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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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.[1] 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.

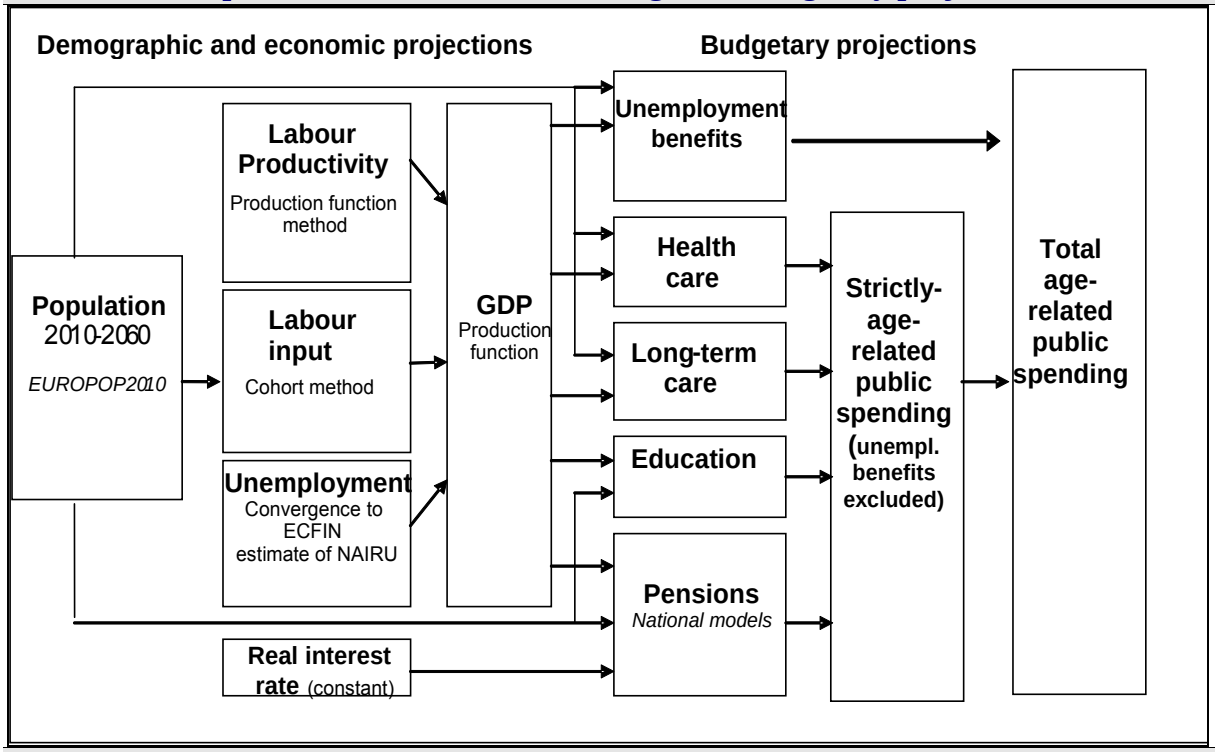
This is the fourth time since 2001 that long-run economic and budgetary projections aimed at assessing the impact of ageing population have been released. This projection exercise builds

[1] 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.

Graph 1 - Overview of the 2012 long-term budgetary projections



Source: Commission services, EPC.

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.[2] 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

[2] 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")[3] 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.[4] Finally, given the current juncture of financial and economic crisis, there is also considerable uncertainty concerning medium-term economic developments.

[3] By comparison, this was the only definition considered in the 2009 Ageing Report.

[4] 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.[5] 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[6], a slightly lower increase is projected, from 1.57 in 2010 to 1.68 in 2060.[7]

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.

[5] 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.

[6] BE, DE, EE, IE, EL, ES, FR, IT, CY, LU, MT, NL, AT, PT, SI, SK and FI.

[7] 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"[8], 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.

[8] 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. [9]

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.

[9] 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[10] (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

[10] 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. [11] 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…

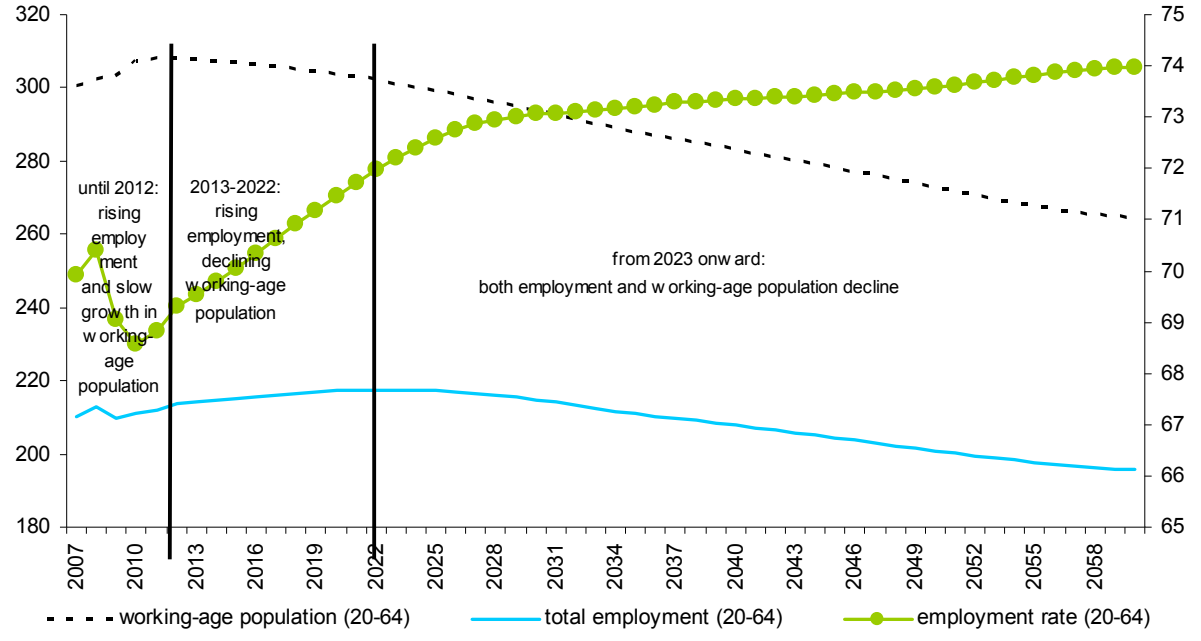
As a result of the population projection, the labour force projection and the unemployment rate assumptions, the total employment rate (for individuals aged 20 to 64) in the EU27 is projected to increase from 68 ½ % in 2010 to 71 ½ % in 2020 and to 74% in 2060. In the euro area, a similar development 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.

[11] 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 ¼ % 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).

Graph 2 - Population and employment developments, EU



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.[12] 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.

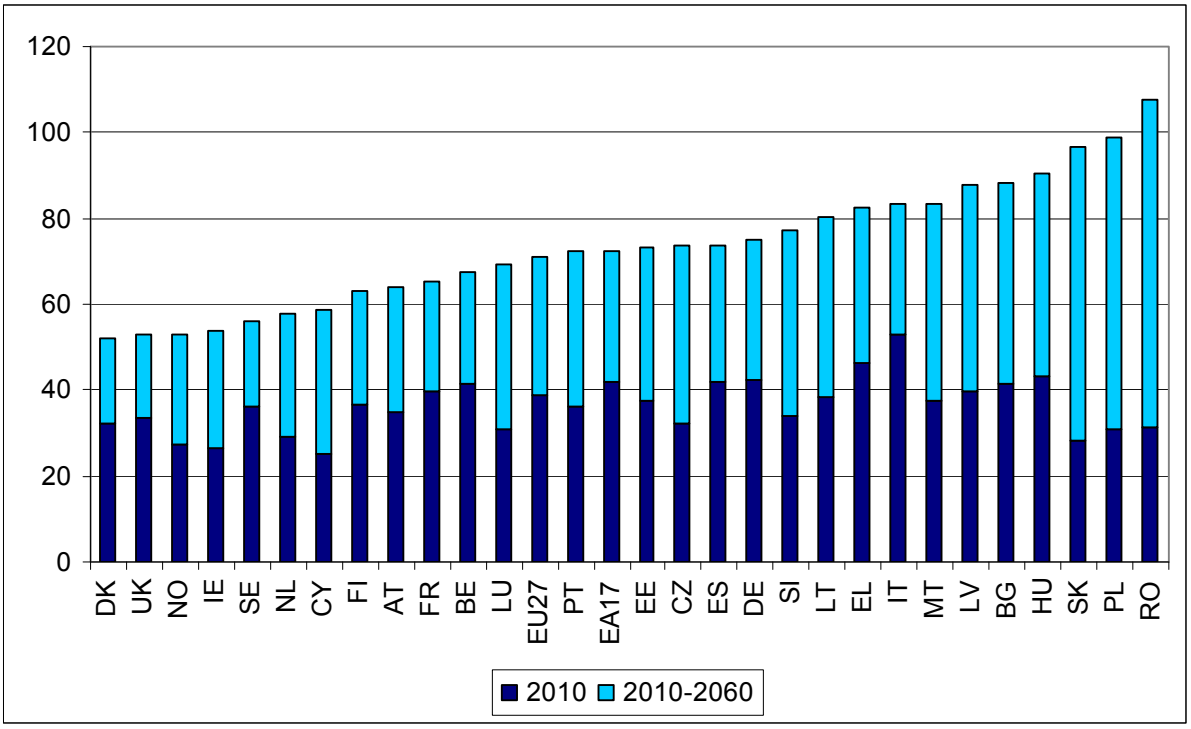
The ratio of elderly non-workers to workers will rise steeply

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.

[12] 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[13] of 1% (which represents a downward revision of 0.1 p.p. relative to the assumption made in the previous round).[14] 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.

[13] Annual average TFP growth in the EU, proxied by EU15, over 1971-2010.
[14] 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[15], 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

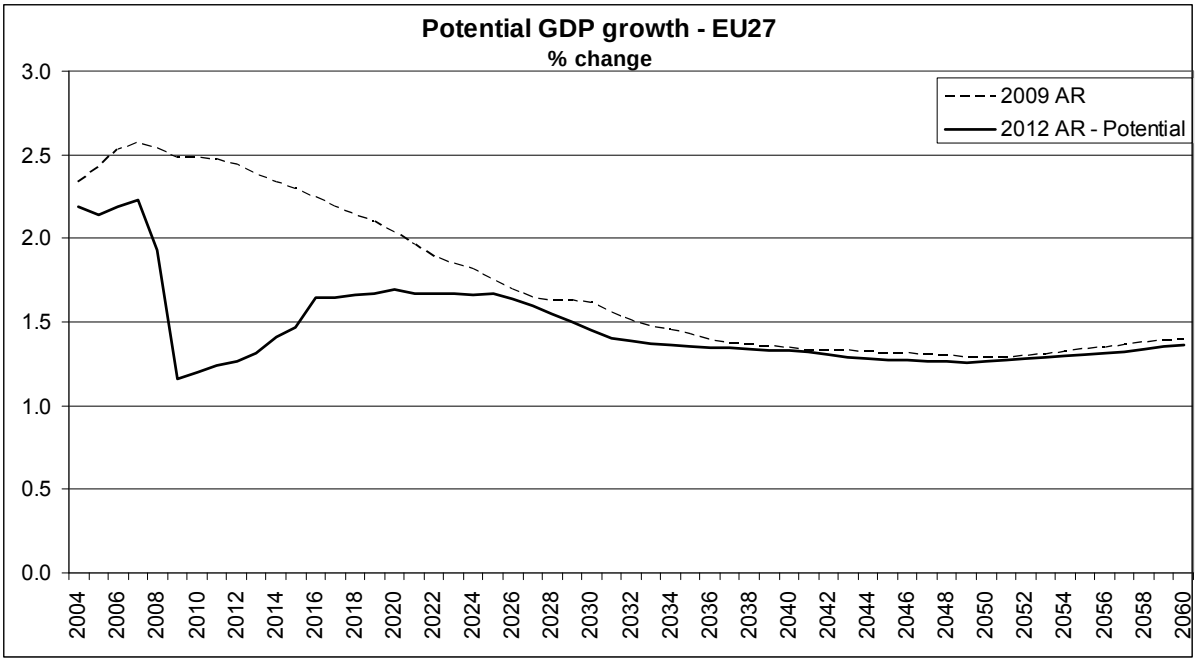
Following the largest economic crisis in many decades, potential GDP growth has been revised downwards in 2010 and the surrounding years, compared with the baseline projection in the 2009 Ageing Report (see Graph 4). The current projections indicate that potential growth in the EU as a whole should only 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 ¾ p.p. lower than the 2009 Ageing Report projection. For the euro area, a slightly

[15] 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.[16]

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.[17]

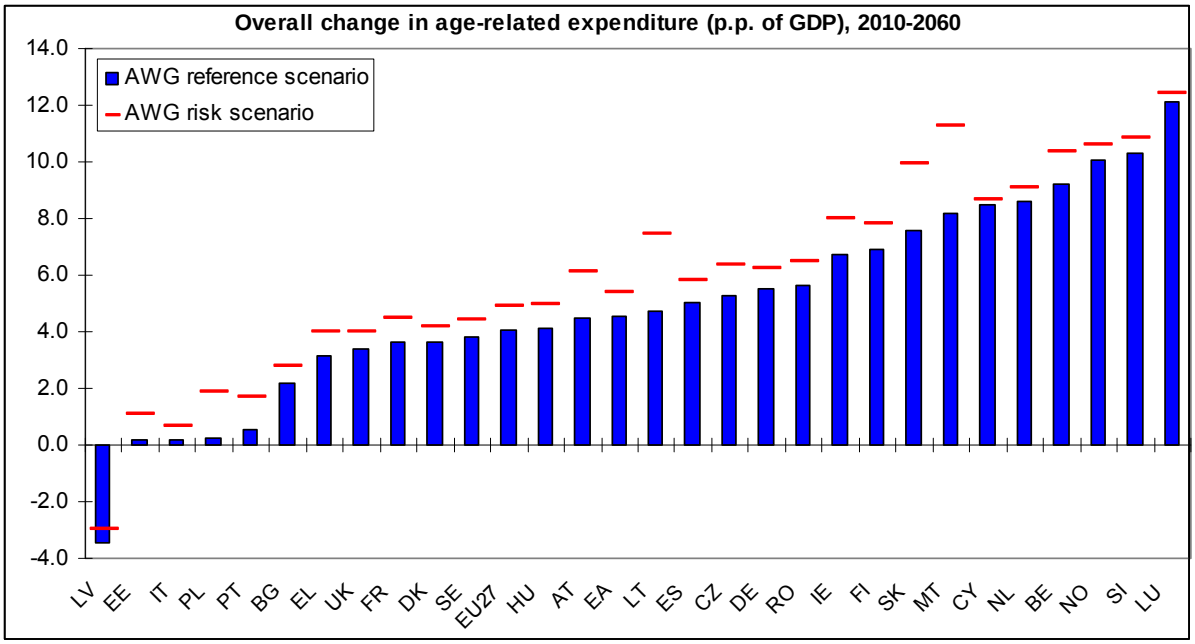
Strictly-age-related public expenditure is projected to increase on average by 4.1 percentage points of GDP by 2060 in the EU - and by 4.5 percentage points in the euro area (see Table 1) in the AWG reference scenario. Most of the projected increase in public spending over the period 2010-2060 will be 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).

[16] 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.

[17] 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[18], 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

[18] 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.[19]
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.

[19] 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																		Total age-related items		
	Pensions			Health care					Long-term care					Education			Unemployment benefits					
	Level	Change		Level	Change				Level	Change				Level	Change		Level	Change				
					Reference scenario		Risk scenario			Reference scenario		Risk scenario								2012 AR*	2009 AR*	
	2010	2010-2020	2010-2060	2010	2010-2020	2010-2060	2010-2020	2010-2060	2010	2010-2020	2010-2060	2010-2020	2010-2060	2010	2010-2020	2010-2060	2010	2010-2020	2010-2060	Change 2010-2060		
BE	11.0	2.1	5.6	6.3	0.1	0.4	0.2	0.8	2.3	0.4	2.7	0.5	3.5	5.7	0.0	0.5	2.1	-0.1	-0.1	9.1	6.6	BE
BG	9.9	-0.7	1.1	4.3	0.2	0.5	0.5	1.1	0.5	0.0	0.3	0.0	0.4	3.5	-0.1	0.2	0.4	-0.1	-0.2	2.0	3.2	BG
CZ	9.1	-0.4	2.7	6.9	0.4	1.7	0.7	2.4	0.8	0.1	0.7	0.1	1.0	3.4	0.0	0.2	0.4	-0.1	-0.1	5.2	6.3	CZ
DK	10.1	0.7	-0.6	7.4	0.4	0.9	0.5	1.5	4.5	0.3	3.5	0.3	3.5	7.6	0.0	-0.2	0.7	0.0	0.0	3.6	2.2	DK
DE	10.8	0.1	2.6	8.0	0.6	1.4	0.9	2.0	1.4	0.3	1.7	0.3	1.8	3.9	-0.5	-0.2	1.0	-0.3	-0.3	5.2	5.1	DE
EE	8.9	-1.2	-1.1	5.2	0.2	1.1	0.5	1.8	0.5	0.0	0.3	0.1	0.5	5.2	0.0	0.0	0.6	-0.1	-0.2	0.0	-0.1	EE
IE	7.5	1.4	4.1	7.3	0.0	1.1	0.1	1.7	1.1	0.2	1.5	0.2	2.1	6.3	0.8	0.0	2.6	0.5	-1.3	5.4	8.7	IE
EL	13.6	0.2	1.0	6.5	-0.1	0.9	-0.1	1.2	1.4	0.2	1.2	0.2	1.8	3.9	-0.2	0.1	0.6	0.0	-0.2	2.9	16.0	EL
ES	10.1	0.5	3.6	6.5	0.0	1.3	0.2	1.9	0.8	0.0	0.7	0.1	0.8	4.2	-0.1	-0.5	2.0	0.5	-1.1	3.9	8.3	ES
FR	14.6	-0.2	0.5	8.0	0.4	1.4	0.7	2.1	2.2	0.4	2.1	0.4	2.2	5.0	-0.2	-0.4	1.7	-0.3	-0.6	3.1	2.2	FR
IT	15.3	-0.8	-0.9	6.6	0.0	0.6	0.1	1.0	1.9	0.1	0.9	0.1	0.9	4.1	-0.4	-0.5	0.7	-0.3	-0.3	-0.1	1.6	IT
CY	7.6	1.9	8.7	2.6	0.1	0.4	0.1	0.5	0.2	0.0	0.1	0.0	0.1	6.7	-0.9	-0.7	0.5	0.0	-0.1	8.4	10.7	CY
LV	9.7	-2.5	-3.8	3.7	0.1	0.5	0.3	1.1	0.7	0.1	0.4	0.1	0.4	4.4	-0.3	-0.6	0.7	0.1	-0.3	-3.8	1.3	LV
LT	8.6	-1.1	3.5	4.9	0.3	0.7	0.5	1.3	1.2	0.1	1.1	0.3	3.2	4.4	-0.6	-0.5	0.4	0.0	-0.2	4.5	6.0	LT
LU	9.2	1.6	9.4	3.8	-0.1	0.7	0.1	1.0	1.0	0.3	2.1	0.3	2.1	3.2	-0.3	-0.1	0.6	-0.1	-0.1	12.0	18.2	LU
HU	11.9	-0.4	2.8	4.9	0.2	1.1	0.3	1.6	0.8	0.1	0.6	0.1	1.0	4.3	-0.3	-0.4	0.4	0.0	-0.1	4.0	4.0	HU
MT	10.4	0.2	5.5	5.4	0.8	2.9	1.0	3.6	0.7	0.1	0.9	0.3	3.2	5.1	-0.9	-1.1	0.4	0.0	0.0	8.2	9.2	MT
NL	6.8	0.6	3.6	7.0	0.5	1.0	0.7	1.5	3.8	0.6	4.1	0.6	4.1	5.3	-0.3	-0.1	1.6	-0.2	-0.3	8.2	9.4	NL
AT	14.1	1.0	2.0	7.4	0.5	1.6	0.8	2.2	1.6	0.2	1.2	0.3	2.3	4.9	-0.6	-0.4	0.8	-0.1	-0.1	4.4	3.3	AT
PL	11.8	-0.9	-2.2	4.9	0.4	1.9	0.7	2.6	0.7	0.1	1.0	0.2	1.9	3.9	-0.6	-0.5	0.2	-0.1	-0.1	0.1	-1.1	PL
PT	12.5	1.0	0.2	7.2	-0.4	1.1	-0.4	1.6	0.3	0.0	0.3	0.1	1.0	4.7	-0.8	-1.1	1.2	0.1	-0.4	0.1	2.9	PT
RO	9.8	-0.6	3.7	3.7	0.0	1.0	0.2	1.4	0.6	0.1	1.1	0.1	1.5	3.5	-0.3	-0.1	0.5	-0.2	-0.3	5.4	8.5	RO
SI	11.2	1.0	7.1	6.1	0.3	1.1	0.5	1.7	1.4	0.3	1.6	0.3	1.6	4.7	0.1	0.5	0.3	0.1	0.0	10.3	12.7	SI
SK	8.0	0.6	5.2	6.2	0.6	2.1	0.9	3.0	0.3	0.0	0.4	0.1	1.9	3.1	-0.3	-0.1	0.2	-0.1	-0.1	7.5	5.5	SK
FI	12.0	1.9	3.2	6.0	0.4	1.0	0.6	1.5	2.5	0.6	2.6	0.6	2.9	5.9	0.0	0.2	1.6	-0.3	-0.3	6.7	5.9	FI
SE	9.6	0.0	0.6	7.5	0.2	0.7	0.4	1.2	3.9	0.2	2.5	0.2	2.5	6.3	-0.2	0.0	0.6	0.0	0.0	3.8	2.7	SE
UK	7.7	-0.7	1.5	7.2	0.3	1.1	0.5	1.8	2.0	0.2	0.7	0.2	0.7	5.0	-0.1	0.0	0.3	0.0	0.0	3.3	4.8	UK
NO	9.3	2.3	4.9	5.8	0.3	1.2	0.5	1.7	3.8	0.1	3.9	0.2	4.0	8.5	-0.3	0.0	0.5	-0.2	-0.2	9.9	8.3	NO
EU27	11.3	-0.1	1.5	7.1	0.3	1.1	0.5	1.7	1.8	0.2	1.5	0.3	1.7	4.6	-0.3	-0.1	1.1	-0.1	-0.3	3.7	4.6	EU27
EA	12.2	0.2	2.0	7.3	0.3	1.1	0.5	1.7	1.8	0.3	1.7	0.3	1.9	4.5	-0.3	-0.2	1.3	-0.1	-0.4	4.1	5.1	EA

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.[20] 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"[21] 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.[22] 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"[23] 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.

[20] 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.
[21] 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.
[22] 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.
[23] 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.[24] 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:[25] (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

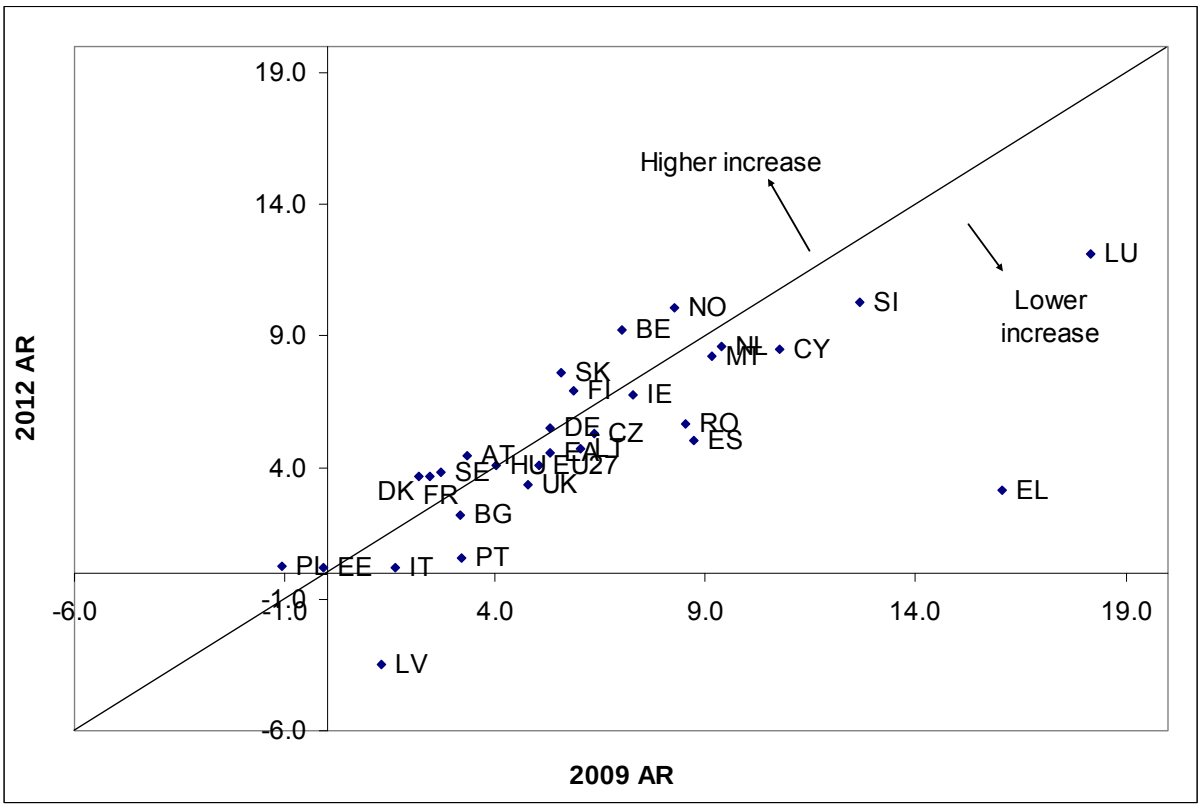
The number of unemployed persons in relation to the number of people who are working is expected to shrink over the projection period. On this basis, unemployment benefit spending in the EU is projected to be slightly lower over the long run (moving from 1.1% of GDP in 2010 to 0.7% in 2060 in the EU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

[24] 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.
[25] See 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.

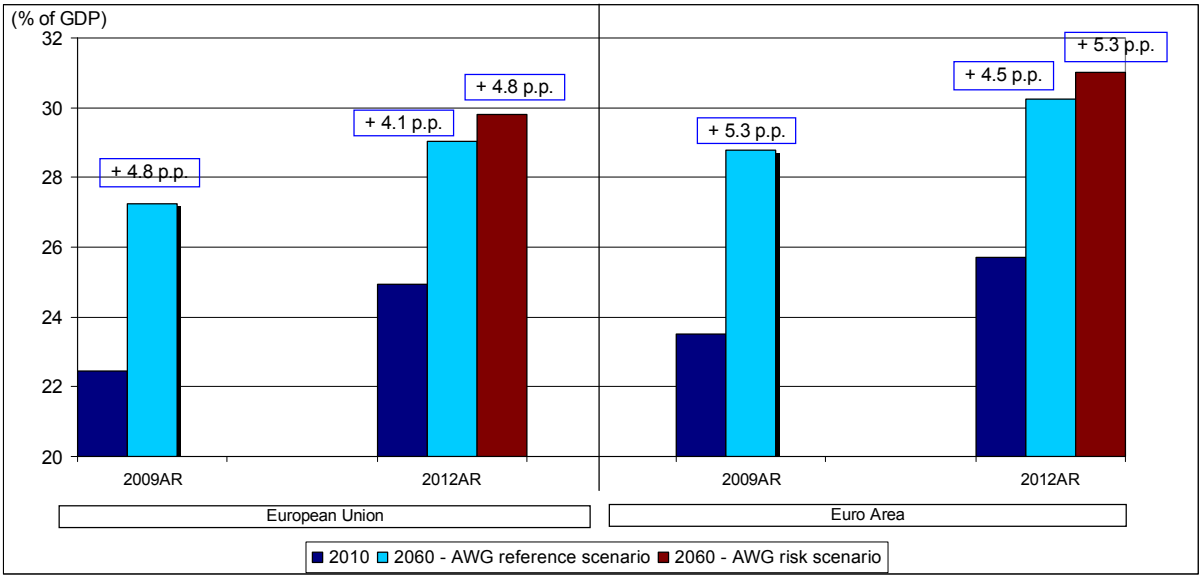
…but from a much higher level after the crisis…

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[26] 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[27]) 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).[28] 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).

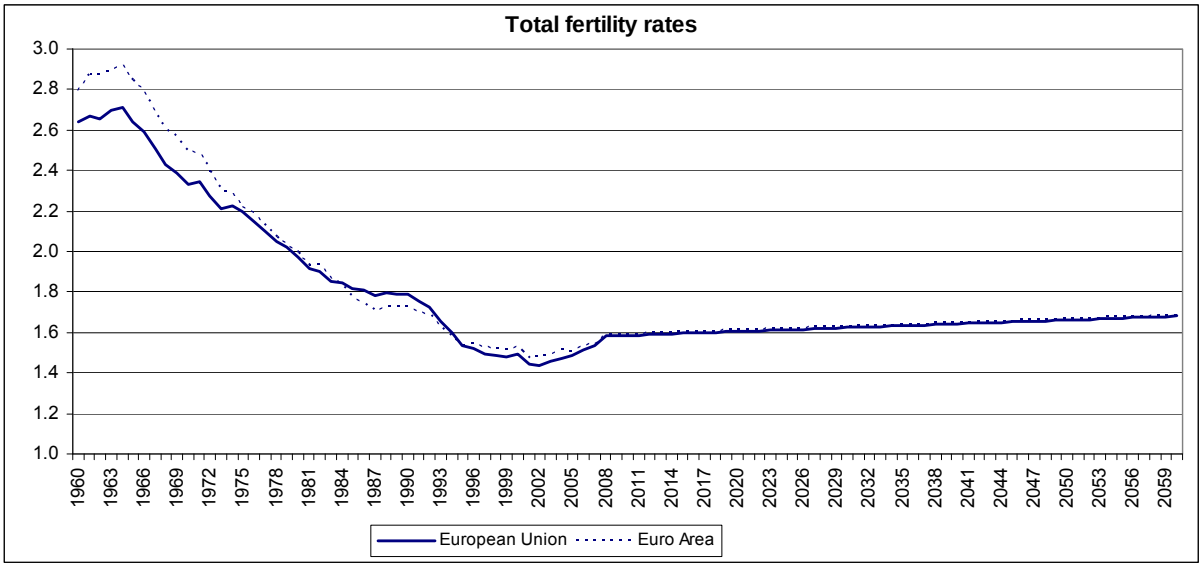
[26] See Eurostat (2011), News release 80/2011, 8 June 2011.

[27] 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).

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

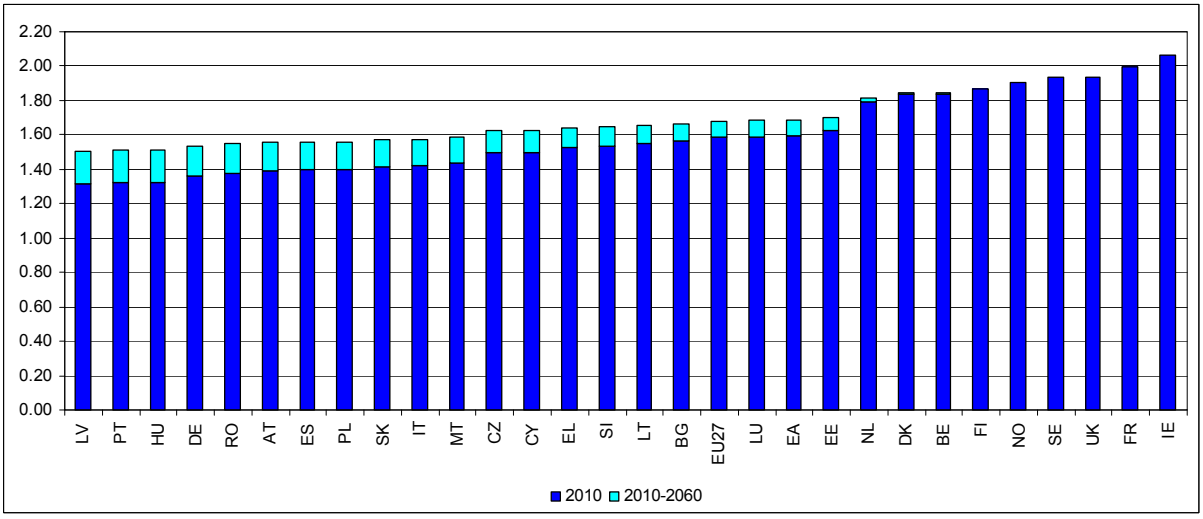
The fertility rate is projected to increase over the projection period in nearly all Member States, with the exception of Ireland, France, Sweden and the United Kingdom (though remaining above 1.9). In Belgium, Denmark and Finland it is projected to remain stable. Hence, in all countries the fertility 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.[29] 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.

[29] Since the 19th 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 19th 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 20th 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

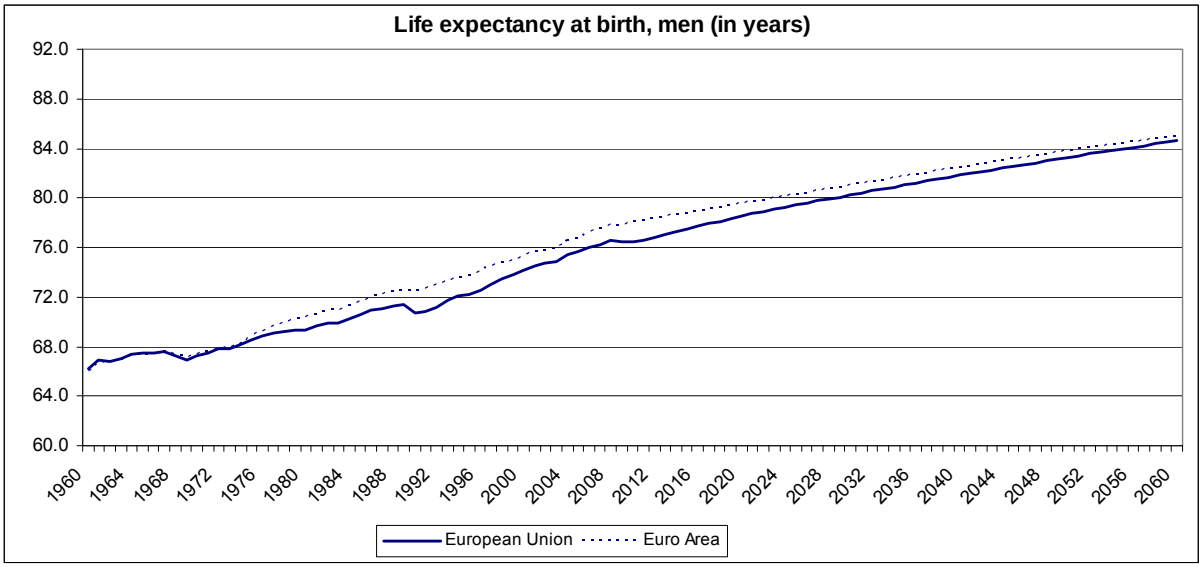
The EUROPOP2010 projection shows large increases in life expectancy at birth being sustained during the projection period, albeit with a considerable degree of diversity across Member States.

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).

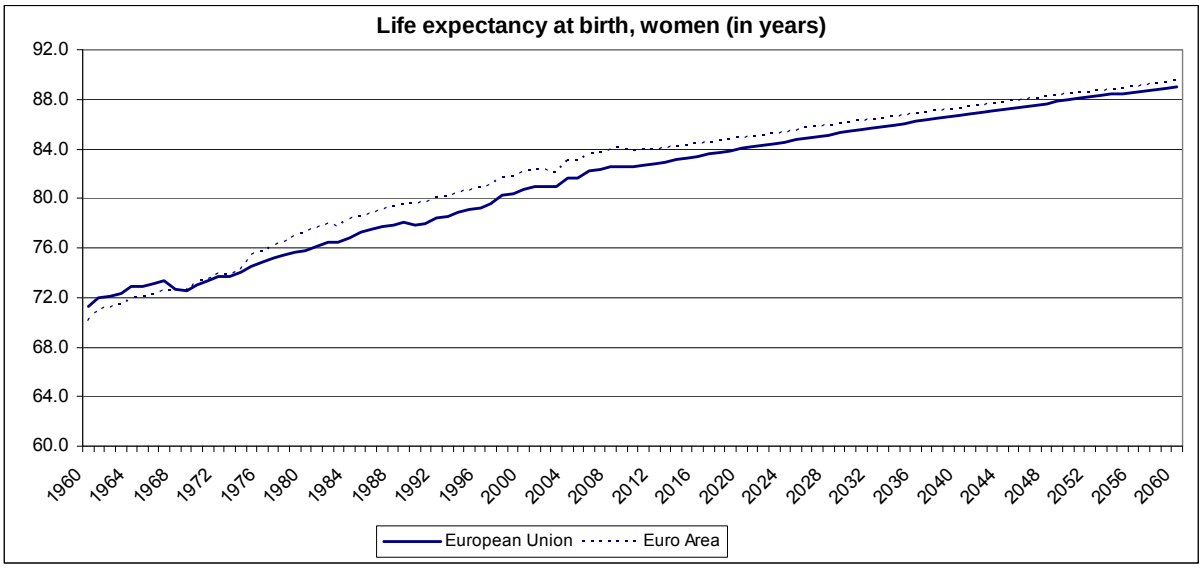
In the EU as a whole, life expectancy at age 65 is projected to increase by 5.2 years for males and by 4.9 years for females over the projection period. In 2060, life expectancy at age 65 will reach 22.4 years for males and 25.6 for females and the projected difference (3.2 years) is smaller than the 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)



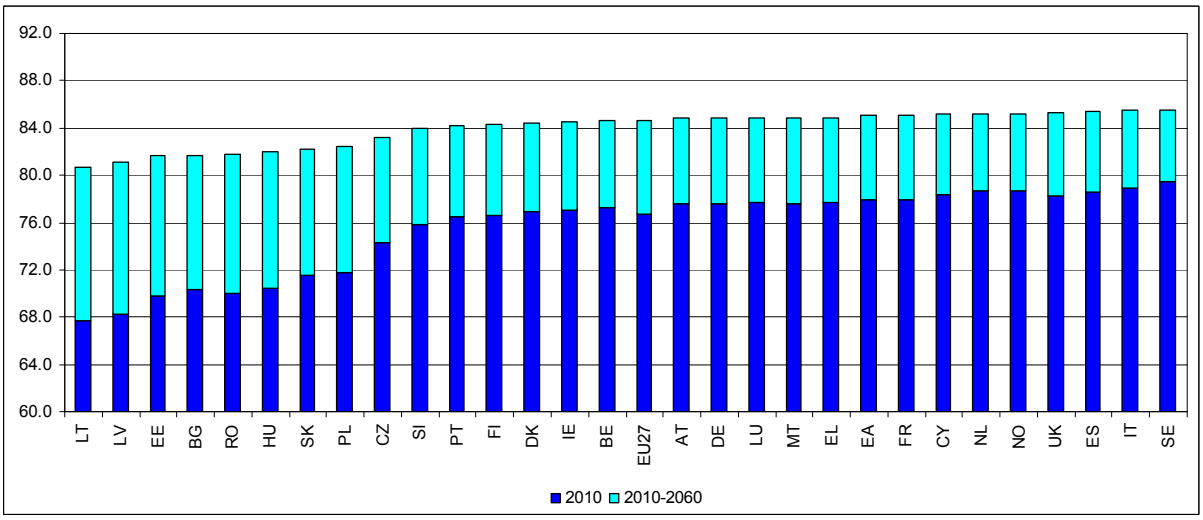
Source: Commission services, Eurostat, EUROPOP2010.

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



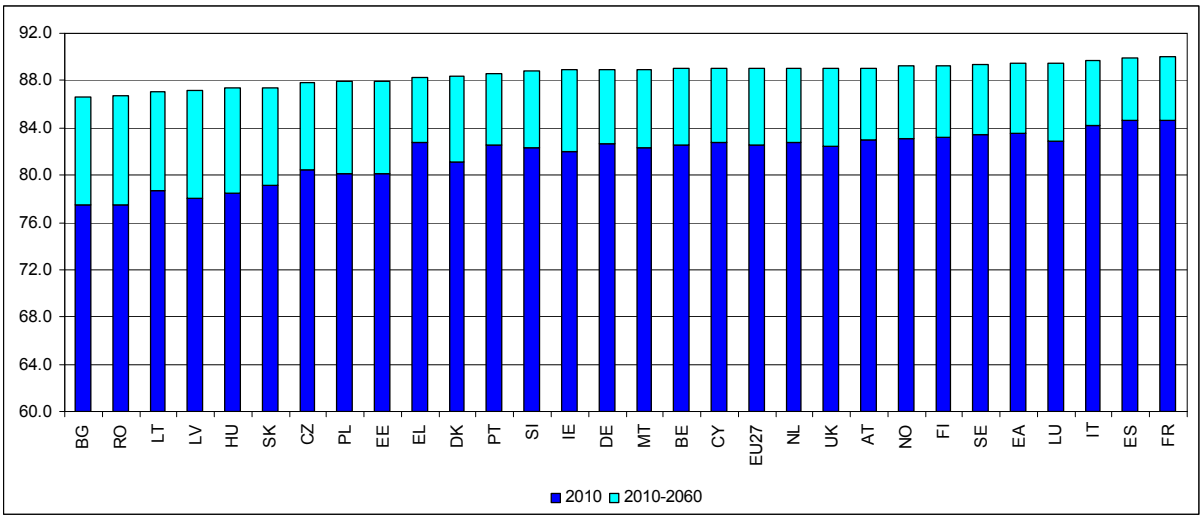
Source: Commission services, Eurostat, EUROPOP2010.

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



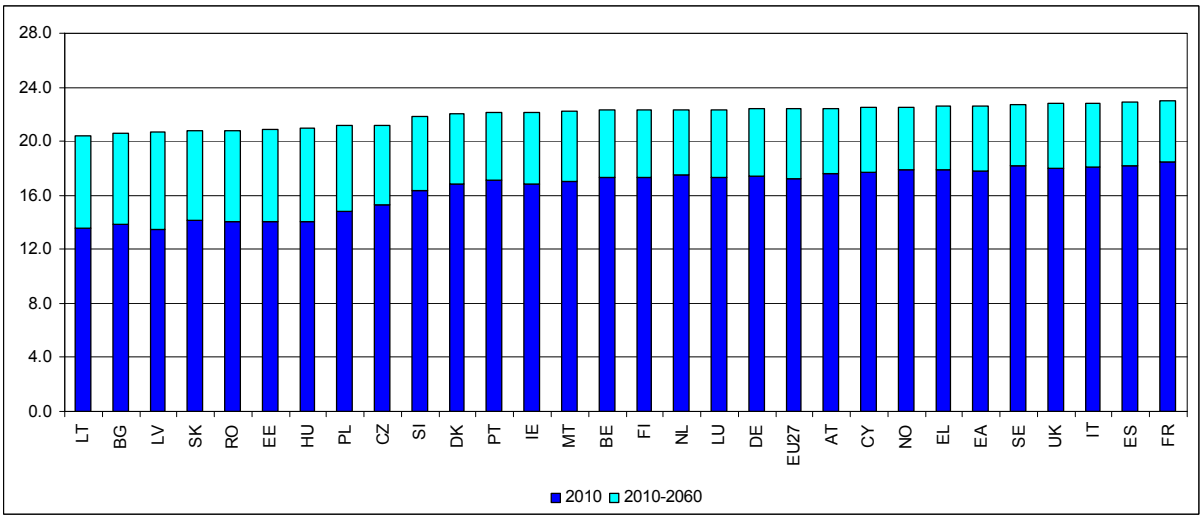
Source: Commission services, Eurostat, EUROPOP2010.

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



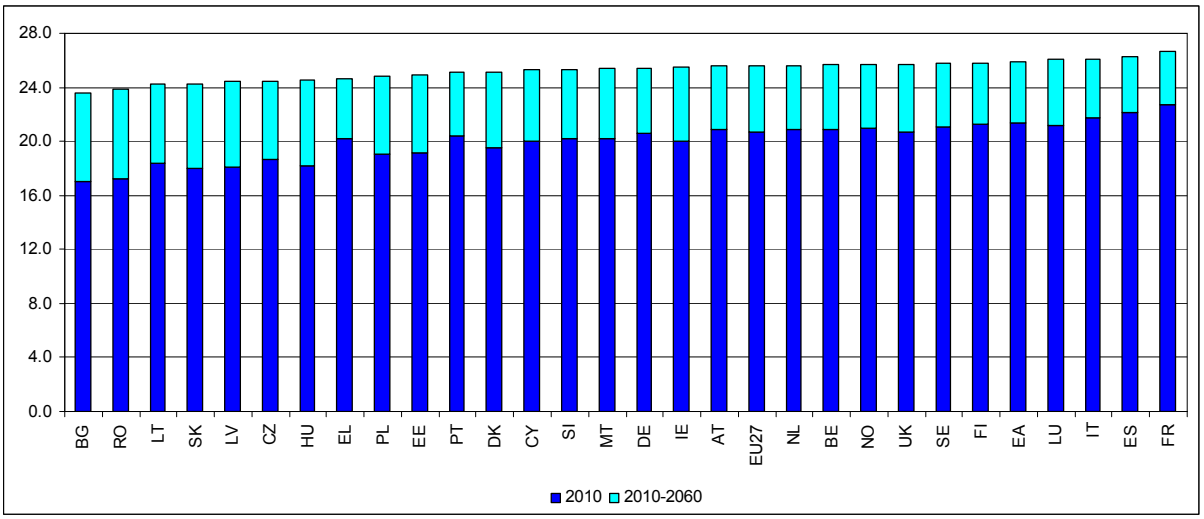
Source: Commission services, Eurostat, EUROPOP2010.

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[30] 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

[30] 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.

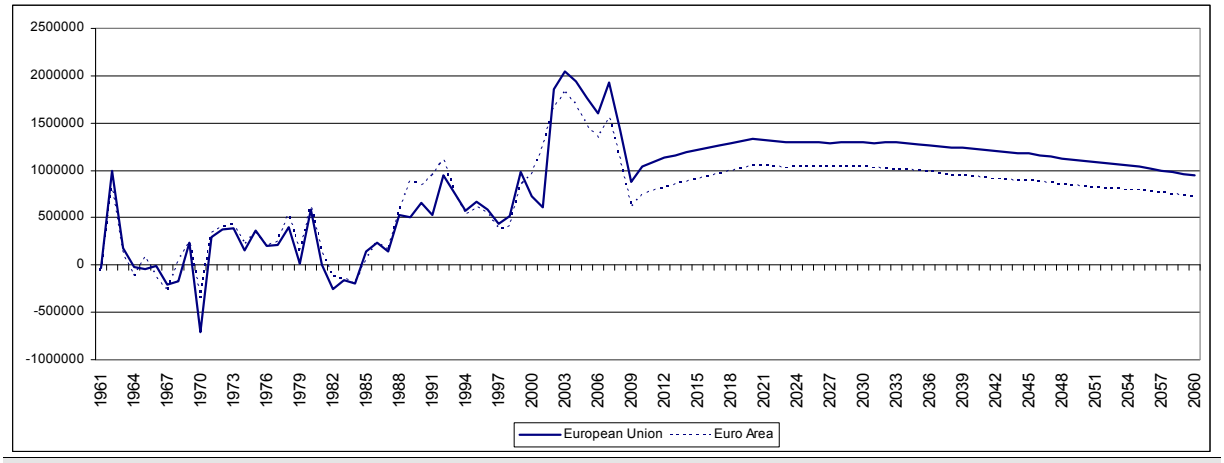
1.1.3.2. The EUROPOP2010 projection

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).

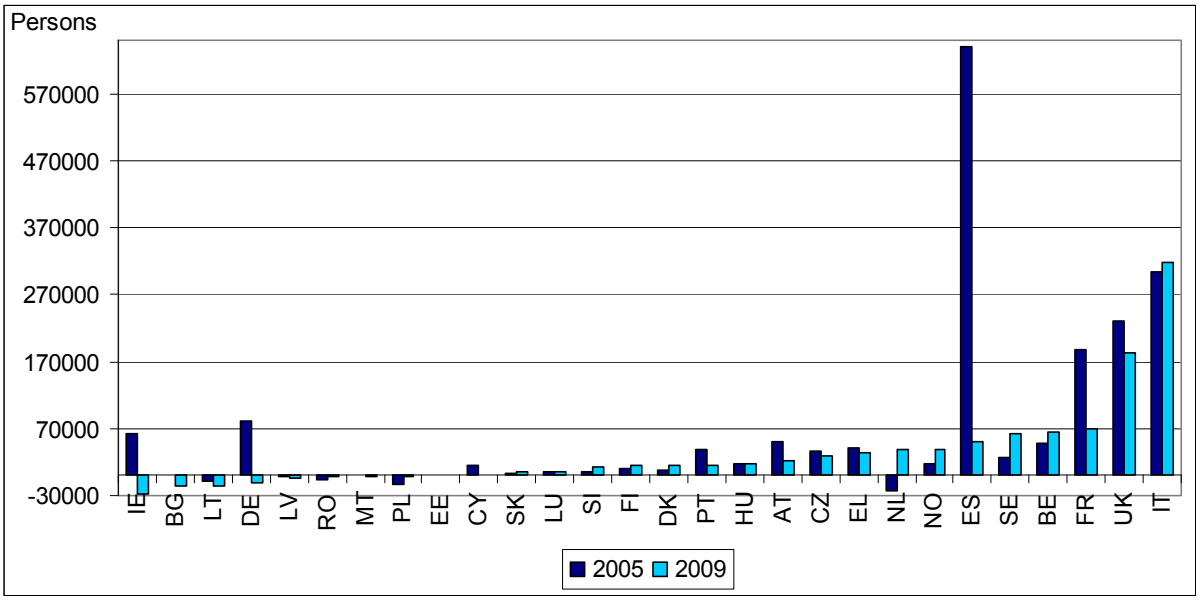
The estimation of the net migration necessary to keep the ratios of working-age population-to total population constant at their 2010 level indicates that the EU as a whole would need significant net immigration. It would amount to over 11 million additional inflows over the period 2010 to 2020, which 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



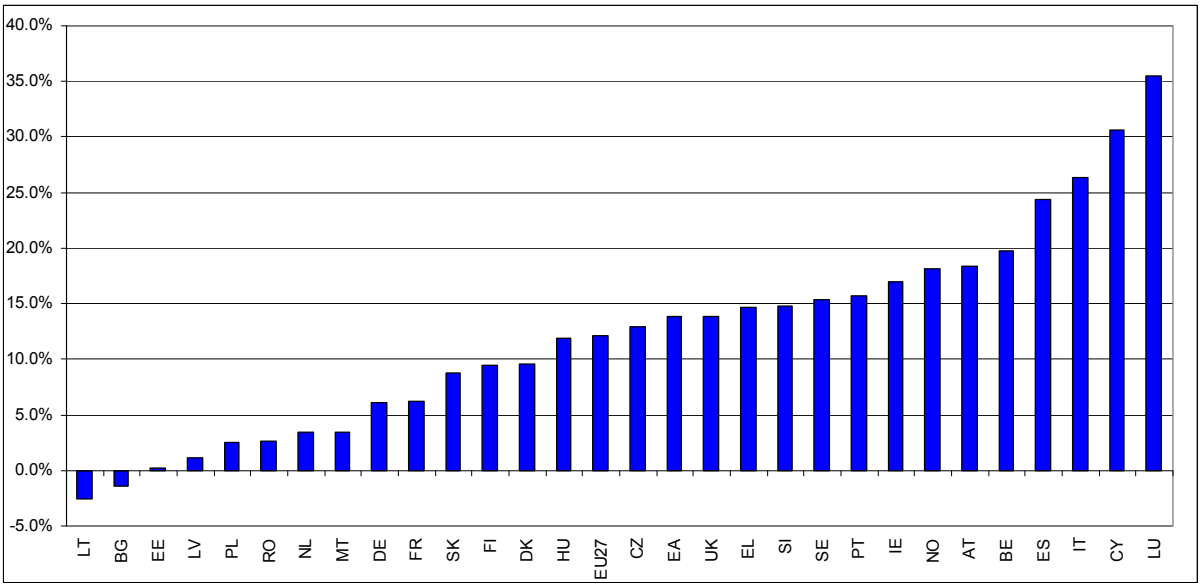
Source: Commission services, Eurostat.

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*

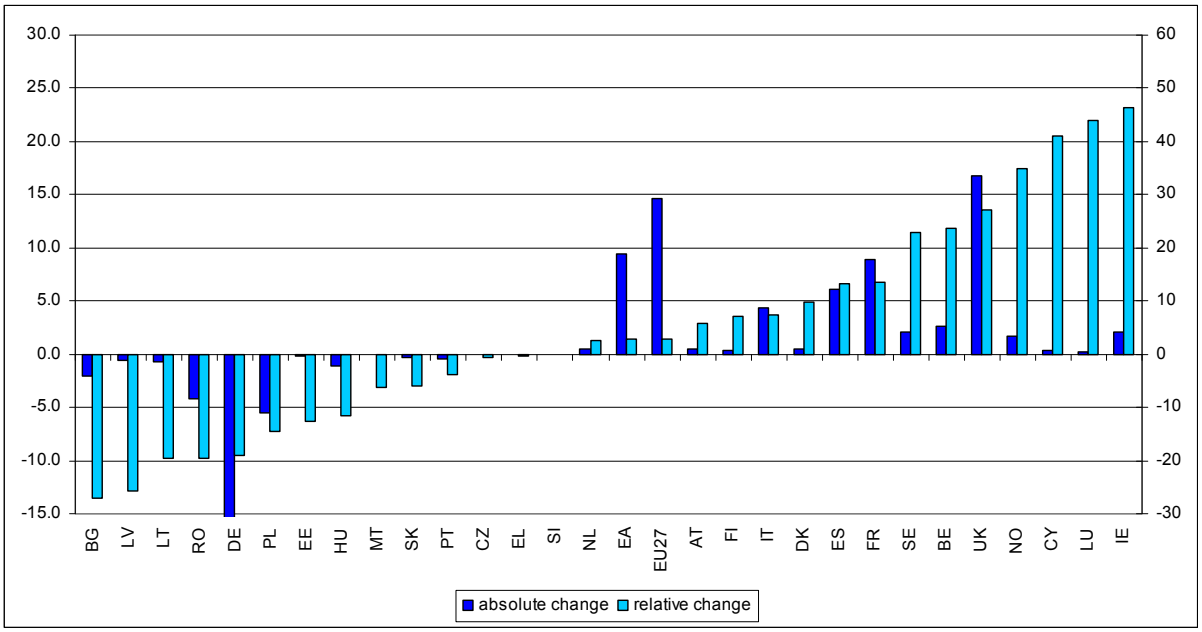
Source: Commission services, Eurostat, EUROPOP2010.
Note: WAP is the working-age population (20-64).

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.

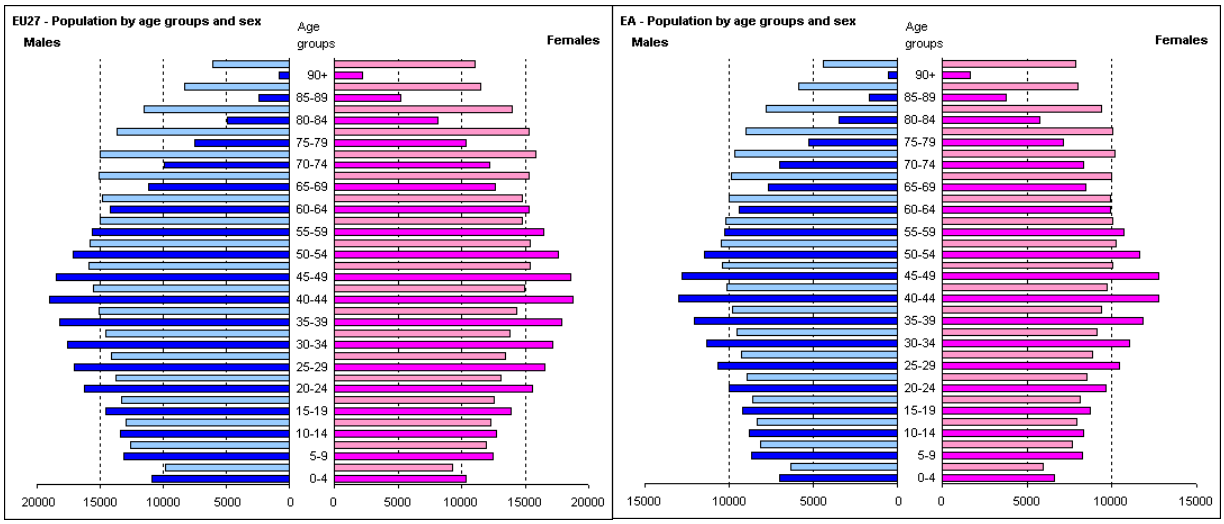
In 2010, the Member States with the largest population were Germany (82 million), France (65 mn), the United Kingdom (62 mn), Italy (60 mn) and Spain (46 mn). In 2060, the United Kingdom is projected to be the most populous EU country (79 million), followed by France (74 mn), Germany (66 mn), Italy (65 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.[31]

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).

[31] 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).

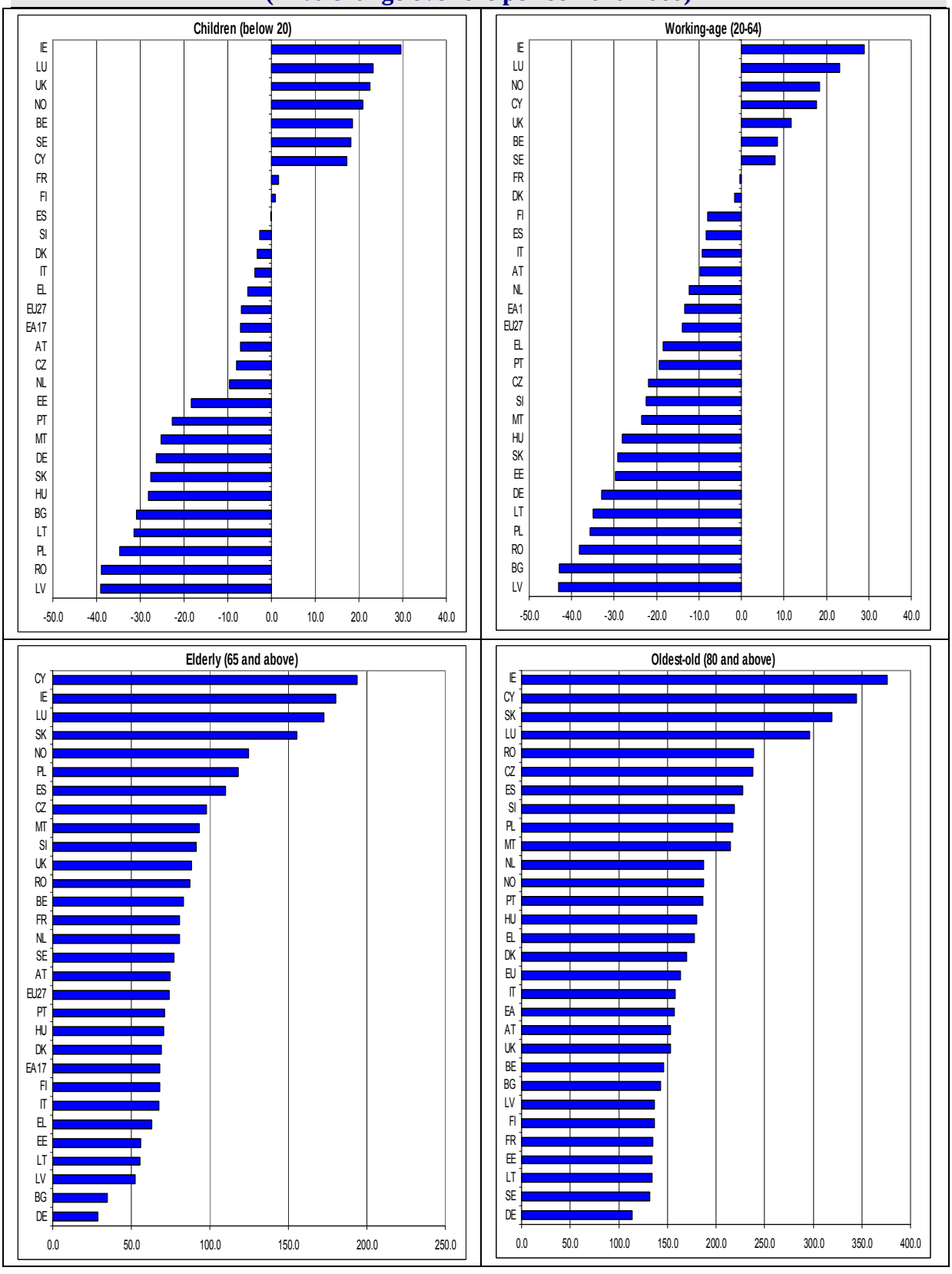
The increase in the total age-dependency ratio (people aged 19 and below and aged 65 and above over the population aged 20-64) is projected to be even larger, rising from 63% to 95%. The difference is noticeable among individual EU Member States. A relatively small increase in the total age-dependency 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)						
		Peak		% change	Trough		% change		Peak		% change	Trough		% change
	2010 - value	value	year	2010 - peak	value	year	peak - trough	2010 - value	value	year	2010 - peak	value	year	peak - trough
BE	10.9	13.5	2060	23.7%	10.9	2010	-19.2%	6.5	7.1	2060	8.5%	6.5	2010	-7.9%
BG	7.5	7.5	2010	0.0%	5.5	2060	-26.9%	4.8	4.8	2010	0.0%	2.7	2060	-43.0%
CZ	10.5	10.9	2025	3.2%	10.5	2060	-3.8%	6.8	6.8	2010	0.0%	5.3	2060	-21.9%
DK	5.5	6.1	2060	9.7%	5.5	2010	-8.8%	3.3	3.3	2021	0.1%	3.2	2041	-3.2%
DE	81.7	81.7	2010	0.0%	66.2	2060	-19.0%	49.7	49.8	2011	0.2%	33.3	2060	-33.1%
EE	1.3	1.3	2010	0.0%	1.2	2060	-12.6%	0.8	0.8	2011	0.2%	0.6	2060	-29.8%
IE	4.5	6.6	2060	46.5%	4.5	2010	-31.7%	2.7	3.5	2060	28.9%	2.7	2015	-23.8%
EL	11.3	11.6	2042	2.8%	11.3	2060	-3.1%	7.0	7.0	2010	0.0%	5.7	2060	-18.5%
ES	46.1	52.7	2051	14.4%	46.1	2010	-12.6%	29.1	29.5	2029	1.4%	26.7	2056	-9.7%
FR	64.9	73.7	2060	13.7%	64.9	2010	-12.0%	38.1	38.2	2011	0.2%	37.5	2038	-1.9%
IT	60.5	66.0	2046	9.1%	60.5	2010	-8.3%	36.8	37.4	2023	1.6%	33.4	2060	-10.8%
CY	0.8	1.1	2060	40.9%	0.8	2010	-29.0%	0.5	0.6	2045	21.2%	0.5	2010	-17.5%
LV	2.2	2.2	2010	0.0%	1.7	2060	-25.8%	1.4	1.4	2011	0.2%	0.8	2060	-43.2%
LT	3.3	3.3	2010	0.0%	2.7	2060	-19.6%	2.1	2.1	2012	0.0%	1.3	2060	-35.0%
LU	0.5	0.7	2060	44.0%	0.5	2010	-30.6%	0.3	0.4	2060	23.2%	0.3	2010	-18.8%
HU	10.0	10.0	2010	0.0%	8.8	2060	-11.7%	6.3	6.3	2011	0.1%	4.5	2060	-28.2%
MT	0.4	0.4	2026	1.2%	0.4	2060	-7.4%	0.3	0.3	2010	0.0%	0.2	2060	-23.6%
NL	16.6	17.7	2036	6.2%	16.6	2010	-5.9%	10.1	10.1	2011	0.1%	8.9	2060	-12.5%
AT	8.4	9.0	2043	7.2%	8.4	2010	-6.7%	5.2	5.3	2019	2.0%	4.7	2060	-11.5%
PL	38.2	38.4	2018	0.6%	32.6	2060	-15.1%	24.8	24.9	2012	0.4%	15.9	2060	-35.9%
PT	10.6	10.8	2034	1.3%	10.2	2060	-5.0%	6.6	6.6	2010	0.0%	5.3	2060	-19.4%
RO	21.4	21.4	2010	0.0%	17.2	2060	-19.6%	13.8	13.8	2011	0.1%	8.5	2060	-38.3%
SI	2.1	2.2	2027	5.0%	2.1	2010	-4.7%	1.3	1.3	2013	0.9%	1.0	2060	-23.2%
SK	5.4	5.6	2024	3.0%	5.1	2060	-8.9%	3.6	3.6	2014	1.4%	2.5	2060	-30.2%
FI	5.4	5.7	2060	7.1%	5.4	2010	-6.6%	3.2	3.2	2010	0.0%	3.0	2060	-8.1%
SE	9.4	11.5	2060	23.0%	9.4	2010	-18.7%	5.5	6.0	2050	9.2%	5.5	2010	-8.5%
UK	62.2	79.0	2060	27.0%	62.2	2010	-21.3%	37.2	41.5	2060	11.8%	37.2	2010	-10.5%
NO	4.9	6.6	2060	35.0%	4.9	2010	-25.9%	2.9	3.4	2060	18.4%	2.9	2010	-15.5%
EU27	501.8	525.8	2042	4.8%	501.8	2010	-4.6%	307.5	308.2	2012	0.2%	264.5	2060	-14.2%
EA17	331.4	348.7	2041	5.2%	331.4	2010	-5.0%	201.7	202.1	2011	0.2%	174.7	2060	-13.6%

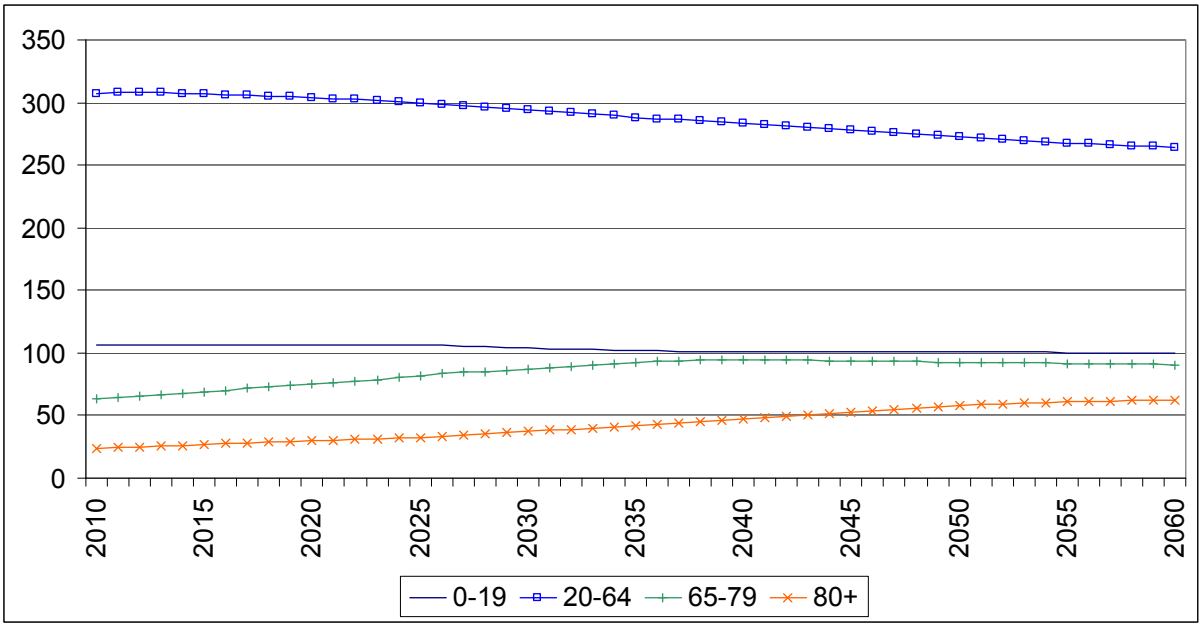
Source: Commission services, Eurostat, EUROPOP2010.

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



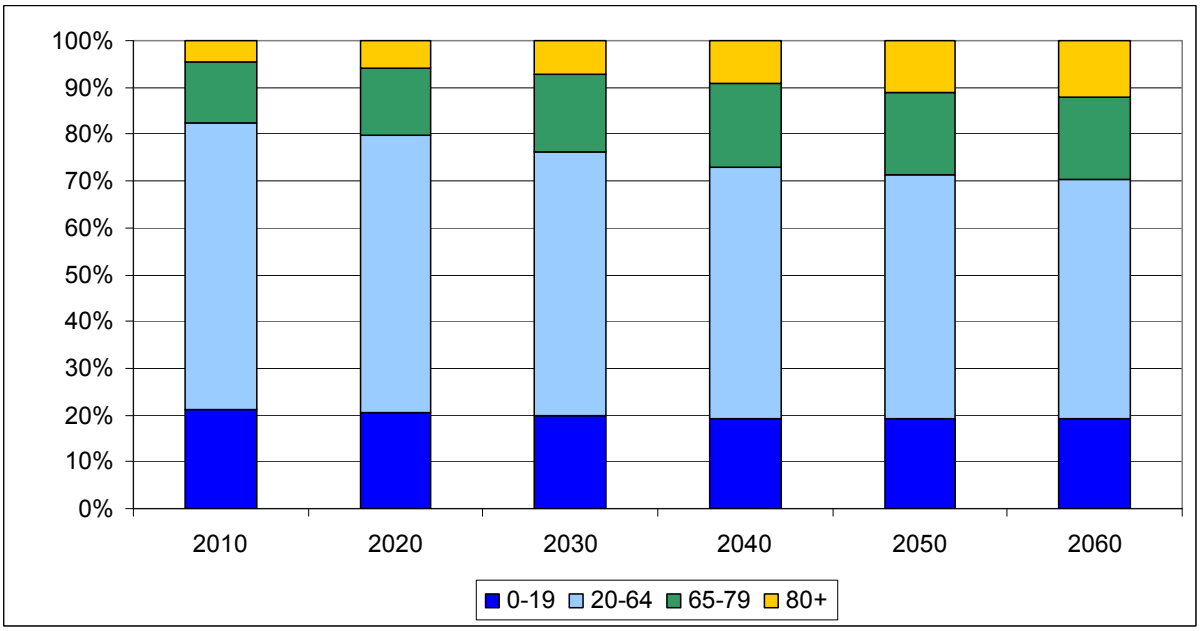
Source: Commission services, Eurostat, EUROPOP2010.

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



Source: Commission services, Eurostat, EUROPOP2010.

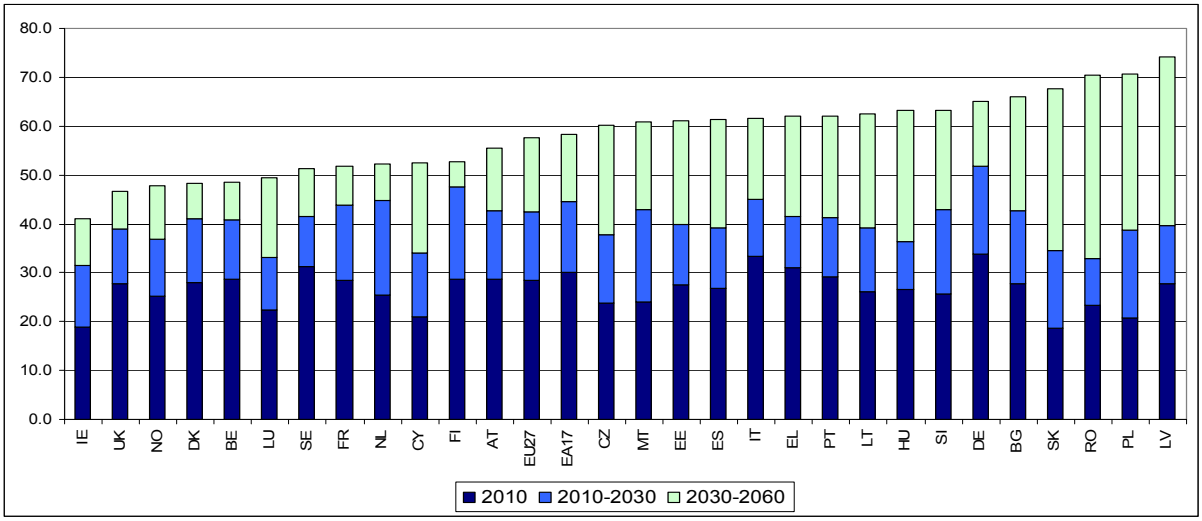
Graph 1. 16 - Projection of changes in the structure of the population by main age groups, EU27 (in %)



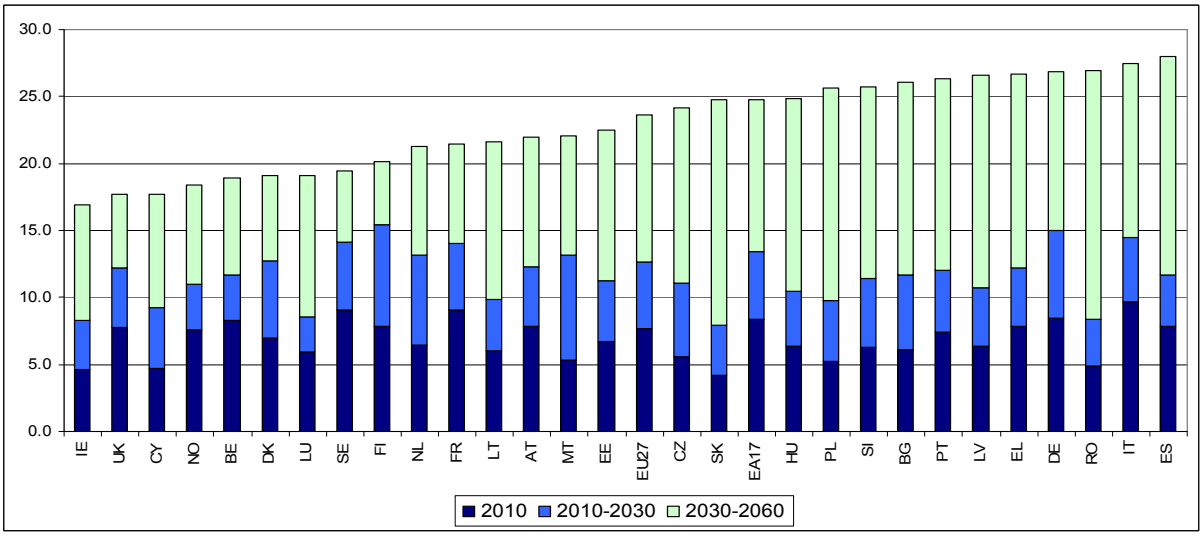
Source: Commission services, Eurostat, EUROPOP2010.

Graph 1. 17 - Dependency ratios (in percentage)

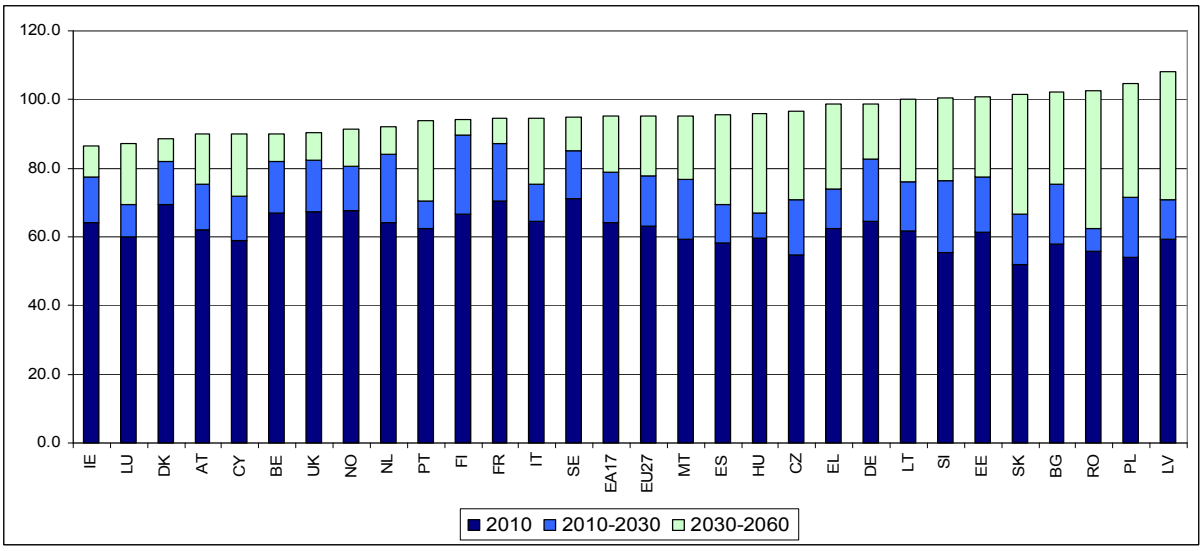
Old-age dependency ratio (ratio of people aged 65 or above relative to the working-age population)



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.[32] 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.

