



**AAE  
DISCUSSION  
PAPER**

# **FROM LABOUR SUPPLY TO LABOUR PRODUCTIVITY**

**MAY 2022**

## MANAGEMENT SUMMARY

### Key messages from the Actuarial Association of Europe

The actuarial profession in Europe welcomes the thorough analysis that lies behind the 2021 Ageing Report and the 2021 Pension Adequacy Report. The Actuarial Association of Europe would regard the following messages as important:

- Uncertainty associated with the size of the future population of the world is driven primarily by uncertainty about the projected number of births. Since up to now fertility rates have been stable or declining, the question '*why should we think that the trend will change?*' remains.
- The COVID-19 pandemic has impacted patterns of behaviour of EU populations. Change in behaviour of EU populations will have short- and long-term consequences on the level and structure of population and therefore on the sustainability of social security systems of EU member states.
- Fairness is inextricable from the long-term nature of pension provision and financing. The close relationship of intergenerational aspects with pension provision means that such analysis cannot be adequately undertaken without an actuarial perspective.
- Sharp and increasing differentiation between employment statuses sets a difficult challenge for national social security systems. Because of that, strategies must be developed with objectives that are not limited to the improvement of conditions simply for the 'best off', or for a notional 'average' older person.
- The more people understand the world of pensions, the more possibilities they see for their future. As people tend not realise how to take care of pension issues adequately, a proper public pension system is necessary.
- Policymakers should consider the distribution of educational resources across the life course as a whole. Adverse stereotypes could be challenged through communication campaigns, aiming to increase knowledge about and understanding of the process of ageing, among the general public, policy-makers, teachers and service providers and as reflected in the media.
- The International Actuarial Association has published a model standard of actuarial practice (ISAP2) on Financial Analysis of Social Security Programs, developed in cooperation with the International Labour Office (ILO) and the International Social Security Association. We recommend that these should be followed in the EU, both for actuarial work in individual countries and for EU level exercises such as the Ageing Report.

MAY 2022

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This paper is a discussion paper of the Actuarial Association of Europe. Any views expressed in this paper are views to stimulate and inform further discussion and should not be read as being representative either of the author's or contributors' individual opinions or of their employers or professional organisations or an agreed position of the Actuarial Association of Europe.

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## EXECUTIVE SUMMARY

1. Population projections play an important role in estimating, in particular, the scope and magnitude of future depopulation or population ageing. Uncertainty associated with the size of the future population of the world is driven primarily by uncertainty about the projected number of births. Since up to now fertility rates have been stable or declining the question ‘*why should we think that the trend will change?*’ remains.
2. The EU’s working age population has been shrinking for a decade and this is projected to continue. Labour productivity growth, driven by Total Factor of Productivity growth, is projected to become the sole source of potential output growth in both the EU and the Euro Area.
3. The COVID-19 pandemic has impacted patterns of behaviour of EU populations, with major impacts on livelihoods, social contracts, and health of the population. The effects on mortality and fertility are likely to differ in EU member states. Change in the behaviour of EU populations will have short- and long-term consequences on the level and structure of population and therefore on the sustainability of the social security systems of EU member states.
4. Insecurity, unfairness, and growing tensions among different groups seem to reflect a growing perception of increases in overall inequality, leading to a growing demand for adjustments in the social contract. It is essential that the issues of why to defend and how to defend the public pension systems be considered jointly, not separately. The contribution of Social Security systems is crucial to a well-functioning and just society.
5. Sharp and increasing differentiation between employment statuses sets a difficult challenge for national social security systems. Because of that, strategies must be developed with objectives that are not limited to the improvement of conditions simply for the ‘best off’, or for a notional ‘average’ older person.
6. Fairness in the broadest sense is a subject that invites questions as to the boundary between subjective and objective assessment. It is inextricable from the long-term nature of pension provision and financing, whether in the broad framework of occupational and personal provision, or that of social security. The close relationship of intergenerational aspects with pension provision means that such analysis cannot be adequately undertaken without an actuarial perspective.

7. The more people understand the world of pensions, the more possibilities they see for their future. Raising public awareness of pension issues, to help people to avoid old-age poverty, is an important, but difficult task. As people tend not to realise how to take care of the pension issues adequately, a proper public pension system is necessary.
8. Policymakers should consider the distribution of educational resources not only to younger populations, but across the life course as a whole. Adverse stereotypes could be challenged through communication campaigns, aiming to increase knowledge about and understanding of the process of ageing, among the general public, policy-makers, teachers and service providers and as reflected in the media.
9. The access of an individual information on his/her own pension is expected to become a necessity in the near future. The development of digital pension tracking systems may be seen as a valuable starting point in this regard, enabling the provision of insights into the current and future patterns of an individual's income and expenses.
10. An 'age-friendly' environment should be created, to allow greater numbers of older people to remain active and so reduce the prospective costs of social care; one approach is through choosing the optimal location of, and investing in, specialised housing and other facilities for older adults.
11. Among the factors which contribute to maintaining pension promises in the future is effective tracking, monitoring and evaluation of the implementation of pension schemes, which in turn provides the basis for the work of actuaries, and other specialist advisers, to governments in preparation for periodical reviews as necessary.
12. Actuarial reporting according to the social security guidelines formalized by the International Social Security Association (ISSA) forms a key element of good social security governance. The actuarial modelling approaches and methodologies are built on projections of future cash flows, which facilitates assessment of the short- medium- and long-term impact of pension policies and reforms on adequacy and sustainability of pension system provision in an integrated way.

## INTRODUCTION

Every three years the European Commission Directorate-General for Economic and Financial Affairs (DG Ecfina), in collaboration with the Ageing Working Group of the Economic Policy Committee of the EU Council, publishes a comprehensive set of projections of age-related public expenditure for all EU Member States (and Norway). The Ageing Report 2021 (thereafter AR21) was published in May 2021, accompanied by Council conclusions on age-related spending<sup>1</sup>. The focus is on fiscal sustainability over the period to 2070.

This analysis is complemented by a concurrent triennial study into Pension Adequacy, overseen by the EU Commission Directorate-General for Employment (DG Employment), in collaboration with the Working Group on Ageing Issues of the Social Protection Committee of the Council (SPC WG-AGE). The Pension Adequacy Report 2021, (hereafter PAR21<sup>2</sup>) was published in June 2021 and looks at similar issues over a long time-frame but from ‘the other end of the telescope’, seeking to measure the success of EU pension systems in meeting objectives of relieving poverty and achieving income replacement at retirement.

The actuarial profession in Europe welcomes the thorough analysis that lies behind the AR21 and the PAR21.

The present paper from the AAE discusses some of the important issues raised by the Commission’s recent publications.

The focus is set on the challenges we need to deal with moving along the time path of the next 50 years.

The primary concern is how we may contribute to the well-being of the society, *underlying which we see:*

The key question to be, not ‘where do we think we will be in the year 2070?’, but ‘where would we like the world to be in 2070?’

- 
- 1 The 2021 Ageing Report: Underlying Assumptions & Projections Methodologies, November 2020 can be found here: [https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies\\_en](https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies_en)  
The 2021 Ageing Report: Economic & Budgetary Projections for the EU Member States (2019-2070), May 2021 can be found here: [https://ec.europa.eu/info/publications/2021-ageing-report-economic-and-budgetary-projections-eu-member-states-2019-2070\\_en](https://ec.europa.eu/info/publications/2021-ageing-report-economic-and-budgetary-projections-eu-member-states-2019-2070_en)
  - 2 The 2021 Pension Adequacy Report can be found here: <https://op.europa.eu/el/publication-detail/-/publication/4ee6cadd-cd83-11eb-ac72-01aa75ed71a1>

## 1 A CLOSE-UP VIEW OF DEMOGRAPHICS

Demographic projections are a keystone for government budgeting of expenditure items, notably (in the perspective of this paper) pension, health care and long-term care.

In our opinion, as Social Security Actuaries, population projections play an important role in estimating, in particular, the scope and magnitude of future depopulation or population ageing. These projections should be carried out under a range of variant scenarios, so as to provide a deep understanding in detail of changes in population structures, together with their drivers and options as to possible policy interventions. Such studies are valuable for all countries, but particularly so for member states that are facing faster than average ageing, which may in turn be related to historical age patterns, or in some cases to projected migration.

### 1.1 FERTILITY IS FALLING AND COVID 19 LIKELY DIDN'T HELP

Fertility rates<sup>3</sup> in the EU Member States declined steadily from the mid-1960s through to the turn of the century. However, at the beginning of the 2000s, the total fertility rate in the EU displayed signs of rising again. This development stopped in 2010 and a subsequent decline was observed through to a relatively low in 2013, followed by a slight increase up to 2016 and another decrease since. In 2019, the Total Fertility Rate (TFR) in the EU was 1.53 live births per woman (as compared to 1.54 in 2018<sup>4</sup>); see table and figures below.

.....  
3 Fertility rates are reflected by the average number of children a woman would have, should she experience at each child-bearing age 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 - TFR

4 Eurostat Fertility Statistics March 2021

TABLE 1: TOTAL FERTILITY RATE 1960 – 2019 (LIVE BIRTHS PER WOMAN)										
	1960	1970	1980	1990	2000	2001	2010	2017	2018	2019
<b>EU <sup>(1)</sup></b>						<b>1.43</b>	<b>1.57</b>	<b>1.56</b>	<b>1.54</b>	<b>1.53</b>
Belgium	2.54	2.25	1.68	1.62	1.67	1.67	1.86	1.65	1.62	1.58
Bulgaria	2.31	2.17	2.05	1.82	1.26	1.21	1.57	1.56	1.56	1.58
Czechia	2.09	1.92	2.08	1.9	1.15	1.15	1.15	1.69	1.71	1.71
Denmark	2.57	1.95	1.55	1.67	1.77	1.74	1.87	1.75	1.73	1.7
Germany					1.38	1.35	1.39	1.57	1.57	1.54
Estonia	1.98	2.17	2.02	2.05	1.36	1.32	1.72	1.59	1.67	1.66
Ireland	3.78	3.85	3.21	2.11	1.89	1.94	2.05	1.77	1.75	1.71
Greece	2.23	2.4	2.23	1.39	1.25	1.25	1.48	1.35	1.35	1.34
Spain			2.22	1.36	1.22	1.23	1.37	1.31	1.26	1.23
France					1.89	1.9	2.03	1.89	1.87	1.86
Croatia						1.46	1.55	1.42	1.47	1.47
Italy <sup>(2)</sup>	2.4	2.38	1.64	1.33	1.26	1.25	1.46	1.32	1.29	1.27
Cyprus				2.41	1.64	1.57	1.44	1.32	1.32	1.33
Latvia					1.25	1.22	1.36	1.69	1.6	1.61
Lithuania		2.4	1.99	2.03	1.39	1.29	1.5	1.63	1.63	1.61
Luxembourg <sup>(3)</sup>	2.29	1.97	1.5	1.6	1.76	1.66	1.63	1.39	1.38	1.34
Hungary	2.02	1.98	1.91	1.87	1.32	1.31	1.25	1.54	1.55	1.55
Malta			1.99	2.02	1.68	1.48	1.36	1.26	1.23	1.14
Netherlands	3.12	2.57	1.6	1.62	1.72	1.71	1.79	1.62	1.59	1.57
Austria	2.69	2.29	1.65	1.46	1.36	1.33	1.44	1.52	1.47	1.46
Poland <sup>(4)</sup>				2.06	1.37	1.31	1.41	1.48	1.46	1.44
Portugal	3.16	3.01	2.25	1.56	1.55	1.45	1.39	1.38	1.42	1.43
Romania			2.43	1.83	1.31	1.27	1.59	1.78	1.76	1.77
Slovenia				1.46	1.26	1.21	1.57	1.62	1.6	1.61
Slovakia	3.04	2.41	2.32	2.09	1.3	1.2	1.43	1.52	1.54	1.57
Finland	2.72	1.83	1.63	1.78	1.73	1.73	1.87	1.49	1.41	1.35
Sweden		1.92	1.68	2.13	1.54	1.57	1.98	1.78	1.76	1.71
Iceland		2.81	2.48	2.3	2.08	1.95	2.2	1.71	1.71	1.74
Liechtenstein					1.57	1.52	1.4	1.44	1.58	1.48
Norway		2.5	1.72	1.93	1.85	1.78	1.95	1.62	1.56	1.53
Switzerland	2.44	2.1	1.55	1.58	1.5	1.38	1.52	1.52	1.52	1.48
Montenegro							1.7	1.78	1.76	1.77
North Macedonia					1.88	1.73	1.56	1.43	1.42	1.34
Albania							1.63	1.48	1.37	
Serbia					1.48	1.58	1.4	1.49	1.49	1.53
Turkey							2.04	2.07	1.99	1.88

(<sup>1</sup>) 2010, 2017 and 2019: break in series.

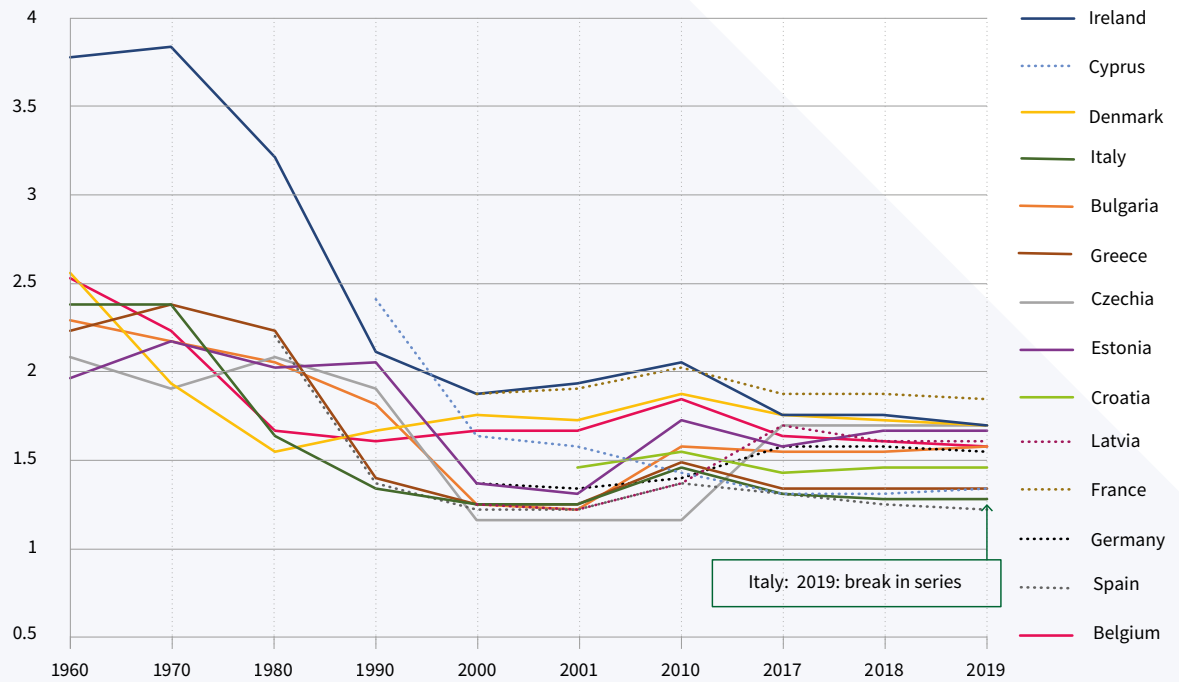
(<sup>2</sup>) 2019: break in series.

