded for Slovenia (+0.6 p.p.). In general, the size of reaction to life expectancy depends on the scheme design. In countries where the annuity explicitly depends on life expectancy at retirement or where automatic stabilizers of spending are built into the system to compensate for some fiscal imbalances (e.g. the sustainability factors in Germany, Finland, Italy, Portugal and Sweden), the effect seems to be less pronounced. On the contrary, the impact is larger in countries without any adjustment mechanism to life expectancy or with a large level of pension expenditure in 2060.

**Graph 2. 15 - Difference in gross public pension expenditure change 2010-2060 between the higher life expectancy and the baseline scenario (in p.p. of GDP)**



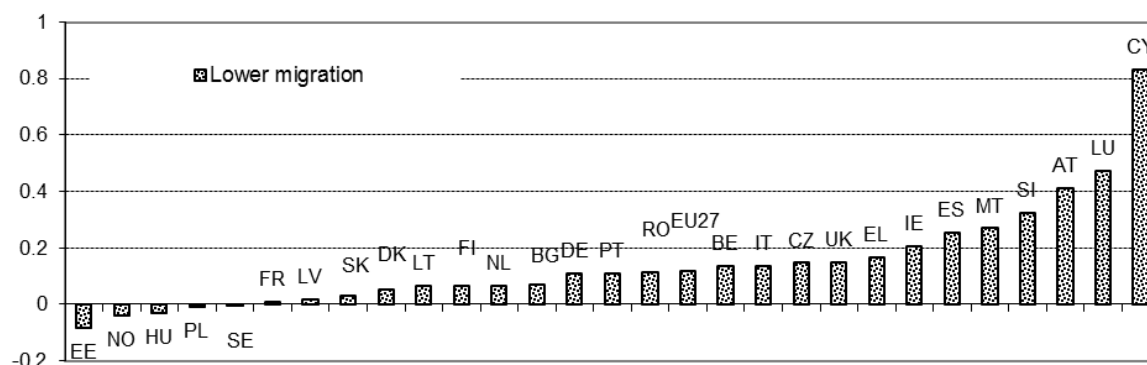
**Source:** Commission services, EPC.

### Lower migration

In the lower migration scenario, the pension-to-GDP ratio increases more than in the baseline scenario. This stems from a smaller labour force and lower GDP over the projection period, as migrants are supposed to be active in the labour market. At the same time, the number of pensioners is generally less affected by the lower migration assumption over the period 2010-2060.

Consequently, lower migration leads to an increasing pension expenditure over GDP ratio in the EU27 by +0.1 p.p. above the baseline change over the projection horizon (see Graph 2. 16). Specifically, all Member States project expenditure increases (highest reaction for Cyprus with more than +0.8 p.p.) except for a negligible negative change in case of Estonia, Norway, Hungary, Poland and Sweden (-0.1 p.p. and below).

**Graph 2. 16 - Difference in gross public pension expenditure change 2010-2060 between the lower migration and the baseline scenario (in p.p. of GDP)**



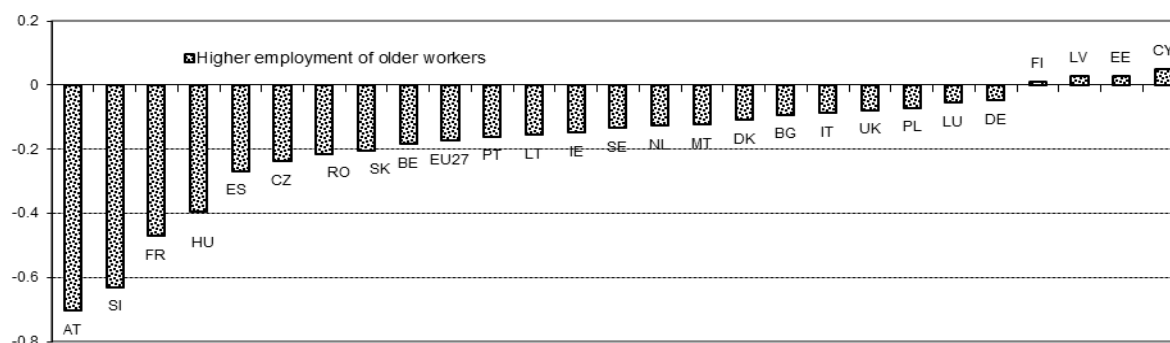
*Source:* Commission services, EPC.

### *Higher employment rate of older workers*

Pension expenditure as a share of GDP would be reduced by almost 0.2 p.p. over 2010-2060 in the EU27 if an increase of the employment rates of older workers by 5 percentage points compared to the baseline is assumed in the projections (see [Graph 2. 17](#)). Higher employment would lead to higher GDP growth, a lower number of pensioners and a reduction in the average number of pension-drawing years. All these components have a decreasing effect on the pension expenditure/GDP ratio. However, employees

would also be able to accrue additional pension rights. This would have an upward impact on the ratio. The overall impact of a higher employment of older workers will in the end depend on which of the two effects turn out to be stronger. In the Member States' projections, the most significant reductions in expenditure would be observed in Austria (-0.7 p.p.), Slovenia (-0.6 p.p.), France (-0.5 p.p.) and Hungary (-0.4 p.p.). On the other hand, only a very small increase is projected for Latvia, Estonia and Cyprus (all below +0.1 p.p.).

**Graph 2. 17 - Difference in gross public pension expenditure change 2010-2060 between the higher employment of older workers and the baseline scenario (in p.p. of GDP)**



*Source:* Commission services, EPC.

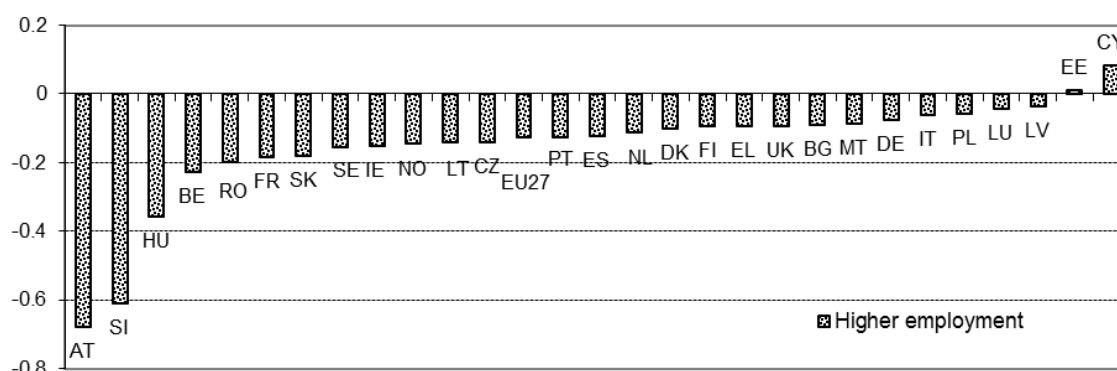
*Note:* No results provided by EL and NO.

### Higher total employment rate

Comparable results can be observed for the total employment rate scenario (see Graph 2. 18). An increase of the total employment rate by 1 p.p. for the entire workforce compared to the baseline scenario (assuming a reduction in the rate of structural

unemployment) leads to a reduction of 0.1 p.p. in the EU27. The strongest impacts are projected for Austria (-0.7 p.p.), Slovenia (-0.6 p.p.) and Hungary (-0.4 p.p.). On the contrary, Estonia and Cyprus project a positive impact on the pension to GDP ratio, however only marginally.