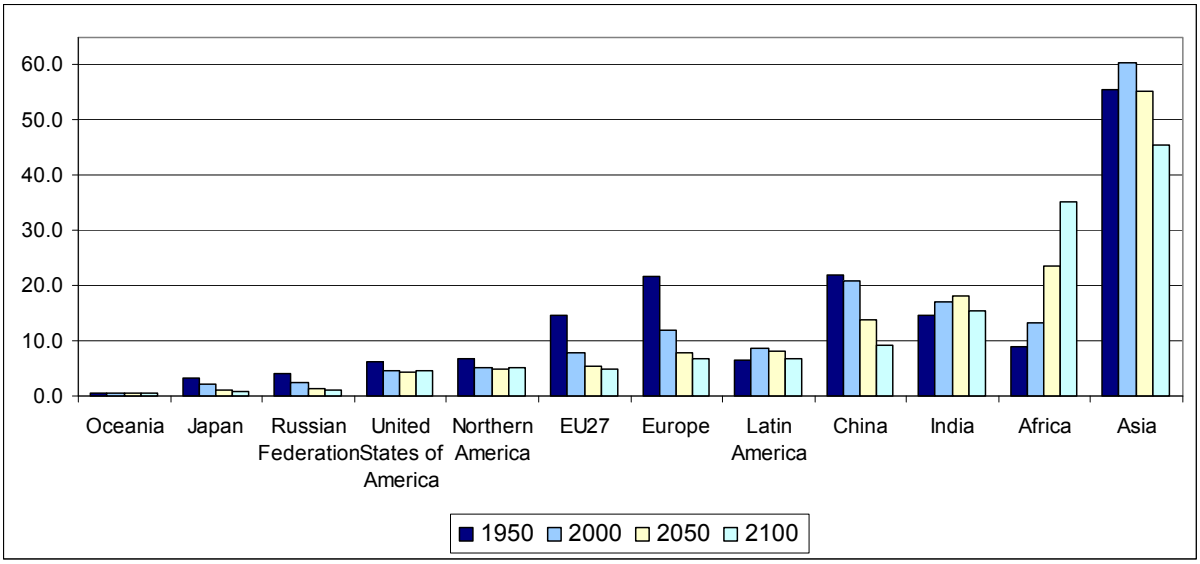
Overall, the world population is continuing to grow sharply and planet earth, hosting 6,895,889,000 inhabitants in 2010, will be the habitat for 9,306,128,000 persons in 2050, which translates into an increase of 35% over forty years.

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.).

[32] The United Nations Population Division produces global population projections every two years. The latest projections are the 2010 Revision.

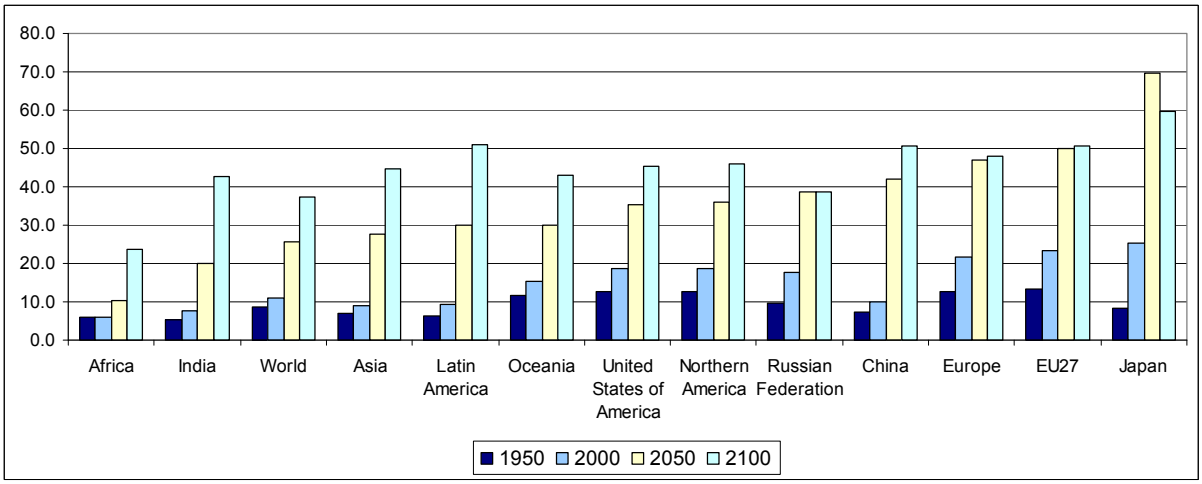
Graph 1. 18 - Population of main geographic areas and selected countries as percentage of the world population, 1950, 2000, 2050, 2100



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.[33] 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.

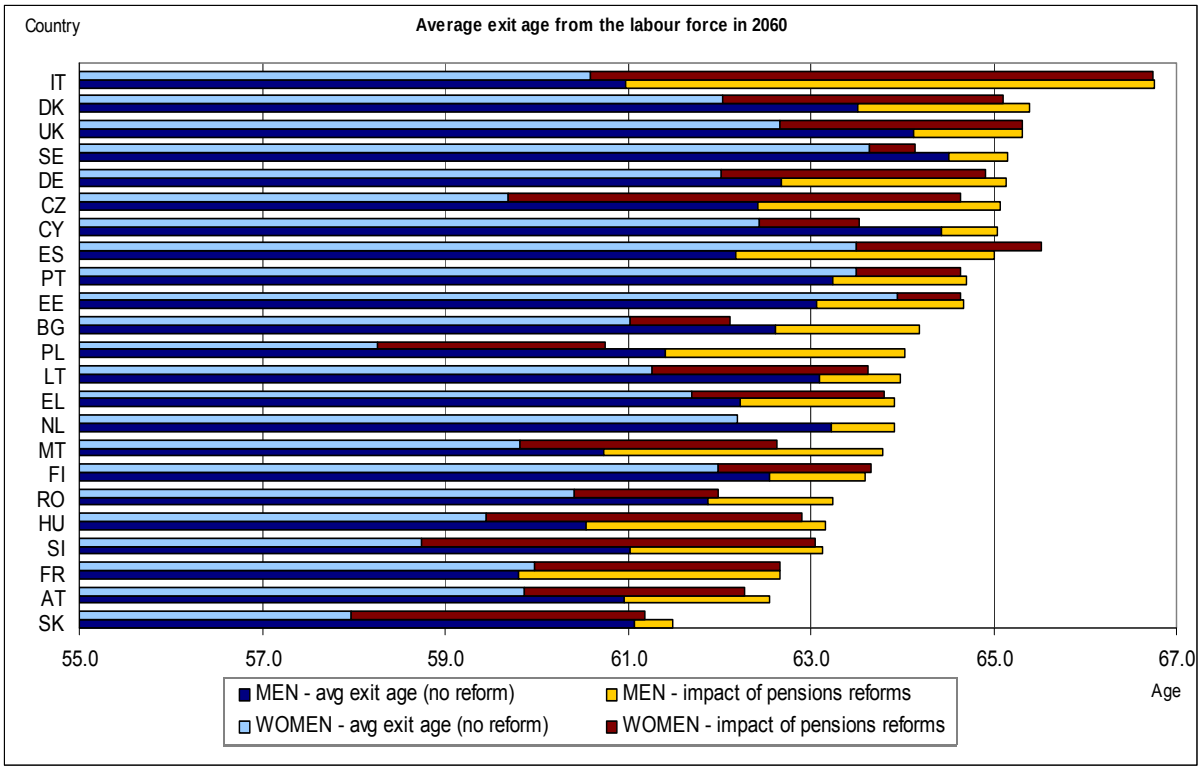
Overall in the EU27, the participation rate of older people (55-64) is estimated to be higher by about 8.3 p.p. in 2020 and by 14.8 p.p. in 2060 due to the projected impact of pension reforms. In the euro area, the impact is estimated to be even larger: 10 p.p. and 16.7 p.p., respectively, in 2020 and 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.

[33] 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.

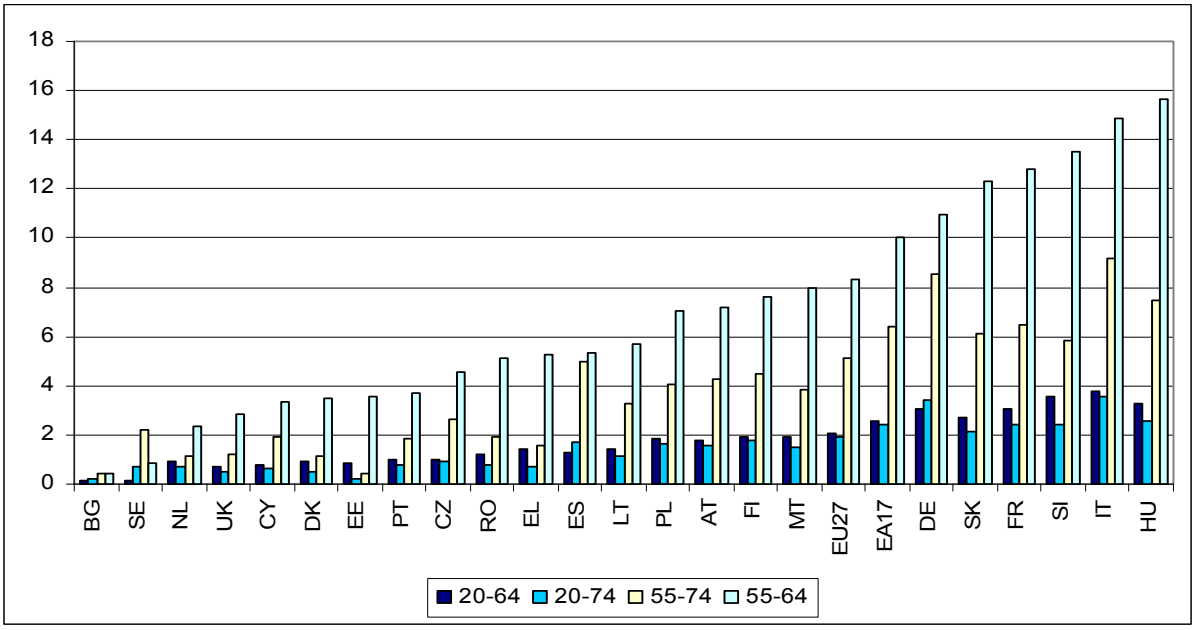
It should be recalled that total participation rates (20-64) are mainly driven by changes in the participation rate of prime-age workers (25-55), as this group accounts for almost two thirds of the total labour force. Therefore, even these significant projected rises in participation rates for older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



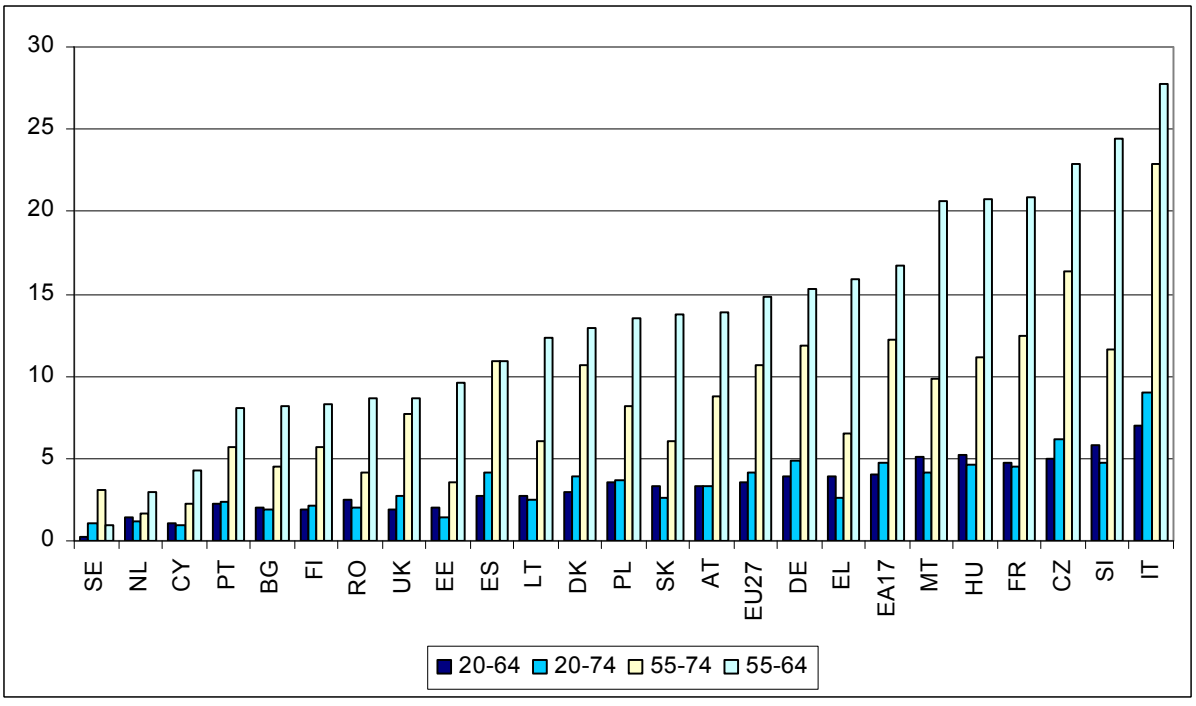
Source: Commission services, EPC.

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.

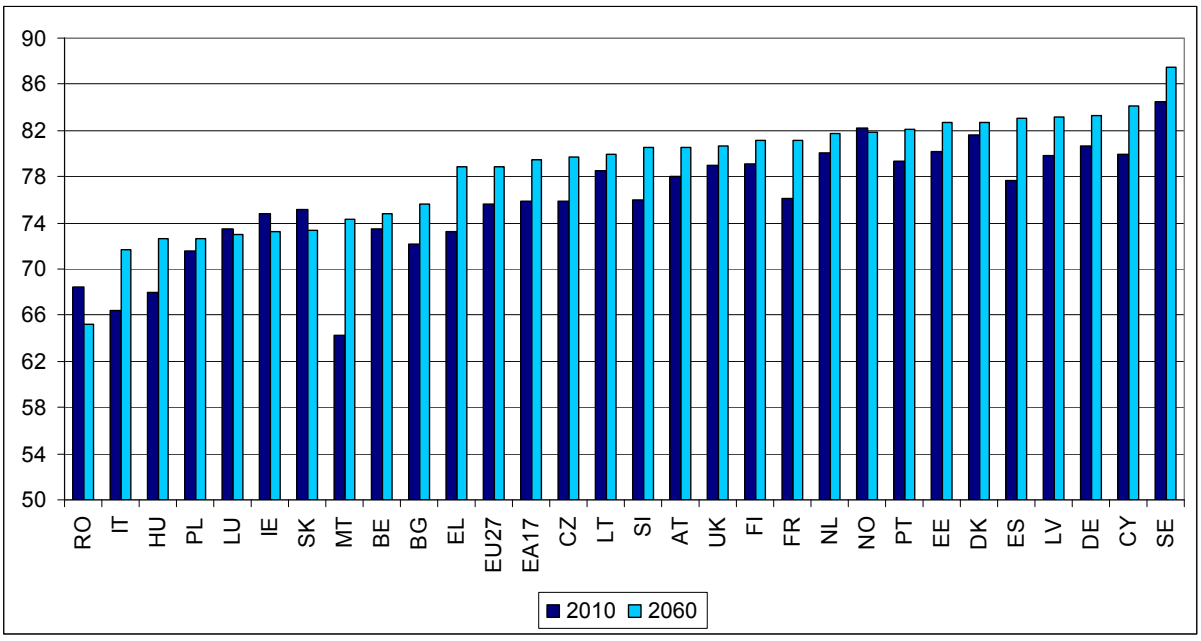
1.2.2. Main results of the projection of labour market participation rates

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.

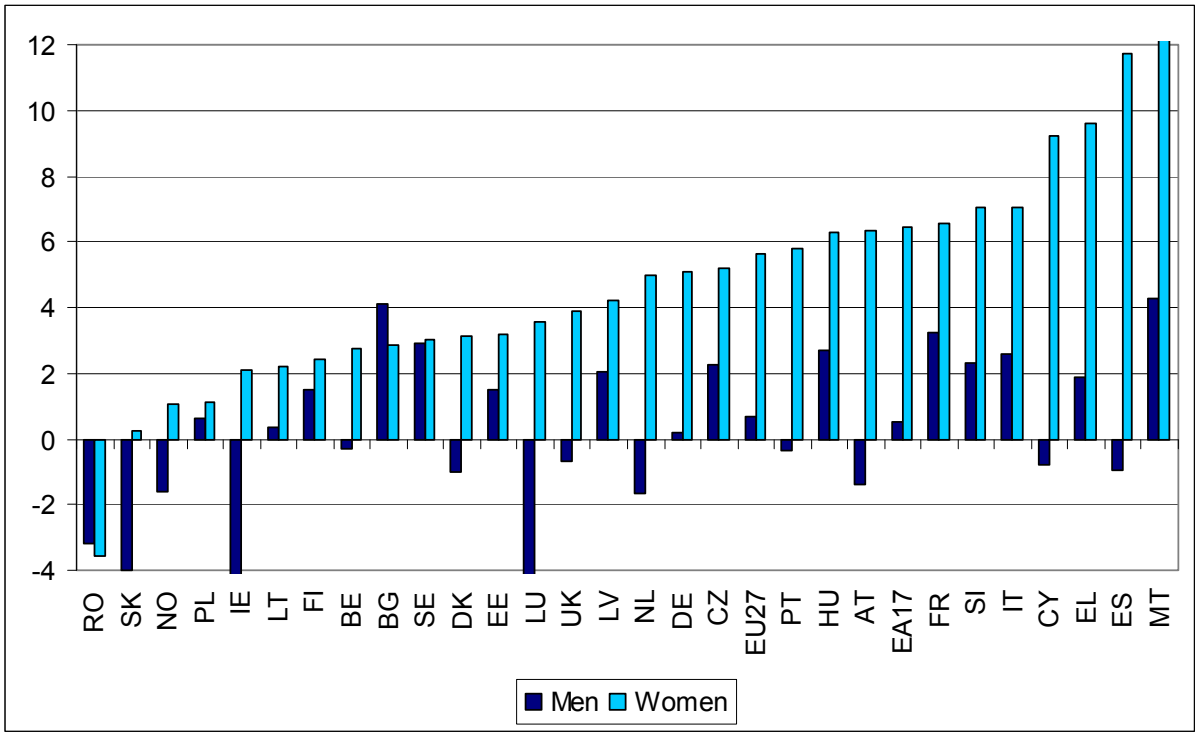
Graph 1. 23 presents the outcome of participation rate projections. The total participation rate (for the age group 20 to 64) in the EU27 is projected to increase by 3.2 percentage points (from 75.6% in 2010 to 78.8% in 2060). For the euro area, a slightly higher increase of 3.6 p.p. is projected (from 75.9% in 2010 to 79.4% in 2060).

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



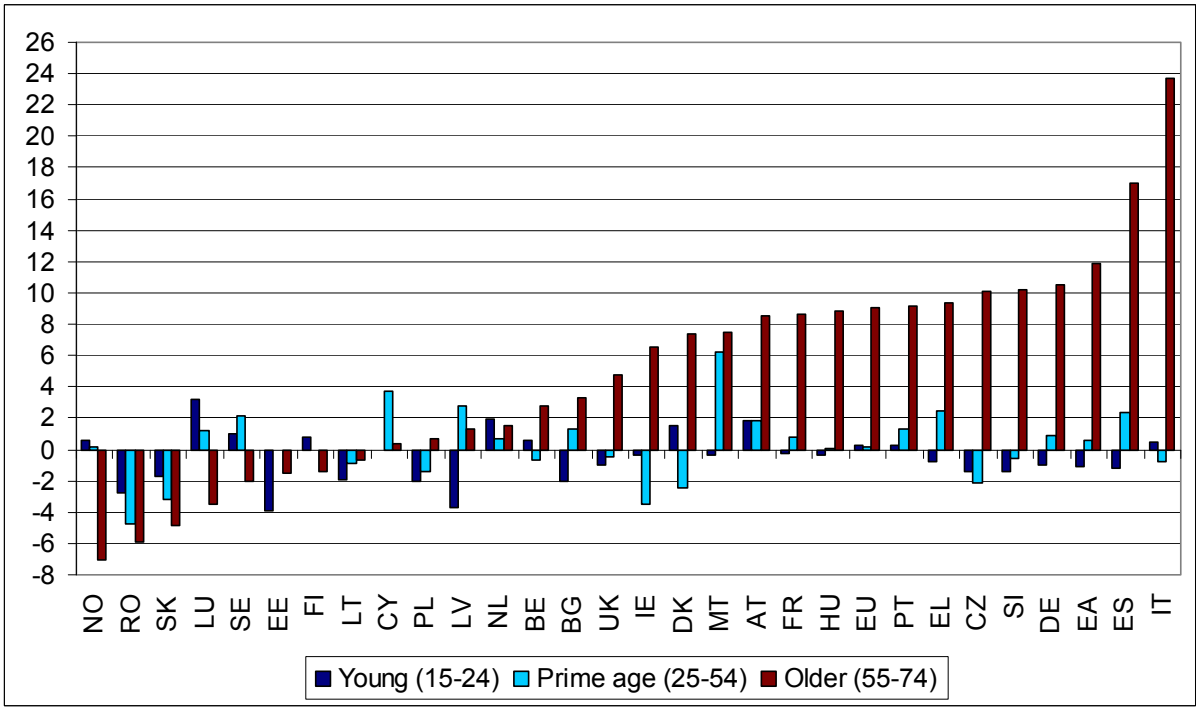
Source: Commission services, EPC.

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 %)



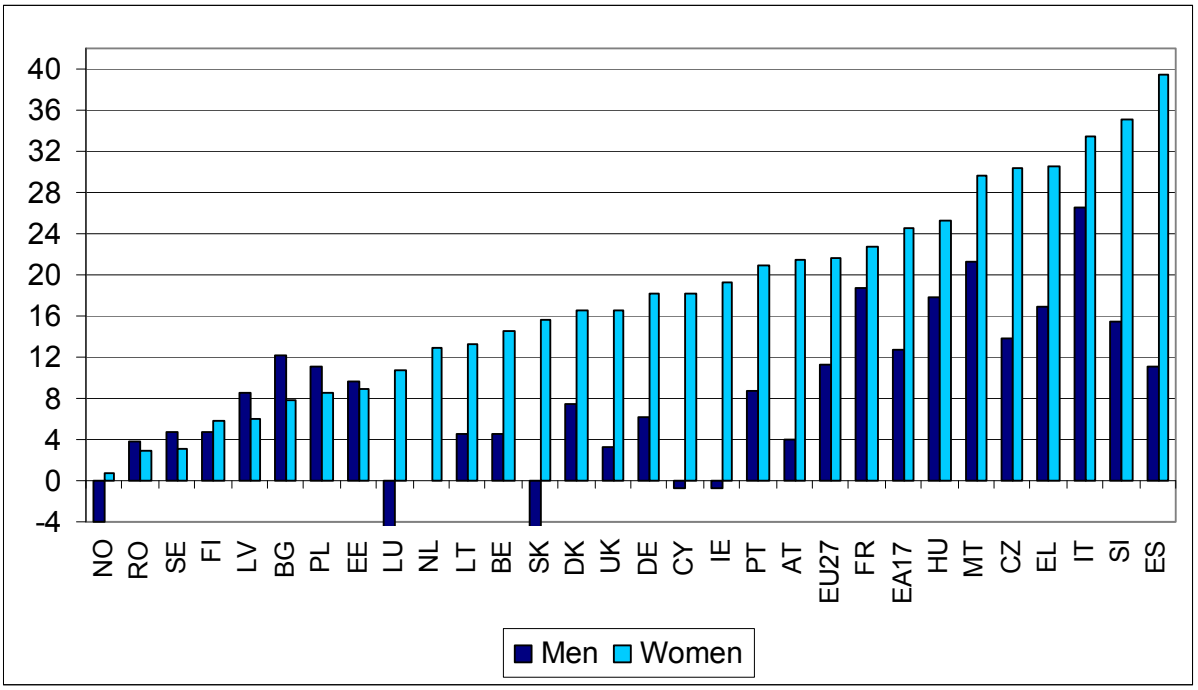
Source: Commission services, EPC.

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.

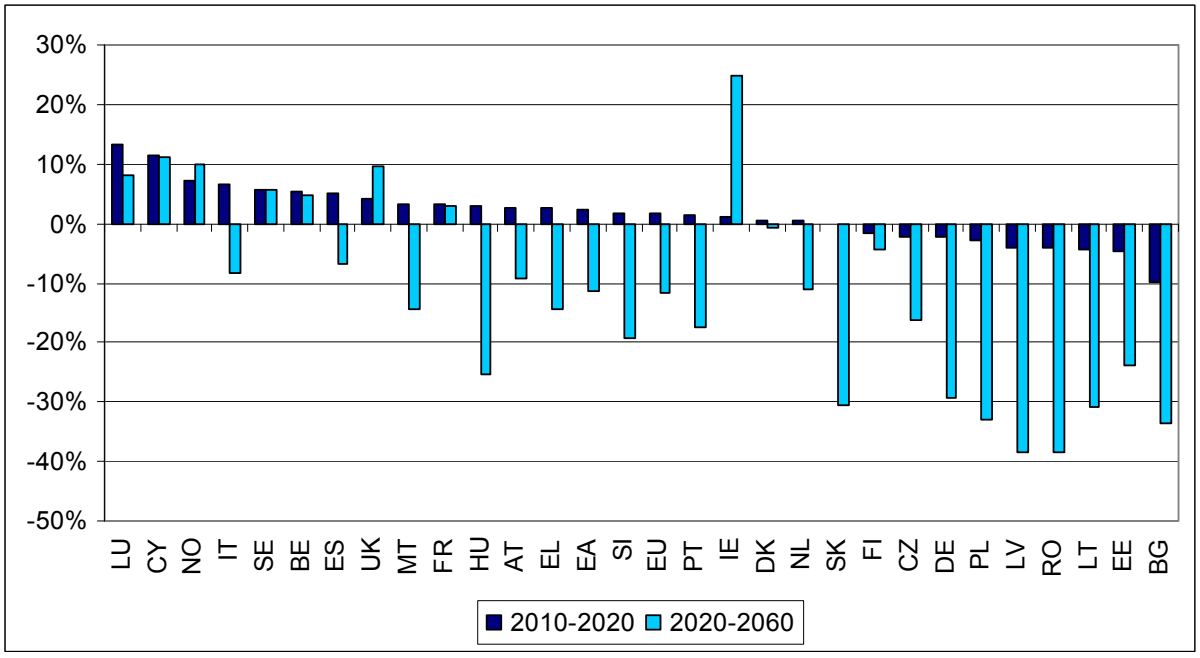
1.2.2.2. Projection of labour supply

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[34]. 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.

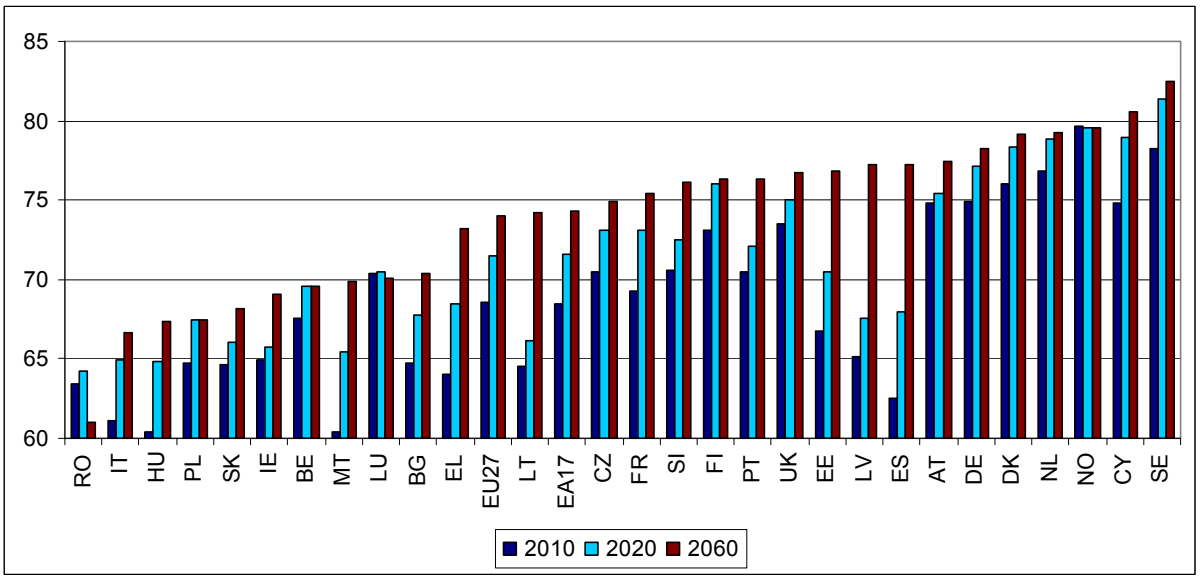
The number of persons employed (using the LFS definition) is projected to record an annual growth rate of only 0.3% over the period 2010 to 2020 (compared to 0.9% over the period 2000-2009), which is expected to reverse to a negative annual growth rate of a similar magnitude over the period 2020 to 2060. 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).

[34] 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.

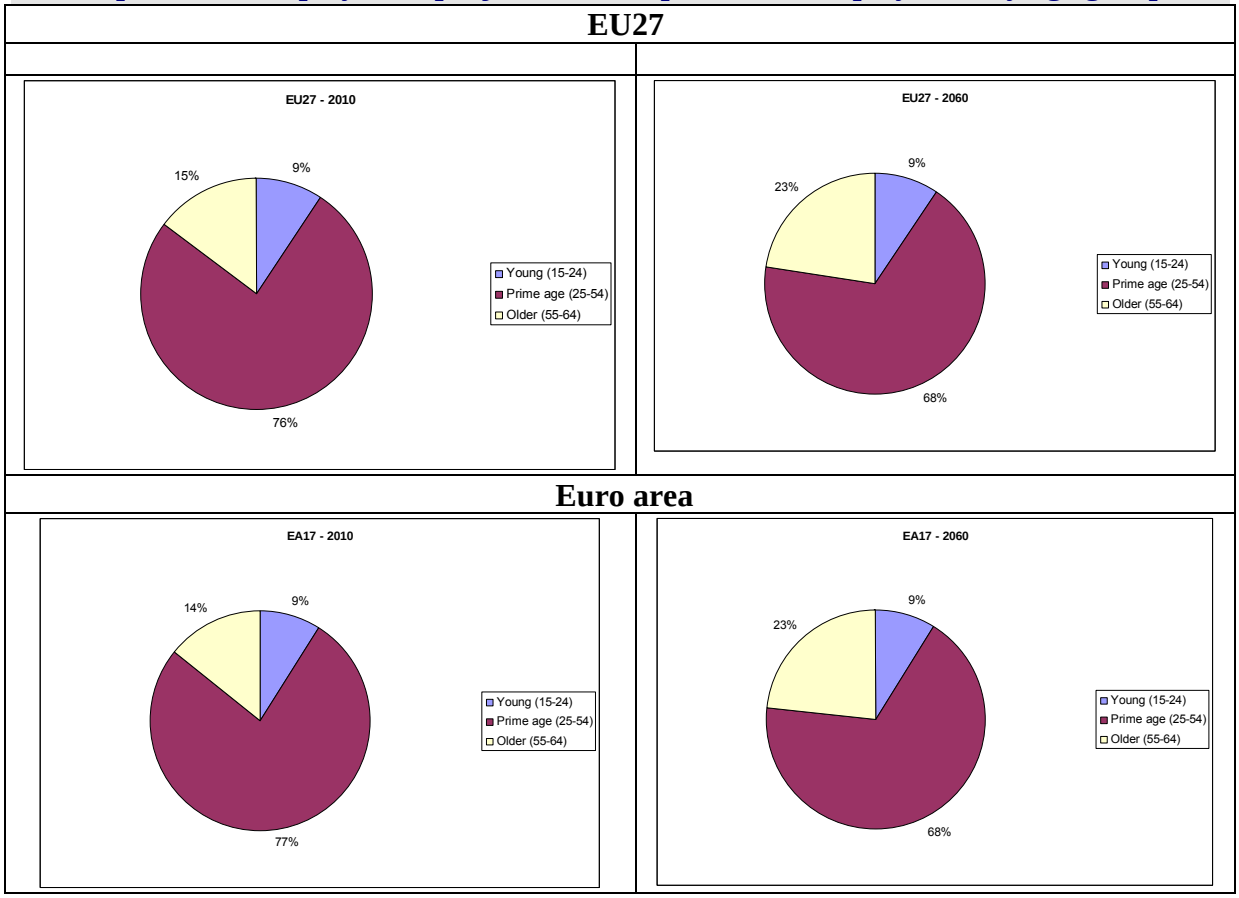
There are however large cross-country differences. In Romania, Poland, Slovenia and Slovakia, it is projected to be more than 180% in 2060, while in other countries (Denmark, Norway and the Netherlands), it is projected to rise to less than 120% by 2060.

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)						
		Peak		% change	Trough		% change		Peak		% change	Trough		
	2010 - value	value	year	2010 - peak	value	year	peak - trough	2010 - value	value	year	2010 - peak	value	year	peak - trough
BE	6.5	7.1	2060	8.5%	6.5	2010	-7.9%	4.4	4.9	2060	11.7%	4.4	2010	-10.5%
BG	4.8	4.8	2010	0.0%	2.7	2060	-43.0%	3.1	3.1	2012	1.1%	1.9	2060	-38.8%
CZ	6.8	6.8	2010	0.0%	5.3	2060	-21.9%	4.8	4.8	2012	1.0%	4.0	2060	-17.8%
DK	3.3	3.3	2021	0.1%	3.2	2041	-3.2%	2.5	2.6	2025	3.7%	2.5	2010	-3.5%
DE	49.7	49.8	2011	0.2%	33.3	2060	-33.1%	37.2	37.9	2012	1.9%	26.0	2060	-31.3%
EE	0.8	0.8	2011	0.2%	0.6	2060	-29.8%	0.6	0.6	2012	7.0%	0.4	2060	-24.4%
IE	2.7	3.5	2060	28.9%	2.7	2015	-23.8%	1.8	2.4	2060	37.1%	1.7	2015	-28.4%
EL	7.0	7.0	2010	0.0%	5.7	2060	-18.5%	4.5	4.7	2024	5.8%	4.2	2060	-12.0%
ES	29.1	29.5	2029	1.4%	26.7	2056	-9.7%	18.2	22.4	2033	22.7%	18.2	2010	-18.5%
FR	38.1	38.2	2011	0.2%	37.5	2038	-1.9%	26.4	28.6	2060	8.5%	26.4	2010	-7.8%
IT	36.8	37.4	2023	1.6%	33.4	2060	-10.8%	22.5	24.5	2024	9.0%	22.3	2060	-9.2%
CY	0.5	0.6	2045	21.2%	0.5	2010	-17.5%	0.4	0.5	2044	29.6%	0.4	2010	-22.8%
LV	1.4	1.4	2011	0.2%	0.8	2060	-43.2%	0.9	1.0	2012	5.1%	0.6	2060	-35.9%
LT	2.1	2.1	2012	0.0%	1.3	2060	-35.0%	1.3	1.4	2012	6.5%	1.0	2060	-29.9%
LU	0.3	0.4	2060	23.2%	0.3	2010	-18.8%	0.2	0.3	2060	22.6%	0.2	2010	-18.5%
HU	6.3	6.3	2011	0.1%	4.5	2060	-28.2%	3.8	4.0	2027	4.5%	3.0	2060	-23.3%
MT	0.3	0.3	2010	0.0%	0.2	2060	-23.6%	0.2	0.2	2033	5.2%	0.1	2060	-16.0%
NL	10.1	10.1	2011	0.1%	8.9	2060	-12.5%	7.8	7.9	2015	2.0%	7.0	2060	-11.5%
AT	5.2	5.3	2019	2.0%	4.7	2060	-11.5%	3.9	4.0	2018	3.0%	3.6	2060	-9.3%
PL	24.8	24.9	2012	0.4%	15.9	2060	-35.9%	16.0	16.3	2014	1.5%	10.8	2060	-33.9%
PT	6.6	6.6	2010	0.0%	5.3	2060	-19.4%	4.6	4.8	2028	4.0%	4.0	2060	-16.0%
RO	13.8	13.8	2011	0.1%	8.5	2060	-38.3%	8.7	8.8	2012	0.6%	5.2	2060	-40.9%
SI	1.3	1.3	2013	0.9%	1.0	2060	-23.2%	0.9	0.9	2020	0.7%	0.8	2060	-17.0%
SK	3.6	3.6	2014	1.4%	2.5	2060	-30.2%	2.3	2.3	2012	1.5%	1.7	2060	-26.4%
FI	3.2	3.2	2010	0.0%	3.0	2060	-8.1%	2.4	2.4	2016	1.3%	2.3	2060	-5.2%
SE	5.5	6.0	2050	9.2%	5.5	2010	-8.5%	4.3	4.9	2050	14.4%	4.3	2010	-12.6%
UK	37.2	41.5	2060	11.8%	37.2	2010	-10.5%	27.3	31.9	2060	16.7%	27.3	2010	-14.3%
NO	2.9	3.4	2060	18.4%	2.9	2010	-15.5%	2.3	2.7	2060	18.2%	2.3	2010	-15.4%
EU27	307.5	308.2	2012	0.2%	264.5	2060	-14.2%	210.9	217.6	2022	3.2%	195.6	2060	-10.1%
EA	201.7	202.1	2011	0.2%	174.7	2060	-13.6%	138.1	143.9	2024	4.2%	129.8	2060	-9.8%

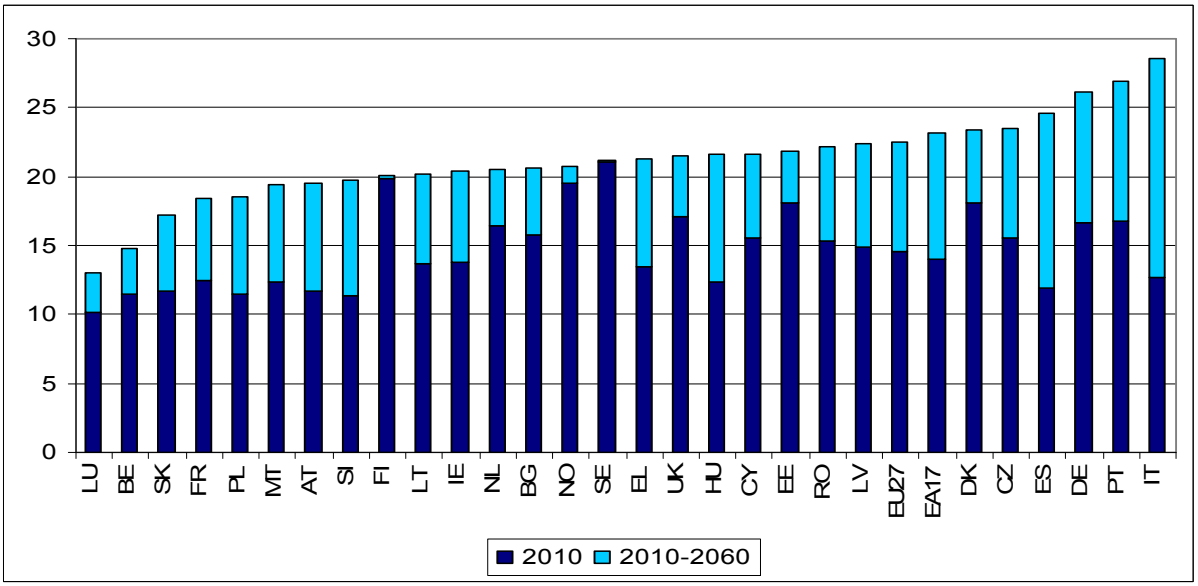
Source: Commission services, Eurostat, EUROPOP2010.

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



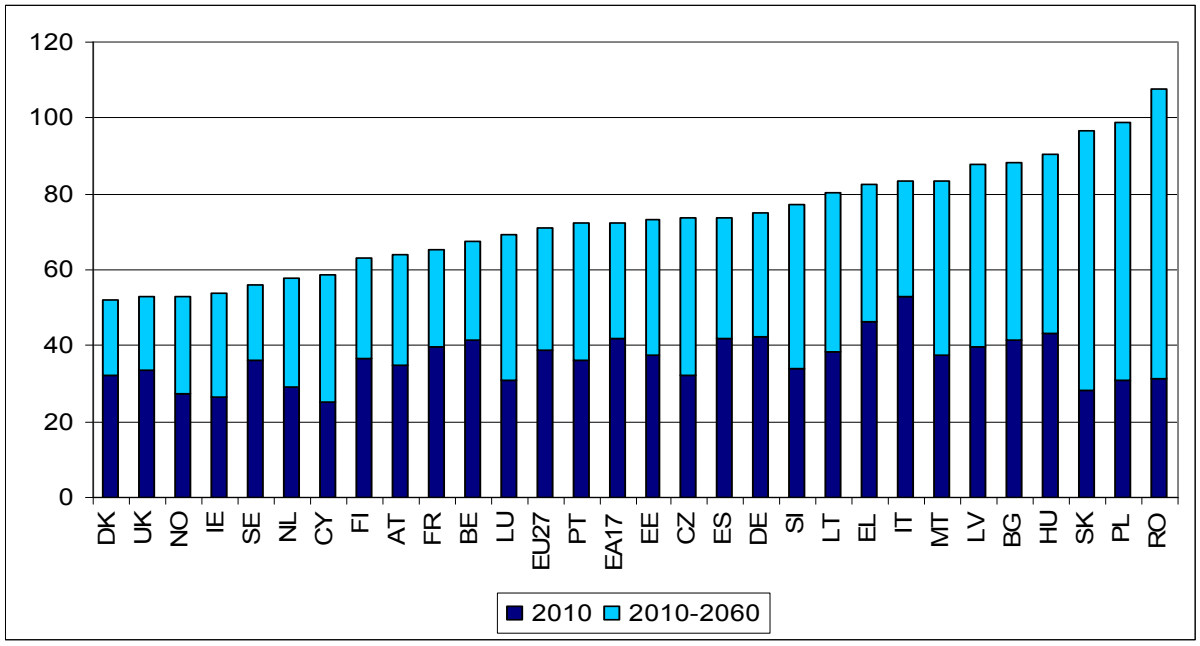
Source: Commission services, EPC.

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



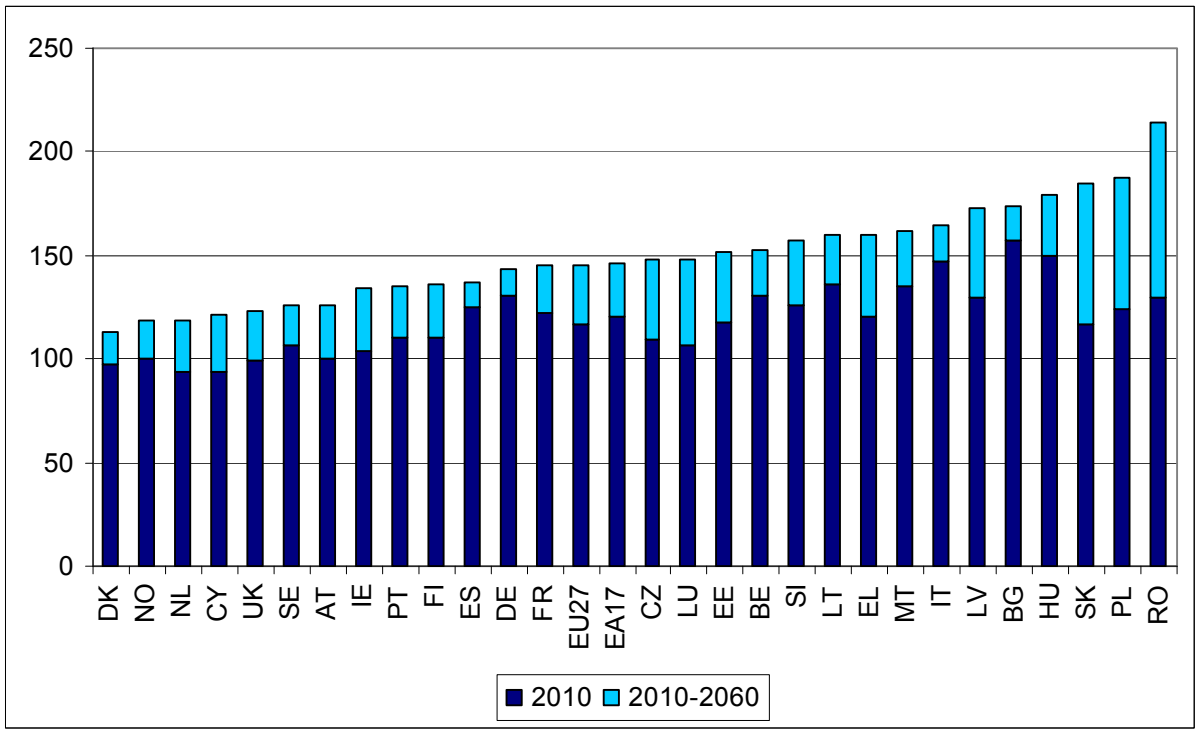
Source: Commission services, EPC.

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.[35] 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.

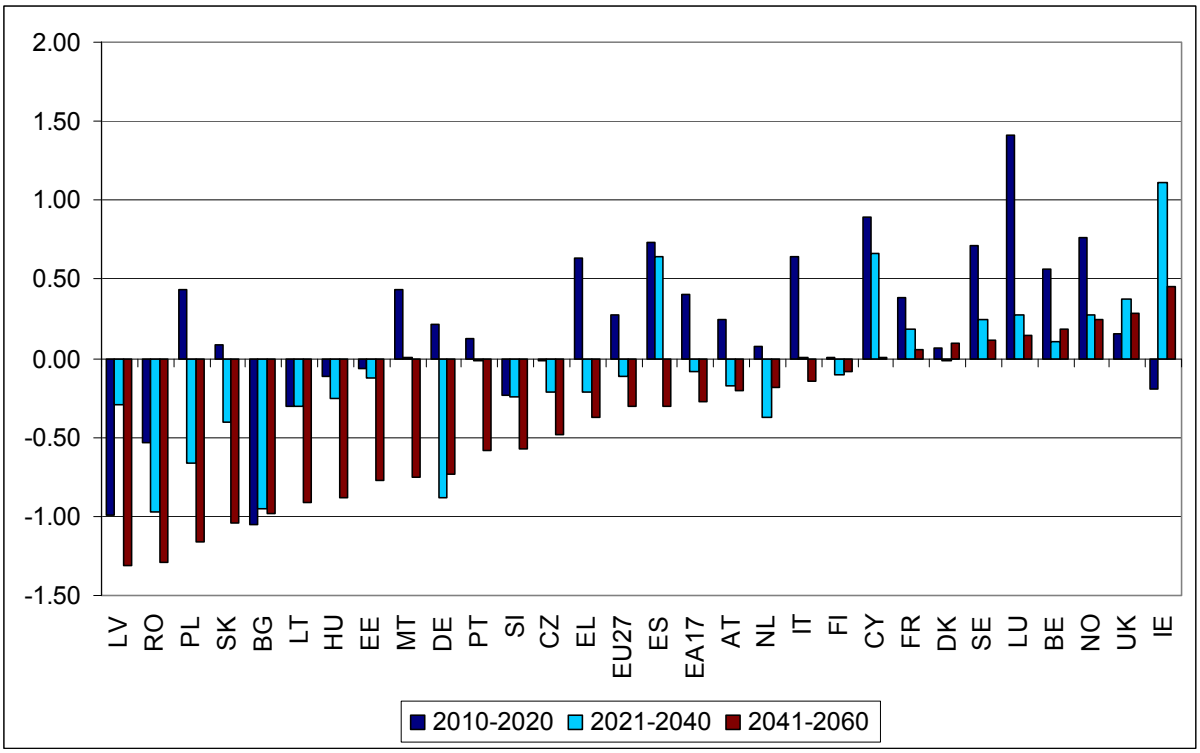
Taking account of the negative output gaps prevailing in the EU Member States, GDP growth is assumed to be higher than the potential growth rates until the output gap is closed (in 2015 as a general rule).[36] For the EU as a whole and the euro area, GDP growth is assumed to be 0.4 p.p. higher than the 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.

[35] 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).

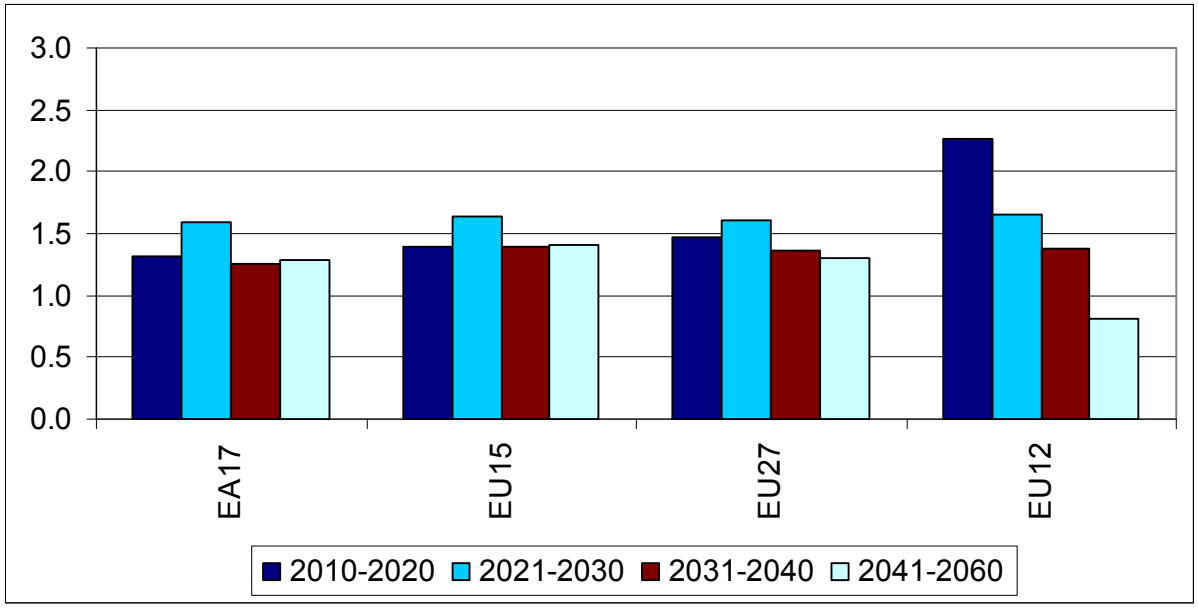
[36] For the medium-term outlook (until 2015), the forecasts and estimates of GDP growth are based on the Commission services economic forecast of Spring 2011 and subsequent data revisions are not included in the projections. For details on the underlying assumptions, see European Commission and Economic 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



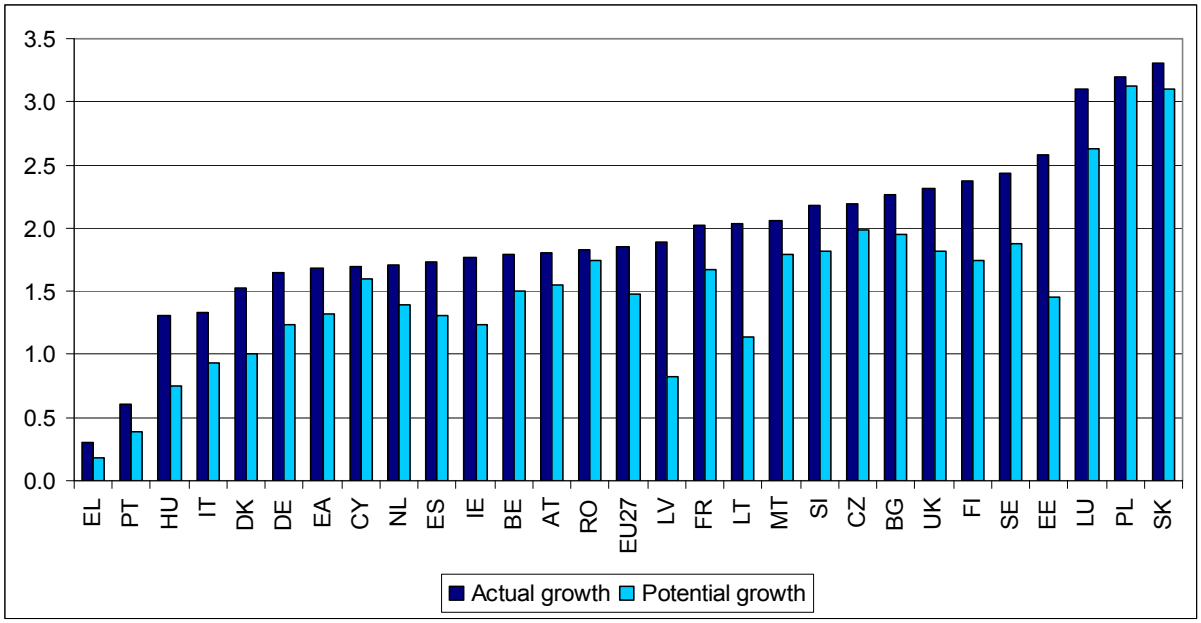
Source: Commission services, EPC.

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



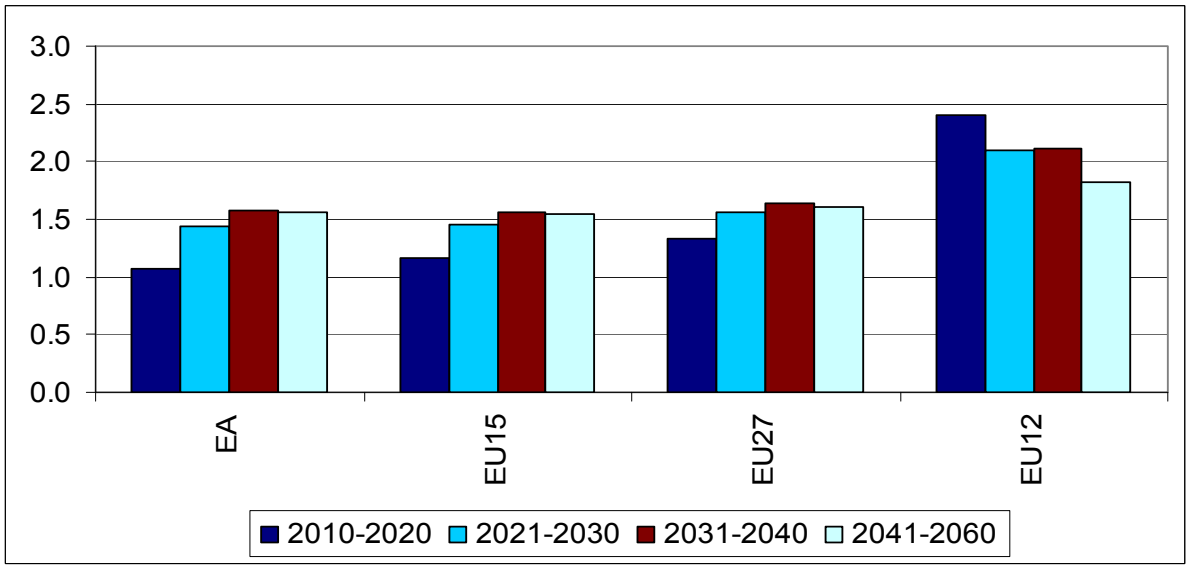
Source: Commission services, EPC.

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



Source: Commission services, EPC.

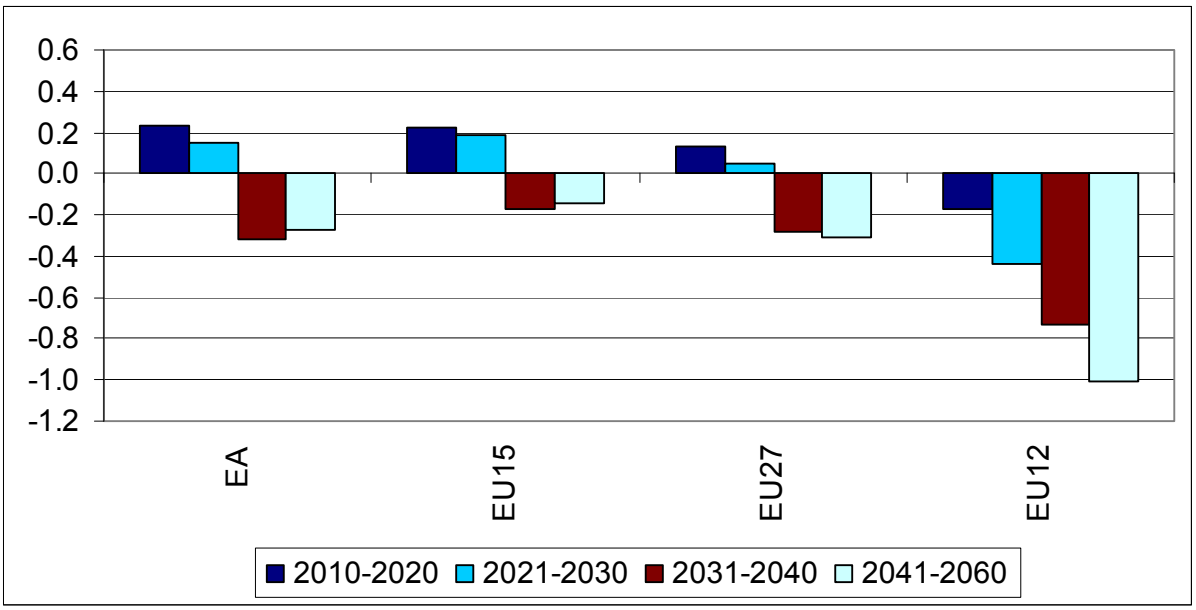
Graph 1. 36 - Labour productivity per hour, annual average growth rates EU aggregates



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.

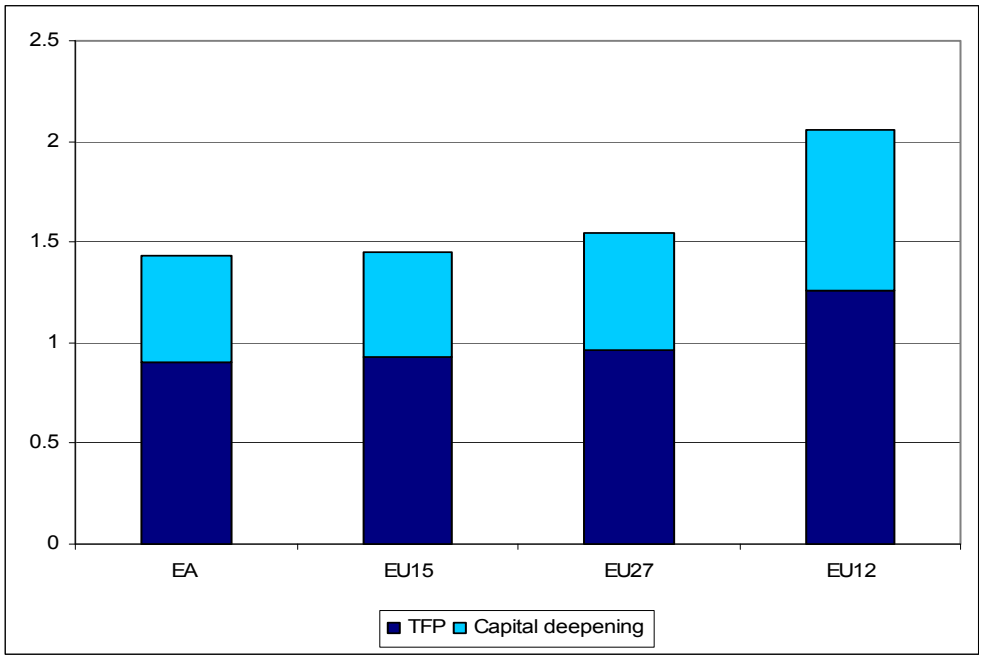
As expected, following the projected increase in output per capita in both the EU27 and the euro area up to the late 2030s, the projected per capita growth is somewhat higher than the projected potential output growth, since the total population is projected to become smaller from that point onwards.

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

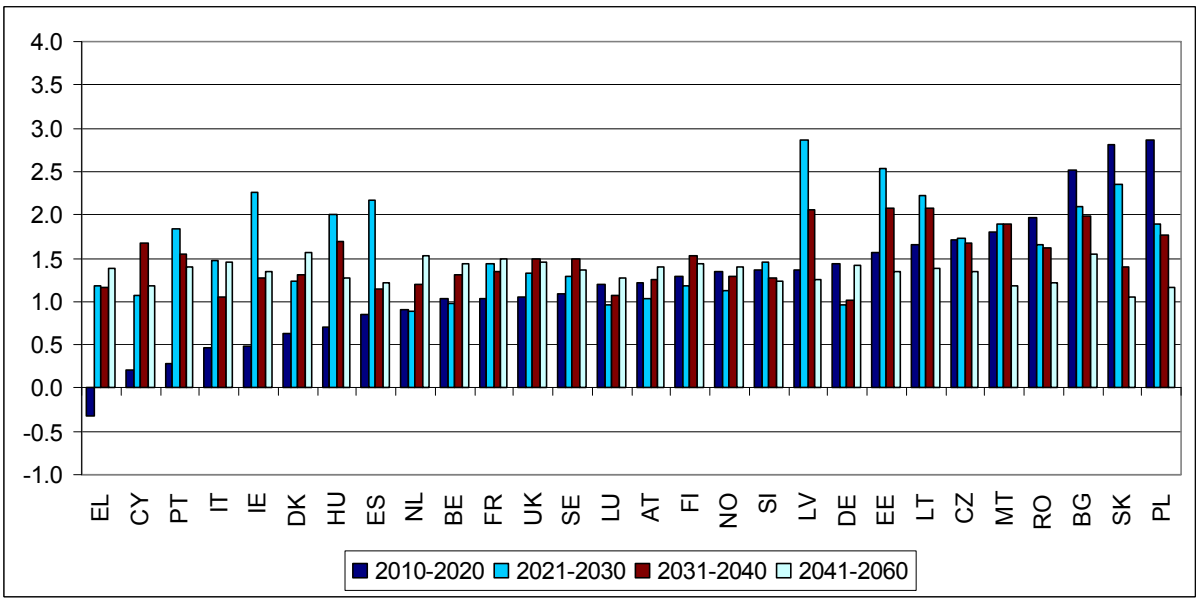
average of -0.2 percentage points). As a result, labour input contributes negatively to output growth on average over the projection period (by 0.15 p.p. and 0.1 p.p., respectively in the EU and in the euro area). Hence, labour productivity growth becomes the sole source for potential output growth in 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



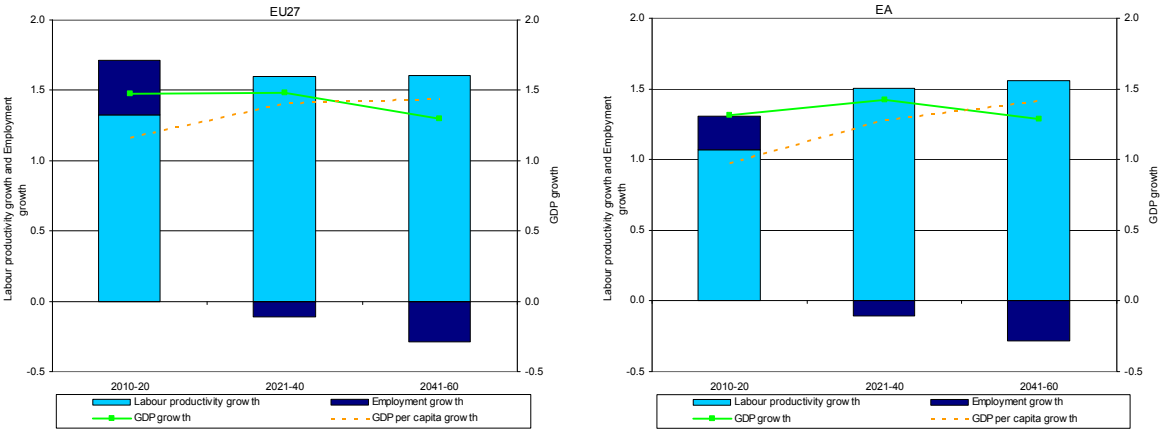
Source: Commission services, EPC.

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	**GDP growth in 2010-2060**	1.4	1.3
	Due to % change in:		
2=3+4	**Productivity**	1.5	1.4
	(GDP per hour worked)		
	of which:		
3	TFP	1.0	0.9
4	Capital deepening	0.6	0.5
5=6+7+8+9	**Labour input**	-0.1	-0.1
	of which:		
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	**GDP per capita growth in 2010-2060**	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.[37] 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).[38] 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

[37] Also visible in the age profile of participation rates, including a downward revision of participation rates for young (male) cohorts.

[38] However, in some countries (e.g. Belgium) where the unemployment rate in 2010 has increased relatively little compare 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. 5 – Long-term projections compared (2012 and 2009 projections): demographic drivers

	Projection exercise 2012 (EUROPOP2010)												Projection exercise 2012 - Projection exercise 2009										
	Fertility rate			Life expectancy at birth						Net migration (1000's)			Fertility rate			Life expectancy at birth						Net migration (1000's)	
				Males			Females									Males			Females				
	2010	2060	change	2010	2060	change	2010	2060	change	2010	2060	cumulated 2010-2060 as % of total pop. in 2010	2010	2060	change	2010	2060	change	2010	2060	change	2010	2060
BE	1.84	1.84	0.00	77.3	84.6	7.3	82.6	89.0	6.4	61	32	18.5%	0.08	0.05	-0.03	0.3	0.2	-0.10	0.0	0.1	0.09	14	9
BG	1.56	1.67	0.10	70.3	81.7	11.4	77.5	86.6	9.1	-10	1	-1.6%	0.17	0.12	-0.06	0.0	0.1	0.08	0.3	0.1	-0.21	-10	2
CZ	1.49	1.62	0.13	74.3	83.2	8.8	80.4	87.8	7.4	30	18	12.5%	0.15	0.10	-0.05	0.1	0.0	-0.06	-0.1	0.0	0.03	5	2
DK	1.84	1.84	0.00	77.0	84.4	7.4	81.1	88.4	7.3	12	9	9.2%	-0.01	-0.01	0.00	0.2	0.2	-0.06	-0.2	0.0	0.20	2	3
DE	1.36	1.54	0.17	77.6	84.8	7.2	82.7	88.9	6.2	41	72	6.2%	0.01	0.01	-0.01	0.0	-0.1	-0.07	-0.2	-0.2	0.00	-106	-44
EE	1.62	1.70	0.08	69.8	81.6	11.8	80.1	88.0	7.9	-1	0	0.2%	0.07	0.04	-0.03	1.2	0.8	-0.44	1.0	0.4	-0.50	0	0
IE	2.07	1.99	-0.08	77.0	84.5	7.5	82.0	88.9	6.9	-22	16	15.7%	0.17	0.11	-0.06	-0.9	-0.7	0.21	-0.2	-0.3	-0.08	-75	7
EL	1.52	1.64	0.12	77.8	84.9	7.1	82.8	88.3	5.5	26	25	14.5%	0.11	0.07	-0.04	0.0	0.1	0.11	-0.1	-0.4	-0.32	-13	-1
ES	1.40	1.56	0.16	78.6	85.4	6.8	84.7	89.9	5.3	79	185	23.4%	0.01	0.00	-0.01	0.9	0.5	-0.42	0.5	0.3	-0.24	-461	55
FR	2.00	1.95	-0.05	77.9	85.1	7.2	84.6	90.0	5.5	72	63	6.0%	0.02	0.02	0.00	0.1	0.0	-0.09	0.0	0.0	-0.03	-26	0
IT	1.42	1.57	0.15	78.9	85.5	6.6	84.2	89.7	5.6	361	244	25.3%	0.03	0.02	-0.01	0.1	0.0	-0.04	-0.3	-0.3	0.09	105	70
CY	1.50	1.62	0.13	78.3	85.1	6.8	82.8	89.0	6.2	2	4	27.8%	0.04	0.02	-0.01	-0.2	0.0	0.17	0.8	0.3	-0.46	-7	-2
LV	1.31	1.51	0.19	68.3	81.1	12.8	78.0	87.2	9.2	-3	1	1.2%	-0.05	-0.03	0.01	1.7	0.6	-1.06	0.8	0.4	-0.44	-3	1
LT	1.55	1.66	0.11	67.7	80.7	12.9	78.7	87.1	8.4	-13	1	-2.7%	0.20	0.12	-0.08	1.2	0.2	-0.97	0.8	0.2	-0.61	-11	1
LU	1.59	1.68	0.09	77.8	84.9	7.1	82.9	89.5	6.6	6	3	31.2%	-0.06	-0.04	0.02	1.1	0.4	-0.70	1.3	1.0	-0.36	2	0
HU	1.32	1.51	0.19	70.4	81.9	11.5	78.4	87.4	9.0	23	19	12.1%	-0.03	-0.02	0.01	0.2	0.1	-0.14	-0.1	0.1	0.13	3	4
MT	1.44	1.59	0.15	77.6	84.9	7.3	82.3	88.9	6.6	-1	0	3.4%	0.05	0.04	-0.01	1.2	0.6	-0.68	0.9	0.3	-0.58	-2	0
NL	1.79	1.81	0.02	78.7	85.2	6.5	82.8	89.1	6.3	36	6	3.3%	0.07	0.04	-0.03	0.4	0.2	-0.17	0.3	0.2	-0.12	28	-2
AT	1.39	1.56	0.16	77.6	84.8	7.2	83.0	89.1	6.1	19	26	17.9%	-0.03	-0.01	0.01	-0.2	-0.1	0.10	-0.2	-0.1	0.11	-14	3
PL	1.40	1.56	0.16	71.7	82.4	10.7	80.1	87.9	7.8	12	14	2.5%	0.12	0.07	-0.05	-0.2	-0.1	0.03	-0.2	-0.1	0.08	27	6
PT	1.32	1.51	0.19	76.5	84.2	7.7	82.5	88.6	6.1	19	28	15.6%	-0.05	-0.03	0.02	0.4	0.2	-0.21	-0.2	-0.2	-0.01	-33	-7
RO	1.38	1.55	0.17	70.0	81.8	11.8	77.5	86.7	9.3	0	8	2.7%	0.05	0.03	-0.02	-0.3	-0.1	0.21	0.4	0.2	-0.22	5	4
SI	1.54	1.65	0.11	75.8	84.0	8.1	82.3	88.8	6.5	11	4	14.2%	0.21	0.13	-0.08	0.7	0.2	-0.48	0.1	0.0	-0.11	6	2
SK	1.41	1.57	0.16	71.6	82.2	10.6	79.1	87.4	8.3	11	7	8.6%	0.15	0.10	-0.05	0.2	0.2	-0.05	0.0	0.1	0.02	7	3
FI	1.86	1.86	0.00	76.6	84.4	7.7	83.2	89.2	6.0	15	7	9.1%	0.02	0.02	0.00	0.1	0.0	-0.09	-0.1	0.0	0.06	5	3
SE	1.94	1.90	-0.03	79.4	85.5	6.1	83.4	89.3	5.9	60	19	14.2%	0.09	0.05	-0.03	0.2	0.1	-0.12	0.0	0.0	-0.01	18	4
UK	1.94	1.91	-0.03	78.3	85.2	7.0	82.4	89.1	6.7	198	134	13.0%	0.10	0.07	-0.03	0.6	0.2	-0.36	0.5	0.2	-0.35	14	20
NO	2.00	1.94	-0.06	78.7	85.2	6.5	83.1	89.2	6.1	37	12	16.4%	0.10	0.06	-0.04	0.0	0.0	-0.02	0.0	0.0	0.03	16	2
EU27	1.59	1.71	0.11	76.7	84.6	7.9	82.5	89.1	6.5	1043	945	11.8%	0.05	0.03	-0.02	0.2	0.1	-0.12	0.1	0.0	-0.07	-520	142
EA	1.57	1.68	0.12	77.9	85.0	7.1	83.5	89.4	5.9	735	722	13.5%											

Source: Commission services, EPC.

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)			Demographic dependency ratio (65+/(15-64)		
	2010	2060	% change	2010	2060	p.p change	2010	2060	p.p change	2010	2060	diff. in 2060 as % of tot pop in EUROPOP2008	2010	2060	p.p change
BE	10.9	13.5	23.7	26.1	43.8	17.7	51.8	71.9	20.1	0.10	1.17	9.5	0.0	-2.0	-2.0
BG	7.5	5.5	-26.9	25.7	60.0	34.3	45.6	84.1	38.5	-0.02	0.03	0.5	0.4	-3.5	-3.9
CZ	10.5	10.5	-0.7	21.8	54.9	33.0	42.2	79.1	36.9	0.13	0.94	9.9	0.0	-6.6	-6.6
DK	5.5	6.1	9.7	25.3	43.7	18.4	52.8	71.3	18.5	0.03	0.16	2.7	0.3	1.1	0.7
DE	81.7	66.2	-19.0	31.2	59.8	28.6	51.6	82.6	31.1	-0.48	-4.61	-6.5	0.0	0.8	0.7
EE	1.3	1.2	-12.6	25.2	55.3	30.1	47.7	81.5	33.9	0.01	0.04	3.4	0.2	-0.2	-0.4
IE	4.5	6.6	46.5	17.1	36.5	19.4	49.3	66.5	17.2	-0.14	-0.19	-2.8	0.5	-7.0	-7.5
EL	11.3	11.3	-0.4	28.6	56.5	27.9	50.3	81.0	30.7	0.01	0.16	1.4	0.4	-0.6	-1.0
ES	46.1	52.2	13.4	24.9	56.2	31.3	47.0	79.0	32.0	-0.59	0.32	0.6	0.5	-2.8	-3.3
FR	64.9	73.7	13.7	25.8	46.6	20.8	54.3	75.3	21.0	2.30	1.95	2.7	0.0	1.4	1.4
IT	60.5	64.9	7.3	30.8	56.6	25.8	52.2	78.9	26.7	0.48	5.53	9.3	-0.2	-2.7	-2.6
CY	0.8	1.1	40.9	18.9	47.8	29.0	42.9	73.6	30.7	-0.01	-0.18	-13.9	0.9	3.4	2.5
LV	2.2	1.7	-25.8	25.2	67.9	42.7	45.2	90.5	45.3	0.00	-0.02	-1.0	0.0	3.4	3.4
LT	3.3	2.7	-19.6	23.4	56.7	33.3	45.1	81.7	36.5	-0.02	0.12	4.8	0.2	-9.0	-9.2
LU	0.5	0.7	44.0	20.4	45.2	24.8	46.2	71.0	24.8	0.01	0.00	-0.4	-0.7	6.1	6.7
HU	10.0	8.8	-11.7	24.3	58.1	33.8	45.7	80.3	34.6	-0.02	0.12	1.4	0.1	0.4	0.4
MT	0.4	0.4	-6.3	21.8	55.9	34.1	44.2	79.3	35.1	0.00	-0.02	-4.4	0.6	-3.2	-3.8
NL	16.6	17.1	2.7	23.0	47.5	24.5	49.2	74.6	25.4	0.11	0.46	2.8	0.2	0.3	0.1
AT	8.4	8.9	5.7	26.1	50.8	24.8	47.9	74.4	26.5	-0.02	-0.17	-1.9	0.1	0.2	0.1
PL	38.2	32.6	-14.6	19.0	64.8	45.8	40.2	87.3	47.2	0.10	1.47	4.7	0.0	-4.2	-4.2
PT	10.6	10.2	-3.7	26.9	57.2	30.3	49.6	78.7	29.1	-0.08	-1.02	-9.0	0.4	2.5	2.1
RO	21.4	17.2	-19.6	21.3	64.8	43.5	43.0	86.3	43.4	0.11	0.32	1.9	0.0	-0.5	-0.5
SI	2.1	2.1	0.0	23.7	57.5	33.7	44.0	82.4	38.3	0.02	0.28	15.5	-0.2	-4.7	-4.6
SK	5.4	5.1	-6.1	17.0	61.9	44.9	38.2	84.7	46.6	0.03	0.56	12.2	0.1	-6.6	-6.7
FI	5.4	5.7	7.1	26.1	47.6	21.5	51.1	75.7	24.6	0.03	0.34	6.4	0.4	-1.8	-2.1
SE	9.4	11.5	23.0	28.1	46.2	18.2	53.6	75.7	22.1	0.08	0.66	6.1	0.3	-0.5	-0.7
UK	62.2	79.0	27.0	25.0	42.1	17.1	51.5	71.5	20.0	0.24	2.37	3.1	0.3	0.0	-0.3
NO	4.9	6.6	35.0	22.7	43.1	20.4	51.1	72.6	21.5	0.07	0.56	9.3	-0.1	-0.8	-0.8
EU27	501.8	516.5	2.9	26.0	52.5	26.5	49.3	77.9	28.5	2.40	10.78	2.1	0.1	-0.9	-1.1
EA	331.4	340.8	2.9	27.6	53.3	25.7	50.9	78.0	27.2						

Source: Commission services, EPC.