(<sup>3</sup>) 2017: break in series.

(<sup>4</sup>) 2000 and 2010: break in series.

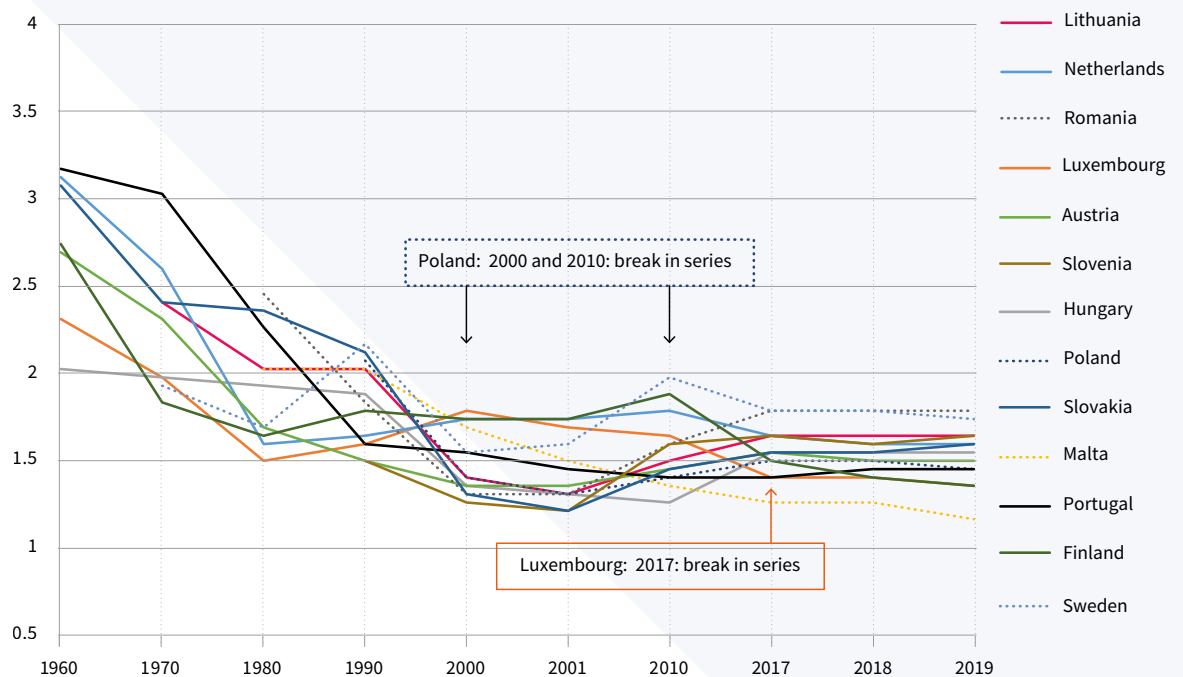
Source: Eurostat (online data code: demo\_find)

**FIGURE 1: TOTAL FERTILITY RATE FOR SELECTED EU AND EFTA MEMBER STATES  
1960 – 2019 (LIVE BIRTHS PER WOMAN)**



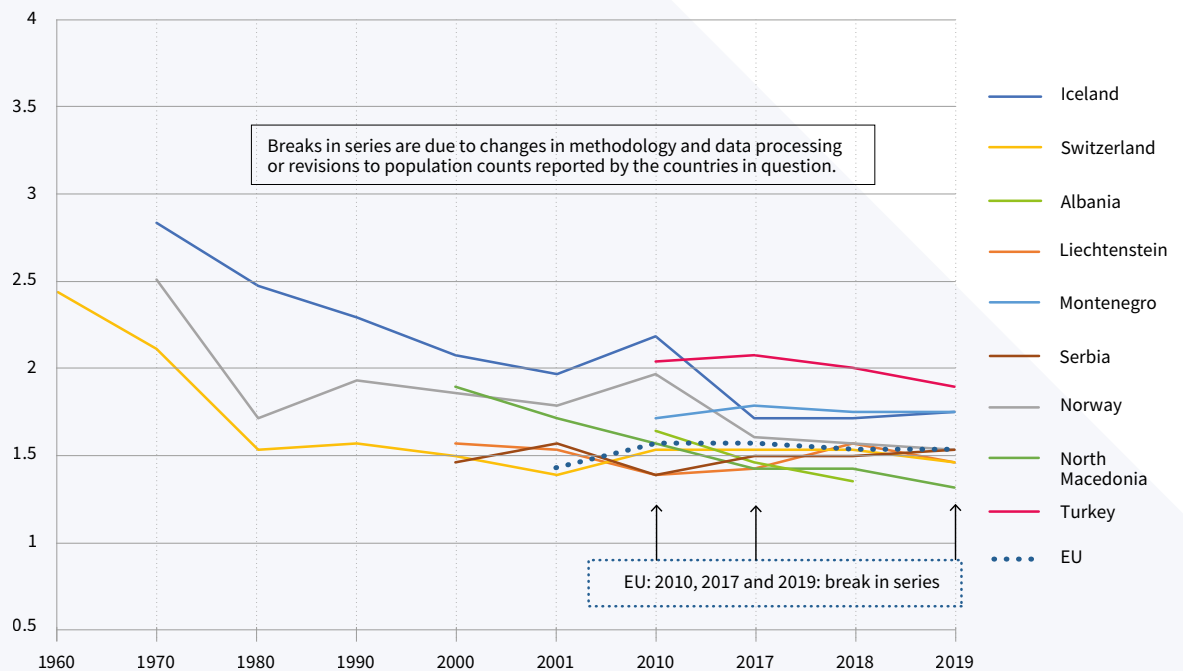
Source: Eurostat (online data code: demo\_find)

**FIGURE 2: TOTAL FERTILITY RATE FOR SELECTED EU AND EFTA MEMBER STATES  
1960 – 2019 (LIVE BIRTHS PER WOMAN)**



Source: Eurostat (online data code: demo\_find)

**FIGURE 3: TOTAL FERTILITY RATE FOR SELECTED EU AND EFTA MEMBER STATES  
1960 – 2019 (LIVE BIRTHS PER WOMAN)**



Source: Eurostat (online data code: demo\_find)

A significant factor behind fertility decline may be seen in increased urbanization. In an urban environment, provisions such as education and child-care tend to be expensive, and the costs of raising children may become high or prohibitive, especially for single mothers.

The question of whether the implementation of policies promoting facilities such as affordable child care can positively affect the choice of individuals to have children has gained importance over the past decades. Although the literature on this subject has grown recently, most of what it is known about the effects of child care policy on fertility comes from countries where birth rates are regarded as 'satisfactory'. An important remaining challenge for policy oriented social science research is to understand whether child care policy can positively influence childbearing decisions in countries where birth rates are considered to be 'too low'<sup>5</sup>.

5 Stefan Bauernschuster Timo Hener Helmut Rainer, Does the Expansion of Public Child Care Increase Birth Rates? Evidence from a Low-Fertility Country, April 2013, Leibniz Institute for Economic Research at the University of Munich, paper no 158

***Health crises: the evidence shows that during and after major epidemics fertility declines strongly<sup>6</sup>.***

In the light of the COVID-19 pandemic, fertility plans have been revised downwards in all countries, but in differing ways.

The impact of COVID-19 on fertility plans in Italy, Germany, France, Spain, and the United Kingdom showed<sup>7</sup> that:

- In Germany and France fertility plans changed moderately, with many people still planning or postponing their decision to have a child. In Germany, abandoners are slightly more prevalent in the regions most affected by COVID-19.
- In Italy the proportion of those abandoning plans to have children is much higher than in the other countries, and the proportion of those deciding to postpone their plans is lower. It is noted that ‘abandoners’ are common among individuals younger than 30 and those without a tertiary education.
- In the United Kingdom, the individuals that most frequently abandoned their fertility plans are those who expect the crisis to result in dramatic reductions in their future income.
- In France and Spain, no clear pattern was observed as to revision of fertility plans.

Eurostat’s EUROPOP2019 projections assume that in the very long term, fertility rates will converge slowly across Member States towards that of the 2019 front-runner (France); i.e. 1.8 children per woman. Under the baseline assumptions, TFRs are projected to increase in all Member States until 2070 with the exception of France where it is expected to remain stable at slightly above 1.8. In the EU as a whole TFR is expected to reach 1.65 in 2070.

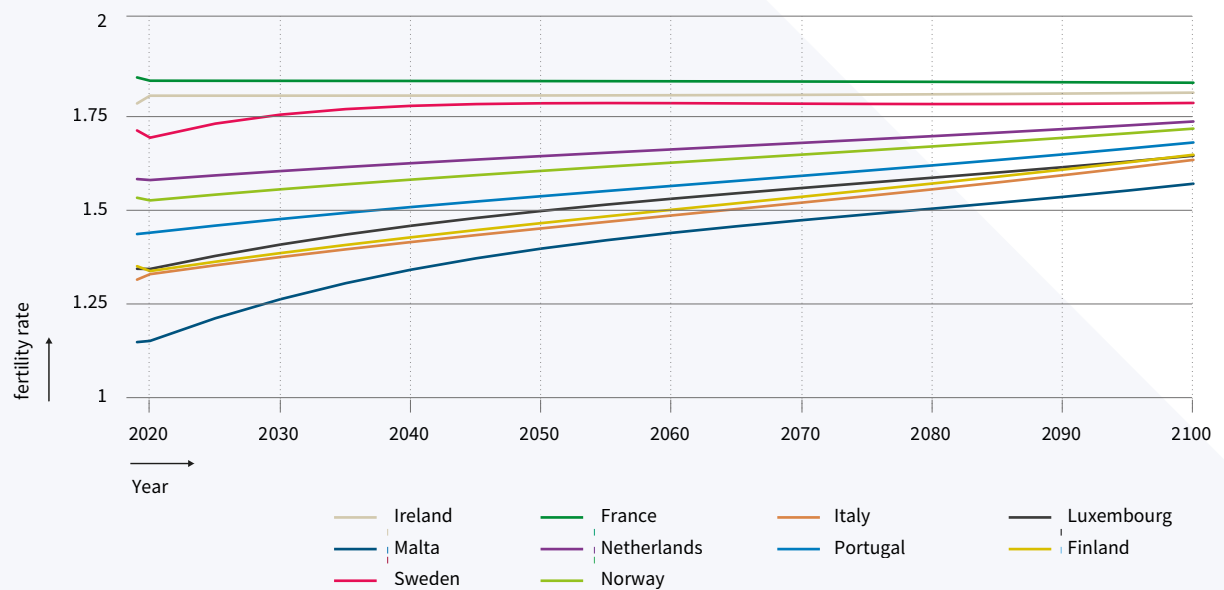
***Nevertheless, since up to now fertility rates have been stable or declining the question ‘why should we think that the trend will change?’ remains.***

The fertility projections under the baseline assumptions are presented in the figures below:

6 Stone 2020; see e.g., Chandra and Yu 2015a, 2015b; Chandra et al. 2018 for the Spanish flu, and Marteleto et al. 2020 for the Zika epidemic

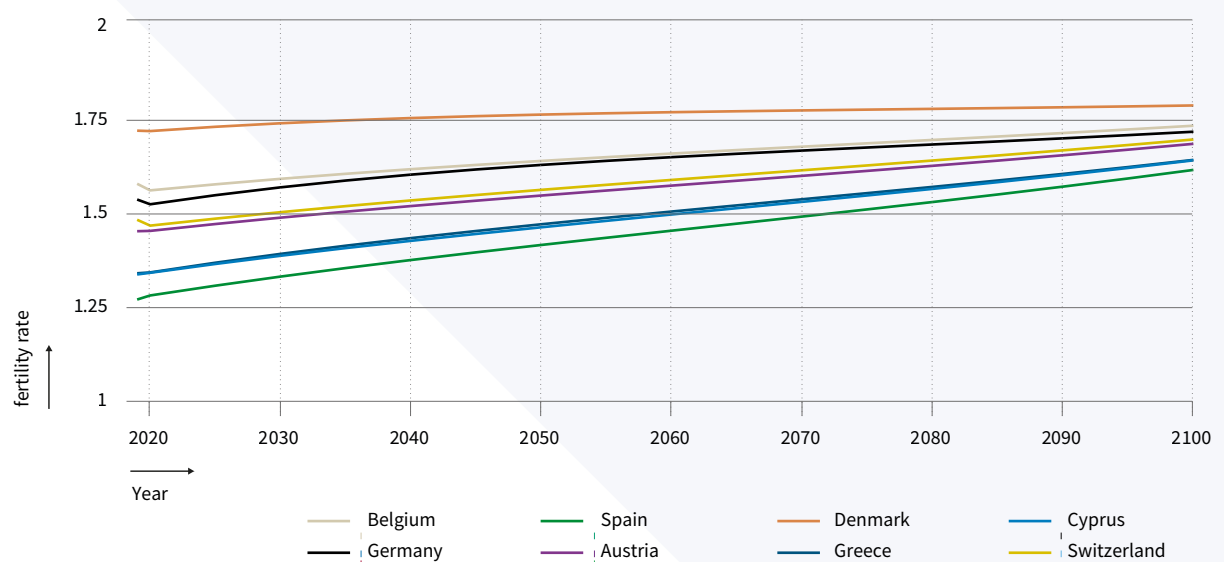
7 Francesca Luppi, Bruno Arpino, Alessandro Rosina, The impact of COVID-19 on fertility plans in Italy, Germany, France, Spain, and the United Kingdom, December 2020 Demographic Research, Volume 43, Article 47, pages 1399 - 1412