**Graph 2. 18 - Difference in gross public pension expenditure change 2010-2060 between the higher total employment and the baseline scenario (in p.p. of GDP)**



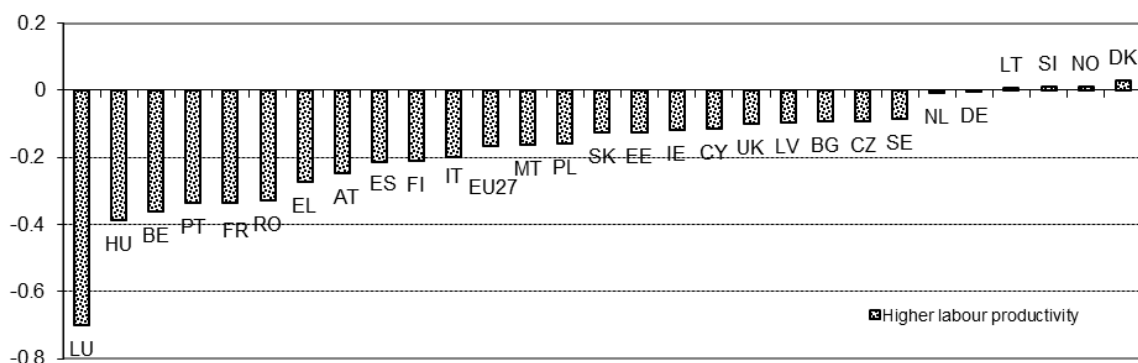
**Source:** Commission services, EPC.

### Higher labour productivity

If a permanent increase of 0.1 p.p. in the productivity growth rate was assumed, the upward change in the pension expenditure to GDP ratio in the EU27 that is projected in the baseline scenario would be decreased by almost 0.2 p.p. over the projection horizon (see Graph 2. 19). Especially in Luxembourg (-0.7 p.p.) the reduction would be rather pronounced. In Lithuania, Slovenia, Norway and Denmark, a negligible increase in the expenditure/GDP ratio in comparison to the baseline scenario would be observed (yet, all

clearly below +0.1 p.p.). As the latter countries often apply indexation rules connected to nominal wage increases, the higher labour productivity has in general no influence on the projection results. In the remaining countries, where pensions are not fully indexed to wages after retirement, higher productivity growth leads to a faster growth of GDP and hence a faster increase in income than in pensions (a fall in benefit ratio). The higher the productivity growth, the higher the gap between the average pension and the average wage.

**Graph 2. 19 - Difference in gross public pension expenditure change 2010-2060 between the higher labour productivity and the baseline scenario (in p.p. of GDP)**



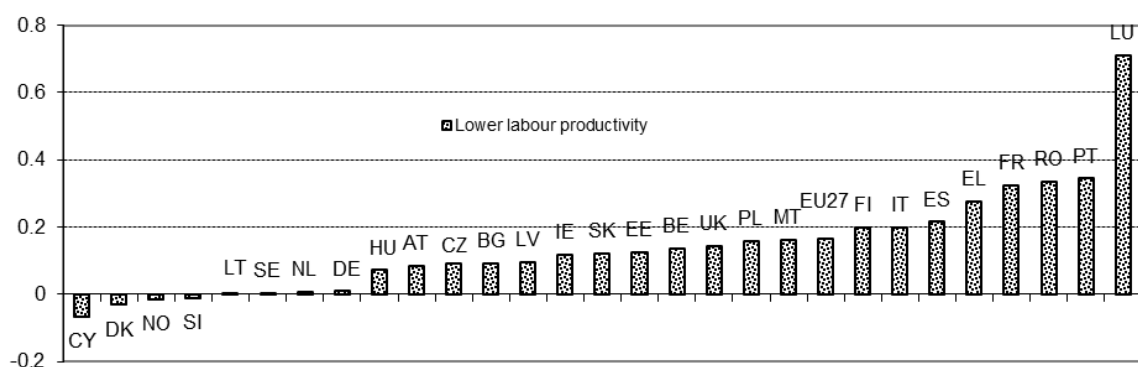
*Source:* Commission services, EPC.

### **Lower labour productivity**

The opposite argumentation line holds for the lower labour productivity scenario. A permanent decrease of 0.1 p.p. in the productivity growth rate would increase the change in the gross public pension expenditure over GDP ratio between 2010 and 2060 by additional 0.2 p.p. in the EU27 (see Graph 2. 20). The lower productivity growth leads to a lower growth of GDP and hence a slower increase in income than in

pensions (an increase in the benefit ratio). Yet, lower labour productivity growth has a different impact on pension expenditure across countries. The highest increase is projected for Luxembourg (+0.7 p.p.) as well as Portugal, Romania and France (all +0.3 p.p.). In contrast, Cyprus (-0.1 p.p.), Denmark, Norway and Slovenia (all clearly below -0.1 p.p.) show a minor decrease, the latter three countries again due to their indexation to nominal wages.

**Graph 2. 20 - Difference in gross public pension expenditure change 2010-2060 between the lower labour productivity and the baseline scenario (in p.p. of GDP)**



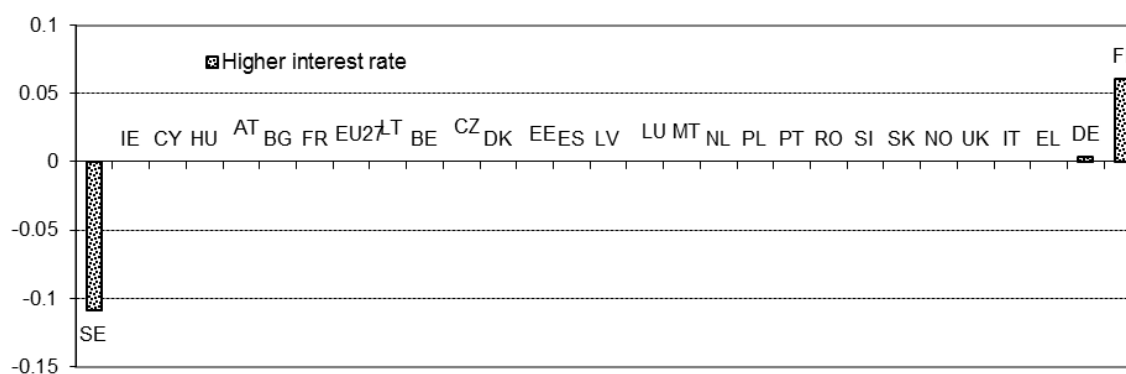
*Source:* Commission services, EPC.

### Higher interest rate

An increased interest rate by 0.5 p.p. will lead to a significant impact on public expenditure only in two countries with funded components in the public pension schemes (see Graph 2. 21). Sweden (-0.11 p.p.) and Finland (+0.06 p.p.) project respective deviations from the baseline scenario. The effect in Sweden comes through a higher rate of return which reflects in higher private (mandatory) premium pensions. In this case, individual entitlements

for public guarantee pensions are reduced accordingly. In Finland, the higher rate of return in pension fund assets lead to lower employees' contributions and thus higher pension accrual, as the latter is calculated from the gross wage subtracted by employees' pension contributions. In countries where a distinctive part of pension entitlements are accumulated in large pensions funds through 2nd and 3rd pillar schemes, the effect of this test is generally stronger (e.g. Denmark and Sweden).

**Graph 2. 21 - Difference in gross public pension expenditure change 2010-2060 between the higher interest rate and the baseline scenario (in p.p. of GDP)**



**Source:** Commission services, EPC.

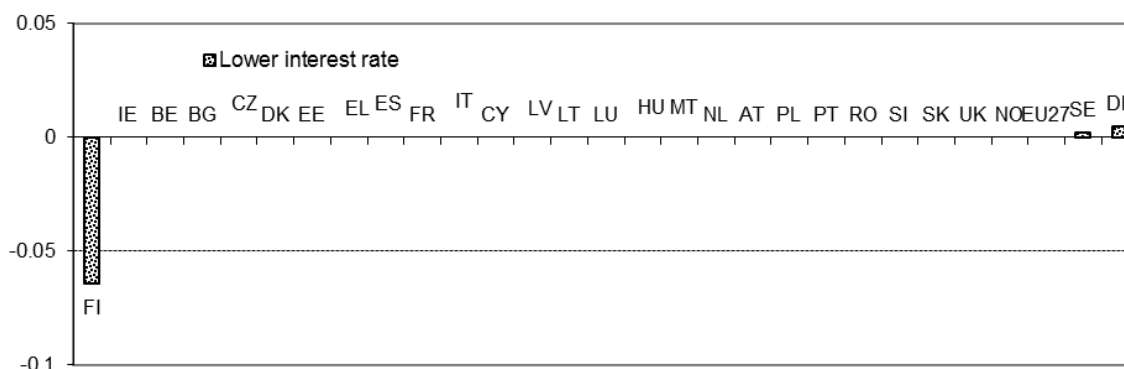
### Lower interest rate

For the lower interest rate scenario, the same argumentation holds as for the higher interest rate scenario. Lowering the assumption on the interest rate by 0.5 p.p. has again an impact on public expenditure only in a few countries with funded components in the public pension schemes (see Graph 2. 22). In this projection round, only the result for Finland is significant (-0.06 p.p.), where opposite effect of the higher interest rate

scenario occurs. In Sweden, the effect on expenditure is less pronounced than in the higher interest rate scenario as a lower entitlement for premium pensions due to a lower rate of return does not necessarily increase entitlements for guarantee pensions. Again, the effect of this test is generally stronger for private pension and in particular for countries that have large pensions scheme funds, such as Denmark and Sweden.