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

	Projection exercise 2012															Projection exercise 2012 - Projection exercise 2009													
	Employment rate (15-64)			Employment rate (55-64)			Participation rate (15-64)			Participation rate (55-64)			Unemployment rate (15-64)			Employment rate (15-64)			Employment rate (55-64)			Participation rate (15-64)			Participation rate (55-64)			Unemployment rate (15-64)		
	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change	2010	2060	p.p. change
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	8.4	7.3	-1.1	-0.8	-1.9	-1.1	-0.2	-0.6	-0.4	-0.2	-1.3	-1.0	0.0	-0.4	-0.4	0.9	1.1	0.2
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	10.5	7.3	-3.2	-4.7	-1.6	3.2	0.6	8.0	7.4	-0.9	0.2	1.1	3.1	9.5	6.4	5.8	2.6	-3.2
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	7.3	6.1	-1.2	-2.8	-1.6	1.2	-3.9	3.8	7.6	-0.8	-0.5	0.4	-2.6	4.9	7.4	2.9	1.6	-1.3
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	7.5	4.8	-2.8	-3.7	-1.5	2.3	-1.1	3.2	4.3	-0.3	-0.2	0.1	0.7	3.8	3.1	4.3	1.5	-2.8
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	7.2	6.1	-1.0	0.1	-0.8	-0.9	3.4	1.4	-2.1	-0.6	-0.9	-0.3	2.6	1.0	-1.6	-0.8	-0.1	0.7
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	17.2	7.3	-10.0	-10.6	-1.8	8.8	-7.3	6.3	13.5	-0.4	1.1	1.5	1.4	9.4	8.0	13.8	3.8	-10.0
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	-10.2	-9.2	1.0	-5.6	-5.6	0.0	-4.3	-9.0	-4.7	-2.4	-5.2	-2.7	8.7	1.0	-7.7
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	-3.1	2.7	5.8	-0.8	16.6	17.4	0.2	3.8	3.6	0.6	17.8	17.2	4.7	1.1	-3.7
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	-8.3	-0.7	7.6	-4.4	2.0	6.4	0.1	0.1	0.0	-0.5	2.4	2.9	11.4	1.1	-10.4
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	-0.5	2.1	2.6	2.8	12.8	10.0	0.6	3.1	2.4	3.7	14.1	10.4	1.6	1.1	-0.5
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	-3.1	-2.0	1.1	-1.7	4.6	6.4	-1.4	-1.1	0.4	-1.3	5.2	6.5	2.8	1.5	-1.3
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	-3.8	-0.8	3.0	-0.6	3.0	3.6	-1.4	0.0	1.5	0.8	3.7	2.9	3.3	1.1	-2.3
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	-11.1	0.7	11.7	-8.7	4.3	13.0	-0.7	2.7	3.3	-1.8	6.1	7.9	14.1	2.4	-11.7
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	-8.6	1.9	10.5	-8.5	10.1	18.6	1.8	4.8	3.0	-2.1	12.0	14.0	14.6	3.7	-10.8
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	1.1	0.9	-0.2	3.6	0.2	-3.4	1.0	0.7	-0.3	3.7	0.3	-3.5	-0.2	-0.4	-0.2
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	-3.2	1.2	4.4	-6.0	8.6	14.6	-1.0	2.1	3.1	-4.9	9.6	14.5	3.5	1.1	-2.5
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	0.8	5.2	4.4	4.4	8.3	3.9	1.3	5.9	4.6	4.9	8.2	3.3	0.7	0.4	-0.2
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	-1.6	-0.6	1.0	2.3	5.0	2.7	-0.5	-0.3	0.2	2.8	5.0	2.2	1.5	0.4	-1.1
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	-0.3	0.0	0.3	2.7	1.1	-1.6	-0.1	-0.1	0.1	2.6	0.6	-1.9	0.2	-0.2	-0.4
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	-0.9	-0.1	0.8	2.8	0.1	-2.7	1.8	0.9	-0.9	4.1	0.8	-3.3	3.9	1.4	-2.6
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	-3.8	-0.5	3.3	-4.1	1.0	5.1	-1.1	0.4	1.5	-2.7	1.6	4.3	3.8	1.1	-2.7
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	-1.2	-0.8	0.5	-2.7	0.4	3.1	-0.2	-0.4	-0.2	-2.2	0.8	3.0	1.6	1.1	-0.6
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	-1.8	2.0	3.8	-0.3	12.1	12.4	0.1	2.8	2.7	0.0	12.4	12.4	2.7	1.0	-1.7
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	-3.6	-4.0	-0.4	-2.5	-2.2	0.3	-1.5	-3.4	-2.0	-1.6	-2.3	-0.7	3.3	1.1	-2.3
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	-2.7	-3.4	-0.6	1.9	-1.9	-3.7	-0.7	-2.9	-2.3	2.9	-2.0	-4.8	2.8	0.8	-2.0
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	-2.9	-1.1	1.8	-0.3	0.8	1.2	-0.9	-0.7	0.2	0.8	1.1	0.3	2.6	0.6	-2.0
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	-2.2	-2.0	0.2	0.4	-1.1	-1.5	-0.3	-2.0	-1.7	1.4	-1.1	-2.5	2.6	0.2	-2.4
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	0.3	0.6	0.3	2.6	2.7	0.1	-0.1	0.0	0.1	2.5	2.5	0.0	-0.5	-0.8	-0.3
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	-2.4	-0.9	1.5	0.1	3.5	3.4	-0.3	-0.3	0.0	1.1	3.9	2.8	3.1	0.8	-2.3
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	-2.5	-0.7	1.8	0.4	4.7	4.3	-0.5	-0.1	0.4	1.2	5.1	3.9	2.9	0.8	-2.1

Source: Commission services, EPC.

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

	2012 projection										Projection exercise 2012 - Projection exercise 2009									
		Due to growth in:										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	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	1=2+5	2=3+4	*3*	*4*	5=6+7+8+9	*6*	*7*	*8*	*9*	10=1-6
BE	**1.6**	**1.4**	0.9	0.5	**0.2**	0.4	-0.1	-0.1	0.0	**1.2**	**BE**	**-0.2**	**-0.3**	-0.2	-0.1	**0.1**	0.1	-0.1	0.1	0.0	**-0.3**
BG	**1.3**	**2.3**	1.4	0.9	**-1.0**	-0.6	0.0	-0.3	0.0	**1.9**	**BG**	**-0.3**	**-0.4**	-0.1	-0.3	**0.1**	0.0	0.0	0.0	0.0	**-0.3**
CZ	**1.5**	**1.9**	1.2	0.7	**-0.3**	0.0	0.0	-0.3	0.0	**1.6**	**CZ**	**0.0**	**-0.2**	-0.1	-0.1	**0.2**	0.2	-0.1	0.1	0.0	**-0.2**
DK	**1.4**	**1.4**	0.9	0.5	**0.0**	0.2	0.0	-0.1	0.0	**1.3**	**DK**	**-0.3**	**-0.3**	-0.2	-0.1	**0.0**	0.0	-0.1	0.0	0.0	**-0.3**
DE	**0.8**	**1.5**	0.9	0.5	**-0.6**	-0.4	0.1	-0.3	0.0	**1.2**	**DE**	**-0.4**	**-0.2**	-0.2	-0.1	**-0.1**	-0.1	0.0	0.0	0.0	**-0.2**
EE	**1.5**	**2.1**	1.2	0.8	**-0.6**	-0.3	-0.1	-0.2	0.0	**1.8**	**EE**	**-0.3**	**-0.4**	-0.2	-0.2	**0.1**	0.1	0.0	0.0	0.0	**-0.3**
IE	**2.1**	**1.6**	1.0	0.6	**0.5**	0.8	-0.1	-0.2	0.0	**1.3**	**IE**	**-0.2**	**-0.1**	-0.1	0.0	**-0.1**	0.0	-0.1	0.1	0.0	**-0.2**
EL	**1.0**	**1.1**	0.8	0.3	**-0.1**	0.1	0.0	-0.3	0.0	**0.9**	**EL**	**-0.6**	**-0.8**	-0.4	-0.4	**0.2**	0.1	0.0	0.0	0.0	**-0.7**
ES	**1.6**	**1.4**	0.8	0.6	**0.2**	0.3	0.2	-0.3	0.0	**1.3**	**ES**	**-0.3**	**-0.5**	-0.4	-0.1	**0.2**	0.0	0.1	0.1	0.0	**-0.3**
FR	**1.7**	**1.5**	0.9	0.5	**0.2**	0.3	0.0	-0.1	0.0	**1.4**	**FR**	**-0.2**	**-0.2**	-0.1	-0.1	**0.0**	0.0	0.0	0.0	0.0	**-0.2**
IT	**1.3**	**1.3**	0.8	0.5	**0.1**	0.2	0.1	-0.2	0.0	**1.2**	**IT**	**-0.1**	**-0.3**	-0.3	-0.1	**0.2**	0.2	0.0	0.0	0.0	**-0.3**
CY	**1.8**	**1.4**	0.8	0.5	**0.5**	0.8	-0.2	-0.2	0.0	**1.1**	**CY**	**-0.9**	**-0.5**	-0.4	-0.2	**-0.3**	-0.2	-0.2	0.1	0.0	**-0.7**
LV	**1.1**	**2.1**	1.2	0.9	**-1.0**	-0.6	0.0	-0.3	-0.1	**1.7**	**LV**	**-0.3**	**-0.4**	-0.2	-0.2	**0.1**	0.0	0.1	0.1	-0.1	**-0.2**
LT	**1.3**	**1.9**	1.1	0.8	**-0.7**	-0.4	-0.1	-0.2	0.1	**1.7**	**LT**	**-0.2**	**-0.5**	-0.3	-0.2	**0.3**	0.1	0.0	0.1	0.1	**-0.3**
LU	**1.9**	**1.5**	0.9	0.6	**0.4**	0.8	-0.1	-0.2	-0.1	**1.2**	**LU**	**-0.6**	**-0.3**	-0.2	-0.1	**-0.4**	0.0	-0.3	0.0	-0.1	**-0.6**
HU	**1.2**	**1.7**	1.0	0.7	**-0.5**	-0.2	0.0	-0.2	0.0	**1.4**	**HU**	**-0.5**	**-0.5**	-0.4	-0.1	**0.0**	0.1	-0.1	0.1	0.0	**-0.6**
MT	**1.4**	**1.7**	1.1	0.6	**-0.2**	-0.1	0.2	-0.2	-0.1	**1.6**	**MT**	**-0.2**	**-0.2**	-0.1	-0.1	**0.1**	-0.1	0.2	0.1	-0.1	**-0.1**
NL	**1.3**	**1.5**	1.0	0.5	**-0.2**	0.1	-0.1	-0.2	0.0	**1.2**	**NL**	**-0.2**	**-0.2**	-0.1	-0.1	**0.0**	0.1	-0.1	0.0	0.0	**-0.3**
AT	**1.4**	**1.5**	1.0	0.5	**-0.1**	0.1	0.0	-0.2	0.0	**1.3**	**AT**	**-0.2**	**-0.2**	-0.1	-0.1	**-0.1**	0.0	-0.1	0.1	0.0	**-0.2**
PL	**1.5**	**2.2**	1.3	0.8	**-0.6**	-0.3	-0.1	-0.3	0.0	**1.8**	**PL**	**0.0**	**-0.2**	0.0	-0.2	**0.2**	0.1	0.0	0.1	0.0	**-0.1**
PT	**1.2**	**1.4**	0.9	0.5	**-0.2**	-0.1	0.0	-0.2	0.0	**1.3**	**PT**	**-0.6**	**-0.5**	-0.3	-0.2	**-0.1**	-0.2	0.0	0.0	0.1	**-0.4**
RO	**1.1**	**2.1**	1.3	0.8	**-1.0**	-0.4	-0.3	-0.3	0.0	**1.5**	**RO**	**-0.7**	**-0.6**	-0.3	-0.3	**-0.1**	0.0	-0.2	0.1	0.0	**-0.7**
SI	**1.3**	**1.6**	1.0	0.7	**-0.3**	0.0	0.0	-0.3	0.0	**1.3**	**SI**	**-0.1**	**-0.5**	-0.3	-0.2	**0.4**	0.3	0.0	0.1	0.0	**-0.4**
SK	**1.6**	**2.3**	1.4	0.8	**-0.6**	-0.1	-0.2	-0.3	0.0	**1.8**	**SK**	**-0.1**	**-0.1**	-0.1	-0.1	**0.1**	0.2	-0.3	0.1	0.0	**-0.3**
FI	**1.5**	**1.7**	1.1	0.6	**-0.1**	0.2	-0.1	-0.2	0.0	**1.4**	**FI**	**-0.1**	**-0.1**	0.0	-0.1	**0.0**	0.1	-0.1	0.0	0.0	**-0.2**
SE	**1.8**	**1.5**	1.0	0.5	**0.2**	0.4	0.0	-0.2	0.0	**1.3**	**SE**	**-0.1**	**-0.2**	-0.1	-0.1	**0.1**	0.1	-0.1	0.0	0.0	**-0.2**
UK	**1.9**	**1.6**	1.0	0.6	**0.3**	0.5	0.0	-0.2	0.0	**1.4**	**UK**	**-0.2**	**-0.2**	-0.1	-0.1	**0.0**	0.1	-0.1	0.0	0.0	**-0.3**
NO	**2.0**	**1.6**	1.1	0.5	**0.4**	0.6	-0.1	-0.1	0.0	**1.3**	**NO**	**0.1**	**-0.1**	0.0	0.0	**0.2**	0.2	0.0	0.0	0.0	**-0.1**
EA	**1.34**	**1.4**	0.9	0.5	**-0.1**	0.1	0.0	-0.2	0.0	**1.3**	**EA**	**-0.2**	**-0.3**	-0.2	-0.1	**0.1**	0.0	0.0	0.0	0.0	**-0.3**
EU27	**1.41**	**1.5**	1.0	0.6	**-0.1**	0.1	0.1	-0.2	-0.1	**1.3**	**EU27**	**-0.2**	**-0.3**	-0.2	-0.1	**0.1**	0.0	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[39] 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.[40] 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).

[39] At least before retirement age. After retirement, disability pensions cease to be paid by the sickness insurance scheme.

[40] 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:[41]

- 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.[42]

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.[43]

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.

[41] 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.

[42] 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

[43] 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) M* (prof)	V*
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	ER	X	ER	ER		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).[44]

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[45] 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%.[46]

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

[45] As of 2014.

[46] 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[47] – 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.

[47] 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.[48]

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*": "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.

[48] 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.[49] 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.[50]

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

[49] 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.

[50] 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.[51]

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.[52] 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.[53] 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.[54,55] 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).[56]

[51] 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.

[52] 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.

[53] All these possible measures are also stressed in the European Commission Annual Growth Survey 2012: http://ec.europa.eu/europe2020/pdf/ags2012_en.pdf

[54] 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.

[55] 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.

[56] See also the box on sustainability factors in pension systems, above.

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 1st, 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 1st, 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			FEMALE			MALE			FEMALE		
	2005	2009	2020 (j)	2060 (j)	2005	2009	2020 (j)	2060 (j)	2005	2009	2020 (j)	2060 (j)	2010	2020	2060	2010	2020	2060	2010	2020	2060	2010	2020	2060
BE	60.6	61.6 (c)	61.5	61.5	61.6	61.2 (c)	61.4	61.4	59.6	61.9 (c)	61.5	61.5	17.4	18.4	22.3	20.9	21.9	25.7	65	65	65	65	65	65
BG	58.6 (e)	60.2 (e)	62.1	63.2	59.3 (e)	60.6 (e)	63.0	64.2	57.6 (e)	59.9 (e)	61.2	62.1	13.8	15.3	20.6	17.0	18.4	23.6	63	63	65	60	60	63
CZ	60.6	60.5	62.0	64.9	62.3	61.5	63.1	65.1	59.1	59.6	60.9	64.6	15.3	16.5	21.2	18.7	19.9	24.5	62y 2m (f)	63y 8m (f)	69y 4m (f)	58y 8m (g)	61y 8m (g)	69y 4m (g)
DK	61	62.3	63.5	65.3	61.2	63.2	64.2	65.4	60.7	61.4	62.8	65.1	16.8	17.9	22.0	19.5	20.8	25.1	65	65	72.5	65	65	72.5
DE	61.3 (a)	62.2	64.6	65.0	61.4 (a)	62.6	64.9	65.1	61.1 (a)	61.9	64.3	64.9	17.4	18.5	22.4	20.6	21.6	25.4	65	65y 9m	67	65	65y 9m	67
EE	61.7	62.6	64.1	64.7	:	:	63.9	64.7	:	:	64.3	64.6	14.1	15.5	20.9	19.1	20.4	24.9	63	63y 9m	65	61	63y 9m	65
IE	64.1	64.1 (b)	65.0	65.0	63.6	63.5 (b)	64.4	64.4	64.6	64.7 (b)	65.7	65.7	16.8	18.0	22.2	20.0	21.2	25.5	66	66	68	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	17.9	18.9	22.6	20.2	21.1	24.6	65	65	69.4 (h)	60	65	69.4 (h)
ES	62.4	62.3	64.5	65.3	62	61.2	64.1	65.0	62.8	63.4	65.1	65.5	18.2	19.2	22.9	22.1	23.0	26.3	65	65.8	67	65	65.8	67
FR	59	60	62.1	62.7	58.7	60.3	62.1	62.7	59.3	59.8	62.1	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
IT	59.7	60.1	65.2	66.7	60.7	60.8	65.4	66.8	58.8	59.4	64.9	66.7	18.1	19.1	22.8	21.7	22.7	26.1	65y 4m	66y 11m	70y 3m	60y 4m	66y 11m	70y 3m
CY	62.7 (a)	62.8	64.3	64.3	:	:	65.0	65.0	:	:	63.5	63.5	17.8	18.8	22.5	20.0	21.1	25.3	65	65	65	65	65	65
LV	62.1	62.7 (d)	63.3	63.3	:	:	63.6	63.6	:	:	63.1	63.1	13.5	15.0	20.6	18.1	19.5	24.4	62	62	62	62	62	62
LT	60	59.9 (b)	63.1	63.8	:	:	63.7	64.0	:	:	62.7	63.6	13.5	15.0	20.4	18.4	19.6	24.2	62.5	64	65	60	63	65
LU	59.4	:	59.9	59.9	:	:	59.5	59.5	:	:	60.5	60.4	17.3	18.4	22.4	21.1	22.2	26.1	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	62.5	62.9	14.0	15.5	20.9	18.1	19.5	24.6	62	65	65	62	65	65
MT	58.8	60.3	62.4	63.3	:	:	62.8	63.8	:	:	61.7	62.6	17.0	18.1	22.2	20.2	21.3	25.4	61	63	65	60	63	65
NL	61.5	63.5	63.1	63.1	61.6	63.9	63.9	63.9	61.4	63.1	62.2	62.2	17.5	18.5	22.3	20.9	21.9	25.6	65	65	65	65	65	65
AT	59.9	60.9 (c)	61.8	62.4	60.3	62.6 (c)	62.4	62.5	59.4	59.4 (c)	61.2	62.3	17.6	18.6	22.4	20.9	21.9	25.6	65	65	65	60	60	65
PL	59.5	59.3 (c)	62.0	62.5	62	61.4 (c)	63.6	64.0	57.4	57.5 (c)	60.3	60.7	14.8	16.2	21.2	19.1	20.3	24.8	65	65	65	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)	63.9 (e)	64.4	64.6	17.1	18.1	22.1	20.4	21.4	25.1	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	63.2 (b)	61.2	62.0	14.1	15.5	20.8	17.2	18.6	23.8	64	65	65	59	61	63
SI	58.5	59.8 (b)	62.5	63.1	:	:	63.1	63.1	:	:	62.0	63.1	16.4	17.6	21.9	20.2	21.3	25.3	63	63	63	61	61	61
SK	59.2	58.8	61.3	61.3	61.1	60.4	61.5	61.5	57.6	57.5	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)	62
FI	61.7	61.7	63.6	63.6	61.8	62.3	63.6	63.6	61.7	61.1	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
SE	63.6	64.3	64.7	64.7	64.3	64.7	65.1	65.1	63	64	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)
UK	62.6	63	64.1	65.3	63.4	64.1	64.3	65.3	61.9	62	63.9	65.3	18.0	19.0	22.8	20.7	21.8	25.7	65	66	68	60	66	68
NO	63.1	63.2	64.3	64.3	63.1	63	64.6	64.6	63.1	63.3	64.1	64.1	17.9	18.9	22.5	21.0	22.0	25.7	67	67	67	67	67	67
EU27	61	61.4	63.5	64.3	61.6	61.8	63.9	64.5	60.4	61	63.2	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	61	63.7	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.

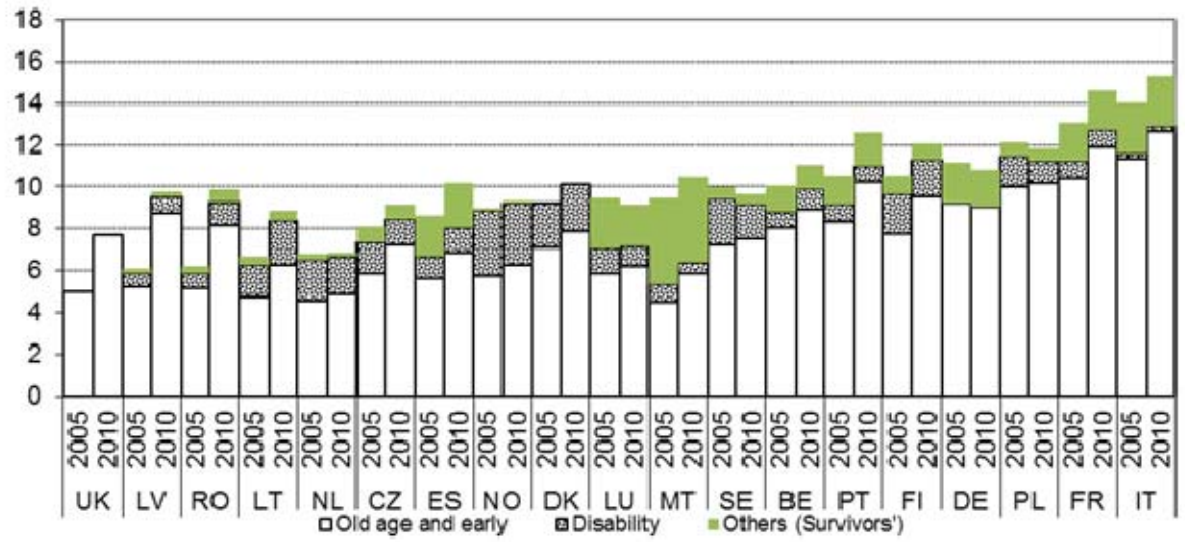
(j): The average effective exit age calculation for 2020 and 2060 is based on the reference age group 50-70.

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

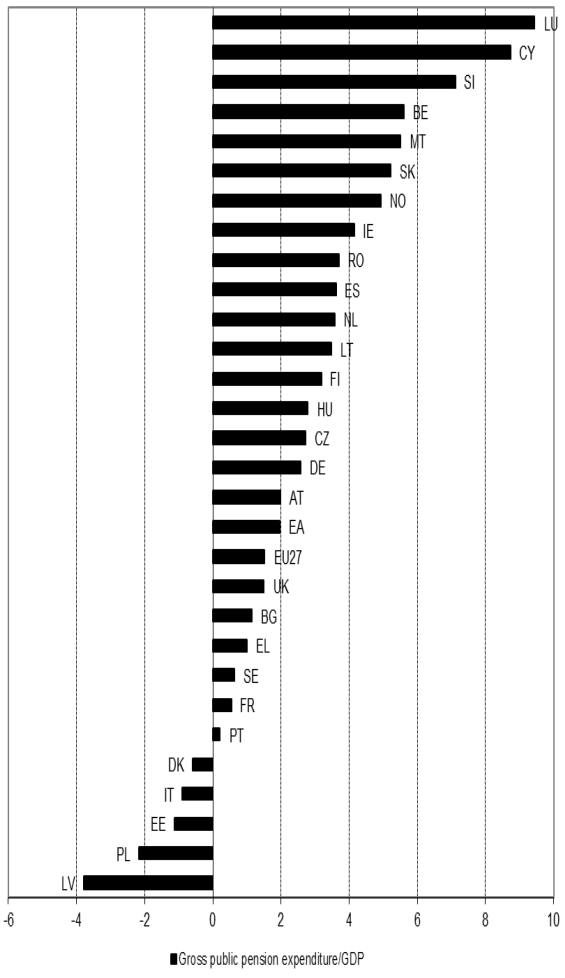
Large differences in pension expenditures across countries will remain also over the whole projection horizon (see Table 2. 5 and Graph 2. 2). Public pension expenditure in the EU27 is projected to increase by 1.5 p.p. of GDP over the period 2010-2060 to a level of 12.9% of GDP. In the euro area, an 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
EU27	11.3	11.3	12.6	12.9	1.5
EA	12.2	12.3	13.9	14.1	2.0

Source: Commission services, EPC.

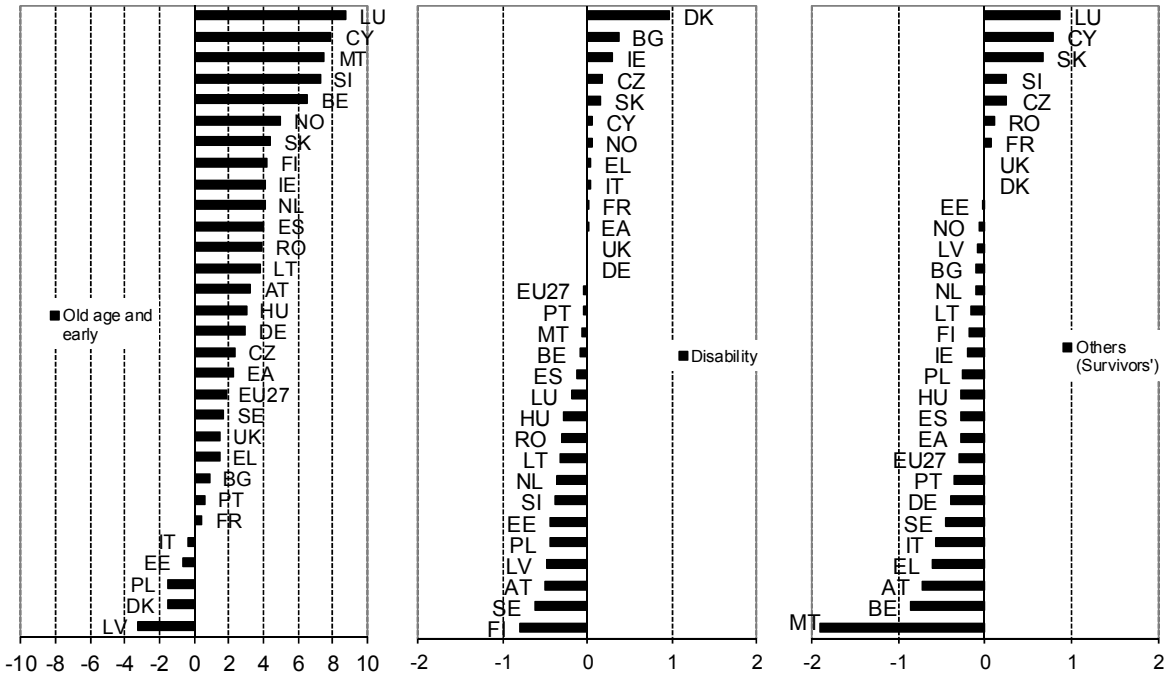
Graph 2. 2 - Change in gross public pension expenditure over 2010-2060 (in p.p. of GDP)



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.[57]

2.4.1.1. Expenditure development by age group

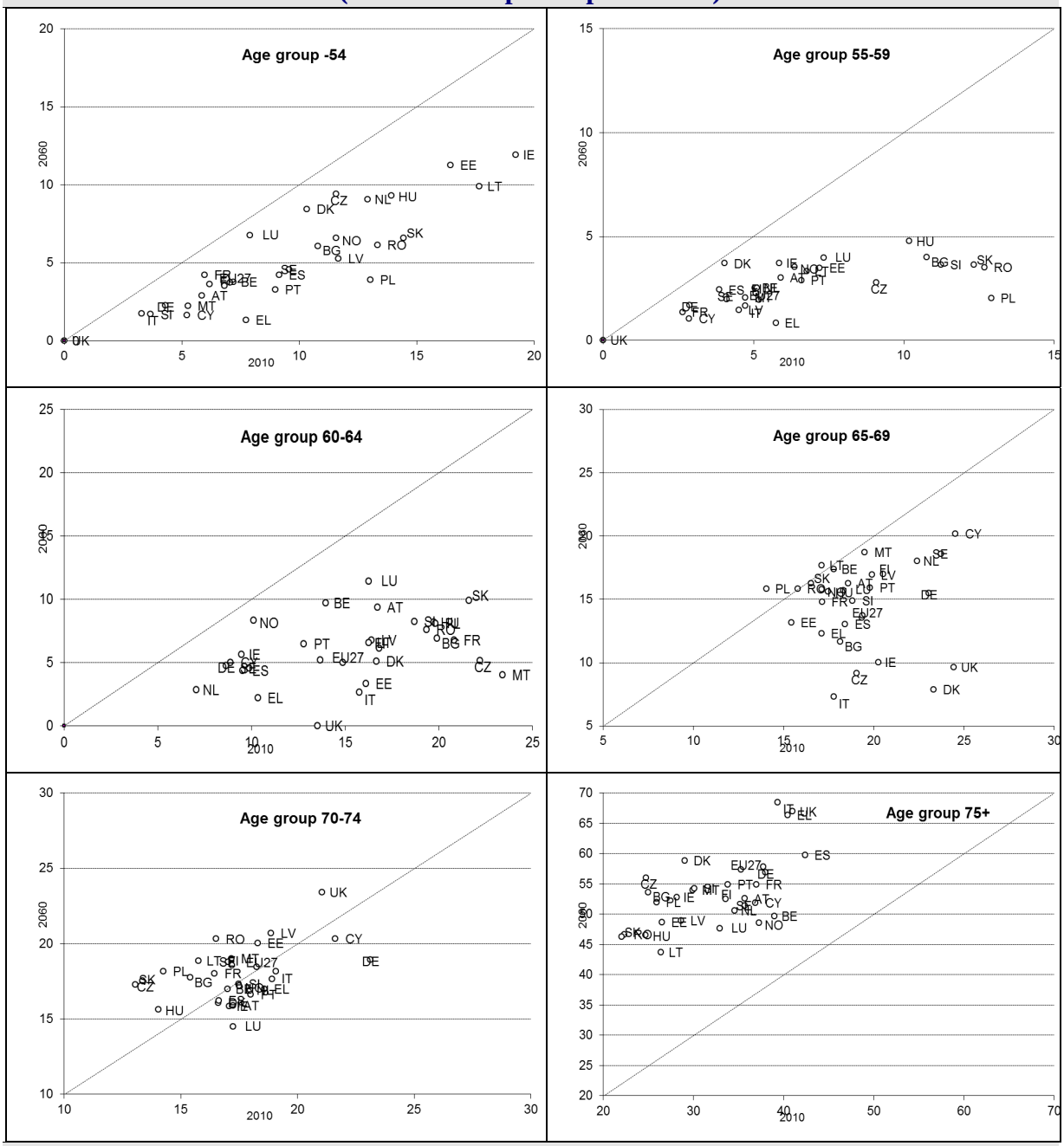
Many countries have introduced pension reforms that will increase the retirement age. To better understand the impact of these reforms, pension expenditures disaggregated by age groups between -54 and 75+ were provided by Member States. Graph 2. 4 depicts the share of public pensioners in different age 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.

[57] 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.

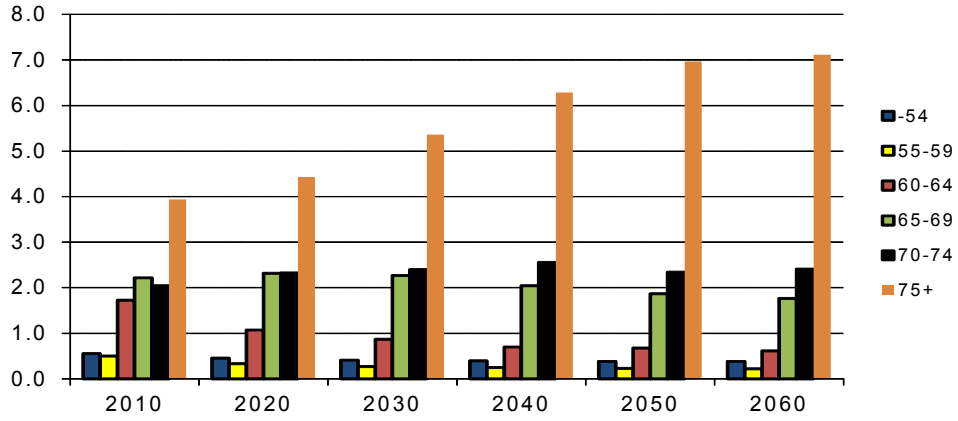
Table 2. 6 - Share of public pensioners in the EU27 by age groups (as % of total public pensioners)

Share of public pensioners in the EU27							
Age group	2010	2020	2030	2040	2050	2060	2010-60 change
-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)

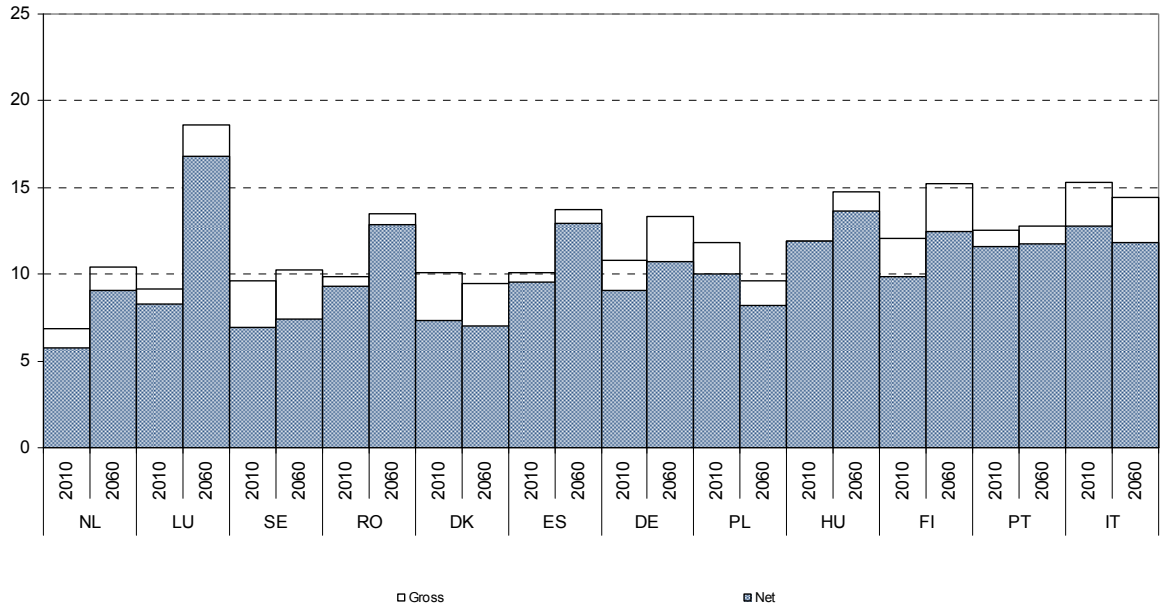
		Age group					
	Year	-54	55-59	60-64	65-69	70-74	75+
BE	2010	0.8	0.7	1.9	2.0	1.8	3.9
	2060	0.6	0.5	1.9	2.9	2.8	7.9
BG	2010	0.8	1.1	2.0	1.9	1.6	2.5
	2060	0.4	0.4	0.7	1.3	2.2	6.0
CZ	2010	0.8	0.7	2.1	1.9	1.3	2.4
	2060	0.8	0.2	0.5	1.0	2.4	7.0
DK	2010	1.2	0.5	2.1	2.1	1.5	2.6
	2060	1.1	0.5	0.7	1.0	1.6	4.7
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.

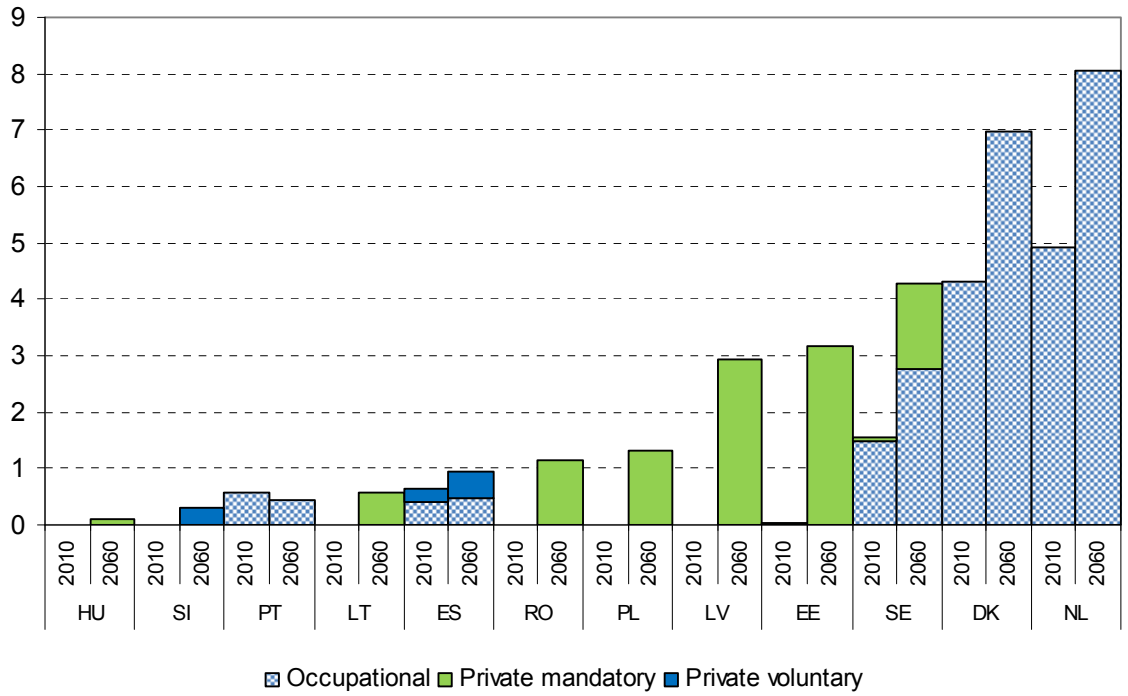
On average, the gap between gross and net public pension amounts to around 1.5 p.p. of GDP in 2010 and 1.8 p.p. of GDP in 2060[58].

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).

[58] 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

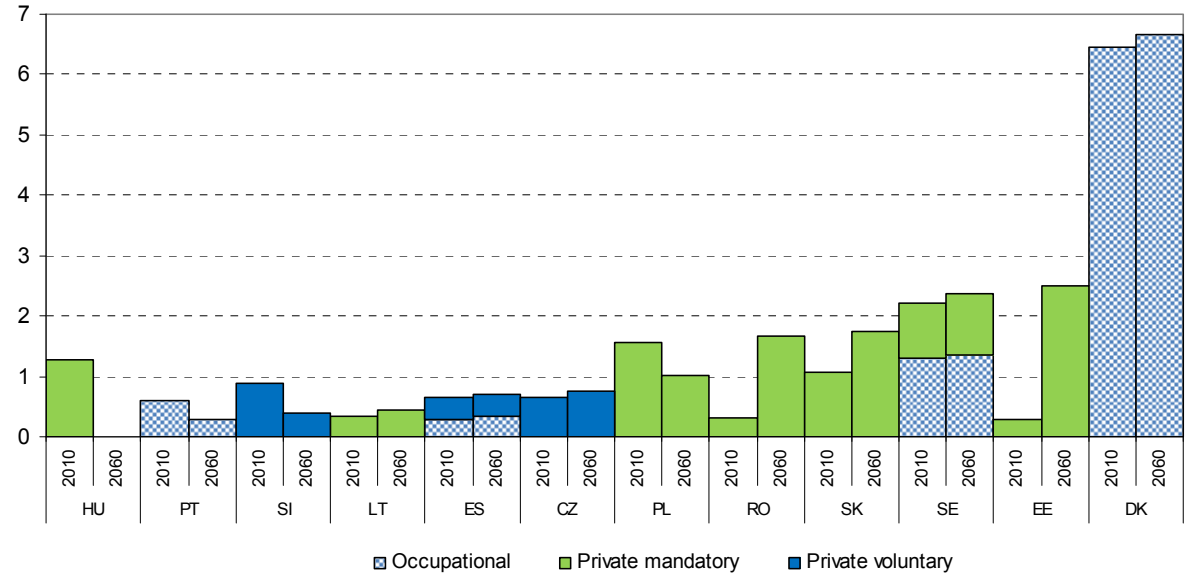
kinds of pensions do not exist in their systems. Comparable to second pillar occupational schemes, the relevance of private mandatory pensions is very low at the moment, but increasing in the future (see Graph 2. 7). As most of the funds will start to pay out pensions only in a few years, only Sweden, 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%).[59]

[59] 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.[60] In Latvia and Poland, the ratio decreases over the whole projection horizon.

[60] 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.

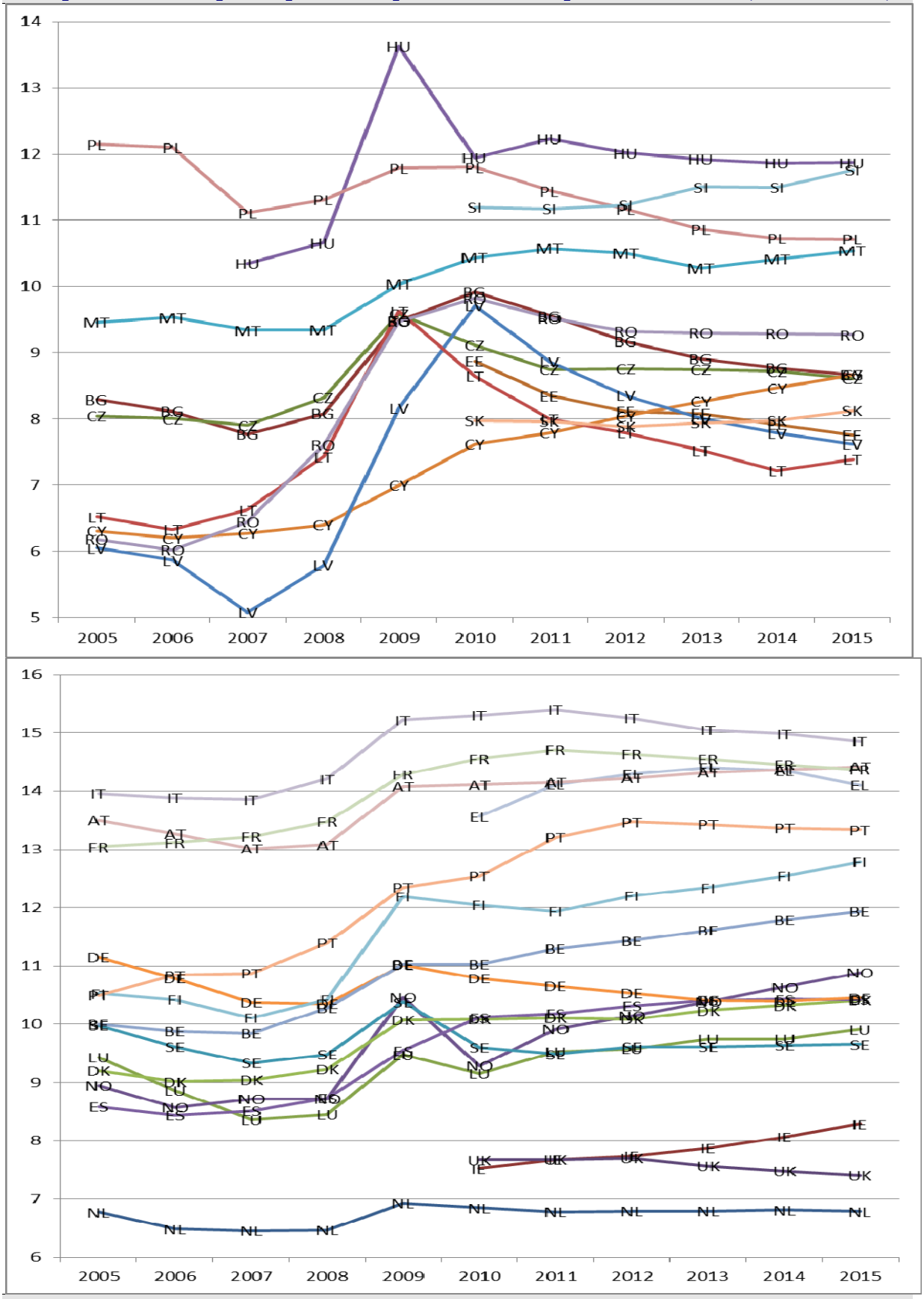
Table 2. 8 - Projected trough and peak years and values for gross public pension expenditure (as % of GDP)

	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.[61] 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.).

[61] 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.[62]

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). [63] 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.[64]

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.[65] 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.

[62] 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.

[63] 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.

[64] 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.

[65] 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:

$$\frac{Pension\ Exp.}{GDP} = \overbrace{\frac{Population\ 65+}{Population\ 20-64}}^{Dependency\ Ratio} \times \overbrace{\frac{Number\ of\ Pensioners}{Population\ 65+}}^{Coverage\ Ratio} \times \overbrace{\frac{Population\ 20-64}{Working\ People\ 20-64}}^{1/\,Employment\,Rate} \times \overbrace{\frac{\frac{Average\ Pension}{GDP}}{HoursWorked\ 20-74}}^{Benefit\ Ratio} \times \underbrace{\frac{WorkingPeople\ 20-64}{HoursWorked\ 20-64}}_{1/\,Labour\ intensity} \times \underbrace{\frac{HoursWorked\ 20-64}{HoursWorked\ 20-74}}_{Residual}$$

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.

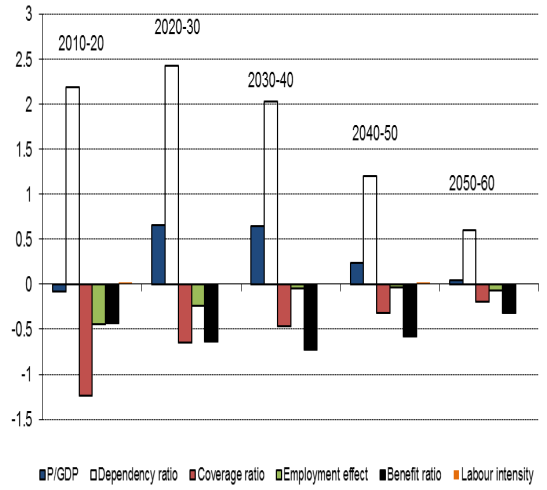
A comparable picture can be observed for the benefit ratio effect. Only two countries project upward pressure on expenditure due to an increasing benefit ratio effect (the United Kingdom with +0.8 p.p. and Ireland with +0.1 p.p.) while in countries like Poland (-8.7 p.p.) and Latvia (-6.8 p.p.) a strong 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.[66]

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

[66] 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).

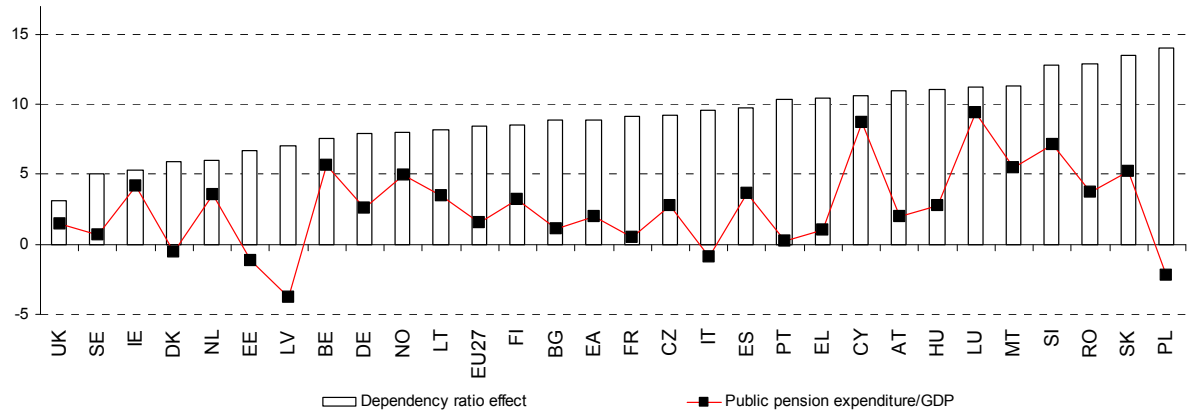
A comparable development can be observed for the employment rate effect at the EU27 level. The strongest diminishing contribution to the overall expenditure change is supposed to take place in the first two decades of the projections (-0.4 p.p. in 2010-2020 and -0.2 p.p. in 2020-2030). Afterwards, the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

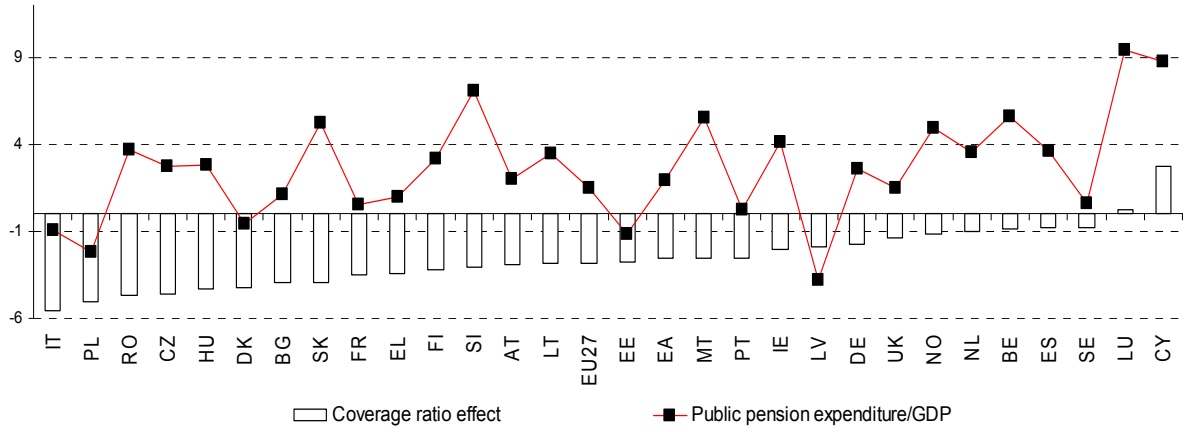
Source: Commission services, EPC.
Note: The "Coverage Ratio 65" is calculated as the total number of public pensioners as a share of the population aged 65 and older. In case the number of pensioners was not provided, in order to quantify the coverage ratio, the number of pensioners was proxied by the 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.[67,68] 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%.

[67] 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.
[68] 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.).[69] The strongest downward contribution is projected for Poland (-2.8 p.p.).[70] 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.).

[69] 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.

[70] 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)

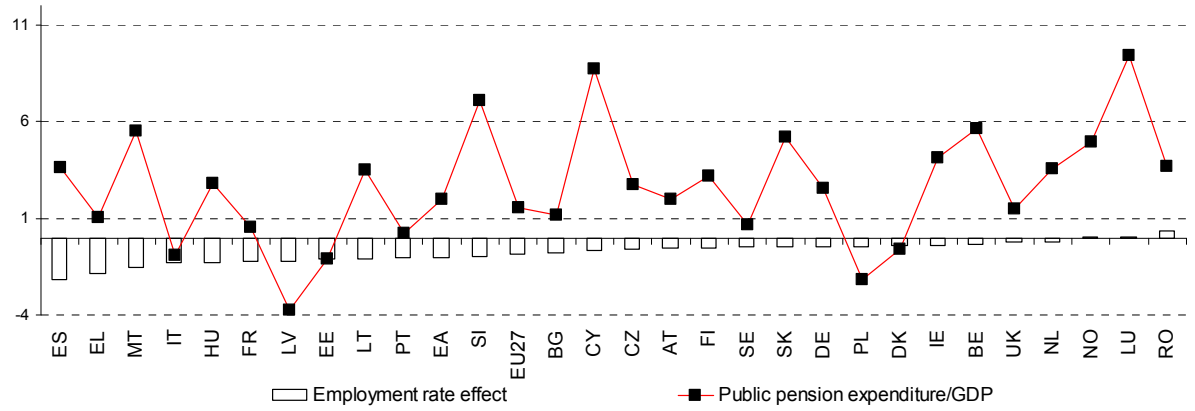
	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60
BE	0.0	-0.5	-0.3	0.1	-0.1	-0.9
BG	-1.3	-1.0	-0.9	-0.6	-0.2	-3.9
CZ	-2.2	-0.6	-0.7	-0.8	-0.3	-4.6
DK	-0.8	-1.5	-1.0	-0.3	-0.6	-4.2
DE	-0.3	-0.8	-0.5	-0.1	-0.1	-1.8
EE	-1.0	-0.8	-0.3	-0.4	-0.2	-2.7
IE	-0.7	-0.8	-0.4	-0.4	0.3	-2.0
EL	-1.2	-0.9	-0.8	-0.5	0.0	-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.).[71] 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.

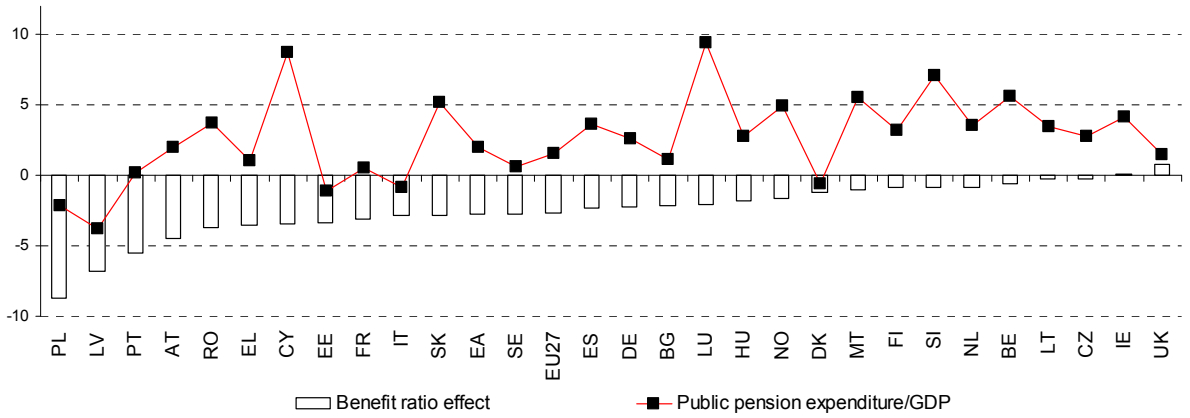
[71] In Poland and Latvia, this is due to a partial shift of pension entitlement accumulation to private pillars. Number of pensions are used to calculate expenditure drivers for Cyprus. As a result, the benefit ratio effect is overestimated due to double counting effects of pensioners receiving more 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.[72] 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.[73]

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.[74] 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. [75] 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.

[72] 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.

[73] 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.

[74] 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.

[75] 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).[76]

(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).

[76] 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.[77]

[77] 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:

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

where P_{new} is the overall spending on new pensions, $\overline{C}_{new}$ is the average contributory period or the average years of service of the new pensions, $\overline{A}_{new}$ is the average accrual rate of the new pensions, $\overline{PE}_{new}$ 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 extent 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.[78] 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.

[78] 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).[79] 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).

[79] 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

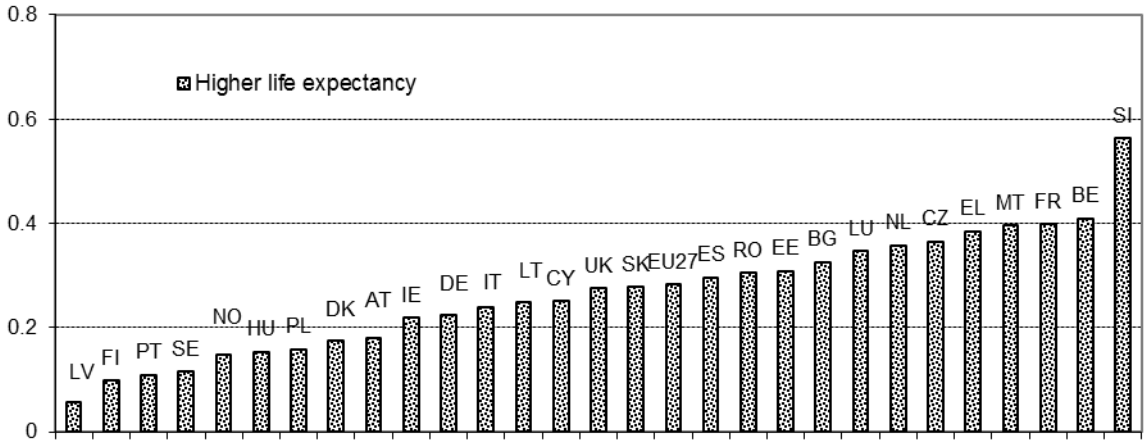
Population		Labour force		Productivity	Interest rate
High life expectancy	**Lower migration**	**Higher employment rate**	**Higher employment rate older workers**	**Higher/lower labour productivity**	**Higher/lower interest rate**
A scenario with an increase of life expectancy at birth of one year by 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)

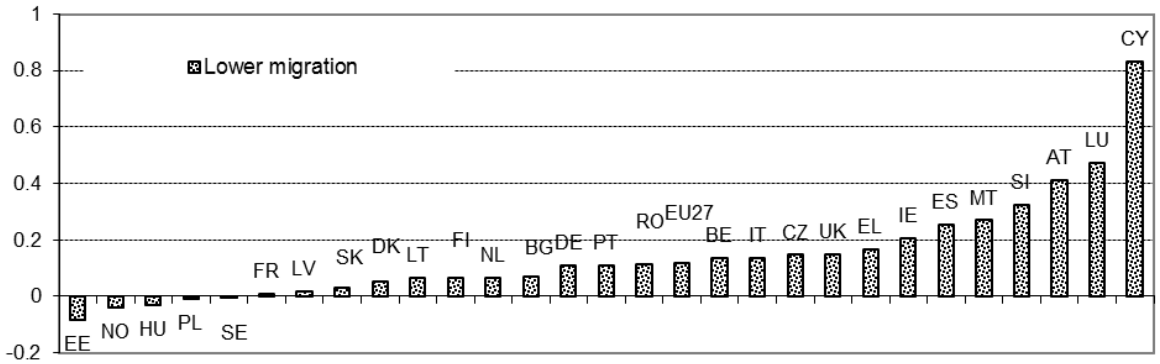


Source: Commission services, EPC.

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)

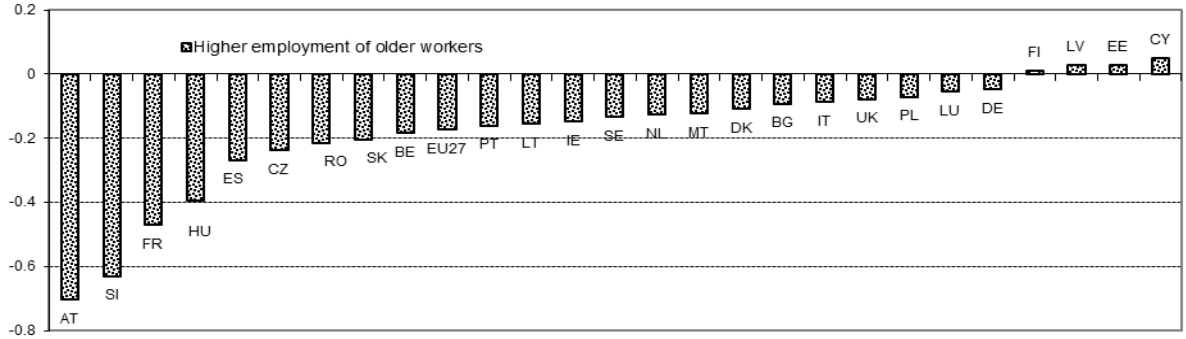


Source: Commission services, EPC.

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)

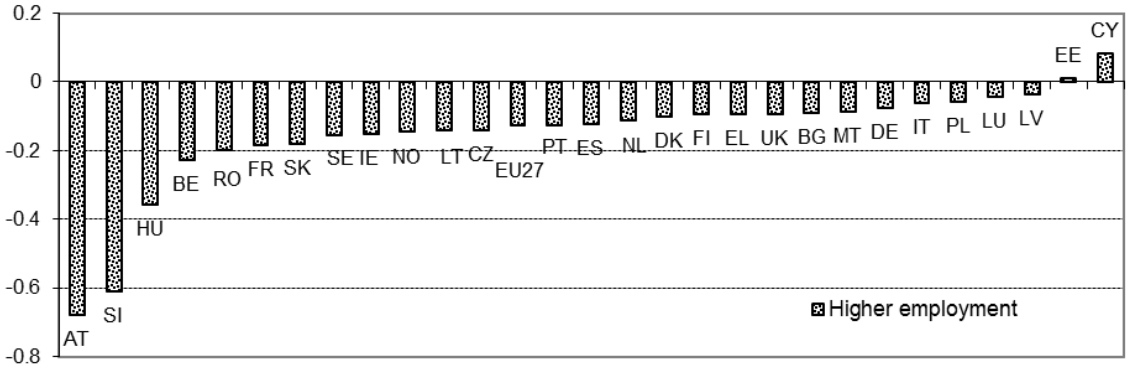


Source: Commission services, EPC.
Note: No results provided by EL and NO.

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)

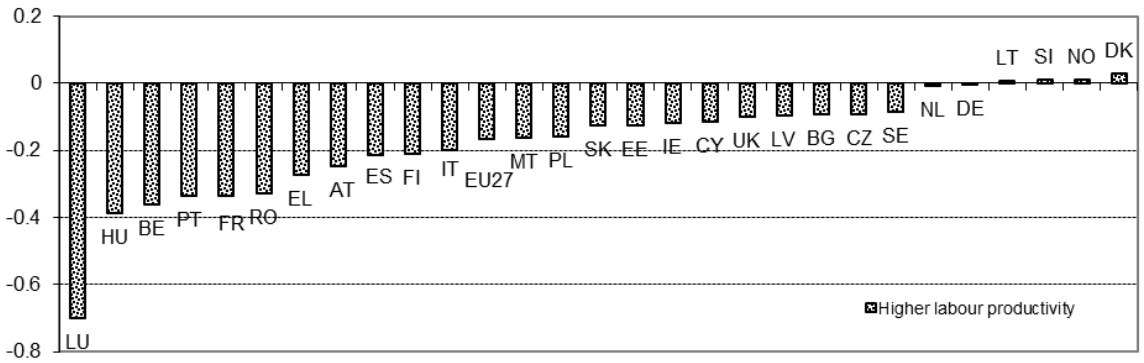


Source: Commission services, EPC.

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)

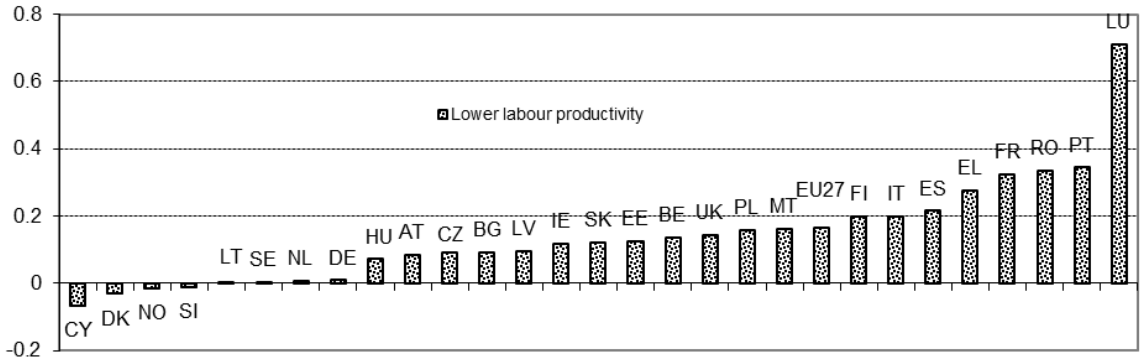


Source: Commission services, EPC.

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)

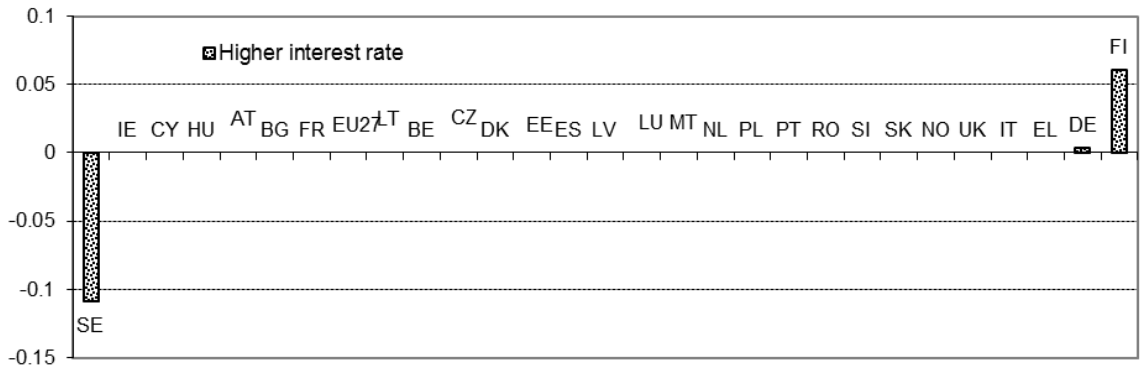


Source: Commission services, EPC.

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)

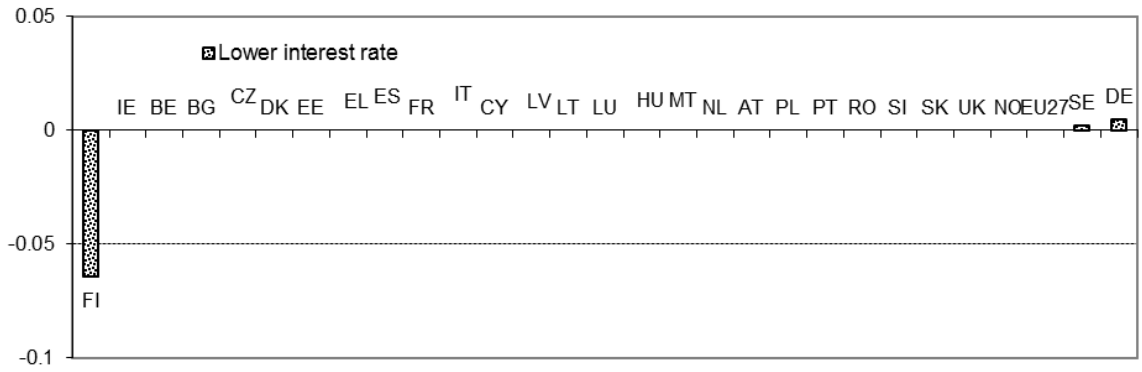


Source: Commission services, EPC.

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).[80,81] 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).

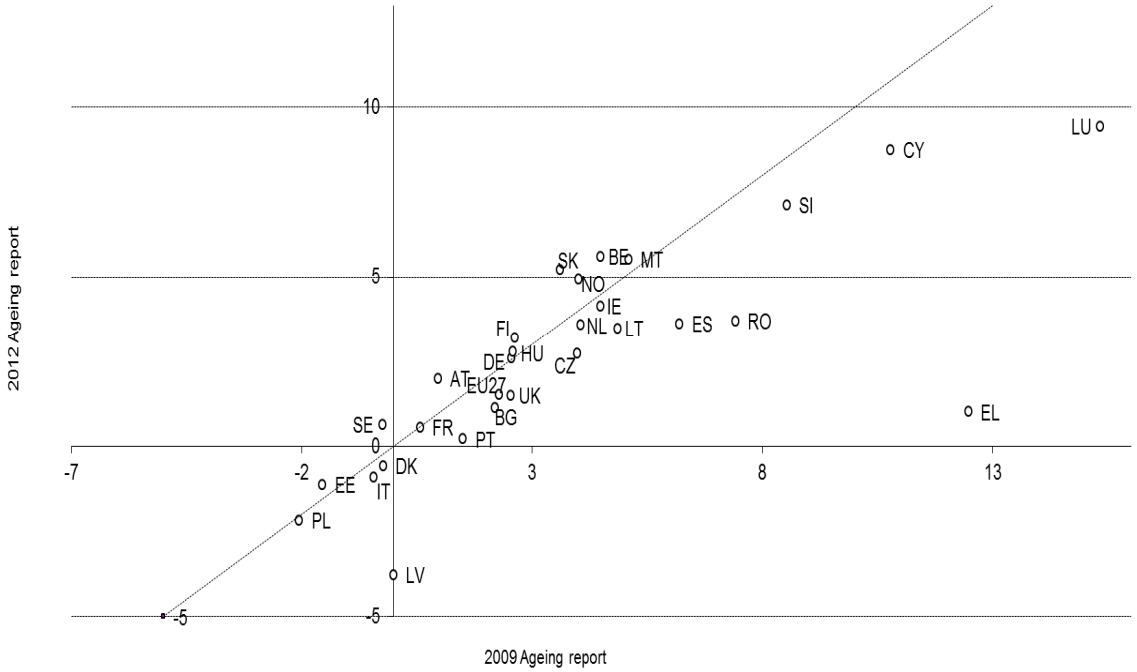
In Belgium, Germany, Estonia, Hungary, Malta, Austria, Slovakia, Finland, Sweden and Norway, the increase in pension expenditure over GDP in this projection round is projected to be higher than in 2009 (or a lower decrease is recorded). However, rather large upward revisions of 1.0 p.p. of GDP are only 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.

[80] In the 2009 Ageing report, gross public pension expenditure was labelled "social security pensions".

[81] 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.[82] 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).

[82] 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	AR2012	AR 2009	AR2012
	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
EU27	10.2	11.3	12.5	12.9	2.3	1.5
EA*	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.[83]

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:

[83] 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.[84]

• The downward impact on pension expenditure of the coverage ratio is more pronounced in the current projection round than in to 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.[85] 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.

[84] 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.

[85] 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)
			ata in curr	Base year						
		GDP (ECFIN projection, in current prices - billions EUR)								
	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								
		1 - PENSION EXPENDITURES (Gross and Net, in millions €)								
	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								
		2 - BENEFIT RATIO								
Vol	44	Public pensions								
Vol	45	Occupational pensions								
Vol	46	Private mandatory pensions								
Vol	47	Private non-mandatory pensions								
Vol	48	Total benefit ratio								
		3 - GROSS AVERAGE REPLACEMENT RATES (at retirment)								
	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								
		4 - NUMBER OF PENSIONS (in 1000)								
	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+								

		5 - NUMBER OF PENSIONERS (in 1000)									
	79	**Public pensions**									
		Of which:									
	80	aged -54									
	81	*Of which: female*									
	82	aged 55-59									
	83	*Of which: female*									
	84	aged 60-64									
	85	*Of which: female*									
	86	aged 65-69									
	87	*Of which: female*									
	88	aged 70-74									
	89	*Of which: female*									
	90	aged 75+									
	91	*Of which: female*									
	92	Old-age and early pensions									
Vol	93	*Of which: earnings-related pensions*									
Vol	94	*Private sector employees*									
Vol	95	*Public sector employees*									
Vol	96	Other pensions (disability, survivors)									
Vol	97	**Occupational scheme**									
Vol	98	**Private scheme**									
Vol	99	Mandatory private scheme									
Vol	100	Non-mandatory private scheme									
	101	**Pensioners receiving non-earning-related minimum pensions**									
	102	**All pensioners**									
		Of which:									
	103	aged -54									
	104	*Of which: female*									
	105	aged 55-59									
	106	*Of which: female*									
	107	aged 60-64									
	108	*Of which: female*									
	109	aged 65-69									
	110	*Of which: female*									
	111	aged 70-74									
	112	*Of which: female*									
	113	aged 75+									
	114	*Of which: female*									
		6 - CONTRIBUTIONS (employee+employer, in millions €)									
	115	**Public pensions**									
	116	Old-age and early pensions									
Vol	117	*Of which: earnings-related pensions*									
Vol	118	*Private sector employees*									
Vol	119	*Public sector employees*									
Vol	120	Other pensions (disability, survivors)									
Vol	121	**Occupational scheme**									
Vol	122	**Private scheme**									
Vol	123	Mandatory private scheme									
Vol	124	Non-mandatory private scheme									
	125	**Total pension contributions**									
		7 - NUMBER OF CONTRIBUTORS (employees, in 1000)									
	126	**Public pensions**									
	127	Old-age and early pensions									
	128	*Of which: earnings-related pensions*									
	129	*Private sector employees*									
	130	*Public sector employees*									
	131	Disability									
	132	Other pensions (survivors)									
Vol	133	**Occupational scheme**									
Vol	134	Average contribution period, years									
Vol	135	**Private scheme**									
Vol	136	Mandatory private scheme									
Vol	137	Average contribution period, years									
Vol	138	Non-mandatory private scheme									
Vol	139	Average contribution period, years									
Vol	140	**All pensions**									
		8 - ASSETS OF PENSION FUNDS AND RESERVES (in millions €)									
Vol	141	**Public pensions**									
Vol	142	Liquid assets (Non-consolidated)									
Vol	143	Liquid assets (Consolidated)									
Vol	144	Other assets									
Vol	145	*Savings to the funds*									
Vol	146	*Payments from the funds*									
Vol	147	**Occupational scheme**									
Vol	148	**Private mandatory scheme**									
Vol	149	**Private non-mandatory scheme**									
Vol	150	**All pensions**									
		9 - DECOMPOSITION OF NEW PUBLIC PENSIONS EXPENDITURES - EARNINGS RELATED (Refer to line 16)									
		Defined Benefit schemes (BE BG CZ DK EE EL ES FR IE CY LT LU HU MT NL AT PT SI FI UK)									
	151	**Number of new pensions (in 1000)**									
	152	**Average contributory period (in years)**									
	153	**Average accrual rate**									
	154	**Average pensionable earning**									
	155	**Sustainability/adjustment factors**									
	156	**Average number of months paid the first year**									
		Point schemes (DE FR RO SK)									
	151	**Number of new pensions (in 1000)**									
	152	**Average contributory period (in years)**									
	153	**Average accrual rate (=*V/K*)**									
	153a	Point value (*V*)									
	153b	Point cost (*K*)									
	154	**Average pensionable earning**									
	155	**Sustainability/adjustment factors**									
	156	**Average number of months paid the first year**									
		Notional defined contribution (IT LV PL SE NO)									
	151	**Number of new pensions (in 1000)**									
	152	**Average contributory period (in years)**									
	153	**Average accrual rate (=*c/A*)**									
	153a	Notional-accounts contribution rate (*c*)									
	153b	Annuity factor (*A*)									
	154	**Average pensionable earning**									
	155	**Sustainability/adjustment factors**									
	156	**Average number of months of pension paid the first year**									
		B. Additional information									

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									
	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	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	...	Adjustmentd 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.