**FIGURE 4: BASELINE FERTILITY RATE ASSUMPTIONS FOR SELECTED EU AND EFTA<sup>8</sup> MEMBER STATES FOR PERIOD 2020-2100**



Source: [EUROPOP2019](#), [EUROSTAT](#), 2020

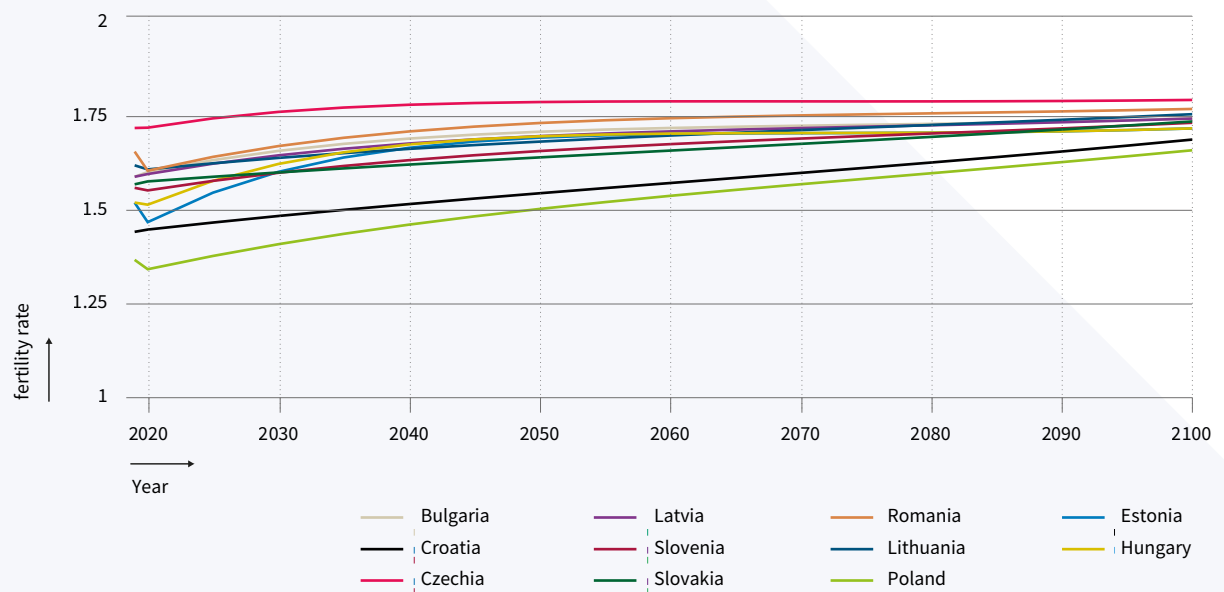
**FIGURE 5: BASELINE FERTILITY RATE ASSUMPTIONS FOR SELECTED EU AND EFTA MEMBER STATES FOR PERIOD 2020-2100**



Source: [EUROPOP2019](#), [EUROSTAT](#), 2020

8 EFTA: European Free Trade Association countries: Iceland, Liechtenstein, Norway, Switzerland

FIGURE 6: BASELINE FERTILITY RATE ASSUMPTIONS FOR SELECTED EU AND EFTA MEMBER STATES FOR PERIOD 2020-2100



Source: [EUROPOP2019](#), [EUROSTAT](#), 2020

*Uncertainty associated with the size of the future population of the world is driven primarily by uncertainty about the projected number of births.*

We may compare the assumptions used by different organizations for projecting total fertility rates as follows:

- The World Population Prospects<sup>9</sup> projections generally assume higher fertility over the projection period than ESSPOP2019, with the exceptions only of France and Ireland, by differentials mostly in the range of 2% to 5% higher by 2100.
- The projections made by the Institute for Health Metrics and Evaluation (IHME<sup>10</sup>), on the other hand, assume much lower fertility than the ESSPOP2019 projections; the assumptions for Finland and Sweden are only slightly lower, but for most counties range between 10% and 20% lower by 2100.

9 World Population Prospects is a division of the United Nation Population

10 The Institute for Health Metrics and Evaluation (IHME) is a research institute working in the area of global health statistics and impact evaluation at the University of Washington in Seattle

## 1.2 THE 100 YEARS OF LIFE

We consider the significant question as to whether or not the probability distribution of the human lifespan has a finite endpoint, and, if so, whether this upper limit changes over time, together of course by what method such an age-limit might be estimated. Crucially, this hypothetical limit is defined, not as the highest observed age at death, but as the highest age that could possibly be reached<sup>11</sup>.

Since 1960, there have been significant gains in life expectancy at birth in all EU Member States; from 66.8 years for males and 72.2 years for females to 77.3 and 83 years respectively in 2018<sup>12</sup>. The gap between the average female and the average male calculated life expectancies at birth rose from 5.4 years in 1960 to 7 years in 1980 and remained close to that level until 2000, albeit with diverging experience in different EU member states.

Since the year 2000, the increase in life expectancy has been 3.5 years for females compared with 4.7 years for males, resulting in a narrowing of the gender longevity gap to 5.8 years in 2018. In that year across Member States life expectancy at birth ranged for females from 78.6 years in Bulgaria to 86.3 years in Spain, and for males from 70.1 years in Latvia to 81.2 years in Italy<sup>13</sup>.

### 1.2.1 IN COVID 19 TIMES

At the beginning of March 2020, the number of deaths rose rapidly. In some Member States of the European Union, however, the difference compared with previous years was exceptionally high, while some other areas were less severely affected.

In total, among the European Union and EFTA<sup>14</sup> countries for which data are available, 2020 recorded around 540,000 more deaths than the annual average for the period from 2016 to 2019, and the accumulated figure reached 600,000 by the end of January 2021. Of these, 175,000 were recorded in the first wave, from Mid-March to mid-May (weeks 11 to 21) with a larger figure of over 340,000 registered between October and December (weeks 42 to the year end). Excess mortality was thus concentrated into two major peaks, in the spring and the autumn, with the proportionate rate of excess in April reaching 25.1%, and in November 40.7%. The impact was significantly greater in central and eastern Europe than in western European countries, but more widely-spread in the second wave which was still active in January 2021<sup>15</sup>.

11 Can we possibly live to 1000 years? Einmahl John, De Actuaris, December 2020

12 The 2021 Ageing Report: Underlying Assumptions & Projections Methodologies, Institutional Paper 142, November 2020

13 The 2021 Ageing Report: Economic & Budgetary Projections for the EU Member States (2019-2070), Institutional Paper 148, May 2021

14 EFTA: European Free Trade Association countries: Iceland, Liechtenstein, Norway, Switzerland

15 COVID 19 impact on the demographic projections, David Bogataj, TAIEX Experts mission on impact of COVID 19 on actuarial projections, April 2021

### 1.2.2 OPTIMISM IS IN THE AIR

Studies suggest that there is unlikely to be any long-term impact from the COVID-19 epidemic on (age-specific) mortality rates.

Over the projection it is thus still expected that the period life expectancy at birth for males will increase by 7.4 years (from 78.7 in 2019 to 86.1 in 2070) and for females by 6.1 years; (from 84.2 in 2019 to 90.3 in 2070)<sup>16</sup>.

The largest increases in life expectancies at birth, for both males and females, are projected to take place in the Member States that currently have the lowest life expectancies; these include Bulgaria, Estonia, Latvia, Lithuania, Hungary, Poland, Romania and Slovakia; where this statistic ranged in 2019 from 70 (Bulgaria) to 75 years. In these countries male life expectancy is expected to increase by 9-12 years by 2070.

It may be noted, however, that these expectations of life are calculated on the basis of the age-specific mortality rates observed in successive calendar years (known as a period expectation of life). They are a measure of mortality levels in that year but do not provide a useful estimate of how long those attaining a particular age are expected to live. The cohort expectation of life, by contrast, includes an estimate of projected mortality improvement in the future years through which that generation will live, with the mortality rates assumed at each age in each future year incorporating an allowance for the anticipated reduction in mortality rates from the base year to the year for which an estimate of the mortality rate is required<sup>17</sup>.

However, despite the fact that the average person is living longer and experiencing better health than in previous generations, national averages may hide the increasing variation amongst sub-groups in both longevity and health conditions.

It should also be highlighted that the heterogeneity in mortality associated with socioeconomic class is well documented in the literature. The life expectancy figures for different groups of people can and do vary considerably. Thus the actuarial assessments needed to support policy choices must properly reflect the way in which the relevant collective population data has been stratified through the use of variables that may themselves be correlated with mortality rates.

Social policies can affect mortality and morbidity inequalities, but are not easily studied in ways that allow direct comparison between (say) different countries. The difficulties of this type of analysis are seen, for example, in relation to Popham et al. (2013)<sup>18</sup>, who argued that the Scandinavian countries, with the most liberal welfare policies, have the smallest level of inequality in the world.

.....  
16 The 2021 Ageing Report: Economic & Budgetary Projections for the EU Member States (2019-2070), Institutional Paper 148, May 2021

17 Meeting the challenge of ageing in the EU, AAE discussion paper, March 2019

18 Are health inequalities really not the smallest in the Nordic welfare states? A comparison of mortality inequality in 37 countries? Popham et al, 2013 Research report

Actuaries develop methods and measures to assess the dynamic effects and uncertainties associated with the inequality (in mortality) on their models used in risk-adjustment. The use of multiple / proxy measures, ranges, clusters and alternative scenarios can enhance many analyses, and in many cases, such multiple measures, groupings or time horizons add value to the conclusions reached.

### 1.3 THE DIFFICULT EQUATION OF MIGRATION

Because of high historical volatility over time and between countries, developing the assumptions relating to levels of migration tends to be amongst the most challenging tasks, methodologically when preparing demographic projections.

Since 1985 figure for annual net migration into the EU has been consistently positive, albeit highly volatile from one year to another. Having risen significantly, annual net entries averaged 622,000 people in 1990-1999 and around 1.1 million in 2000- 2008<sup>19</sup>. Over the period 1960 - 2018 Germany, Spain, France, Italy and Sweden recorded the largest total net inflows in absolute terms. When relating migration flows to the 1960 population, the largest overall inflows were in Luxembourg (+75%), Sweden (+23%), Cyprus (+21%), Norway (+20%), Spain (+19%), Austria (+19%) and Germany (+19%). At the opposite end are Romania, Poland, Bulgaria, Portugal and Lithuania, which saw the largest outflows in absolute terms.

In 2015, several Member States saw large inflows resulting from instability in North Africa and the Middle East, while in 2018 net inflows surpassed 1 million people.

The methodology to determine net migration projections for the 2021 Ageing Report is fundamentally different from that of the population projections underlying the AR18. Whereas these directly projected net migration, EUROPOP2019 provides separate flows for emigration and immigration as migration data has improved. The new migration model ensures consistency for intra-EU flows and takes better into account sex differentials. Assessments of immigration levels are based fundamentally on historical and current observed data, but for emigration levels apply probability estimates.

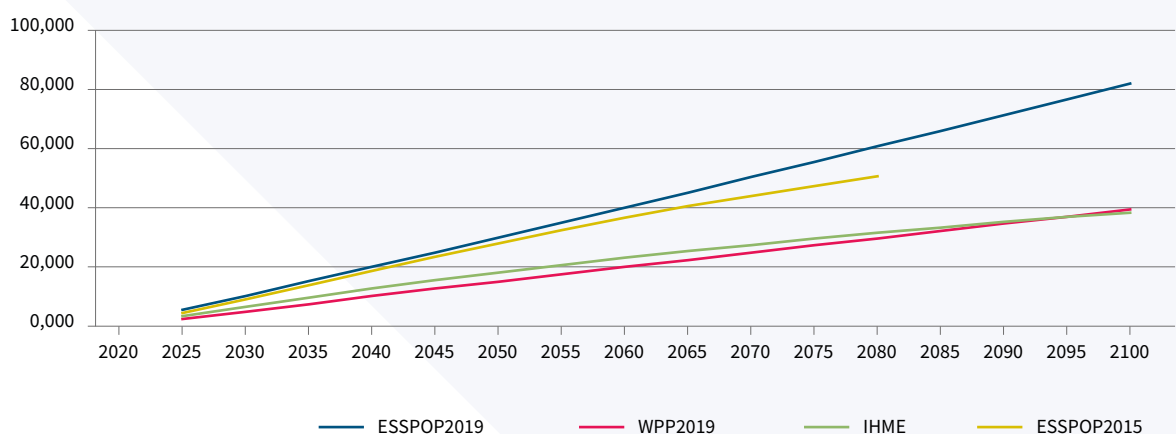
In the case of the immigration model, a feedback mechanism is also applied in developing estimates of the contribution of non-EU immigration to working age populations. This drives a 'correction factor', which is triggered for all years in which the size of the population aged between 15 and 64 is projected to shrink effectively assuming that additional immigration will offset 10% of the decline in the working- age population, distributed by age and sex in accordance with the country-specific immigration pattern for the applicable year.

19 The 2021 Ageing Report: Underlying Assumptions & Projections Methodologies, Institutional Paper 142, November 2020

According to the latest projections, employing the new methodology, annual net migration inflows into the EU are expected to decrease from about 1.3 million people in 2019 (0.3% of the population) to around 1 million people (0.2%) in the course of (most of) the projection period until 2070<sup>20</sup>.