**Graph 2. 22 - Difference in gross public pension expenditure change 2010-2060 between the lower interest rate and the baseline scenario (in p.p. of GDP)**



*Source:* Commission services, EPC.

## 2.9. Comparison with the 2009 round of projections

When comparing the change in gross public pension expenditure as a share of GDP between 2010 and 2060 in the current and the 2009 projection exercise, one can notice quite remarkable revisions (see Graph 2. 23, as reflected by the distance from the 45 degree line).<sup>80,81</sup> In terms of financial sustainability of the pension systems, 18 Member States project an expenditure/GDP change that is smaller than projected 3 years ago. Consequently, compared with the 2009 pension projection exercise, pension expenditure is now projected to be increasing less sharply between 2010 and 2060 for the EU27 in total (rising by 1.5% of GDP, compared with 2.3% of GDP in the 2009 Ageing Report).

In Belgium, Germany, Estonia, Hungary, Malta, Austria, Slovakia, Finland, Sweden and Norway, the increase in pension expenditure over GDP in this projection

round is projected to be higher than in 2009 (or a lower decrease is recorded). However, rather large upward revisions of 1.0 p.p. of GDP are only registered in Belgium, Austria and Slovakia. On the opposite, a lower increase (or higher decrease) is now projected in Bulgaria, the Czech Republic, Denmark, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovenia and the United Kingdom, with significant downward revisions of 1.5 p.p. of GDP or more in Greece, Spain, Cyprus, Latvia, Luxembourg and Romania.

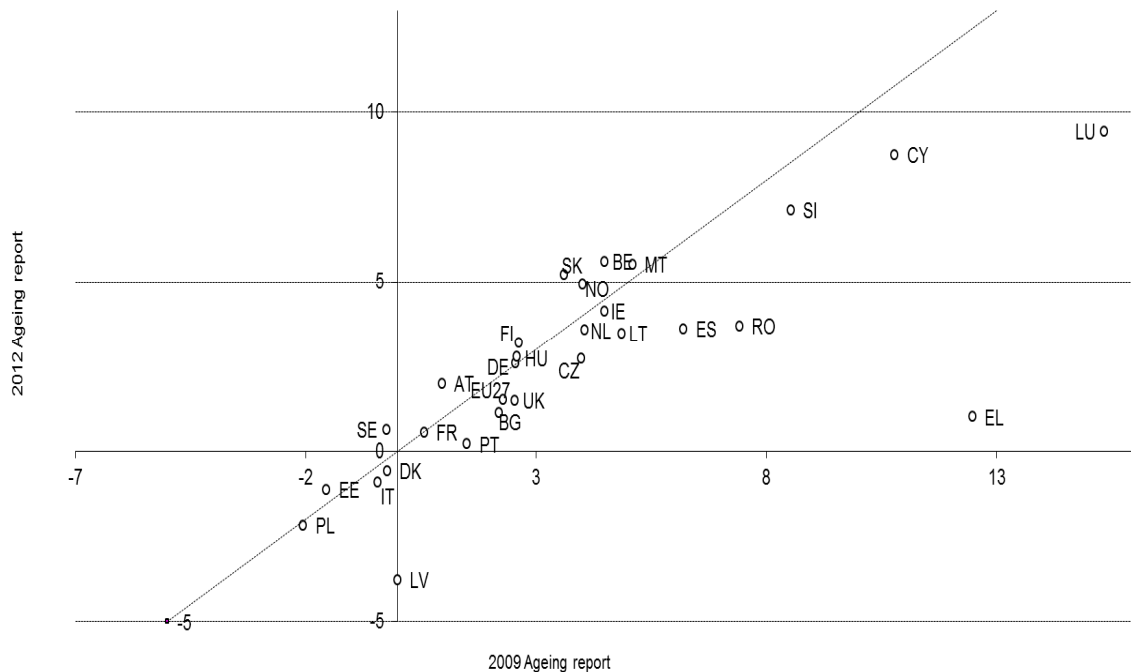
Pension reforms that have been legislated during the last three years are one of the main factors responsible for the revisions of projected changes in pension expenditure over the long term. However, changes in the demographic and macro-economic assumptions, changes in modelling pension expenditure over the long term and changes in the coverage of the projection (data on pension schemes covered in the projection) may have influenced this result as well. In particular, upward revisions of expenditure might at least partially be caused by the impact of the weaker economic developments (lower GDP growth) and not due to an increase in projected pension expenditure in absolute terms.

<sup>80</sup> In the 2009 Ageing report, gross public pension expenditure was labelled "social security pensions".

<sup>81</sup> For consistency reasons, 2010 is used as a reference year also for the 2009 Ageing Report projections, although 2007 was the base year in the former projection round. Alternative graphs and tables covering a comparison between the 2009 and 2012 Ageing Report with 2007 as a base year for the former projections are presented in Annex IV.



**Graph 2. 23 - Change in gross public pension expenditure (2010-2060) compared: 2009 Ageing Report and current projection round (in p.p. of GDP)**



**Source:** Commission services, EPC.

One further aspect has to be taken into account when comparing the results for the 2009 and 2012 projection rounds: the financial and economic crisis and its impact on pension expenditure and GDP developments. As shown in Graph 2. 9, the economic crisis leads to a large drop in GDP growth in many Member States, having thus a strong upward pushing "base effect" on the pension expenditure to GDP ratio in 2008 as well as 2009. In addition, the GDP figures in the base year 2010 for this projection round are still affected by the aftermath of the economic crisis. Hence, it is necessary not only to analyse the change in expenditure over the projection horizon when comparing the two projection rounds, but also the different expenditure levels.

Table 2. 21 compares the two levels at the beginning and at the end of the projection horizon in both exercises. Several results are striking.

Expenditure figures in 2010 are for most of the Member States systematically higher in

the 2012 than in the 2009 projection round, with the exception of Sweden and Norway.<sup>82</sup> Consequently, also 2010 expenditure in the EU27 is 1.1 p.p. of GDP higher in the current projection round.

However, expenditures increase less sharply in this projection round (by 1.5 p.p. of GDP) than in the 2009 Ageing Report (by 2.3 p.p. of GDP). As a consequence, the gap between public pension expenditure/GDP ratios in the two projection rounds diminishes towards the end of the projection period. Only a difference of 0.4 p.p. remains (12.5% of GDP in the 2009 Ageing Report, 12.9% in this projection round).

<sup>82</sup> One reason next to a possible base effect might be a different composition of expenditures in the 2012 projection round in comparison to the 2009 projections. E.g., Malta includes Treasury pensions in the 2012 projections, explaining a major part of the difference in their respective expenditure levels between the 2012 and 2009 projections.