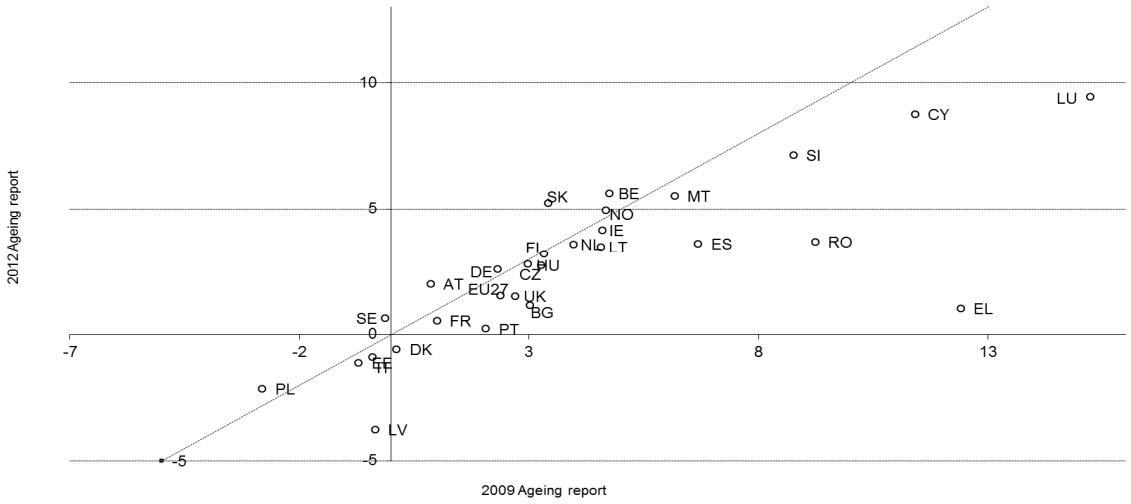
Table 2. 26 - Indexation rules applied in the projection exercise (when different from the legal rule)

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

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.

3. Health care expenditure

3.1. Introduction

This chapter presents the projection results regarding public expenditure on health care from 2010 to 2060. Projections were run using Commission services' (DG ECFIN) models on the basis of the methodology and data agreed with the Member States' delegates to the AWG-EPC.[86] The chapter, after providing a quick overview of the determinants of health care expenditure, briefly describes the methodology (so-called scenarios) used to project public expenditure on health care. Finally, projection results by scenario are reported and compared to the previous projection exercise.

Demand for health care provision is sizeable and its potential benefits are high. However, those benefits come at a substantial cost: in the EU27 total expenditure on health care equalled 10.2% of GDP in 2009. A substantial part of this expenditure – 7.8% of GDP on average in the EU27 in 2009 – is public spending. Overall, public expenditure on health care is on the rise in most EU Member States. Table 3. 1 and Box 1 present the evolution of public spending on health care, its share in total health expenditure and total government outlays over the last decades. The size and growing importance of public health care in government expenditure and the need for budgetary consolidation all across Europe makes health care expenditure an important topic in the policy debate on how to ensure the long-term sustainability of public finances. The complexity of health care markets makes expenditure projections a challenging task.[87] The projections presented in this report follow a "what if" approach and results are bound with uncertainty.[88] Nevertheless, these projections can be very helpful for allowing policy makers to figure out the possible evolution of their public expenditure and the impact of the main underlying drivers of health care costs.

[86] Public expenditure on health in this publication is basically defined as the "core" health care categories (SHA categories (HC.1 to HC.9), excluding long-term nursing care category (HC.3), but including capital investment in health (HC.R.1). The data and methodology for running the long-term expenditure projections is explained in detail in 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. Country specific information regarding any relevant recent reforms legislated and/or implemented that could have an impact on health care and long-term care expenditure (e.g. freeze of wages) were taken into account in the current projections.

[87] Health care markets may suffer from adverse selection (higher health risks have difficulties in obtaining affordable coverage), moral hazard (insured people have an incentive to over-consume health care services as they do not bear the full cost) and asymmetric information (physicians have more information than patients, which could lead to supply-induced demand and economic rents, depending on the type of remuneration of physicians: capitation, fee-for-service, pay-for-performance). These market failures are the economic rationale for public sector involvement (financing and regulations) in health care markets based on efficiency and equity considerations.

[88] Uncertainty relates to three factors. First, public expenditure on health care is determined by an interrelated play of numerous demand and supply-related factors, often not fully observed or quantifiable. Second, ad hoc policy reforms may change their relevance and impact upon future health care spending. Third, the long-term horizon of the projections increases the uncertainty of the results.

Box 1: Public health care expenditure in the last decades

The governments of all EU Member States are heavily involved in the financing and often in the provision of health care services. Public health care spending is a major and growing source of fiscal pressure, representing a significant and growing share of GDP in EU Member States.

During the 1960s and 1970s, public (and private) health care expenditure rose rapidly, triggered by an increase in population coverage and improvements in the provision of the health services associated with populations' higher expectations and their willingness to pay more for better health care services. In the 1980s and 1990s, the growth of public expenditure on health slowed down, and even reversed in a few countries. This was largely due to budgetary consolidation efforts, as growth in health care expenditure was perceived as too strong. In the late 1990s and especially in the first decade of the 21st century, health expenditure growth picked up again. It has reached an average level of 8% of GDP in 2009 in the EU, though ranging from less than 3% of GDP in Cyprus to nearly 10% of GDP in Denmark.

As far as the share of public in total health expenditure is concerned, there seem to be two divergent movements: in general, the share of public spending in EU15 Member States has increased in the last decade, whilst in EU12 Member States private financing has increased as a source of total health care funding. Moreover, health care has gained prominence relative to other government expenditure. In all EU Member States with available data except for Hungary, Romania, Austria and Portugal, the share of health care in total government expenditure has increased. Public spending on health care now accounts on average for 14.6% of total government spending in the EU, ranging from 7.2 to 18.8%. 75% of the EU Member States spend between 11 to 15% of their resources on health care.

Table 3. 1 - Public health care expenditures (including long-term nursing care) in EU Member States, 1970-2009

	Public health care expenditure as %of												
	GDP					total health expenditure					total government expenditure		
	1970	1980	1990	2000	2009	1970	1980	1990	2000	2009	1990	2000	2009
BE	:	:	:	6.6	8.2	:	:	:	73	75	10.0	12.8	14.8
BG	:	:	5.2	3.7	4.2	:	:	100	61	58	:	8.7	10.8
CZ	:	:	4.6	5.9	6.9	:	:	98	91	84	:	13.6	17.4
DK	:	7.9	6.9	6.8	9.8	:	89	83	82	85	11.9	12.3	15.0
DE	4.4	6.6	6.3	8.2	8.9	73	79	76	80	77	:	13.7	14.4
EE	:	:	:	4.1	5.3	:	:	:	77	75	:	11.9	12.4
IE	4.1	6.8	4.4	4.6	7.2	80	82	72	73	85	:	17.4	18.1
EL	2.3	3.3	3.5	4.7	5.9	43	56	53	59	63	:	8.4	11.3
ES	2.3	4.2	5.1	5.2	7.0	66	79	78	72	74	:	13.3	14.6
FR	4.1	5.6	6.4	8.0	9.3	76	80	76	79	78	:	13.7	14.9
IT	:	:	6.1	5.8	7.0	:	:	79	72	77	11.7	13.0	14.5
CY	0.9	1.5	1.8	2.4	2.5	33	54	40	42	42	:	7.1	7.2
LV	:	:	2.5	3.2	4.1	:	:	100	53	62	:	10.5	10.6
LT	:	:	3.0	4.5	5.6	:	:	91	69	73	:	10.5	12.8
LU	2.8	4.8	5.0	5.2	5.7	90	92	93	90	84	11.1	10.9	11.8
HU	:	:	:	5.0	5.2	:	:	:	71	70	:	10.5	9.9
MT	:	:	:	4.9	5.8	:	:	:	72	84	:	12.0	12.8
NL	:	5.1	5.4	5.0	9.5	:	69	68	63	79	:	8.4	13.2
AT	3.3	5.1	6.1	7.6	8.6	63	69	73	77	78	:	16.2	15.7
PL	:	:	4.4	3.9	5.3	:	:	92	71	72	:	:	11.5
PT	1.5	3.4	3.8	6.4	6.5	60	64	64	73	65	:	15.1	14.8
RO	:	:	2.9	3.6	4.5	:	:	100	69	79	:	10.9	10.5
SI	4.2	4.4	5.6	6.1	6.8	100	100	100	73	73	:	13.8	14.1
SK	:	:	:	4.9	6.0	:	:	:	89	66	:	10.0	18.8
FI	4.1	5.0	6.2	5.1	6.8	75	79	81	71	75	12.1	11.8	14.2
SE	5.8	8.2	7.4	7.0	8.2	85	92	90	85	81	:	11.1	13.4
UK	3.9	5.0	4.9	5.6	8.2	87	89	83	80	84	12.1	14.6	16.5
NO	4.0	5.9	6.3	6.9	7.5	:	:	83	83	84	12.6	16.3	16.7
EU27	:	:	:	6.6	8.0	:	:	:	77	78	:	13.0	14.6
EU15	:	:	:	6.7	8.3	:	:	:	77	78	:	13.4	14.8
EU12	:	:	:	4.4	5.4	:	:	:	74	73	:	:	12.7
EA	:	:	:	6.9	8.2	:	:	:	76	76	:	13.2	14.5

Sources: Eurostat 2011; United Nations Statistics Division (2011); Commission services; 2009 or latest data used.
Note: The EU and EA averages are weighted according to GDP.

3.2. Determinants of health care expenditure

Public expenditure on health care depends on a series of factors that affect both demand for and supply of health care goods and services. Population size and structure, its health status, the individual and national income as well as provisions regulating access to health care goods and services are seen as key determinants of demand. Supply side determinants include the availability of and distance to health care services, technological progress and the framework regulating the provision of those goods and services (institutional settings).[89] The next sections briefly describe the relation between these factors and public spending on health care.

3.3. Demographic structure of the population

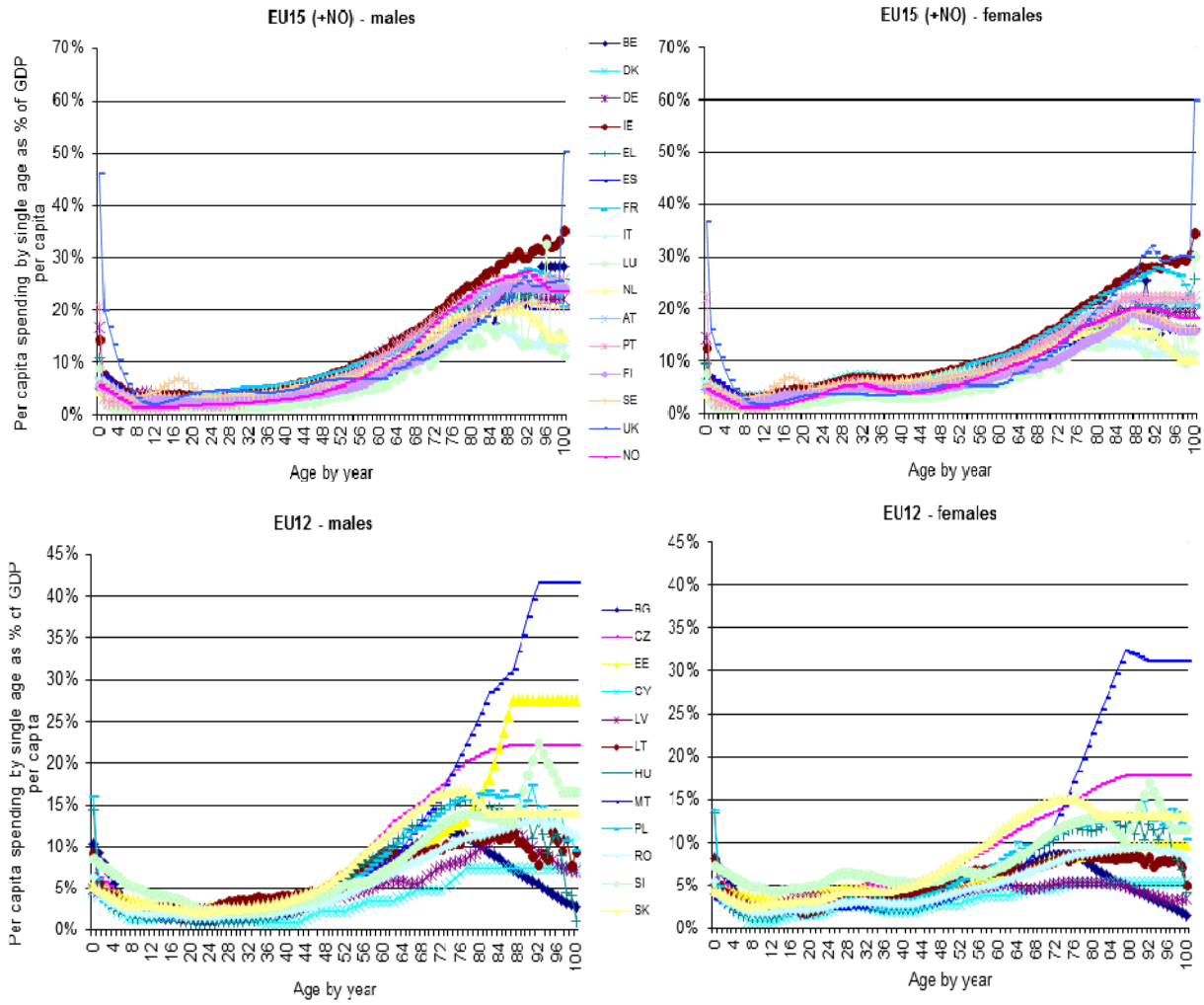
The demand for health care goods and services depends on the number of people in

[89] There are other important determinants of health care demand, such as education, information on the availability of health care services and the socio-cultural context influencing behaviour w.r.t. to demanding health care services (Grossman, 2000). These are, however, not discussed in this projection framework, largely due to unavailability of data.

need of care. This depends not only on the size but also on the health status of the population. The latest one is linked to the age- and gender-structure of the population, notably to the share of elderly people in the overall population. This is because older people often develop multi-morbidity conditions, which require costly medical care.

The relationship between the age of an individual and his/her demand for health care is well displayed by the so-called "*age-related expenditure profiles*" shown in Graph 3. 1. The graph plots average public spending on health care per capita (as % of GDP per capita) against the age of individuals in each country of the EU. Spending generally increases with the age of a person, notably from the ages of 55 and more for men and 60 and more for women, coinciding naturally with higher morbidity at older age. The demand for health care is also high at very young ages and during maternity years for women. Consequently, the population structure, and ageing in particular, is often seen as one of the main drivers of increasing health care expenditures.

Graph 3. 1 - Age-related expenditure profiles of health care provision (spending per capita as % of GDP per capita)



Source: Commission services, EPC

Population ageing may pose a risk for the sustainability of health care financing in two ways. Firstly, increasing longevity, without an improvement in health status, leads to increasing demand for services over a longer period of lifetime, increasing total lifetime health care expenditures and overall health care spending (Breyer *et al*. 2010; Zweifel *et al*. 2005). It is often argued that new medical technologies have been successful in saving life from a growing number of fatal diseases, but have been less successful in keeping people in good health. Secondly, in many EU Member States, public health care is largely financed by social security contributions of the working population. Ageing leads to an increase in the old-age dependency ratio, i.e. fewer contributors to the recipients of services. As it is explained in Chapter 1 of the present Report, the old-age dependency ratio is projected to double from 26% in 2010 to 52% in 2060 (EUROPOP2010). Consequently, in the future far fewer people will contribute to finance public health care, while a growing share of older people may require additional health care goods and services.

Longer working lives accompanied by a healthier working population can mitigate the impact of ageing (Oliveira Martins *et al*., 2005). In addition, many researchers have shown that ageing has contributed much less than widely thought to the observed growth in expenditure[90] and in many Member States an actual reduction in per capita spending at very old age (85+) can be observed.[91] This is because alongside real needs, social, economic and cultural considerations determine the allocation of resources to the sector and use of resources across different age groups. Therefore, ageing should be analysed in conjunction with other determinants of expenditure, such as health status, income and non-demographic factors as explained next.

3.4. Health status

Increasing life expectancy is due to falling mortality rates at all ages, including older people. However, in some cases mortality has decreased at the expense of increased morbidity, meaning that more years are spent with chronic illnesses. If increasing longevity goes in line with an increasing number of healthy life years, then ageing may not necessarily translate into rising health care costs. Better health goes along with lower health care needs and may drive down health services use and health expenditure (Rechel *et al*. 2009). Therefore, it is crucial to determine if longevity is accompanied by more good health or less.

Projecting the future evolution of the population's health status is challenging due to the difficulties associated with predicting the changes in morbidity and measuring bad health. While the evolution in mortality rates and life expectancy can be estimated on the basis of administrative information (censuses, surveys, etc.), epidemiological data is subject to much higher uncertainty. Three different hypotheses have been put forward to predict a possible future interaction between the evolution in life expectancy and changes in the prevalence of disability and bad health:

- The "expansion of morbidity" hypothesis (Gruenberg, 1977; Verbrugge, 1984; Olshansky *et al*., 1991) claims that the decline in mortality is largely due to a decreasing fatality rate of diseases, rather than due to a reduction in their prevalence/incidence. Consequently, falling mortality is accompanied by an increase in morbidity and disability.

[90] See studies referred to in the boxes 2 and 3 below.

[91] The reduction in per capita spending at the very old ages can be explained by three different phenomena: utilitarian reasons (devoting limited resources to the treatment of older age cohorts), technical reasons (less knowledge about the treatment of the elderly) or voluntary restraining from receiving health care by older people who find the investment in health will not pay back any more connected to a generation effect which reflects differences in perceived needs, mentality and habits between older and younger generations.

- The "compression of morbidity" hypothesis (Fries, 1980, 1989) suggests that disability and bad health is compressed towards the later period of life at a faster pace than mortality. Therefore, people are expected to live not only longer, but also in better health.

- The "dynamic equilibrium" hypothesis (Manton 1982) suggests counterbalancing effects of two phenomena: decreasing prevalence/incidence of chronic diseases on the one hand, and decreasing fatality rates of diseases leading to longer prevalence of disability on the other.

Empirical research has not come to a clear conclusion regarding these hypotheses: health may continue to improve, but at the same time some causes of disability may become more prominent.[92] For example, higher levels of some disabling conditions (dementia, musculoskeletal diseases) go along with decreasing rates of prevalence of others (cardiovascular and chronic respiratory diseases). Consequently, it remains difficult to draw clear conclusions on the validity of the hypotheses mentioned above.

Other authors have argued that better health throughout a lifetime can induce savings overall because proximity to death is a more important determinant of health expenditure than ageing *per se*: a large share of lifelong expenditures on health occurs in the last year before death and even in the last few weeks before dying. If per capita costs of health care can be lower at very old ages than in childhood, youth or working ages, living longer, dying at an older age and being healthy for much of a lifetime could therefore lead to savings.

3.4.1. Individual and national income

Another important factor influencing health care expenditure is income. A significant relationship between income and health care spending is observable at both individual and national level. At the individual level, spending on health care depends in particular on whether a health care intervention is covered by public or private insurance and to what extent. If an individual is fully covered by health insurance, health care demand is independent of individual income, i.e. the income elasticity on health care spending is zero. However, if a health care intervention is not or only partially covered by insurance, demand will depend on the individual income. All other things equal, increasing health insurance coverage reduces the sensitivity of changes of income on changes on demand.

At the national level, spending is driven by different considerations. On the one hand, spending must be covered by revenues at an aggregate level. This is why the correlation between health care spending and income is stronger at the national than at the individual level (in the presence of insurance). On the other hand, policy measures to control spending and political priorities to devote less or more resources to different areas of public spending may reduce the link between public expenditure on health care and national income. Therefore, while it is generally agreed that the growth in *per capita* income brings about an increase in health spending, the strength of this relationship, i.e. the value of the income elasticity of health services demand, remains uncertain.

[92] Global Forum for Health Research (2008).

A number of empirical studies attempted to estimate the correlation between income and health expenditure. Most of the earlier studies led to the conclusion that health care is an individual necessity and a national luxury good. In other words, health spending is highly inelastic at an individual level, but at the national level its elasticity with respect to income exceeds unity. However, the earlier empirical literature is subject to methodological problems and more recent studies attempt to overcome these problems by estimating the real causal effect of income on demand of health services (Box 2). The general implication, however, remains that as national income or wealth increases, expectations will rise and health spending will also rise, regardless of changes in needs.

Box 2: Income elasticity of health care demand - a short literature survey

There is no consensus on a precise estimate of the income elasticity on health care expenditure. Time-series and cross-country evidence usually suggest income elasticities above one. Older, purely cross-sectional studies find higher income elasticities, such as Newhouse (1977) with a point estimate of around 1.35 for 30 OECD countries or Leu (1986) for 19 OECD countries with an estimate of 1.2.

Studies based on panel data find in general lower income elasticities around or below one, e.g. Gerdtham *et al*. (1991) and (1995); Mahieu (2000), Bac *et al*. (2002); Azizi *et al*. (2005).

A general critique is that the estimated elasticities are likely to be spurious, i.e. the increase in health care spending is not determined by income alone but by other factors that happen to be correlated with income.

Moreover, the estimates are probably affected by endogeneity problems: health – and therefore also health care spending – is likely to affect economic growth. Acemoglu *et al*. (2009) attempt to overcome these problems and estimate the causal effect of income on health care expenditures. They find an income elasticity of 0.72 with an upper value of 1.13.

Cross-sectional studies on individual income show small or even negative elasticities (e.g. Newhouse *et al*. 1993). For an overview see also Getzen (2000).

3.4.2. Health technology

Growth in health care expenditure has been much faster than what is suggested by changes in demographic structure, morbidity and income (see above discussion on income elasticity). Empirical research suggests that health technology has been a major driver of expenditures. Different authors attribute 27% to 75% of health expenditure growth in the industrialised countries to technological change (Box 3). A broad consensus exists that technological change is the main driver of health systems' costs in today's developed societies.

Whether a particular technological development increases or decreases costs depends on its impact on unit cost, its level of use and whether the treatment complements or replaces the existing methods. If technological development leads to a more cost-efficient treatment of previously treated medical conditions, the new technology is likely to replace the old one, thereby reducing the unit cost of

treatment. This effect is called the substitution effect: replacing less by more efficient treatments. If this is also accompanied by no changes in the number of individuals treated, the overall cost is reduced. However, if treatment with the new technology becomes more frequent, expenditure may stay constant or increase.

If medical innovations allow for treating conditions which were not treated previously, then expenditures may rise. This is called the expansion or extension mechanism: extending health care procedures to previously untreated medical conditions for scientific reasons (the methods of treatment were simply unknown) or economic reasons (previous methods of treatment were known, but not affordable). In other words, the supply of new products matches with previously unmet demand. As such, the health sector is similar to other expanding sectors of the economy, such as those producing ICT-related products.

The currently prevalent view is that technological change is an important driver of health care expenditures (Box 3). This is despite the measurement problems of technological change on expenditures and health-restoring or life-saving effects.[93] It is to be kept in mind that new inventions have been used in areas judged necessary from the societal point of view such as in palliative care, where ethical considerations are of considerable importance.

3.4.3. Legal and institutional setting

Apart from the above factors, public expenditure on health care is strongly influenced by the legal settings and institutional arrangements according to which health care is provided and financed. These factors play an important role in delineating provision and use of health care services and therefore health care costs. Institutional settings may limit (or not) the introduction, coverage and use of services and new technology, through the set of incentives patients and providers face. Legal provisions, such as strict spending constraints defined by public authorities, may curb the provision and use of health care services.

[93] The societal and political pressures to implement more cost-effective and to discard ineffective technologies are increasing. Evaluations are done by the use of health technology assessments (HTA), which assess the additional cost-benefit of an innovation relative to given treatment options. For more information see: http://www.eunethta.eu/.

Box 3: Excess cost growth in health care expenditures - a short literature survey

In the Ageing Report 2012 the impact of non-demographic drivers on health care expenditure is used in some scenarios. Non-demographic drivers are also sometimes referred to as "*excess cost growth*" (Smith *et al*. 2009). The literature on "*excess cost growth*" estimates the excess of growth in per capita health expenditures over the growth in per capita GDP after controlling for the effect of demographic change. Thus, whereas the income elasticity (see Box 2) should capture changes in health care expenditure due to changes in income only, "*excess cost growth*" estimates may also capture effects due to other factors than income, for instance technological change, health policies, institutional settings and Baumol's cost disease.[94]

The literature generally finds that health care expenditure grows 1-2 percent faster than GDP per capita.[95] The IMF (2010), for instance, estimates an excess cost growth of 1.2 percent for 27 advanced economies over the period 1980-2008, while Hagist and Kotlikoff (2009) estimate an excess cost growth of about 1.5 percent over 1970-2002 for ten OECD countries (see also Blomqvist and Carter (1997); OECD (2006)). However, the excess cost growth rates vary considerably across countries. The IMF (2010), for instance, finds excess cost growth rates in Europe that vary between -0.9 percent (the Czech Republic) and 2.4 percent (Luxembourg). On average, however, their findings are consistent with the 1.3 elasticity estimate used in this Ageing Report for the scenario on non-demographic drivers and the AWG risk scenario.

Innovations in medical technology are generally believed to be the primary driver of health care spending. Recent estimates suggests that medical technology explains 27 to 48% of health care spending growth since 1960 (Smith *et al*, 2009). Earlier studies found that technology explained a somewhat larger fraction of the increase, 50 to 75%. See e.g. Newhouse (1992); Cutler (1995); Okunade and Murthy (2002) as well as Oliveira Martins and de la Maisonneuve (2005).

[94] According to Baumol (1996), low productivity increases in medical care relative to other less labour-intensive sectors shift the relative prices of medical care upwards.

[95] Note that the excess cost growth is not defined in the same way as the income elasticity. However, "*excess cost growth*" estimates may be transformed into a measure with a similar interpretation as the income elasticity.

A number of such variables have been tested in the literature for assessing their impact on health expenditure. These include the role of general practitioners (GPs) as an independent entity and gatekeeper, the type of remuneration of physicians or the type of system financing.[96] Despite such studies, it is not feasible to draw unequivocal conclusions.

3.4.4. Human and physical capital

The provision of health care is highly labour-intensive, more than many other sectors of the society. Health professionals are vital to the provision of health services and goods. As a result, changes associated with the health workforce have an impact on provision and therefore expenditure. For example, the ageing of the workforce could have an impact on expenditure through reducing staff numbers and increasing wages. However, an over-supply of physicians may induce an over-supply of health care services.

In addition, human and physical capital resources devoted to the health care sector are determined by policy decisions (e.g. qualitative limits and qualitative requirements on the access to medical schools or professional certificates, decisions on the location of facilities, legal regulations on the density of health care staff per number of population). A number of studies have attempted to find a statistical correlation between the size of medical staff and health expenditure,[97] but the results are not conclusive.

3.5. Short overview of the projection methodology

3.5.1. The model

On the basis of the description just presented, a series of so-called scenarios test the potential impact of the different determinants of public spending on health care. The impact of each determinant is calculated separately on the basis of hypothetical assumptions (a "what if" situation). This can indicate how each determinant may contribute to the evolution of public health care over the next 50 years. This analysis may help inform future policy decisions, which aim at improving the sustainability of health care spending.

It is important to stress that future levels of public health care spending are modelled to a large extent exogenously. Future health policy reforms and behavioural changes by individuals are not taken into account.[98] In many scenarios, the adjustments observed relate solely to health care provision adjusting automatically to the needs that result from changes in population structure, health status and changes in income. As such, most scenarios should be considered as "no-policy change" scenarios.

The basic setup of the model used to project future expenditure on health care is a traditional simulation model whereby the overall population is disaggregated into a number of groups having a common set of features, such as age and sex. As the number of individuals in each group changes over time, so do the aggregate values of the endogenous variables. The schematic methodology to project health care expenditure is presented in Graph 3. 2.[99] The common elements of all scenarios are the labour force and macroeconomic assumptions agreed by the Commission services (DG ECFIN) and the Economic

[96] Gerdtham *et al*. (1992a, 1992b and 1992c), L'Horty *et al*. (1997), Leu (1986), Bac (2004).

[97] Getzen (1990), Murthy and Ukpolo (1994), Bac (2004), Schulz (2005), Bac and Balsan (2001), Rochaix and Jacobzone (1997).

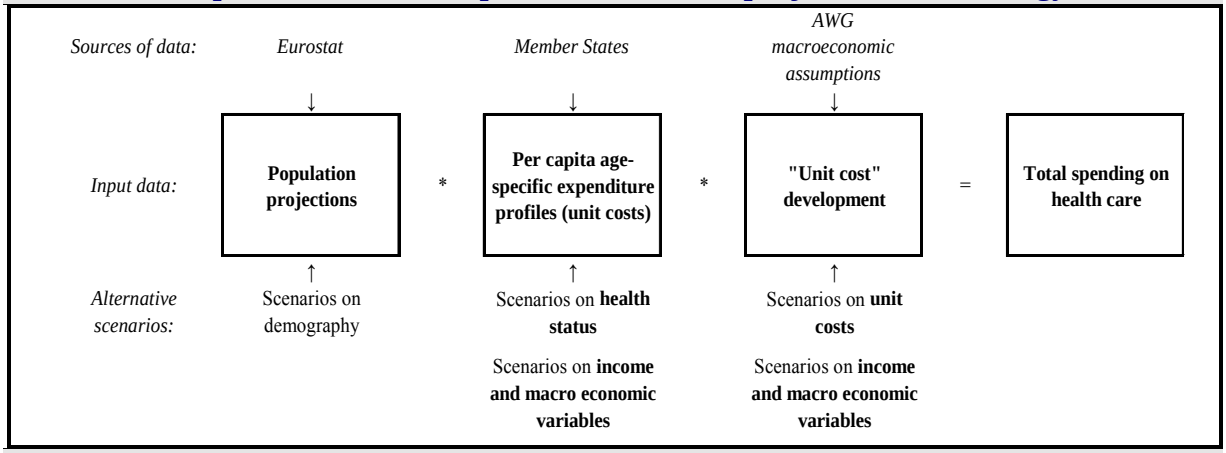
[98] An exception is made for the years 2010 and 2011 for a number of countries where fiscal consolidation measures were implemented but are not reflected in the base year of data used in the projections which is 2009 (or 2008) for all countries except Italy, which is 2010.

[99] Detailed explanation can be found in European Commission – Economic Policy Committee (2011), "The 2012 Ageing Report "Underlying assumptions and projection methodologies", European Economy No. 4.

Policy Committee (AWG) and the population projections provided by Eurostat (EUROPOP2010). The age- and gender-specific per capita public expenditure (on health care) profiles are provided by Member States. They are interacted with the demographic projections provided by Eurostat in order to calculate nominal spending on health care.

The adjustments reflecting the effects of different factors on health care spending are applied by correspondingly changing one of three main inputs: 1) the demographic/population projections, 2) the age-related expenditure profiles (capturing unit costs) and 3) assumptions regarding the development of unit costs over time, as driven by the macroeconomic variables or assumptions on the evolution of the population's health status.

Graph 3. 2 - Schematic presentation of the projection methodology



Source: Commission services, EPC.

3.5.2. Scenarios

Different scenarios simulated changes in the demographic structure, life expectancy and health status of the population, the importance of health care costs in the last years of life (*death-related costs*), an income elasticity of demand for health care higher than one but converging to 1 at the end of the projection period, different patterns of unit cost evolution and the cost-convergence of age profiles across the EU27 Member States. The ideas behind the different scenarios are presented in Table 3. 2.[100]

All scenarios are described in more detail in the following.[101]

1. The "***demographic scenario***" attempts to isolate the "pure" effect of an ageing population on health care spending. It assumes that age-specific morbidity rates do not change over time. This implies that age-related public health care spending per capita (considered as the proxy for the morbidity rate[102]) remains constant in real terms over the projection period.

As constant health status is accompanied by a gradual increase in life expectancy (EUROPOP 2010), all gains in life expectancy are assumed to be spent in bad health. As such, this scenario reflects the "*expansion of morbidity*" hypothesis above. It is further assumed that the costs, and therefore expenditure per capita, evolve in line with GDP per capita. This implies that without a change in the age structure of the population and in life expectancy, the share of health care spending in GDP would remain constant over the projection period.

2. The "***high life expectancy scenario***" is a variant to the "*demographic scenario*". It tries to measure the impact of an alternative assumption on mortality rates. It assumes, as in the sensitivity tests used for pension projections, that life expectancy at birth in 2060 is higher, by one year, than the projected life expectancy used in the "*demographic scenario*". In comparison to the "*demographic scenario*", alternative demographic and macroeconomic data are used as a different demographic structure impacts on several variables including GDP.[103]

3. The "***constant health scenario***" is inspired by the "*dynamic equilibrium*" hypothesis and captures the potential impact of improvements in the health status, should this occur in parallel with projected declines in mortality rates. It assumes that the number of years spent in bad health remains constant over the whole projection period, i.e. all future gains in life expectancy are spent in good health. To generate a fall in the morbidity rate in line with the decline in the

[100] A detailed account of the projection methods is given in European Commission – Economic Policy Committee (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.

[101] Most of the scenarios were already included in the 2009 Ageing Report. However, three scenarios have been updated methodologically and one new scenario has been added. First, the parameters used in the "non-demographic determinants scenario" (previously termed "technology scenario") have been refined using a more sophisticated econometric estimation method. Second, the "cost convergence scenario" assumes that Member States with below average unit costs converge to the EU27 average over the projection period, whilst a cost convergence of EU12 Member States to the EU15 average was assumed in the 2009 Ageing Report. Third, the "death-related costs scenario" now uses country-specific age-related cost profiles, whilst average EU profiles have been used before. Fourth, the "sector-specific composite indexation scenario" is new. Here, per capita health care costs evolve according to sector-specific categories of expenditure (e.g. wages, pharmaceutical expenditure, capital), rather than productivity or GDP per capita.

[102] Strictly speaking, age-expenditure profiles are not a measure of health status or morbidity. However, given the lack of a reliable and comparable data on the latter, it is plausible to assume that the shape of the profiles follows the evolution of health status over the lifespan.

[103] Since GDP data also captures the impact of changes in life expectancy through their impact on labour forces.

mortality rate, this scenario is modelled by assuming that per capita age profiles observed in the base year are shifted outwards, in direct proportion to the projected gains in age- and gender-specific life expectancy.[104]

4. The "***death-related costs scenario***" employs an alternative method to project health care spending, taking into account a probable postponement in health care spending resulting from the evolution of mortality rates. There is empirical evidence that a large share of total spending on health care during a person's life is concentrated in its final years (Palangkaraya and Yong, 2009).[105] Therefore, as mortality rates at relatively younger age decline and a smaller share of each age cohort is in its terminal phase of life, the health care expenditure calculated using constant expenditure profiles may be overestimated. To run this scenario, profiles of *death-related costs* by age have been supplied by some Member States, where unit costs are differentiated between decedents and survivors.[106]

5. The "***income elasticity scenario***" shows the effect of income elasticity of demand exceeding unity on the evolution of public spending on health care. The impact of income growth on health care expenditure may incorporate the effects of a number of factors: higher living standards, growing expectations and social pressure to catch-up with the quality and coverage of health care provided to the populations in the neighbouring countries and possibly the development of medical knowledge and technologies. In practical terms, the scenario is identical to the *"demographic scenario"* except that the income elasticity of demand is equal to 1.1 in the base year and converges to 1 by the end of projection horizon in 2060.

6. The "***EU27 cost convergence scenario***" is meant to capture the possible effect of a convergence in real living standards (which emerges from the macroeconomic assumptions) on health care spending. The "*cost convergence scenario"* considers the convergence of all EU27 countries that are below the EU27 average of per capita public expenditure relative to GDP per capita to that EU27 relative average. This means that the country-specific age/gender per capita public expenditure profiles as a share of GDP per capita which are below the corresponding EU27 profiles in the base year (i.e. 2010) are assumed to increase to the EU27 relative average up to 2060. The convergence speed for all the countries below the EU27 relative average differs, as the differences in the initial situation are taken into account, i.e. the extent of the initial gap between country-specific and EU27 relative average profile.

[104] The method is applied to those age/gender groups where expenditure per capita is growing. As in the previous scenarios and in practical terms, it is assumed that age/gender specific expenditure profiles proxy the health status (i.e. morbidity). In other words, higher expenditure captures higher morbidity. For the young and the oldest old, the reference age/gender and therefore age/gender per capita public expenditure profile remains the same over the whole projection period.

[105] The authors find that population ageing does not add anything to growth in health expenditure once proximity to death is accounted for. As a consequence, the effects of ageing on health expenditure growth might be estimated as too high, whilst the high costs of medical care at the end of life are probably underestimated.

[106] Data was provided by 11 Member States: Belgium, Bulgaria, Denmark, Spain, Italy, the Netherlands, Austria, Poland, Slovenia, Finland and the United Kingdom. For countries that did not provide this data, no projections for this scenario were done.

Table 3. 2 - Overview of different scenarios used to project health care spending

	Demographic scenario	High life expectancy scenario	Constant health scenario	Death-related costs scenario	Income elasticity scenario	EU27 cost convergence scenario	Labour intensity scenario	Sector-specific composite indexation scenario	Non-demographic determinants scenario	AWG reference scenario	AWG risk scenario
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Population projection	EUROPOP2010	Alternative higher life expectancy scenario (+1 year)	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010
Age-related expenditure profiles	2010 profiles held constant over projection period	2010 profiles held constant over projection period	2010 profiles shift in line with changes in age-specific life expectancy	2010 profiles held constant but split into profiles of decedents and survivors	2010 profiles held constant over projection period	Individual EU27 profiles converging to the EU27 average profile over the projection period	2010 profiles held constant over projection period	2010 profiles held constant over projection period	2008 profiles held constant over projection period	Intermediate between scenarios I and III, whereby 2010 profiles shift by half the change in age-specific life expectancy	Intermediate between scenarios I and III, whereby 2010 profiles shift by half the change in age-specific life expectancy
Unit cost development	GDP per capita	GDP per capita	GDP per capita	GDP per capita	GDP per capita	GDP per capita	GDP per hours worked	Input-specific indexation	GDP per capita	GDP per capita	GDP per capita
Elasticity of demand	1	1	1	1	Income elasticity of 1.1 in 2010 converging to 1 by 2060	1	1	1	Elasticity of 1.3 in 2010 converging to 1 by 2060	Income elasticity of 1.1 in 2010 converging to 1 by 2060	Elasticity of 1.3 in 2010 converging to 1 by 2060

Source: Commission services, EPC.

7. The "***labour intensity scenario***" is an attempt to estimate the evolution in health care expenditure under the assumption that unit costs are driven by changes in labour productivity, rather than growth in the national income, as health care is a highly labour-intensive sector. This assumption implies as well that, contrary to the "*demographic scenario*", the cost of public provision of health care is supply- rather than demand-driven. This scenario is similar to the "*demographic scenario*", except that costs are assumed to evolve in line with the evolution of GDP per worker. As wages are projected to grow in line with productivity (generally faster than GDP per capita), this scenario provides an insight into the effects of unit costs in the health care sector being driven mostly by increases in wages and salaries.

8. The "***sector-specific composite indexation scenario***" aims at capturing the relative importance and different past trends of the most relevant health care expenditure drivers: wages, pharmaceuticals, therapeutic appliances, capital investment, prevention related health care services, as well as a residual factor. Wages account for the highest share in the overall expenditures, followed by pharmaceutical expenditure and capital investment (Graph 3. 3).

Unit costs of individual expenditure items tend to evolve at a different pace (Graph 3. 4). It is crucial to compare their growth rates to the growth rates of GDP per capita as the latter are the speed at which health costs evolve in the "*demographic scenario*". Throughout 1999 to 2008, wages tended to grow slower than the costs of other expenditure items. However, given their high share in total spending, their impact on expenditure growth will remain crucial. Growth rates for all other items have been above GDP per capita growth in the EU15. In contrast, in the EU12 costs evolved slower than GDP per capita for all but the prevention item, basically due to the high economic growth rate in these countries.

Given the special character of the health care sector (high level of government regulation, investment in new technologies, high labour intensity), considering health care sector-specific rather than economy-wide determinants of unit costs is particularly informative. In this scenario, the growth rate of each item is estimated separately, based on past trends, thus creating a sort of composite indexation for "unit cost development". As such, their relative contribution to future changes in health care spending can be traced over time.

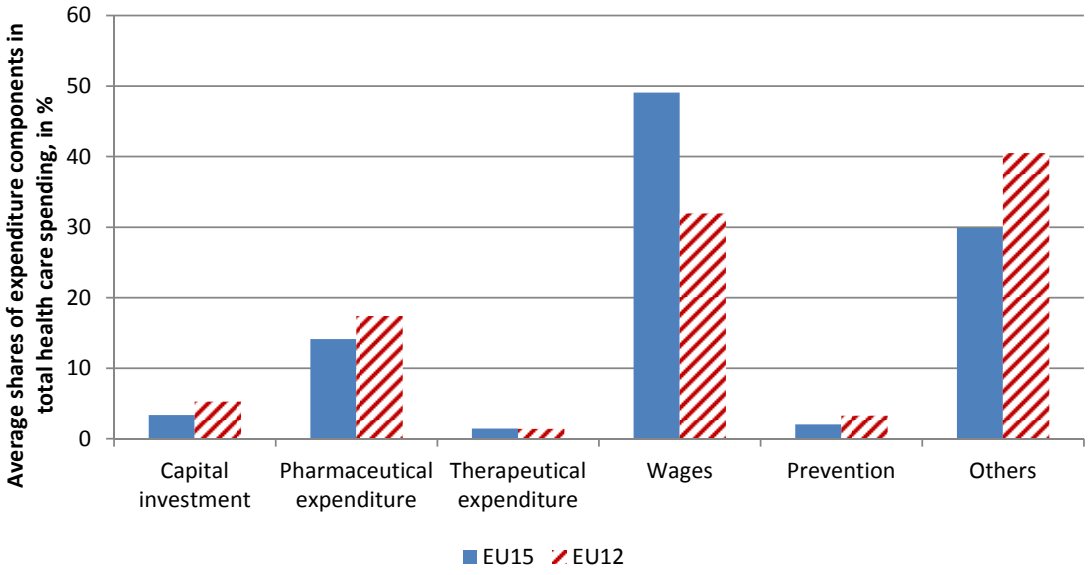
9. The "***non-demographic determinants scenario***" is an attempt to estimate the impact of non-demographic drivers (NDD) on health care expenditure, i.e. income, technology, institutional settings. It is also referred to as "*excess cost growth*" *(*Smith *et al*., 2009). Ignoring the effect of NDD on health care expenditure would imply making the assumption that past trends of health care expenditure related to these drivers will disappear in the future. In practice, the effect of demographic changes – captured using the above mentioned econometric analysis – is subtracted from the total increase in expenditure and the remaining part (i.e. the residual) is attributed to the impact of NDD. The estimated residual is translated into an EU average elasticity of 1.3 converging to 1 until the end of the projection period.[107] This

[107] The reason for the convergence of the elasticity is that only a partial continuation of past trends related to NDD in the future is expected. In the past, extensions of insurance to universal coverage of the population were an important trigger of increases in public health expenditures. As universal coverage is nearly reached in the EU, this one-time shock will not occur again in the future. Note that by "coverage" is not only meant coverage in terms of percentage of population covered, but also in terms of the "depth" of the coverage, i.e. the size of the benefits basket and the coverage rates of benefits. However, data availability at the level of individual countries to correct for coverage effects is suboptimal. Ideally, in order to identify the impact of NDD on health care expenditure one should also control for other variables, such as the health status, relative prices, and institutional variables. However, limitations on data and methodological concerns prevent the use of a broader set of regressors.

elasticity is added to the "pure" effect of ageing as modelled in the "demographic scenario".

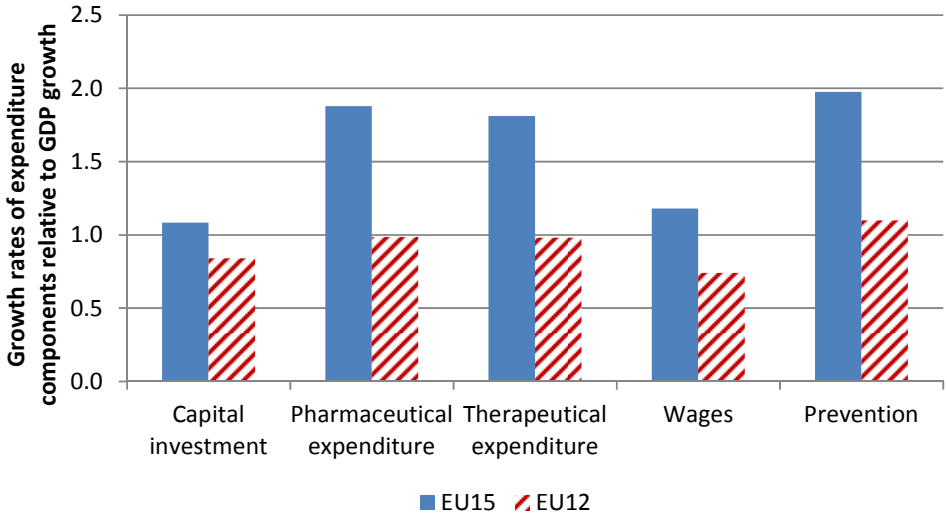
10. The "***AWG reference scenario***" combines the assumptions of the demographic, the constant health and the income elasticity scenarios. The combination of scenarios is the same as in the 2009 Ageing Report. Specifically, it is assumed that half of the future gains in life expectancy are spent in good health, taking thus an intermediate position between the demographic and constant health scenario assumptions. In addition, an income elasticity with respect to health care expenditure of 1.1 at the outset of the projection period, converging to 1 at the end of the projection period, is assumed.

Graph 3. 3 - 10 year average shares of expenditure components in total health care spending (1999-2008), in % in EU15 and EU12



Source: Commission services, EPC.

Graph 3. 4 - 10 or 15 year average growth rates of health care expenditure items relative to GDP growth in EU15 and EU12 (1999-2008)



Source: Commission services, EPC.
Note: For capital investment and wages 15-year average growth rates are used (1994-2008).

11. The "***AWG risk scenario***", as the AWG reference scenario, keeps the assumption that half of the future gains in life expectancy are spent in good health but attempts to take into account technological changes and institutional mechanisms which have stimulated expenditure growth in recent decades. Following econometric estimates based on past expenditure data, this scenario assumes an elasticity of 1.3 – higher than the 1.1 elasticity of the AWG reference scenario – converging to 1 until 2060. As such, it remains bounded in a longer term perspective, as the projected excess growth of health care spending eventually approaches zero (by 2060). Together with the AWG reference scenario, this scenario is part of a range of possible outcomes.

3.6. Projection results

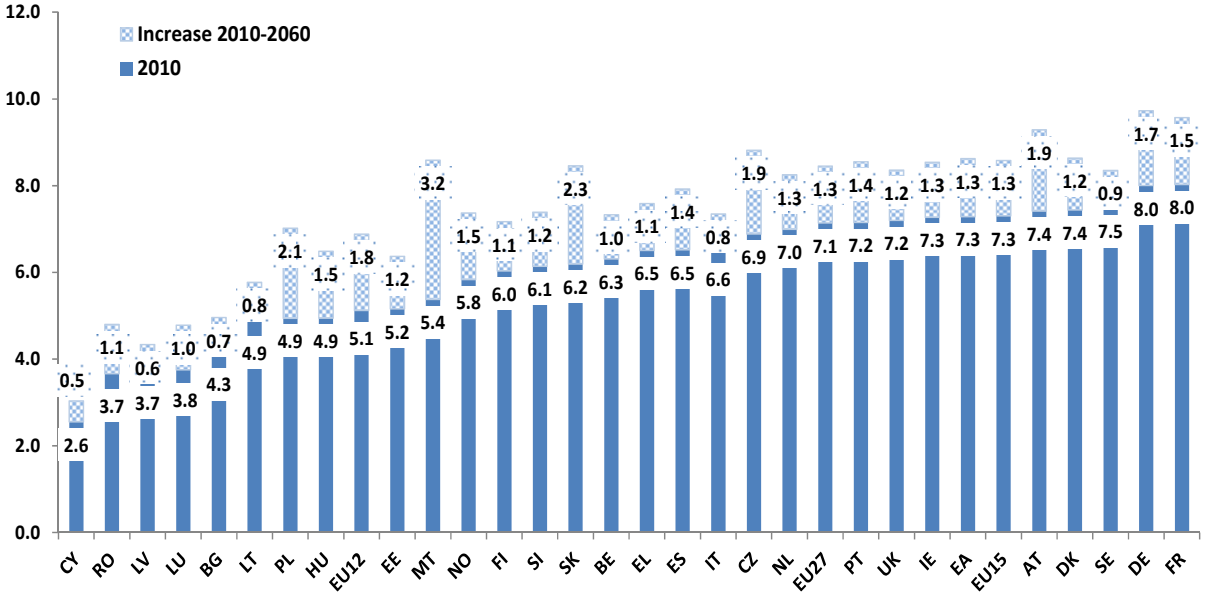
As mentioned above, projection results are not meant to be spending forecasts, but a useful analytical tool to raise awareness on the possible future trends in public health care spending, the role played by some of the major drivers and their potential impact on long-term sustainability of public finances. Therefore, the projected health care spending levels should be interpreted prudently.

3.6.1. Changes in demography and health status

According to the "*demographic scenario*", public health care expenditure in the EU27 is projected to increase by 1.3 p.p. of GDP, i.e. from 7.1% to 8.4% of GDP from 2010 to 2060. For half of the countries the expenditure increase lies between 1.1 and 1.6 p.p. of GDP over the whole projection period.

Expenditures are expected to increase stronger in the EU12 (1.8 p.p. of GDP from the initial level of 5.1% of GDP in 2010) than in the EU15 (1.3 p.p. of GDP from an initial 7.3% of GDP). Therefore, a convergence process of public health expenditures between the EU15 and the EU12 may be expected due to different demographic changes. The impact of ageing on health care spending in each country is shown in Graph 3. 5 and Table 3. 3.

Graph 3. 5 - Projected increase in public expenditure on health care due to demographic change over 2010-2060, as % of GDP



Source: Commission services, EPC.

Table 3. 3 - Demographic scenario - projected increase in public expenditure on health care over 2010-2060, as % of GDP

	Expenditure level		Change 2010-2060		
	2010	2060	in pp. of GDP	in %	
BE	6.3	7.3	1.0	16	BE
BG	4.3	5.0	0.7	15	BG
CZ	6.9	8.8	1.9	28	CZ
DK	7.4	8.6	1.2	16	DK
DE	8.0	9.7	1.7	22	DE
EE	5.2	6.4	1.2	24	EE
IE	7.3	8.5	1.3	17	IE
EL	6.5	7.6	1.1	17	EL
ES	6.5	7.9	1.4	21	ES
FR	8.0	9.6	1.5	19	FR
IT	6.6	7.3	0.8	12	IT
CY	2.6	3.0	0.5	19	CY
LV	3.7	4.3	0.6	16	LV
LT	4.9	5.8	0.8	17	LT
LU	3.8	4.8	1.0	27	LU
HU	4.9	6.5	1.5	31	HU
MT	5.4	8.6	3.2	60	MT
NL	7.0	8.2	1.3	18	NL
AT	7.4	9.3	1.9	25	AT
PL	4.9	7.0	2.1	42	PL
PT	7.2	8.5	1.4	20	PT
RO	3.7	4.8	1.1	31	RO
SI	6.1	7.4	1.2	20	SI
SK	6.2	8.5	2.3	37	SK
FI	6.0	7.2	1.1	19	FI
SE	7.5	8.3	0.9	12	SE
UK	7.2	8.4	1.2	16	UK
NO	5.8	7.4	1.5	26	NO
EU27	7.1	8.5	1.3	18	EU27
EU15	7.3	8.6	1.3	17	EU15
EU12	5.1	6.9	1.8	34	EU12
EA	7.3	8.6	1.3	18	EA

Source: Commission services, EPC.
Note: The EU and EA averages in all result tables are weighted according to GDP.

Projections reflecting only demographic changes (Table 3. 3) may turn out to be either optimistic or pessimistic, depending on whether living longer will go along with increasing or decreasing morbidity. The "*high life expectancy scenario*" provides a sensitivity test to assess the potential implication of future gains in life expectancy higher than those assumed in the population projections (EUROPOP2010). It provides an estimate of the budgetary impact of an extra year of life under the (pessimistic) view that this additional year is associated with an extra year in "bad health" (along the line of the "morbidity expansion" hypothesis). Under this assumption, each extra year of life expectancy leads to an average increase of 0.1 p.p. of GDP (Table 3. 4).

Table 3. 4 - High life expectancy scenario - projected increase in public expenditure on health care over 2010-2060, as % of GDP

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	7.4	1.1	18	0.1	BE
BG	4.3	5.0	0.7	16	0.0	BG
CZ	6.9	8.9	2.0	30	0.1	CZ
DK	7.4	8.7	1.3	17	0.1	DK
DE	8.0	9.9	1.9	23	0.1	DE
EE	5.2	6.4	1.3	25	0.1	EE
IE	7.3	8.6	1.4	19	0.1	IE
EL	6.5	7.7	1.2	18	0.1	EL
ES	6.5	8.0	1.5	23	0.1	ES
FR	8.0	9.7	1.7	21	0.1	FR
IT	6.6	7.4	0.8	13	0.1	IT
CY	2.6	3.1	0.5	20	0.0	CY
LV	3.7	4.3	0.6	17	0.0	LV
LT	4.9	5.8	0.9	17	0.0	LT
LU	3.8	4.9	1.1	30	0.1	LU
HU	4.9	6.5	1.6	32	0.0	HU
MT	5.4	8.8	3.4	64	0.2	MT
NL	7.0	8.3	1.3	19	0.1	NL
AT	7.4	9.4	2.0	27	0.1	AT
PL	4.9	7.1	2.2	44	0.1	PL
PT	7.2	8.7	1.5	21	0.1	PT
RO	3.7	4.9	1.2	33	0.1	RO
SI	6.1	7.5	1.3	21	0.1	SI
SK	6.2	8.5	2.3	38	0.1	SK
FI	6.0	7.3	1.2	21	0.1	FI
SE	7.5	8.4	1.0	13	0.1	SE
UK	7.2	8.5	1.3	18	0.1	UK
NO	5.8	7.5	1.7	28	0.1	NO
EU27	7.1	8.6	1.4	20	0.1	EU27
EU15	7.3	8.7	1.4	19	0.1	EU15
EU12	5.1	7.0	1.9	36	0.1	EU12
EA	7.3	8.8	1.5	20	0.1	EA

Source: Commission services, EPC.

In line with the (optimistic) assumptions of the "*dynamic equilibrium*" hypothesis, assuming a constant number of years in bad health, whatever the future longevity gains, the *"constant health scenario"* assumes that all future gains in life expectancy are spent in good health. A comparison of the demographic (or high life expectancy scenario) with the "*constant health scenario*" illustrates how shifts in the health status of the population can impact on health expenditure.

As expected, in the *"constant health scenario"* increases in public expenditure on health care are significantly lower than those obtained in the "*demographic scenario"*. The ageing effect on expenditure growth is

reduced to only a third compared to the "*demographic scenario*". For the EU27, a 0.5 p.p. of GDP increase is expected over the whole projection period (Table 3. 5). Most of the Member States can expect an expenditure growth of below 1 p.p. of GDP and two countries even a slight decrease (BE and BG). Therefore improvements in health status may be crucial for keeping expenditure on health care under control in the future.

Table 3. 5 - Constant health scenario - projected increase in public expenditure on health care over 2010-2060, as % of GDP

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	6.1	-0.2	-3	-1.2	BE
BG	4.3	4.2	-0.1	-2	-0.8	BG
CZ	6.9	7.7	0.8	11	-1.2	CZ
DK	7.4	7.7	0.2	3	-1.0	DK
DE	8.0	8.6	0.6	8	-1.1	DE
EE	5.2	5.5	0.4	7	-0.9	EE
IE	7.3	7.6	0.3	4	-1.0	IE
EL	6.5	6.9	0.4	5	-0.7	EL
ES	6.5	7.1	0.6	9	-0.8	ES
FR	8.0	8.7	0.7	8	-0.9	FR
IT	6.6	6.7	0.1	2	-0.7	IT
CY	2.6	2.7	0.1	5	-0.4	CY
LV	3.7	3.8	0.1	2	-0.5	LV
LT	4.9	5.0	0.1	1	-0.8	LT
LU	3.8	4.0	0.3	7	-0.8	LU
HU	4.9	5.3	0.4	8	-1.2	HU
MT	5.4	7.3	2.0	36	-1.3	MT
NL	7.0	7.4	0.4	6	-0.9	NL
AT	7.4	8.3	0.8	11	-1.0	AT
PL	4.9	6.0	1.0	21	-1.0	PL
PT	7.2	7.6	0.5	6	-0.9	PT
RO	3.7	4.1	0.5	12	-0.7	RO
SI	6.1	6.6	0.5	8	-0.8	SI
SK	6.2	7.3	1.1	17	-1.2	SK
FI	6.0	6.4	0.3	5	-0.8	FI
SE	7.5	7.4	0.0	0	-0.9	SE
UK	7.2	7.7	0.5	7	-0.6	UK
NO	5.8	6.4	0.5	9	-1.0	NO
EU27	7.1	7.6	0.5	6	-0.9	EU27
EU15	7.3	7.7	0.4	6	-0.8	EU15
EU12	5.1	5.9	0.8	15	-1.0	EU12
EA	7.3	7.7	0.4	6	-0.9	EA

Source: Commission services, EPC.

Table 3. 6 - Death-related costs scenario - projected increase in public expenditure on health care over 2010-2060, as % of GDP

	Expenditure level		Change 2010-2060		Difference to pure demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	7.1	0.8	12	-0.2	BE
BG	4.3	4.9	0.6	15	0.0	BG
DK	7.4	8.3	0.9	12	-0.3	DK
ES	6.5	7.7	1.2	18	-0.2	ES
IT	6.6	7.0	0.4	6	-0.4	IT
NL	7.0	7.9	0.9	13	-0.4	NL
AT	7.4	8.8	1.4	18	-0.5	AT
PL	4.9	6.8	1.8	37	-0.2	PL
SI	6.1	7.2	1.0	17	-0.2	SI
FI	6.0	6.9	0.9	14	-0.3	FI
UK	7.2	8.4	1.2	16	0.0	UK

Source: Commission services, EPC.

The "*death-related costs scenario*" follows a similar logic to the constant health scenario: the years spent with bad health are compressed towards the later period of life. However, a different methodological approach and different features of the data used lead to results varying considerably between the two scenarios. Note that data on death-related costs was provided only by 11 Member States.[108]

Incorporating the concept of death-related costs in the projection methodology leads to a reduction in the projected health care expenditure relative to the "*demographic scenario*" for most of the countries (Table 3. 6).[109] The projected increase in public expenditure ranges from 0.4 p.p. of GDP for Italy to 1.8 p.p. of GDP for Poland.

Graph 3. 6 shows a comparison of the results of the three scenarios related to the future evolution of the health status. The comparison between the shapes of the curves for EU15 and EU12 highlights two features worth to be stressed. The first one is the more pronounced growing path of the "*demographic scenario*" in the EU12. This is likely driven by faster demographic developments, i.e. faster ageing, but also faster national income growth. The second one is a stronger potential effect of a positive evolution in health status in the EU12, represented by the wider gap between demographic and constant health scenarios at the end of the projection period. It reflects the potential for reducing costs in the EU12 by improving health.

3.6.2. Changes in income and macroeconomic variables

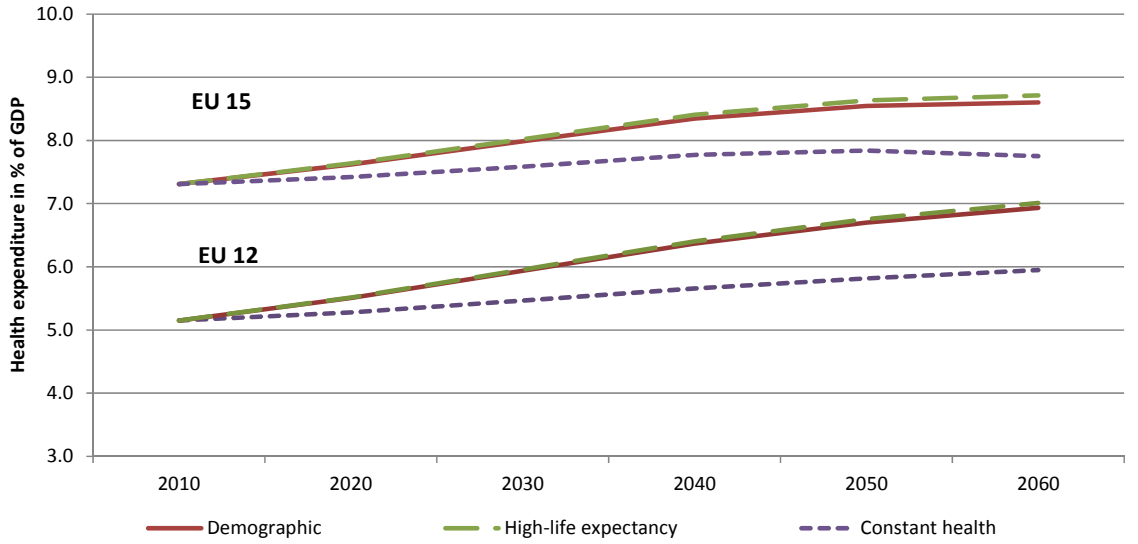
The "*demographic scenario*" assumes that per capita spending grows in line with national income per capita. The effect is that, without population ageing, the share of health spending in percent of national income would stay constant. However, empirical research shows that growth in both public and total health care spending may exceed the growth rate of national income, be it because of rising expectations towards more and better health care and a higher willingness to pay for health care services. Consequently, the "*demographic scenario*" may substantially underestimate health spending growth. One way to address this concern is to assume that trends in health spending exceed the growth rate of national income.[110]

[108] Note that in the current projections exercise the methodology behind the death-related costs scenario does not perfectly illustrate the underlying theoretical concept. In particular, the period of time defined as 'close to death' is limited to one year, while several studies argue that the health care costs of decedents are higher than those of survivors up to six years before death. This is due to the fact that, with the exception of one Member State, all Member States reported expenditure for the last year of life only.

[109] In fact, using this methodological approach does not reduce the overall amount of expenditure devoted to health care. Instead, it spreads the costs of health care over time by assuming that with a decline in mortality rate the share of decedents in each age cohort is decreasing.

[110] The *"income elasticity scenario"* projects health care spending by assuming an elasticity coefficient of 1.1 converging to one over the projection period.

Graph 3. 6 - Impact of demography and health status - Comparison between scenarios in EU15 and EU12



Source: Commission services, EPC.

Table 3. 7 - Income elasticity scenario (public spending on health care, as % of GDP)

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	7.5	1.2	19	0.2	BE
BG	4.3	5.2	0.9	22	0.3	BG
CZ	6.9	9.2	2.3	33	0.4	CZ
DK	7.4	8.9	1.5	20	0.3	DK
DE	8.0	10.0	2.0	25	0.3	DE
EE	5.2	6.7	1.6	31	0.4	EE
IE	7.3	8.9	1.6	22	0.3	IE
EL	6.5	7.8	1.3	19	0.2	EL
ES	6.5	8.2	1.7	26	0.3	ES
FR	8.0	9.9	1.9	24	0.3	FR
IT	6.6	7.6	1.0	15	0.2	IT
CY	2.6	3.1	0.6	22	0.1	CY
LV	3.7	4.6	0.9	23	0.3	LV
LT	4.9	6.1	1.2	23	0.3	LT
LU	3.8	4.9	1.2	32	0.2	LU
HU	4.9	6.7	1.8	36	0.3	HU
MT	5.4	9.0	3.6	67	0.4	MT
NL	7.0	8.5	1.5	21	0.2	NL
AT	7.4	9.6	2.2	29	0.3	AT
PL	4.9	7.4	2.5	50	0.4	PL
PT	7.2	8.8	1.6	23	0.2	PT
RO	3.7	5.0	1.4	37	0.2	RO
SI	6.1	7.7	1.5	25	0.3	SI
SK	6.2	8.9	2.7	44	0.5	SK
FI	6.0	7.4	1.4	23	0.3	FI
SE	7.5	8.6	1.2	15	0.3	SE
UK	7.2	8.7	1.5	20	0.3	UK
NO	5.8	7.6	1.8	30	0.2	NO
EU27	7.1	8.7	1.6	23	0.3	EU27
EU15	7.3	8.9	1.6	21	0.3	EU15
EU12	5.1	7.2	2.1	41	0.3	EU12
EA	7.3	8.9	1.6	22	0.3	EA

Source: Commission services, EPC.

Assuming a slightly higher growth in spending relative to national income (i.e. an income elasticity of 1.1) adds an extra 0.3 p.p. of GDP to health expenditure. The additional impact is similar for the EU15 and the EU12 as the gap in the GDP growth rate has already been included in the "*demographic scenario*". If these projections are closer to reality, then the "*demographic scenario*" probably underestimates the total growth of health care expenditure by assuming a neutral relation between income and health care spending (Table 3. 7).

Table 3. 8 - The EU27 cost convergence scenario (public spending on health care, as % of GDP)

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	7.6	1.3	20	0.2	BE
BG	4.3	7.8	3.5	81	2.8	BG
CZ	6.9	8.8	2.0	28	0.0	CZ
DK	7.4	8.7	1.2	17	0.0	DK
DE	8.0	9.8	1.8	22	0.0	DE
EE	5.2	7.7	2.6	50	1.4	EE
IE	7.3	8.5	1.3	17	0.0	IE
EL	6.5	7.6	1.1	17	0.0	EL
ES	6.5	8.0	1.5	22	0.1	ES
FR	8.0	9.6	1.6	20	0.1	FR
IT	6.6	7.8	1.2	19	0.5	IT
CY	2.6	7.0	4.4	174	4.0	CY
LV	3.7	7.5	3.8	102	3.2	LV
LT	4.9	7.6	2.6	54	1.8	LT
LU	3.8	6.1	2.4	63	1.3	LU
HU	4.9	7.9	2.9	60	1.4	HU
MT	5.4	9.5	4.2	77	0.9	MT
NL	7.0	8.4	1.4	20	0.2	NL
AT	7.4	9.3	1.9	26	0.0	AT
PL	4.9	8.0	3.1	62	1.0	PL
PT	7.2	8.7	1.6	22	0.2	PT
RO	3.7	7.2	3.6	98	2.4	RO
SI	6.1	8.2	2.1	34	0.8	SI
SK	6.2	8.9	2.7	44	0.4	SK
FI	6.0	7.5	1.5	25	0.4	FI
SE	7.5	8.4	0.9	12	0.0	SE
UK	7.2	8.8	1.6	23	0.5	UK
NO	5.8	7.9	2.0	35	0.5	NO
EU27	7.1	8.7	1.6	22	0.3	EU27
EU15	7.3	8.8	1.5	20	0.2	EU15
EU12	5.1	8.1	3.0	58	1.2	EU12
EA	7.3	8.8	1.5	21	0.2	EA

Source: Commission services, EPC.

In the "*cost convergence scenario*" it is assumed that citizens' income per capita and expectations regarding the consumption of health goods and services converge across countries. This scenario, performed solely for those Member States with shares of GDP per capita spending below the EU27 average, captures the possible effect of a convergence in real living standards across EU countries on public expenditure on health care.[111]

[111] Please note that the "cost convergence" scenario does not assume convergence in absolute costs but in relative costs, that is in per capita public expenditure relative to GDP per capita.

Table 3. 9 - Labour intensity scenario (public spending on health care, as % of GDP)

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	8.1	1.8	29	0.8	BE
BG	4.3	5.6	1.3	31	0.7	BG
CZ	6.9	10.1	3.2	46	1.3	CZ
DK	7.4	9.1	1.6	22	0.4	DK
DE	8.0	10.9	2.9	37	1.2	DE
EE	5.2	6.6	1.4	28	0.2	EE
IE	7.3	9.1	1.8	25	0.5	IE
EL	6.5	8.0	1.5	24	0.5	EL
ES	6.5	7.6	1.1	17	-0.3	ES
FR	8.0	9.9	1.9	24	0.4	FR
IT	6.6	7.5	0.9	14	0.2	IT
CY	2.6	3.4	0.8	33	0.4	CY
LV	3.7	4.7	1.0	26	0.4	LV
LT	4.9	5.9	1.0	20	0.1	LT
LU	3.8	5.5	1.8	47	0.7	LU
HU	4.9	7.3	2.3	48	0.8	HU
MT	5.4	9.0	3.6	67	0.4	MT
NL	7.0	9.3	2.3	33	1.1	NL
AT	7.4	10.4	3.0	41	1.2	AT
PL	4.9	8.5	3.5	71	1.4	PL
PT	7.2	9.1	1.9	27	0.5	PT
RO	3.7	6.3	2.7	73	1.6	RO
SI	6.1	8.8	2.6	43	1.4	SI
SK	6.2	10.7	4.5	73	2.3	SK
FI	6.0	8.1	2.0	34	0.9	FI
SE	7.5	9.1	1.6	21	0.7	SE
UK	7.2	9.1	1.9	26	0.7	UK
NO	5.8	8.3	2.4	42	0.9	NO
EU27	7.1	9.1	1.9	27	0.6	EU27
EU15	7.3	9.2	1.9	25	0.6	EU15
EU12	5.1	8.2	3.0	59	1.3	EU12
EA	7.3	9.2	1.9	26	0.5	EA

Source: Commission services, EPC.

Cost convergence can be a costly process, especially for the EU12 Member States. Depending on the current expenditure profile, governments would need to spend up to 4.4 p.p. of GDP more over the next five decades (Table 3. 8). For the EU12, achieving by 2060 the level of relative health care provision per person equal to that of the EU27 average would necessitate a rise in expenditures by 3.0 p.p. of GDP (EU15: 1.5). However, these results are quite sensitive to the convergence process simulated.[112]

An alternative perspective of unit costs evolution is illustrated by the *"labour intensity scenario"*. For most of the Member States, productivity (and therefore real wages) grows faster than per capita income. The effect of productivity replacing income as the driver of unit costs of health care provision in the projections leads to an additional spending of 0.6 p.p. of GDP relative to the "*demographic scenario*" (Table 3. 9). Given the assumed catching-up in terms of labour productivity, the effect is stronger (1.3 p.p.) in the EU12.

The "*sector-specific composite indexation scenario*", in which future expenditure of each different driver evolves in line with its specific past trends (Table 3. 10), leads to an average projected increase 0.8 p.p. of GDP higher than in the "*demographic scenario*".

[112] See comparison of results between the Ageing Report 2009 and 2012 in section 3.9.

However, the effect differs between the EU15 and the EU12. For the EU15, growth in this scenario is 0.8 p.p. of GDP higher than in the "*demographic scenario*". This is largely due to the high growth rates of some health cost components relative to GDP growth per capita (Graph 3. 4). In particular, wages and pharmaceuticals are the most important drivers of expenditure growth. For the EU12, growth is however 0.2 p.p. of GDP lower than the demographic counterpart, as in the past unit costs of health cost components have grown slower than GDP per capita.

Table 3. 10 - Sector-specific composite indexation scenario (public spending on health care, as % of GDP)

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	8.3	2.0	32	1.0	BE
BG	4.3	4.1	-0.2	-6	-0.9	BG
CZ	6.9	8.4	1.5	22	-0.4	CZ
DK	7.4	8.7	1.3	17	0.1	DK
DE	8.0	11.2	3.2	39	1.4	DE
EE	5.2	6.2	1.0	20	-0.2	EE
IE	7.3	10.8	3.5	48	2.3	IE
EL	6.5	8.4	1.9	29	0.8	EL
ES	6.5	8.4	1.9	29	0.5	ES
FR	8.0	10.8	2.8	34	1.2	FR
IT	6.6	7.7	1.2	18	0.4	IT
CY	2.6	2.9	0.4	15	-0.1	CY
LV	3.7	5.5	1.8	49	1.2	LV
LT	4.9	5.5	0.6	12	-0.2	LT
LU	3.8	5.0	1.2	32	0.2	LU
HU	4.9	6.2	1.2	25	-0.3	HU
MT	5.4	10.0	4.7	87	1.5	MT
NL	7.0	8.8	1.8	26	0.5	NL
AT	7.4	9.6	2.2	29	0.3	AT
PL	4.9	7.0	2.1	43	0.0	PL
PT	7.2	8.5	1.3	18	-0.1	PT
RO	3.7	4.3	0.6	16	-0.5	RO
SI	6.1	6.8	0.6	10	-0.6	SI
SK	6.2	8.6	2.4	38	0.1	SK
FI	6.0	7.3	1.2	21	0.1	FI
SE	7.5	8.2	0.7	9	-0.2	SE
UK	7.2	9.1	1.9	26	0.7	UK
NO	5.8	7.3	1.4	25	-0.1	NO
EU27	7.1	9.2	2.1	29	0.7	EU27
EU15	7.3	9.4	2.1	29	0.8	EU15
EU12	5.1	6.7	1.6	31	-0.2	EU12
EA	7.3	9.5	2.2	30	0.9	EA

Source: Commission services, EPC.

Table 3. 11 - Non-demographic drivers scenario - projected increase in public expenditure on health care over 2010-2060, as % of GDP

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	8.4	2.1	33	1.1	BE
BG	4.3	6.4	2.1	48	1.4	BG
CZ	6.9	10.6	3.8	55	1.8	CZ
DK	7.4	10.0	2.6	35	1.4	DK
DE	8.0	11.3	3.3	41	1.5	DE
EE	5.2	8.1	3.0	58	1.8	EE
IE	7.3	9.9	2.7	37	1.4	IE
EL	6.5	8.4	1.9	29	0.8	EL
ES	6.5	9.2	2.7	41	1.3	ES
FR	8.0	11.3	3.3	41	1.8	FR
IT	6.6	8.3	1.8	27	1.0	IT
CY	2.6	3.4	0.9	35	0.4	CY
LV	3.7	5.6	1.8	49	1.2	LV
LT	4.9	7.3	2.4	48	1.5	LT
LU	3.8	5.4	1.7	45	0.6	LU
HU	4.9	7.8	2.8	58	1.3	HU
MT	5.4	10.4	5.1	94	1.8	MT
NL	7.0	9.5	2.5	36	1.3	NL
AT	7.4	10.8	3.4	46	1.5	AT
PL	4.9	8.8	3.9	78	1.8	PL
PT	7.2	9.5	2.3	33	0.9	PT
RO	3.7	5.7	2.1	57	1.0	RO
SI	6.1	8.7	2.6	42	1.3	SI
SK	6.2	10.6	4.4	71	2.1	SK
FI	6.0	8.5	2.5	41	1.4	FI
SE	7.5	9.8	2.3	31	1.4	SE
UK	7.2	9.9	2.7	38	1.6	UK
NO	5.8	8.5	2.7	47	1.2	NO
EU27	7.1	9.9	2.8	39	1.4	EU27
EU15	7.3	10.0	2.7	37	1.4	EU15
EU12	5.1	8.5	3.4	65	1.6	EU12
EA	7.3	10.0	2.7	38	1.4	EA

Source: Commission services, EPC.