It is interesting to compare the cumulative inwards migration (i.e. immigration) to the 27 EY countries combined, over the period 2020 to 2100, as estimated by different organizations. The ESSPOP2109 projections assume 82 million immigrants, numbering 42.6 million more – over double – than the WPP2019<sup>21</sup> projected figure of 39.5 million. The IHME<sup>22</sup> assumptions are similar to the WPP2019 projections, amounting to 38.4 million over the period from 2020 to 2100. The additional immigrants projected by ESSPOP2019 as compared to WPP2019 would be heavily concentrated in Spain and Italy (11.1 million each), Germany and Poland (about 5.5 million more each), with the remaining 9.3 million spread over all the other countries. ESSPOP2019 projects higher inward migration (or in a few cases lower net outwards migration) for all countries except Cyprus, Czechia, Denmark, Finland and Luxembourg. The graph below shows the different migration assumptions for the three sets of projections in respect of the 27 countries of the EU and graphs on the next three pages show the differences country by country. While, as noted above, the IHME projections give similar results to WPP2019, there are variations as between countries; with higher figures for, notably, Belgium, Germany and Lithuania offset by lower or comparable figures for other countries.

**FIGURE 7: COMPARISON OF CUMULATIVE MIGRATION INTO EU FOR THE PERIOD 2020 – 2100**



Source: ESSPOP2019, WPP2019, ESSPOP2015, and IHME published data

20 The 2021 Ageing Report: Underlying Assumptions & Projections Methodologies, Institutional Paper 142, November 2020

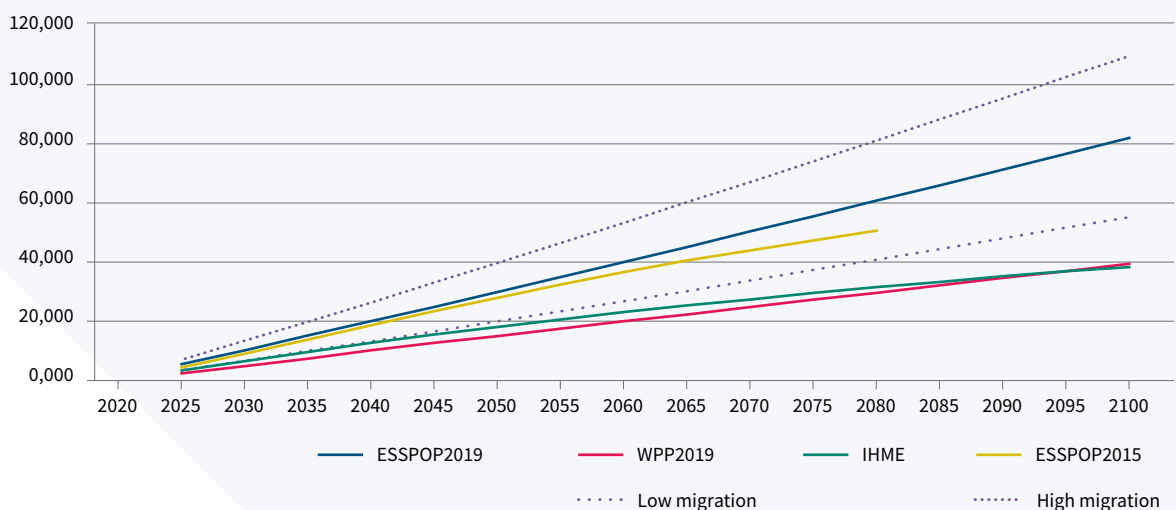
21 World Population Prospects is a division of the United Nation Population

22 The Institute for Health Metrics and Evaluation (IHME) is a research institute working in the area of global health statistics and impact evaluation at the University of Washington in Seattle

As the above figure shows the projections constructed by Eurostat are significantly higher than the corresponding ones set out both in the WPP and by IHME. If borne out, the Eurostat figures would imply a relatively smaller impact of the ageing of the population on the pension cost cashflow projections.

It should be noted that the ESSPOP2019 projections include variants based on both low migration and high migration estimates, in addition to the baseline projections. These imply cumulative migration into the EU by 2100 of 55 million (low migration variant) and 109 million (high migration variant, compared to 82 million in the baseline projection). However, even the low migration estimate (55 million) is higher by 15 million than the medium projection figure set out in the UN Population Division's WPP. The graph below adds in the low migration and high migration variants of the ESSPOP2019 projections for cumulative migration into the 27 countries of the EU from 2020 to 2100.

**FIGURE 8: COMPARISON OF CUMULATIVE MIGRATION INTO EU FOR THE PERIOD 2020 – 2100 INCLUDING LOW AND HIGH ESSPOP2019 ASSUMPTIONS**



Source: ESSPOP2019, WPP2019, ESSPOP2015, and IHME published data

As the above figure shows the UN WPP 2019 projections and the IHME projections fall well outside the range of the migration variants of ESSPOP2019.

There are even bigger proportionate differences between the different projections at country level. There are 16 countries where the ESSPOP2019 projected population in 2100 is more than 10% higher than the WPP2019 projected population, with the largest differences (in either direction) being as follows:

**TABLE 2: ESSPOP2019 PROJECTED POPULATION RELATIVE TO WPP2019  
PROJECTED POPULATION IN 2100**

Country	ESSPOP2019 projected population relative to WPP2019 projected population in 2100
Malta	+92.7%
Spain	+37.9%
Estonia	+36.7%
Bulgaria	+32.0%
Italy	+28.6%
Hungary	+27.1%
Croatia	+27.1%
Greece	+23.7%
Luxembourg	-20.7%
Cyprus	-14.6%
Finland	-10.2%
Denmark	-9.1%
Belgium	-5.1%
Latvia	-2.9%
Czechia	-0.6%

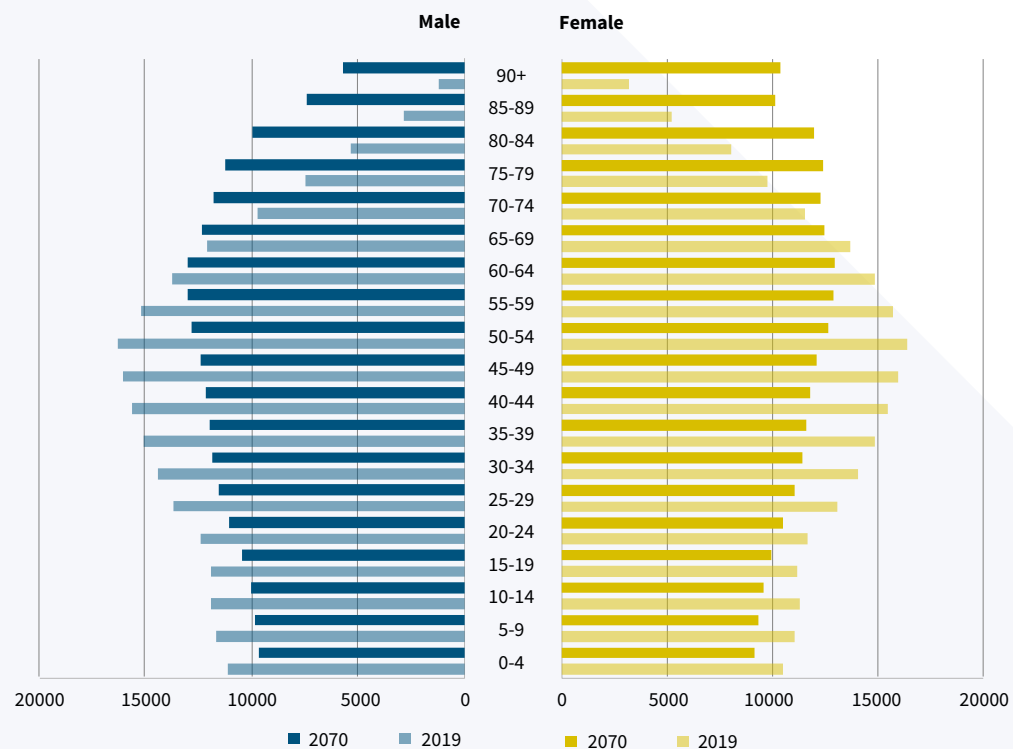
#### 1.4 CENSUS BRIEF: LESSER AND OLDER AFTER 100 YEARS

The EU population is projected to decline from 447 million people in 2019 to 424 million in 2070. During this period, Member States' population will age dramatically given the dynamics in fertility, life expectancy and migration. The median age would rise by five years over the next decades.<sup>23</sup>

This is due to lower projections for people aged less than 65 years, with the upward revision in net migration insufficient to offset the downward revision in the average fertility rate.

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23 The 2021 Ageing Report: Underlying Assumptions & Projections Methodologies, Institutional Paper 142, November 2020

FIGURE 9: EU POPULATION BY AGE GROUPS AND GENDER 2019 AND 2070



Source: [EUROPOP2019, EUROSTAT, 2020](#)

In the base year 2019, the EU population counted 762,000 fewer people than anticipated in the 2015- based demographic projections. This difference was mainly due to France, Germany and Italy, reflecting how net migration in 2016-2018 was smaller than expected under ESSPOP2015.

For 11 Member States and Norway the total population would increase between 2019 and 2070, while 16 Member States would see the number of inhabitants shrink. Compared to the base year, 2019, the sharpest declines are expected in Latvia, Lithuania, Romania, Bulgaria and Croatia, with a fall of between 26% and 38%. Declines by around 20% are projected in Greece, Poland and Portugal. In these countries, the population is expected to dwindle steadily throughout the projection period.

In all Member States, the share in the overall population of the age cohorts above 65 years is expected to rise by 2070, from 20% in 2019 to 30% in 2070 for the EU. Increases range from six percentage points in Sweden to 16 in Poland, where people aged 65 or more would represent 34% of the population in 2070. Shares in Greece, Croatia, Italy, Latvia and Poland would be similar, with one in three persons being at least 65 years old at the end of the projection period.

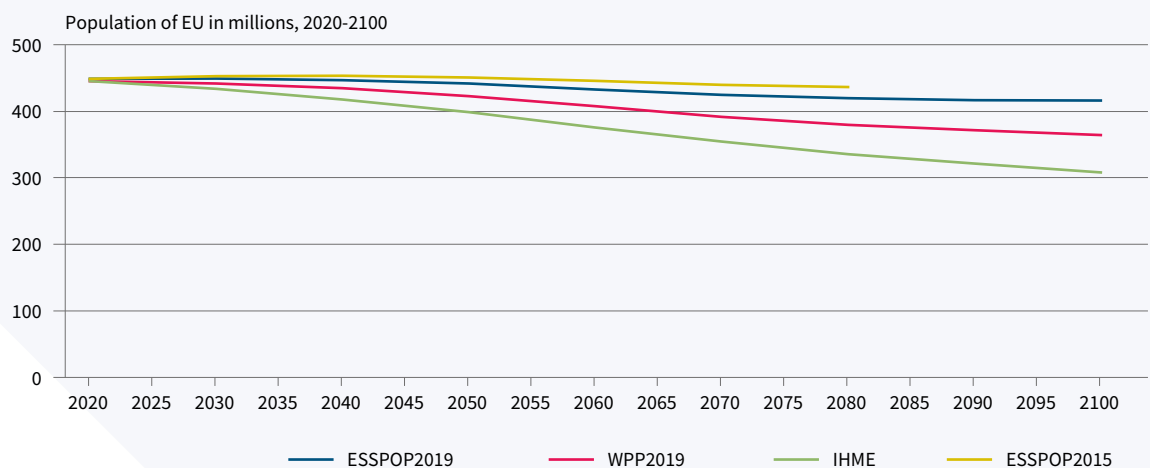
The population share of the age group 0-19 would shrink in all Member States during the projection horizon, aside from Germany where it would increase slightly. The share in the EU population of this youngest group would decrease from 20% in 2019 to 18% in 2070.

The dwindling – also in absolute numbers for most countries – of the 0-19 age group is the sharpest in Ireland and Finland.

While in 2019, the largest cohort, for both males and females, was that of people aged 50-54, in 2070 the 55-59 and 60-64 age brackets would be the largest cohorts. Overall, the median age will rise from 43.7 year in 2019 to 48.8 year in 2070, most of which occurs by around 2040. For men it goes from 42.2 to 47.3 and for women from 45.2 to 50.3 years. 80+ age group would rise from 6% in 2019 to 13% in 2070. The projected increase is the highest in Poland, and Slovakia.

The comparison between the population projection results of ESSPOP2019, WPP2019 and IHME for the 27 EU countries as a whole are summarized in the following graph; the previous Eurostat projections, ESSPOP2015, is also quoted:

**FIGURE 10: COMPARISON OF THE POPULATION PROJECTIONS IN THE EU BETWEEN 2020 AND 2100**



Source: ESSPOP2019, WPP2019, ESSPOP2015, and IHME published data

The above figure shows that the ESSPOP2019 projections suggest a much higher population for the EU by the year 2100 than either of the other sets of projections, with WPP2019 12.5% (51.9m people) lower and IHME 26% (108m people) lower than the 416m population projected by Eurostat for 2100, as compared with the observed population of 448.7m in 2020.

## 2 FROM LABOUR SUPPLY TO LABOUR PRODUCTIVITY

The EU's working age population has been shrinking for a decade and this is projected to continue<sup>24</sup>.

The population at working age (20–64 years of age), would shrink in all Member States as a proportion of the overall population. Whereas in 2019 people of working age represented 59% of the EU population, this share would fall to 51% by 2070.

The drivers include a) the increasing shares of the population in the higher age cohorts due to the combination impact of the large cohorts of those born in the 1950s and 1960s together with continuing gains in life expectancy; and b) the changing patterns of fertility (in comparison with the natural replacement rate), and shrinking cohorts of women in childbearing ages. Inward migration, at the relatively high (cumulative) levels suggested by the ESSPOP2019 projections may lessen the potential impact of the ageing of the population, as shown in Figures 7 and 8 above (in Chapter 1). However, it is not expected that net migration flows will suffice to fully offset the trends towards an ageing population.

The overall picture is one in which total employment is expected to decline steadily over the projection period, and the contribution of labour input to output growth to decline accordingly, at a slightly higher annual average rate in the EU than in the wider euro area<sup>25</sup>.