**Table 2. 21 - Comparison of gross public pension expenditure levels (2010 and 2060) in the 2009 and 2012 projection rounds**

Country	AR 2009	AR 2012	AR 2009	AR 2012	AR 2009	AR 2012
	2010	2060	2060	Change 2010-2060	Change 2010-2060	Change 2010-2060
BE	10.3	11.0	14.7	16.6	4.5	5.6
BG	9.1	9.9	11.3	11.1	2.2	1.1
CZ	7.1	9.1	11.0	11.8	4.0	2.7
DK	9.4	10.1	9.2	9.5	-0.2	-0.6
DE	10.2	10.8	12.8	13.4	2.5	2.6
EE	6.4	8.9	4.9	7.7	-1.6	-1.1
IE	4.1	7.5	8.6	11.7	4.5	4.1
EL	11.6	13.6	24.1	14.6	12.5	1.0
ES	8.9	10.1	15.1	13.7	6.2	3.6
FR	13.5	14.6	14.0	15.1	0.6	0.5
IT	14.0	15.3	13.6	14.4	-0.4	-0.9
CY	6.9	7.6	17.7	16.4	10.8	8.7
LV	5.1	9.7	5.1	5.9	0.0	-3.8
LT	6.5	8.6	11.4	12.1	4.9	3.5
LU	8.6	9.2	23.9	18.6	15.3	9.4
HU	11.3	11.9	13.8	14.7	2.6	2.8
MT	8.3	10.4	13.4	15.9	5.1	5.5
NL	6.5	6.8	10.5	10.4	4.0	3.6
AT	12.7	14.1	13.6	16.1	1.0	2.0
PL	10.8	11.8	8.8	9.6	-2.1	-2.2
PT	11.9	12.5	13.4	12.7	1.5	0.2
RO	8.4	9.8	15.8	13.5	7.4	3.7
SI	10.1	11.2	18.6	18.3	8.5	7.1
SK	6.6	8.0	10.2	13.2	3.6	5.2
FI	10.7	12.0	13.4	15.2	2.6	3.2
SE	9.6	9.6	9.4	10.2	-0.2	0.6
UK	6.7	7.7	9.3	9.2	2.5	1.5
NO	9.6	9.3	13.6	14.2	4.0	4.9
<b>EU27</b>	10.2	11.3	12.5	12.9	2.3	1.5
<b>EA*</b>	11.1	12.2	13.8	14.1	2.7	2.0

**Source:** Commission services, EPC.

**Note:** \* Different compositions in the two projection rounds.

Next to the analysis of possible level and base effects, it is useful to conduct a deeper examination of the likely reasons behind the changes between the 2009 and 2012 projection round. For this purpose, a comparison of the decomposition of the change in public pension expenditure between the 2009 Ageing Report and the current projection exercise into the four factors (dependency ratio effect, coverage

ratio effect, employment rate effect as well as benefit ratio effect) is conducted.<sup>83</sup>

Table 2. 22 below shows how each effect has changed between the two projection rounds and depicts the decomposed effects of each projection round separately. The main findings are the following:

<sup>83</sup> The labour intensity effect was not calculated in the 2009 projection round. Yet, as respective results for the 2012 projections are negligible, the comparison of the other four factors is still possible in a coherent way.

- Both in the 2009 and the 2012 projections, the main (and on the aggregate EU27 level only) factor responsible for the increase in the public pension expenditure/GDP ratio between 2010 and 2060 is population ageing. Yet, both upward and downward revisions in the population projections between EUROPOP2008 and EUROPOP2010 have been made. In roughly half of the Member States the dependency ratio effect has increased (Luxembourg, Hungary, Slovakia, Estonia, Austria, Latvia, France, Portugal, Poland, the Czech Republic, Malta, Germany, Belgium, Finland and Denmark). It has decreased in Sweden, Cyprus, Norway, the Netherlands, Bulgaria, Slovenia, Italy, Romania, Spain, the United Kingdom, Lithuania, Greece and Ireland. On the EU27 level, a very small increase from 8.4 to 8.5 p.p. of GDP is recorded.<sup>84</sup>

- The downward impact on pension expenditure of the coverage ratio is more pronounced in the current projection round than in the 2009 round (-2.9 p.p. vs. -2.4 p.p. of GDP). This reflects changes in pension policies that have aimed at increasing the effective retirement age either through increases in the statutory retirement age and/or through increases in the career requirements for full pension requirements and/or tightened access to early and disability pension schemes. In comparison with the 2009 projection results, especially Luxembourg, Greece, Italy and the Czech Republic record a substantially higher downward impact of the coverage ratio on pension expenditure.<sup>85</sup> On the opposite, a

lower impact is projected for Malta and Cyprus.

- Although rather small, the employment effect nevertheless contributes to offset the dependency effect on public pension expenditure. When comparing the overall EU27 effect one can even observe a slight increase in the offsetting effect from -0.5 p.p. of GDP in 2009 projection round to -0.8 p.p. in the current one. This revision is recorded for the vast majority of Member States (exceptions: Belgium, Germany, Finland and the United Kingdom). Higher participation rates (e.g. for older people and women) lead to higher employment rates. This has a positive effect both on GDP and pension expenditure through a postponement of retirement.

- In most of the Member States, the benefit ratio effect is negative both in the 2009 and the 2012 projection rounds. On the EU27 level, the effect in the 2012 projections is slightly higher (-2.6 p.p. of GDP in 2009, -2.7 p.p. of GDP in 2012), reflecting in many cases reforms that have been introduced so as to make the public pension systems more robust to demographic changes. In Greece, Luxembourg, Romania, Cyprus, Latvia, Poland, Denmark, the Netherlands, Malta, Portugal, Ireland, Slovakia, Slovenia and Germany the offsetting impact of the relative benefit reduction has increased compared to the 2009 projections.

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<sup>84</sup> For some countries (BE, CZ, MT, PL, SK and FI), the lower projected old-age dependency ratio in comparison to the 2009 projection round is counteracted by the positive impact of the increased pension expenditure to GDP ratio on the respective expenditure driver, due to the weakening of the macroeconomic context.

<sup>85</sup> As cross-border workers in Luxembourg are not covered in the labour force projections for the pension projection exercise, a deeper analysis of the employment effect contribution as well as the coverage ratio contribution is not meaningful.

**Table 2. 22 - Decomposition of gross public pension expenditure change over 2010-2060 in the 2009 and 2012 projection rounds (in p.p. of GDP)**

	Projection year	Dependency ratio	Coverage ratio	Employment rate	Benefit Ratio	Change 2010 - 2060 in p.p. of GDP
BE	2009	7.4	-1.0	-0.4	-1.2	4.5
	2012	7.6	-0.9	-0.3	-0.6	5.6
BG	2009	9.0	-3.0	-0.2	-2.9	2.2
	2012	8.8	-3.9	-0.8	-2.1	1.1
CZ	2009	8.7	-3.0	-0.3	-0.6	4.0
	2012	9.3	-4.6	-0.6	-0.2	1.1
DK	2009	5.7	-4.7	-0.1	-0.5	-0.2
	2012	5.9	-4.2	-0.4	-1.2	-0.6
DE	2009	7.4	-1.7	-0.5	-1.9	2.5
	2012	7.9	-1.8	-0.5	-2.2	2.6
EE	2009	4.7	-1.8	0.0	-4.1	-1.6
	2012	6.7	-2.7	-1.1	-3.3	-1.1
IE*	2009	7.8	-2.0	-0.2	0.5	5.9
	2012	5.3	-2.0	-0.4	0.1	4.1
EL	2009	12.4	-0.2	-0.4	0.7	12.5
	2012	10.4	-3.4	-1.9	-3.6	1.0
ES	2009	10.7	-0.8	-0.8	-2.4	6.2
	2012	9.7	-0.8	-2.2	-2.3	3.6
FR	2009	8.1	-2.5	-0.6	-3.9	0.6
	2012	9.1	-3.5	-1.2	-3.1	0.5
IT	2009	10.0	-2.7	-0.9	-5.9	-0.4
	2012	9.5	-5.5	-1.3	-2.9	-0.9
CY	2009	10.7	1.1	-0.3	-0.5	10.8
	2012	10.6	2.8	-0.6	-3.4	8.7
LV	2009	5.6	-1.3	0.0	-3.9	0.0
	2012	7.0	-1.9	-1.2	-6.8	-3.8
LT	2009	9.5	-2.3	0.1	-1.7	4.9
	2012	8.2	-2.9	-1.1	-0.2	3.5
LU	2009	8.2	4.9	0.1	1.7	15.3
	2012	11.2	0.3	0.1	-2.1	9.4
HU	2009	8.3	-4.1	-0.9	-2.6	0.2
	2012	11.1	-4.3	-1.3	-1.8	2.8
MT	2009	10.8	-3.6	-0.7	-0.5	5.1
	2012	11.3	-2.6	-1.5	-1.0	5.5
NL	2009	6.1	-1.4	-0.1	-0.3	4.0
	2012	6.0	-1.0	-0.2	-0.8	3.6
AT	2009	9.4	-2.4	-0.4	-4.7	1.0
	2012	11.0	-2.9	-0.6	-4.5	2.0
PL	2009	13.3	-5.5	-0.4	-7.6	-2.1
	2012	14.0	-5.0	-0.4	-8.7	-2.2
PT	2009	9.4	-1.5	-0.4	-5.1	1.5
	2012	10.4	-2.5	-1.0	-5.5	0.2
RO	2009	13.7	-4.8	0.4	-0.5	7.4
	2012	12.9	-4.7	0.4	-3.7	3.7
SI	2009	13.2	-3.3	-0.1	-0.6	8.5
	2012	12.8	-3.1	-1.0	-0.9	7.1
SK	2009	11.4	-3.6	-0.4	-2.5	3.6
	2012	13.5	-3.9	-0.5	-2.8	5.2
FI	2009	8.4	-3.2	-0.6	-1.2	2.6
	2012	8.6	-3.2	-0.5	-0.9	3.2
SE	2009	5.1	-0.2	-0.3	-4.3	-0.2
	2012	5.0	-0.8	-0.5	-2.7	0.6
UK*	2009	4.1	-1.5	-0.3	0.5	2.5
	2012	3.1	-1.4	-0.2	0.8	1.5
NO	2009	8.1	-1.4	0.1	-2.4	4.0
	2012	8.0	-1.1	0.0	-1.6	4.9
EU27	2009	8.4	-2.4	-0.5	-2.6	2.3
	2012	8.5	-2.9	-0.8	-2.7	1.5