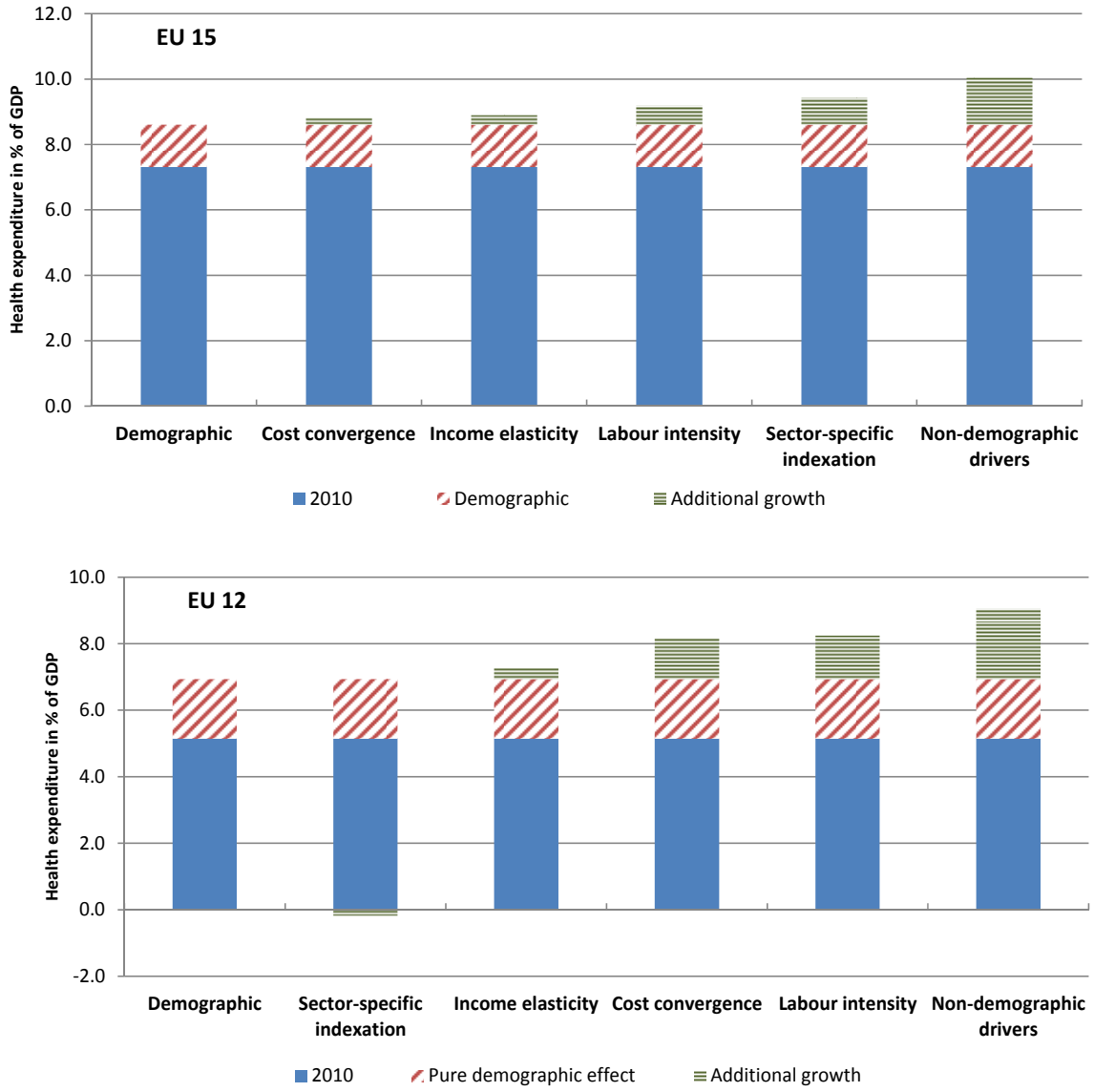
Table 3. 11 presents the projection results under the non-demographic drivers (NDD) scenario. Following econometric analysis,[113] an average elasticity of 1.3 converging to 1 in 2060 is applied to the age-gender expenditure profiles. On average, the increase in public expenditure on health care is projected to be 2.8 p.p. of GDP (compared to the 1.4 p.p. of GDP projected under the demographic scenario). The results highlight the potential impact of non-demographic drivers on health care expenditure, such as innovations in medical technology, institutional settings and individual behaviour. Such upward risk on the future evolution of public expenditure on health care is not captured in the "*demographic scenario*".

The joint analysis of the five scenarios based on income and macroeconomic variables (Graph 3. 7) in comparison with the "*demographic scenario*" allows to draw some important conclusions. First, supply-side factors, whose impact remains still relatively unknown and difficult to quantify, appear to push health care spending up to a considerably higher degree than relatively well specified and quantified demographic

[113] For details see note ECFIN/C2(2011)720472 entitled "Alternative scenarios for assessing the impact of non-demographic factors on health care expenditure" and EC-EPC (2011), "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.

and demand-side factors. In this sense, the projected increase in public spending in a pure demographic scenario can be considered as on the low side. It possibly underestimates the future budgetary pressure coming from the technical and economic process of producing and providing ever more sophisticated health care services. Still, methodological uncertainties with regard to estimating the impact of non-demographic drivers on health care expenditure make continuous improvements of the estimation methodology desirable.

Graph 3. 7 - Impact of income and macroeconomic variables in EU15 and EU12 – HC spending in 2060, different scenarios



Source: Commission services, EPC.

Second, in some countries future spending may be substantially driven by the possible convergence in health care provision across countries. Governments of countries where the current provision of health care is seen as less than that of other EU countries (mainly, though not only, EU12 countries) may face increasing pressure from their citizens to substantively increase the level of spending in order to reach – at least over the long term

– the coverage and standards guaranteed already today to the citizens of the richest EU countries.

3.7. AWG reference scenario

The "AWG reference scenario" is the point of reference for comparisons with the 2009 Ageing Report. In this scenario health care expenditures are driven by the assumption that half of the future gains in life expectancy are spent in good health and an income elasticity of health care spending converging from 1.1 in 2010 to unity in 2060. The joint impact of those factors is a projected increase in spending of about 1.1 p.p. of GDP in the EU27 by 2060 (Table 3. 12). Individual countries' results range between 0.4 (Belgium and Cyprus) and 2.9 p.p. of GDP (Malta). The estimated increases in spending are by 0.2 p.p. of GDP lower for the EU15 and the EU12 than in the demographic scenario.

Table 3. 12 - AWG reference scenario - projected increase in public expenditure on health care over 2010-2060, as % of GDP

	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	6.7	0.4	7	-0.6	BE
BG	4.3	4.8	0.5	12	-0.1	BG
CZ	6.9	8.5	1.7	24	-0.3	CZ
DK	7.4	8.4	0.9	12	-0.3	DK
DE	8.0	9.4	1.4	18	-0.3	DE
EE	5.2	6.2	1.1	21	-0.1	EE
IE	7.3	8.3	1.1	14	-0.2	IE
EL	6.5	7.4	0.9	13	-0.2	EL
ES	6.5	7.8	1.3	19	-0.1	ES
FR	8.0	9.4	1.4	18	-0.1	FR
IT	6.6	7.2	0.6	10	-0.1	IT
CY	2.6	2.9	0.4	14	-0.1	CY
LV	3.7	4.3	0.5	15	-0.1	LV
LT	4.9	5.6	0.7	14	-0.1	LT
LU	3.8	4.5	0.7	19	-0.3	LU
HU	4.9	6.1	1.1	23	-0.4	HU
MT	5.4	8.3	2.9	54	-0.3	MT
NL	7.0	8.0	1.0	15	-0.2	NL
AT	7.4	9.0	1.6	22	-0.3	AT
PL	4.9	6.8	1.9	38	-0.2	PL
PT	7.2	8.3	1.1	16	-0.3	PT
RO	3.7	4.6	1.0	27	-0.2	RO
SI	6.1	7.2	1.1	18	-0.1	SI
SK	6.2	8.3	2.1	33	-0.2	SK
FI	6.0	7.0	1.0	16	-0.2	FI
SE	7.5	8.1	0.7	9	-0.2	SE
UK	7.2	8.3	1.1	16	0.0	UK
NO	5.8	7.1	1.2	21	-0.3	NO
EU27	7.1	8.3	1.1	16	-0.2	EU27
EU15	7.3	8.4	1.1	15	-0.2	EU15
EU12	5.1	6.7	1.5	30	-0.2	EU12
EA	7.3	8.4	1.1	15	-0.2	EA

Source: Commission services, EPC.

3.8. AWG risk scenario

The "AWG risk scenario", which assumes the partial continuation of recently observed trends in health care expenditure,[114] projects spending in the EU27 to 8.9% of GDP in 2060, i.e. an increase of 1.7 p.p. of GDP relative to 2010 (Table 3. 13). Excess cost growth through technological and institutional changes adds around 0.6 p.p. of GDP in EU15 and EU12 to the impact of rising income levels, as modelled in the "AWG reference scenario". Over the whole projection period, Cyprus is expected to have the lowest increase with 0.5 p.p. of GDP. Malta has the highest increase with 3.6 p.p. of GDP.

3.9. Comparing results of the 2012 with the 2009 Ageing Report

It is interesting to compare the current results with the projections of the 2009 Ageing Report. Differences across the two waves of projections may arise from different demographic assumptions (faster ageing of population) or changes in the age-gender expenditure profiles. However, when making these comparisons, it has to be kept in mind that there are many reasons why differences in results may not simply reflect changes in the underlying ageing process. Differences may stem from a different base year for starting the projections, updated macroeconomic assumptions resulting in different GDP per capita growth rates and GDP levels for the period under analysis and changes in scenario assumptions.

What follows focuses on the two major sources of differences: population and expenditure profiles. Graph 3. 8 depicts the assumed evolution of the population over the projection period by single age in both Ageing Reports. Changes in population projections appear, on average, to drive significantly the different results between the two reports: for males and females in both EU15 and EU12 a lower decline of populations at lower ages is expected, whilst for higher ages there is not a big difference in the population projections. In other words, the new population projections show a slower ageing process for many Member States, leading to a lower growth in health care expenditure compared to 2009.

In addition, the graph shows the age-gender expenditure profiles as percent of GDP for all ages. A significant evolution is observable. In the EU15, the expenditure profiles in the current report are lower than those of the 2009 Ageing Report, starting roughly from the age of 60. In contrast, in the EU12, the expenditure profiles get steeper at around age 50 as compared to the previous projection exercise. This suggests that a convergence process of age expenditure profiles between the EU15 and the EU12 took place since the last report. These changes in the profiles may explain a smaller increase in public expenditure on health care in many EU15 countries as compared to the 2009 Ageing Report and the larger increase in several EU12 countries in this report as compared to 2009.

A quantitative decomposition of drivers is proposed in Table 3. 14. The decomposition aims at quantifying which factors are driving the differences in projected spending between the 2009 and the 2012 projection exercises. The considered drivers are the age-cost profiles, GDP per capita growth, population, an interaction and a base year effect. Basically, departing from the level of expenditure in 2010, each driver's impact is estimated by replacing *ceteris paribus* its current value with the 2009 Ageing Report data. This is done subsequently for the age-

[114] It is partial, because the impact of non-demographic drivers on future trends is captured by using an elasticity of health care spending of 1.3 in 2010 converging to unity in 2060. The elasticity itself is based on econometric estimates, which take into account past trends in health care spending. See description of the non-demographic drivers scenario in section 3.5.2.

cost profiles, GDP per capita growth and population data. As for the results at the level of the EU27, the new age-cost profiles as well as GDP per capita growth projections have driven down the results by roughly 0.2 p.p. of GDP, whilst new demographic data has, in general, driven up spending projections. However, there is considerable variation between countries. Just as hinted by Graph 3. 8, age-cost profiles appear to have increased spending projections in EU12 while they appear to have decreased spending projections in the EU15, confirming the described cost convergence.

Table 3. 13 - AWG risk scenario - projected increase in public expenditure on health care over 2010-2060, as % of GDP

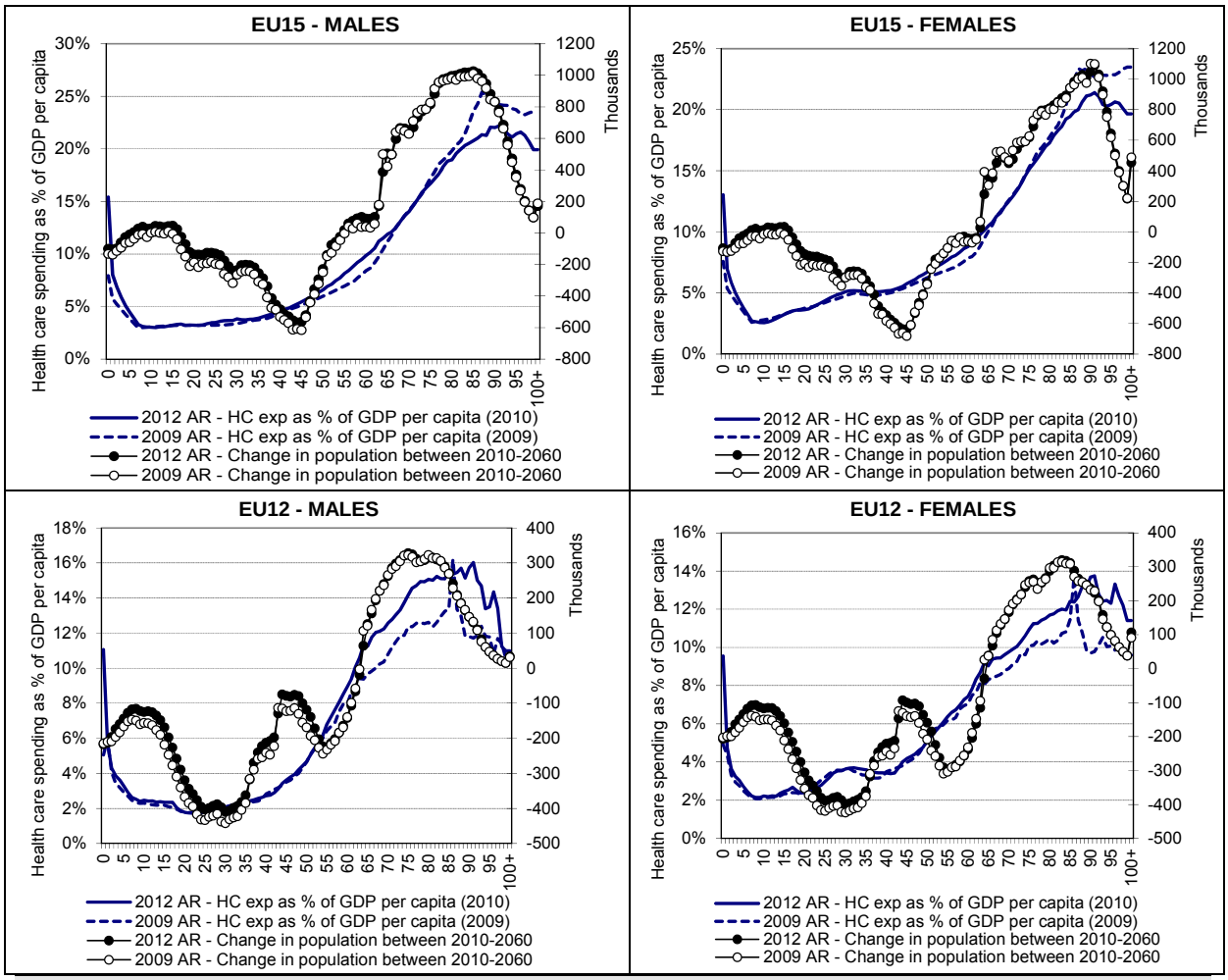
	Expenditure level		Change 2010-2060		Difference to demographic scenario	
	2010	2060	in pp. of GDP	in %		
BE	6.3	7.1	0.8	13	0.4	BE
BG	4.3	5.4	1.1	25	0.6	BG
CZ	6.9	9.3	2.4	35	0.7	CZ
DK	7.4	8.9	1.5	20	0.5	DK
DE	8.0	10.0	2.0	25	0.6	DE
EE	5.2	7.0	1.8	35	0.7	EE
IE	7.3	8.9	1.7	23	0.6	IE
EL	6.5	7.7	1.2	19	0.3	EL
ES	6.5	8.4	1.9	29	0.6	ES
FR	8.0	10.1	2.1	26	0.7	FR
IT	6.6	7.6	1.0	16	0.4	IT
CY	2.6	3.1	0.5	21	0.2	CY
LV	3.7	4.8	1.1	28	0.5	LV
LT	4.9	6.2	1.3	27	0.6	LT
LU	3.8	4.7	1.0	26	0.3	LU
HU	4.9	6.6	1.6	33	0.5	HU
MT	5.4	9.0	3.6	67	0.7	MT
NL	7.0	8.5	1.5	22	0.5	NL
AT	7.4	9.6	2.2	30	0.6	AT
PL	4.9	7.6	2.6	53	0.8	PL
PT	7.2	8.8	1.6	23	0.5	PT
RO	3.7	5.1	1.4	38	0.4	RO
SI	6.1	7.8	1.7	27	0.5	SI
SK	6.2	9.2	3.0	48	0.9	SK
FI	6.0	7.5	1.5	25	0.5	FI
SE	7.5	8.7	1.2	16	0.6	SE
UK	7.2	9.0	1.8	25	0.6	UK
NO	5.8	7.5	1.7	29	0.5	NO
EU27	7.1	8.9	1.7	24	0.6	EU27
EU15	7.3	9.0	1.7	23	0.6	EU15
EU12	5.1	7.3	2.2	43	0.7	EU12
EA	7.3	9.0	1.7	23	0.6	EA

Source: Commission services, EPC.

This convergence of costs per capita at higher ages is reflected in the results (Graph 3. 9). The projected increase in spending is now lower within the EU15 and higher within EU12 in all but the cost-convergence scenarios. This is partly because the age expenditure profiles are fed into all the scenarios. In addition, changes in the other above-mentioned drivers have at least not counteracted, or have likely added to this convergence process. The scenarios on cost-convergence and on non-demographic drivers are built on different methodological assumptions compared to the 2009 Ageing Report. It is therefore not surprising that they show the biggest differences in projection results.

In the 2009 Ageing Report, cost-convergence was referring to the EU12 Member States converging to the EU15 relative average, while in the 2012 Report convergence refers to all the EU27 Member States below the EU27 relative average. Consequently, the convergence gap and spending target is now lower than in the past, such that the cost pressure for the EU12 Member States (many of which are at the low side of spending) is considerably lower. Therefore, the projected increase in spending for the EU12 that is now observed is lower than in the 2009 Ageing Report. The scenario on non-demographic drivers has been improved methodologically, in that it uses a more refined estimation technique. The new wave of projections shows lower (higher) spending projections for the EU15 (EU12).

Graph 3. 8 - Age-gender expenditure profiles and population changes in the 2012 and 2009 Ageing Reports



Source: Commission services, EPC.
Note: HC exp: Health care expenditure.

Table 3. 14 – Decomposing the impact of drivers on differences in spending growth between the 2009 and the 2012 Ageing Reports- based on the demographic scenario as p.p. of GDP

	Difference in spending growth between the 2012 and 2009 Ageing Reports	Due to:						
		Change in age-cost profiles	Change related to GDP growth	Change in demographic projections	Interaction effect*	Change in all drivers**	Base-year effect***	
BE	-0.4	0.0	-0.6	0.4	0.0	-0.1	-0.3	BE
BG	0.0	0.2	0.0	-0.1	0.0	0.1	-0.1	BG
CZ	-0.2	0.0	-0.7	0.3	0.0	-0.4	0.2	CZ
DK	0.1	-0.3	-0.2	0.2	0.0	-0.2	0.3	DK
DE	-0.1	-0.2	0.6	-0.6	0.0	-0.2	0.1	DE
EE	0.1	0.0	-0.2	0.2	0.0	0.0	0.0	EE
IE	-0.7	-0.2	0.0	-0.5	0.0	-0.6	0.0	IE
GR	-0.3	-0.1	-0.1	0.0	0.0	-0.2	-0.1	GR
ES	-0.3	0.0	-0.2	0.1	-0.1	-0.1	-0.2	ES
FR	0.2	0.2	0.1	0.0	0.0	0.3	0.0	FR
IT	-0.4	-0.1	-0.6	0.5	0.0	-0.2	-0.2	IT
CY	-0.3	-0.2	0.4	-0.4	0.0	-0.2	-0.1	CY
LV	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	LV
LT	-0.3	-0.1	-0.3	0.1	-0.1	-0.4	0.1	LT
LU	-0.2	0.2	0.1	0.2	0.0	0.5	-0.7	LU
HU	-0.2	0.0	-0.1	0.1	0.0	0.0	-0.3	HU
MT	-0.4	-0.4	0.4	-0.6	-0.1	-0.7	0.3	MT
NL	0.2	-0.2	-0.2	0.1	0.0	-0.2	0.4	NL
AT	0.3	0.1	0.2	-0.1	-0.1	0.1	0.2	AT
PL	0.8	0.7	-0.3	0.1	0.0	0.6	0.3	PL
PT	-0.6	0.3	0.7	-0.5	0.0	0.4	-1.1	PT
RO	-0.2	-0.1	-0.1	0.0	0.0	-0.1	-0.1	RO
SI	-0.6	-0.2	-1.1	0.8	0.1	-0.4	-0.2	SI
SK	0.1	0.0	-1.0	0.6	0.0	-0.4	0.5	SK
FI	-0.1	-0.1	-0.4	0.3	0.0	-0.2	0.1	FI
SE	0.0	0.0	-0.4	0.4	0.0	0.0	0.0	SE
UK	-0.9	-0.8	-0.2	0.2	0.0	-0.8	-0.1	UK
NO	-0.1	0.0	-0.6	0.5	0.0	-0.1	0.0	NO
EU27	-0.3	-0.1	-0.1	0.1	0.0	-0.2	-0.1	EU27

Source: Commission services, EPC.

Note:

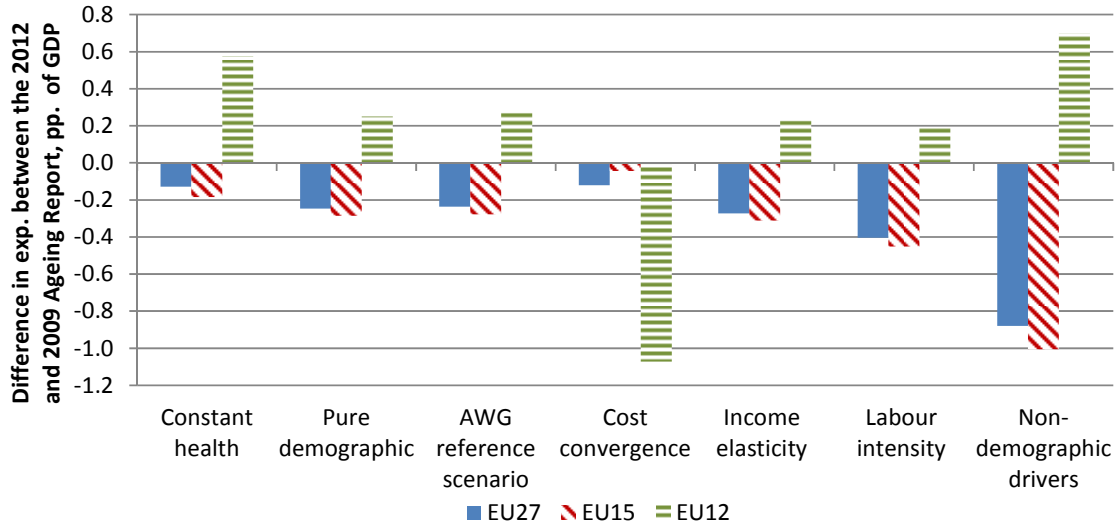
* The interaction effect is the unexplained difference between the change in all drivers and the sum of the effects of the individual drivers.

** The change in all drivers is estimated by replacing the current data with the 2009 Ageing Report data for all drivers at once.

*** The base-year effect is the difference between column 1 and column 6.

At the country level, differences in projections for the "AWG reference scenario" between the two reports are depicted in Graph 3. 10. For most countries the deviations are below 0.3 p.p. of GDP. A large increase appears for Poland, while Belgium, Ireland, Portugal, Slovenia and the United Kingdom have pronounced decreases in projected spending levels.

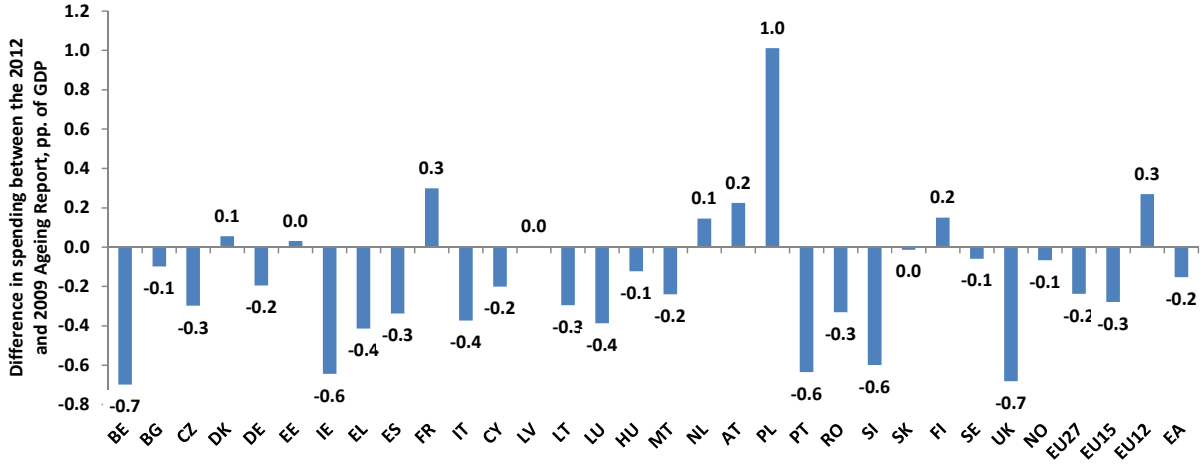
Graph 3. 9 - Differences in the projected increase in public expenditure on health care over 2010-2060 between the 2012 and 2009 Ageing Report, as p.p. of GDP



Source: Commission services, EPC.

Note: As some scenario names have changed, the following comparisons have been made to the scenarios in the 2009 report: The "non-demographic drivers scenario" is compared to the "technology scenario". The "EU27 cost convergence scenario" is compared to the "EU12 cost convergence scenario". The "high life expectancy scenario" and the "sector-specific indexation scenario" did not exist in the 2009 report. No EU averages could be calculated for the death-related cost scenario in the current projection, so that a comparison is not possible.

Graph 3. 10 - AWG reference scenario: differences in the projected increase in public expenditure on health care over 2010-2060 between the 2012 and 2009 Ageing Report, as p.p. of GDP



Source: Commission services, EPC.

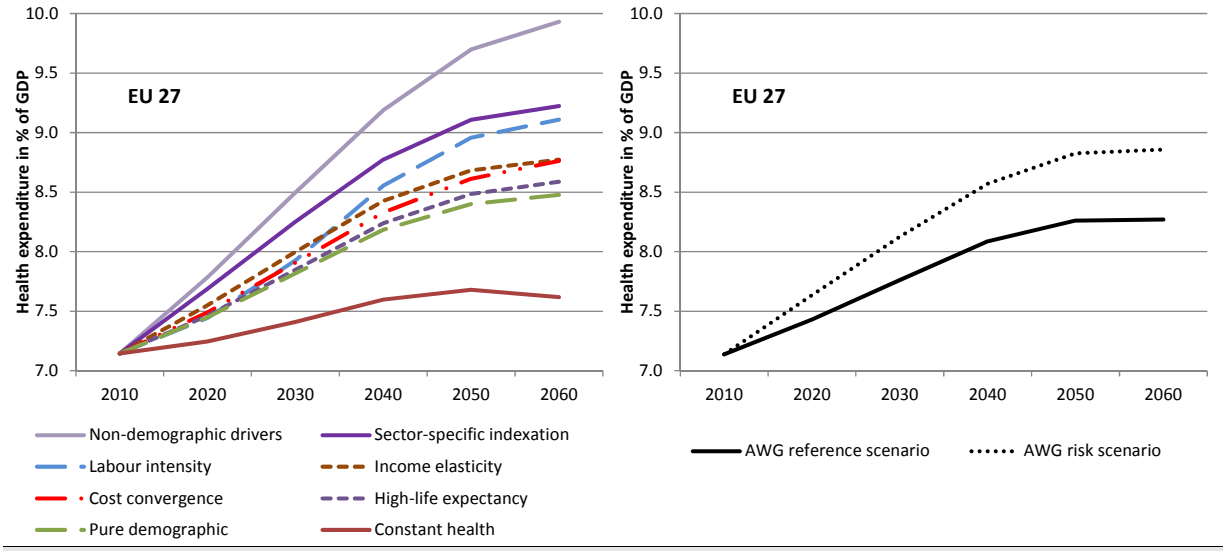
3.10. Conclusions

Growing public health care expenditure raises concerns about its long-term sustainability. Whilst public health expenditure in EU27 was at 5.9% of GDP in 1990 and 7.2% of GDP in 2010, the projections show that expenditure may grow to 8.5% of GDP in 2060 only on accounts of demographic ageing – and to higher levels when other push up factors are accounted for as in the other scenarios presented in this report. This report takes into account the possibility that alternative scenarios materialize in a context bounded with uncertainty.

The "*demographic scenario"* assumes that per capita spending grows in line with national income per capita. The effect is that without population ageing, the share of health spending in percent of national income would stay constant. However, on the one hand empirical research shows that growth in both public and total health care spending may exceed the growth rate of national income, be it because of rising expectations towards more and better health care and a higher willingness to pay for health care services. On the other hand, the scenario assumes that all future gains in life expectancy are spent in bad health. Consequently, the "*demographic scenario*" may under- or overestimate health spending growth.

Indeed, the projections show that whilst ageing *per se* has a non-negligible effect on expenditure growth, it is rather moderate. In effect, much depends on whether gains in life expectancy are spent in good or bad health. Optimistically, if all additional life years are healthy life years, the additional cost burden from ageing can be lowered, as exemplified in the "*constant health scenario"*.

Graph 3. 11 - Range of results from different scenarios on health care in EU27



Source: Commission services, EPC.

Table 3. 15 - Overview of scenario results – increase in public expenditure on health care over 2010-2060, as p.p. of GDP

	Demo-graphic scenario	High life expectancy scenario	Constant health scenario	Death-related costs scenario	Income elasticity scenario	EU27 cost convergence scenario	Labour intensity scenario	Sector-specific composite indexation scenario	Non-demographic determinants scenario	AWG reference scenario	AWG risk scenario	
BE	1.0	1.1	-0.2	0.8	1.2	1.3	1.8	2.0	2.1	0.4	0.8	BE
BG	0.7	0.7	-0.1	0.6	0.9	3.5	1.3	-0.2	2.1	0.5	1.1	BG
CZ	1.9	2.0	0.8	:	2.3	2.0	3.2	1.5	3.8	1.7	2.4	CZ
DK	1.2	1.3	0.2	0.9	1.5	1.2	1.6	1.3	2.6	0.9	1.5	DK
DE	1.7	1.9	0.6	:	2.0	1.8	2.9	3.2	3.3	1.4	2.0	DE
EE	1.2	1.3	0.4	:	1.6	2.6	1.4	1.0	3.0	1.1	1.8	EE
IE	1.3	1.4	0.3	:	1.6	1.3	1.8	3.5	2.7	1.1	1.7	IE
EL	1.1	1.2	0.4	:	1.3	1.1	1.5	1.9	1.9	0.9	1.2	EL
ES	1.4	1.5	0.6	1.2	1.7	1.5	1.1	1.9	2.7	1.3	1.9	ES
FR	1.5	1.7	0.7	:	1.9	1.6	1.9	2.8	3.3	1.4	2.1	FR
IT	0.8	0.8	0.1	0.4	1.0	1.2	0.9	1.2	1.8	0.6	1.0	IT
CY	0.5	0.5	0.1	:	0.6	4.4	0.8	0.4	0.9	0.4	0.5	CY
LV	0.6	0.6	0.1	:	0.9	3.8	1.0	1.8	1.8	0.5	1.1	LV
LT	0.8	0.9	0.1	:	1.2	2.6	1.0	0.6	2.4	0.7	1.3	LT
LU	1.0	1.1	0.3	:	1.2	2.4	1.8	1.2	1.7	0.7	1.0	LU
HU	1.5	1.6	0.4	:	1.8	2.9	2.3	1.2	2.8	1.1	1.6	HU
MT	3.2	3.4	2.0	:	3.6	4.2	3.6	4.7	5.1	2.9	3.6	MT
NL	1.3	1.3	0.4	0.9	1.5	1.4	2.3	1.8	2.5	1.0	1.5	NL
AT	1.9	2.0	0.8	1.4	2.2	1.9	3.0	2.2	3.4	1.6	2.2	AT
PL	2.1	2.2	1.0	1.8	2.5	3.1	3.5	2.1	3.9	1.9	2.6	PL
PT	1.4	1.5	0.5	:	1.6	1.6	1.9	1.3	2.3	1.1	1.6	PT
RO	1.1	1.2	0.5	:	1.4	3.6	2.7	0.6	2.1	1.0	1.4	RO
SI	1.2	1.3	0.5	1.0	1.5	2.1	2.6	0.6	2.6	1.1	1.7	SI
SK	2.3	2.3	1.1	:	2.7	2.7	4.5	2.4	4.4	2.1	3.0	SK
FI	1.1	1.2	0.3	0.9	1.4	1.5	2.0	1.2	2.5	1.0	1.5	FI
SE	0.9	1.0	0.0	:	1.2	0.9	1.6	0.7	2.3	0.7	1.2	SE
UK	1.2	1.3	0.5	1.2	1.5	1.6	1.9	1.9	2.7	1.1	1.8	UK
NO	1.5	1.7	0.5	:	1.8	2.0	2.4	1.4	2.7	1.2	1.7	NO
EU27	1.3	1.4	0.5	:	1.6	1.6	1.9	2.1	2.8	1.1	1.7	EU27
EU15	1.3	1.4	0.4	:	1.6	1.5	1.9	2.1	2.7	1.1	1.7	EU15
EU12	1.8	1.9	0.8	:	2.1	3.0	3.0	1.6	3.4	1.5	2.2	EU12
EA	1.3	1.5	0.4	:	1.6	1.5	1.9	2.2	2.7	1.1	1.7	EA

Source: Commission services, EPC.

With rising income and longevity, older people are willing to spend more on health care services.[115] Assuming a higher growth in spending relative to national income (i.e. an income elasticity of 1.1) adds an extra 0.3 p.p. of GDP to health expenditure. Rising income, in turn, drives technological innovations in the health sector, which have been confirmed in many studies to be crucial in explaining past increases in health expenditures (Breyer *et al*. 2010). In addition, policy decisions to expand access and improve quality to health services especially for older people will inextricably mean that ageing remains at the core of public debates related to health expenditures.

As such, non-demographic factors will be a driving force of health expenditures, if past trends persist. Our projections show that – on the basis of an econometric estimate – when the impact of future income growth on the demand for more and better health care is taken into consideration, projected expenditure becomes much higher. This is reasonable, as increasing economic wealth puts governments at pressure to provide more health services and to improve the quality of care. In addition, growing living standards change people's attitude towards their own health and raise their expectations on living a longer and healthier life.

Innovations can produce efficiency gains and thus be cost-saving. However, in medical care they have also expanded the possibilities of life-saving treatments. These have added

[115] In the past decade there was an increase in the expenditure associated with old age diseases such as Alzheimer or dementia.

to costs, both by adding extra expenditure to previously non-curable diseases and by saving peoples' lives at the cost of longer periods of morbidity, especially at old ages. Overall, this had a strong increasing and dominant effect on public spending. The currently prevalent consensus is that this will also be the case in the future. Still, extrapolating past trends may also mean overestimating the cost-increasing impact of non-demographic drivers and underestimating the cost-saving impact of technological progress in the future.

Other supply related drivers, such as the costs of wages, are a non-negligible component of health expenditures. Health care is highly labour-intensive and requires highly skilled medical personnel who has strong bargaining power in a number of countries. Assuming that wages grow in line with labour productivity (therefore exceeding growth in GDP per capita) – such as in the "*labour intensity scenario*", leads to an additional spending of 0.6 p.p. of GDP relative to the "*demographic scenario*".

In addition to wages, medical products and health care infrastructure constitute large shares of total health care expenditure. Disentangling the contribution of the individual costs components and their contribution to changes in health care spending improves the understanding of the actual expenditure drivers ("*sector-specific composite indexation scenario*"*).* The "*sector-specific composite indexation scenario*" in which future expenditure of each different driver evolves in line with its specific past trend, leads to an average projected increase of 0.8 p.p. of GDP higher than in the "*demographic scenario"*. Two conclusions can be drawn from this scenario. First, wages and pharmaceuticals are the most important drivers of expenditure growth. Second, whether the growth contribution is positive or negative is country-specific.

Finally, growing convergence in citizens' income per capita and expectations towards benefitting from a similar basket of health services and goods across countries may push expenditures up for below EU average income countries ("*cost convergence scenario*"). In the "*cost convergence scenario*" Member States with shares of GDP per capita spending below the EU27 average converge in real living standards to the EU27 average. Depending on the current expenditure profile, governments would need to spend up to 4.4 p.p. of GDP more over the next five decades.

The different drivers described above lead to a varying degree of pressure on health care expenditure over the next 50 years. The range of estimated outcomes on expected health expenditure growth is wide, ranging from 0.5% to 2.8 % of GDP in the EU27 between 2010 and 2060 (Graph 3. 11,Table 3. 15 and Graph 3. 12). Based on a combination of different scenarios, the "AWG reference" and the "AWG risk" scenarios show that spending in the EU27 may increase between 1.1 and 1.7 p.p. of GDP. Different institutional and legal settings (financing mechanisms, ownership structure, organisation of health provision, etc.), as well as policy changes, which are not well reflected in the projections, further increase this range both at the low and high ends. Despite these uncertainties, all scenarios for almost all Member States point to considerable continuous pressures on public spending from the health care sector – even under conservative assumptions.

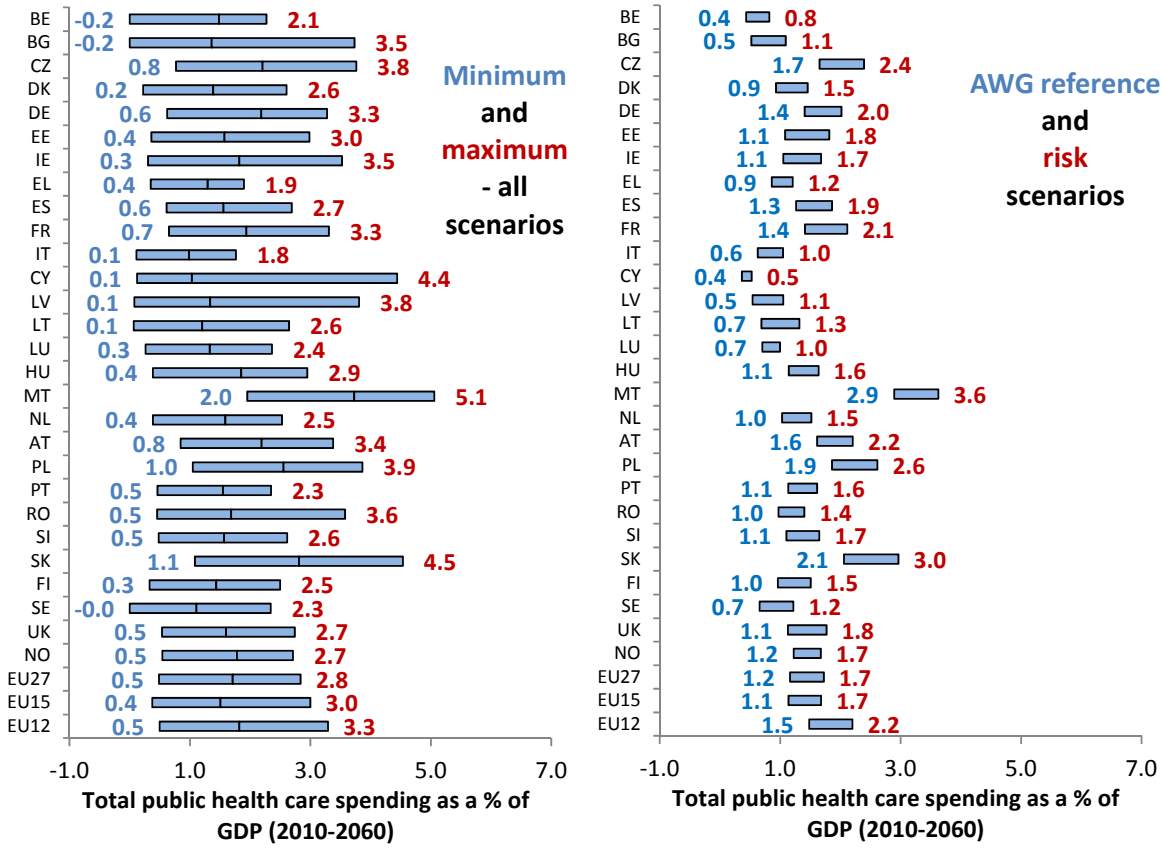
It is unlikely that these pressures will lead to a withdrawal from public financing of health care. Due to market failures in health care markets, public financing will remain a large share of health care provision. Private spending may play a more important role but will remain of a complementary character in many Member States, closing gaps in public financing and enabling treatment in areas not considered as life-saving.

The challenges will likely be different for the two groups of Member States (EU15 and EU12) (Graph 3. 13). The current spending

on health care is significantly higher both as % of GDP and in per capita terms in the EU15. Moreover, the shape of the expenditure profile suggests large differences in the provision of health care not only due to the gap in life expectancy, but also to normative health and social policy considerations.

First, given the more profound demographic changes expected to be experienced by the new Member States, the demographic impact, quantified in the "*demographic scenario*" will be stronger in the EU12 than in the EU15. Yet, the same group of EU12 countries is expected to undergo more dynamic improvement in health status, which is projected to partially offset the demography-driven increase in expenditure.

Graph 3. 12 - Country specific range of results from different scenarios on health care, 2010-60 changes as % of GDP

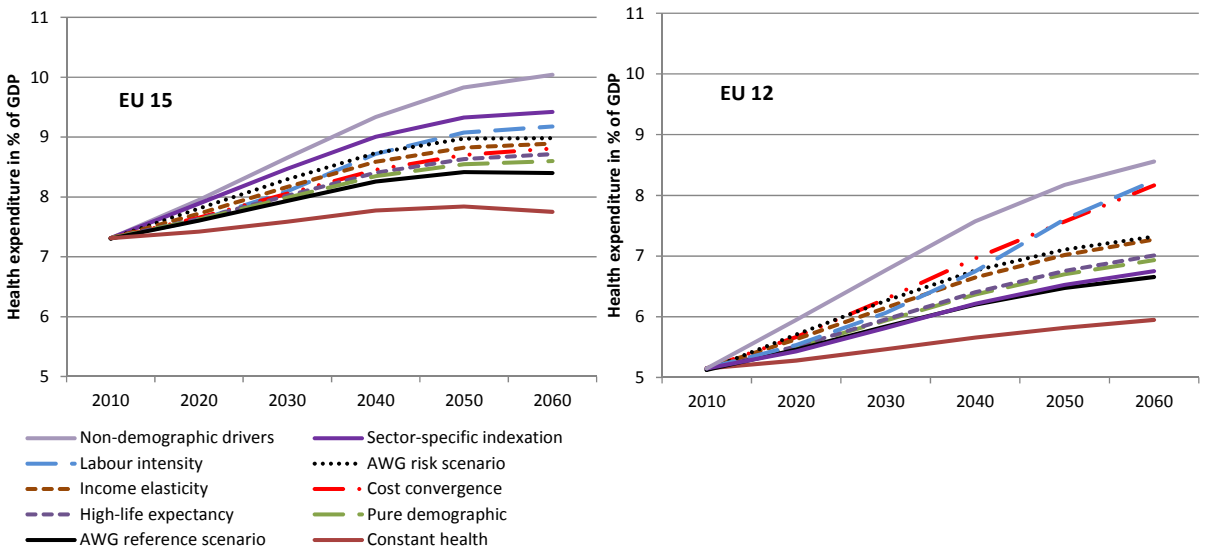


Source: Commission services, EPC.

Second, the health care spending in the EU12 countries is also expected to be affected more profoundly by the changes linked to income growth and the effect of some supply-side factors. Given the current gap in the health care provision and the on-going process of convergence in terms of national income growth, a considerably faster growth in demand for health care is expected to occur in the decades to come as compared to EU15. The same observation applies to the supply-side factors. Growth in productivity and thus wages is expected to exceed for at least a few decades the increase in wages experienced in the EU15.

Overall, ageing as well as non-demographic drivers of health care expenditures will continue putting pressure on the long-term sustainability of public finances. Balancing the health care needs of the European population with spending resources, as well as continuous efforts to increase the efficiency and quality of health service delivery, will continue to be high on the political and economic reform agenda.

Graph 3. 13 - Range of results from different scenarios on health care in EU15 and EU12



Source: Commission services, EPC.

4. Long-term care

This chapter presents the scenarios and the projection results regarding public expenditure on long-term care (LTC) from 2010 to 2060 for the 27 EU Member States plus Norway.[116] Projections were run using Commission services' (DG ECFIN) models on the basis of the methodology and data agreed with the Member States' delegates to the AWG-EPC.[117] The chapter starts by providing a quick overview of determinants of long-term care expenditure, explaining the factors affecting the future demand and supply of long-term care (section 4.2). Section 4.3 then briefly describes the methodology (and so-called scenarios) used to project public expenditure on long-term care and presents and discusses the projections results according to each scenario. It is important to note that these are only scenarios, not forecasts. Each of them tries to capture a single effect, leaving aside the effect of other variables. Finally, section 4.4 compares the results of this round of projections with those of the previous 2009 Ageing Report.

4.1. Introduction

The term "long-term care services" refers to the organisation and delivery of a broad range of services and assistance to people who are limited in their ability to function independently on a daily basis over an extended period of time. The services may be provided in a variety of settings including institutional, residential – i.e. in supported living arrangements other than nursing homes – or home care. Mixed forms of residential care and (internally or externally provided) care services exist in the form of assisted living facilities, sheltered housing, etc., for which a wide range of national arrangements and national labels exist. At the same time, long-term care comprises a mix of both health and social components, therefore pertaining to both health and social sectors. This complexity is a challenge when one has to define a clear, understandable and feasible boundary between the two long-term components: health care and social care. In addition, most Member States provide some kind of long-term care related "cash benefits" that can also be used to pay for services, mainly provided by the private sector or by informal carers. This also makes expenditure projections a challenge.

Though a smaller expenditure item than health care, the provision of long-term care services represents a non-negligible and growing share of GDP and of total government spending. It is also a non-negligible part of total age-related expenditure. In the future, the demand for formal long-term care services is likely to grow, since the numbers of persons who reach 80 years and above are growing faster than any other segment of the population in all EU Member States. This ageing of the population is expected to put pressure on governments to provide more long-term care services because very old people often develop multi-morbidity conditions, which require not only long-term medical care but assistance with a number of daily tasks. Hence, one can expect an upward pressure on public expenditure and on the ratio of long-term care expenditure to GDP. This makes the issue of public spending on long-term

[116] Projected public expenditure on LTC comprises both in-kind and cash benefits, as detailed in Annex I.

[117] The methodology for running the long-term expenditure projections is explained in detail in the 2012 Ageing Report "Underlying assumptions and projection methodologies": http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-4_en.pdf. Country specific information regarding any relevant recent reform legislated and/or implemented that could have an impact on long-term care expenditure (e.g. freeze of wages) were taken into account in the current projections (see Box 2, p 206).

care a significant part of the debate on the long-term sustainability of public finances.

4.2. Determinants of long-term care expenditure

Public expenditure on long-term care depends on a number of factors affecting the demand and supply of long-term care services. On the demand side, the main factors include the socio-demographic developments and the health status of the population – notably through the dependency trend. On the supply side, the factors include the patterns of long-term care provision (organisation and financing of the system), essentially the extent to which Member States rely on different types of formal, paid care and on informal care. They also include the availability of human resources, be it for formal or informal care supply. In addition, technological progress could also play a role although to a lesser extent than in the case of "acute" health care. Indeed, although much less important than for health care expenditure, technology is often seen as a promising development in long-term care. Various solutions –mainly IT devices – may be created and/or their use further developed in order to facilitate daily life for the disabled and dependent people. They could alleviate somewhat the expected increase in long-term care needs.[118] This factor will not be addressed in the current projection exercise as data is very poor on that matter. Finally, economic growth and development may also play a role. The way these factors impact on public expenditure on long-term care is described below.

4.2.1. Demography

A key element of the projections of public expenditure on long-term care is the estimation of the future population's size that will require and receive long-term care.[119] The rise in the numbers of older people expected in the coming decades is seen as a major determinant of increased need and therefore demand for long-term care services. Indeed, the increase in life expectancy may translate in an increase in the number of years during which long-term care services are provided and therefore costs accumulate.[120] Further, the need for long-term care is determined by the overall health status of the population, which is highly correlated with the share of the elderly in the overall population. Indeed, the risk to live with physical or mental disability leading to a dependency situation tends to increase with age, especially with very old age (80+).

The relationship between the age of an average individual and his/her use of long-term care is well illustrated by the so-called "age-related expenditure profiles per capita" shown in Graph 4. 8 in Annex I. The graphs plot average public per capita spending on long-term care (as percentage of GDP per capita) against the age of individuals, for EU15 and EU12. As can be seen, per capita expenditure increases substantially from the age of 65 onwards.

As further explained in section 4.3, the "*demographic scenario*" aims at capturing the impact of the above-mentioned size effect on future long-term care public expenditure, while the "*high life expectancy scenario*" allows an estimation of the impact on spending for an additional year increase in life expectancy.

4.2.2. Dependency levels - developments in health status

The need for long-term care is not arising from ageing itself; it is a consequence of

[118] See Fujisawa & Colombo (2009).

[119] This "size effect" is well illustrated by the Graph 1. 15 of the present Report, showing the increase in population aged 65 and above and 80 and above according to EUROPOP2010 projections.

[120] This is the case when longevity is not accompanied by correspondent improvement in the "quality" of life (see next item: "dependency levels").

frailty, causing individuals to be dependent on others.[121] The prevalence levels of dependency have been shown to be an important determinant of long-term care expenditure. As in the field of health care, there is an on-going debate on the future developments of disability[122], defined as some form of functional impairment of the individual. Nevertheless, what determines the demand for long-term care and therefore expenditure is not only the measure of disability, but also the extent to which this disability transfers into dependency, and therefore requires some kind of long-term care provision.

Disability depends on a person's perception of his/her ability to perform activities associated with daily living and eventually this "subjective" need for long-term care will not necessarily transfer into actual demand and/or provision of LTC. This subjectivity is related to social and cultural considerations. In addition, the legal definition of "dependency" – the level of dependency opening a right to the provision of long-term care – differs widely from one Member State to another, preventing full data comparability. It also contributes to explaining the observed variations in provision and expenditure across countries.

The projected numbers of dependent people is a key element in the projected cost developments. For this projection exercise, a common definition of disability and therefore dependency is used for all countries – the EU-SILC definition[123] - adjusted for each country to the number of recipients (by age groups) when this was provided.[124]

4.2.3. Patterns of long-term care provision

The extent to which 1) a country relies on formal care (rather than informal care), and 2) in-kind formal care is provided in institutions or at home, is put forward as a crucial determinant of public expenditure on long-term care. Indeed, 1) informal care is still often seen by governments as "free" – i.e. privately paid – and 2) institutional care is considered as much more costly than home care, even though it still generally concerns different levels of care, and the difference is much less clear for very severe cases. Yet, there is an increasing interest for the "opportunity costs" derived from informal care: the impact on labour market and productivity, as well as on carers' health status itself.

The governments of most EU Member States are involved in either the provision or financing of long-term care services, or often both, although the extent and nature of their

[121] Dependency refers to the inability to perform daily personal care tasks. It is often referred to as "ADL-dependency" i.e. difficulties in performing at least one Activity of Daily Living (ADL).

[122] A key question for the purposes of making long-term care projections is of course whether, as life expectancy increases, dependency levels by (older) age will increase, remain constant or decrease. Recent empirical evidence has not come to a clear conclusion regarding these hypotheses. International evidence suggests that health may continue to improve, but some causes of disability may at the same time become more prominent. Some of those identified have direct incidence on the frailty of longer-living elderly. In particular, the number of people with a diagnosis of dementia (Alzheimer) is expected to increase. On the other hand, certain studies have noted that, as life expectancy increases, the incidence of severe disability is postponed, leading to a reduction in the prevalence of severe disability for some age-groups (see Robine and Michel, 2004).

[123] To calculate disability rates, the AWG, based on the proposal in the February 2011 Commission's note on HC and LTC data availability, decided to use the EU-SILC item "Limitation in activities because of health problems [for at least the last 6 months]". In order to clarify the relation and to follow the usual eligibility conditions of public schemes, it is commonly accepted that the disability levels accounted for are those categorized as "severe". This is the only measure of dependency available for all Member States and Norway. Note, though, that the relevant EU-SILC question does not specify the activities that the respondent should consider, nor offer a description of what is meant by "severe limitation". This implies that the subjective assessment by the respondent plays a more important role than is typically the case when assessing legal eligibility for public LTC.

[124] See Annex I.

involvement differ widely across countries. Some Member States rely heavily on the informal provision of long-term care and their expenditure on formal care is accordingly small. Other Member States provide extensive public services, notably to the elderly dependent, and devote a significant share of GDP to fund their policies. Pressure for increased public provision and financing of long-term care services may grow substantially in coming decades, especially in Member States where the bulk of long-term care is currently provided informally. Note that the private market for LTC is still under-developed in most Member States and is most often not a real alternative yet.[125]

4.2.4. Care supply – availability of human resources

The model implicitly assumes that all those receiving home care or institutional care are dependent, and that all persons deemed dependent either receive informal care, home care, institutional care or cash benefits.[126] However, one should be aware that the provision of LTC is not as flexible as usually assumed, be it for formal or for informal care. Further, the substitution effects between formal and informal care are not straightforward.

In some countries, the personnel vacancy rates in the sector are already high, and a potential – possible – pressure on formal provision of LTC may also have an impact on wages in the sector.[127] Indeed, the cost of long-term care is dominated by labour costs, and changes in wage rates of nurses and other LTC workers (due to relative labour shortages for example) are likely to influence future costs of care.

As for informal care, it is mostly provided by either partners, or children and children-in-law (intergenerational care). Two dimensions are to be taken into account: the future availability of potential informal carers (i.e. the future living arrangements of older people), and their future propensity to provide care (affected by the participation in the labour market, as well as the ability/willingness[128] to provide care, which is likely to decrease as spouses and relatives themselves become older and frailer).[129]

The expected decrease in informal care availability and therefore the further need for/recourse to formal care also presses for higher public expenditure on long-term care. Of course, given the rigidities in the sector – with a sometimes already limited formal care supply – the pressure may not fully translate into direct increase in public expenditure on formal care services. Still, the increasing pressure will then have to be addressed in other ways, for instance through better working conditions in the formal care sector, but also arrangements for a better work/life balance to make easier the provision of informal care, better (public) support to informal carers, development of respite care,

[125] On LTC - market failures and the respective roles of state, family and market, see for instance Cremer and Pestieau (2009).

[126] Note that dependent people may also receive a combination of formal and informal care. However, this could not be taken into account into the model, given the lack of provided data on possible overlapping.

[127] See for instance, Fujisawa and Colombo (2009).

[128] Of course, other variables enter into this decision process: community values, possible social pressure or at least, societal opinion, altruism (pure or forced), strategic/reciprocal motivations. See for instance Cremer and Pestieau (2009), Haberkern and Szydlik (2010).

[129] Indeed, one can foresee a shift from informal care towards an increasingly formal type of care-giving – in general, but with national structural differences – as the typical caregivers (i.e. middle-aged daughters, or spouses) get more involved in the labour market, and the new family structures tend to mean less support to the older generations. Further, it goes the other way round as well: in case of intensive caring, there may be consequences on the carer's health status/ mental health status, reducing the ability to care. And it may also reduce labour market participation, especially of women and older workers (see also Colombo, 2010). This is why, in a future exercise, projections could include formal care provided to help the carers, when data is made available.

investments in ICT solutions. In the short to medium term, these ultimately mean more public expenditure as well.

The 2009 scenario that aimed at analysing the informal care supply trends has not been retained for the 2012 exercise. Yet, the scenario of a "shift to formal care" implicitly addresses this issue.

4.3. Future expenditure for LTC provision: the various scenarios

The projection exercise is aimed at capturing the effect of a certain number of demographic and non-demographic variables on future public expenditure on long-term care. Macro-simulation models developed by the Commission services (DG ECFIN) have been used to project long-term care expenditure. The macrosimulation models include most of the variables just reviewed, and are structured in a way that ensures that a large number of Member States can provide the necessary data to run the projections. Indeed, the choice of methodology and various scenarios is constrained by the availability, accessibility and quality of long-term care data, provided by Eurostat or national sources.[130,131] Therefore, the scenarios used to project long-term care expenditure may not include all the relevant factors identified as affecting health and long-term care spending.

[130] Note that the data and methodology for running the long-term expenditure projections are explained in detail in the 2012 Ageing Report (2011) "Underlying assumptions and projection methodologies", European Economy No. 4. Note also that in this 2012 projection round, the data availability and comparability have improved significantly.

[131] Due to lack of data, some variables had to be imputed with EU corresponding average in place of national data, as further explained in Annex I. Changes in reported data of one country, for statistical or institutional reasons, can therefore impact the projected expenditure of some other countries through these imputed variables.

4.3.1. Methodology

The methodology aims at analysing the impact of changes in the assumptions made about:

- the future relative numbers of elderly people, reflecting changes in the population projections;
- the future numbers of dependent (elderly) people, by applying changes to the prevalence rates of dependency;
- the balance between formal and informal care provision;
- the unit costs of care.

These macro-simulation models assume that the whole population is divided into groups which are assigned certain characteristics (e.g. age, gender, per capita expenditure, health status, type of care/support…). Changes in the (relative) size or features of these groups lead to expenditure changes overtime. A schematic presentation of the methodology can be found in Graph 4. 1 below.

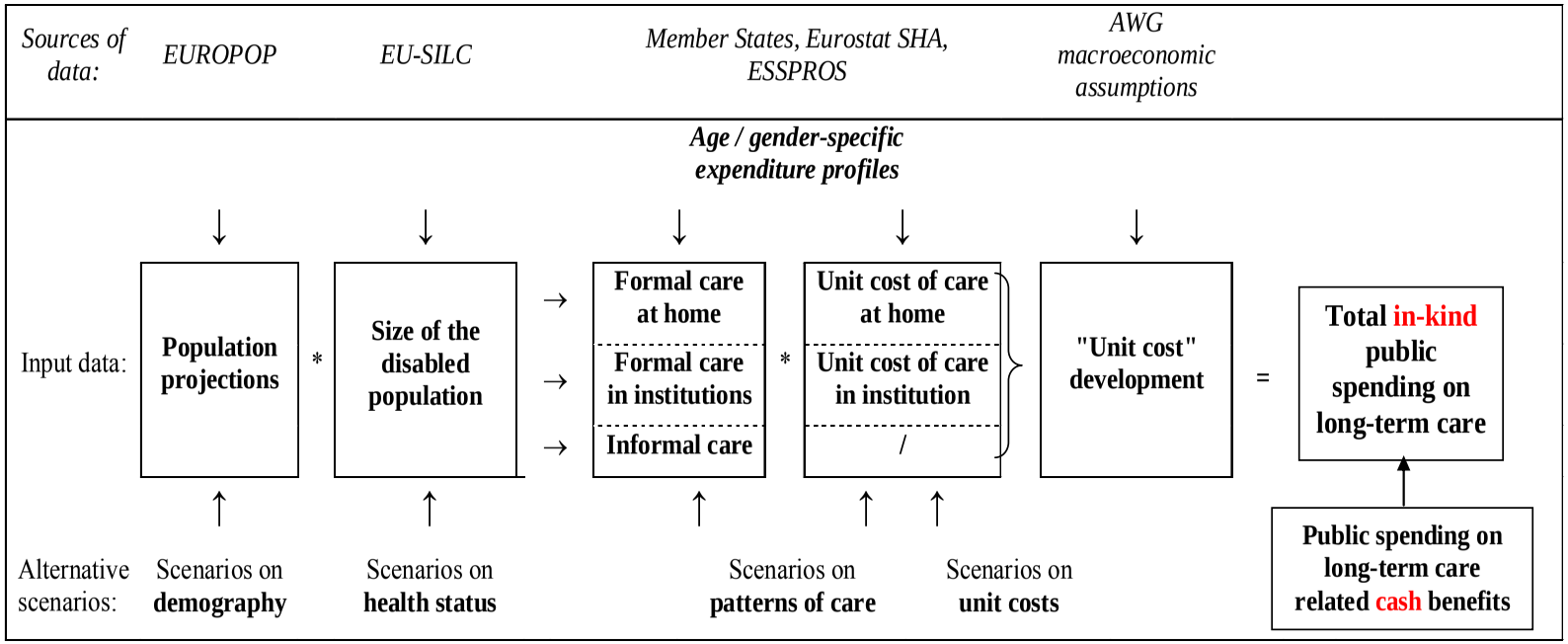
In past exercises, it has been decided that the base-case long-term budgetary projections should illustrate the policy-neutral situation. This is the situation where changes in government policy are not considered.[132] In other words, any potential future institutional or legal changes to the financing and organisation of long-term care systems are not reflected in the methodology used for projecting expenditure, except when specifically and clearly stated.

Pressure for increased public provision and financing of long-term care services may grow substantially in coming decades, especially in Member States where the bulk of long-term care is currently provided informally. Therefore, additional "policy-

[132] It is implicitly assumed that the eligibility requirements do not change, as the proportion of persons covered is kept constant. Therefore, the supply of LTC will follow any related changes in demand.

change scenarios" have been prepared to illustrate the impact of possible future policy changes on that matter, such as Member States deciding to provide more formal care services to the elderly.

Graph 4. 1 - Schematic presentation of the projection methodology



Source: Commission services.

Note: The projections need to be viewed in the context of the overall exercise. Consequently, the common elements of all scenarios are the population projections provided by Eurostat (EUROPOP2010) and the baseline assumptions on labour force and macroeconomic variables agreed by the EC (DG ECFIN) and the AWG-EPC. The age- and gender-specific per user public expenditure (on long-term care) profiles are provided by Member States, or proxied by the EU-average. They are applied to the demographic projections provided by Eurostat to calculate nominal spending on long-term care. As to cash benefits, they are assumed to grow in line with GDP per capita; their actual unit cost is seldom available, and therefore could not be used in this projection exercise. Further, the necessary age and sex distribution of cash recipients has not been provided by most member states.

Box 1: What is this scenario for?

- The "**demographic scenario**" aims to isolate the size effect of an ageing population on public expenditure on LTC; for all types of LTC, expenditure per user grows in line with GDP per capita.
- The "**base case scenario**" reflects in addition the highly labour-intensive characteristic of the long-term care services by letting in-kind LTC benefits profile grow in line with GDP per hours worked. This is the common assumption to all scenarios – except the "*demographic*" one.
- The "**high life expectancy scenario**" assumes an even further demographic development, whereby life expectancy in 2060 is higher by one year than the "*base case*" projected life expectancy.
- The "**constant disability scenario**" addresses the dependency factor in particular: it aims to capture the potential impact of assumed improvements in the health (or non-disability) status.
- Two scenarios propose to illustrate the impact of changes in the relative size of the different components:
    - The "**shift to formal care scenario**" illustrates the impact of a 10-year progressive shift into the formal service sector of 1% per year of dependent population who have so far received only cash benefits or informal care.
    - The "**coverage convergence scenario**" assumes an extension of the formal/public coverage in any form (institutional, home care or cash benefits) towards the EU-average rate.
- The "**cost convergence scenario**" is meant to capture the potential impact of a convergence in real living standards on LTC spending.
- The "**AWG reference scenario**" is a central scenario, intermediate between the "*demographic*" and the "*constant disability*" scenarios, assuming that half of the projected gains in life expectancy are spent without disability.
- Finally, the "**AWG risk scenario**" combines the "*AWG reference*" and the "c*ost convergence*" scenarios by assuming the convergence of total national average cost to the EU27 weighted average, in order to capture the possible effect of a convergence in real living standards.

4.3.2. Scenarios and projection results

The scenarios carried out in the projection exercise illustrate the future budgetary impact of changes in (i) demography, (ii) disability, (iii) policy setting, (iv) unit costs. The next sub-sections present the results of the long-term projections of public expenditure on LTC expressed as % of GDP, over the period 2010-2060.

4.3.2.1. The impact of future demographic change

(1) "Demographic scenario"

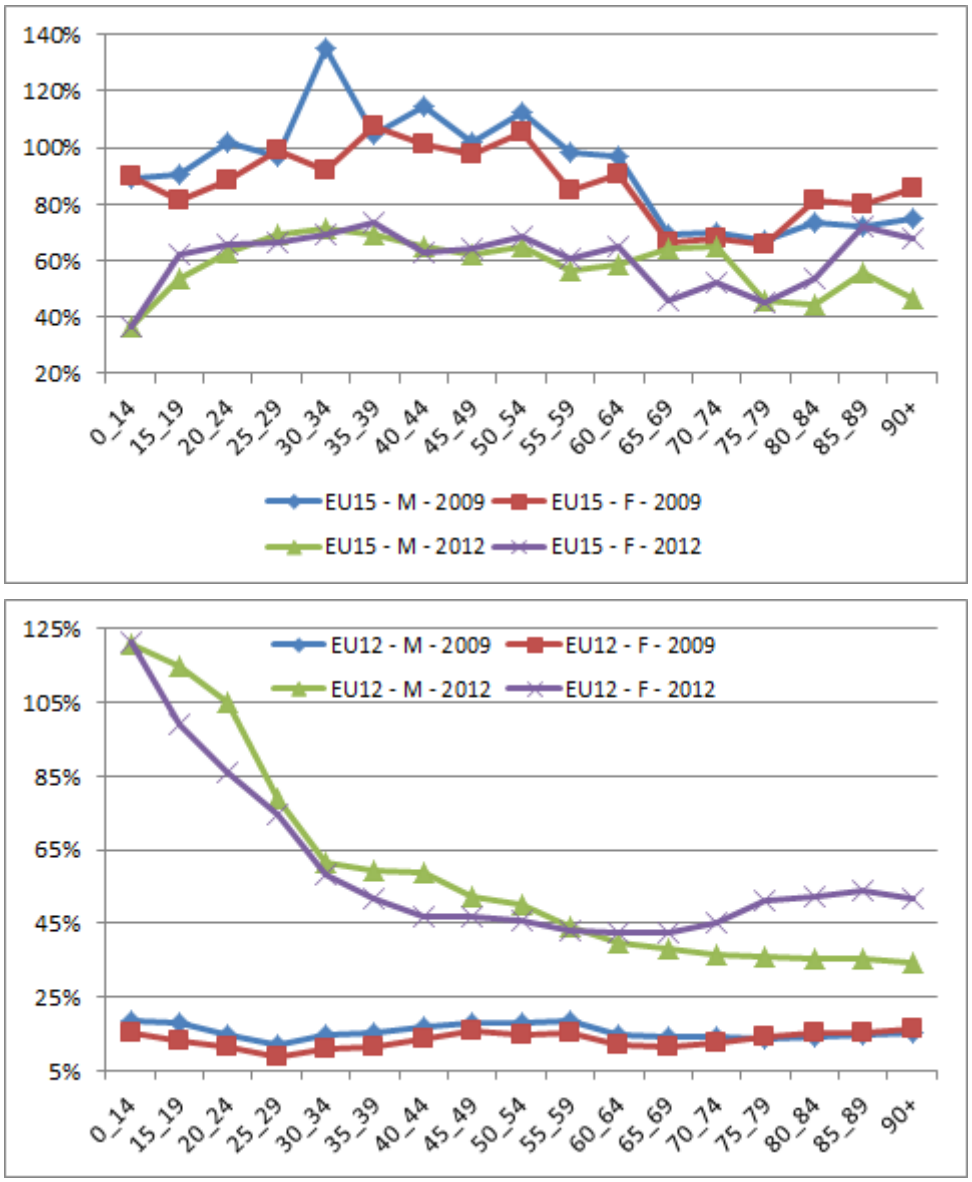
The "***demographic scenario***" examines the impact on the public expenditure of long-term care of the "size effect", i.e. future numbers of elderly people. It is a "no policy change scenario" as it assumes that the shares of the dependent population who receive either informal care, formal care at home or institutional care are kept constant over the projection period. Those constant shares (at the 2010 – base year – level) are then applied to the projected changes in the dependent population. Since the prevalence of dependency is also kept constant over the projection horizon, the dependent population evolves in line with the total elderly population. This implies that all gains in life expectancy are spent in disability. This scenario assumes that average lifetime consumption of LTC services will increase over time. As in the "*demographic scenario*" for health care expenditure projections, all types of LTC expenditure (in-kind and cash) are assumed to evolve in line with GDP per capita growth.

Graph 4. 2 below shows the so-called "age-gender expenditure profiles", i.e. the relationship between the age of an average individual and his/her demand for long-term care. The graph plots each age-gender specific average public spending on LTC per user (and not per capita as in the case of health care) as a share of GDP per capita in EU12 and EU15[133], as used in this report and in the 2009 Ageing Report.

Graph 4. 3 below shows the projected increase in public expenditure on long-term care from 2010 to 2060, while Table 4. 1 details the projected figures for every ten year, in the 2012 projection exercise. For the EU27, public expenditure on LTC is projected to increase by more than 80%. The projected increase ranges from less than 40% in the United Kingdom to around 200% in Luxembourg. In percentage points, the projected increase amounts to 1.5 p.p. of GDP on average for the EU27, i.e. from 1.8% in 2010 to 3.4% in 2060. The projected increases range from 0.1-0.5 p.p. in Bulgaria, Estonia, Cyprus, Latvia, Portugal and Slovakia to +3.6-3.9 p.p. in Denmark, the Netherlands and Norway.

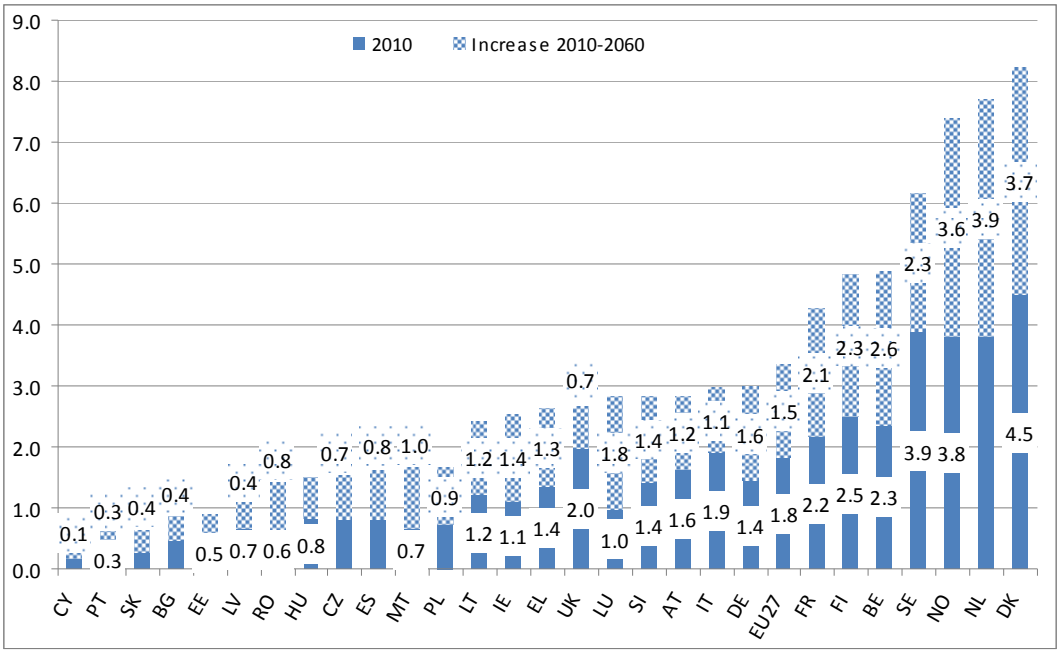
[133] Graph 4. 7 in Annex I presents the national "age-gender expenditure profiles", i.e. the relationship between the age of an individual and his/her demand for long-term care. The figures plot each age-gender specific average public spending on LTC per user as a share of GDP per capita in each EU Member State and Norway. Graph 4.8. shows the expenditure per capita as a share of GDP per capita.

Graph 4. 2 - Age-gender expenditure profiles (per beneficiary/ user of formal LTC)



***Source*:** Commission services, EPC.
***Note*:** The EU15 average is calculated using 10 available data sets; the EU12 average is based on 6 available data sets.

Graph 4. 3 - Demographic scenario
Public expenditure on LTC as % of GDP; 2010-2060



***Source*:** Commission services, EPC.
Note: Cyprus reports a public share of only 6% of total in-kind LTC expenditure in 2008.

Table 4. 1 - Demographic scenario - Total public spending on LTC as % of GDP

								Change 2010-2060		
	2010	2015	2020	2030	2040	2050	2060	pp.	in %	
BE	2.3	2.6	2.8	3.1	3.8	4.5	4.9	2.6	108.8	BE
BG	0.5	0.5	0.5	0.6	0.7	0.8	0.9	0.4	81.5	BG
CZ	0.8	0.9	0.9	1.1	1.2	1.3	1.5	0.7	86.6	CZ
DK	4.5	4.6	4.9	5.8	6.8	7.6	8.2	3.7	82.4	DK
DE	1.4	1.6	1.7	2.0	2.4	2.9	3.0	1.6	109.2	DE
EE	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.4	67.7	EE
IE	1.1	1.1	1.2	1.5	1.8	2.2	2.5	1.4	127.3	IE
EL	1.4	1.5	1.6	1.8	2.0	2.3	2.6	1.3	95.0	EL
ES	0.8	0.9	0.9	1.0	1.2	1.4	1.6	0.8	96.1	ES
FR	2.2	2.4	2.5	2.8	3.6	4.0	4.3	2.1	97.9	FR
IT	1.9	2.0	2.1	2.3	2.5	2.8	3.0	1.1	56.1	IT
CY	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.1	70.7	CY
LV	0.7	0.7	0.7	0.8	0.9	1.0	1.1	0.4	61.1	LV
LT	1.2	1.3	1.4	1.6	1.9	2.2	2.4	1.2	97.0	LT
LU	1.0	1.1	1.3	1.4	1.8	2.4	2.8	1.8	189.0	LU
HU	0.8	0.9	0.9	1.1	1.2	1.4	1.5	0.7	80.6	HU
MT	0.7	0.7	0.9	1.3	1.4	1.3	1.7	1.0	153.4	MT
NL	3.8	4.1	4.4	5.3	6.4	7.4	7.7	3.9	101.6	NL
AT	1.6	1.7	1.8	2.1	2.4	2.7	2.8	1.2	73.9	AT
PL	0.7	0.8	0.9	1.0	1.3	1.5	1.7	0.9	128.5	PL
PT	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.3	94.1	PT
RO	0.6	0.6	0.7	0.8	1.0	1.1	1.4	0.8	126.1	RO
SI	1.4	1.6	1.7	1.9	2.3	2.6	2.8	1.4	98.5	SI
SK	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.4	131.9	SK
FI	2.5	2.8	3.0	3.7	4.5	4.7	4.8	2.3	92.8	FI
SE	3.9	3.9	4.0	4.7	5.3	5.7	6.2	2.3	58.9	SE
UK	2.0	2.1	2.1	2.3	2.5	2.6	2.7	0.7	35.5	UK
NO	3.8	3.8	3.9	4.7	5.8	6.6	7.4	3.6	94.0	NO
EU27	1.8	2.0	2.1	2.4	2.8	3.2	3.4	1.5	83.1	EU27
EA17	1.8	1.9	2.1	2.3	2.8	3.2	3.4	1.7	94.7	EA17

Source: Commission services, EPC.

Box 2: Taking account of existing policy settings in the Member States

Indexation to prices: Germany and France

In the projection, unit costs are indexed to GDP per hours worked or GDP per capita. Under current rules in Germany, all long-term care benefits are indexed to prices. The difference between the amounts financed by the State and the costs of long term care are either recovered by private insurance or are paid by the beneficiaries themselves. To better reflect the current German legislation, an alternative projection has been run where unit costs of long-term care benefits remain constant in real terms. This would mean that the amounts financed by the State are adjusted in line with prices. The same partly holds true for France, where one part of the long-term care benefits is also indexed to prices. For people over 60 years old, the benefits are calculated according to the needs up to a ceiling which is indexed to prices; while for people under 60, the indexation is decided each year by the ministry in charge of the disability matters.

Assuming constant unit costs in real terms, the long-term care public expenditure in Germany is projected to increase not above 1.73% of GDP, with around 1.6% of GDP at the end of the projection period, as compared to an increase from close to 1.4% of GDP today up to 3.3% of GDP when assuming unit costs evolve in line with GDP per hours worked ("*base case scenario*"). The results of the two scenarios illustrate the difference between what the State is projected to spend under these two assumptions.

Germany								
	Base case scenario							
	CH 10-60	2010	2015	2020	2030	2040	2050	2060
Unit costs evolve in line with GDP per hours worked	1.85	1.43	1.57	1.72	2.10	2.52	3.10	3.28
Unit costs constant in real terms	0.14	1.43	1.44	1.48	1.57	1.64	1.73	1.57
	AWG reference scenario							
	CH 10-60	2010	2015	2020	2030	2040	2050	2060
Unit costs evolve in line with GDP per hours worked	1.69	1.43	1.56	1.70	2.05	2.43	2.97	3.12
Unit costs constant in real terms	0.06	1.43	1.43	1.46	1.53	1.58	1.65	1.49

If the same treatment is assumed for both age groups in France, i.e. both indexed to prices, the long-term care expenditure is then projected to increase only to 2.1% of GDP in 2060, not increasing above 2.34% throughout the projection period; as compared to an increase from 2.2% of GDP to 4.4% in the "*base case scenario*".