***Labour productivity growth, driven by Total Factor of Productivity growth<sup>26</sup>, is projected to become the sole source of potential output growth in both the EU and the Euro Area.***

### 2.1 A CLOSE-UP VIEW OF ANXIETY

This year, 2022, sees the 78th anniversary of the first use of the term 'total dependency ratio' by Notestein et al. (1944, Chapter 7, pp. 153–163). The total dependency ratio was defined there as the ratio of totals of people 0–14 years of age and those of 65 years and over to those aged 15–64. Although the youth old-age components of the total dependency ratio were computed and presented separately in graphs, the terms 'youth dependency ratio' and 'old-age dependency ratio' did not appear there as such; that terminology emerged later. Notestein et al. (1944) were clear about their interpretation

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24 Eurostat online tables demo\_pjan and proj\_19np

25 The 2021 Ageing Report: Economic & Budgetary Projections for the EU Member States (2019–2070), Institutional Paper 148, May 2021

26 Total Factor of Productivity: The ratio of aggregate outputs (GDP) to aggregate inputs (labour and capital used in production)

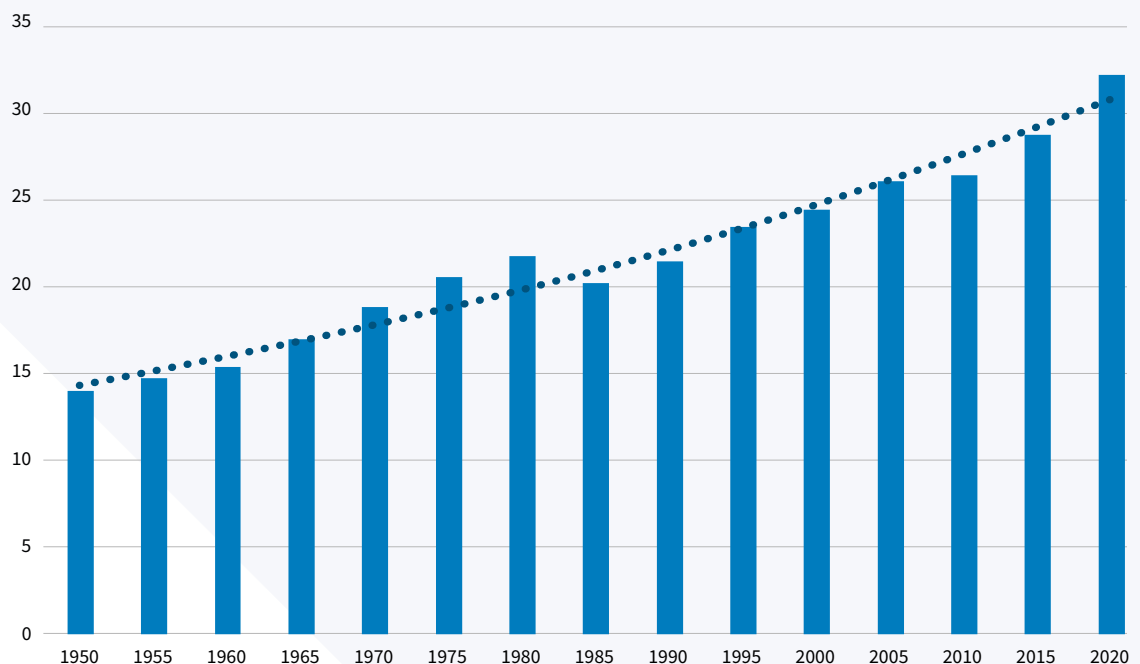
of the age boundaries. As they wrote, ‘Any age limits set for the productive and dependent groups are bound to be inadequate for the heterogeneous area [Europe and the Soviet Union] and the thirty-year period under consideration. Nevertheless, uniformity of treatment requires that some arbitrary limits be set’ (p. 153). Despite this caveat, it remains the case current that those age boundaries typically those used globally, to assess progress in all countries of the world and for the entire time span from 1950 to 2100<sup>27</sup>.

The old-age dependency ratio (OADR), expresses the presumed number of pensioners in relation to the (hypothetical) number of prospective contributors. It provides a gauge of how demographic ageing alters the beneficiary-contributor balance.

Between the years 1950 and 2020 the old -age dependency ratio in Europe more than doubled; from 13.9 per cent in 1950 to 32 per cent in 2020.

**FIGURE 11: OLD AGE DEPENDENCY RATIO IN EUROPE BETWEEN 1950 AND 2020**

Old-age dependency ratio (ratio of population aged 65+ per 100 population 20-64)



Source: United Nations, Dept of Economic & Social Affairs, Population Division (2019) World Population Prospects 2019, Online Edition

As a result of demographic ageing – the shift from younger to older age groups - demographic dependency ratios are expected to increase significantly in all countries. The OADR is projected to increase from 34% in 2019 to 59% in 2070 for the EU as a whole. In simple terms: the population structure will move from roughly three working age people per person of pensionable age (2.9 in 2019) to less than two (1.7 in 2070)<sup>28</sup>.

27 Are We Overly Dependent on Conventional Dependency Ratios? Sanderson Warren C, Scherbov Sergei, 2015 Population and Development Review published by Wiley Periodicals, Inc

28 The 2021 Ageing Report: Economic & Budgetary Projections for the EU Member States (2019-2070), Institutional Paper 148, May 2021

We should in addition to take account of the numbers of those of working age who are not actually employed (at least as counted in official statistics). The ILO<sup>29</sup> has produced consistent series of labour force participation rates for all UN countries with forecasts to 2030 (ILO 2011). Applying these participation rates to United Nations population forecasts produces consistent forecasts for the ratio of non-workers to workers, called the Economic Dependency Ratio (EDR).

The EDR would rise strongly amid demographic ageing with large variability across countries. Measured as the ratio of total inactive population to those between 20 to 64 years of age who are in employment, the projected change in the Euro Area is from 120.9 per cent in 2019 to 140.9 per cent in 2070. We may take account of the significant proportion of workers who remain in employment after age 65, albeit in a somewhat ‘ad hoc’ way, by adjusting the measure to the ratio of total inactive population to those in employment between 20 and 74 years of age. On this basis, the projected increase in the Euro Area is ameliorated slightly, by 5.4 percentage points, from 118.2 per cent in 2019 to 132.8 per cent in 2070<sup>30</sup>.

## 2.2 NAVIGATING WITH THE PROJECTION MODELS

The pension projections set out in Ageing Reports depend on estimates made under the auspices of the Member States. The Member States each use their own national model(s), validated by a process of peer review carried out by the EPC<sup>31</sup> Ageing Working Group. In this way, the projections benefit from capturing the country-specific circumstances prevailing in the different Member States (different pension legislation). At the same time, the principle of consistency is observed since the projections are based on commonly agreed macro-economic underlying assumptions. The projections for health care, long-term care and education are carried out by the Commission services (DG ECFIN<sup>32</sup>) in collaboration with the EPC Ageing Working Group, on the basis of a common projection model for each expenditure item.

The projection models used may be categorized into several types, the main ones being (a) macro cohort type, (b) macro cohort models with explicit reference to multi-state methods, (c) microsimulation, and (d) combined use of both macro and microsimulation methods.

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29 ILO: International Labour Organization

30 The 2021 Ageing Report: Underlying Assumptions & Projections Methodologies, Institutional Paper 142, November 2020

31 EPC: Economic Policy Committee

32 DG ECFIN: Directorate-General for Economic and Financial Affairs

The ‘classic’ macro cohort models in use are those developed by ILO-ISSA<sup>33</sup> and The World Bank’s PROST<sup>34</sup>. The ILO-ISSA model applies specific probabilities to the transitions of insured pensioners between the states of retirement, disability or death. However, this model is easily adaptable, using appropriate transition matrices, to all socio-economic groups of interest in pension modelling; this approach is used by some Member States. For those Member States which use models combining both macro and microsimulation, the latter is used specifically for the demography module.

As actuaries, we have a major interest and role in analysing the implications for policy development in the Member States’ response to increases in life expectancy. We categorize the possible and actual solutions as (a) incorporation of life expectancy (at retirement age) as a specific factor in the pension benefit formula(e) used, (b) adjusting (invariably upwards) the defined normal retirement age (NRA), and (c) a combination of both (a) and (b). In some Member States, plans are under consideration to factor life expectancy into the benefit formulae of their national pension schemes, but not yet having done so, the details of such rule changes are not specified in the country fiches provided for the AR and PAR.

In seventeen European countries the national PAYG Defined Benefit pension system forms the most important component of old age income. Among these Member States (a) nine use a microsimulation cohort model for the purposes of their input to the Ageing Report, (b) three use a multi-state macro model with explicit transitions between socio-economic or pension states while (c) four apply a microsimulation demographic model as the basis of the projections; two of these align to macro cohort models. Of the four Member States, the main component of whose pension systems is of the Notional Defined Contribution type, their practice for the AR and PAR projections varies between the use of multi-state macro and microsimulation models. The remaining EU countries have retirement income systems with mixed characteristics, which may be described broadly as ‘minimum (flat-rate)- plus - earnings related pensions’; two of these use multi-state macro cohort models. The overall picture is summarized in the following table; one observation of interest brought out by this categorization is that the total number of countries using, respectively, the microsimulation and the multi-state macro cohort approaches equal, at seven a piece<sup>35</sup>.

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 33 Plamondon, P.; Drouin, A.; Binet, G.; Cichon, M.; McGillivray, W.R.; Bédard, M.; Perez-Montas, H.: Actuarial practice in social security, International Labour Office/International Social Security Association -ISSA, 2002; Scholz, W.; Cichon, M.; Hagemeyer, K.: Social budgeting, International Labour Office/International Social Security Association, 2000

34 The World Bank’s Pension Reform Options Simulation Toolkit: computer-based toolkit to simulate pension systems over a long timeframe

35 It is noted that the MS were not aware of our interest, as actuaries, in this topic; so, a number of those reported multi-state macro cohort models as macro cohort models.

Model type	System type			
	DB	NDC	FLAT+ER*	
<b>Macro cohort</b>	AT, MT, ES, PT, SK, DE, BG, HR, RO	-	EE, LT, IE, NL	14
<b>Macro cohort – Multi - state</b>	BE*, LU, CY	IT, EL	FI, NO	7
<b>Micro</b>	HU, FR	LV	SE (NDC)	4
<b>Macro + micro</b>	CZ, SI	PL	-	3
<b>Total countries</b>	17	4	7	28

The demographic projections contributing to the Ageing Report assume without exception that the life expectancies for all genders and cohorts will increase during the period considered. Other conditions remaining the same, lower fertility would result in reduced contribution income, while longer life expectancy at retirement implies either higher expenditure or lower benefit levels for individual members of social security pension systems; at the time of publication, the AR showed, at the whole EU level, income and expenditure to be in relative balance. Nevertheless, we should keep in mind that the overall objective to which the modelling and analysis undertaken for the Ageing Report primarily contributes, is to maintain the balance - i.e. sustainability – of the system. Even maintaining the current level and balance of sustainability and adequacy is self-evidently a major challenge.

The benefit formulae of the NDC components which predominate in the systems of Latvia, Poland, Italy and Greece and comprise a significant part of that in Sweden allow for the management of this issue by decreasing in an automatic way the progression of benefit levels. by definition. The systems in Greece, Denmark (not included in the table above) and Finland take account of increasing life expectancy, through adjustment not only of the benefit level, but also the specified age for normal retirement. Seven other countries (FI, PT, CZ, MT, EE and FR<sup>36</sup>) have indicated that they plan to change the legal NRA in order to manage the cost implications of increasing life expectancy. The strategy of upward adjustment of the NRA poses the fewest problems for countries starting from an ‘affordable’, reasonably balanced financial position. A variant of this strategy is to put in place a ‘dynamic’ adjustment of the retirement age in such a way as to preserve the proportional balance of expected years of the whole period of life as between working and retired generations; to apply this concept in practice may need to be implemented by reference to a proxy measure of the proportional balance between the generations as at the last financially balanced period. In this way, the burden of adjustment should be fairly shared between generations. For Finland, specifically, the planned adjustment aims to implement a fair balance of the total years spent (on average) in retirement as against those spent in working life, but to do so by fixing the ratio deterministically, rather than ‘dynamically’ on a basis tied to the financial balance of the system.

.....  
36 CY and BG haven't specified the details, SK suspended the implementation.

Austria follows an approach under which its social security pension system undergoes regular (actuarial) valuation to assess the impact of ageing on the financial balance; in the event that the valuation indicates a deterioration in sustainability, statutory arrangements are in place to convene a committee suitably qualified to consider and propose corrective measures.

Models of the macro cohort type (as used in ES, DK, PT, MT, NL, EE, CZ, SK, BG, AT) and multi-state macro cohort type (as used in IT, EL, FI, CY) are, in their fundamental nature, suitable for the analysis needed to demonstrate the results of such measures. Life expectancy is, however a statistic that is essentially stochastic in nature. If it is treated as such in microsimulation procedures, the outcome will be of increased levels of intrinsic uncertainty underlying the results. For this reason, the approaches used in a number of countries combine micro and macro elements in a way which reflects similarities with macro cohort models (NO, LV, SE, FR, PL).

The overall picture is rather complicated. The following table seeks to provide a concise summary of the differences across countries in the relationships between their approaches to pension system projection models and the basis on which changing life expectancy is reflected (actually or prospectively) in the benefit formulae.

Model type	Basis of referral to life expectancy					
	Benefit formula	Benefit + NRA	Keep it proportional	Not specified	Sustainability trigger	
Macro cohort	ES	DK(c)	PT, MT, NL, EE, CZ	SK, BG	AT	10
Macro cohort – Multi –state	IT	EL(c), FI(pr)	-	CY	-	4
Micro	NO, LV, SE	-	FR	-	-	4
Macro + micro	PL	-	-	-	-	1
Total countries	6	3	6	3	1	19

## 2.3 DECODING PENSION EXPENDITURES

Although population ageing is the main cause of the expected future deterioration of the fiscal balance of public pension systems, it is appropriate to consider all factors which in combination help to explain the overall dynamics.