**Source:** Commission services, EPC.

**Note:** \* IE, UK: Decomposition excluding IE public service occupational and UK public service pensions.

Due to different macroeconomic assumptions, different projection coverage as well as different definitions of underlying drivers in the 2009 and 2012 Ageing Reports, one must be cautious when comparing the results in the table above.

## **Annex I: Pension projection questionnaire**

## Table 2. 23 - Pension projection questionnaire

European Commission DG ECFIN Unit C2 Draft reporting framework: Pension expenditure and contributions - in billions EUROS, current prices									
Country: Scenario: Pension scheme: Voluntary									
A. Fixed table									
		2005	2010	2020	2030	2040	2050	2060	Control variable (1 - 0)
		Data in current	Base year						
<b>GDP (ECFIN projection, in current prices - billions EUR)</b>									
1 GDP (used in projections, in current prices)									
2 GDP deflator									
3 Gross wage (used in projections, in current prices - billions EUR)									
4 Average wage (used in the projections, in current prices - 1000 EUR)									
5 Consumer price inflation									
<b>1 - PENSION EXPENDITURES (Gross and Net, in millions €)</b>									
6 Public pensions scheme, gross									
Of which:									
7 aged -54									
8 aged 55-59									
9 aged 60-64									
10 aged 65-69									
11 aged 70-74									
12 aged 75+									
13 Old-age and early pensions									
14 Of which: new pensions									
15 Of which: earnings-related pensions									
16 new pensions									
17 Private sector employees									
18 Public sector employees									
19 Of which: non-earning-related minimum pensions / minimum income guarantee for persons over statutory retirement age									
20 Disability									
21 Of which: new pensions									
22 Other pensions (survivors)									
23 Of which: new pensions									
Vol	24 Occupational scheme, gross								
Vol	25 Of which: new pensions								
Vol	26 Private scheme gross								
Vol	27 Of which: new pensions								
Vol	28 Mandatory private scheme								
Vol	29 Of which: new pensions								
Vol	30 Non-mandatory private scheme								
Vol	31 Of which: new pensions								
32 Total pension expenditure, gross									
Of which:									
33 aged -54									
34 aged 55-59									
35 aged 60-64									
36 aged 65-69									
37 aged 70-74									
38 aged 75+									
Vol	39 Public pensions scheme, net								
Vol	40 Of which: non-earning-related minimum pensions / minimum income guarantee for persons over statutory retirement age								
Vol	41 Occupational scheme, net								
Vol	42 Private scheme, net								
Vol	43 Total pension expenditure, net								
<b>2 - BENEFIT RATIO</b>									
Vol	44 Public pensions								
Vol	45 Occupational pensions								
Vol	46 Private mandatory pensions								
Vol	47 Private non-mandatory pensions								
Vol	48 Total benefit ratio								
<b>3 - GROSS AVERAGE REPLACEMENT RATES (at retirement)</b>									
49 Public pensions (earnings related)									
Vol	50 Occupational pensions								
51 Private mandatory pensions									
Vol	52 Private non-mandatory pensions								
Vol	53 Total gross replacement rate								
<b>4 - NUMBER OF PENSIONS (in 1000)</b>									
54 Public pensions									
Of which:									
55 aged -54									
56 aged 55-59									
57 aged 60-64									
58 aged 65-69									
59 aged 70-74									
60 aged 75+									
61 Old-age and early pensions									
62 Of which: earnings-related pensions									
63 Private sector employees									
64 Public sector employees									
65 Disability									
66 Other pensions (survivors)									
Vol	67 Occupational scheme								
Vol	68 Private scheme								
Vol	69 Mandatory private scheme								
Vol	70 Non-mandatory private scheme								
71 Non-earning-related minimum pensions									
72 All pensions									
Of which:									
Vol	73 aged -54								
Vol	74 aged 55-59								
Vol	75 aged 60-64								
Vol	76 aged 65-69								
Vol	77 aged 70-74								
Vol	78 aged 75+								

*Source:* Commission services, EPC.

## Annex II: Coverage of pension projections and open issues with respect to Member States' projection coverage

The core of the projection exercise is *the government expenditure on pensions for both the private and public sectors*. Data on occupational schemes, private schemes (mandatory and non-mandatory), replacement rates (at retirement), benefit ratio and net pension expenditures have been provided on a voluntary basis. In line with previous exercises, the members of the AWG agreed to provide pension projections for the following 4 items on a mandatory basis:

- Gross pension expenditure
- Number of pensions/pensioners in public pension schemes
- Number of contributors to public pension schemes
- Contributions to public pension schemes

In contrast to the 2009 exercise, Member States also agreed to provide mandatory data on:

- Gross pension expenditure by age groups
- Gross average replacement rates (in public schemes and private mandatory schemes)
- Number of pensioners in public pension schemes by age and gender group
- Number of pensions in public schemes by age group

In addition, as in the 2009 exercise, Member States could cover on a voluntary basis:

- Occupational and private (mandatory and non-mandatory) pension expenditure
- Number of pensions/pensioners in occupational and private (mandatory and non-mandatory) schemes

- Number of contributors to occupational and private (mandatory and non-mandatory) schemes
- Contributions to occupational and private (mandatory and non-mandatory) schemes
- Benefit ratios
- Net pension expenditure

The Commission and the AWG decided that, for the 2012 pension projection exercise, Member States can provide on a voluntary basis:

- Assets of pension funds and reserves

Moreover, in order to simplify the reporting exercise, and considering that figures on net pension can be provided, the AWG agreed that Member States do not report projections on the following item:

- Taxes on pension

Finally, the members of the AWG agreed that, for the 2012 exercise, projections should encompass more variables, mainly with respect to:

- Public earning-related pension expenditure for new pensions.

In the previous pension projection exercise in 2009, several improvements were introduced in comparison to the 2006 Ageing Report that form a solid point of departure for the current round of projections. Still, a few changes in the 2012 pension reporting framework were introduced. In general, all of the amendments reflect the need to better understand recent developments and the expected changes over the projection period as regards the main features of the pension systems in the Member States. They mainly stem from the following considerations:



- The willingness to improve the information disclosure of the reporting framework and to enhance the transparency and the reliability of the projections by allowing for consistency and internal coherence checks.

- The disaggregation of the projected annual flow of earnings-related pensions to new pensions in their main drivers was introduced in the projection questionnaire for the first time in this projection round. It contributes to the understanding of the future functioning of pension systems and is a value added to the transparency of the projection exercise. It was agreed to introduce some flexibility in the reporting of the breakdown of the expenditure drivers for new pensions and coverage rates to cater for country specificities.