France								
	Base case scenario							
	CH 10-60	2010	2015	2020	2030	2040	2050	2060
Unit costs evolve in line with GDP per hours worked	2.26	2.16	2.42	2.55	2.84	3.69	4.16	4.42
Unit costs constant in real terms	-0.10	2.16	2.20	2.17	2.09	2.34	2.26	2.06
	AWG reference scenario							
	CH 10-60	2010	2015	2020	2030	2040	2050	2060
Unit costs evolve in line with GDP per hours worked	2.07	2.16	2.40	2.52	2.78	3.59	4.01	4.23
Unit costs constant in real terms	-0.19	2.16	2.18	2.14	2.04	2.27	2.18	1.97

For budgetary surveillance purposes, the evolution of long-term care expenditure in the "*AWG reference scenario*" above, reflecting current legislation in both countries, are relevant.

Impact of reforms on public wages

Seven Member States (CY, ES, IE, LV, PT, RO and SI) have reported reforms implying wage changes in the years 2010-2015. These reforms usually apply to the whole public sector or to the health and long-term care sector only. For these seven Member States, reforms have been taken into account for both types of in-kind formal care, relatively to the share of wages in the total amount – approximated by their share in the health sector. For most countries, the impact of these reforms on LTC public expenditure is negligible (less than or equal to -0.01 p.p. of GDP difference over the period 2010-2060) or at most very small (-0.02, -0.03, and -0.05 p.p. for Latvia, Spain and Portugal, respectively). The impact is a bit higher for Romania and Ireland, with respectively -0.2 and -0.3 p.p. of GDP by 2060.

(2) "Base case scenario"

The second "demographic" scenario is the so-called ***"base case scenario"***. It is slightly different from the "*demographic scenario*", in that LTC (in-kind) age-gender expenditure profiles evolve in line with GDP per hours worked (i.e. productivity), rather than with GDP per capita. Given the currently predominant deficit of formal care provision and its high labour-intensive character, public expenditure seems supply- rather than demand-driven. For that reason, GDP per hours worked is seen as the main driver of unit costs, which is assumed to reflect changes in the labour productivity and, at the same time, the wage evolution in the care sector[134]. Table 4. 2 shows the projected increase in public expenditure on LTC from 2010 to 2060 under the "*base case scenario*". For the EU27, projections point to an increase close to 1.7 p.p. of GDP over the period 2010-2060, compared to the 1.5 p.p. of GDP obtained under the "*demographic scenario*". This is due to the fact that for most countries the growth in GDP per hours worked is higher than the growth in GDP per capita for most or all of the projection period.

The smallest expenditure increases are those observed for Cyprus (+0.1 p.p.), Portugal (+0.3 p.p.), Estonia, Bulgaria (+0.4 p.p. of GDP), Slovakia and Latvia (+0.5 p.p.). The largest projected increases are those projected for the Netherlands, Norway and Denmark with respectively 4.6 p.p., 4.3 p.p. and 4.0 p.p. of GDP.

(3) "High life expectancy scenario"

The "***high life expectancy scenario***" presents the budgetary effects of an alternative demographic scenario which assumes life expectancy at birth to be one year higher than in the baseline scenario. In terms of methodology, the scenario does not differ from the "*base case scenario*", apart from the fact that the baseline demographic projections – i.e. the structure of the population evolving over the projection period as well as the consequent evolution in the macroeconomic assumptions – used as input data are replaced with the alternative, high life expectancy, variant (the same used to assess the sensitivity of pension spending).

The results presented in Table 4. 3 show that, for the EU as a whole, as any extra year of increase in life expectancy (at birth) would imply an increased number of disabled persons, public expenditure would increase by 0.2 p.p. above the "*base case scenario*". As expected, countries with a rather high coverage display the largest increases, such as Belgium, Denmark, the Netherlands and Norway, followed by Finland and Sweden.

[134] Note that expenditure on cash benefits for LTC continues to evolve in line with GDP per capita (as cash benefits are more related to a form of income support).

Table 4. 2 - Base case scenario - Total public spending on LTC as % of GDP

								Change 2010-2060		
	2010	2015	2020	2030	2040	2050	2060	pp.	in %	
BE	2.3	2.6	2.8	3.3	4.1	4.9	5.4	3.0	128.7	BE
BG	0.5	0.5	0.5	0.6	0.7	0.8	0.9	0.4	91.2	BG
CZ	0.8	0.9	0.9	1.1	1.3	1.4	1.6	0.8	97.9	CZ
DK	4.5	4.6	4.9	5.9	7.0	7.8	8.5	4.0	88.7	DK
DE	1.4	1.6	1.7	2.1	2.5	3.1	3.3	1.9	129.4	DE
EE	0.5	0.6	0.6	0.6	0.7	0.8	0.9	0.4	70.1	EE
IE	1.1	1.2	1.3	1.5	1.9	2.3	2.7	1.6	141.4	IE
EL	1.4	1.5	1.6	1.7	2.0	2.5	2.8	1.4	104.0	EL
ES	0.8	0.9	0.9	0.9	1.1	1.4	1.6	0.7	89.9	ES
FR	2.2	2.4	2.5	2.8	3.7	4.2	4.4	2.3	104.5	FR
IT	1.9	2.0	2.0	2.2	2.5	2.9	3.0	1.1	58.2	IT
CY	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.1	72.0	CY
LV	0.7	0.7	0.7	0.8	0.9	1.0	1.2	0.5	72.2	LV
LT	1.2	1.3	1.4	1.5	1.8	2.2	2.5	1.2	100.8	LT
LU	1.0	1.1	1.2	1.5	2.0	2.7	3.2	2.3	231.4	LU
HU	0.8	0.9	0.9	1.1	1.2	1.4	1.6	0.7	88.9	HU
MT	0.7	0.7	0.8	1.2	1.3	1.3	1.7	1.1	165.1	MT
NL	3.8	4.1	4.5	5.6	7.0	8.0	8.4	4.6	121.2	NL
AT	1.6	1.7	1.8	2.1	2.5	2.9	3.0	1.4	86.4	AT
PL	0.7	0.8	0.8	1.1	1.3	1.6	1.9	1.1	156.4	PL
PT	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.3	106.4	PT
RO	0.6	0.6	0.7	0.8	1.1	1.4	1.9	1.2	198.7	RO
SI	1.4	1.6	1.7	2.0	2.5	2.9	3.2	1.8	125.5	SI
SK	0.3	0.3	0.3	0.4	0.5	0.6	0.8	0.5	184.3	SK
FI	2.5	2.8	3.1	4.0	4.9	5.2	5.4	2.9	114.5	FI
SE	3.9	4.0	4.1	4.9	5.6	6.0	6.7	2.8	72.0	SE
UK	2.0	2.1	2.2	2.4	2.6	2.7	2.9	0.9	44.5	UK
NO	3.8	3.8	4.0	4.9	6.3	7.2	8.1	4.3	113.5	NO
EU27	1.8	2.0	2.1	2.4	2.9	3.3	3.6	1.7	94.0	EU27
EA17	1.8	1.9	2.1	2.4	2.9	3.4	3.6	1.9	105.5	EA17

Source: Commission services, EPC.

Table 4. 3 - High life expectancy scenario - Total public spending on LTC as % of GDP

	Level 2010	Level 2060	Increase 2010-2060 in pp.	Difference to base case	
BE	2.3	5.8	3.5	0.5	BE
BG	0.5	0.9	0.5	0.0	BG
CZ	0.8	1.7	0.9	0.1	CZ
DK	4.5	9.1	4.6	0.6	DK
DE	1.4	3.5	2.1	0.2	DE
EE	0.5	0.9	0.4	0.0	EE
IE	1.1	2.9	1.7	0.2	IE
EL	1.4	2.9	1.6	0.2	EL
ES	0.8	1.6	0.8	0.1	ES
FR	2.2	4.7	2.5	0.3	FR
IT	1.9	3.1	1.2	0.1	IT
CY	0.2	0.3	0.1	0.0	CY
LV	0.7	1.2	0.5	0.0	LV
LT	1.2	2.6	1.4	0.1	LT
LU	1.0	3.5	2.5	0.3	LU
HU	0.8	1.6	0.8	0.1	HU
MT	0.7	1.8	1.2	0.1	MT
NL	3.8	9.0	5.2	0.6	NL
AT	1.6	3.2	1.6	0.2	AT
PL	0.7	2.0	1.2	0.1	PL
PT	0.3	0.7	0.4	0.0	PT
RO	0.6	2.0	1.3	0.1	RO
SI	1.4	3.4	2.0	0.2	SI
SK	0.3	0.8	0.5	0.0	SK
FI	2.5	5.8	3.3	0.4	FI
SE	3.9	7.1	3.2	0.4	SE
UK	2.0	3.0	1.0	0.1	UK
NO	3.8	8.7	4.9	0.6	NO
EU27	1.8	3.8	1.9	0.2	EU27
EA17	1.8	3.9	2.1	0.2	EA17

Source: Commission services, EPC.

4.3.2.2. The impact of future changes in the prevalence of disability

Improvements in the disability status of elderly people might mitigate the rise in the demand for long-term care services, and hence the associated public expenditure. The narrowing of the gap between female and male life expectancy, assuming both men and women live in good health and free of disability, could also bring a higher potential supply of informal care by old spouses.

(1) "Constant disability scenario"

The ***"constant disability scenario"*** reflects an alternative assumption about trends in age-gender specific dependency rates. Analogous to the "*constant health scenario*" performed in the framework of health care expenditure projections, it assumes that all gains in life expectancy are spent in good health, without disability. In addition, as in the "*base case scenario*", public expenditure on LTC in-kind services is assumed to evolve in line with GDP per hours worked, while expenditure on cash benefits evolves in line with GDP per capita. The age-gender specific dependency rates are shifted in line with changes in life expectancy (e.g. if life expectancy for a 50-year old person has increased by 2 years in year 2030, then the dependency rate of a 50-year old man in 2030 is that of a 48-year old man today). This results in a gradual decrease over time in disability prevalence for each age cohort.

The results presented in Table 4. 4 show that an improved disability status would lead to a considerably lower number of disabled persons at each specific age in the future.

This moderates the expected increase in expenditure due to rising numbers of older people. Public expenditure would increase by 1.4 p.p. for the EU27 as a whole or 0.4 p.p. below the "*base case scenario*". This lower increase is due to the fact that lower dependency rates translate in lower demand for and therefore lower expenditure in LTC services.

Table 4. 4 - Constant disability scenario - Total public spending on LTC as % of GDP

	Level 2010	Level 2060	Increase 2010-2060 in pp.	Difference to base case	
BE	2.3	4.7	2.4	-0.6	BE
BG	0.5	0.7	0.3	-0.2	BG
CZ	0.8	1.3	0.5	-0.3	CZ
DK	4.5	7.5	3.0	-1.0	DK
DE	1.4	3.0	1.5	-0.3	DE
EE	0.5	0.7	0.2	-0.2	EE
IE	1.1	2.5	1.4	-0.2	IE
EL	1.4	2.4	1.0	-0.4	EL
ES	0.8	1.4	0.6	-0.2	ES
FR	2.2	4.1	1.9	-0.4	FR
IT	1.9	2.7	0.7	-0.4	IT
CY	0.2	0.2	0.1	0.0	CY
LV	0.7	0.9	0.3	-0.2	LV
LT	1.2	2.1	0.9	-0.3	LT
LU	1.0	2.9	2.0	-0.3	LU
HU	0.8	1.3	0.5	-0.3	HU
MT	0.7	1.3	0.7	-0.4	MT
NL	3.8	7.4	3.6	-1.0	NL
AT	1.6	2.7	1.1	-0.4	AT
PL	0.7	1.6	0.9	-0.3	PL
PT	0.3	0.6	0.3	-0.1	PT
RO	0.6	1.6	1.0	-0.3	RO
SI	1.4	2.9	1.4	-0.3	SI
SK	0.3	0.7	0.4	-0.1	SK
FI	2.5	4.8	2.2	-0.6	FI
SE	3.9	6.1	2.3	-0.5	SE
UK	2.0	2.5	0.5	-0.3	UK
NO	3.8	7.3	3.5	-0.8	NO
EU27	1.8	3.2	1.4	-0.4	EU27
EA17	1.8	3.3	1.5	-0.4	EA17

Source: Commission services, EPC.

Compared to the assumption of no change in health status, the countries that see the highest decrease in this scenario (in p.p. of GDP) are Denmark, the Netherlands and Norway, followed by Belgium and Finland. It may be expected as these are the countries with some of the highest spending on LTC and where a decrease in dependency may therefore make a difference.

4.3.2.3. The impact of future changes in policy

Extrapolating forward on the basis of existing policies and current expenditure does not capture the full scale of the policy challenge, which goes beyond examining the future increases in public expenditure projected if policies are unchanged. Future changes in the numbers of people who will actually receive the formal care services they need (increase in the coverage) are also crucial policy questions. Pressure is likely to emerge in the future for policy changes to

increase formal care provision, especially as the future availability of informal care is likely to diminish rather than increase. Even informal care is now seen as having a potential side-effect on public expenditure, in that it calls for more support (such as respite care for instance) in order to avoid its major adverse impact on labour participation and carers' health. Note also that the private market for LTC is still under-developed in most Member States and is most often not a real alternative yet.

Currently, in Denmark, the Netherlands, Sweden and Norway, public expenditure in percentage of GDP is among the highest in the EU – more than twice the EU27 average, but the long-term care needs of the population are fully covered within the formal system and are expected to remain fully covered in the future. In contrast, in many Member States large numbers of people do not receive formal care services and rely exclusively on informal care; considerable increases of people relying on formal care are projected in the future.

Under no policy change, a growing gap may occur between the number of (elderly) citizens with disability who are in need of care and the actual supply of formal care services. Trying to address the policy challenges that may arise in the (near) future, two scenarios illustrate how policy changes can affect future public expenditure on LTC: the "*shift to formal care scenario"*, assessing the effect of a shift from informal or cash to formal care services and the "*coverage convergence scenario"*. It is important to note that these are only scenarios, not forecasts. Each of them tries to capture the single effect of a specific assumption, leaving aside the effect of other variables and their potential interaction.

(1) "Shift to formal care"

The "***shift to formal care scenario***" attempts to assess the impact of growing pressure to increase public finance/provision of LTC services. Indeed, and especially in Member States where the bulk of LTC services is currently provided informally, the pressure to provide formal care may grow substantially in the coming decades. This scenario is run to assess the impact of a demand-driven increase in public funding/provision of formal care in-kind which replaces informal care. In particular, this scenario examines the budgetary impact of a progressive shift into the formal in-kind sector of a 1% per year of the dependent population who have so far received only informal care or cash benefits. This extra shift takes place during the first ten years of the projection period only; therefore it sums up to about 9.6% shift to formal care. Only one of the three alternative options considered in the 2009 Ageing Report is analysed: 50% of these "new" beneficiaries are considered to move into institutional care, while the other 50% are assumed to receive formal care at home.

Table 4. 5 below shows the projected public expenditure on LTC from 2010 to 2060 for this scenario[135]. For the EU27, public expenditure on LTC is projected to increase by 2.6 p.p. of GDP from 2010 up until 2060, compared to the 1.7 p.p. of GDP under the "*base case scenario*". Given the increased coverage of dependents assumed by the scenario, it results in a projected increase in LTC expenditure for all countries.

[135] As in the "*base case scenario*", public expenditure on LTC in-kind services is assumed to evolve in line with GDP per hours worked, while expenditure on cash benefits evolves in line with GDP per capita.

Table 4. 5 - Shift to formal care scenario - Total public spending on LTC as % of GDP

	Level 2010	Level 2060	Increase 2010-2060 in pp.	Difference to base case	
BE	2.3	5.9	3.5	0.5	BE
BG	0.5	1.0	0.5	0.1	BG
CZ	0.8	1.8	0.9	0.2	CZ
DK	4.5	9.3	4.8	0.8	DK
DE	1.4	4.0	2.6	0.7	DE
EE	0.5	1.1	0.6	0.2	EE
IE	1.1	3.4	2.2	0.7	IE
EL	1.4	3.1	1.8	0.4	EL
ES	0.8	2.0	1.2	0.4	ES
FR	2.2	5.7	3.5	1.2	FR
IT	1.9	3.9	2.0	0.9	IT
CY	0.2	0.3	0.1	0.0	CY
LV	0.7	1.7	1.1	0.6	LV
LT	1.2	2.7	1.5	0.3	LT
LU	1.0	3.7	2.7	0.5	LU
HU	0.8	1.8	1.0	0.2	HU
MT	0.7	1.9	1.3	0.2	MT
NL	3.8	9.1	5.3	0.6	NL
AT	1.6	3.5	1.8	0.4	AT
PL	0.7	2.9	2.2	1.0	PL
PT	0.3	0.9	0.6	0.3	PT
RO	0.6	2.4	1.7	0.5	RO
SI	1.4	4.0	2.5	0.7	SI
SK	0.3	1.1	0.8	0.3	SK
FI	2.5	6.3	3.8	0.9	FI
SE	3.9	7.6	3.8	1.0	SE
UK	2.0	3.9	1.9	1.0	UK
NO	3.8	8.9	5.1	0.8	NO
EU27	1.8	4.4	2.6	0.8	EU27
EA17	1.8	4.4	2.7	0.8	EA17

Source: Commission services, EPC.

The largest projected increases vis-à-vis the "*base case scenario*" are observed for France (+1.2 p.p. of GDP), Poland, Sweden and the United Kingdom (+1 p.p. of GDP). Interestingly, even countries where expenditure level and coverage rate are already relatively high (such as Denmark or Finland) show a projected increase that is almost 1 p.p. of GDP higher than in the "*base case scenario*". The methodology used is one reason for that rather unexpected change: for as long as coverage of the dependent population is less than 100% in any age-group, the scenario assumes an additional increase in coverage of the dependent population in this age group. Moreover, larger increases can be expected where the ageing phenomenon is more marked and/or dependency rates are higher even if coverage – and/or cost per user – is already high.

(2) "Coverage convergence scenario"

The "***coverage convergence scenario***" assumes that the exchange of best practices across Europe and growing expectations of the populations will result in an expansion of publicly-financed formal care provision (be it in-kind or in cash) into groups of population that so far have not been covered by public programmes. The remaining number of "dependent" people is assumed to receive informal care (or no care). Similarly to the scenario assessing the effect of a shift to formal care, this scenario should also be

considered as a policy-change scenario, as it assumes a shift in the current LTC provision policy, while aiming to take into account the high diversity of the country-specific current care-mix. It assumes that, by 2060, there is a coverage convergence to the EU27 average in 2010. In other words, the Member States where the formal coverage rate for total formal care (in-kind and cash) is below the EU27 average in the starting year are assumed to converge to this average by 2060. For better clarity, it is important to note here that: 1) the convergence is calculated for each age group; 2) the relative proportions of each type of formal care are kept constant.[136]

Given the number of assumptions, results may be misleading for some countries. The convergence process is based on an initial comparison between 1) the number of so-called "disabled", as surveyed by EU-SILC and 2) the number of recipients of formal care. Both give scope for over- or under-estimation: 1) EU-SILC gives a self-perception of disability, which may differ considerably between countries, due to survey particularities and cultural characteristics[137], while 2) numbers of recipients are sometimes provided by the Member State only from a very partial source, or even not provided at all, and therefore replaced by the EU12 or EU15 average. As shown in Table 4. 15 (Annex I) age-specific dependency rates vary markedly across EU Member States; in some countries they are three times higher than in others. Hence, the comparability of dependency rates and thus coverage rates based on the EU-SILC data concerning self-perceived disability is limited. This is especially true for countries with well-developed long-term care systems, where the scenario may considerably overestimate the increase of public expenditure.

Table 4. 6 shows the projection results under the "*coverage convergence scenario*". For the EU27, public expenditure on LTC is projected to increase by 3.2 p.p. of GDP over the period 2010 to 2060, 1.5 p.p. of GDP higher than the "*base case scenario*". As in the "*shift to formal scenario*", this higher but expected increase vis-à-vis the "*base case*" scenario is the result of an increased coverage of dependent individuals, especially in countries where the coverage of the dependent population is currently low compared to the EU average.

Larger projected increases vis-à-vis the "*base case scenario*" are observed for Latvia (+3.2 p.p.), Germany (+2.6 p.p.), France (+2.5 p.p.) and Slovenia (+2.4 p.p.). For these four countries, the calculated coverage rate in 2010 is relatively low (see Annex I). When compared to the initial coverage rates as shown in Table 4. 16 in Annex, the results are generally quite consistent. There is (almost) no difference between the "*coverage convergence*" and the "*base case*" scenarios for countries like Norway, Lithuania, the Netherlands or Belgium, showing for 2010 a coverage rate above the average. Yet, some countries experiencing an already higher expenditure level and coverage ratios present puzzling results. This may be due to several reasons, as noted above: the fact that, for as long as coverage of dependent population is less than 100% in each and all age groups, the scenario assumes an additional increase in coverage of dependent population; larger increases can be expected where the ageing phenomenon is more marked and/or dependency rates are higher even if coverage is high; available data are not accurate and/or comprehensive enough.

[136] As in the "*base case scenario*", public expenditure on LTC in-kind services is assumed to evolve in line with GDP per hours worked, while expenditure on cash benefits evolves in line with GDP per capita.

[137] In other words, people in one country may consider themselves as "disabled", when people in another country with the same health status would not do so.

Table 4. 6 - Coverage convergence scenario - Total public spending on LTC as % of GDP

	Level 2010	Level 2060	Increase 2010-2060 in pp.	Difference to base case	
BE	2.3	5.4	3.0	0.0	BE
BG	0.5	1.4	0.9	0.5	BG
CZ	0.8	1.7	0.9	0.1	CZ
DK	4.5	8.6	4.1	0.1	DK
DE	1.4	5.9	4.5	2.6	DE
EE	0.5	1.3	0.8	0.4	EE
IE	1.1	2.8	1.7	0.1	IE
EL	1.4	3.5	2.1	0.7	EL
ES	0.8	3.1	2.3	1.6	ES
FR	2.2	6.9	4.7	2.5	FR
IT	1.9	4.6	2.7	1.6	IT
CY	0.2	0.3	0.2	0.0	CY
LV	0.7	4.4	3.7	3.2	LV
LT	1.2	2.5	1.3	0.0	LT
LU	1.0	4.8	3.8	1.6	LU
HU	0.8	2.0	1.2	0.4	HU
MT	0.7	1.9	1.3	0.2	MT
NL	3.8	8.4	4.6	0.0	NL
AT	1.6	3.3	1.7	0.3	AT
PL	0.7	2.6	1.9	0.7	PL
PT	0.3	1.8	1.5	1.2	PT
RO	0.6	3.2	2.6	1.4	RO
SI	1.4	5.6	4.2	2.4	SI
SK	0.3	1.8	1.6	1.1	SK
FI	2.5	5.6	3.1	0.2	FI
SE	3.9	6.9	3.0	0.2	SE
UK	2.0	3.9	1.9	1.0	UK
NO	3.8	8.1	4.3	0.0	NO
EU27	1.8	5.0	3.2	1.5	EU27
EA17	1.8	5.3	3.6	1.7	EA17

Source: Commission services, EPC.
***Note*:** In countries where the coverage rate in 2010 is already quite high, the results are obviously affected by the data approximations/non-comparability; for instance Germany, Spain or France.

For some countries, the projected increase is also higher than in the scenario assessing a shift to formal care. It is the case for Latvia, but also for Portugal, Spain and Slovakia, although to a lesser extent. This may occur when the coverage convergence corresponds to a higher increase in the share of the dependent population that will be covered by formal care than in the case of the "*shift scenario*" (which was 10% of the dependent population receiving informal care or cash benefits).

4.3.2.4. The impact of future changes in unit cost

(1) "Cost convergence scenario"

The "***cost convergence scenario***" is a new scenario run in parallel with the analogous scenario on health care expenditure projections. For those Member States with high levels of informal care, and relatively low costs for LTC, the increase in population expectations for more formal care may result in an increase in the average cost of LTC, for example towards the EU average. The "*cost convergence scenario*" is meant to capture the possible effect of a convergence in real

living standards on LTC spending. It assumes an upward convergence of the relative age-gender specific per beneficiary expenditure profiles (as percentage of GDP per capita) of all countries below the corresponding EU27 average to the EU27 average. Note that the convergence is calculated for each age group, on the basis of the coverage gap for all services in kind.[138]

Table 4. 7 shows the results under this scenario. For the EU27, public expenditure on LTC is projected to increase by 1.9 p.p. of GDP from 2010 up until 2060, compared to 1.7 p.p. of GDP for the "*base case scenario*", with the impact of an increased cost per user of LTC services, assumed to be the result of economic convergence and higher user expectations.

The largest projected increases vis-à-vis the "*base case scenario*" are observed for Malta (+2.6 p.p. of GDP.) and Lithuania (+2.2 p.p.), Slovakia (+1.5 p.p.) and Austria (+1.1 p.p.), followed by Poland (+0.9 p.p.), Belgium (+0.8 p.p.), Ireland and Portugal (+0.7 p.p.).

Note that some extreme results may be partly due to data issues. Indeed, as explained in Annex I, non-available or partial data lead to the (full or partial) application of the EU averages for the missing parts – in terms of coverage and related cost profile – adjusted to the national expenditure level. Note that the reported coverage rate for institutionalised recipients is extremely high for Malta, while Lithuania reported a very high number of beneficiaries and an extremely low available cost profile for 2010, compared to the EU average, which causes this important increase.

In general, as it can be expected, a country with high coverage and therefore relatively low average cost profile in the base year 2010 will show a relatively bigger increase in the "*cost convergence scenario*", while the expenditure increase projected for a country with relatively low coverage, and relatively high starting average cost profile, will be relatively bigger in the "*coverage convergence scenario*".

In addition, as for all policy-change scenarios, caution should be raised on the limits and constraints of the exercise: the starting point only reflects the average cost. Which means, for instance, that a country covering only the most severe cases may have higher average unit cost, and will see no additional expenditure in that scenario.

[138] As in the "*base case scenario*", public expenditure on LTC in-kind services is assumed to evolve in line with GDP per hours worked, while expenditure on cash benefits evolves in line with GDP per capita.

Table 4. 7 - Cost convergence scenario - Total public spending on LTC as % of GDP

	Level 2010	Level 2060	Increase 2010-2060 in pp.	Difference to base case	
BE	2.3	6.2	3.9	0.8	BE
BG	0.5	0.9	0.5	0.0	BG
CZ	0.8	2.0	1.2	0.4	CZ
DK	4.5	8.5	4.0	0.0	DK
DE	1.4	3.4	2.0	0.1	DE
EE	0.5	1.1	0.6	0.2	EE
IE	1.1	3.3	2.2	0.7	IE
EL	1.4	3.3	2.0	0.6	EL
ES	0.8	1.8	0.9	0.2	ES
FR	2.2	4.5	2.4	0.1	FR
IT	1.9	3.0	1.1	0.0	IT
CY	0.2	0.3	0.2	0.0	CY
LV	0.7	1.2	0.5	0.0	LV
LT	1.2	4.7	3.4	2.2	LT
LU	1.0	3.2	2.3	0.0	LU
HU	0.8	2.0	1.1	0.4	HU
MT	0.7	4.3	3.7	2.6	MT
NL	3.8	8.5	4.7	0.0	NL
AT	1.6	4.1	2.5	1.1	AT
PL	0.7	2.8	2.1	0.9	PL
PT	0.3	1.3	1.0	0.7	PT
RO	0.6	2.3	1.7	0.5	RO
SI	1.4	3.2	1.8	0.0	SI
SK	0.3	2.3	2.0	1.5	SK
FI	2.5	5.7	3.2	0.3	FI
SE	3.9	6.7	2.8	0.0	SE
UK	2.0	2.9	0.9	0.0	UK
NO	3.8	8.2	4.4	0.1	NO
EU27	1.8	3.8	1.9	0.2	EU27
EA17	1.8	3.9	2.1	0.2	EA17

Source: Commission services, EPC.

4.3.2.5. AWG reference scenario

The "***AWG reference scenario***" combines the assumptions of the "*demographic*" and the "*constant disability*" scenarios. It is based on the assumptions of the baseline scenario for LTC expenditure projections of the 2009 Ageing Report. Specifically, it is assumed that half of the projected gains in life expectancy are spent without disability (i.e. demanding care), taking thus an intermediate position between the "*demographic*" and "*constant disability*" scenarios assumptions.

In the "*AWG reference scenario*", public long-term expenditure is thus driven by the combination of changes in the population structure and a moderately positive evolution of the health (non-disability) status. The joint impact of those factors is a projected increase in spending of about 1.5 p.p. of GDP in the EU27 by 2060, i.e. 0.2 p.p. lower than the increase projected in the "*base case scenario*", as shown in Table 4. 8. Individual countries' results range between almost no change – for Cyprus and Portugal – and -0.5 p.p. of GDP for Denmark and the Netherlands.

Table 4. 8 - AWG reference scenario - Total public spending on LTC, as % of GDP

	Level 2010	Level 2060	Increase 2010-2060 in pp.	Difference to base case	
BE	2.3	5.0	2.7	-0.3	BE
BG	0.5	0.8	0.3	-0.1	BG
CZ	0.8	1.5	0.7	-0.1	CZ
DK	4.5	8.0	3.5	-0.5	DK
DE	1.4	3.1	1.7	-0.2	DE
EE	0.5	0.8	0.3	-0.1	EE
IE	1.1	2.6	1.5	-0.1	IE
EL	1.4	2.6	1.2	-0.2	EL
ES	0.8	1.5	0.7	-0.1	ES
FR	2.2	4.2	2.1	-0.2	FR
IT	1.9	2.8	0.9	-0.2	IT
CY	0.2	0.3	0.1	0.0	CY
LV	0.7	1.0	0.4	-0.1	LV
LT	1.2	2.3	1.1	-0.2	LT
LU	1.0	3.1	2.1	-0.1	LU
HU	0.8	1.4	0.6	-0.1	HU
MT	0.7	1.5	0.9	-0.2	MT
NL	3.8	7.9	4.1	-0.5	NL
AT	1.6	2.9	1.2	-0.2	AT
PL	0.7	1.7	1.0	-0.1	PL
PT	0.3	0.6	0.3	0.0	PT
RO	0.6	1.7	1.1	-0.1	RO
SI	1.4	3.0	1.6	-0.2	SI
SK	0.3	0.7	0.4	-0.1	SK
FI	2.5	5.1	2.6	-0.3	FI
SE	3.9	6.4	2.5	-0.3	SE
UK	2.0	2.7	0.7	-0.2	UK
NO	3.8	7.7	3.9	-0.4	NO
EU27	1.8	3.4	1.5	-0.2	EU27
EA17	1.8	3.4	1.7	-0.2	EA17

Source: Commission services, EPC.

4.3.2.6. AWG risk scenario

The "***AWG risk scenario***" keeps the assumption that half of the future gains in life expectancy are spent with no care-demanding disability, as in the "*AWG reference scenario*". In addition, it combines it with the "*cost convergence scenario*" by assuming convergence of total average cost to the EU27 average for those below it. In comparison to the "*AWG reference scenario*", this scenario thus captures the impact of additional cost drivers to demography and health status, i.e. the possible effect of a convergence in real living standards on LTC spending.[139] Specifically, it assumes an upward convergence to the EU27 corresponding average of the relative per beneficiary expenditure profiles (as percentage of GDP per capita) for all countries below the EU27 average. Together with the "*AWG reference scenario*" it proposes a range of possible outcomes.

The "*AWG risk scenario*" projects spending in the EU27 to 3.6% of GDP, i.e. an increase of 1.7 p.p. of GDP relative to 2010 (see Table 4. 9). The cost convergence process – as defined above – adds around 0.2 p.p. of GDP, compared to the "*AWG reference scenario*". Over the whole projection period, Cyprus is expected to have the lowest increase with 0.1 p.p. of GDP, followed by Bulgaria and Latvia (+0.4 p.p.). The Netherlands and Norway have the highest increase with around 4 p.p. of GDP, followed by Belgium and Denmark (+3.5 p.p.).

[139] Graph 4. 2 on page 204 shows the converging trend between the EU15 and the EU12 average costs.

Table 4. 9 - AWG risk scenario - Total public spending on LTC, as % of GDP

	Level 2010	Level 2060	Increase 2010-2060 in pp.	Difference to base case	
BE	2.3	5.8	3.5	0.4	BE
BG	0.5	0.8	0.4	-0.1	BG
CZ	0.8	1.8	1.0	0.2	CZ
DK	4.5	8.0	3.5	-0.5	DK
DE	1.4	3.2	1.8	0.0	DE
EE	0.5	1.0	0.5	0.1	EE
IE	1.1	3.2	2.1	0.6	IE
EL	1.4	3.1	1.8	0.3	EL
ES	0.8	1.7	0.8	0.1	ES
FR	2.2	4.3	2.2	-0.1	FR
IT	1.9	2.8	0.9	-0.2	IT
CY	0.2	0.3	0.1	0.0	CY
LV	0.7	1.0	0.4	-0.1	LV
LT	1.2	4.4	3.2	1.9	LT
LU	1.0	3.1	2.1	-0.1	LU
HU	0.8	1.8	1.0	0.2	HU
MT	0.7	3.9	3.2	2.1	MT
NL	3.8	7.9	4.1	-0.5	NL
AT	1.6	3.9	2.3	0.9	AT
PL	0.7	2.6	1.9	0.7	PL
PT	0.3	1.3	1.0	0.6	PT
RO	0.6	2.2	1.5	0.3	RO
SI	1.4	3.1	1.6	-0.2	SI
SK	0.3	2.1	1.9	1.4	SK
FI	2.5	5.4	2.9	0.0	FI
SE	3.9	6.4	2.5	-0.2	SE
UK	2.0	2.7	0.7	-0.2	UK
NO	3.8	7.8	4.0	-0.3	NO
EU27	1.8	3.6	1.7	0.0	EU27
EA17	1.8	3.7	1.9	0.0	EA17

Source: Commission services, EPC.

4.4. Comparing the results of the 2012 with the 2009 Ageing Report

It is interesting to compare the current results with the projections of the 2009 Ageing Report. As in the case of health care projections, the national differences observed between the 2009 Ageing Report and the current projections may result from:

- different demographic assumptions (faster/slower ageing of population);
- differences in dependency rates and in the number of beneficiaries of formal LTC services;
- changes in the age-gender expenditure profiles;
- a different base-year for starting the projections and a different initial spending level;
- updated macroeconomic assumptions resulting in different GDP per capita/ per hours worked growth rates and GDP levels for the period under analysis;
- and changes in scenario assumptions.

The combination of changes in each country's population structure combined with changes in dependency rates can have an important impact. If the ageing phenomenon indicated by the demographic projections is now less (more) marked, and if this is combined with lower (higher) dependency rates, i.e. lower (higher) number of dependents and therefore lower (higher) potential demand for LTC, then a smaller (larger) projected increase may be expected.

In addition, there may have been changes in the age-gender profile between the two projection exercises. An upward shift of the age-gender expenditure profile compared to the 2009 Ageing Report and, especially, a change in the age-gender expenditure profile whereby the profile is now higher for population groups with a higher number of dependents may explain a larger increase in projected expenditure in some countries. This is notably the case for countries where an average cost profile has been used, even partially, in both rounds of projections (see Table 4. 14 in Annex I). Indeed, the Graph 4. 2 on page 204 shows – sometimes noticeable – differences in EU average cost profiles between 2009 and 2012. Table 4. 16 in Annex I also shows the LTC coverage rates in 2010 and 2060.

Compared to the 2009 Ageing Report, a cost–converging trend between the EU15 and the EU12 groups of countries is observed, with a downward move across the age-spectrum of the EU15 average – as well as of the cost profile of Norway – and an upward trend of the EU12 one, although to a different extent according to the individual Member States. In the EU15 region, the decrease is very small for Germany and Italy, while Sweden and Finland are quite stable. The situation is less clear in the EU12 area, as Lithuania, Slovakia and the Czech Republic display only a slight increase or stability over age groups, while the cost profile of Cyprus has even decreased. Note that differences in the availability of data may also be one reason for such a change.

Differences in level of expenditure in the base year determine to a large extent the differences observed in the projected increase. Regarding changes in the initial level of expenditure and base year for the projections, it can be seen in Table 4. 10 that the 2010 level of public expenditure on LTC is on average 0.5 p.p. of GDP higher in the current exercise than the expenditure level for 2010 calculated in the 2009 projections. In other words, most countries now start from a higher level of spending which for Denmark is over 2.5 p.p. of GDP higher than the 2010 values projected in 2009.[140] Part of this difference is due to levels of GDP in 2010 lower than those projected for 2010 in the 2009 Ageing Report for most if not all countries.[141]

Graph 4. 4 shows the difference in the projected expenditure increase for each scenario which has been run for both Ageing Reports (2009 and 2012). The largest difference is observed for the "*shift to formal scenario*", which is be partly due to the difference in the methodology used. Indeed, cash benefits have now been included as part of formal care, while this was not the case in the 2009 Ageing Report. Table 4. 10 provides as overview for all the countries and common scenarios.

Compared to the 2009 Ageing Report the projected increase given by the "*demographic scenario*" is now higher by 0.5 p.p. of GDP. For several countries the projected increase is quasi-similar to the projected increase obtained in the 2009 projections but there are some differences. As shown in Table 4. 10, the largest differences are observed for Denmark (+2.1 p.p. of GDP compared to the 2009 Ageing

[140] In general, the levels of public expenditure on LTC for the 2009 Ageing Report were reported for 2007 and for many Member States even earlier so that the 2009 value was already a projection.

[141] There is an additional explanation as for the policy-change scenarios: the disability data for the 2012 exercise come from a common source – namely the EU-SILC – while it was not the case in the 2009 exercise.

Report), France and Norway (resp. +1.5 and +1.3 p.p.). Greece, Luxembourg, Malta and the Netherlands have now a lower projected increase in public expenditure as a share of GDP. [142]

Similarly, the projected increase using the "*base case scenario*" is now higher by 0.5 p.p. of GDP than the increase projected by the 2009 Ageing Report. For many countries the projected increase is almost similar to the projected increased obtained in the 2009 projections. The largest differences are observed for Denmark (+2 p.p. of GDP), followed by Belgium (+1.5 p.p.), France and Norway (+1.4 p.p.), and Romania (+1.2 p.p). Greece, Italy, Malta, the Netherlands but also Latvia and Slovenia show a lower projected increase in public expenditure as a share of GDP than in the 2009 Ageing Report. In addition to the possible explanations advanced previously, note that some differences may be explained by the fact that this round of projections uses GDP per hours worked instead of GDP per worker.

The projected increase according to the "*constant disability scenario*" is similar to the projected increase obtained in the 2009 projections. The largest differences are observed for Denmark (+1.5 p.p. of GDP), France and Belgium (+1.2 p.p.), followed by Romania (+1 p.p.). Greece, the Netherlands and Malta, Italy, Latvia and Slovenia, but also Spain and Finland show a lower projected increase in public expenditure as a share of GDP than in the 2009 Ageing Report.

On average, when compared with the 2009 Ageing Report the projected increase according to the "*shift to formal care scenario*" is 0.9 p.p. of GDP higher. The largest positive differences are observed for Denmark and France (+2.5 p.p. of GDP), followed by Norway (+1.8 p.p.), Belgium and Romania (+1.7 p.p.), while Greece, Malta, the Netherlands, and especially Poland (-2.8 p.p.) show a lower projected increase.

At the country-level, differences in projections for the "*AWG reference scenario*" between the two reports are depicted in Graph 4. 5. A large increase appears for Denmark, Belgium, France, Norway and Romania, while Greece, Malta, the Netherlands and Italy show pronounced decreases in projected spending levels.

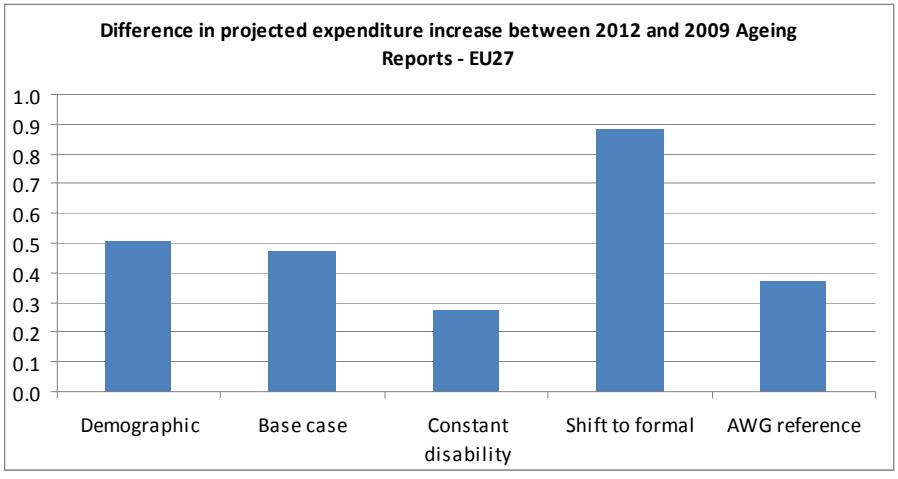
[142] See additional tables in the Annex III.

Table 4. 10 - Comparing projected spending growth between the 2012 and the 2009 Ageing Reports, in p.p. of GDP

		Change in spending grow th betw een 2010 - 2060					
	Base-year difference 2010	Demographic	Base case	Constant disability	Shift to formal	AWG reference	
BE	0.8	1.3	1.5	1.2	1.7	1.4	BE
BG	0.3	0.2	0.2	0.1	0.3	0.1	BG
CZ	0.6	0.4	0.4	0.1	0.4	0.2	CZ
DK	2.7	2.1	2.0	1.5	2.5	1.8	DK
DE	0.5	0.3	0.4	0.2	0.8	0.3	DE
EE	0.5	0.3	0.3	0.1	0.4	0.2	EE
IE	0.2	0.3	0.2	0.2	0.6	0.2	IE
EL	-0.1	-0.5	-0.9	-0.9	-1.0	-0.9	EL
ES	0.1	0.2	0.0	-0.1	0.0	-0.1	ES
FR	0.7	1.5	1.4	1.2	2.5	1.3	FR
IT	0.2	0.0	-0.3	-0.4	0.0	-0.4	IT
CY	0.2	0.1	0.1	0.1	0.1	0.1	CY
LV	0.3	0.1	-0.1	-0.2	0.1	-0.1	LV
LT	0.7	0.8	0.6	0.4	0.7	0.5	LT
LU	-0.5	-0.3	0.1	0.1	0.1	0.1	LU
HU	0.6	0.4	0.4	0.1	0.3	0.2	HU
MT	-0.4	-0.4	-0.7	-0.7	-0.8	-0.7	MT
NL	0.3	-0.2	-0.4	-0.8	-0.4	-0.6	NL
AT	0.3	0.2	0.2	0.0	0.3	0.1	AT
PL	0.3	0.4	0.4	0.2	-2.8	0.3	PL
PT	0.2	0.2	0.2	0.2	0.5	0.2	PT
RO	0.6	0.8	1.2	1.0	1.7	1.1	RO
SI	0.3	0.2	-0.1	-0.2	0.3	-0.1	SI
SK	0.1	0.1	0.1	0.0	0.3	0.1	SK
FI	0.6	0.1	0.3	-0.1	0.7	0.1	FI
SE	0.4	0.3	0.3	0.2	0.8	0.3	SE
UK	1.1	0.2	0.3	0.1	1.3	0.2	UK
NO	1.6	1.3	1.4	0.9	1.8	1.2	NO
EU27	0.5	0.5	0.5	0.3	0.9	0.4	EU27
EA17	0.4	0.5	0.4	0.3	0.9	0.3	EA17

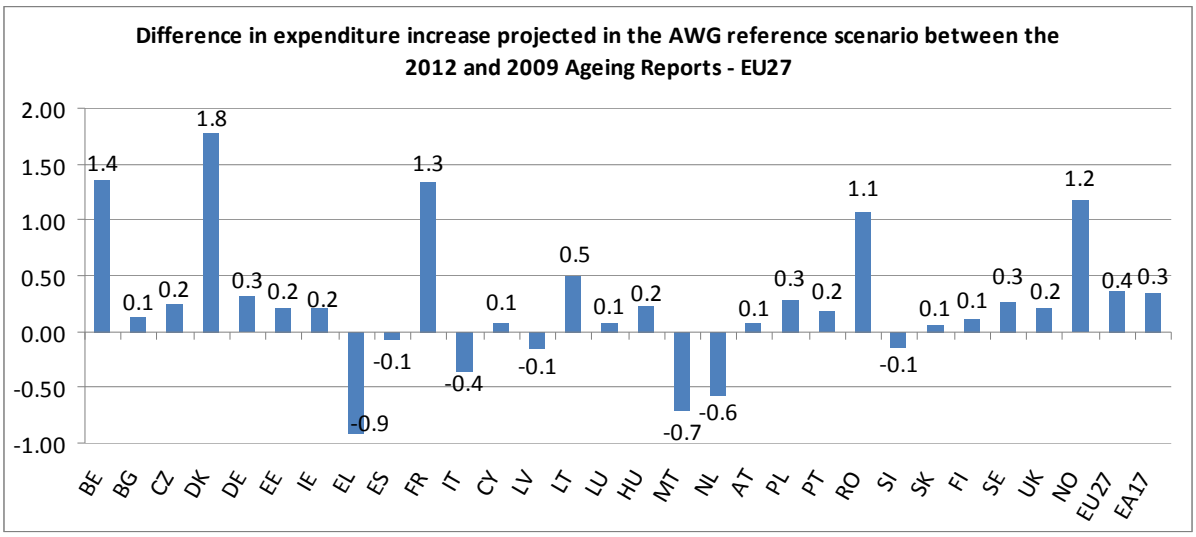
Source: Commission services, EPC.
Note: For some countries, imputed variables are used due to the lack of national data (see Table 4. 14 in Annex I). For these countries, this may then partly explain the difference in LTC public spending growth between the two projection rounds.

Graph 4. 4 - Difference in projected LTC expenditure increase between the 2012 and 2009 Ageing Reports, as p.p. of GDP, EU27



Source: Commission services, EPC.
Note: As some scenario names have changed, the following comparisons have been made: the 2012 "*demographic scenario*" is compared to the 2009 "*demand-driven scenario*" and the 2012 "*base case scenario*" is compared to the 2009 "*pure demographic scenario*". The "*high-life expectancy*", the "*coverage convergence*" and the "*cost convergence*" scenarios did not exist in the 2009 report.

Graph 4. 5 - AWG reference scenario: Differences in the projected LTC public expenditure increase over 2010-2060 between the 2012 and 2009 Ageing Reports as p.p. of GDP



Source: Commission services, EPC.

A quantitative decomposition of drivers is proposed in Table 4. 11. The decomposition aims at quantifying which factors are driving the differences in projected spending between the 2009 and the 2012 projection exercises. The considered drivers are the age-cost profiles, the number of beneficiaries of formal care, the size of the disabled (dependent) population, GDP per hours worked, the population projections, an interaction and a base-year effect. Basically, departing from the level of expenditure in 2010, each driver's impact is estimated by replacing *ceteris paribus* its current value with the 2009 Ageing Report data.

As for the results, the difference between the projection exercises is relatively small for a majority of Member States. However, for the following countries some drivers clearly stand out in their relative impact on the change of results between the two Ageing Reports. For Belgium, it is to a large extent a steeper age cost-profile among older age groups and especially for women that drives expenditure projections upwards relative to the 2009 Ageing Report. For France, it is the cost profile for older disabled – which was imputed for the 2009 round of projections and is fully equal to the EU15 average cost profile in the 2012 exercise – as well as the higher coverage rate due to improved data used in this report. For Poland, it is a higher coverage rate and a higher disability prevalence that push the results. For Finland, a lower coverage and lower GDP growth per hours worked decrease results relatively strongly compared to the last report. Finally, a significantly lower coverage rate and lower GDP growth rates per hours worked prospects considerably reduce projected growth in expenditure for Sweden.

Table 4. 11 - Decomposing the impact of drivers on differences in spending growth between the 2009 and the 2012 Ageing Reports based on the base case scenario, in p.p. of GDP.

	Difference in spending growth between the 2012 and 2009 Ageing Reports	Due to:								
		Change in age-cost profiles	Change in coverage	Change in disability rate	Change related to GDP growth	Change in demographic projections	Interaction effect*	Change in all drivers**	Base-year effect***	
BE	1.5	1.1	0.0	0.0	-0.4	0.1	0.1	1.0	0.5	BE
BG	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	BG
CZ	0.4	-0.1	0.1	0.0	-0.2	0.0	0.0	-0.1	0.4	CZ
DK	2.0	0.1	-1.1	-0.1	-0.3	0.2	1.0	-0.3	2.3	DK
DE	0.4	0.0	-0.2	0.0	0.2	-0.2	0.1	-0.1	0.5	DE
EE	0.3	0.0	0.0	0.0	-0.1	0.0	0.0	-0.2	0.4	EE
IE	0.2	0.1	-0.2	0.0	-0.1	-0.1	-0.1	-0.4	0.6	IE
EL	-0.9	0.1	0.0	0.0	-0.3	-0.1	0.0	-0.3	-0.6	GR
ES	0.0	-0.1	0.1	0.0	-0.3	0.0	0.0	-0.3	0.3	ES
FR	1.4	0.4	0.6	0.0	-0.1	0.1	0.0	1.0	0.4	FR
IT	-0.3	0.0	0.0	0.0	-0.4	0.1	0.0	-0.3	0.0	IT
CY	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	CY
LV	-0.1	-0.2	0.0	0.0	-0.2	0.0	0.0	-0.3	0.3	LV
LT	0.6	-0.3	0.7	0.0	-0.7	-0.1	0.2	-0.2	0.8	LT
LU	0.1	0.0	0.0	0.0	0.4	0.5	-0.1	0.8	-0.7	LU
HU	0.4	-0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.3	HU
MT	-0.7	0.0	0.2	0.0	-0.1	-0.2	0.0	0.0	-0.6	MT
NL	-0.4	0.4	-0.2	0.0	-0.2	0.1	-0.2	-0.1	-0.3	NL
AT	0.2	0.0	0.0	0.1	0.1	-0.1	0.0	0.1	0.1	AT
PL	0.4	0.0	0.3	0.3	-0.2	0.0	0.0	0.5	-0.1	PL
PT	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	PT
RO	1.2	-0.2	0.5	0.0	0.0	0.0	0.1	0.4	0.9	RO
SI	-0.1	-0.2	0.6	0.0	-0.7	0.2	0.2	0.1	-0.2	SI
SK	0.1	-0.1	0.2	0.0	-0.1	0.0	0.0	0.1	0.0	SK
FI	0.3	-0.1	-0.2	0.0	-0.2	0.1	-0.1	-0.6	0.8	FI
SE	0.3	0.1	-1.0	0.0	-0.4	0.3	-0.4	-1.4	1.7	SE
UK	0.3	0.0	-0.4	0.0	0.0	0.0	0.1	-0.3	0.7	UK
NO	1.4	0.0	0.4	-0.1	-0.7	0.4	0.0	0.1	1.3	NO
EU27	0.5	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.5	EU27

Source: Commission services, EPC.

Note:

* The interaction effect is the unexplained difference between the change in all drivers and the sum of the effects of the individual drivers.

** The change in all drivers is estimated by replacing the current data with the 2009 Ageing Report data for all drivers at once.

*** The base-year effect is the difference between column 1 and column 8.

For some countries, imputed variables are used due to the lack of national data (see Table 4. 14 in Annex I). For these countries, this may then partly explain the difference in LTC public spending growth between the two projection rounds.

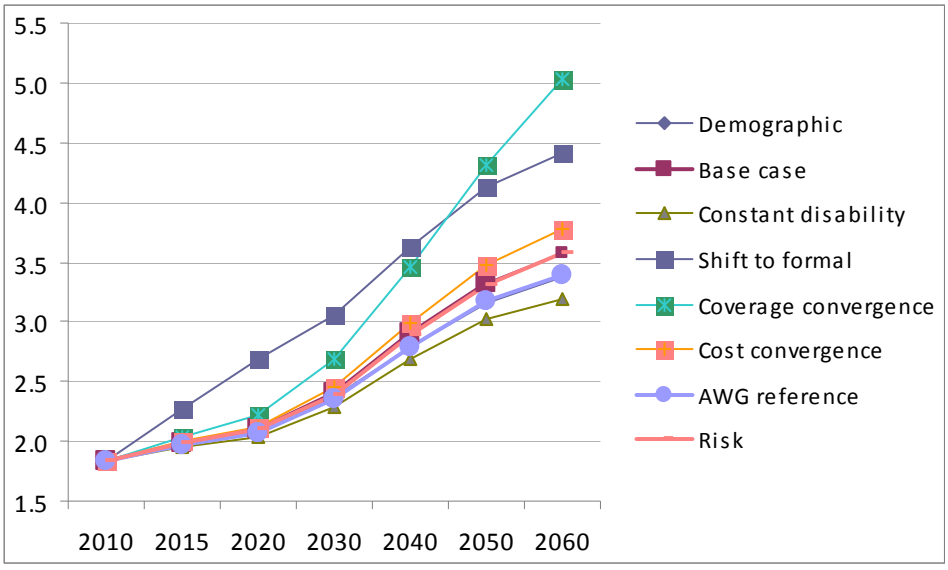
4.5. Conclusions

Availability and access to formal care services and cash benefits will increasingly shape the welfare of dependent citizens and their families. It may also have broader economic implications as greater provision of formal care may 1) increase labour participation among women who currently provide informal care and 2) improve future health status of the informal carers – therefore with an additional potential impact on labour market participation. A major public policy consideration concerns the impact on public finances, as the unit cost of providing care can be very high, especially when provided in an institution. The future amount of LTC expenditure will not only depend on the mere fact that the population is ageing, but also on the health quality of the additional years an individual can expect to gain. In addition, the governments will have to face expected pressure on the LTC delivery – in all forms, and will have to react through adequate and sustainable political choices that may differ from those envisaged today.

Moreover, pressure for increased public budget on formal care services need to be seen in conjunction with the projected impact of ageing on other expenditure items, notably pensions and health care.

The range of results is pictured in Graph 4. 6, showing that even taking into account only the impact of an ageing population (the "*base case scenario*"), public expenditure would on average almost double over the projection period (+1.7 p.p. of GDP increase). Table 4. 12 orders in more details the scenarios' results according to increasing changes in spending over 2010-2060 for the EU27. Estimation results range between +1.4 ("*constant disability scenario*") and +3.1 p.p. of GDP (for the "*coverage convergence scenario*").

Graph 4. 6 - Projected expenditure according to the different scenarios, EU27 % of GDP



Source: Commission services, EPC.
Note: The "*risk scenario*" line approximately follows the "*base case scenario*" one, while the "*AWG reference*" and the "*demographic*" scenarios also follow the same trend.

Table 4. 12 - Overview of results across scenarios – Change in spending as % of GDP, 2010-2060

	Constant disability	Demographic	AWG reference	Base case	Risk scenario	Cost convergence	Shift to formal	Coverage convergence	
BE	2.4	2.6	2.7	3.0	3.5	3.9	3.5	3.0	BE
BG	0.3	0.4	0.3	0.4	0.4	0.5	0.5	0.9	BG
CZ	0.5	0.7	0.7	0.8	1.0	1.2	0.9	0.9	CZ
DK	3.0	3.7	3.5	4.0	3.5	4.0	4.8	4.1	DK
DE	1.5	1.6	1.7	1.9	1.8	2.0	2.6	4.5	DE
EE	0.2	0.4	0.3	0.4	0.5	0.6	0.6	0.8	EE
IE	1.4	1.4	1.5	1.6	2.1	2.2	2.2	1.7	IE
EL	1.0	1.3	1.2	1.4	1.8	2.0	1.8	2.1	EL
ES	0.6	0.8	0.7	0.7	0.8	0.9	1.2	2.3	ES
FR	1.9	2.1	2.1	2.3	2.2	2.4	3.5	4.7	FR
IT	0.7	1.1	0.9	1.1	0.9	1.1	2.0	2.7	IT
CY	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	CY
LV	0.3	0.4	0.4	0.5	0.4	0.5	1.1	3.7	LV
LT	0.9	1.2	1.1	1.2	3.2	3.4	1.5	1.3	LT
LU	2.0	1.8	2.1	2.3	2.1	2.3	2.7	3.8	LU
HU	0.5	0.7	0.6	0.7	1.0	1.1	1.0	1.2	HU
MT	0.7	1.0	0.9	1.1	3.2	3.7	1.3	1.3	MT
NL	3.6	3.9	4.1	4.6	4.1	4.7	5.3	4.6	NL
AT	1.1	1.2	1.2	1.4	2.3	2.5	1.8	1.7	AT
PL	0.9	0.9	1.0	1.1	1.9	2.1	2.2	1.9	PL
PT	0.3	0.3	0.3	0.3	1.0	1.0	0.6	1.5	PT
RO	1.0	0.8	1.1	1.2	1.5	1.7	1.7	2.6	RO
SI	1.4	1.4	1.6	1.8	1.6	1.8	2.5	4.2	SI
SK	0.4	0.4	0.4	0.5	1.9	2.0	0.8	1.6	SK
FI	2.2	2.3	2.6	2.9	2.9	3.2	3.8	3.1	FI
SE	2.3	2.3	2.5	2.8	2.5	2.8	3.8	3.0	SE
UK	0.5	0.7	0.7	0.9	0.7	0.9	1.9	1.9	UK
NO	3.5	3.6	3.9	4.3	4.0	4.4	5.1	4.3	NO
EU27	1.4	1.5	1.5	1.7	1.7	1.9	2.6	3.2	EU27
EA17	1.5	1.7	1.7	1.9	1.9	2.1	2.7	3.6	EA17

Source: Commission services, EPC.

Annex I: Input data used to project long-term care expenditure

Types of care, data sources and categories

As was the case in the 2009 exercise, the projections rely on the OECD/ EUROSTAT System of Health Accounts database as the primary data source supplemented, when necessary, with data from the ESSPROSS database. Only if no data was available from both sources, the Member States have been asked to provide the missing figures. In addition, dependency levels are measured with the EU-SILC data – i.e. available for the 27 Member States and Norway. Note that in this projection round, the data coverage and availability have improved further.

Public expenditure on long-term care

The notion of long-term care services usually refers to services delivered over a sustained period of time, sometimes defined as lasting at least six months.[143] Public expenditure on long-term care is defined, according to the System of Health Accounts classification, as the sum of the following publicly-financed items:

- services of long-term nursing care (HC.3) (which is also called "the medical component of long-term care" or "long-term health care", and includes both nursing care and personal care services), and
- social services of long-term care (HC.R.6.1), which is the "assistance services" part, relating primarily to assistance with IADL (instrumental activities of daily living) tasks.

These components mainly represent the in-kind benefits allocated to dependent people. In addition, projections on long-term care also cover public spending on cash benefits. The cash benefits include social programmes offering care allowances, addressed to persons with long-term care needs who live in their own homes. However, the design of these programmes varies widely across countries, which reduces the comparability between them. Illustrating this variety of systems, it is noteworthy that some countries account for nursing allowances in the HC.3 category. Yet, while the total public expenditure on long-term care comprises both in-kind and cash benefits, public expenditure on cash benefits is projected separately from expenditure on long-term care services provided "in kind" – at home or in the institutions.

As agreed, based on the February 2011 note to the AWG[144] and presented in Table 4. 13, the data from the two databases (SHA and ESSPROS) will be combined as follows:

1) *In-kind public expenditure on long-term care*

For the 23 EU Member States using SHA joint questionnaire data and Norway, public expenditure on LTC is computed as the sum of the above-mentioned SHA categories: long-term nursing care (HC.3) and related social services in kind (HC.R.6.1). Data by category are available on both the OECD Health Data and Eurostat Cronos. Most recent data by category refers to 2009. For those

[143] For more details, see: OECD (2006), Costs of Care for Elderly Populations. Guidelines for estimating long-term care expenditure, DELSA/HEA/DIS (2006)4, 14 February 2006, pp. 9-11.

[144] Note to the attention of the AWG: European Commission – DG ECFIN (2011), "Health and long-term care expenditure projections: availability/collection of data", ECFIN/C2 (2011)128176.

countries not using the SHA joint questionnaire or not reporting HC.R.6, proxies have been calculated on the basis of ESSPROS data.[145]

2) *Long-term care related cash benefits*

Long-term care related cash benefits are reported within two ESSPROS functions[146]: "Disability" and "Old Age". Thus, both periodic and lump-sum parts of care allowances and economic integration in the Disability function, as well as periodic care allowance in the Old Age function are generally added, as cash benefits, to the HC.3+HC.R.6.1 sum or to the correspondent ESSPROS sum as calculated above.

Moreover, the SHA joint questionnaire data by sub-categories of long-term nursing care (HC.3) – i.e. inpatient, day cases, and home care – and ESSPROS data by type of benefits in kind are used to identify the two components of total public expenditure: home care and institutional care. We then proceed to calculate the part of HC.R.6.1 which constitutes home care and the part which constitutes institutional care, through proxies calculated on the basis of the ESSPROS data.

Disabled and recipients

When available, data on numbers of recipients have been provided by Member States, while disability rates are available for all Member States and Norway in the 2009 EU-SILC database, for people aged 15+, by age group.[147]

On the one hand, the legal definition of "dependent/recipient", or "entitled to long-term care", can differ widely from one Member State to another, preventing full data comparability. In other words, the level of dependency opening a right to the provision of long-term care may vary a lot across countries. On the other hand, what we consider is the proportion of recipients (by age groups) with respect to the number of disabled (according to the EU-SILC definition).[148]

[145] The categories concerned are: a) Sickness/Health Care function – "other benefits in kind"; b) Disability function – "benefits in kind" ("accommodation" + "rehabilitation" + "home help/assistance in carrying out daily tasks" + "other benefits in kind"); c) Old Age function – "benefits in kind" ("accommodation" + "home help/assistance in carrying out daily tasks" + "other benefits in kind").

[146] The HC.R.7 SHA category (health-related cash benefits) cannot be used for our purpose, as it does not allow for a clear differentiation between health care related and long-term care related cash benefits. Moreover, the relevant data is missing for many countries.

[147] Note that for the 0-14 age group, the 15-19 disability rate has been applied.

[148] In order to clarify the relation and to follow the usual eligibility conditions of public schemes, it is commonly accepted that the disability levels accounted for are those categorized as "severe". To calculate disability rates, the AWG, based on the proposal in the February 2011 Commission's note on HC and LTC data availability, decided to use the EU-SILC item "Limitation in activities because of health problems [for at least the last 6 months]". This is considered the only available measure of dependency for all concerned countries. Note, though, that the relevant EU-SILC question does not specify the activities that the respondent should consider, nor offer a description of what is meant by "severe limitation". This implies that the subjective assessment by the respondent plays a more important role than is typically the case when assessing legal eligibility for public LTC.

Table 4. 13 - Possible combinations of sources according to data availability

Preferred solution: SHA, when data is available (CZ, DE, EE, ES, FR, CY, LV, LT, LU, PL, RO, SI, SK, FI, SE)

HC	LTC – "medical" component	LTC – "social" component	LTC – institutional care	LTC – home care	LTC – cash benefits
SHA: HC.1-HC.2 + HC.4-HC.9 + HC.R.1 + **ESSPROS**: Health-related cash benefits	**SHA**: HC.3	**SHA**: HC.R.6.1	**SHA**: HC.3.1 + HC.3.2 + HC.R.6.1 divided according to the split in benefits in kind in **ESSPROS** data	**SHA**: HC.3.3 + HC.R.6.1 divided according to the split in benefits in kind in **ESSPROS** data	**ESSPROS**: cash benefits from **disability** and **old-age** functions

Alternative 1: When data on HC.R.6.1 - "social" component of LTC is not available in SHA (BE, BG, DK, HU, AT, NO)

		LTC – "social" component			
		ESSPROS: benefits in kind from 1) **sickness**, 2) **disability** and 3) **old-age** functions			

Alternative 2: When SHA lacks data on institutional/home care, i.e. sub-categories of HC.3 (NL, PT)

			LTC – institutional care	LTC – home care	
			SHA health providers classification: HP.1, HP.2 and HP.3, except for HP.3.6	SHA health providers classification: HP.3.6 and HP.7.2.	

Alternative 3: When SHA data is not available (IE, EL, MT, UK)

HC	LTC – "medical" component AND "social" component	LTC – institutional care	LTC – home care	
ESSPROS: Benefits in kind (in-patient + out-patient) and cash benefits in **sickness** function + other benefits in kind in **family** function + exp. on rehabilitation in **social exclusion** function	Estimated on the basis of ESSPROS data: benefits in kind from **sickness**, **disability** and **old-age** functions + cash benefits in **disability** and **old-age** functions	Estimated on the basis of ESSPROS data	Estimated on the basis of ESSPROS data	

Source: Commission services, EPC.
Note: IT provided 2010 expenditure data, as well as 2010 ESSPROS items.

Input data

Only a few countries provided the full set of data necessary to run the projection exercise.[149] Missing data were replaced in a number of ways. In particular:

1. when the number of users of institutional and home care and the number of cash beneficiaries were not available for each age and sex group but only with partial or different disaggregation, the distribution was adjusted by age and sex on the basis of the share of dependents (EU-SILC dependency rates) by respective age and sex group (e.g. NO, UK);
2. when a country provided the needed age- and gender-disaggregation of the total number of users only for one type of LTC services (home or institutional) and the total number of users of the other type, or only the total numbers for both types, by age group, the "slope", i.e. the allocation of care users was assumed to be the same for both types of care (e.g. HU, SE);
3. when no data on the numbers of recipients were available (e.g. CY, RO, SK, EE), the coverage rates of each type of formal care was proxied by the coverage profile of a similar Member State (both in terms of GDP per capita and relative expenditure profile);
4. missing LTC age-gender specific profiles were replaced by the average of individual countries' LTC age-gender specific expenditure profiles expressed as % of GDP per capita; the average was calculated using all available data, either for EU12 or EU15;
5. public spending in home and institutional care was proxied by the average share of those two items in total public LTC spending.

The average LTC age-gender specific expenditure profile (as calculated in point 4 just above) was also used when a country provided aggregate expenditure but 1) no information on recipients of institutional and home care, 2) no information on age-gender expenditure profile per user and 3) only age-gender specific expenditure per capita (total public expenditure on long-term care for each age-gender cohort divided by the number of people in a given age-gender cohort). Using per capita rather than per user creates a pattern of age-gender profiles which is not coherent with the pattern of age-gender profiles of the countries providing data per user. Indeed, the per capita profiles show a strongly increasing (exponential) shape. The methodology for running these projections requires expenditure per user (also called beneficiary or recipient).

Moreover, the age-gender expenditure profiles were adjusted to the total public expenditure in-kind provided according to SHA/ESSPROS. This is the same procedure as that followed in the case of health care projections. When the profile was explicitly calculated for the HC.3 part only, the HC.R.6.1 part was assumed to grow in line with GDP, not with the age profile.

Age-related expenditure profiles per beneficiary and per capita

Graph 4. 7 displays the age-related expenditure profiles (as % of GDP per beneficiary) which have been used in the projection of long-term care expenditure. Graph 4. 2 on page 204 shows the shift in EU15 and EU12 profiles between 2009 and 2012 exercises, also illustrating the variation introduced by the imputation methodology. Graph 4. 8 presents the announced per capita profiles, for information.

[149] Table 4.14 below presents an overview of the provided or imputed data.

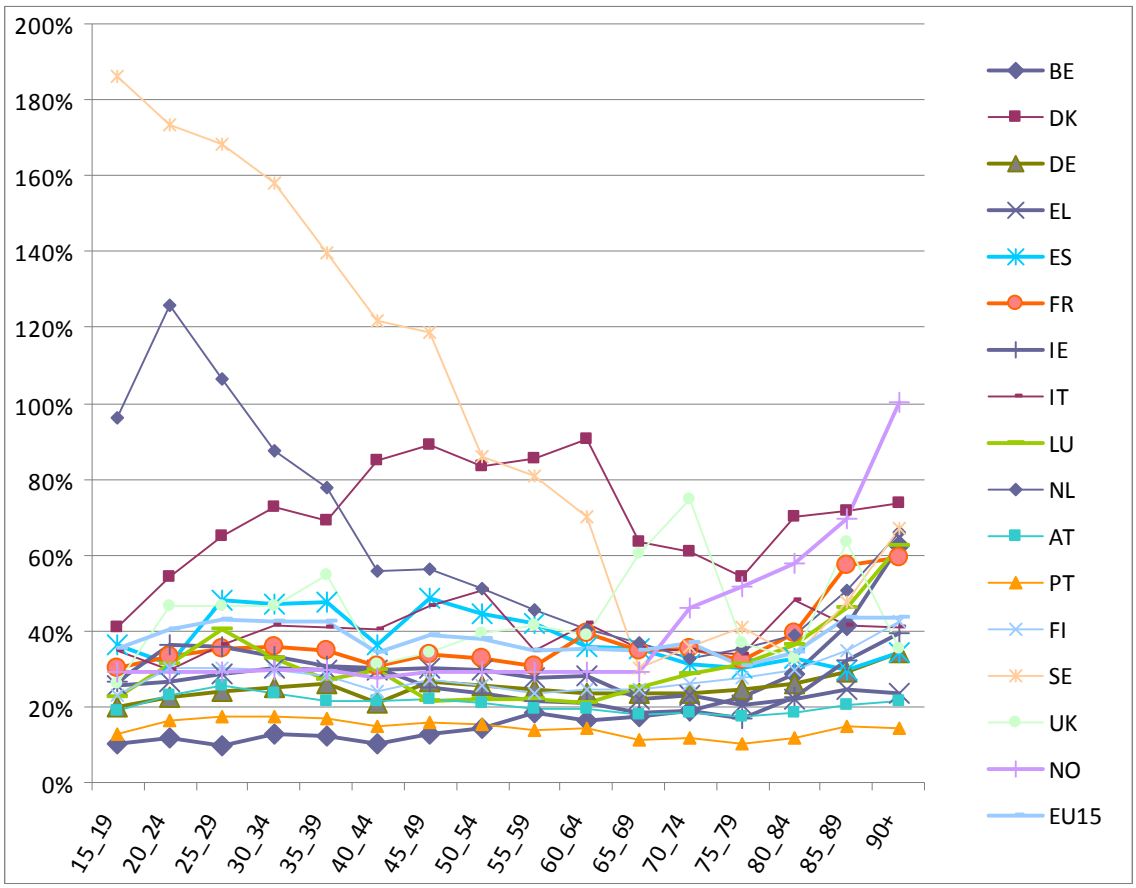
Table 4. 14 – Overview of provided/imputed variables

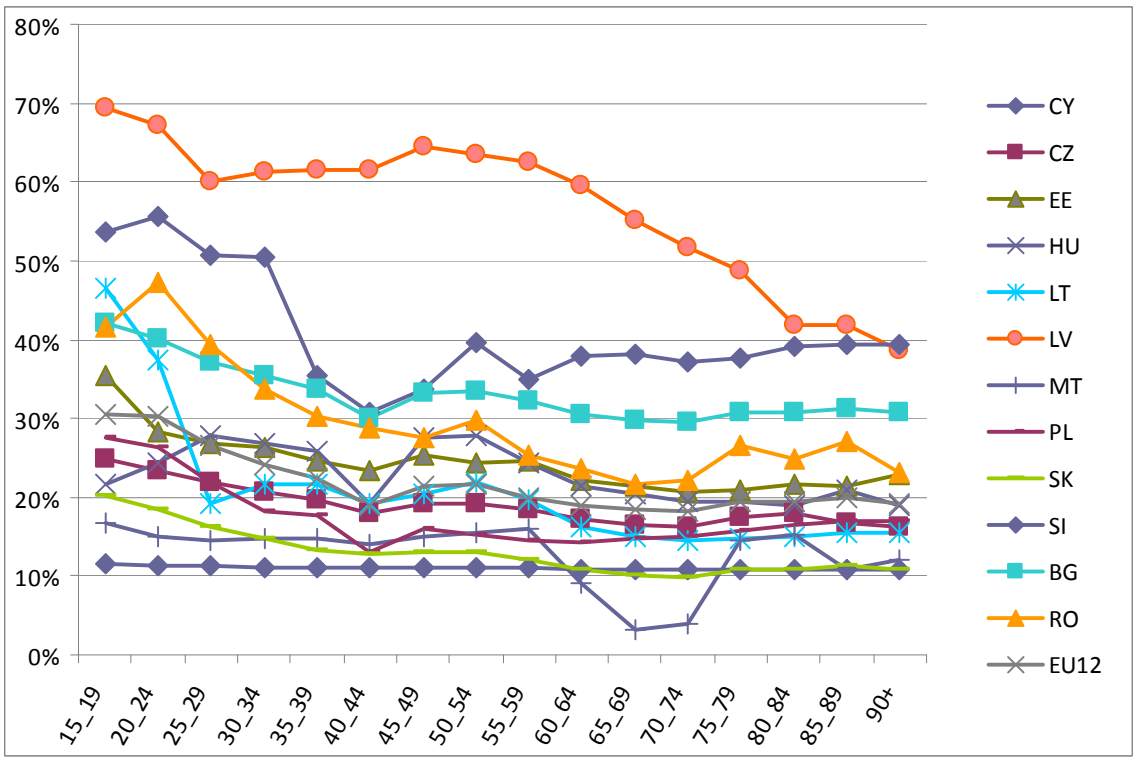
AR 2012 - Long-term care data provided and used											
Country	**Expenditure in-kind SHA or specified**	**Expenditure cash-benefits ESSPROS**		**Age cost profiles**			**Detailed Expenditure and Numbers of recipients by type of care**			**Average profile used in both ARs (even partially)**
	Year	**Year**	**Comment**	**Year**	**Age groups**	**Comment**	**Year**	**Age groups**	**Comment**	
Total	EL, IE, UK: only ESSPROS	-		-	16 country specific profiles + NO	*EU15 average based on: BE, DK, FI, DE, IT, LU, NL, ES, SE, UK EU12 average based on: HU, LV, LT, MT, PL, SI*	-	-	-	
Austria	2009	2009		-	-	*EU15 average imputed*	2009/2010	cash recipients: by single age	no data on in-kind recipients; no detailed expenditure	*x*
Belgium	2009 + Planning Bureau	2009		2009	by 5-year age group; 0-19 to 85+	profile based on HC.3; HC.R.6.1 and cash follow GDP per capita	2009	recipients by 5-year age group; detailed exp. by single age	no data on cash benefits	
Bulgaria	2008	2009		-	-	*EU12 average imputed*	-	-	*EU12 averages imputed*	*x*
Cyprus	2008	2009	reform: wage freeze	-	-	*EU12 average imputed*	-	-	*EU12 averages imputed*	*x*
Czech Republic	2009	2009		-	-	*EU12 average imputed*	-	-	*EU12 averages imputed*	*x*
Denmark	2009	2009		2007 (AR 2009)	by single age	profile based on HC.3; HC.R.6.1 and cash follow GDP per capita	AR 2009	-	number of recipients from AR 2009	
Estonia	2009	2009		-	-	*EU12 average imputed*	-	-	*EU12 averages imputed*	
Finland	2009	2009		2009	by 5-year age group	in-kind profile, derived*	2009	by 5-year age group	-	
France	2009	2009		-	-	*EU15 average imputed*	2009	recipients by 5-year age group	no detailed expenditure; no info on cash; 3 in-kind benefits	*x*
Germany	2009	2009		2010	by 5-year age group; 0-14	profile based on HC.3	2010	by 5-year age group; 0-14	detailed expenditure only on institutions; no separate data on cash recipients	
Greece	2009 ESSPROS	2009		-	-	*EU15 average imputed*	-	-	*EU15 averages imputed*	*x*
Hungary	2009	-		2010	by single age	adjusted, devaluated profile based on HC.3; HC.R.6.1 (and cash) follow GDP per capita	2010	recipients by single age	no info on cash benefits; no info on detailed exp.	
Ireland	2009 ESSPROS	-	reform: wage change	-	-	*EU15 average imputed*	2008	recipients: total	no info on cash benefits; no info on detailed exp.	*x*

AR 2012 - Long-term care data provided and used											
Country	**Expenditure in-kind SHA or specified**	**Expenditure cash-benefits ESSPROS**		**Age cost profiles**			**Detailed Expenditure and Numbers of recipients by type of care**			**Average profile used in both ARs (even partially)**
	Year	**Year**	**Comment**	**Year**	**Age groups**	**Comment**	**Year**	**Age groups**	**Comment**	
Italy	2010 provided	2010, provided		2010	by 5-year age group	in-kind profile, derived*	2010	by 5-year age group	-	
Latvia	2009 + ESSPROS	2009	reform: wage changes	2008	by 5-year age group	in-kind profile, derived*	2008	by 5-year age group	-	
Lithuania	2009	2009		2009	by single age	in-kind profile, derived*	2009	by single age	-	
Luxembourg	2008	2009		2009	by 5-year age group	in-kind profile	2009	by single age	-	
Malta	2008 Ministry of Health	2009		2008	partial disaggregation	in-kind extrapolated profile	2008	partial disaggregation	no data on home care; very partial data on detailed exp.	
Netherlands	2009	-		2009	by 5-year age group (18+)	profile based on HC.3; HC.R.6.1 (and cash) follow GDP per capita	2009	recipients: by single age; in-kind-exp.: by 5-year	no info on cash exp.	
Norway	2009 + ESSPROS	2009		2009	partial disaggregation	in-kind extrapolated profile	2009	recipients: partial disaggregation	no info on detailed exp.	
Poland	2009	2009		2010	by 5-year age group	profile based on HC.3, derived*; HC.R.6.1 and cash follow GDP per capita	2010	by single age	cash benefits: only 75+	
Portugal	2009	2009	reform: wage changes	-	-	*EU15 average imputed*	-	-	*EU15 averages imputed*	x
Romania	2008	2009	reform: wage cuts	-	-	*EU12 average imputed*	-	-	*EU12 averages imputed*	x
Slovak Republic	2009	2009		-	-	*EU12 average imputed*	-	-	*EU12 averages imputed*	x
Slovenia	2009	2009	reform: wage changes	2009	by 5-year age group	in-kind adjusted profile	2009	by 5-year age group	-	
Spain	2009 + nat. estimation	2009 + nat. estimation	reform: wage changes	2009	by single age	in-kind profile	2009	by single age	-	
Sweden	2009	2009		2009	by 5-year age group	in-kind adjusted profile	2009	recipients: by 5-year age group (derived from total)	no data on cash benefits; no info on detailed exp.	
United Kingdom	2009 ESSPROS	2009		2010	partial disaggregation	in-kind extrapolated profile	2010	recipients: extrapolated (partial disaggregation)	no data on cash benefits; no info on detailed exp.	
	*"derived" means that we calculated the profile on the basis of data provided for "Detailed LTC expenditure" and "Recipients".									