In particular, we seek to estimate the ratio of pension expenditure to GDP<sup>37</sup>, which comprises the following factors:

- **dependency ratio effect** – defined for the purposes of AR21 and hence the present paper as the ratio of population aged 65 and over to the population aged between 20 and 64 years. This statistic is directly correlated with the degree of population ageing.
- **coverage ratio effect** – Ratio of the number of pensioners of all ages to the population above 65. This statistic provides an indication of the share of the population covered by the pension system.
- **benefit ratio effect** – Ratio of the average pension (public pension spending divided by the number of pensioners) to the average wage. This indicates the way in which the average pension develops relative to the average wage (and hence provides one indication - amongst several - of the adequacy of the degree to which public pension provision provides, at the level of individual retirees, for replacement of income from work (wages and salaries).
- **labour market effect** – This factor may be decomposed into three components:
  - **employment rate effect** – Ratio of population aged 20-64 to the number of working people aged 20-64. This is the inverse of the employment rate, so a relative decrease implies, all other things being equal, a decrease in pension expenditures.
  - **labour intensity effect** – Ratio of the working population aged 20 -64 to the hours worked by the population aged 20 -64. This is the inverse of labour intensity, and a decrease implies the availability of increasing resources, and a reduction in the pension expenditure ratio.
  - **The career prolongation effect** – Ratio of hours worked by the population aged 20-64 to the hours worked by the population aged 20-74, which is in fact the inverse of the effect described as ‘career shift’. An increase in this statistic is associated with increasing prolongation (on average) of individuals’ careers beyond age 65 (possibly reflecting active ageing policies) and hence a downward influence on overall pension expenditures.

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37 Gross Domestic Product: The OECD defines GDP as ‘an aggregate measure of production equal to the sum of the gross values added of all resident and institutional units engaged in production and services (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)

The above factors may be summarized in the formula below:

$$\frac{(\text{Pension expenditure})}{GDP} = \text{dependency ratio} * \text{coverage ratio} * \text{benefit ratio} * \text{labour market effect},$$

where

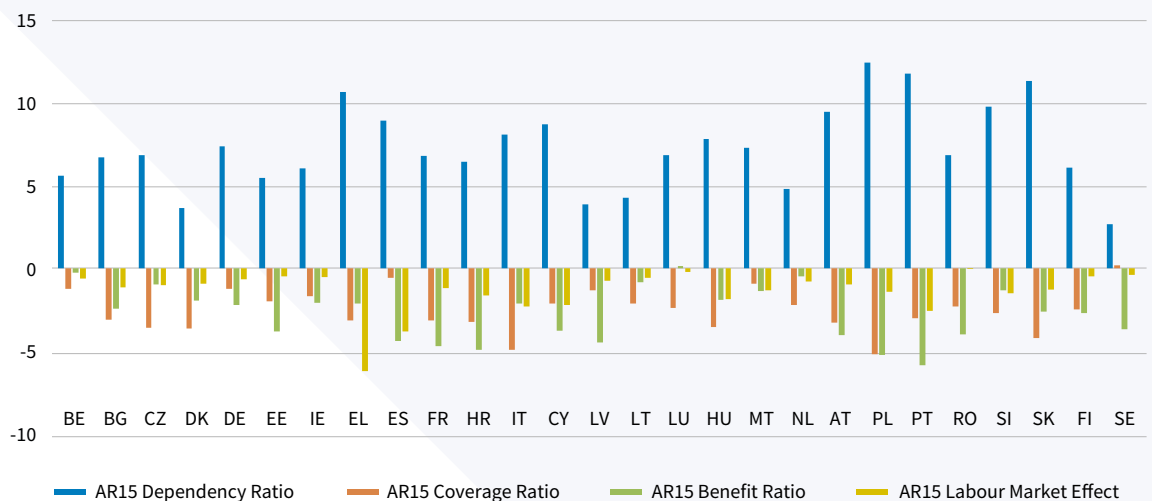
$$(\text{labour market effect}) = \frac{1}{(\text{employment rate})} * \frac{1}{(\text{labour intensity})} * \frac{1}{(\text{career shift})}$$

On closer consideration of the figures for recent years set out in the successive Ageing Reports, it is of interest to see a developing pattern among the Member States as to the combined effect of the coverage ratio and the labour market effect, which seemingly may decrease while simultaneously the benefit ratio shows a slight increase.

The following diagrams depict the relative magnitudes of these factors for the Member States of the EU, and their recent evolution:

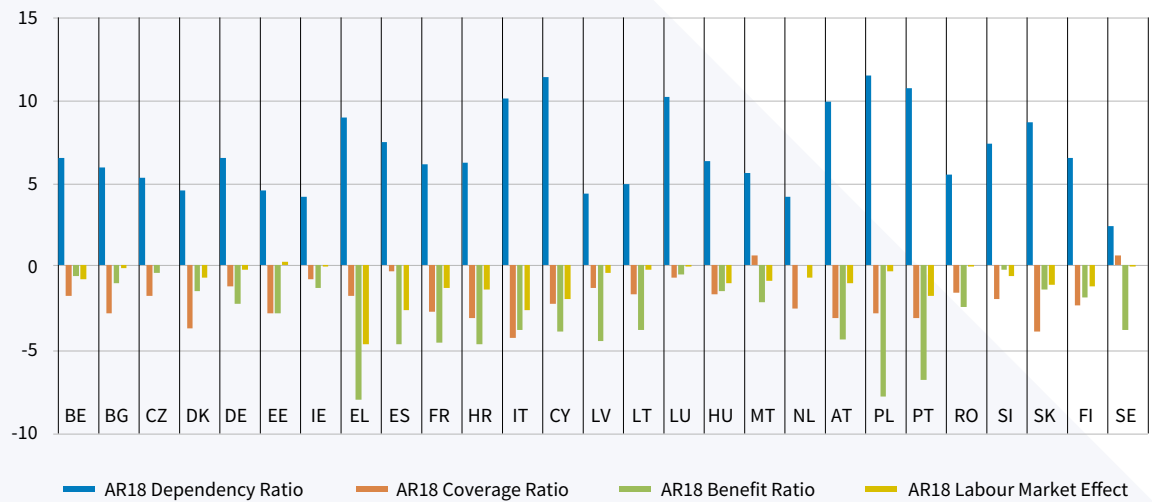
#### CONTRIBUTION OF PENSION EXPENDITURE FACTORS, AS REPORTED IN AR15, AR18 AND AR21 RESPECTIVELY (3 FIGURES)

FIGURE 12: EXPECTED CONTRIBUTION OF THE PENSION EXPENDITURE FACTORS; YEAR 2015



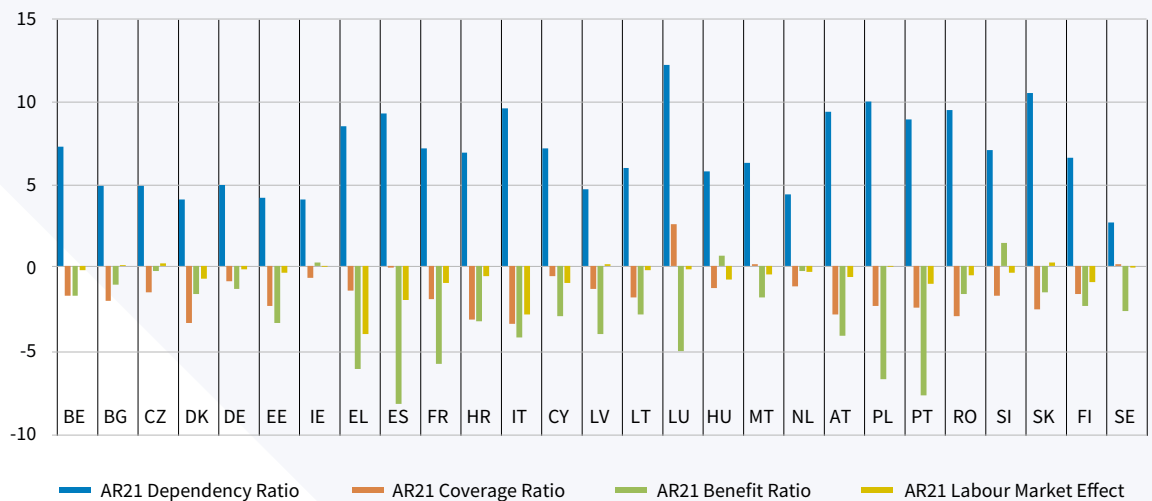
Source: Ageing Report 2015, EC, 2015

FIGURE 13: EXPECTED CONTRIBUTION OF THE PENSION EXPENDITURE FACTORS; YEAR 2018



Source: Ageing Report 2018, EC, 2018

FIGURE 14: EXPECTED CONTRIBUTION OF THE PENSION EXPENDITURE FACTORS; YEAR 2021



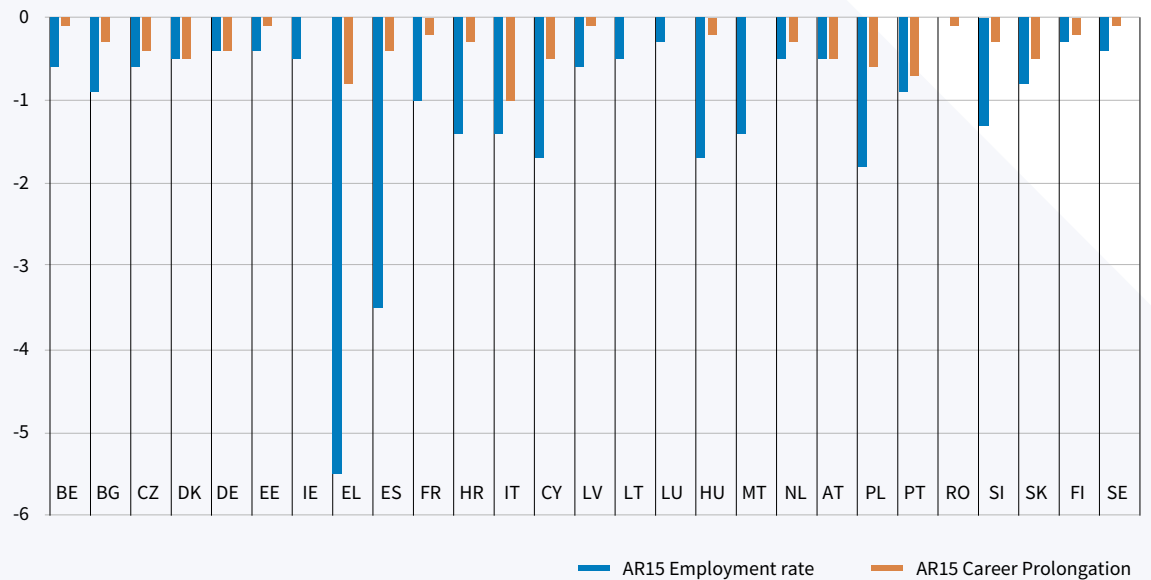
Source: Ageing Report 2021, EC, 2021

Regarding the labour market effect, it is of interest to notice how throughout the years the Member States expect that the effect of the career prolongation will be higher than that of the employment rate<sup>38</sup>:

.....  
 38 The labour intensity effect is expected zero for most Member states

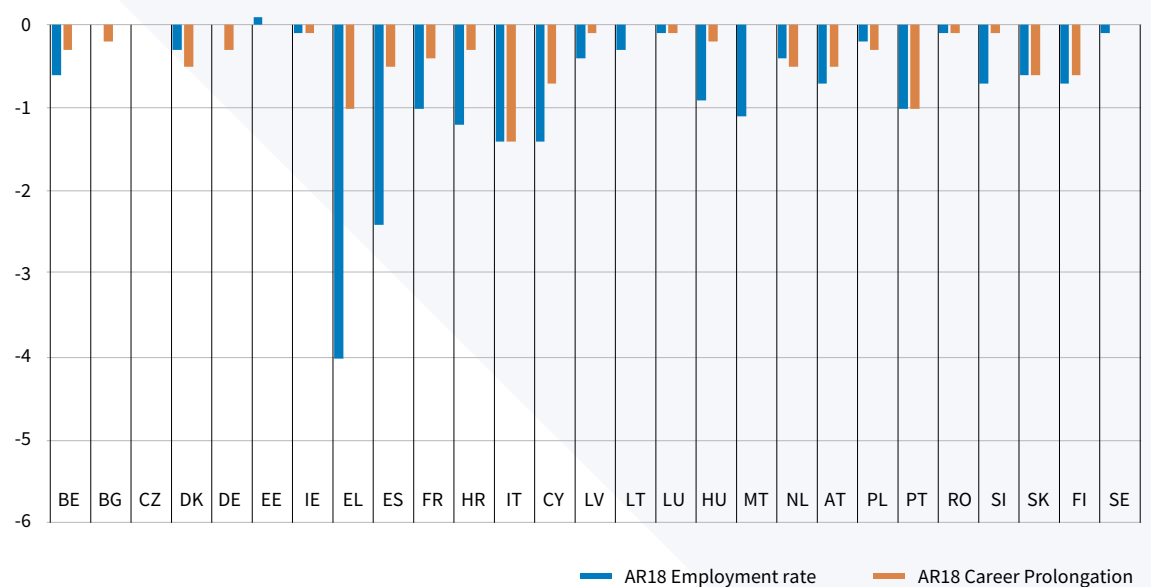
### CONTRIBUTION OF LABOUR MARKET COMPONENTS, AS REPORTED IN AR15, AR18 AND AR21 RESPECTIVELY (3 FIGURES)

**FIGURE 15: EXPECTED CONTRIBUTION OF THE LABOUR MARKET COMPONENTS IN PENSION EXPENDITURE;  
YEAR 2015**



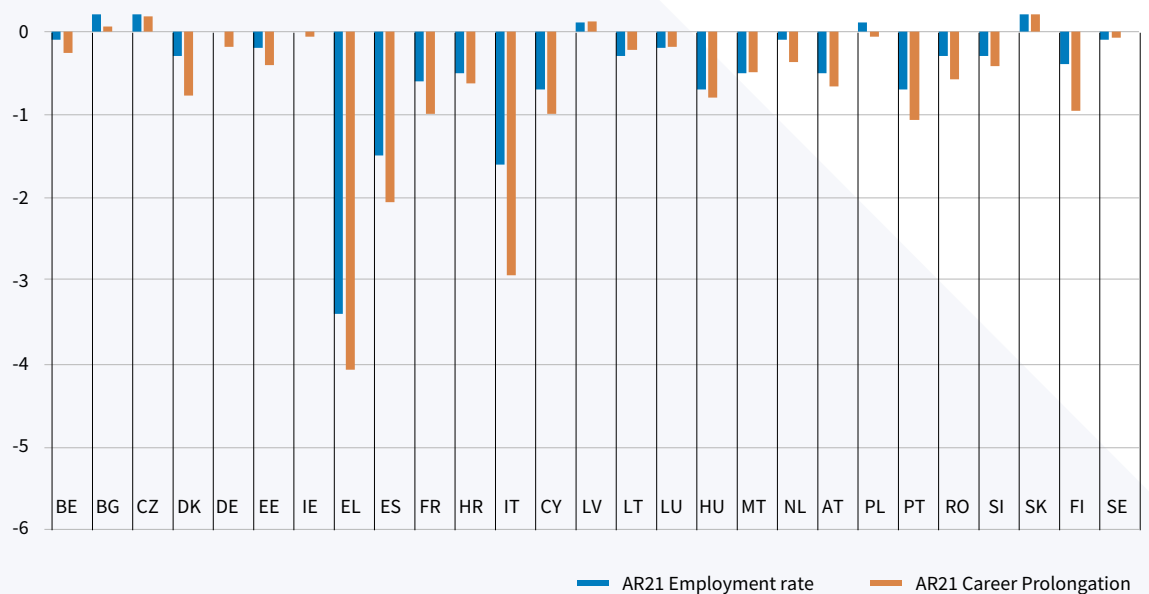
Source: Ageing Report 2015, EC, 2015

**FIGURE 16: EXPECTED CONTRIBUTION OF THE LABOUR MARKET COMPONENTS IN PENSION EXPENDITURE;  
YEAR 2018**



Source: Ageing Report 2018, EC, 2018

FIGURE 17: EXPECTED CONTRIBUTION OF THE LABOUR MARKET COMPONENTS IN PENSION EXPENDITURE; YEAR 2021



Source: Ageing Report 2021, EC, 2021

It should be noted that in both of the reporting years 2015 and 2018, the effect of pension reforms is included.