- Projections on contribution years and accrual rates help providing a clearer picture of the future drivers of the expenditure and the viability of the pension systems. Projected accrual rates might change over time and across different types of pensions. Pensionable earnings are essential to evaluate consistency between the development of pension expenditure and accruals.

- Many countries have introduced pension reforms that will increase the retirement age. To better understand the impact of these reforms on the coverage, and thus on pension spending, the reporting framework for the number of pensions and pensioners is extended to cover a wider range of current and future statutory (and effective) retirement and effective retirement age. The same information allows identifying the driving forces behind the projected dynamics of the benefit ratio and how they are affected by pension reforms.

- The distribution of pensioners by age and gender groups helps to increase consistency with projections of population and labour force across countries and over the projection period (as both statutory retirement and effective retirement age vary across countries and will change over time).

On this basis, the 2012 pension reporting framework has expanded compared with the 2009 version. In particular, Member States have agreed to provide information on public earnings-related pensions for new pensioners and their main driver, on pension expenditure and pensions by age group and data on pensioners broken-down by age and gender (taking into account difficulties arising from double-counting that may undermine comparability).

In order to ensure high quality and comparability across country-specific pension projection results, an in-depth peer review was carried out for all pension projections provided by the Member States. The projection results were discussed by the AWG and the European Commission (DG ECFIN) during the projection exercise and revised where deemed necessary.

It was found that in some cases there was a need for providing additional information in the country fiches as well as in the projection questionnaires so as to better understand the different pensions systems and notably the dynamics of the projection results. [Table 2. 24](#) provides an overview of those Member States with remaining open issues in their pension projections that have not been addressed after the peer review and before the finalisation of the Ageing Report 2012.

**Table 2. 24 - Open issues with respect to Member States' projection coverage**

Country	Open issues not addressed in pension projections after peer review
DK	No agreement on the appropriate number of pensioners by age group was found between the Danish delegation and the AWG.
MT	New pensions expenditure decomposition missing. Expenditure by age group missing.
PL	New pensions expenditure decomposition missing.
UK	New pensions expenditure decomposition missing. Incomplete public sector pension coverage.

**Source:** Commission services.

## Annex III: Detailed overview of indexation rules

**Table 2. 25 - Legal indexation rules in EU Member States**

	LEGAL INDEXATION						Occupational pension scheme		Private pension scheme	
	Public pensions					Mandatory private scheme			Voluntary Pension scheme	
	Minimum pension / social allowance	Old-age pensions	Early retirement pensions	Disability pensions	Survivors' pensions					
BE	CPI + LSA (up to 2012 YD)	CPI + LSA (up to 2012 YD)	CPI + LSA (up to 2012 YD)	CPI + LSA (up to 2012 YD)	CPI + LSA (up to 2012 YD)	-	-	-		
BG	50% CPI + 50% NI (only as of 2013)	50% CPI + 50% NI (only as of 2013)	50% CPI + 50% NI (only as of 2013)	50% CPI + 50% NI (only as of 2013)	50% CPI + 50% NI (only as of 2013)	NR	NR	NR		
CZ	NR	CPI + min 1/3 RI	CPI + min 1/3 RI	CPI + min 1/3 RI	CPI + min 1/3 RI	-	-	-		
DK	NI	NI	NI	NI	NI	-	-	-		
DE	70% CPI + 30% net wages per capita	NI + sust	NI + sust	NI + sust	NI + sust	-	-	-		
EE	80% ST + 20% CPI	80% ST + 20% CPI	80% ST + 20% CPI	80% ST + 20% CPI	80% ST + 20% CPI	-	-	-		
IE	NR	NR	NR	NR	NR	NR - pub	-	-		
EL	until 2015: YD, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: YD, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: YD, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: YD, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: YD, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	-	-	-		
ES	CPI	CPI	CPI	CPI	CPI	-	-	-		
FR	CPI	CPI	CPI	CPI	CPI	-	-	-		
IT	CPI ; lump-sums fixed in nominal terms	CPI - size	CPI - size	CPI - size	CPI - size	-	-	-		
CY	NI	Basic: NI; Suppl.: CPI	Basic: NI; Suppl.: CPI	Basic: NI; Suppl.: CPI	Basic: NI; Suppl.: CPI	NI - pub	-	-		
LV	up to 2009: CPI + 50% RI; 2009-2013: NR; as of 2014: CPI	up to 2009: CPI + 50% RI; 2009-2013: NR; as of 2014: CPI	up to 2009: CPI + 50% RI; 2009-2013: NR; as of 2014: CPI	up to 2009: CPI + 50% RI; 2009-2013: NR; as of 2014: CPI	up to 2009: CPI + 50% RI; 2009-2013: NR; as of 2014: CPI	-	-	-		
LT	NR	NR	NR	NR	NR	-	-	NR		
LU	CPI if CPI>2.5% & RI re-exam(2)	CPI if CPI>2.5% & RI re-exam(2)	CPI if CPI>2.5% & RI re-exam(2)	CPI if CPI>2.5% & RI re-exam(2)	CPI if CPI>2.5% & RI re-exam(2)	-	-	-		
HU	-	min 100% CPI	min 100% CPI	min 100% CPI	min 100% CPI	-	min 100% CPI	-		
MT	COLA	COLA or NI in previous job (born before 1962); 70% NI + 30% CPI (born after 1962)	-	COLA or NI in previous job (born before 1962); 70% NI + 30% CPI (born after 1962)	COLA or NI in previous job (born before 1962); 70% NI + 30% CPI (born after 1962)	-	-	-		
NL	NI	NI	-	NI	NI	CPI/NI (depending on scheme)	-	-		
AT	CPI	CPI	CPI	CPI	CPI	-	-	-		
PL	CPI + 20% RI	CPI + 20% RI	CPI + 20% RI	CPI + 20% RI	CPI + 20% RI	-	NR	NR		
PT	CPI + GDP partially (real growth of GDP and size of growth)	CPI + GDP partially (real growth of GDP and size of growth); 2010-2013 suspended	CPI + GDP partially (real growth of GDP and size of growth); 2010-2013 suspended	CPI + GDP partially (real growth of GDP and size of growth); 2010-2013 suspended	CPI + GDP partially (real growth of GDP and size of growth); 2010-2013 suspended	CPI for some collective labour agreements and re-exam(1) for the other plans	-	-		
RO	Up to 2011: YD; as of 2012: CPI + 50% RI; as of 2030: CPI	Up to 2011: YD; as of 2012: CPI + 50% RI; as of 2030: CPI	Up to 2011: YD; as of 2012: CPI + 50% RI; as of 2030: CPI	Up to 2011: YD; as of 2012: CPI + 50% RI; as of 2030: CPI	Up to 2011: YD; as of 2012: CPI + 50% RI; as of 2030: CPI	-	NR	-		
SI	In line with pensions	NI (50% in 2010, 25% in 2011)	NI (50% in 2010, 25% in 2011)	NI (50% in 2010, 25% in 2011)	NI (50% in 2010, 25% in 2011)	NR	NR	NR		
SK	CPI	50% CPI + 50% NI	50% CPI + 50% NI	50% CPI + 50% NI	50% CPI + 50% NI	-	NR	-		
FI	CPI	80% CPI + 20%NI + sust	80% CPI + 20%NI + sust	80% CPI + 20%NI + sust	80% CPI + 20%NI + sust	-	-	-		
SE	CPI	NI + sust	NI + sust	NI + CPI	NI + CPI	-	-	-		
UK	highest of NI, CPI and 2,5%	CPI	-	-	CPI	-	-	-		
NO	NI (- 0.75pp as of 2011)	NI (- 0.75 pp as of 2011)	-	NI	NI (- 0.75 pp as of 2011)	-	-	-		

Key:		
NR	...	No rule exists
RI	...	Real income growth
NI	...	Nominal income growth
ST	...	Social tax growth
GDP	...	GDP growth
CPI	...	CPI inflation
LE	...	Adjustment to life expectancy
LSA	...	Living standard adjustment
COLA	...	Adjustment to cost of living
size	...	Adjusted by a pension size
sust	...	Additional adjustment due to other mechanisms such as a sustainability factor, balancing mechanism, life expectancy, value of a pension point, maintenance of relativity between means-tested and contributory pension, etc.
re-exam(X)	...	Reexamination of pension value every X years
min	...	At least
YD	...	Yearly decree
pub	...	Public sector