Source: Commission services, EPC.

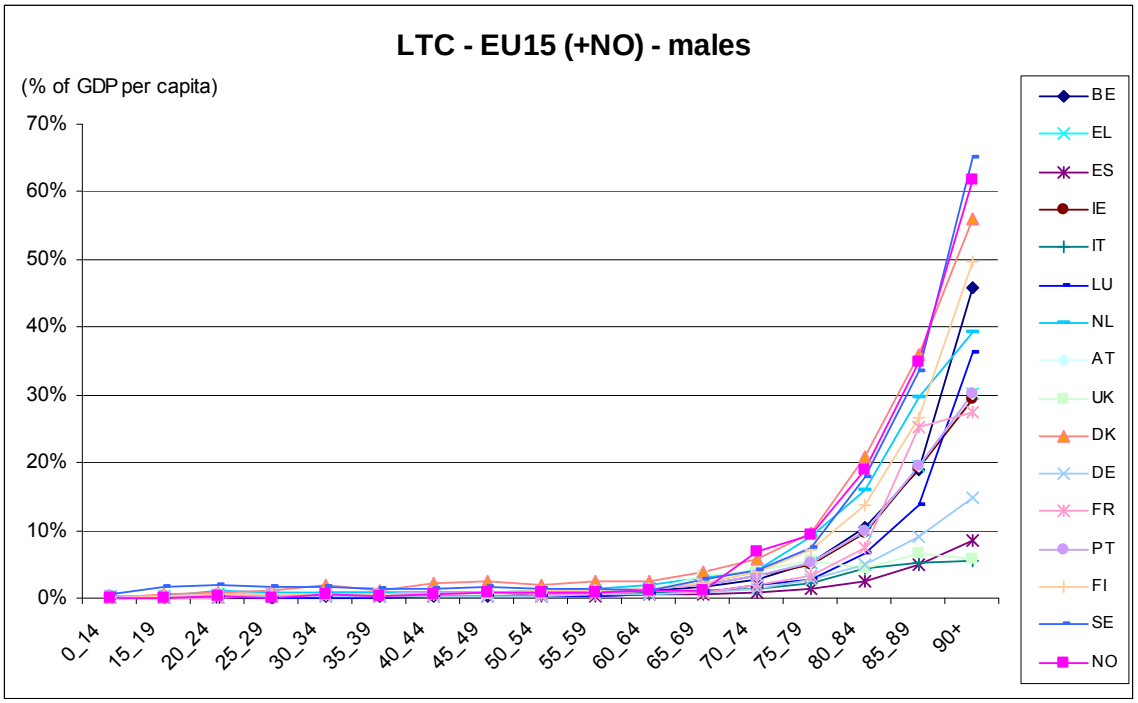
Graph 4. 7 - Age-related expenditure profiles of LTC provision: per user (as % of GDP per capita), EU15 and EU12

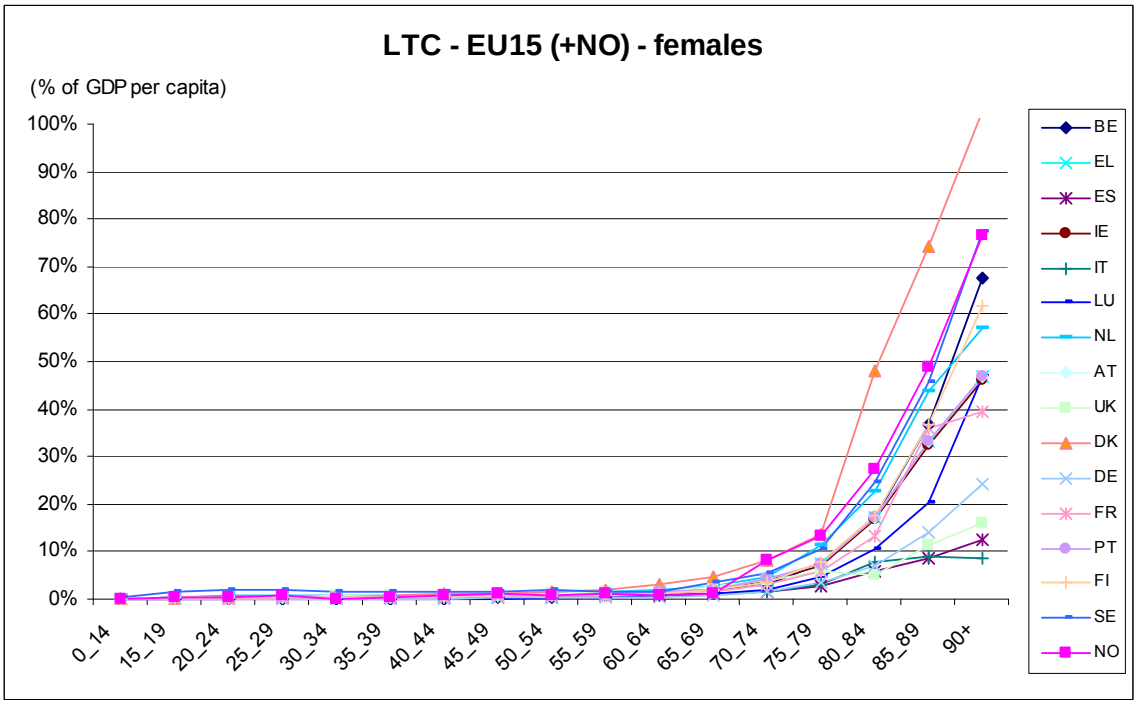


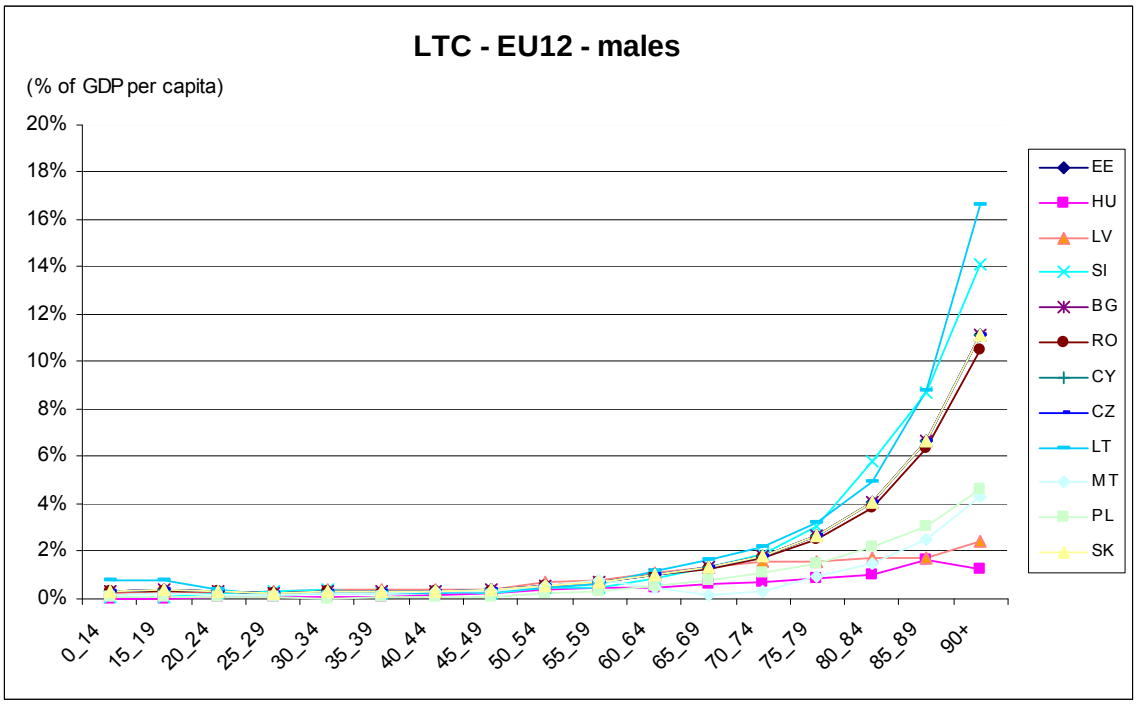


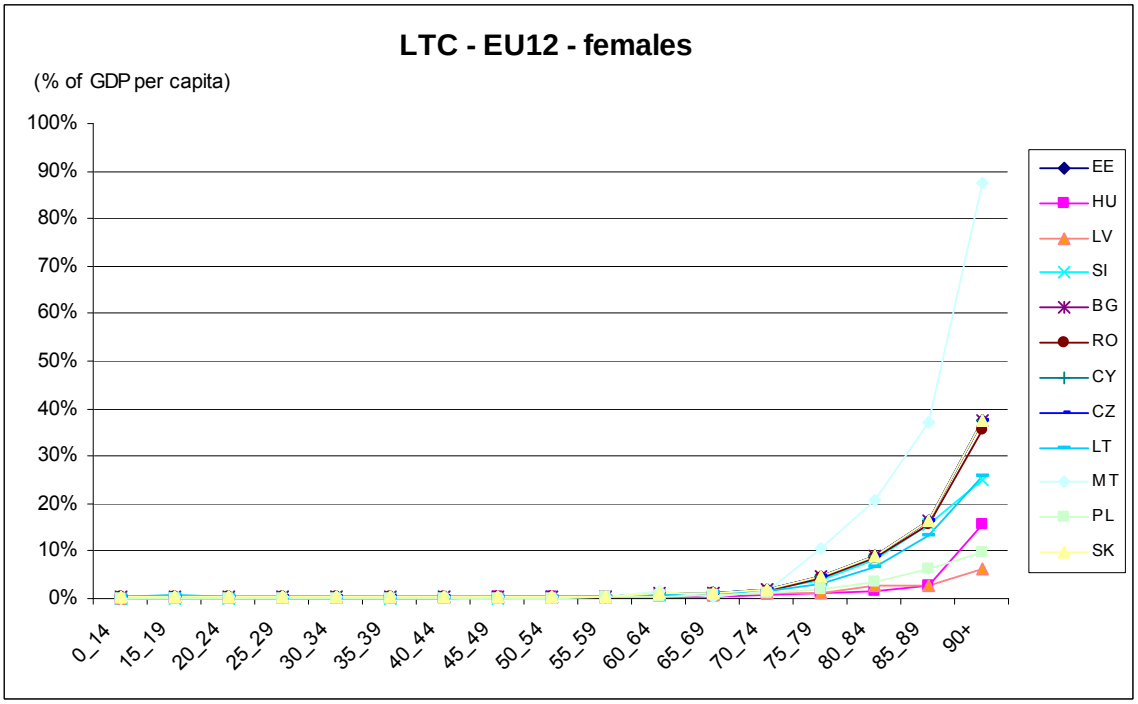
Source: Commission services, EPC.

Graph 4. 8 - Age-related expenditure profiles of LTC provision: per capita (as % of GDP per capita)









Source: Commission services, EPC.

Table 4. 15 - Dependency rates – Total

	2009 Dependency rates - Total														
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
BE	0.7	2.1	2.1	3.3	5.0	5.6	7.2	8.2	9.9	9.2	10.6	14.1	15.8	21.8	27.5
BG	0.3	0.8	0.7	0.5	1.5	1.4	1.9	2.2	5.1	6.7	9.8	10.1	16.3	19.0	27.4
CZ	2.2	1.2	1.6	2.2	2.6	2.0	5.5	6.7	7.2	6.8	8.3	13.4	17.3	23.9	34.3
DK	4.3	3.9	3.4	3.7	4.4	7.7	6.9	10.5	9.4	12.1	8.7	7.3	12.3	18.4	19.6
DE	1.2	1.9	1.8	3.1	4.1	6.5	6.9	11.0	16.5	17.2	14.7	18.1	25.5	30.8	52.0
EE	0.9	1.4	2.4	2.1	1.8	2.4	5.1	7.3	7.3	7.6	13.3	18.6	28.1	35.7	41.3
IE	0.6	4.1	1.0	4.1	4.5	1.5	3.9	5.3	7.8	9.4	8.4	11.5	13.2	19.5	22.6
EL	0.1	0.3	0.6	2.0	1.1	2.3	3.3	1.8	4.5	9.7	15.0	21.4	30.7	40.1	54.2
ES	0.8	1.1	1.4	2.4	2.2	2.4	4.0	4.7	6.2	7.7	8.8	11.0	15.5	22.8	33.2
FR	1.9	1.1	1.2	2.7	3.8	4.5	5.2	9.4	10.4	9.5	12.8	17.9	24.1	35.8	45.7
IT	1.2	1.2	1.5	2.5	2.9	3.2	3.6	4.2	6.8	8.8	11.6	16.6	21.8	33.5	39.3
CY	0.8	2.2	2.4	2.5	2.0	3.0	3.2	3.6	9.2	10.7	10.7	15.0	27.1	41.7	39.0
LV	0.7	0.9	1.7	2.1	1.5	3.0	4.0	4.7	8.2	10.4	10.7	16.5	23.3	25.0	35.3
LT	0.5	1.9	0.7	1.5	3.9	3.8	3.8	5.2	9.7	13.7	14.1	14.8	21.7	31.3	41.5
LU	1.7	2.1	1.7	2.7	5.3	5.9	4.2	4.0	9.4	9.0	12.3	14.4	12.7	16.1	23.6
HU	1.1	1.0	1.9	1.6	2.9	4.6	5.2	8.8	9.5	12.7	14.4	19.8	29.7	34.4	41.5
MT	0.7	1.4	0.8	0.8	1.6	1.2	2.1	4.6	3.6	3.8	6.4	8.7	18.8	18.2	29.6
NL	1.0	1.5	1.3	3.4	4.4	3.4	3.4	5.3	7.1	8.4	8.3	9.3	12.5	14.8	20.5
AT	1.5	2.6	2.5	2.9	3.3	5.4	8.0	10.0	12.6	13.6	13.5	19.5	27.1	34.1	49.2
PL	1.4	1.9	2.1	2.0	2.3	3.1	4.3	6.9	8.6	10.7	14.9	18.2	26.0	29.5	38.6
PT	1.0	1.5	3.6	4.3	3.3	4.9	6.4	8.7	12.6	16.4	17.0	22.8	30.6	41.9	55.6
RO	1.1	0.7	1.4	1.4	1.8	2.7	4.8	7.0	9.6	8.1	10.3	20.8	24.3	31.2	36.9
SI	2.4	3.3	3.1	4.5	5.7	6.6	8.5	11.1	14.6	14.0	18.7	20.4	25.0	32.3	35.5
SK	2.1	2.1	2.6	2.3	4.3	4.0	5.6	10.6	13.5	17.7	24.1	29.8	43.7	55.8	63.0
FI	2.0	1.7	2.3	1.8	4.4	4.3	5.0	7.0	12.3	7.4	10.5	13.4	19.3	31.7	37.1
SE	2.2	2.3	1.6	1.7	4.0	4.3	6.0	8.0	8.7	7.6	6.5	9.5	15.7	16.1	20.3
UK	2.0	2.9	1.5	4.3	3.5	6.2	7.4	9.2	11.1	11.6	16.4	16.7	22.2	21.8	29.6
NO	2.4	2.3	2.3	2.6	2.3	4.4	6.2	6.3	6.3	6.6	7.3	13.1	10.3	19.5	13.5

Source: Commission services, EPC, on the basis of the EU-SILC data.

Dependency rates

As defined in EU-SILC, dependency does increase by age (and, on average, is more prevalent among women than among men). Table 4. 15 shows the dependency rates per age group, for each Member State and Norway.[150]

The age-specific dependency rates vary markedly across EU Member states (and Norway). In some countries they are three times higher than in others. Given the limited comparability of the data concerning self-perceived disability, the dependency rates in Table 4. 15 cannot fully represent the real country-specific health status. As already mentioned, they may diverge noticeably from other national statistics.

Coverage rates

Bearing this in mind, the calculated coverage rates, for both types of formal LTC services are presented for each country in Table 4. 16. They result from the comparison between the number of "dependents", such as defined by EU-SILC, and the number of recipients of LTC services as provided by the Member States (or, when missing, as measured by the correspondent EU12 or EU15 average).[151] Of course, the approximation which results from using EU-SILC survey has consequences for the construction of coverage rates as well, which may be considerably under- or overestimated.

In nearly all countries, overall coverage rates are projected to increase between

[150] It should be noted that EU-SILC covers only the population in private households in most Member States, implying that persons in institutions – including much of residential care – are excluded. This may mean that dependency rates among the very old are underestimated, especially in Member States with a high institutional rate for the elderly. It is noteworthy that dependency rates seem fairly low for the 85+, and rather high for the population 40-70.

[151] Note that to calculate the number of dependents in the age group 0-14, the 15-19 disability rate has been applied.

2010 and 2060, even in the "*base case scenario*". This reflects the fact that the ageing of the population shifts the composition of the dependent population towards higher ages, where coverage rates are higher.

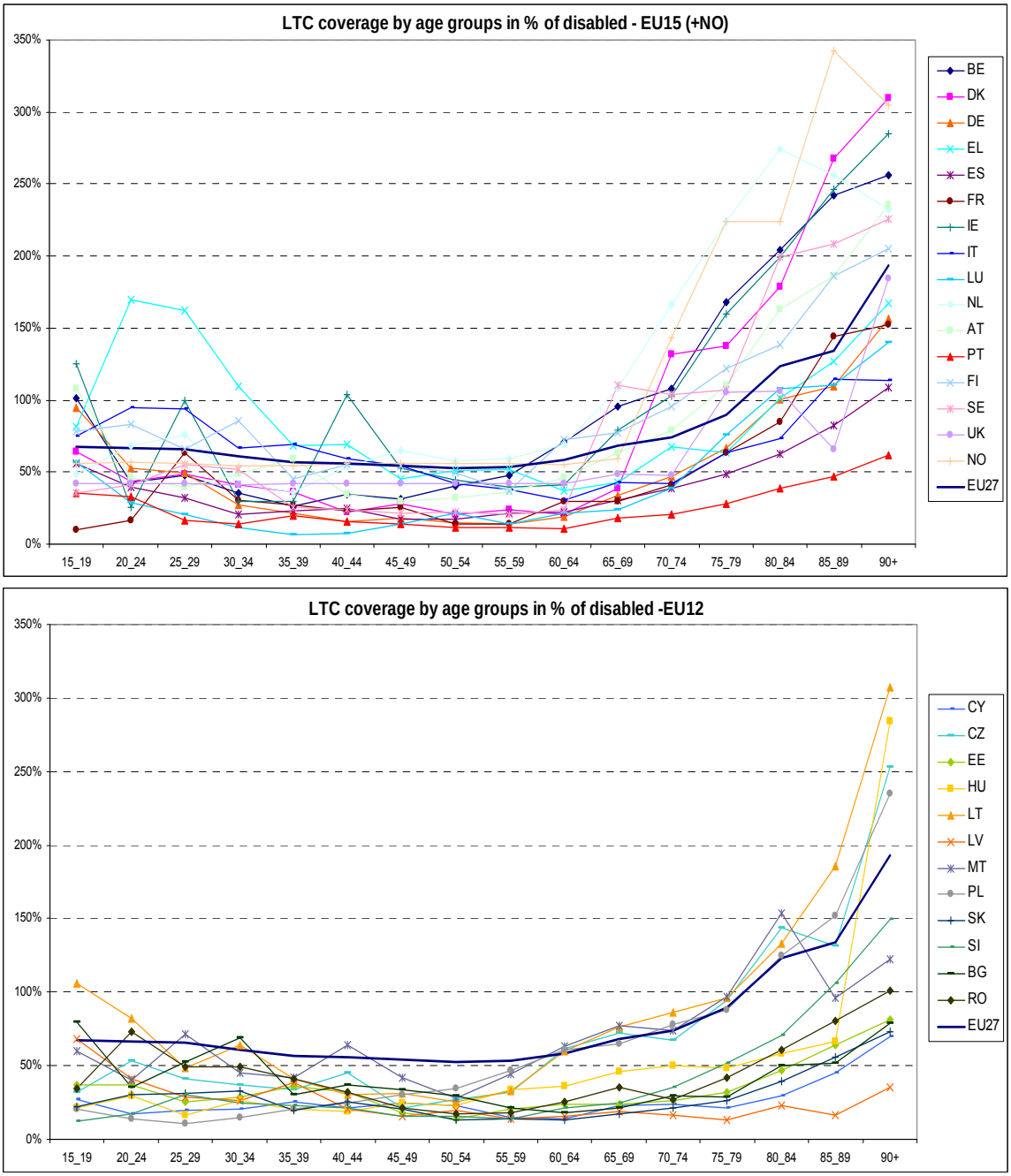
Finally, Graph 4. 9 displays the LTC coverage rates for all countries, and the EU27 average. The measure comprises all types of formal LTC, including cash benefits, which – obviously – gives rise to overlapping (partially documented by only 2 countries).

Table 4. 16 - Coverage rates in the base case scenario, +15

	Coverage Home care		Coverage Institutional Care	
	2010	2060	2010	2060
BE	60%	74%	17%	29%
BG	0%	0%	13%	16%
CZ	15%	24%	18%	24%
DK	34%	53%	17%	32%
DE	18%	25%	8%	15%
EE	13%	15%	8%	10%
IE	27%	38%	11%	18%
EL	28%	32%	14%	20%
ES	17%	21%	11%	13%
FR	18%	23%	10%	14%
IT	18%	17%	6%	7%
CY	0%	0%	9%	11%
LV	8%	8%	8%	8%
LT	36%	62%	20%	23%
LU	23%	32%	14%	27%
HU	7%	11%	11%	17%
MT	16%	17%	44%	55%
NL	60%	76%	33%	47%
AT	22%	29%	11%	18%
PL	2%	2%	5%	8%
PT	9%	12%	6%	8%
RO	14%	19%	9%	12%
SI	7%	12%	12%	20%
SK	9%	13%	6%	8%
FI	15%	21%	24%	35%
SE	33%	42%	33%	42%
UK	22%	26%	5%	6%
NO	67%	83%	17%	28%

Source: Commission services, EPC.

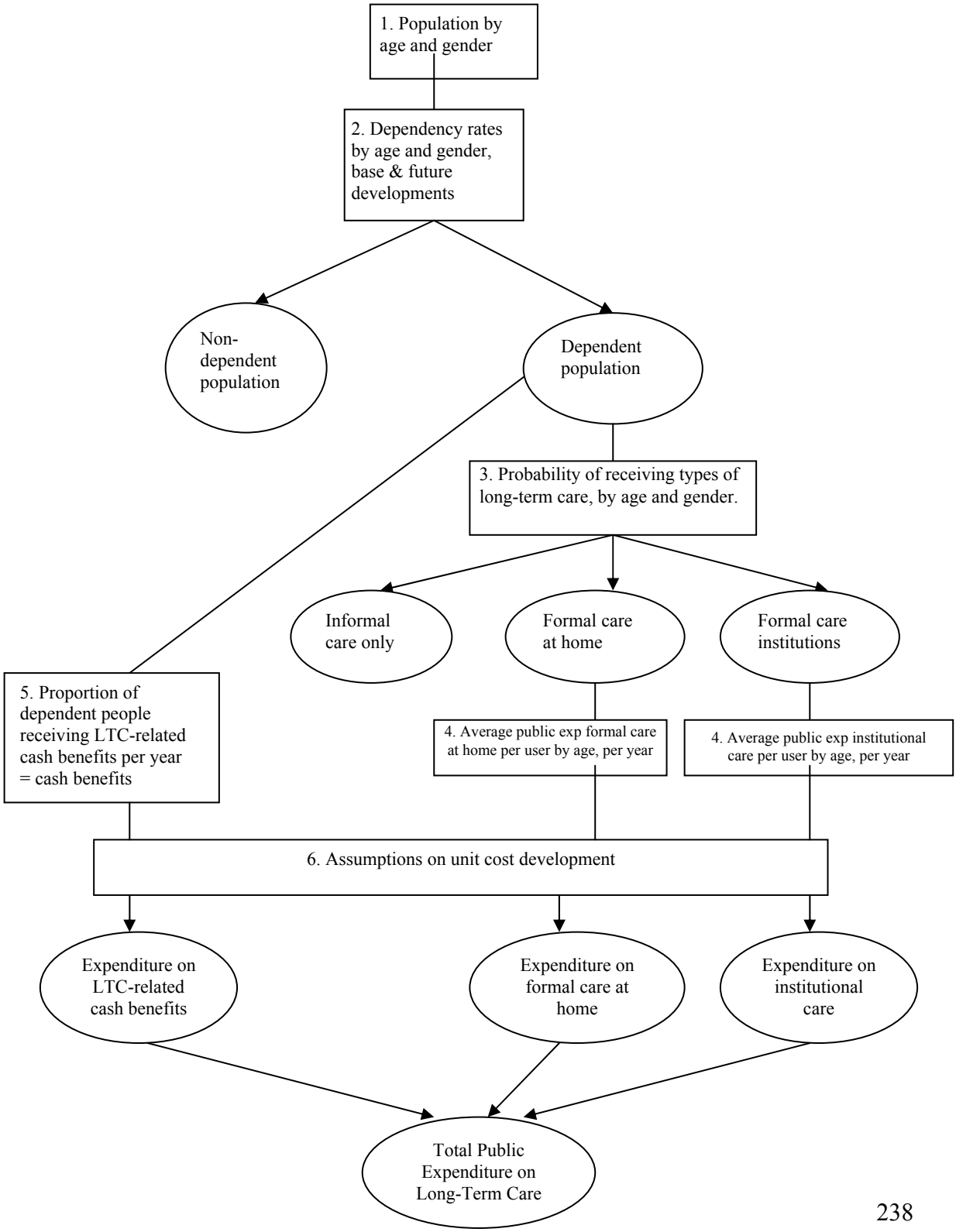
Graph 4. 9 - LTC coverage (in-kind and cash benefits), 15+



Source: Commission services, EPC.
Note: The EU27 average is a simple average, based upon the provided data sets only.

Annex II: Summary of the methodology used to project LTC expenditure

The graph below provides an overview of the model structure, based on a proposal by Comas-Herrera *et al*., (2005). The square boxes indicate data that need to be entered into the model to make projections for each year, and the round boxes indicate calculations that are produced within the model for each year.



Step 1: taking the baseline population projection (by age and gender), a projection is made of the dependent population, who are assumed to need some form of long-term care service, and the non-dependent population who are assumed not to be in need of long-term care services. This is made by extrapolating age- and gender-specific dependency ratios of a base year (estimated using existing indicators of disability from comparable sources) to the baseline population projection. More specifically, it refers to the concept of ADL-dependency which refers to difficulties in performing at least one Activity of Daily Living (ADL) (Katz *et al*., 1963).

Step 2 is to split, by age and gender, the dependent (elderly) population into three groups depending on the type of care they receive, namely (i) informal care, which is assumed to have no impact on public spending, (ii) formal care at home and (iii) formal care in institutions (both of which impact on public spending but their unit costs may differ). The model implicitly assumes that all those receiving home care or institutional care have difficulties with one or more ADLs, and that all persons deemed ADL-dependent either receive informal care, home care or institutional care. The split by type of care received is made by calculating the "probability of receiving different types of long-term care by age and gender". This is calculated for a base year using data on the numbers of people with dependency (projected in step 1), and the numbers of people receiving formal care at home and in institutions (provided by Member States). It is assumed that the difference between the total number of dependent people and the total number of people receiving formal care (at home or in institutions) is the number of people who rely exclusively on informal care.

Step 3 involves the calculation of public spending for the two types of formal long-term care services, by multiplying the number of people receiving formal care (at home and in institutions) by the average age-specific public expenditure (respectively at home and in institutions) per year and per user. Average expenditure is calculated for a base year using data on total public expenditure in home care and institutional care and the numbers of people receiving formal care at home and in long-term care institutions (provided by Member States). Two assumptions are required:

- it is implicitly assumed that current expenditure in services divided by the number of users equals the long-run unit costs of services;
- it is assumed that average expenditure per user increases with the age of the user.[152]

Step 4: by adding up the expenditure on formal care at home and in institutions, total public expenditure on long-term care services ("in-kind benefits") is obtained. Public expenditure on cash benefits for people with ADL-dependency is then added to the expenditure on services, in order to obtain total public expenditure on long-term care. Note that cash benefits are assumed to grow in line with the numbers of people with dependency.

Overall, given the availability of a numerical measure of disability, the

[152] In practice, average expenditure, for each type of service, is decomposed into average expenditure by age groups, by assuming the same rate of increase in spending by age as in the age-related expenditure profile. It is important to note that the age-related expenditure profile provides information on spending in formal care by age, without distinction between care provided at home and in institutions. The model uses average public expenditure in formal care and in institutional care to project future expenditure in both types of services.

projection methodology described above is more precise than that used for health care expenditure where there is no direct indicator of health status and the age-related expenditure profile is used as a proxy. However, an important caveat to note is that while dependency rates are an indicator of the need for care, those needs may not necessarily translate into actual public expenditure, as most long-term care is still provided by unpaid informal carers. Expenditure profiles contain information about the propensity to receive paid formal care, which depends on a number of factors other than dependency that affect demand for paid care such as household type, availability of informal carers, income or housing situation. Most of these factors, in turn, are also correlated with age.

The advantage of the methodology described above is that it allows one to examine different scenarios regarding the evolution of dependency rates, unit costs and policy settings. Table 4. 17 outlines the scenarios carried out as part of the projection exercise.

Table 4. 17 - Overview of the different LTC scenarios

	Demographic scenario	Base case scenario	High life expectancy scenario	Constant disability scenario	Shift to formal care scenario	Coverage convergence scenario	Cost convergence scenario	AWG reference scenario	Risk scenario
	I	II	III	IV	V	VI	VII	VIII	IX
Population projection	EUROPOP2010	EUROPOP2010	Alternative higher life expectancy scenario	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010	EUROPOP2010
Age-related expenditure profiles / Dependency status	2010 profiles / disability rates held constant over projection period	2010 profiles / disability rates held constant over projection period	2010 profiles / disability rates held constant over projection period	2010 disability rates change in line with changes in age-specific life expectancy	2010 profiles / disability rates held constant over projection period	2010 profiles / disability rates held constant over projection period	Individual profiles converge to the EU27 average age profiles over the projection period	2010 disability rates change by half the change in age-specific life expectancy	2010 disability rates change by half the change in age-specific life expectancy AND individual profiles converge to the EU27 average
Policy setting / Care mix	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level	Gradual increase of the number of persons receiving formal care services for the first ten years (at home and institutions)	Probability of receiving any type of formal care converging to the EU-27 average	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level
Unit cost development	GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita	*In-kind*: GDP per hours worked; *cash benefits*: GDP per capita

Source: Commission services, EPC.

Annex III: Comparing the two exercises: AR 2012 to AR 2009 – Additional tables

Table 4. 18 - Comparison between the two exercises: 2012 to 2009 – Demographic scenario

	2010	2015	2020	2030	2040	2050	2060	Change 2010-2060	
BE	0.8	1.0	1.1	1.1	1.4	1.8	2.1	1.3	BE
BG	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.2	BG
CZ	0.6	0.6	0.6	0.7	0.8	0.8	0.9	0.4	CZ
DK	2.7	2.8	2.8	3.2	3.7	4.2	4.8	2.1	DK
DE	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.3	DE
EE	0.5	0.5	0.5	0.6	0.6	0.7	0.8	0.3	EE
IE	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.3	IE
EL	-0.1	-0.2	-0.2	-0.3	-0.4	-0.5	-0.7	-0.5	EL
ES	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.2	ES
FR	0.7	0.9	1.0	1.1	1.7	2.0	2.2	1.5	FR
IT	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.0	IT
CY	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.1	CY
LV	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.1	LV
LT	0.7	0.8	0.9	1.0	1.2	1.4	1.5	0.8	LT
LU	-0.5	-0.5	-0.5	-0.5	-0.7	-0.8	-0.8	-0.3	LU
HU	0.6	0.6	0.6	0.7	0.8	0.9	1.0	0.4	HU
MT	-0.4	-0.4	-0.4	-0.4	-0.6	-0.8	-0.8	-0.4	MT
NL	0.3	0.3	0.3	0.2	0.1	0.1	0.2	-0.2	NL
AT	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.2	AT
PL	0.3	0.3	0.4	0.4	0.6	0.6	0.7	0.4	PL
PT	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.2	PT
RO	0.6	0.6	0.7	0.8	0.9	1.1	1.4	0.8	RO
SI	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.2	SI
SK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	SK
FI	0.6	0.6	0.7	0.8	0.8	0.8	0.7	0.1	FI
SE	0.4	0.4	0.4	0.4	0.5	0.5	0.7	0.3	SE
UK	1.1	1.2	1.2	1.3	1.4	1.4	1.4	0.2	UK
NO	1.6	1.6	1.7	2.0	2.4	2.6	2.9	1.3	NO
EU27	0.5	0.6	0.6	0.7	0.8	1.0	1.1	0.5	EU27

Source: Commission services, EPC.

Table 4. 19 - Base case scenario - Comparison between the two exercises: 2012 to 2009

	2010	2015	2020	2030	2040	2050	2060	Change 2010-2060	
BE	0.8	1.0	1.1	1.2	1.6	2.0	2.3	1.5	BE
BG	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.2	BG
CZ	0.6	0.6	0.6	0.7	0.8	0.8	0.9	0.4	CZ
DK	2.7	2.6	2.6	3.0	3.6	4.1	4.7	2.0	DK
DE	0.5	0.5	0.6	0.6	0.7	0.9	0.9	0.4	DE
EE	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.3	EE
IE	0.2	0.3	0.3	0.3	0.5	0.5	0.4	0.2	IE
EL	-0.1	-0.2	-0.2	-0.4	-0.6	-0.8	-1.0	-0.9	GR
ES	0.1	0.0	0.0	-0.1	-0.1	0.0	0.1	0.0	ES
FR	0.7	0.9	1.0	1.1	1.6	1.9	2.1	1.4	FR
IT	0.2	0.2	0.2	0.2	0.1	0.0	-0.1	-0.3	IT
CY	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.1	CY
LV	0.3	0.3	0.3	0.3	0.3	0.3	0.2	-0.1	LV
LT	0.7	0.8	0.8	0.9	1.0	1.2	1.4	0.6	LT
LU	-0.4	-0.3	-0.3	-0.3	-0.4	-0.4	-0.3	0.1	LU
HU	0.6	0.6	0.6	0.7	0.8	0.9	0.9	0.4	HU
MT	-0.4	-0.4	-0.4	-0.5	-0.7	-1.0	-1.1	-0.7	MT
NL	0.3	0.3	0.3	0.1	-0.1	-0.1	-0.1	-0.4	NL
AT	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.2	AT
PL	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.4	PL
PT	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.2	PT
RO	0.6	0.6	0.7	0.8	1.1	1.4	1.8	1.2	RO
SI	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-0.1	SI
SK	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	SK
FI	0.6	0.7	0.7	0.9	0.9	0.9	0.9	0.3	FI
SE	0.4	0.4	0.4	0.3	0.5	0.5	0.6	0.3	SE
UK	1.1	1.2	1.3	1.4	1.4	1.4	1.5	0.3	UK
NO	1.6	1.6	1.7	2.0	2.4	2.7	3.1	1.4	NO
EU27	0.5	0.6	0.6	0.7	0.8	0.9	1.0	0.5	EU27

Source: Commission services, EPC.

Table 4. 20 - Constant disability scenario
Comparison between the two exercises: 2012 to 2009

	2010	2015	2020	2030	2040	2050	2060	Change 2010-2060	
BE	0.8	1.0	1.1	1.1	1.4	1.8	2.0	1.2	BE
BG	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.1	BG
CZ	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.1	CZ
DK	2.7	2.6	2.6	2.9	3.4	3.8	4.2	1.5	DK
DE	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.2	DE
EE	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.1	EE
IE	0.2	0.3	0.3	0.4	0.5	0.6	0.4	0.2	IE
EL	-0.1	-0.2	-0.3	-0.4	-0.6	-0.9	-1.1	-0.9	EL
ES	0.1	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.1	ES
FR	0.7	0.9	0.9	1.0	1.5	1.7	1.9	1.2	FR
IT	0.2	0.2	0.2	0.1	0.0	-0.1	-0.2	-0.4	IT
CY	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	CY
LV	0.3	0.3	0.3	0.2	0.2	0.1	0.1	-0.2	LV
LT	0.7	0.8	0.8	0.8	0.9	1.1	1.1	0.4	LT
LU	-0.4	-0.3	-0.3	-0.3	-0.4	-0.4	-0.3	0.1	LU
HU	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.1	HU
MT	-0.4	-0.4	-0.4	-0.5	-0.7	-1.0	-1.1	-0.7	MT
NL	0.3	0.3	0.2	0.0	-0.2	-0.4	-0.4	-0.8	NL
AT	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.0	AT
PL	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.2	PL
PT	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.2	PT
RO	0.6	0.6	0.6	0.7	1.0	1.2	1.6	1.0	RO
SI	0.3	0.3	0.3	0.1	0.1	0.1	0.1	-0.2	SI
SK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	SK
FI	0.6	0.6	0.7	0.8	0.8	0.7	0.6	-0.1	FI
SE	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.2	SE
UK	1.1	1.2	1.2	1.2	1.3	1.2	1.2	0.1	UK
NO	1.6	1.6	1.6	1.9	2.2	2.4	2.6	0.9	NO
EU27	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.3	EU27

Source: Commission services, EPC.

Table 4. 21 - Shift to formal care scenario
Comparison between the two exercises: 2012 to 2009

	2010	2015	2020	2030	2040	2050	2060	Change 2010-2060	
BE	0.7	1.0	1.2	1.3	1.7	2.2	2.5	1.7	BE
BG	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.3	BG
CZ	0.6	0.6	0.7	0.8	0.8	0.9	1.0	0.4	CZ
DK	2.6	2.8	3.0	3.4	4.0	4.5	5.1	2.5	DK
DE	0.4	0.6	0.9	1.0	1.1	1.3	1.3	0.8	DE
EE	0.5	0.5	0.6	0.7	0.7	0.8	0.9	0.4	EE
IE	0.2	0.5	0.7	0.7	0.9	1.0	0.8	0.6	IE
EL	-0.2	-0.2	-0.3	-0.4	-0.7	-0.9	-1.2	-1.0	EL
ES	0.1	0.0	0.1	0.0	-0.1	0.0	0.0	0.0	ES
FR	0.6	1.2	1.7	1.9	2.5	2.9	3.1	2.5	FR
IT	0.1	0.2	0.4	0.4	0.3	0.2	0.1	0.0	IT
CY	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.1	CY
LV	0.3	0.4	0.5	0.4	0.4	0.4	0.4	0.1	LV
LT	0.7	0.8	1.0	1.0	1.1	1.3	1.5	0.7	LT
LU	-0.5	-0.4	-0.3	-0.3	-0.5	-0.5	-0.3	0.1	LU
HU	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.3	HU
MT	-0.4	-0.5	-0.5	-0.5	-0.8	-1.1	-1.2	-0.8	MT
NL	0.2	0.2	0.3	0.0	-0.2	-0.2	-0.2	-0.4	NL
AT	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.3	AT
PL	0.0	-0.5	-0.8	-1.1	-1.4	-2.1	-2.8	-2.8	PL
PT	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.5	PT
RO	0.6	0.7	0.9	1.1	1.4	1.8	2.3	1.7	RO
SI	0.2	0.4	0.6	0.5	0.5	0.5	0.5	0.3	SI
SK	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.3	SK
FI	0.5	0.7	1.0	1.2	1.2	1.2	1.2	0.7	FI
SE	0.3	0.6	0.9	0.8	0.9	0.9	1.1	0.8	SE
UK	1.1	1.6	2.1	2.2	2.3	2.4	2.4	1.3	UK
NO	1.6	1.6	1.9	2.3	2.7	3.0	3.4	1.8	NO
EU27	0.5	0.7	1.0	1.0	1.2	1.3	1.4	0.9	EU27

Source: Commission services, EPC.

Table 4. 22 - AWG reference scenario
Comparison between the two exercises: 2012 to 2009

	2010	2015	2020	2030	2040	2050	2060	Change 2010-2060	
BE	0.8	1.0	1.1	1.2	1.5	1.9	2.2	1.4	BE
BG	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.1	BG
CZ	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.2	CZ
DK	2.7	2.6	2.6	3.0	3.5	4.0	4.5	1.8	DK
DE	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.3	DE
EE	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.2	EE
IE	0.2	0.3	0.3	0.3	0.5	0.6	0.5	0.2	IE
EL	-0.1	-0.2	-0.2	-0.4	-0.6	-0.8	-1.0	-0.9	EL
ES	0.1	0.0	0.0	-0.1	-0.1	0.0	0.1	-0.1	ES
FR	0.7	0.9	0.9	1.0	1.5	1.8	2.0	1.3	FR
IT	0.2	0.2	0.2	0.1	0.0	-0.1	-0.2	-0.4	IT
CY	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	CY
LV	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-0.1	LV
LT	0.7	0.8	0.8	0.8	1.0	1.1	1.2	0.5	LT
LU	-0.4	-0.3	-0.3	-0.3	-0.4	-0.4	-0.3	0.1	LU
HU	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.2	HU
MT	-0.4	-0.4	-0.4	-0.5	-0.7	-1.0	-1.1	-0.7	MT
NL	0.3	0.3	0.2	0.0	-0.2	-0.2	-0.3	-0.6	NL
AT	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.1	AT
PL	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.3	PL
PT	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.2	PT
RO	0.6	0.6	0.7	0.8	1.0	1.3	1.7	1.1	RO
SI	0.3	0.3	0.3	0.2	0.1	0.1	0.1	-0.1	SI
SK	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	SK
FI	0.6	0.6	0.7	0.8	0.8	0.8	0.7	0.1	FI
SE	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.3	SE
UK	1.1	1.2	1.2	1.3	1.4	1.3	1.3	0.2	UK
NO	1.6	1.6	1.6	1.9	2.3	2.6	2.8	1.2	NO
EU27	0.5	0.6	0.6	0.6	0.8	0.9	0.9	0.4	EU27

Source: Commission services, EPC.

5. Education

5.1. Introduction

Government expenditure on education largely reflects demographic developments due to the pronounced age profile of enrolment rates, and consequently of expenditure levels. However, many other factors have also an important bearing on government education expenditure, such as the involvement of the general government in the education system, the duration of mandatory education, progress towards education-related targets, relative wages in the education sector, the average size of classes, etc.

The main aim of this projection exercise is to assess the impact of demographic changes *per se* on general government education expenditure. Therefore, projections are carried out under the assumption of "no policy change". The methodology used is highly stylised and does not make justice to the complexities of Member States education systems. It has been set out with a view to use harmonised datasets,[153] secure equal treatment across countries, and be consistent with wide labour market developments, particularly on participation rates.

The present exercise considers three scenarios. First and foremost, a baseline scenario that attempts to isolate the impact of demographic factors. Two sensitivity scenarios are also considered for illustrative purposes. A first sensitivity scenario ("inertia scenario") is considered just to check the robustness of the baseline scenario to the potential key assumption on the students-to-teacher ratio.[154] A second sensitivity scenario attempts to measure the budgetary costs of attaining the two education-related targets of the EU2020 strategy ("EU2020 scenario").

5.2. General characteristics of national education systems

While the methodology used to project future education expenditure is based on a highly stylised framework that abstracts from country specificities, the methodology considers also major aspects of education systems, such as enrolment rates by age and expenditure categories by level of education. Detailed consideration of education systems improves the quality of model calibrations for the base year/period of the projections, which is likely to enhance their quality.

5.2.1. Enrolment rates in the EU

The institutional structure of education systems varies considerably across Member States. Although the configuration between compulsory and non-compulsory education is in general similar across countries (mandatory education starting between ages 5 to 7 and ending between ages 13 to 16), education pathways of young people differ across countries. Differences in "statutory" age bands for a person attending a particular level of education are reflected in cross-country differences in the distribution of "actual" enrolment ages, raising the issue of cross-country comparability. Country diversity is clearly visible in Table 5. 6 in Annex I, which presents average enrolment rates in the period 2007-2008 by country, age and level of education.

[153] UNESCO-UIS/OECD/EUROSTAT (UOE) data collection on education statistics, LFS data, and macroeconomic variables from *The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies - Joint Report prepared by the European Commission (DG ECFIN) and the Economic Policy Committee (AWG), European Economy, No. 4/2011, European Commission*.

[154] The baseline scenario assumes a constant students-to-teacher ratio, implying an instantaneous adjustment in the number of teaching staff to student levels, while the "inertia scenario" assumes a lagged adjustment.

5.2.2. Students-to-teacher ratio (average class size)

Average class sizes vary significantly both across countries and level of education, reflecting specific organisational features of education systems.

The size of primary education classes is on average slightly larger than that of secondary education (both lower and upper). In most countries, average class size is largest in tertiary education (see Graph 5. 1), reflecting teaching methods relying more on individual research and library work.

5.2.3. Staff compensation in the education sector

There is considerable variation across Member States in the wages paid in the education sector. Graph 5. 2 plots average data for the period 2007-2008 for the compensation per public employee in the education sector to GDP per worker.[155] Both the wage distribution and the structure of employment in the education sector (i.e. the relative importance of different professional categories, such as professors, assistants and non-teaching staff) play a role in explaining these differences. As expected, on average wages are highest in the tertiary level of education, reflecting the higher qualifications required of the staff. The data also suggests that wage compensation in the education sector is higher in the EU15 (weighted average) than in the EU12 across all education levels.[156]

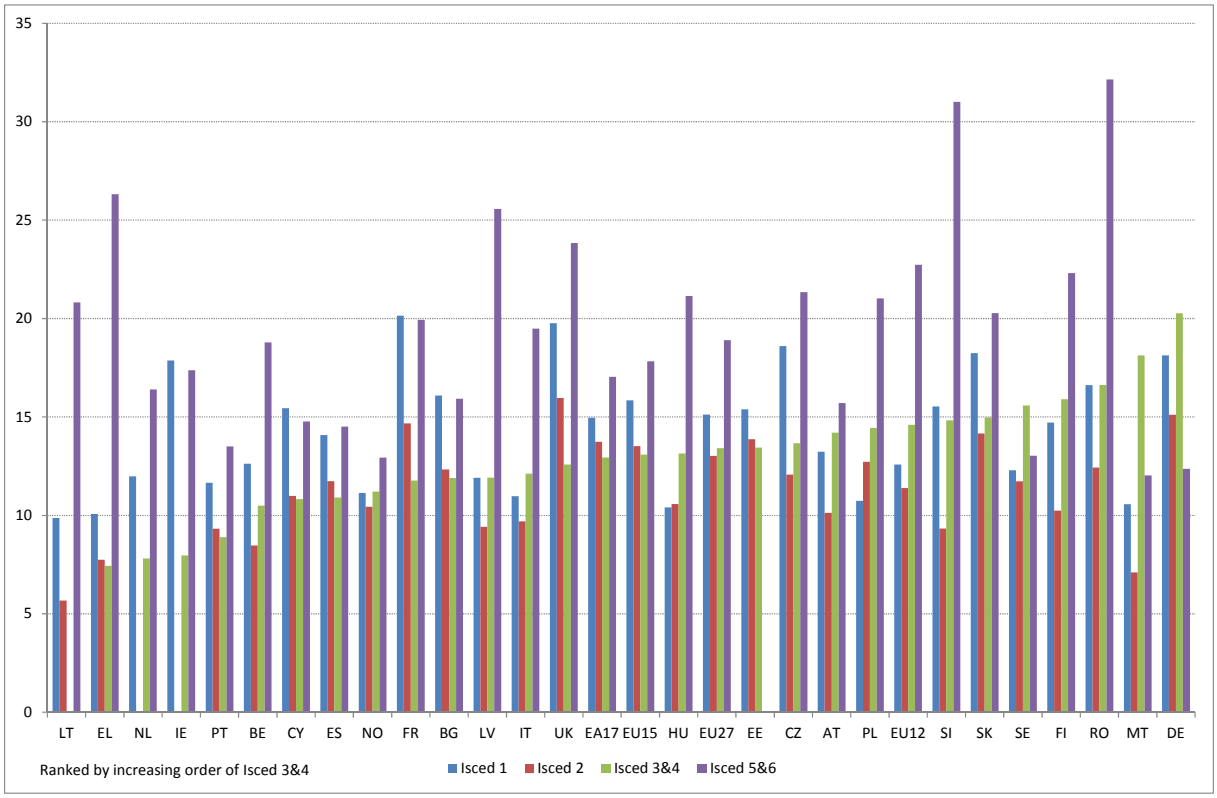
Graph 5. 3 presents average total public expenditure in education in the period 2007-2008 in the four levels of education. Total public expenditure ranges from 3.2% of GDP (Slovakia) to 6.9% (Denmark and Cyprus) (see Table 5. 7 and Table 5. 8 in Annex I).[157]

[155] 2008 is the latest year for which UNESCO-UIS/OECD/EUROSTAT (UOE) education statistics are available. As a rule, the AWG decided to use the average for the years 2007 and 2008 as the base period for education projections. As regards financial data, this general rule could be applied to 24 countries, namely AT, BE, BG, CY, CZ, DE, DK, ES, FI, FR, IE, IT, LT, LV, MT, NL, NO, PL, PT, RO, SE, SI, SK, and UK. For 4 countries (EE, EL, HU and LU) missing data were interpolated, namely total expenditure (i.e. expenditure categories G5+P5) was broken down into personnel compensation (A6), other current expenditure (A13), and capital expenditure (A15) using the average distribution in the above mentioned 24 countries. For the 4 countries with missing data, total expenditure (G5+P5) was taken from the following years: 2007-2008 in EE and HU, 2004-2005 in EL, and 2006-2007 in LU.

[156] Data are incomplete or missing for a number of countries. In particular, expenditure data are missing for some Isced levels in BE, EL, LU and SI (see Table 5. 8 in Annex I).

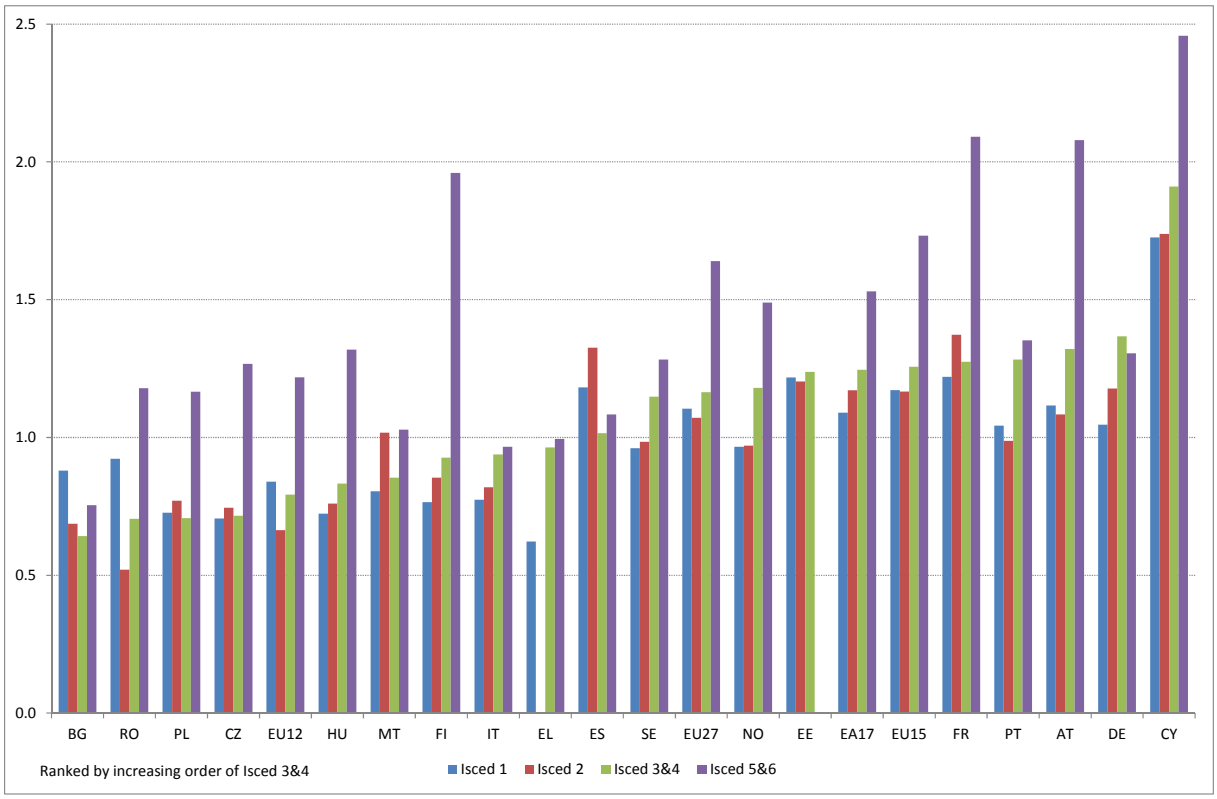
[157] The ratio of 8.1% in NO is inflated by the use of the mainland GDP concept.

Graph 5. 1 - Students-to-teacher ratio across ISCED levels (average values of 2007-2008)



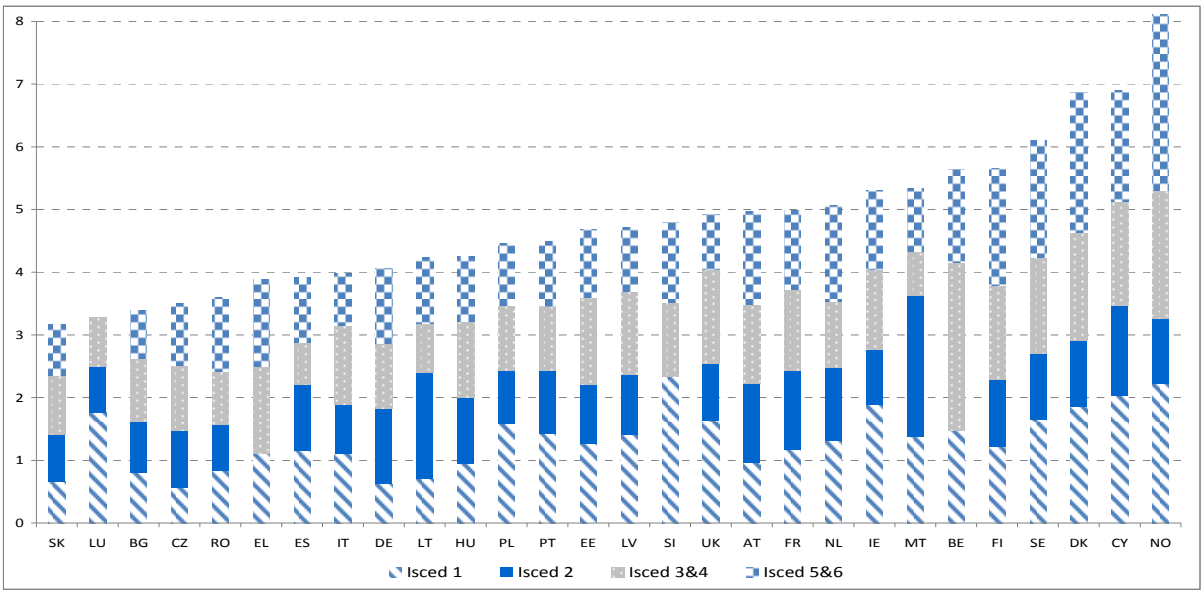
Source: Commission services, EPC.

Graph 5. 2 - Average compensation per member of staff as a ratio of GDP per worker (average values of 2007-2008)



Source: Commission services, EPC.

Graph 5. 3 - Structure of public expenditure on education as % of GDP (average values of 2007-2008)



Source: Commission services, EPC.

5.3. Methodology and results

5.3.1. Decomposition of total changes

A simple simulation model is used to project expenditure on education. As a rule, average expenditure in the years 2007 and 2008 is used as the base period. Total expenditure on education is broken down into four components: i) expenditure on staff compensation (i.e. gross wages and salaries of teaching and non-teaching staff); ii) other current expenditure; iii) capital expenditure; and iv) transfers (e.g. scholarships and public subsidies to private education institutions).[158]

The objective is to project the total expenditure-to-GDP ratio. The ISCED levels considered are: ISCED 1, ISCED 2, ISCED 3&4, and ISCED 5&6.[159]

$$\frac{\sum_i EDU_t^i}{GDP_t} = \frac{\sum_i \left[W_t^i + O_t^i + K_t^i + R_t^i\right]}{GDP_t}$$

(1)

Where EDU_t^i is expenditure on education in ISCED level *i* and year *t*; *W* is expenditure on staff compensation; *O* is other current expenditure; *K* is capital expenditure; *R* is transfers; and $i \in \{1, 2, 3\&4, 5\&6\}$.

The main assumption of the methodology is that per-capita costs grow in line with labour productivity. Specifically, the average compensation per member of the staff ($\frac{W_t^i}{T_t^i}$), and the other three expenditure variables in terms of their student ratios ($\frac{O_t^i}{S_t^i}, \frac{K_t^i}{S_t^i}, \frac{R_t^i}{S_t^i}$) grow in line with labour productivity, where *T* and *S* are the numbers of teaching workers and of students, respectively.

Assuming that per-capita variables grow in line with labour productivity is sufficient to derive the following compact general formula for the expenditure on education-to-GDP ratio:

$$\frac{\sum_i EDU_t^i}{GDP_t} = \left[\frac{\sum_i W_0^i}{GDP_0} * \overline{IT}_t + \frac{\sum_i \left[O_0^i + K_0^i + R_0^i\right]}{GDP_0} * \overline{IS}_t\right] * \frac{IP_t}{IG_t} + CE_t$$

(2a)

Where IT_t^i, IS_t^i, IP_t^i, and IG_t^i are indexes of respectively, teaching staff, students, labour productivity, and GDP.[160] A bar over an index represents one calculated over all ISCED levels considered.[161] CE_t is the composition effect, which is usually a small number compared with the total expenditure-to-GDP ratio.[162]

Equation 2a expresses the expenditure on education-to-GDP ratio as a function of base period ratios, and indexes for teaching staff, students, labour productivity and GDP.

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[158] For a detailed presentation of the methodology see: *The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies - Joint Report prepared by the European Commission (DG ECFIN) and the Economic Policy Committee (AWG), European Economy, No. 4/2011, European Commission*.

[159] It should be stressed that no attempt is made to project total expenditure on education, as ISCED 0 level expenditure (pre-primary and not allocated by level) is not covered by the analysis.

[160] An index $IX_t = \frac{X_t}{X_0}$ measures the ratio between the values of variable *X* in the current period *t* and in the base period *0*.

[161] $\overline{IT}_t = \frac{\sum_i T_t^i}{\sum_i T_0^i}$ and $\overline{IS}_t = \frac{\sum_i S_t^i}{\sum_i S_0^i}$.

[162] The composition effect is given by: $CE_t = \left[\frac{\sum_i W_0^i * \left\{IT_t^i - \overline{IT}_t\right\}}{GDP_0} + \frac{\sum_i \left[O_0^i + K_0^i + R_0^i\right] * \left\{IS_t^i - \overline{IS}_t\right\}}{GDP_0}\right] * \frac{IP_t}{IG_t}$

In the baseline scenario, which assumes a constant ratio of teaching staff to students (i.e. $IT_t^i = IS_t^i$), equation 2a can be further simplified to:

$$\frac{\sum_i EDU_t^i}{GDP_t} = \frac{\sum_i EDU_0^i}{GDP_0} * \frac{\overline{IS}_t * IP_t}{IG_t} + CE_t$$

(2b)

Equivalently, equation 2b can also be written as:

$$\frac{\sum_i EDU_t^i}{GDP_t} = \frac{\sum_i EDU_0^i}{GDP_0} * \frac{\overline{IS}_t}{IE_t} + CE_t \approx \frac{\sum_i EDU_0^i}{GDP_0} * \frac{\overline{IS}_t}{IE_t}$$

(2c)

Where IE_t is the employment index.[163]

In the baseline scenario, equation 2b allows the following straightforward interpretation: projections for the expenditure-to-GDP ratio are obtained by "inflating" base period values by students and labour productivity indexes and by "deflating" them by a GDP index.[164] There are two sources for the increase in expenditure (ratios): the (average) number of students and per-capita costs that are assumed to grow in line with labour productivity; conversely GDP growth "deflates" expenditure ratios.

Equation 2 provides an exact expression for decomposing variations in the expenditure-to-GDP ratio, allowing the comparison of results between different scenarios and/or exercises.

According to equation 2a, a major driver of the expenditure-to-GDP ratio is the (average) number of students. Using UOE data[165], the number of students is projected for each education level. Calculations take into consideration various elements, such as enrolment rates in the base period (average values of years 2007 and 2008), demographic assumptions, and labour market projections for participation rates. A crucial point of the methodology is the (inverse) relation between changes in participation rates and enrolment rates (only for full-time students), meaning for example that newcomers to the labour market were, to a large extent, previously engaged in education activities, and conversely reductions in participation rates will increase the number of students depending on age specific propensities to enrol in education. The other main driving forces of the projection are the wide macroeconomic assumptions for labour productivity, employment, and the assumption on the students-to-teaching staff ratio.

5.3.2. Projection results for the baseline scenario

Assuming "no policy change" in the provision of education, the baseline scenario attempts to illustrate the pure impact of demographic changes on government education expenditure for the 28 countries considered in the projections, while taking full account of all legislated measures. Recall that the baseline scenario assumes a fixed students-to-teaching staff ratio. To what extent the latter is compatible with an assumption of "no policy change" merits some consideration. In fact, assuming that staff levels in the education sector adjust instantaneously to student levels might prove unrealistic, besides actually demanding discretionary action to change staff levels. Instead, it might be preferable to assume some lag or inertia in the adjustment. This consideration led to the calculation of the "inertia scenario", which assumes that adjustments in the number of teaching staff lag by five years variations in the number of students.

The formula used to calculate the number of students differs according to the level of education. For compulsory education levels

[163] The approximation assumes that CE_t is a small number.
[164] The discrepancy being given by the composition effect (CE_t).
[165] See footnote 153.

(which by convention are defined as the primary and lower secondary education levels, respectively, ISCED 1 and ISCED 2[166]), enrolment rates are projected to remain at the average values of the base period 2007-2008. For individuals younger than 15 years old these values are close to 100%.[167]

For non-compulsory education (which by convention covers upper secondary and tertiary education levels, respectively, ISCED 3&4, and ISCED 5&6)[168], changes in enrolment rates are assumed to be inversely related to participation rate changes according to the following equation.[169]

$$e_{i,t} - e_{i,b} = -\frac{\bar{\kappa}_{i,b}}{1-\bar{\alpha}_{i,b}} * \left(p_{i,t} - p_{i,b}\right)$$

where

$$0 \le \bar{\kappa}_{i,b}, \bar{\alpha}_{i,b} \le 1$$

(3)

Where *i*, *t*, and *b* refer respectively to age (15 years old or more), the current period, and the base period; $e_{i,t}$ is the enrolment rate for total students in non-compulsory education; p_{it} the participation rate; $\bar{\kappa}_{i,b}$ is the ratio between full-time students and total inactive people; and $\bar{\alpha}_{i,b}$ the fraction of part-time students in the total number of students.

Recall that in the baseline scenario, the students-to-teacher ratio remains constant over the whole projection period, and that per-capita costs grow in line with labour productivity.

Table 5. 1 shows the variation in the projections of education expenditure for the baseline and inertia scenarios between 2010 (start year of the projections) and 2060 (end year of the projections). Expenditure scenarios look robust to the assumption on the students-to-staff ratio, as the results for the baseline and inertia scenarios are very similar.[170] The impact of recently legislated measures can be assessed in Annex I (see Table 5. 10), by comparing the baseline scenario including or not recently *legislated measures*.[171]

[166] Basic (primary plus lower secondary) education. Level 1 and 2 of ISCED classification. Level 1 is the start of compulsory education (the first stage of basic education) with a legal age of entry usually not lower than five years old and not higher than seven years old. This level covers in principle six years of full-time schooling. Level 2 is lower secondary school (or a second stage of basic education). The end of this stage is usually after nine years of schooling after the beginning of primary education and often coincides with the end of the compulsory education. It includes general education as well as pre-vocational or pre-technical education and vocational and technical education (UNESCO, 1997).

[167] In the 2009 projections, enrolment rates were projected to reach 100% for individuals younger than 15 years old over the first decade of the projection period. In the current 2012 projections, it was decided to keep unchanged the average attainment levels in the base period, because they are already close to 100% and some minimum dropout rates are expected due, *inter alia*, bad health.

[168] Upper-secondary education. Level 3 and 4 of ISCED classification. Level 3 is upper-secondary school and the entry is typically 15 or 16 years old. It also includes vocational and technical education. Level 4 is post-secondary non-tertiary education and these programmes are typically designed to prepare students to the following level (university). Tertiary education. Level 5 and 6 of ISCED classification. Level 5 covers at least two years of education and the minimal access requirements is the completion of levels 3 and 4. However a Master course that implies up to 6 years of tertiary education is included in level 5. Level 6 includes tertiary programmes which lead to the award of an advanced research qualification (UNESCO, 1997).

[169] For individuals older than 15 years of age.

[170] The baseline scenario assumes a fixed students-to-staff ratio; whereas the inertia scenario assumes that staff changes in the education sector lag 5 years changes in the number of students. More precisely, in the inertia scenario the current period staff index is a three years moving average of the students index ratio in the baseline scenario lagged 5 years.

[171] For countries having reported legislated measures, which are ES, IT, FR, PT, LV, SI and UK.

As regards the baseline scenario on average across the EU, government expenditure is expected to slightly decline from 4.6% of GDP in 2010 to 4.5% in 2060 (minus 0.1 and 0.2 p.p. of GDP, respectively, in the EU15 and EU12). Government expenditure on education increases in 9 countries and falls in 19 countries. However, the impact varies considerably across individual countries from a decline of 1.1 p.p. of GDP in Portugal to an increase of 0.5 p.p. in Belgium.

Graph 5. 4 shows the projected changes in expenditure-to-GDP ratios between 2010 and 2060 by country and ISCED level in the baseline scenario.

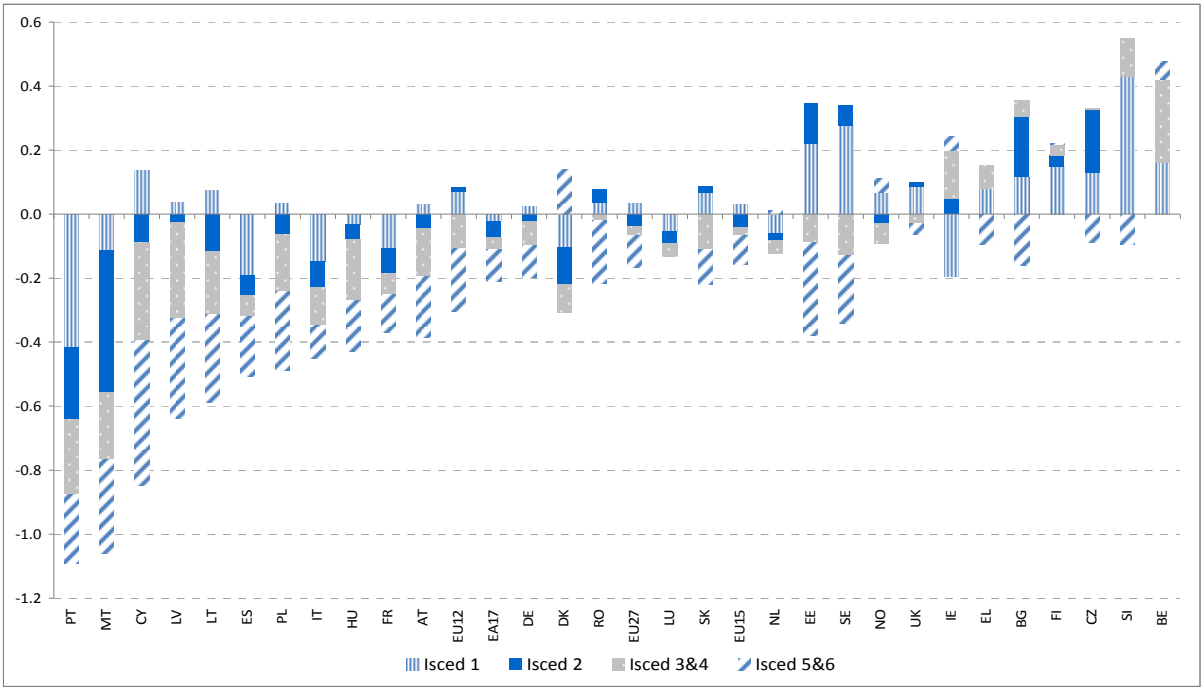
In those countries for which a reduction in total expenditure between 2010 and 2060 is projected, it is common that secondary education (Isced levels 2, 3 and 4) contributes the most to the projected fall in total expenditure (the notable exceptions being Spain and France), followed by tertiary education. At the same time, in Member States where total education expenditure is projected to rise between 2010 and 2060, tertiary education tends to dampen the overall increase in expenditure (e.g. EE, SE, EL, BG, CZ, SI, and UK).

Table 5. 1 - Results of the baseline and inertia scenarios (public expenditure on education as % of GDP)

	Level	Level baseline	Level inertia	Change 2060-2010	
				Baseline	Inertia pp
	2010	2060	2060	pp of GDP	of GDP
BE	5.7	6.2	6.1	0.48	0.42
BG	3.5	3.7	3.8	0.20	0.28
CZ	3.4	3.7	3.7	0.24	0.25
DK	7.6	7.4	7.4	-0.17	-0.15
DE	3.9	3.8	3.8	-0.18	-0.12
EE	5.2	5.1	5.2	-0.03	0.02
IE	6.3	6.4	6.4	0.05	0.01
EL	3.9	3.9	3.9	0.06	0.07
ES	4.2	3.7	3.7	-0.51	-0.49
FR	5.0	4.6	4.6	-0.37	-0.36
IT	4.1	3.7	3.7	-0.45	-0.43
CY	6.7	6.0	5.9	-0.71	-0.83
LV	4.4	3.8	3.8	-0.60	-0.52
LT	4.4	3.9	3.9	-0.51	-0.49
LU	3.2	3.1	3.0	-0.13	-0.17
HU	4.3	3.8	3.9	-0.43	-0.37
MT	5.1	4.0	4.0	-1.06	-1.05
NL	5.3	5.2	5.2	-0.11	-0.08
AT	4.9	4.5	4.5	-0.35	-0.35
PL	3.9	3.5	3.5	-0.46	-0.40
PT	4.7	3.7	3.7	-1.09	-1.02
RO	3.5	3.4	3.5	-0.14	-0.05
SI	4.7	5.2	5.3	0.45	0.51
SK	3.1	3.0	3.0	-0.13	-0.10
FI	5.9	6.1	6.1	0.22	0.21
SE	6.3	6.3	6.2	0.00	-0.06
UK	5.0	5.1	5.0	0.04	0.00
NO	8.5	8.5	8.5	0.02	-0.05
EA17	4.5	4.3	4.3	-0.21	-0.19
EU12	3.9	3.7	3.7	-0.22	-0.17
EU15	4.7	4.6	4.6	-0.13	-0.12
EU27	4.6	4.5	4.5	-0.13	-0.12

Source: Commission services, EPC.

Graph 5. 4 - Changes in government expenditure by ISCED level between 2010 and 2060 (p.p. of GDP) – baseline scenario



Source: Commission services, EPC.

5.3.3. Main drivers of expenditure on education

Table 5. 2 uses equation 2c to break down changes in the GDP ratio of public expenditure on education between 2010 and 2060.

According to equation 2c, the evolution of public expenditure on education is determined by the ratio between the (average) student and employment indices.[172]

$$\frac{\frac{\sum_i EDU_t^i}{GDP_t}}{\frac{\sum_i EDU_0^i}{GDP_0}} \approx \frac{\overline{IS}_t}{IE_t} \qquad (2c)$$

Empirically, the ratio of indices $\frac{\overline{IS}_t}{IE_t}$ is driven by the age structure of the population. Graph 5. 5 plots across countries $\frac{\overline{IS}_t}{IE_t}$ against the ratio of the population in schooling age (ages 6 to 24) to the "active" population (ages 25 to 65). Variations in government expenditure on education between 2010 and 2060 (y-axis) are highly correlated with changes in the age structure of the population (x-axis). This results from the methodology used where per-capita costs grow in line with labour productivity, thereby the expenditure-to-GDP ratio basically increases with the number of students and decreases with employment levels, the difference being a (usually small) discrepancy largely due to composition effects.[173]

[172] Assuming a constant students-to-teacher ratio (i.e. $IT_t=IS_t$).

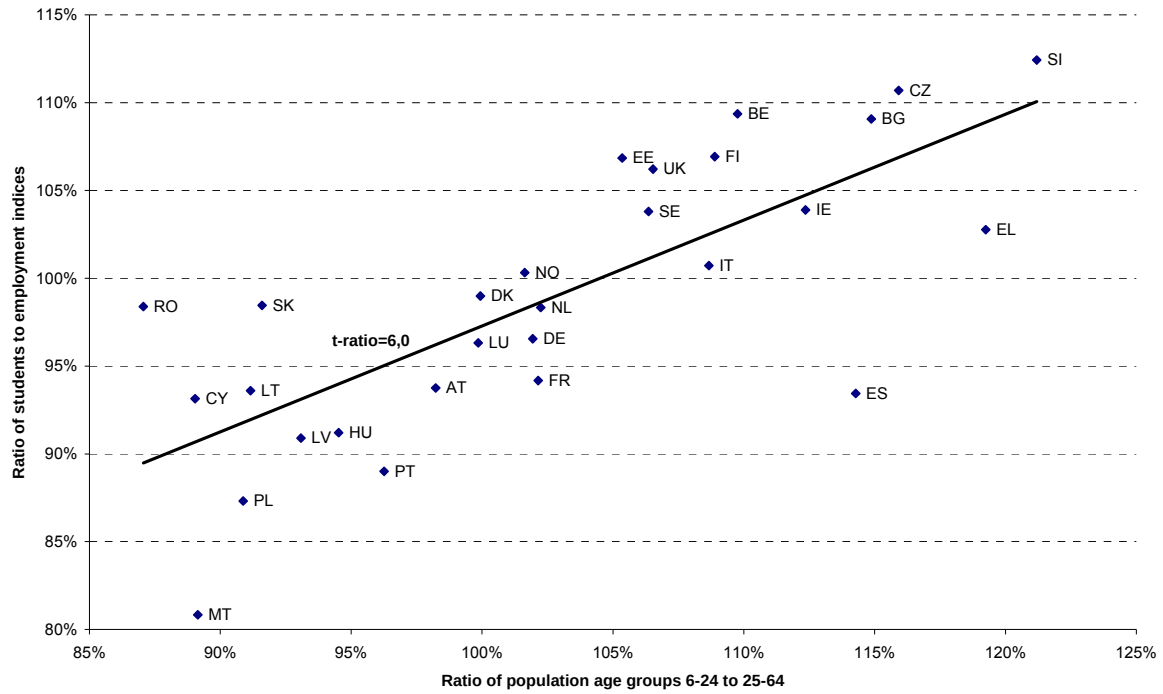
[173] The discrepancy can be non-negligible due to the introduction of *policy measures*.