It is pertinent to recall that the projections made for the Ageing Report 2015 (AR15) indicated the expectation that pension expenditure in the EU as a whole would show a decrease, albeit slight, over the period from 2016 to 2060, driven by reforms that had already been legislated. Nevertheless, the conclusions set out in AR15 included commentary demanding further reforms, are as follows:

‘Further steps still need to be taken by Member States, though to varying degrees, to raise the effective retirement age, including by avoiding early exit from the labour market and by linking the retirement age or pension benefits to life expectancy’<sup>39</sup>.

Proposals by governments for pension reforms tend to be initiated during times of economic and financial crisis. In such periods governments face problems resulting mainly from falling revenues, but tend also to face less than usual resistance to the implementation of contingency measures, such as reducing the value of pension ‘promises’, in seeking to rebalance the budget. While social security pension expenditure is usually the largest item of each national budget, the fact that national systems maintain correspondingly large funds may offer the possibility of acting as a ‘buffer’ and allow scope for the implementation of (short term) corrections. Such measures might improve long term sustainability, but by nature tend to compromise the adequacy of pensions<sup>40</sup>.

39 <http://www.consilium.europa.eu/en/press/press-releases/2015/05/12/ecofin-ageing-populations/>

40 Párnitzky Tibor, A short note on pension reforms in the Member States in 2016 – 2018, SSSC discussion paper, August 2018

While adjustment measures, if implemented without adequate preparations and support, may have undesirable side-effects<sup>41</sup>, the eventual outcome is not always one of increased stringency. Soon after a crisis, the number of pro-stringency reform initiatives tends to decline and moves may be seen towards adequacy improvements, if not reversals of hastily-implemented reforms. The Ageing Report 2018 (AR18) deals with a period largely characterized by recovery from the foregoing financial and economic crisis, allowing policy makers, generally, to take a rather different direction in relation to reform provisions. Compared to the previous (post-crisis) period, a number of examples were seen of reversals of earlier tightening of rules as to pensionable age and also the (re)-introduction of some schemes for special occupational categories. In some countries, attempts have been made to work within a mode of policy development, specifically relating to work and pensions, that can be focused in an integrated way on multiple, and sometimes broader, social and economic objectives.

Amongst the early results of the COVID-19 crisis, in all EU Member States, was a surge in public pension spending, measured as a percentage of countries' GDP, essentially because of the sharp fall in GDP in the recession triggered by the pandemic. Average spending on public pensions in the EU rose from 11.6% in 2019 to 12.8% in 2020, partially reversed with a fall (again, in all Member States) to 12.2% in 2021<sup>42</sup>, reflecting incipient economic recovery<sup>43</sup>.

The projections set out in AR21, were made, of course, before the onset of the Covid-19 pandemic (indeed, before any such onset could be foreseen). While this means that the myriad of calculated statistics are not now likely to approximate usefully to the prospective real-world year-by-year outcomes in terms of income and expenditure. Nevertheless, assuming that we see a return without delay to sustained economic activity, the analysis provided in AR21 should still reveal the broad patterns of financial balance or imbalance in public pension systems over the period of assessment (up to year 2070). That analysis indicated an expectation that public pension spending was expected to increase significantly, as a proportion of GDP, over the first part of the projection period, declining thereafter.

Table 3, below, sets out details on a country-by country basis. It can be seen that, within the overall pattern, notable differences may be observed between Member States.

.....  
41 OECD (2017)

42 The baseline projections (or Ageing Working Group reference scenario) are made under a 'no-policy-change' assumption, generally illustrating the evolution of age-related expenditure if current policies remain unchanged.

43 The 2021 Ageing Report: Economic & Budgetary Projections for the EU Member States (2019-2070), Institutional Paper 148, May 2021

The AR21 projections suggested that, between 2019 and 2070, overall public pension spending in the EU would rise in 16 Member States and in Norway while it would decline in 11 Member States. The highest relative increase, at 8.7 per cent of GDP was projected in Luxembourg, followed by Slovenia (+6 per cent), Slovakia (+5.9 per cent, Hungary (+4.1 per cent, Malta and Romania (each +3.8 per cent). The largest decrease was projected for Greece (-3.8 per cent of GDP), followed by Portugal (-3.2 per cent of GDP pps).

It should be noted that the age-related expenditure projections for all Member States discussed in the 2021 Ageing Report, AR21, are based on the most recent Eurostat population projections available at the time of making the projections. The population projections are taken from the EUROPOP2019 projections released by Eurostat in April 2020<sup>44</sup>. They also incorporate a set of macroeconomic assumptions and methodologies that project, in turn, a set of exogenous macroeconomic variables covering labour force (participation, employment and unemployment), labour productivity and interest rates<sup>45</sup>. The Economic Policy Committee agreed common assumptions and methodologies to be used for all Member States. While making no reference, of course, to the Covid-9 pandemic, a broad set of alternative scenarios have been analysed, complemented by sensitivity tests, highlighting the extent to which public expenditure projections are sensitive to key assumptions.

.....  
 44 More details of the projections are given in AR21: Underlying Assumptions & Projections Methodologies, Institutional Paper 142, November 2020 and found at: [https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies\\_en](https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies_en)

45 More details of the projections are given in AR21: Underlying Assumptions & Projections Methodologies, Institutional Paper 142, November 2020 and found at: [https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies\\_en](https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies_en)

**TABLE 3: LEVEL AND CHANGE IN GROSS PUBLIC PENSION EXPENDITURE; 2019 – 2070, BASELINE SCENARIO (% PPS OF GDP)**

Country	2019	2045	2070	Ch 19-45	Ch 19-70
BE	12.2	15.1	15.2	2.9	3.0
BG	8.3	8.9	9.7	0.6	1.4
CZ	8.0	10.7	10.9	2.7	2.9
DK	9.3	7.8	7.3	-1.5	-2.0
DE	10.3	12.1	12.4	1.8	2.1
EE	7.8	6.3	5.4	-1.5	-2.3
IE	4.6	7.2	7.6	2.7	3.0
EL	15.7	13.7	11.9	-2.0	-3.8
ES	12.3	13.2	10.3	0.8	-2.1
FR	14.8	14.6	12.6	-0.2	-2.2
HR	10.2	10.1	9.5	-0.1	-0.7
IT	15.4	17.3	13.6	1.9	-1.8
CY	8.8	10.3	10.9	1.5	2.1
LV	7.1	6.3	5.9	-0.9	-1.2
LT	7.1	8.3	7.5	1.2	0.4
LU	9.2	13.9	18.0	4.6	8.7
HU	8.3	10.8	12.4	2.4	4.1
MT	7.1	7.2	10.9	0.1	3.8
NL	6.8	9.0	9.1	2.2	2.3
AT	13.3	14.9	14.3	1.6	1.0
PL	10.6	10.6	10.5	-0.1	-0.2
PT	12.7	13.7	9.5	1.0	-3.2
RO	8.1	14.7	11.9	6.6	3.8
SI	10.0	14.8	16.0	4.8	6.0
SK	8.3	12.5	14.2	4.2	5.9
FI	13.0	12.6	14.4	-0.4	1.3
SE	7.6	7.0	7.5	-0.7	-0.1
NO	11.0	12.6	13.6	1.7	2.6
EA	12.1	13.3	12.1	1.2	0.1
EU	11.6	12.7	11.7	1.1	0.1

Source: European Commission, EPC

It is important to underline that the projections set out above should not be treated as *forecasts*. They represent hypothetical outcomes obtained by the use specific models and applying agreed assumptions.

As actuaries, in the light of our expertise and in view of the uncertainties about many of the assumptions, particularly over as long a time period as that to 2070, we would urge caution in drawing strong policy conclusions from the projections.

We also remark that projections should be regularly updated and policies should be designed as far as possible to be robust to deviations from the expected financial outturns.

The impact of ageing on the sensitive balance of sustainability for pension systems will provide a major challenge for our European society. While this aspect of the future picture for pensions might be uncertain, one certainty is, however, the inevitability of population change. Actuarial methods provide exactly the tools to manage the challenges of this type of uncertainly-with-certainty, through examining, analysis and assessment of possible future outcomes.

### 3 HOW WE COULD DEFEND THE PUBLIC PENSION SYSTEMS?

As Social Security Actuaries we are proud – with good reason – of our role in the development of theory and practice in the Social Security field. The context, however, is one in which populations, societies, and markets change in a dynamic way. Insecurity, unfairness, and growing tensions among different groups seem to reflect a growing perception of increases in overall inequality, leading to a growing demand for adjustments in the social contract<sup>46</sup>.

It is essential that the issues of why to defend and how to defend the public pension systems be considered jointly, not separately. The contribution of Social Security systems is crucial to a well-functioning and just society. In that light, we defend the importance of public pension systems for

- current pensioners and contributors
- future generations in these roles
- the multiple vulnerable groups which, at the present time of crisis, as with any crisis, are increasing relentlessly.

#### 3.1 HOW CAN THE ASSESSMENT OF THE FINANCIAL SUSTAINABILITY AND PENSION ADEQUACY BE BEST INTEGRATED?

Fiscal sustainability is often regarded as the key issue; either implicitly or explicitly. Political sustainability it is also, however, of fundamental importance in democracies and this may depend to a significant extent on whether the resulting benefits are both adequate and seen as manifestly fair and equitable<sup>47</sup>.

It is felt that in recent years, pension reforms in many EU Member States have prioritized the financial sustainability of public pensions systems, rather than the complementary objective of ensuring or improving the adequacy of current and future pensions. Specific reforms have provided for (i) stronger links to be established between individual contribution payments and pension entitlements, (ii) reduced levels of indexation of pensions in payment, and (iii) legislated increases in pensionable ages, with, in some cases, ongoing linkages to changing life expectancy statistics. As a result of such reforms, it is increasingly unlikely that those who spend large periods of their working life in unremunerated work and those with lower earnings levels will receive adequate levels of old age pensions. Current high levels of youth unemployment in many countries increase further the risk of inadequate pensions for this generation.

46 Our future role as Social Security Actuaries in Europe, SSSC discussion paper, May 2021

47 The ageing of the EU – implications for pensions, AAE discussion paper, January 2016

From the actuarial perspective it is proposed that social protection systems should seek to include provisions for minimum old age pensions through existing redistributive measures or new ones, in order to protect people who are unable to build sufficient entitlements under social insurance (contributory) systems as a result of career breaks or low earnings. Those redistributive measures could include, specifically, recognition of credits for those who are temporarily out of the workforce with caring responsibilities (be it for children, for disabled relatives or for elderly relatives), and also a broader range of social security instruments, including universal non-contributory residency-based pension schemes and national flat-rate pension arrangements with less strict qualifying conditions.

### 3.1.1 MINDING THE GAP BETWEEN THE DIFFERENT PROFILES OF INDIVIDUALS

Sharp and increasing differentiation between employment statuses (notably, but not only, between those employed and the self-employed) sets a difficult challenge for national social security systems. Because of that, strategies must be developed with objectives that are not limited to the improvement of conditions simply for the ‘best off’, or for a notional ‘average’ older person<sup>48</sup>.

As actuaries we strongly recommend that increased attention should be paid to the diversity of profiles amongst individuals protected under social security. In addition, adequate social benefits (notably pension and unemployment benefits) should be available to all employed and self-employed<sup>49</sup> persons.

### 3.1.2 MINDING THE GENDER GAP

It is understood with increasing clarity that social security pension schemes must pay attention to the need for fair, equitable treatment of women as compared with their male counterparts. A specific issue in this regard is the poor level of provision for women, arising in significant measure from their duties in relation to care work, which is (largely) unpaid, represents the main barrier to women’s participation in labour markets, is a key determinant of the lower quality of their employment relative to men’s<sup>50</sup>, and results, as an outcome of these factors in combination, in poor levels of pension provision.

It is likely that no substantive progress will be made in achieving gender equality in the labour force until inequalities in unpaid care work are tackled.

As actuaries we point out that long-term solutions require the effective recognition and redistribution of unpaid care work not only between women and men, but also as between families and the State<sup>51</sup>.

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48 World Health Organization 2015: World Report on Ageing and Health

49 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

50 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

51 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

### 3.1.3 DO PEOPLE WORK LONGER AS THEY LIVE LONGER?

The longer the periods spent by individuals in paid employment, the better the prospects for provision of adequate pensions, noting also that management through pension systems with balanced redistribution supports sustainability.

According to the 2018 Reports<sup>52</sup>, examining reforms in the 2016-2018 period, the main impact from a sustainability perspective was on labour participation rates of workers close to and beyond their previously-expected retirement ages<sup>53</sup>.