**Source:** Commission services, EPC.

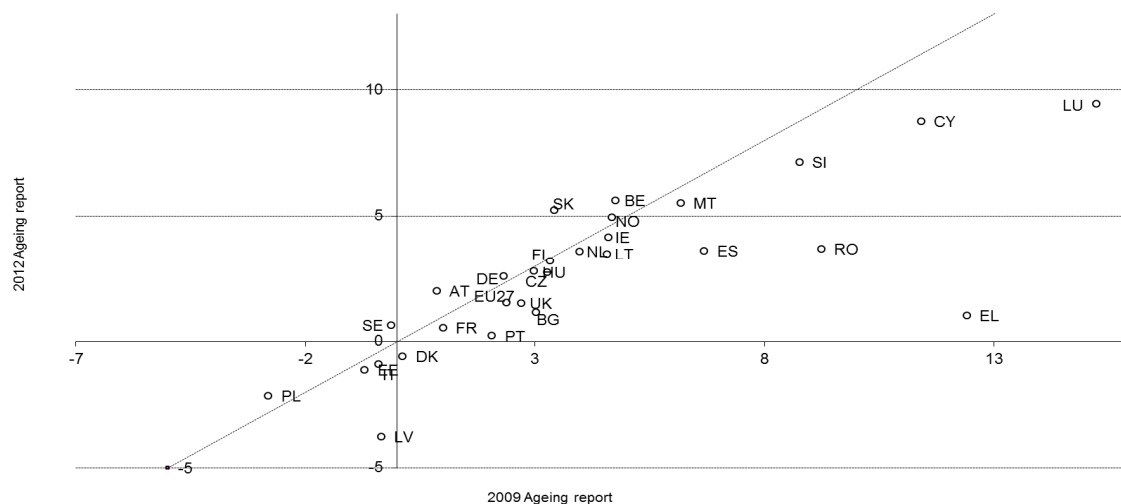
**Table 2. 26 - Indexation rules applied in the projection exercise  
(when different from the legal rule)**

	APPLIED INDEXATION									
	Public pensions						Occupational pension scheme	Private pension scheme		
	Minimum pension / social allowance	Old-age pensions	Early retirement pensions	Disability pensions	Survivors' pensions				Mandatory private scheme	Voluntary Pension scheme
CZ	NI	CPI + 1/3 RI	CPI + 1/3 RI	CPI + 1/3 RI	CPI + 1/3 RI	0	-	0	-	-
IE	NI (no indexation until 2014)	NI (no indexation until 2014)	NI (no indexation until 2014)	NI (no indexation until 2014)	NI (no indexation until 2014)	0	NI (no indexation until 2014)	0	-	-
EL	until 2015: no indexation, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: no indexation, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: no indexation, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: no indexation, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	until 2015: no indexation, as of 2015: Minimum of 1) 50% CPI + 50% GDP or 2) 100% CPI	0	-	0	-	-
ES	NI (CPI in 2011)	CPI (no indexation in 2011)	CPI (no indexation in 2011)	CPI (no indexation in 2011)	CPI (no indexation in 2011)	0	-	0	-	-
IT	CPI up to 2015; GDP per capita as of 2016					0	-	0	-	-
LT	NI (no indexation for 2011-2014)	NI (no indexation for 2011-2014)	NI (no indexation for 2011-2014)	NI (no indexation for 2011-2014)	NI (no indexation for 2011-2014)	0	-	0	-	-
LU	CPI if CPI>2.5% & RI (up to 2018: 100%, as of 2019: 50%)	CPI if CPI>2.5% & RI (up to 2018: 100%, as of 2019: 50%)	CPI if CPI>2.5% & RI (up to 2018: 100%, as of 2019: 50%)	CPI if CPI>2.5% & RI (up to 2018: 100%, as of 2019: 50%)	CPI if CPI>2.5% & RI (up to 2018: 100%, as of 2019: 50%)					
NL			-			0	35% NI & 65% CPI	0	-	-
AT	NI									
PL						0	-	0	CPI + 20% NI	-
SK	NI					0	-	0	CPI	-
FI	50 % CPI + 50 % to NI as of 2015					0	-	0	-	-
SE	Up to 2014: CPI; as of 2015: NI	NI	NI	NI	NI	0	-	0	-	-

**Source:** Commission services, EPC.

## Annex IV: Comparison with the 2009 round of projections based on 2007 as reference year for the 2009 Ageing report

**Graph 2. 24 - Change in the public pension to GDP ratio compared: 2009 Ageing Report (2007-2060) and current projection round (2010-2060) (in percentage points)**



*Source:* Commission services, EPC.

**Table 2. 27 - Comparison of public pension expenditure levels 2007/2010 and 2060 in the 2009 and 2012 projection rounds (as % of GDP)**

	AR 2009		AR 2012		AR 2009		AR2012		AR 2009		AR2012	
Country	2007	2010	2007	2010	2060	2060	2007	2060	Change 2007-2060	Change 2010-2060	2007	2060
BE	10.0	11.0	10.0	11.0	14.7	16.6	10.0	16.6	4.8	5.6	10.0	16.6
BG	8.3	9.9	8.3	9.9	11.3	11.1	8.3	11.1	3.0	1.1	8.3	11.1
CZ	7.8	9.1	7.8	9.1	11.0	11.8	7.8	11.8	3.3	2.7	7.8	11.8
DK	9.1	10.1	9.1	10.1	9.2	9.5	9.1	9.5	0.1	-0.6	9.1	9.5
DE	10.4	10.8	10.4	10.8	12.8	13.4	10.4	13.4	2.3	2.6	10.4	13.4
EE	5.6	8.9	5.6	8.9	4.9	7.7	5.6	7.7	-0.7	-1.1	5.6	7.7
IE	4.0	7.5	4.0	7.5	8.6	11.7	4.0	11.7	4.6	4.1	4.0	11.7
EL	11.7	13.6	11.7	13.6	24.1	14.6	11.7	14.6	12.4	1.0	11.7	14.6
ES	8.4	10.1	8.4	10.1	15.1	13.7	8.4	13.7	6.7	3.6	8.4	13.7
FR	13.0	14.6	13.0	14.6	14.0	15.1	13.0	15.1	1.0	0.5	13.0	15.1
IT	14.0	15.3	14.0	15.3	13.6	14.4	14.0	14.4	-0.4	-0.9	14.0	14.4
CY	6.3	7.6	6.3	7.6	17.7	16.4	6.3	16.4	11.4	8.7	6.3	16.4
LV	5.4	9.7	5.4	9.7	5.1	5.9	5.4	5.9	-0.4	-3.8	5.4	5.9
LT	6.8	8.6	6.8	8.6	11.4	12.1	6.8	12.1	4.6	3.5	6.8	12.1
LU	8.7	9.2	8.7	9.2	23.9	18.6	8.7	18.6	15.2	9.4	8.7	18.6
HU	10.9	11.9	10.9	11.9	13.8	14.7	10.9	14.7	3.0	2.8	10.9	14.7
MT	7.2	10.4	7.2	10.4	13.4	15.9	7.2	15.9	6.2	5.5	7.2	15.9
NL	6.6	6.8	6.6	6.8	10.5	10.4	6.6	10.4	4.0	3.6	6.6	10.4
AT	12.8	14.1	12.8	14.1	13.6	16.1	12.8	16.1	0.9	2.0	12.8	16.1
PL	11.6	11.8	11.6	11.8	8.8	9.6	11.6	9.6	-2.8	-2.2	11.6	9.6
PT	11.4	12.5	11.4	12.5	13.4	12.7	11.4	12.7	2.1	0.2	11.4	12.7
RO	6.6	9.8	6.6	9.8	15.8	13.5	6.6	13.5	9.2	3.7	6.6	13.5
SI	9.9	11.2	9.9	11.2	18.6	18.3	9.9	18.3	8.8	7.1	9.9	18.3
SK	6.8	8.0	6.8	8.0	10.2	13.2	6.8	13.2	3.4	5.2	6.8	13.2
FI	10.0	12.0	10.0	12.0	13.4	15.2	10.0	15.2	3.3	3.2	10.0	15.2
SE	9.5	9.6	9.5	9.6	9.4	10.2	9.5	10.2	-0.1	0.6	9.5	10.2
UK	6.6	7.7	6.6	7.7	9.3	9.2	6.6	9.2	2.7	1.5	6.6	9.2
NO	8.9	9.3	8.9	9.3	13.6	14.2	8.9	14.2	4.7	4.9	8.9	14.2
EU27	10.1	11.3	10.1	11.3	12.5	12.9	10.1	12.9	2.4	1.5	10.1	12.9
EA*	11.0	12.2	11.0	12.2	13.8	14.1	11.0	14.1	2.8	2.0	11.0	14.1

*Source:* Commission services, EPC.