Table 5. 2 - Breakdown in the total variation between 2010 and 2060 – baseline scenario

	Expenditure to GDP ratio		Change 2060-2010 in pp	Breakdown of total variation		
	2010	2060	(3)=(2)-(1)	Students effect	Employment effect	Discrepancy
	(1)	(2)	(3)=(4)+(5)+(6)	(4)	(5)	(6)
BE	5,7	6,2	0,48	1,13	-0,62	-0,03
BG	3,5	3,7	0,20	-1,40	1,59	0,01
CZ	3,4	3,7	0,24	-0,24	0,56	-0,08
DK	7,6	7,4	-0,17	-0,06	-0,24	0,13
DE	3,9	3,8	-0,18	-1,35	1,23	-0,05
EE	5,2	5,1	-0,03	-1,14	1,07	0,03
IE	6,3	6,4	0,05	2,08	-2,13	0,10
EL	3,9	3,9	0,06	-0,23	0,33	-0,04
ES	4,2	3,7	-0,51	0,15	-0,63	-0,03
FR	5,0	4,6	-0,37	0,12	-0,46	-0,03
IT	4,1	3,7	-0,45	-0,11	-0,14	-0,20
CY	6,7	6,0	-0,71	0,85	-1,34	-0,22
LV	4,4	3,8	-0,60	-2,15	1,49	0,07
LT	4,4	3,9	-0,51	-1,80	1,30	-0,02
LU	3,2	3,1	-0,13	0,61	-0,75	0,01
HU	4,3	3,8	-0,43	-1,39	0,95	0,01
MT	5,1	4,0	-1,06	-1,41	0,44	-0,09
NL	5,3	5,2	-0,11	-0,59	0,44	0,04
AT	4,9	4,5	-0,35	-0,53	0,22	-0,04
PL	3,9	3,5	-0,46	-1,77	1,26	0,06
PT	4,7	3,7	-1,09	-1,01	0,49	-0,57
RO	3,5	3,4	-0,14	-1,83	1,74	-0,05
SI	4,7	5,2	0,45	-0,26	0,87	-0,16
SK	3,1	3,0	-0,13	-1,01	0,91	-0,03
FI	5,9	6,1	0,22	0,00	0,27	-0,05
SE	6,3	6,3	0,00	0,89	-0,77	-0,13
UK	5,0	5,1	0,04	1,10	-0,84	-0,23
NO	8,5	8,5	0,02	1,64	-1,61	-0,01
EA17	4,5	4,3	-0,21	-0,32	0,17	-0,06
EU12	3,9	3,7	-0,22	-1,49	1,24	0,02
EU15	4,7	4,6	-0,13	-0,03	-0,03	-0,08
EU27	4,6	4,5	-0,13	-0,33	0,24	-0,04

Source: Commission services, EPC.
Note: Large values in the discrepancy reflect the introduction of *policy measures* (e.g. PT and IT).

Graph 5. 5 - Demographic structure as the main driver of education expenditure (2060 index values, 2010=100)



Source: Commission services, EPC.

Using equation 2, results can also be broken down between two exercises (Table 5. 3). Although there are considerable cross-country variations, on average the expenditure-to-GDP ratio for 2060 was revised upwards by about 0.56 p.p. between the 2009 and the 2012 projection exercises, of which 53% result from an increase in the number of students, 42.5% from an upward revision in base period values, and 5.5% from a downward revision due to lower employment levels.[174]

The upward revision in the projections for the public expenditure-to-GDP ratio largely reflects (on average about half of the total increase) the rise in the number of students. Two main explanations can be advanced for the increase in the number of students: firstly, the rise in (long-term) fertility rates (Graph 5. 6); and secondly, a decline in participation rates for young age cohorts (Graph 5. 7). The latter reflects the fact that, according to the methodology used, lower participation rates for young cohorts (ages 15 to 29) increase enrolment rates (equation 3).[175]

[174] Discrepancy values represent on average only -1% of total changes.

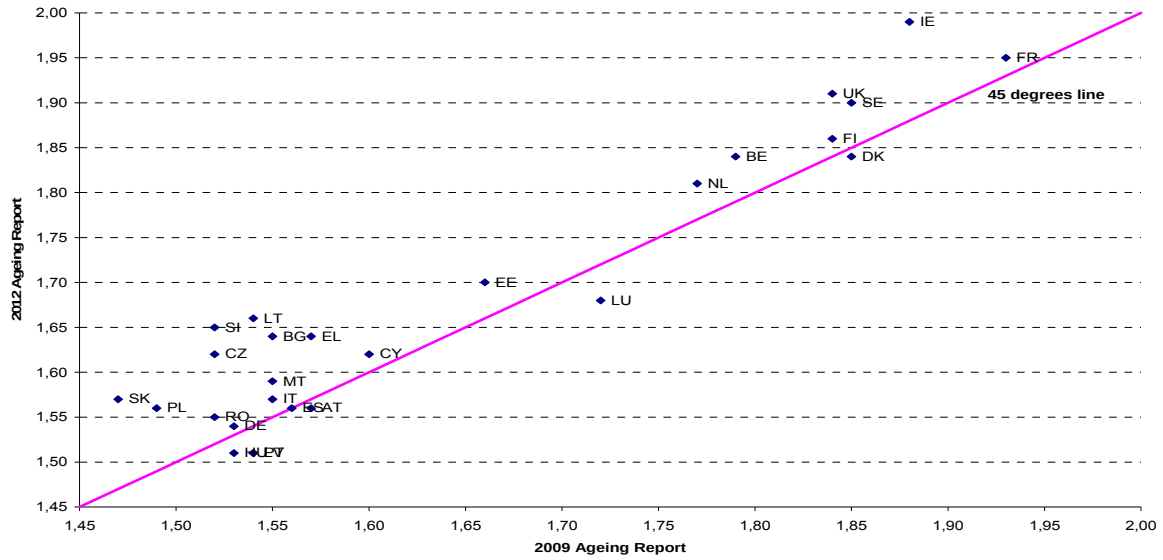
[175] Lower participation rates for young cohorts partly reflects the impact of the 2008-2009 economic recession (see "*The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies*", European Economy No.4 (2011), Part I, Chapter 2).

Table 5. 3 - Breakdown of revisions in the expenditure-to-GDP ratio (2012 round minus 2009 round), 2060

	Base	Index Students	Index Employment	Discrepancy	Expenditure to GDP
	(1)	(2)	(3)	(4)	(5)=(1)+(2)+(3)+(4)
BE	0,15	0,80	-0,20	-0,02	0,73
BG	0,13	0,42	0,10	0,05	0,71
CZ	-0,02	0,71	-0,25	-0,01	0,44
DK	-0,18	0,26	0,16	-0,07	0,17
DE	0,18	-0,13	0,27	-0,04	0,28
EE	1,04	0,45	0,15	0,03	1,66
IE	0,81	0,54	0,72	0,08	2,15
EL	0,17	0,19	-0,08	0,00	0,28
ES	0,43	0,05	-0,08	-0,11	0,28
FR	0,30	-0,22	-0,03	-0,04	0,01
IT	-0,16	0,54	-0,34	0,10	0,14
CY	0,65	-0,79	1,21	-0,03	1,05
LV	0,97	0,02	0,14	0,09	1,23
LT	0,23	0,59	-0,15	0,08	0,75
LU	-0,44	-0,25	0,55	-0,05	-0,19
HU	-0,11	0,04	-0,05	-0,01	-0,13
MT	0,27	0,09	-0,27	-0,07	0,02
NL	0,45	0,38	0,00	-0,05	0,78
AT	0,16	-0,07	0,10	-0,01	0,18
PL	0,06	0,42	-0,22	0,05	0,31
PT	-0,10	-0,47	0,51	-0,04	-0,09
RO	0,72	0,13	0,17	0,05	1,07
SI	-0,39	1,25	-0,81	-0,02	0,02
SK	0,04	0,68	-0,06	0,03	0,69
FI	0,00	0,72	0,04	0,00	0,75
SE	0,06	0,67	-0,19	0,02	0,56
UK	1,12	0,41	0,09	-0,10	1,52
NO	0,19	0,95	-0,58	-0,09	0,47
Non-weighted average	0,24	0,30	0,03	-0,01	0,56
% of total change	42,5%	53,0%	5,5%	-1,0%	100,0%

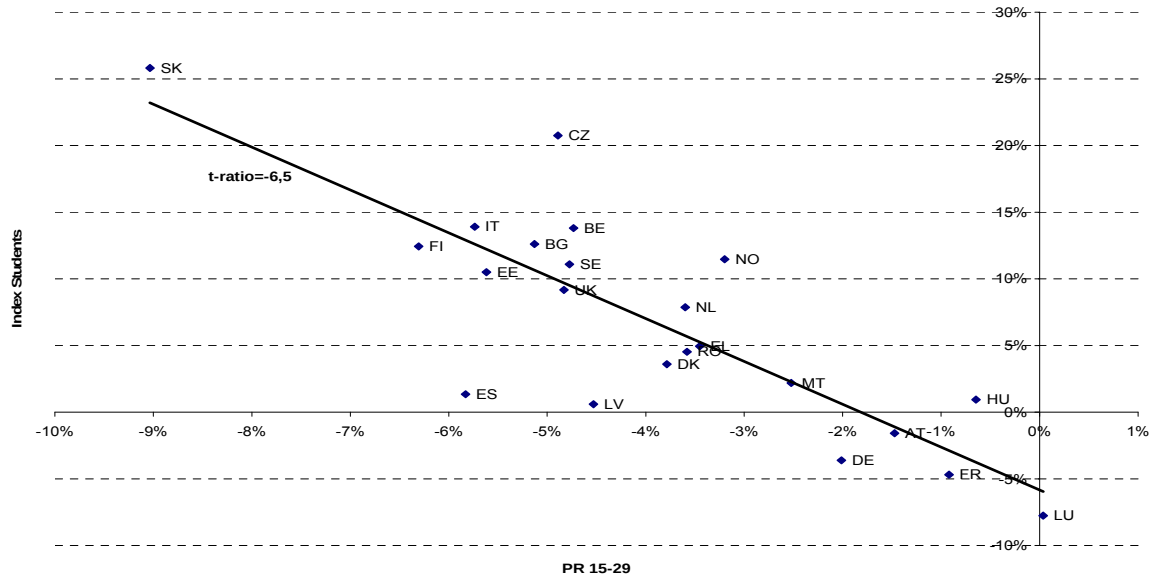
Source: Commission services, EPC.

Graph 5. 6 - Long-term fertility rate assumptions in the 2012 and 2009 projection rounds



Source: Commission services, EPC.

Graph 5. 7 - Inverse relation between the number of students and participation rates for younger cohorts (2012 round minus 2009 round), 2060[176]



Source: Commission services, EPC.

[176] Excludes IE, LT, PL, PT, SI and CY, because they appear to be outliers.

5.4. Sensitivity tests: the EU2020 scenario

The EU2020 scenario is strictly defined in terms of its two education-related objectives to be achieved by 2020, namely:[177]

1. The share of early leavers from education and training should be less than 10%;

2. The share of 30 to 34-year-olds with tertiary or equivalent educational attainment should be at least 40%.

Results suggest that meeting benchmark 2 does not necessarily guarantee compliance with benchmark 1.[178] The latter refers to early school leaving.[179] In operational terms, in this exercise it is considered that benchmark 1 is met when the average enrolment rate in upper-secondary education in the three ages with higher values represents at least 90% of the population.

The tertiary education attainment rate (ages 30-34) varies between 17.5% (RO) to 49.5% (IE) (Table 5. 4), currently attaining the 40% benchmark set for 2020 in 13 countries (BE, CY, DK, ES, FI, FR, IE, LT, LU, NL, SE, UK, and NO).

Thereby, up to 2020 fifteen countries need to increase the number of graduates having completed tertiary education.[180] An increase in the number of graduates can be achieved in two ways, either through an increase in graduation rates[181] (i.e. a reduction in dropout rates) or through an increase in enrolment rates. The current projections assume an equal contribution of improvements in the efficiency of the education system (i.e. reduction in dropout rates) and increases in enrolment rates in order to meet the benchmark target for tertiary educational attainment by 2020.[182]

Note that an increase in enrolment rates in tertiary education (ISCED 5 and 6) implies also a proportional increase in early levels of education (ISCED 3 and 4), as the "additional" students entering university must have completed upper-secondary education. Therefore, projections include also an increase of enrolment rates for ISCED 3 and 4 on top of the increase in ISCED 5 and 6. However, in few countries these induced rises turn out to be insufficient to meet the enrolment target in upper secondary education, requiring further rises.

The EU2020 scenario is built from the baseline scenario. The baseline scenario is modified in two fundamental ways. Firstly, enrolment rates in tertiary education are increased in order to secure (together with the assumed reduction in dropout rates) a linear rise in the attainment level in education by 2020, which is compatible with attaining the 40% benchmark for the age group 30-34. If the induced rise in enrolment rates in upper secondary education is insufficient to meet the early leaving target, additional increases

[177] http://ec.europa.eu/education/lifelong-learning-policy/doc34_en.htm.

[178] In the 2009 Ageing Report, it was found that meeting the tertiary attainment target secured the fulfilment of the 90% enrolment target in upper secondary education in all countries. In the 2012 Ageing Report that is not the case in a few countries because the tertiary target has been corrected to 40% of the ageing group 30-34 (instead of 45%). Setting a higher target for tertiary education has knock-on effects on lower levels of education, because completion of higher secondary education is assumed to be a necessary condition to enrol in tertiary education.

[179] The official indicator used for early school leaving is defined as the percentage of the population aged 18-24 with at most lower secondary education and not in further education or training.

[180] Germany has set the national target to 42%, including ISCED 4 programmes. The corresponding attainment rate in 2009/2010 was 41.0%.

[181] The graduation rate is the ratio between the number of graduates and the total number of students enrolled.

[182] This assumption was also made in the EU2020 scenario of the 2009 Ageing Report.

are considered for this level. This implies an overall increase of the student index (IS_t). Secondly, given the methodology used (see equation 3), a rise in the number of students, especially in university, leads to a reduction in participation rates, and assuming unchanged unemployment rates, to a reduction in employment levels. This tends to reduce the employment index (IE_t). Both effects will tend to raise the expenditure-to-GDP ratio (see equation 2c).

Table 5. 4 - Percentage of persons with tertiary education attainment in the age group 30-34, average values 2009-2010 in percentage

BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT
43,2	27,8	19,0	47,6	29,6	38,0	49,5	27,5	40,0	43,4	19,4	44,9	31,2	42,2
LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
46,4	24,8	21,3	41,0	23,5	34,1	22,3	17,5	33,2	19,9	45,8	44,9	42,3	47,2

Source: Eurostat.

Table 5. 5 - EU2020 and baseline scenarios (public expenditure-to-GDP ratio)

	Average	2010		2020		2030		2040		2050		2060			
	2007-2008	EU2020	Baseline	EU2020	Baseline	EU2020	Baseline	EU2020	Baseline	EU2020	Baseline	EU2020 (1)	Baseline (2)	Difference (3)=(1)-(2)	
BE	5.6	5.7	5.7	5.7	5.7	6.1	6.1	6.1	6.1	6.1	6.1	6.2	6.2	0.0	BE
BG	3.4	3.6	3.5	3.7	3.5	3.8	3.5	3.6	3.3	3.9	3.7	4.0	3.7	0.3	BG
CZ	3.5	3.5	3.4	4.3	3.4	4.5	3.6	4.2	3.3	4.3	3.4	4.6	3.7	0.9	CZ
DK	6.9	7.6	7.6	8.4	7.6	8.2	7.5	8.4	7.6	8.2	7.5	8.1	7.4	0.7	DK
DE	4.1	4.0	3.9	3.9	3.4	3.9	3.5	4.1	3.7	4.1	3.7	4.2	3.8	0.4	DE
EE	4.7	5.2	5.2	5.2	5.1	5.2	5.1	4.6	4.5	4.9	4.8	5.2	5.1	0.1	EE
IE	5.3	6.3	6.3	7.1	7.1	6.5	6.5	6.0	6.0	6.5	6.5	6.4	6.4	0.0	IE
EL	3.9	3.9	3.9	4.2	3.7	4.3	3.7	4.2	3.7	4.4	3.8	4.5	3.9	0.6	EL
ES	3.9	4.2	4.2	4.3	4.0	3.7	3.4	3.5	3.3	3.8	3.6	3.9	3.7	0.2	ES
FR	5.0	5.0	5.0	5.0	4.8	4.9	4.7	4.8	4.6	4.8	4.6	4.8	4.6	0.2	FR
IT	4.0	4.2	4.1	4.5	3.7	4.3	3.5	4.3	3.6	4.4	3.7	4.4	3.7	0.7	IT
CY	6.9	6.7	6.7	5.9	5.8	6.2	6.2	5.8	5.8	5.6	5.6	6.0	6.0	0.0	CY
LV	4.7	4.4	4.4	4.2	4.0	3.9	3.7	3.5	3.3	3.7	3.5	4.0	3.8	0.2	LV
LT	4.2	4.4	4.4	3.9	3.8	4.0	3.9	3.7	3.5	3.6	3.5	4.0	3.9	0.1	LT
LU	3.3	3.2	3.2	3.1	2.9	3.2	3.0	3.3	3.0	3.3	3.0	3.4	3.1	0.3	LU
HU	4.3	4.3	4.3	4.4	3.9	4.0	3.6	3.9	3.5	4.1	3.7	4.3	3.8	0.4	HU
MT	5.3	5.2	5.1	5.1	4.1	4.9	4.0	4.6	3.7	4.6	3.7	4.9	4.0	0.9	MT
NL	5.1	5.4	5.3	5.4	5.0	5.5	5.1	5.7	5.3	5.6	5.2	5.6	5.2	0.4	NL
AT	5.0	5.0	4.9	5.1	4.3	5.1	4.4	5.2	4.4	5.2	4.4	5.3	4.5	0.8	AT
PL	4.5	4.0	3.9	3.5	3.4	3.6	3.5	3.2	3.1	3.3	3.2	3.6	3.5	0.1	PL
PT	4.5	4.8	4.7	4.7	3.9	4.2	3.5	4.2	3.5	4.3	3.6	4.4	3.7	0.7	PT
RO	3.6	3.6	3.5	4.3	3.3	4.2	3.2	4.1	3.1	4.2	3.3	4.4	3.4	1.0	RO
SI	4.8	4.8	4.7	5.1	4.9	5.0	4.8	4.8	4.6	5.2	5.0	5.4	5.2	0.2	SI
SK	3.2	3.2	3.1	3.4	2.8	3.3	2.8	3.2	2.7	3.4	2.8	3.6	3.0	0.6	SK
FI	5.7	5.9	5.9	5.9	5.9	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	0.0	FI
SE	6.1	6.3	6.3	6.1	6.1	6.3	6.3	6.2	6.2	6.1	6.1	6.3	6.3	0.0	SE
UK	4.9	5.0	5.0	5.0	5.0	5.2	5.2	5.0	5.0	5.0	5.0	5.1	5.1	0.0	UK
NO	8.1	8.5	8.5	8.2	8.2	8.4	8.4	8.6	8.6	8.4	8.4	8.5	8.5	0.0	NO
EA17	4.4	4.5	4.5	4.6	4.2	4.5	4.1	4.5	4.1	4.6	4.2	4.7	4.3	0.4	EA17
EU12	4.1	3.9	3.9	3.9	3.5	4.0	3.6	3.7	3.3	3.8	3.4	4.1	3.7	0.4	EU12
EU15	4.6	4.7	4.7	4.8	4.5	4.7	4.4	4.7	4.4	4.8	4.5	4.9	4.6	0.3	EU15
EU27	4.6	4.7	4.6	4.7	4.4	4.7	4.4	4.7	4.3	4.7	4.4	4.8	4.5	0.3	EU27

Source: Commission services, EPC.

Table 5. 5 and Graph 5. 8 present the results for the EU2020 and the baseline scenarios. On average across the EU27, attainment of the EU2020 education targets is expected to raise the expenditure-to-GDP by 0.3% of GDP in 2060. The additional cost relative to the baseline is similar across the EU12 and EU15, respectively, +0.4 p.p. and +0.3 p.p. of GDP.

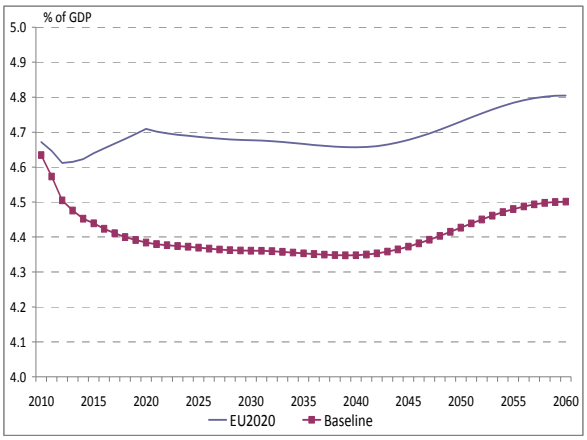
In 2060, the additional budgetary cost for attaining the EU2020 education-related targets varies from ¾ of a p.p. of GDP or more (in RO, CZ, MT, AT, IT, DK and PT) to zero in those countries that have already met both targets (namely BE, CY, FI, IE, SE, UK, and NO).

When analysing the results of the EU2020 scenario, one should recall the assumption made that only half of the expected growth in the number of graduates results from an increase in enrolment numbers, thereby involving a direct budgetary cost. The other half is driven by an expected improvement in the efficiency of the education system.

A general caveat should also be made regarding the presence of country specific effects that might bias education expenditure projections, such as significant international trans-border flows of students, and migration of individuals with tertiary education, particularly coming from new Member States. The latter leads to an overestimation of the initial gap towards meeting those targets, thereby to a likely overestimation of their budgetary cost for "outflow" countries. Overall, country specific effects are likely to lead to an underestimation of education expenditure in "outflow" countries and to an overestimation in "inflow" countries, provided that the current direction of flows unwinds in the future.

While not being explicitly considered in this report, a better educated labour force should lead to higher productivity growth and welfare. The EU2020 scenario measures only the budgetary costs of achieving two education-related targets, not considering the returns of the investment made on labour force productivity, including likely windfall gains on public finance.

Graph 5. 8 - Expenditure on education-to-GDP ratio in the EU27

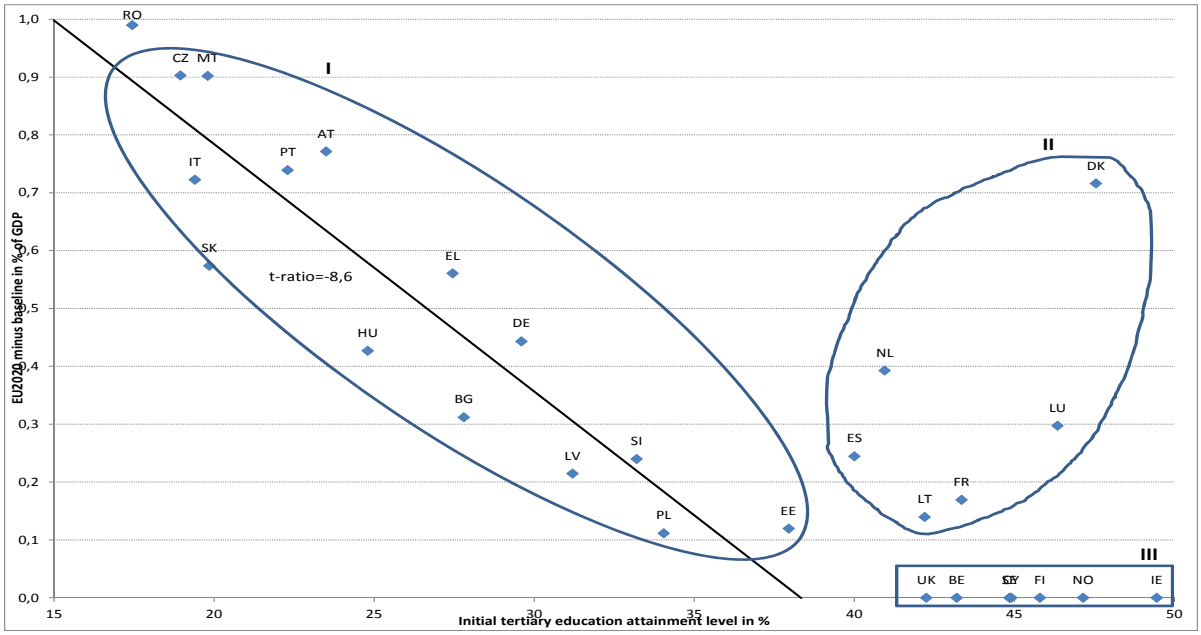


Source: Commission services, EPC.

Graph 5. 9 puts countries into three groups. Group I includes those countries that have not yet met at least the tertiary education attainment target. Group II includes those countries that have met the tertiary education target, but not the early school leaving one. Group III includes the seven countries that have already met both targets.[183]

[183] Results obtained using the operationalization of the early school leaving target might suffer from bias compared to its official definition, overestimating expenditure in some countries (e.g. DK), while underestimating in others (e.g. ES).

Graph 5. 9 - Difference between the EU2020 and the Baseline scenarios in 2060



Source: Commission services, EPC.

Annex I: Statistics

Table 5. 6 - Enrolment rates by country, age and Isced level (average of years 2007 and 2008)

	Ages	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
ISCED 1	0-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	4	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00
	5	0.01	0.00	0.01	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.10	0.01	0.00	0.00	0.04	0.00	0.71	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00
	6	0.94	0.06	0.50	0.03	0.61	0.14	1.00	0.99	0.97	1.00	0.99	1.00	0.05	0.09	0.93	0.23	0.98	1.00	0.61	0.01	1.00	0.23	0.95	0.54	0.01	0.02	1.00	1.00
	7	0.99	0.99	0.94	0.81	1.00	0.95	1.00	1.00	0.98	0.99	0.99	1.00	0.89	0.98	0.95	0.93	1.00	0.99	0.98	0.97	1.00	0.91	0.97	0.98	0.96	0.98	1.00	1.00
	8	0.99	0.98	0.99	0.99	0.99	0.97	1.00	1.00	0.98	0.98	0.99	1.00	0.95	0.99	0.95	0.98	1.00	0.99	0.99	0.98	1.00	0.95	0.97	0.99	0.99	0.99	1.00	0.99
	9	0.99	0.97	1.00	1.00	0.99	0.99	1.00	1.00	0.99	0.97	1.00	1.00	0.97	0.99	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.96	0.98	1.00	0.99	1.00	0.98	0.99
	10	0.99	0.92	1.00	1.00	0.54	1.00	1.00	1.00	1.00	0.95	0.96	1.00	1.00	0.85	0.96	0.76	1.00	0.99	0.45	1.00	1.00	0.80	0.95	0.49	1.00	1.00	0.98	1.00
	11	0.97	0.08	0.52	1.00	0.07	1.00	0.99	0.99	0.99	0.21	0.04	0.99	1.00	0.08	0.87	0.10	0.36	0.97	0.04	0.99	0.99	0.12	0.44	0.07	1.00	1.00	0.08	0.99
	12	0.23	0.03	0.11	0.97	0.00	0.87	0.60	0.07	0.17	0.02	0.01	0.07	0.91	0.01	0.21	0.02	0.03	0.42	0.00	0.98	0.31	0.06	0.02	0.03	0.99	1.00	0.00	0.99
	13	0.03	0.02	0.01	0.17	0.00	0.07	0.04	0.02	0.01	0.01	0.00	0.01	0.19	0.00	0.03	0.01	0.00	0.06	0.00	0.05	0.15	0.00	0.00	0.01	0.06	0.00	0.00	0.00
	14	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.08	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	Ages	**BE**	**BG**	**CZ**	**DK**	**DE**	**EE**	**IE**	**EL**	**ES**	**FR**	**IT**	**CY**	**LV**	**LT**	**LU**	**HU**	**MT**	**NL**	**AT**	**PL**	**PT**	**RO**	**SI**	**SK**	**FI**	**SE**	**UK**	**NO**
ISCED 2	10	0.00	0.07	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.14	0.02	0.24	0.00	0.00	0.55	0.00	0.00	0.18	0.03	0.51	0.00	0.00	0.02	0.00
	11	0.02	0.92	0.47	0.00	0.92	0.00	0.00	0.01	0.00	0.79	0.96	0.01	0.00	0.91	0.08	0.90	0.56	0.01	0.95	0.00	0.01	0.86	0.55	0.92	0.00	0.00	0.92	0.00
	12	0.76	0.96	0.89	0.03	0.99	0.13	0.38	0.91	0.83	0.96	0.99	0.93	0.09	0.99	0.74	0.98	0.92	0.57	0.99	0.01	0.69	0.94	0.96	0.97	0.01	0.00	0.99	0.00
	13	0.96	0.96	1.00	0.83	1.00	0.93	0.96	0.97	0.99	0.97	0.96	0.99	0.81	0.99	0.89	0.99	0.97	0.94	1.00	0.95	0.85	0.96	0.98	0.99	0.93	1.00	0.99	0.99
	14	0.32	0.62	1.00	0.97	0.99	0.98	0.98	0.95	0.96	0.96	0.11	0.92	0.95	1.00	0.85	0.69	0.98	0.98	0.49	0.98	0.91	0.86	0.90	0.94	0.99	1.00	0.02	1.00
	15	0.10	0.11	0.52	0.96	0.95	0.88	0.61	0.13	0.98	0.39	0.03	0.07	0.90	1.00	0.41	0.12	0.98	0.74	0.08	0.98	0.46	0.16	0.04	0.42	0.98	0.95	0.02	1.00
	16	0.04	0.04	0.08	0.56	0.60	0.16	0.06	0.05	0.35	0.06	0.01	0.01	0.25	0.91	0.15	0.05	0.41	0.39	0.02	0.08	0.28	0.07	0.01	0.06	0.10	0.06	0.04	0.00
	17	0.03	0.01	0.01	0.11	0.16	0.06	0.02	0.02	0.16	0.00	0.00	0.00	0.09	0.18	0.04	0.02	0.03	0.12	0.00	0.04	0.14	0.00	0.01	0.02	0.01	0.02	0.02	0.00
	18	0.03	0.01	0.01	0.02	0.04	0.02	0.01	0.01	0.06	0.00	0.00	0.00	0.04	0.05	0.01	0.01	0.00	0.03	0.00	0.02	0.06	0.00	0.00	0.01	0.00	0.01	0.01	0.00
	Ages	**BE**	**BG**	**CZ**	**DK**	**DE**	**EE**	**IE**	**EL**	**ES**	**FR**	**IT**	**CY**	**LV**	**LT**	**LU**	**HU**	**MT**	**NL**	**AT**	**PL**	**PT**	**RO**	**SI**	**SK**	**FI**	**SE**	**UK**	**NO**
ISCED 3 & 4	14	0.68	0.35	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03	0.89	0.08	0.00	0.00	0.07	0.31	0.00	0.01	0.50	0.00	0.01	0.09	0.07	0.05	0.00	0.00	0.98	0.00
	15	0.90	0.82	0.48	0.01	0.04	0.12	0.38	0.81	0.01	0.59	0.94	0.91	0.08	0.00	0.49	0.88	0.00	0.25	0.87	0.01	0.51	0.76	0.93	0.57	0.01	0.03	0.98	0.00
	16	0.96	0.84	0.92	0.35	0.39	0.84	0.93	0.87	0.58	0.88	0.90	0.95	0.73	0.08	0.70	0.92	0.27	0.59	0.90	0.91	0.65	0.83	0.99	0.90	0.86	0.93	0.87	0.95
	17	0.95	0.83	0.96	0.72	0.77	0.91	0.83	0.74	0.67	0.86	0.85	0.81	0.85	0.77	0.74	0.89	0.56	0.74	0.88	0.93	0.68	0.79	0.98	0.89	0.93	0.95	0.72	0.92
	18	0.50	0.75	0.87	0.77	0.80	0.73	0.56	0.23	0.35	0.48	0.74	0.13	0.77	0.80	0.67	0.70	0.45	0.57	0.67	0.90	0.40	0.60	0.86	0.79	0.92	0.89	0.25	0.86
	19	0.27	0.18	0.45	0.54	0.60	0.25	0.20	0.17	0.20	0.24	0.19	0.02	0.34	0.28	0.42	0.40	0.27	0.41	0.33	0.43	0.23	0.16	0.30	0.36	0.32	0.23	0.10	0.42
	20	0.14	0.04	0.12	0.32	0.36	0.14	0.15	0.11	0.11	0.10	0.07	0.01	0.10	0.12	0.25	0.23	0.15	0.27	0.13	0.23	0.13	0.09	0.29	0.08	0.17	0.14	0.06	0.21
	21	0.09	0.02	0.05	0.23	0.23	0.08	0.12	0.19	0.06	0.04	0.03	0.01	0.04	0.05	0.13	0.11	0.08	0.16	0.07	0.14	0.08	0.34	0.00	0.02	0.16	0.13	0.05	0.12
	22	0.07	0.01	0.03	0.16	0.26	0.05	0.08	0.02	0.04	0.02	0.01	0.00	0.09	0.03	0.07	0.06	0.04	0.10	0.05	0.08	0.06	0.00	0.00	0.01	0.15	0.10	0.04	0.08
	23	0.07	0.01	0.02	0.13	0.10	0.03	0.05	0.02	0.03	0.01	0.00	0.01	0.01	0.02	0.04	0.04	0.03	0.07	0.03	0.06	0.04	0.00	0.00	0.01	0.13	0.09	0.03	0.06
	24	0.07	0.01	0.02	0.10	0.04	0.02	0.04	0.03	0.02	0.01	0.00	0.00	0.01	0.02	0.03	0.03	0.02	0.04	0.02	0.04	0.04	0.00	0.00	0.01	0.11	0.07	0.03	0.04
	25	0.06	0.01	0.02	0.08	0.05	0.02	0.02	0.01	0.02	0.01	0.00	0.00	0.02	0.02	0.02	0.03	0.09	0.03	0.02	0.10	0.03	0.00	0.11	0.01	0.10	0.06	0.02	0.03
	Ages	**BE**	**BG**	**CZ**	**DK**	**DE**	**EE**	**IE**	**EL**	**ES**	**FR**	**IT**	**CY**	**LV**	**LT**	**LU**	**HU**	**MT**	**NL**	**AT**	**PL**	**PT**	**RO**	**SI**	**SK**	**FI**	**SE**	**UK**	**NO**
ISCED 5 & 6	17	0.01	0.00	0.00	0.00	0.01	0.00	0.05	0.09	0.00	0.02	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00
	18	0.33	0.02	0.01	0.00	0.03	0.08	0.35	0.44	0.29	0.28	0.03	0.23	0.03	0.07	0.01	0.12	0.16	0.21	0.05	0.01	0.20	0.16	0.05	0.04	0.01	0.02	0.25	0.00
	19	0.46	0.30	0.22	0.05	0.10	0.36	0.46	0.52	0.36	0.39	0.34	0.26	0.36	0.45	0.05	0.33	0.25	0.31	0.15	0.38	0.29	0.35	0.49	0.25	0.20	0.14	0.33	0.15
	20	0.48	0.36	0.37	0.15	0.18	0.39	0.44	0.54	0.38	0.41	0.36	0.28	0.42	0.52	0.08	0.38	0.27	0.36	0.23	0.47	0.32	0.34	0.54	0.36	0.33	0.22	0.34	0.28
	21	0.42	0.36	0.36	0.26	0.23	0.39	0.34	0.47	0.34	0.36	0.36	0.24	0.41	0.51	0.10	0.38	0.23	0.37	0.26	0.48	0.32	0.32	0.52	0.35	0.41	0.27	0.25	0.34
	22	0.32	0.33	0.32	0.33	0.24	0.33	0.21	0.42	0.30	0.30	0.33	0.18	0.34	0.43	0.07	0.34	0.15	0.34	0.26	0.45	0.28	0.31	0.49	0.32	0.44	0.30	0.17	0.35
	23	0.22	0.24	0.28	0.35	0.24	0.26	0.13	0.32	0.24	0.22	0.29	0.14	0.26	0.33	0.05	0.27	0.10	0.29	0.25	0.41	0.22	0.26	0.44	0.24	0.43	0.31	0.13	0.32
	24	0.15	0.18	0.22	0.35	0.23	0.19	0.10	0.24	0.20	0.15	0.23	0.11	0.19	0.23	0.04	0.20	0.07	0.22	0.22	0.25	0.17	0.22	0.36	0.15	0.38	0.28	0.11	0.27
	25	0.10	0.12	0.15	0.32	0.20	0.14	0.07	0.15	0.15	0.10	0.16	0.09	0.15	0.16	0.02	0.15	0.05	0.16	0.19	0.14	0.13	0.17	0.26	0.11	0.32	0.24	0.09	0.22
	26	0.08	0.09	0.09	0.27	0.17	0.12	0.06	0.11	0.12	0.07	0.11	0.07	0.13	0.13	0.02	0.11	0.04	0.12	0.15	0.09	0.10	0.12	0.17	0.08	0.26	0.19	0.08	0.17
	27	0.06	0.07	0.07	0.22	0.13	0.11	0.06	0.09	0.09	0.05	0.08	0.05	0.11	0.12	0.01	0.09	0.03	0.08	0.12	0.06	0.08	0.10	0.12	0.07	0.22	0.15	0.07	0.14
	28	0.05	0.05	0.06	0.18	0.10	0.10	0.06	0.08	0.07	0.04	0.07	0.05	0.10	0.10	0.01	0.08	0.03	0.06	0.10	0.04	0.07	0.09	0.09	0.06	0.19	0.13	0.06	0.12
	29	0.04	0.04	0.05	0.14	0.08	0.09	0.06	0.18	0.06	0.03	0.05	0.03	0.09	0.09	0.01	0.07	0.02	0.04	0.08	0.04	0.06	0.08	0.07	0.05	0.16	0.11	0.06	0.10
	30-34	0.03	0.03	0.03	0.08	0.04	0.07	0.09	0.16	0.04	0.05	0.03	0.02	0.08	0.07	0.00	0.05	0.02	0.02	0.05	0.07	0.04	0.03	0.05	0.04	0.11	0.08	0.05	0.07
	35-39	0.01	0.02	0.02	0.04	0.01	0.04	0.00	0.00	0.02	0.00	0.03	0.01	0.06	0.04	0.00	0.03	0.01	0.01	0.02	0.00	0.02	0.05	0.03	0.03	0.06	0.05	0.04	0.05
	40+	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01

Source: Commission services, EPC.

Table 5. 7 - Expenditure-to-GDP ratios in the base period (average 2007-2008) – breakdown by component

	Staff Compensation (W)	Other Current Expenditure (O)	Capital Expenditure (K)	Transfers (R)	Total
	(1)	(2)	(3)	(4)	(5)=(1)+(2)+(3)+(4)
BE	4.3	0.9	0.2	0.3	5.6
BG	1.8	0.7	0.5	0.5	3.4
CZ	1.8	1.2	0.3	0.2	3.5
DK	4.4	1.0	0.3	1.1	6.9
DE	2.5	0.7	0.3	0.5	4.1
EE a)	3.1	0.9	0.4	0.3	4.7
IE	3.5	0.9	0.5	0.5	5.3
EL b)	2.3	0.9	0.7	0.0	3.9
ES	2.7	0.7	0.4	0.1	3.9
FR	3.5	0.9	0.4	0.2	5.0
IT	2.8	0.8	0.2	0.2	4.0
CY	4.3	0.9	0.7	1.0	6.9
LV	2.9	0.9	0.7	0.2	4.7
LT	2.8	0.8	0.4	0.2	4.2
LU c)	2.3	0.6	0.3	0.1	3.3
HU a)	2.8	0.8	0.3	0.3	4.3
MT	3.3	1.7	0.3	---	5.3
NL	3.0	0.8	0.6	0.7	5.1
AT	3.2	1.2	0.2	0.4	5.0
PL	2.8	1.2	0.4	0.1	4.5
PT	3.7	0.5	0.2	0.2	4.5
RO	1.8	1.0	0.6	0.1	3.6
SI	3.0	0.9	0.5	0.4	4.8
SK	1.8	1.0	0.1	0.3	3.2
FI	3.1	1.7	0.4	0.4	5.7
SE	3.4	1.6	0.3	0.7	6.1
UK	2.5	0.8	0.3	1.3	4.9
NO d)	4.3	1.4	0.7	1.7	8.1
EA17	2.9	0.8	0.3	0.3	4.4
EU12	2.5	1.1	0.4	0.2	4.1
EU15	2.9	0.8	0.3	0.5	4.6
EU27	2.9	0.9	0.3	0.5	4.6

a) Total expenditure in 2007-2008 was broken down using the average distribution in 24 countries.
b) Total expenditure in 2004-2005 was broken down using the average distribution in 24 countries.
c) Total expenditure in 2006-2007 was broken down using the average distribution in 24 countries.
d) Mainland GDP.
The 24 countries are: AT, BE, BG, CY, CZ, DE, DK, ES, FI, FR, IE, IT, LT, LV, MT, NL, NO, PL, PT, RO, SE, SI, SK, and the UK.

Source: Commission services, EPC.

Table 5. 8 - Expenditure-to-GDP ratios in the base period (average 2007-2008) – breakdown by ISCED levels

	Isced 1	Isced 2	Isced 3&4	Isced 5&6	Isced 1&6
BE	1.5	---	2.7	1.5	5.6
BG	0.8	0.8	1.0	0.8	3.4
CZ	0.6	0.9	1.0	1.0	3.5
DK	1.9	1.1	1.7	2.2	6.9
DE	0.6	1.2	1.0	1.2	4.1
EE a)	1.3	0.9	1.4	1.1	4.7
IE	1.9	0.9	1.3	1.3	5.3
EL b)	1.1	---	1.4	1.4	3.9
ES	1.2	1.1	0.7	1.0	3.9
FR	1.2	1.3	1.3	1.2	5.0
IT	1.1	0.8	1.3	0.8	4.0
CY	2.0	1.4	1.7	1.8	6.9
LV	1.4	1.0	1.3	1.0	4.7
LT	0.7	1.7	0.8	1.1	4.2
LU c)	1.8	0.7	0.8	---	3.3
HU a)	0.9	1.1	1.2	1.0	4.3
MT	1.4	2.3	0.7	1.0	5.3
NL	1.3	1.2	1.1	1.5	5.1
AT	1.0	1.3	1.3	1.5	5.0
PL	1.6	0.9	1.0	1.0	4.5
PT	1.4	1.0	1.0	1.0	4.5
RO	0.8	0.7	0.8	1.2	3.6
SI	2.3	---	1.2	1.3	4.8
SK	0.7	0.8	0.9	0.8	3.2
FI	1.2	1.1	1.5	1.9	5.7
SE	1.7	1.1	1.5	1.9	6.1
UK	1.6	0.9	1.5	0.9	4.9
NO d)	2.2	1.0	2.0	2.8	8.1

For the legend see the previous table.

Source: Commission services, EPC.

Table 5. 9 - Results of the baseline scenario (public education expenditure as % of GDP)

	2010	2020	2030	2040	2050	2060
BE	5.7	5.7	6.1	6.1	6.1	6.2
BG	3.5	3.5	3.5	3.3	3.7	3.7
CZ	3.4	3.4	3.6	3.3	3.4	3.7
DK	7.6	7.6	7.5	7.6	7.5	7.4
DE	3.9	3.4	3.5	3.7	3.7	3.8
EE	5.2	5.1	5.1	4.5	4.8	5.1
IE	6.3	7.1	6.5	6.0	6.5	6.4
EL	3.9	3.7	3.7	3.7	3.8	3.9
ES	4.2	4.0	3.4	3.3	3.6	3.7
FR	5.0	4.8	4.7	4.6	4.6	4.6
IT	4.1	3.7	3.5	3.6	3.7	3.7
CY	6.7	5.8	6.2	5.8	5.6	6.0
LV	4.4	4.0	3.7	3.3	3.5	3.8
LT	4.4	3.8	3.9	3.5	3.5	3.9
LU	3.2	2.9	3.0	3.0	3.0	3.1
HU	4.3	3.9	3.6	3.5	3.7	3.8
MT	5.1	4.1	4.0	3.7	3.7	4.0
NL	5.3	5.0	5.1	5.3	5.2	5.2
AT	4.9	4.3	4.4	4.4	4.4	4.5
PL	3.9	3.4	3.5	3.1	3.2	3.5
PT	4.7	3.9	3.5	3.5	3.6	3.7
RO	3.5	3.3	3.2	3.1	3.3	3.4
SI	4.7	4.9	4.8	4.6	5.0	5.2
SK	3.1	2.8	2.8	2.7	2.8	3.0
FI	5.9	5.9	6.1	6.1	6.1	6.1
SE	6.3	6.1	6.3	6.2	6.1	6.3
UK	5.0	5.0	5.2	5.0	5.0	5.1
NO	8.5	8.2	8.4	8.6	8.4	8.5
EA17	4.5	4.2	4.1	4.1	4.2	4.3
EU12	3.9	3.5	3.6	3.3	3.4	3.7
EU15	4.7	4.5	4.4	4.4	4.5	4.6
EU27	4.6	4.4	4.4	4.3	4.4	4.5

Source: Commission services, EPC.

Table 5. 10 – Results of the baseline scenario including and excluding recently legislated measures (public education expenditure as % of GDP)

	2010			2020			2030			2040			2050			2060			
	Incl.	Excl.	Diff.	Incl.	Excl.	Diff.	Incl.	Excl.	Diff.	Incl.	Excl.	Diff.	Incl.	Excl.	Diff.	Incl.	Excl.	Diff.	
	(1)	(2)	(3)=(2)-(1)	(1)	(2)	(3)=(2)-(1)	(1)	(2)	(3)=(2)-(1)	(1)	(2)	(3)=(2)-(1)	(1)	(2)	(3)=(2)-(1)	(1)	(2)	(3)=(2)-(1)	
ES	4,2	4,4	0,24	4,0	4,3	0,27	3,4	3,7	0,23	3,3	3,5	0,22	3,6	3,8	0,24	3,7	3,9	0,25	ES
FR	5,0	5,0	0,00	4,8	4,8	0,03	4,7	4,8	0,03	4,6	4,7	0,03	4,6	4,7	0,03	4,6	4,6	0,03	FR
IT	4,1	4,2	0,11	3,7	4,0	0,31	3,5	3,8	0,29	3,6	3,9	0,30	3,7	4,0	0,31	3,7	4,0	0,30	IT
LV	4,4	5,3	0,93	4,0	4,9	0,86	3,7	4,5	0,79	3,3	4,0	0,71	3,5	4,3	0,76	3,8	4,6	0,81	LV
PT	4,7	4,7	0,00	3,9	4,5	0,59	3,5	4,0	0,52	3,5	4,0	0,52	3,6	4,2	0,55	3,7	4,2	0,55	PT
SI	4,7	4,9	0,15	4,9	5,2	0,37	4,8	5,1	0,36	4,6	5,0	0,34	5,0	5,4	0,38	5,2	5,6	0,39	SI
UK	5,0	5,0	0,00	5,0	5,2	0,22	5,2	5,4	0,23	5,0	5,3	0,22	5,0	5,2	0,22	5,1	5,3	0,22	UK

All measures are permanent.

ES: a 5% reduction in wages in 2010; a freeze in wages in 2011.

FR: savings in the wage bill amounting to 1% in 2012.

IT: increase in average class sizes of 2/3 "students per teaching staff" between 2010 (inclusive) and 2014 (inclusive); wage freeze between 2010 (inclusive) and 2014 (inclusive).

LV: (average) reduction in wages of 27% in 2010.

PT: a 5% reduction in wages in 2011; a 13% reduction in wages in 2012.

SI: a 1.1% reduction in wages in 2010; a 1.5% reduction in wages in 2011; a 1.6% reduction in wages in the first half of 2012.

UK: wages frozen in Q4 2011; wage feeze in 2012; wage inflation of 1/4% in 2013; wage inflation of 1% in 2014; in the first 3 quarters of 2015 wages growth by 3/4%.

Source: Commission services, EPC.

Table 5. 11 - Results of the inertia scenario (public education expenditure as % of GDP)

	2010	2020	2030	2040	2050	2060
BE	5.7	5.6	6.0	6.1	6.1	6.1
BG	3.5	3.4	3.7	3.4	3.7	3.8
CZ	3.4	3.3	3.6	3.4	3.4	3.7
DK	7.6	7.6	7.5	7.6	7.5	7.4
DE	3.9	3.6	3.6	3.7	3.7	3.8
EE	5.2	5.0	5.2	4.8	4.7	5.2
IE	6.3	6.8	6.5	6.0	6.3	6.4
EL	3.9	3.7	3.8	3.7	3.8	3.9
ES	4.2	3.9	3.5	3.3	3.5	3.7
FR	5.0	4.7	4.7	4.7	4.6	4.6
IT	4.1	3.7	3.6	3.6	3.7	3.7
CY	6.7	5.7	6.0	5.9	5.6	5.9
LV	4.4	4.0	3.8	3.5	3.6	3.8
LT	4.4	3.9	3.9	3.8	3.5	3.9
LU	3.2	2.8	2.9	3.0	3.0	3.0
HU	4.3	4.0	3.7	3.6	3.7	3.9
MT	5.1	4.2	4.0	3.9	3.8	4.0
NL	5.3	5.1	5.1	5.3	5.3	5.2
AT	4.9	4.4	4.4	4.5	4.5	4.5
PL	3.9	3.4	3.5	3.3	3.3	3.5
PT	4.7	4.0	3.6	3.5	3.7	3.7
RO	3.5	3.3	3.3	3.2	3.3	3.5
SI	4.7	4.7	4.9	4.7	5.0	5.3
SK	3.1	2.8	2.8	2.8	2.8	3.0
FI	5.9	5.9	6.1	6.1	6.1	6.1
SE	6.3	6.0	6.2	6.2	6.1	6.2
UK	5.0	4.8	5.1	5.0	4.9	5.0
NO	8.5	8.1	8.3	8.5	8.4	8.5
EA17	4.5	4.2	4.2	4.2	4.2	4.3
EU12	3.9	3.5	3.6	3.5	3.5	3.7
EU15	4.7	4.4	4.4	4.5	4.5	4.6
EU27	4.6	4.4	4.4	4.4	4.4	4.5

Source: Commission services, EPC.

Table 5. 12 - Results of the EU2020 scenario (public education expenditure as % of GDP)

	2010	2020	2030	2040	2050	2060
BE	5.7	5.7	6.1	6.1	6.1	6.2
BG	3.6	3.7	3.8	3.6	3.9	4.0
CZ	3.5	4.3	4.5	4.2	4.3	4.6
DK	7.6	8.4	8.2	8.4	8.2	8.1
DE	4.0	3.9	3.9	4.1	4.1	4.2
EE	5.2	5.2	5.2	4.6	4.9	5.2
IE	6.3	7.1	6.5	6.0	6.5	6.4
EL	3.9	4.2	4.3	4.2	4.4	4.5
ES	4.2	4.3	3.7	3.5	3.8	3.9
FR	5.0	5.0	4.9	4.8	4.8	4.8
IT	4.2	4.5	4.3	4.3	4.4	4.4
CY	6.7	5.9	6.2	5.8	5.6	6.0
LV	4.4	4.2	3.9	3.5	3.7	4.0
LT	4.4	3.9	4.0	3.7	3.6	4.0
LU	3.2	3.1	3.2	3.3	3.3	3.4
HU	4.3	4.4	4.0	3.9	4.1	4.3
MT	5.2	5.1	4.9	4.6	4.6	4.9
NL	5.4	5.4	5.5	5.7	5.6	5.6
AT	5.0	5.1	5.1	5.2	5.2	5.3
PL	4.0	3.5	3.6	3.2	3.3	3.6
PT	4.8	4.7	4.2	4.2	4.3	4.4
RO	3.6	4.3	4.2	4.1	4.2	4.4
SI	4.8	5.1	5.0	4.8	5.2	5.4
SK	3.2	3.4	3.3	3.2	3.4	3.6
FI	5.9	5.9	6.1	6.1	6.1	6.1
SE	6.3	6.1	6.3	6.2	6.1	6.3
UK	5.0	5.0	5.2	5.0	5.0	5.1
NO	8.5	8.2	8.4	8.6	8.4	8.5
EA17	4.5	4.6	4.5	4.5	4.6	4.7
EU12	3.9	3.9	4.0	3.7	3.8	4.1
EU15	4.7	4.8	4.7	4.7	4.8	4.9
EU27	4.7	4.7	4.7	4.7	4.7	4.8

Source: Commission services, EPC.

Table 5. 13 - Total expenditure on education-to-GDP ratio COFOG and UOE

	COFOG a)		UOE b)	
	2007	2008	2007	2008
BE	5.8	6.0	6.0	6.5
BG	3.8	4.1	4.1	4.6
CZ	4.7	4.7	4.2	4.1
DK	6.7	7.0	7.8	7.8
DE	4.0	4.1	4.5	4.6
EE	5.9	6.7	4.9	5.7
IE	4.8	5.4	4.9	5.6
EL	4.0	4.1	na	na
ES	4.4	4.6	4.4	4.6
FR	5.9	5.9	5.6	5.6
IT	4.6	4.5	4.3	4.6
CY	6.3	6.7	6.9	7.4
LV	5.8	6.5	5.0	5.7
LT	5.2	5.8	4.7	4.9
LU	4.2	4.4	3.2	na
HU	5.3	5.2	5.2	5.1
MT	5.4	5.3	6.3	6.0
NL	5.2	5.4	5.3	5.5
AT	5.2	5.4	5.4	5.5
PL	5.7	5.7	4.9	5.1
PT	6.1	6.3	5.3	4.9
RO	3.9	4.5	4.3	na
SI	5.9	6.1	5.2	5.2
SK	3.9	3.5	3.6	3.6
FI	5.7	5.9	5.9	6.1
SE	6.7	6.8	6.7	6.7
UK	6.2	6.4	5.4	5.4
NO	5.4	5.3	6.8	6.5

a) Classifications of the function of government.

b) Unesco/Oecd/Eurostat education statistics.

Source: Eurostat.

6. Unemployment benefits expenditure

Unemployment benefits (UB) projections are carried out in order to preserve the comprehensive nature of the long-term budgetary exercise, although UB expenditure is more affected by (short- and medium-term) cyclical fluctuations than by (long-term) demographic waves.

In order to project expenditure on UB, the 2012 Ageing Report applies the same simple methodology used in the previous three projection rounds (2003, 2006 and 2009). The driving variable of the UB projections is the unemployment rate scenario commonly agreed in the AWG. The main assumption of the methodology is one of unchanged policies throughout the projection period, namely of constant replacement and coverage rates of UB systems.

6.1. The base period of expenditure

The methodology basically uses the AWG's unemployment rate scenario (as the driving variable) and UB expenditure in the base period (a three-year average: 2007 to 2009) to extrapolate future expenditure levels. Using multi-annual averages can limit the impact of any given year on the final results, which is desirable in periods of strong economic fluctuations and possible statistical errors. Taking a three-year average as starting point allows to take due account of recent reforms that reduced the size of benefits in many countries.

In the absence of alternative reasonable assumptions on the future number of UB beneficiaries (which results from entitlement and eligibility rules that affect coverage, take-up rates, and so on) and the average duration of unemployment spells, the calculation assumes that all these elements remain constant. This approximation is neutral and should not lead to any systematic bias in the projections.

In order to guarantee the comparability of projections across countries, expenditure data were taken from Eurostat's Social Protection Statistics (ESSPROS)[184], specifically, the two main components of social protection spending on unemployment: "Full unemployment" and "Partial unemployment" (see Table 6. 1).

At the time of making these projections, the latest year for which official ESSPROS data were available was 2009. UB projections are carried out using a three-year average, specifically 2007 to 2009. Table 6. 2 shows in column 1 the expenditure base used in the 2009 Ageing Report,[185] and in column 2 the base period used in the projections carried out for the 2012 Ageing Report.

The initial value of spending on unemployment benefits and the assumption of a decline in the unemployment rate drive a projected decrease in the unemployment benefits-to-GDP ratio (UB-GDP). In the EU27, the UB-GDP ratio is projected to decline by about 0.35 p.p. between 2010 and 2060 (Table 6. 3). Across countries, there is however a wide variation in the UB-GDP ratio, from very large reductions in Ireland and Spain (higher than 1 percentage point) to virtually no change in Austria, Belgium, Malta, Poland, Slovenia, Sweden and the United Kingdom.[186]

[184] The **E**uropean **S**ystem of integrated **S**ocial **PRO**tection **S**tatistics (ESSPROS).
[185] Average of 2005 and 2006.
[186] For countries with data for 2010, actual values are used instead of projections for that year.

Table 6. 1 - Different kinds of unemployment benefit expenditure as % of GDP, 2009

	EU27	EA17	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
Social protection benefits on unemployment (1)+(2)	1,8	2,1	4,9	0,5	1,3	2,1	2,2	1,3	3,0	1,6	3,8	1,9	0,8	1,0	1,6	0,9	1,7	1,2	0,6	1,4	1,9	0,4	1,4	0,4	0,6	1,0	2,3	1,2	0,8	0,5
(1) Cash benefits	1,7	2,0	4,8	0,5	1,3	2,1	2,1	1,2	2,9	0,9	3,6	1,9	0,8	0,9	1,5	0,8	1,6	1,2	0,5	1,4	1,5	0,4	1,4	0,4	0,6	1,0	2,1	1,1	0,7	0,5
Periodic cash benefits	1,4	1,6	3,8	0,3	0,6	2,1	1,5	0,9	2,6	0,8	2,4	1,7	0,8	0,5	1,1	0,6	1,2	0,8	0,5	1,4	1,2	0,4	1,3	0,4	0,4	0,7	2,1	1,0	0,4	0,5
Full unemployment benefits	1,0	1,2	1,6	0,3	0,4	0,9	1,1	0,9	2,3	0,6	2,3	1,4	0,5	0,5	1,0	0,6	0,6	0,4	0,4	1,4	0,8	0,2	1,2	0,3	0,4	0,3	1,5	0,7	0,3	0,4
Partial unemployment	0,1	0,1	0,5	:	:	:	0,2	:	:	0,1	0,0	0,0	0,2	:	:	0,0	:	:	:	0,1	0,0	:	0,0	:	0,0	:	0,0	:	:	:
Placement services and job search assistance	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,1	0,0	0,0	:	0,0	0,0	0,1	0,0	:	0,0	0,0	:	0,1	:	:	0,0	0,1	0,0	0,1	0,1	0,1	0,2
Early retirement benefit for labour market reasons	0,1	0,1	0,4	:	0,0	:	0,1	:	:	0,1	0,0	0,1	0,1	:	:	0,1	0,2	0,1	0,1	:	0,0	0,1	0,1	:	:	0,4	0,4	:	:	0,0
Periodic benefit vocational training	0,1	0,1	0,1	0,0	0,0	1,1	0,1	0,0	0,2	0,0	0,0	0,1	:	:	:	0,0	:	:	0,0	:	0,2	0,1	0,1	:	0,0	0,0	0,2	0,3	0,0	0,0
Other periodic cash benefits	0,1	0,1	1,1	0,0	0,2	:	0,1	:	:	:	0,1	:	:	:	0,1	:	0,4	0,3	0,0	:	0,1	0,0	0,0	0,0	:	:	:	:	0,0	:
Lump sum cash benefits	0,2	0,3	0,0	0,1	0,5	:	0,3	0,2	0,3	0,1	1,0	0,2	:	0,5	0,3	0,2	0,1	0,1	:	:	0,1	0,0	0,1	0,0	0,1	0,4	0,0	0,1	0,3	:
Lump sum benefit vocational training	0,0	0,0	:	:	:	:	:	:	:	:	:	:	:	:	:	:	0,1	:	:	:	:	:	:	:	:	:	:	:	0,0	:
Lump sum benefit redundancy compensation	0,2	0,2	0,0	0,1	0,4	:	0,0	0,1	0,3	0,0	0,9	0,2	:	0,5	0,3	0,2	:	0,1	:	:	:	:	0,0	0,0	:	0,3	0,0	0,1	0,3	:
Other lump sum cash benefits	0,1	0,1	:	0,0	0,1	:	0,2	0,1	:	0,0	0,1	0,0	:	0,0	0,0	0,0	:	:	:	:	0,1	0,0	0,0	:	0,1	0,0	:	:	0,0	:
(2) Benefits in kind	0,1	0,1	0,0	0,0	0,0	:	0,1	0,1	0,1	0,7	0,2	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,1	:	0,4	0,0	0,0	0,0	0,0	0,0	0,2	0,1	0,1	0,0
Mobility and resettlement benefits	0,0	0,0	0,0	0,0	:	:	0,0	:	:	0,2	0,0	:	:	:	:	:	:	:	:	:	0,1	0,0	:	0,0	:	0,0	0,0	0,0	:	:
Vocational training	0,1	0,1	0,0	0,0	0,0	:	0,1	0,1	0,1	0,4	0,2	:	0,0	0,0	0,1	0,0	0,0	0,0	0,0	:	0,2	0,0	0,0	0,0	0,0	0,0	0,2	0,1	0,1	0,0
Other benefits in kind	0,0	0,0	:	0,0	0,0	:	0,0	:	0,0	0,1	:	0,0	:	0,0	:	:	:	:	0,1	:	0,1	:	:	:	0,0	:	:	0,0	:	:

Source: Eurostat, ESSPROS database.

Table 6. 2 - Total unemployment benefits expenditure-to-GDP ratio in percentage Base-period values

	ESSPROS a)	
	2005-2006	2007-2009
BE	2,2	2,0
BG	0,2	0,2
CZ	0,2	0,2
DK	1,1	0,7
DE	1,4	1,1
EE	0,1	0,4
IE	0,8	1,5
EL	0,4	0,5
ES	1,1	1,6
FR	1,5	1,3
IT	0,4	0,5
CY	0,4	0,4
LV	0,3	0,6
LT	0,1	0,3
LU	0,5	0,5
HU	0,3	0,3
MT	0,4	0,4
NL	1,5	1,2
AT	0,7	0,7
PL	0,2	0,1
PT	1,1	1,0
RO	0,2	0,2
SI	0,3	0,3
SK	0,1	0,2
FI	1,5	1,3
SE	1,1	0,6
UK	0,2	0,2
NO	0,4	0,3
EU27 b)	0,7	0,7

a) Full and partial unemployment benefits.
b) Non-weighted average.

Source: Commission services, EPC.

Table 6. 3 - Unemployment benefits expenditure projections in % of GDP (base period 2007-2009)

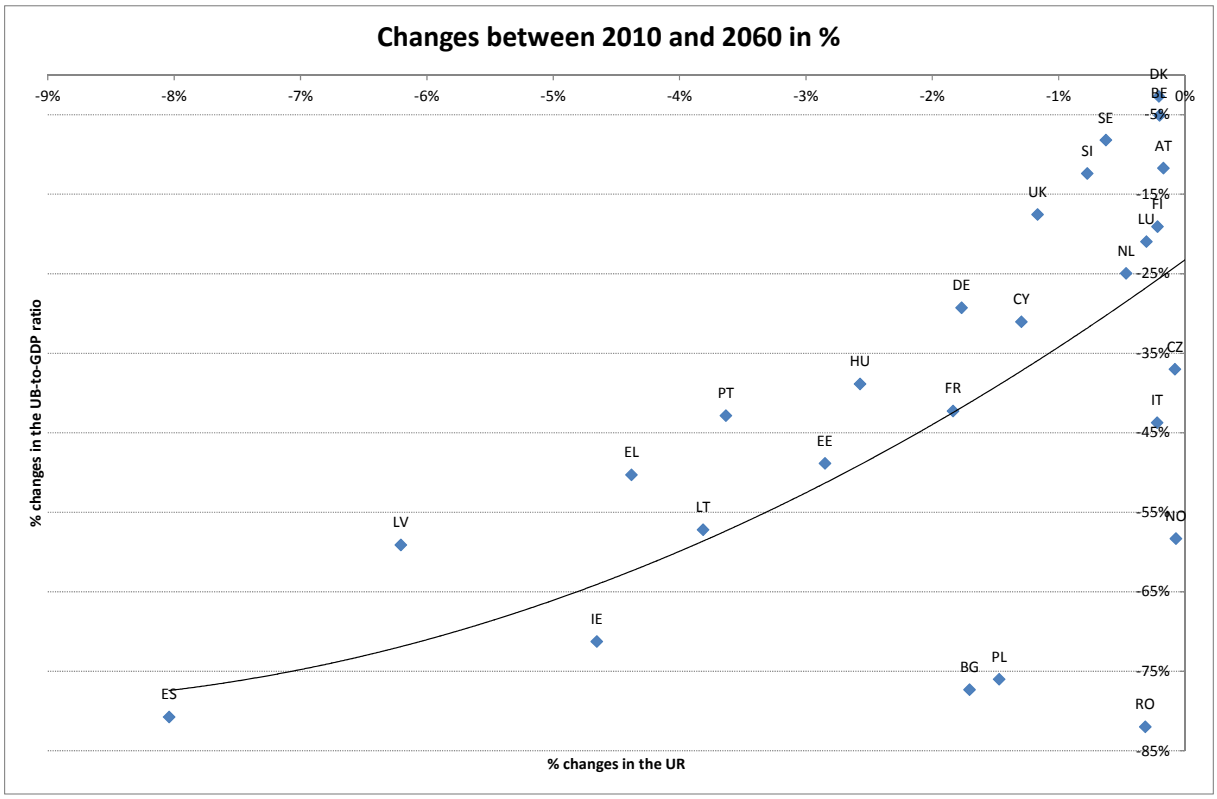
									pro memoria: 2009 Ageing Report			
		2010	2020	2030	2040	2050	2060	2060-2010	2010	2060	2060-2010	
BE	*	2.09	2.00	1.98	1.98	1.98	1.99	-0.10	1.93	1.49	-0.44	BE
BG	*	0.44	0.32	0.25	0.22	0.21	0.20	-0.24	0.09	0.09	0.00	BG
CZ	*	0.35	0.25	0.25	0.24	0.24	0.24	-0.11	0.11	0.11	0.00	CZ
DK		0.74	0.77	0.73	0.72	0.72	0.72	-0.02	0.84	0.82	-0.01	DK
DE		1.01	0.75	0.75	0.75	0.75	0.75	-0.26	0.86	0.64	-0.22	DE
EE	*	0.56	0.51	0.41	0.37	0.35	0.34	-0.22	0.05	0.05	0.00	EE
IE	*	2.62	3.13	2.02	1.54	1.35	1.28	-1.34	0.86	0.85	-0.01	IE
EL		0.60	0.62	0.46	0.40	0.38	0.36	-0.24	0.29	0.21	-0.07	EL
ES		1.96	2.46	1.70	1.19	1.00	0.88	-1.09	1.37	0.94	-0.44	ES
FR	*	1.68	1.34	1.19	1.13	1.11	1.10	-0.58	1.19	0.92	-0.27	FR
IT	*	0.75	0.48	0.48	0.48	0.48	0.48	-0.27	0.34	0.34	-0.01	IT
CY	*	0.49	0.52	0.42	0.38	0.36	0.36	-0.13	0.25	0.25	-0.01	CY
LV	*	0.68	0.75	0.52	0.43	0.40	0.38	-0.30	0.18	0.18	0.00	LV
LT	*	0.42	0.45	0.32	0.27	0.25	0.24	-0.18	0.05	0.05	0.00	LT
LU	*	0.60	0.50	0.49	0.48	0.48	0.48	-0.11	0.45	0.45	0.00	LU
HU	*	0.40	0.41	0.32	0.29	0.28	0.27	-0.13	0.31	0.24	-0.07	HU
MT		0.36	0.36	0.36	0.36	0.36	0.36	0.00	0.35	0.34	-0.01	MT
NL	*	1.58	1.39	1.29	1.25	1.23	1.23	-0.35	1.02	1.01	-0.01	NL
AT	*	0.75	0.67	0.67	0.67	0.67	0.67	-0.08	0.63	0.62	-0.02	AT
PL	*	0.19	0.10	0.09	0.09	0.09	0.09	-0.10	0.07	0.06	0.00	PL
PT		1.22	1.30	0.99	0.87	0.82	0.79	-0.42	1.09	0.83	-0.26	PT
RO	*	0.45	0.22	0.21	0.20	0.20	0.20	-0.25	0.19	0.18	-0.01	RO
SI		0.31	0.39	0.32	0.29	0.28	0.27	-0.04	0.22	0.21	-0.01	SI
SK	*	0.23	0.15	0.11	0.10	0.10	0.09	-0.14	0.10	0.05	-0.05	SK
FI	*	1.61	1.32	1.32	1.32	1.33	1.33	-0.28	0.99	0.98	-0.02	FI
SE		0.59	0.57	0.55	0.54	0.54	0.54	-0.05	0.87	0.86	-0.01	SE
UK		0.26	0.30	0.25	0.23	0.22	0.22	-0.04	0.21	0.21	0.00	UK
NO	*	0.49	0.28	0.28	0.27	0.27	0.27	-0.22	0.41	0.41	0.00	NO
EA17		1.31	1.17	1.04	0.95	0.92	0.90	-0.41				EA17
EU12		0.32	0.22	0.19	0.18	0.18	0.18	-0.14				EU12
EU15		1.13	1.02	0.89	0.81	0.78	0.77	-0.36	0.79	0.65	-0.14	EU15
EU27		1.07	0.95	0.83	0.76	0.73	0.72	-0.35	0.70	0.59	-0.12	EU27

Source: Commission services, EPC.
Note: * Actual data used in 2010.

Note that in a number of countries the trajectory of the UB-to-GDP ratio is hump-shaped (e.g. ES, IE, LT, LV), reflecting the projected high inertia of unemployment (assumed to continue to increase in the first years of the projection) in some countries particularly affected by the 2008-2009 economic recession.

Graph 6. 1 highlights the strong cross-country correlation between changes in expenditure on unemployment benefits and unemployment rate assumptions (see equation 7 in Annex I).

Graph 6. 1 - Changes in the UB-to-GDP ratio against changes in unemployment rate assumptions (2060-2010)



Source: Commission services, EPC.

In fact, the percentage change in the UB-to-GDP ratio between the final period (2060) and the base period, i.e. $(\ln\left(\frac{UB}{GDP}\right)_t - \ln\left(\frac{UB}{GDP}\right)_b)$, can be broadly approximated by: $\frac{1}{1-u_t} * \left(\frac{u_t - u_b}{u_b}\right)$. This means that reducing the unemployment rate pays a "double dividend" in terms of reducing the UB-to-GDP ratio. For similar changes in the unemployment rate $(\frac{u_t - u_b}{u_b})$, countries with a higher unemployment rate will record a larger variation in the UB-to-GDP ratio.

This reflects the fact that two channels affect the UB-to-GDP ratio: expenditure (the numerator) which varies with the unemployment rate; and GDP (the denominator) which is adversely affected by the unemployment rate.

Annex I: Methodology and sources

The methodology is derived from the following identity:

$$UB \equiv UB_{pb} * B$$

Equation 1

where total expenditure in unemployment benefits (*UB*) is broken down in expenditure per beneficiary (UB_{pb}) and the number of beneficiaries (*B*).

Unemployment expenditure per beneficiary is a fraction of average wages in the economy:

$$UB_{pb} = RR * \frac{W}{E}$$

Equation 2

where *RR* is the replacement rate; *W* is the wage bill; and *E* is employment.

Substituting equation 2 into equation 1:

$$UB = RR * \frac{W}{E} * \frac{B}{U} * U$$

Equation 3

where *U* is unemployment.

Dividing equation 3 by GDP and rearranging:

$$\frac{UB}{GDP} = RR * CR * WS * \frac{u}{1-u}$$

Equation 4

where $CR \equiv \frac{B}{U}$ is the coverage rate or the take-up rate of unemployment benefits; $WS \equiv \frac{W}{GDP}$ is the wage share in income; and *u* is the unemployment rate.[187]

Equation 4 shows that the ratio between UB expenditure and GDP is determined by four parameters/variables: i) the replacement rate of UB (*RR*); ii) the coverage/take-up rate of UB (*CR*); iii) the wage share in income (*WS*); and iv) the unemployment rate (*u*).

The methodology assumes that the replacement rate (RR) and the coverage rate (CR) are constant throughout the projection horizon at the level observed in a base period/year (*b*).

$$RR_t = RR_b$$
$$CR_t = CR_b$$

Equation 5

Using equation 4 and the assumption of unchanged policies (equation 5). The UB-to-GDP ratio ($\frac{UB_t}{GDP_t}$) is calculated as:

$$\frac{UB_t}{GDP_t} = \left[\frac{UB_b}{GDP_b} * \frac{1}{WS_b} * \frac{1-u_b}{u_b} \right] * WS_t * \frac{u_t}{1-u_t}$$

Equation 6

"Historical" values (i.e. base period) are taken from the ESSPROS database for the UB-to-GDP ratio ($\frac{UB_b}{GDP_b}$). Three-year averages are used, covering the period 2007

[187] Given that $E = LF * (1-u)$ and $U = LF * u$ then $\frac{U}{E} = \frac{u}{1-u}$; where uppercase variables *E*, *U*, *LF* are respectively, employment, unemployment and the labour force; and lowercase *u* the unemployment rate.

to 2009. The wage income share (WS_b) is provided in AMECO.

During the projection period, the trajectory for the unemployment rate (u_t) is derived using the methodology agreed in the 2012 "Underlying Assumptions and Projection Methodologies" Report and data are from the European Commission's Economic Forecast (spring 2011). The wage share (WS_t) is endogenously calculated in the model.

Recall that the projection of UB expenditure (as a share of GDP) is done under the assumption of unchanged policies, namely replacement and coverage rates are kept constant throughout the projection period.

It should be noted that all projection scenarios (including sensitivity scenarios decided by the AWG) use the same unemployment rate assumptions. Thereby and according to equation 6, variations in the UB-to-GDP ratio between scenarios reflect only differences in the ratio: $\frac{WS_t}{WS_b}$. Empirically, the latter is very stable across scenarios. Therefore, the UB-to-GDP ratio changes only marginally across scenarios (results not shown).

Finally, it can be shown that changes in the UB-to-GDP ratio can be approximated as:

$$\ln\left(\frac{UB}{GDP}\right)_t - \ln\left(\frac{UB}{GDP}\right)_b \approx \frac{1}{1-u_t} * \left(\frac{u_t - u_b}{u_b}\right)$$

Equation 7

Equation 7 is derived as follows. Take the logarithm of equation 6:

$$\ln\left(\frac{UB}{GDP}\right)_t - \ln\left(\frac{UB}{GDP}\right)_b = \ln WS_t - \ln WS_b + \ln\frac{u_t*(1-u_b)}{(1-u_t)*u_b}$$

Assume that changes in the wage share are small:

$$\ln\left(\frac{UB}{GDP}\right)_t - \ln\left(\frac{UB}{GDP}\right)_b \approx \ln\frac{u_t*(1-u_b)}{(1-u_t)*u_b}.$$

Finally, use the Maclaurin approximation (Taylor formula centred at zero) to $\ln(1+x) \approx x$. The latter allows writing:

$$\ln\frac{u_t*(1-u_b)}{(1-u_t)*u_b} = \ln\left(1+\frac{u_t*(1-u_b)-(1-u_t)*u_b}{(1-u_t)*u_b}\right) \approx \frac{u_t*(1-u_b)-(1-u_t)*u_b}{(1-u_t)*u_b}$$

Or,

$$\ln\frac{u_t*(1-u_b)}{(1-u_t)*u_b} \approx \frac{u_t*(1-u_b)-(1-u_t)*u_b}{(1-u_t)*u_b} = \frac{1}{1-u_t}\frac{u_t-u_b}{u_b}$$

And finally,

$$\ln\left(\frac{UB}{GDP}\right)_t - \ln\left(\frac{UB}{GDP}\right)_b \approx \frac{1}{1-u_t}\frac{u_t-u_b}{u_b}.$$

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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