*Note:* \* Different compositions in the two projection rounds.

**Table 2. 28 - Decomposition of the public pension expenditure to GDP ratio over 2007-2060 in the 2009 and over 2010-2060 in the 2012 projections (in p.p.)**

	Projection year	Dependency ratio	Coverage ratio	Employment rate	Benefit Ratio	Change 2010 - 2060 in p.p. of GDP*
BE	2009	7.4	-0.9	-0.5	-1.0	4.8
	2012	7.6	-0.9	-0.3	-0.6	5.6
BG	2009	9.1	-3.0	-0.5	-1.8	3.0
	2012	8.8	-3.9	-0.8	-2.1	1.1
CZ	2009	9.5	-3.5	-0.5	-1.2	3.3
	2012	9.3	-4.6	-0.6	-0.2	1.1
DK	2009	6.5	-4.9	-0.1	-0.5	0.1
	2012	5.9	-4.2	-0.4	-1.2	-0.6
DE	2009	7.9	-1.9	-0.8	-2.2	2.3
	2012	7.9	-1.8	-0.5	-2.2	2.6
EE	2009	4.6	-1.6	-0.2	-3.1	-0.7
	2012	6.7	-2.7	-1.1	-3.3	-1.1
IE**	2009	8.0	-2.1	-0.3	0.8	6.1
	2012	5.3	-2.0	-0.4	0.1	4.1
EL	2009	12.7	-0.4	-0.6	0.8	12.4
	2012	10.4	-3.4	-1.9	-3.6	1.0
ES	2009	10.7	-0.9	-0.9	-1.7	6.7
	2012	9.7	-0.8	-2.2	-2.3	3.6
FR	2009	8.4	-2.2	-0.5	-4.0	1.0
	2012	9.1	-3.5	-1.2	-3.1	0.5
IT	2009	10.4	-3.2	-1.1	-5.5	-0.4
	2012	9.5	-5.5	-1.3	-2.9	-0.9
CY	2009	10.8	1.6	-0.5	-0.3	11.4
	2012	10.6	2.8	-0.6	-3.4	8.7
LV	2009	5.7	-1.6	-0.2	-3.9	-0.4
	2012	7.0	-1.9	-1.2	-6.8	-3.8
LT	2009	9.6	-2.4	0.0	-1.8	4.6
	2012	8.2	-2.9	-1.1	-0.2	3.5
LU	2009	8.4	5.2	0.0	1.2	15.2
	2012	11.2	0.3	0.1	-2.1	9.4
HU	2009	8.9	-4.6	-1.1	-2.7	-0.2
	2012	11.1	-4.3	-1.3	-1.8	2.8
MT	2009	11.3	-3.1	-0.7	-0.5	6.2
	2012	11.3	-2.6	-1.5	-1.0	5.5
NL	2009	6.6	-1.5	-0.2	-0.6	4.0
	2012	6.0	-1.0	-0.2	-0.8	3.6
AT	2009	9.9	-2.6	-0.5	-5.0	0.9
	2012	11.0	-2.9	-0.6	-4.5	2.0
PL	2009	13.4	-6.3	-1.0	-7.1	-2.8
	2012	14.0	-5.0	-0.4	-8.7	-2.2
PT	2009	9.8	-1.7	-0.6	-4.5	2.1
	2012	10.4	-2.5	-1.0	-5.5	0.2
RO	2009	13.6	-4.9	0.3	1.7	9.2
	2012	12.9	-4.7	0.4	-3.7	3.7
SI	2009	13.7	-3.5	-0.1	-0.7	8.8
	2012	12.8	-3.1	-1.0	-0.9	7.1
SK	2009	11.7	-3.9	-0.6	-2.4	3.4
	2012	13.5	-3.9	-0.5	-2.8	5.2
FI	2009	8.7	-3.1	-0.6	-0.9	3.3
	2012	8.6	-3.2	-0.5	-0.9	3.2
SE	2009	5.6	-0.4	-0.4	-4.3	-0.1
	2012	5.0	-0.8	-0.5	-2.7	0.6
UK**	2009	4.2	-1.4	-0.3	0.5	2.7
	2012	3.1	-1.4	-0.2	0.8	1.5
NO	2009	8.2	-1.2	0.3	-2.4	4.7
	2012	8.0	-1.1	0.0	-1.6	4.9
EU27	2009	8.7	-2.6	-0.7	-2.4	2.4
	2012	8.5	-2.9	-0.8	-2.7	1.5

**Source:** Commission services, EPC.

**Note:** \* 2007-2060 for 2009 projections; \*\* IE, UK: Decomposition excluding IE public service occupational and UK public service pensions.

## Abbreviations and symbols used

### Member States

BE	Belgium
BG	Bulgaria
CZ	Czech Republic
DK	Denmark
DE	Germany
EE	Estonia
EI	Ireland
EL	Greece
ES	Spain
FR	France
IT	Italy
CY	Cyprus
LV	Latvia
LT	Lithuania
LU	Luxembourg
HU	Hungary
MT	Malta
NL	Netherlands
AT	Austria
PL	Poland
PT	Portugal
RO	Romania
SI	Slovenia
SK	Slovakia
FI	Finland
SE	Sweden
UK	United Kingdom
EA	Euro area
EA17	Euro area, 17 Member States
EU	European Union
EU25	European Union, 25 Member States (excl. BG and RO)
EU27	European Union, 27 Member States
EU15	European Union, 15 Member States before 1 May 2004
EU12	European Union, 12 Member States that joined the EU on and after 1 May 2004 (BG, CZ, EE, CY, LV, LH, HU, MT, PL, RO, SI, SK)

### Others

2009 AR	2009 Ageing Report
2012 AR	2012 Ageing Report
ADL	Activity of daily living
AWG	Ageing Working Group
AMECO	Macro-economic database of the European Commission
COFOG	Classification of the functions of government
CPI	Consumer price index
CSM	Cohort Simulation Model/Method
DB	Defined benefits
DC	Defined contributions

DG ECFIN	Directorate-General Economic and Financial Affairs
ECB	European Central Bank
ECOFIN	Economic and Financial Council
EPC	Economic Policy Committee
ESA(95)	European System of National and Regional Accounts
ESSPROS	European System of Integrated Social Protection Statistics
EU KLEMS	European database on capital, labour, energy, material and services
EUR	Euro
EUROPOP2008	Eurostat demographic projections 2007-2060
EUROPOP2010	Eurostat demographic projections 2010-2060
EU-SILC	European Union Statistics on Income and Living Conditions
GDP	Gross domestic product
GDR	German Democratic Republic
HC	Health care
ICT	Information and communications technology
IMF	International Monetary Fund
ISCED	International Standard Classification of Education
LTC	Long-term care
MS	Member State(s)
MTO	Medium-term budgetary objective
NAWRU	Non accelerating wage rate of unemployment
NDC	Non defined contributions
NDD	Non demographics drivers
OECD	Organisation of Economic Co-operation and Development
p.p.	Percentage points
PAYG system	Pay-as-you-go system
RAMS	Recently acceded Member States
SHA	System of Health Accounts
TFP	Total factor productivity
TFR	Total fertility rate
UB	Unemployment benefits
UN	United Nations
WHO	World Health Organization

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