Most countries have by now recognized the need, in order to ensure the sustainable long-term financial balance of social security pension systems, to raise the general age at which individuals (on average) retire from active work. It is sometimes overlooked that a concomitant need is to ensure that individuals have the scope to continue in work sufficiently long to match the planned increase in pensionable age. This issue has some implications in relation to the availability of early retirement pensions, and the actuarial neutrality of the terms for their provision.

In the light of these issues, consideration should be given to the inclusion in pension regulation of a compulsory requirement that provision be made, in scheme rules, with appropriate actuarially-based conditions, to allow the choice of retirement earlier or later than a 'standard' retirement age, possibly combined with provision for flexibility of, part-time working and final retirement arrangements.

The need is seen to devise and introduce new and innovative forms of employment, aiming to support specific elements of the transition to jobs suited to older workers; these may be physically less demanding but still (for some, at least) mentally challenging ('life-cycle job descriptions').

An important externality for a national-level pension system is the nature of its interaction with the country's labour market. The multiple dimensions of that interaction have important implications for actuarial valuations and assessments, through their influence on a range of real-world parameters, including (a) labour demand for older workers, (b) the attitudes of employers, and (c) the personal decisions of individual retirees (which should be seen as informed, even if not always motivated by simple financial self-interest).

It is noted that a trend towards longer working lives will entail increased exposure (by comparison with younger cohorts) to a number of workplace risks. We consider therefore that means to reduce the potential disincentive for older individuals to remain in the labour force should be sought through positive incentives for employers to minimise such risks<sup>54</sup>. Means may be sought to overcome perceived divisions between groups

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52 Ageing Report 2018 and Pension Adequacy Report 2018

53 Párnitzky Tibor, A short note on pension reforms in the Member States in 2016 – 2018, SSSC discussion paper, August 2018

54 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

who might be categorised as ‘younger’ and ‘older’. Enhanced interaction between such groups should help to develop collaborations, if not friendships; these in turn encourage individuals to develop multiple perspectives and stretch their views of the world.

#### **3.1.4 THE SENSITIVE QUESTION OF SOLIDARITY BETWEEN GENERATIONS**

This is a subject which attracts increasing attention, not least in the press and wider media. It is also one with significant potential for presentation in ways which can be dramatic rather than analytical.

One reason for this is that the issues, particularly as viewed in the perspective of the younger generations, are reflected in and interact with a very wide range of policy areas (and associated aspects of administration), including, self-evidently, the changing nature of labour markets and employment relationships, but also for example education and health (both physical and mental). As a result, it is difficult to frame any question in a way that may be amenable to a ‘closed’ or finite analytical study; a high degree of focus is needed to overcome this difficulty.

Intergenerational fairness issues may be prompted by sustainability measures. Specifically, it is common that policy makers faced with financial risks put forward measures intended to reinforce sustainability, but which tend, in turn, to lead to pension adequacy risks for the elderly. In order to mitigate these risks, responses may include either contribution increases or a heavier tax burden for those of working age, or a decrease in the future benefits of those retired, each of these affecting the generations differently. Adjustment measures, in some cases designed to ease restrictions during periods of economic recovery from crisis, may be seen as imposing increasing burdens on tax-payers. Improved intergenerational fairness and pension adequacy should be seen, not as competing aspirations but as mutually reinforcing principles for pension institutions, both having as their ultimate objective the prevention of old age poverty.

At its most fundamental, intergenerational fairness demands the realization of solidarity between generations; this is an age-old and sensitive question.

That said, it is a subject which may not be avoidable for actuaries. It is inextricable from the long-term nature of pension provision and financing, whether in the broad framework of occupational and personal provision, or that of social security. Moreover, we should note the growing interest in the approach of ‘transfer’ accounting to the economic analysis of national economies and their long-term trends; in this picture, the close relationship of intergenerational aspects with pension provision means that such analysis cannot be adequately undertaken without an actuarial perspective.

Social security provides by far the most important framework within which the issues of fairness across generations can be addressed. Social Security systems are inherently redistributive in their nature and are most likely to achieve their objectives (notably

of ensuring adequate livelihoods for those living in retirement) if the mechanisms of redistribution operate in a balanced way and are based on a high level of social accord, or 'social solidarity'. In this sense, systems may seek to achieve fairness on a basis which is primarily collective, rather than individual, but which, in any case, respects the broader objective of preventing wide-spread poverty, that itself and in the longer term would be harmful to economies.

Aiming to support intergenerational fairness in their Social Security pension system, some Member States have already taken measures. Germany introduced a balancing factor in the benefit indexation formula. This factor takes into account the weighted ratio of contributors and pensioners, sustainability and an explicit factor moderating the allocation of risks. Italy and Romania use indexation rules to support redistribution as a fairness measure. Czech Republic, Portugal, Hungary and Slovakia deliver a degree of redistribution through the application of pension formulae designed – in the light of dialogue amongst social partners – which are (relatively) favourable for low earners.

A further aspect of old age poverty in the context of increasing life expectancy is the relative experience – and hence perceived fairness – of the generations already retired and those, still active, yet to do so.

In addition, due to declining population and increasing of life expectancy, the demographic profile of the retired population, in terms of both age and length-to-date of retirement period, is changing year by year. In other words, the challenge of population ageing should be seen in terms, not only of pre-retirement and post-retirement cohorts, but also as having aspects for the different cohorts of those within the retirees' group. If we view pension provision in a very broad picture as a pooling mechanism for the 'longevity risk' within the group of retirees, then the question of intergenerational fairness also stands to be addressed in relation to the effective transfer of actuarial gains or losses between the different age cohorts.

An issue closely related to these questions is that of the degree to which individuals' incomes from year to year enable them to maintain the standards of living that they may have previously achieved; for the elderly, this means the degree to which pensions benefit from indexation. It is important that the financial planning of schemes and systems should properly reflect the indexation mechanisms incorporated in the scheme designs, so as to avoid (as far as possible) unexpected financing problems. All EU pension systems do in fact apply pension indexation. In general, the mechanisms used refer to indices of two types, respectively, a wage index, a (consumer) price index (CPI); these may be used in combination, in a mixed or so-called 'Swiss' system. The use of a wage index expresses the link with and enables pension increases to track those in active-age earnings, recognizing in effect that the purpose of pension insurance is to substitute labour income. The usual argument for indexation based on price inflation is that the main aim should be to enable pensioners to maintain their standard of living in terms simply of consumption. Experience over a long period suggests that the long-run trend of wage increases tends

to be higher than that of prices, implying that, if benefits are indexed by reference to wages rather than prices, the overall cost of a scheme, and accordingly contributions, will increase at a higher pace.

Well-designed redistribution mechanisms may remain in place for generations, so protecting in the future those making up the presently active cohorts, but who may in their turn experience vulnerability after their own retirements.

Actuarial modelling approaches and methodologies should be used to produce expert analyses of the impact of redistribution mechanisms and how they affect the balance between generations.

Active oversight and management of schemes is necessary to guard against undesirable forms of redistribution and weakening of intergenerational fairness, which may result from unexpected changes (or crises), whether financial or demographic in origin, but which may also arise as outcomes of ad-hoc or poorly-evaluated amendments to scheme rules.

For such reasons, it is vitally important that adequate systems for monitoring the long-term impact of demographic and other changes should be built into pension schemes. Schemes seek, furthermore, means of (financial) risk management, in the face of disruptive changes of such kinds. An approach that has had success is the inclusion in the schemes' financial designs of so-called 'automatic adjustment (or balancing) mechanisms'.

*Fairness* in the broadest sense is a subject that invites questions as to the boundary between subjective and objective assessment, and so the extent to which it sits properly within the scope of the actuarial discipline. This seems to be a source of some possible discomfort as to whether and how actuaries may approach it. Yet actuaries are well used to addressing questions of *equity*, by way of establishing suitable parameters for their assessment<sup>55</sup>. In this light, there are aspects of practical importance to not only policy-makers, but specifically to regulators, which are fundamentally actuarial. Hence, we may suggest that, provided care is taken in regard to the parameters for, and focus of, study questions, the profession should now take this subject forward.

For better understanding and highlighting intergenerational issues The Australian Actuaries Intergenerational Equity Index (AAIEI)<sup>56</sup> has been established. The purposes of the index are: a) to understand change over time in Australian society, particularly the way younger people are better or worse off over time b) to understand how government policy contributes to, or detracts from, intergenerational equity and c) to provide the ability to test scenarios and their impact on intergenerational equity.

55 Intergenerational equity is the concept of fairness or justice between generations, often covering economic, psychological and sociological aspects.

56 Actuaries Institute MIND THE GAP – The Australian Actuaries Intergenerational Equity Index Green Paper August 2020

The European Intergenerational Fairness Index<sup>57</sup> launched in 2012, backfitted to year 2000, measures the impact that government policies have on young people over time. It combines measures of unemployment, housing, pensions, government debt, health, income, environmental impacts and education. A common issue for EU governments is maintaining health and pension spending on the old as the population ages. At the same time there is evidence of stalling government investment in the young. This is widely recognised as unsustainable because today's young cannot carry the burden of an ageing population without themselves having decent jobs, wages and fair living standards.

### 3.1.5 ENABLING SUPPLEMENTARY PENSIONS

The extension of supplementary pension provision in the EU should be linked to pension adequacy gaps identified through an EU commonly agreed analytical framework, based on which the pension adequacy dimension is properly measured, analysed, and monitored with the use of appropriate indicators (noting the development of 'pension dashboards') and in a manner which is consistent and fully integrated with the assessment of financial sustainability. Robust funding of second- and third- pillar pension arrangements could potentially enhance adequacy, contributing towards the key policy objective of maintaining standards of living post-retirement<sup>58</sup>.

To evaluate fully the role of supplementary pensions, a clear picture of the long-term financial outcomes should be developed forthwith. On that basis, regular actuarial review of long-term financial progress of social security pension schemes is an essential tool of financial governance<sup>59</sup>.

## 3.2 HOW TO BEST MONITOR THE PENSION ADEQUACY DIMENSION?

In the future, the increase of the career-length requirements may result in retirees with short careers qualifying for only minimum benefits, such as social pensions.

It is a matter of concern that an individual who is, for any reason, unable to accumulate either sufficient years of pensionable service in work, or whose reference wage or salary level is too low, to qualify for an adequate pension will inevitably face a relatively high risk of poverty.

In such a scenario, a so called 'adequate pension' should be considered in terms of a measure of the degree to which the pensioner is able to maintain his/her economic wellness, and in the light of what needs the pension income is expected to cover. For example, a given pension level may be adequate in a country that provides tax-financed, publicly-provided services and goods (such as subsidized access to care for

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57 Actuaries Institute MIND THE GAP – The Australian Actuaries Intergenerational Equity Index Green Paper August 2020

58 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

59 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

the elderly), but inadequate in other countries where the elderly must finance these needs themselves<sup>60</sup>.

In addressing these issues, the Pension Adequacy Report refers to the basic measure income maintenance measure of the so-called Theoretical Replacement Rate. This is calculated for hypothetical individuals having different historical career and earnings patterns, for whom it is possible to calculate the ratio of the retiree's expected pension income in the first year after retirement to his/her earnings immediately before retirement. These ratios are also presented for several individual career patterns, and also compare the expected outcomes for individuals retiring at the time of the Report (2019) as against those projected to retire forty years later (in 2059).

A different indicator that may be useful in assessing the financial situation of individuals at their retirement ages is the Pension Wealth (PW) indicator.

The PW measures the discounted value of a lifetime flow of the total projected retirement incomes of a pensioner at retirement age; this may be thought of, in a highly hypothetical way, as the lump-sum needed to buy an annuity<sup>61</sup>. Used with care, this indicator can provide information about potential changes over time in the financial security of retirees.

Social security systems offer the broad framework in which such financial security may be achieved. An important aspect is the targeting of resources on elderly people who may have been poor on a lifetime basis and thus unable to save enough to support themselves in old age. Countries vary both in the level of resources they devote and in the way they include these design objectives in social security programmes to support their earnings-related insurance system. The optimal impact in terms of old-age poverty prevention and reduction is likely to be achieved through policies jointly mobilizing national social protection systems together with other related services, including fiscal (taxation) and access to health and social support services.

Actuaries strongly recommend the implementation of minimum guaranteed levels of pension. In particular, minimum guarantees provided through public systems play a significant role in the social protection coverage of a range of vulnerable groups, including those on low incomes, those having short or interrupted career records, or having non-standard forms of employment, or who for a wide variety of other reasons may be excluded (fully or partly) from the usual forms of social insurance coverage.

An important category amongst vulnerable groups is that of those suffering work injuries, and who may as a result lose all or part of their wage or salary income, either temporarily or permanently. For these individuals the proper functioning of a protection system, based on a strong actuarial structure, is vital<sup>62</sup>.

60 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

61 'Pensions at a Glance 2017: OECD and G20 Indicators', OECD (2017).

62 R. Marcelloni, TRRs and vulnerable groups- An Italian experience, AAE SSSC Meeting, Copenhagen 2017

Guaranteed and minimum pension provisions are, however, designed in most countries to prevent old age poverty, within a limited context. These measures can protect vulnerable groups, those with short and fragmented careers, and those who are unable, for diverse reasons, to participate in the insurance system where well-designed redistribution and indexation within social insurance schemes can contribute to overall well-being in retirement, and hence can contribute to the stability of national economies. Accordingly, a minimum pension (or other income) guarantee scheme should not be assessed in isolation, but in the context of a comprehensive national social protection system comprising all of its complementary components. When assessing the effectiveness of national minimum old-age income policies, a holistic approach is required.

From an actuarial perspective, a key approach to achieving a universal social protection net preventing elderly persons in need from falling into poverty is to ensure an effective interface between core income security programmes, formed of social insurance and universal tax-financed schemes, and *last-resort* income support programmes, comprised of social assistance schemes.

Empirical evidence from the EU Member States suggests that the overall architecture and efficiency of national social protection systems, particularly the social insurance and universal programmes, are important factors in explaining low poverty levels in old-age. In fact, in a number of Member States, social insurance and universal programme benefits do successfully prevent poverty to a large extent, with the result that the role of public assistance becomes marginal.

Social protection programmes incorporating a minimum income guarantee should assess its effectiveness, in terms of optimal use of resources, not only as measured by the achievement of key pension policy objectives but also by reference to international standards, such as the European Code of Social Security and International Labour Organization (ILO) social security standards. Those key policy objectives, which could assist in determining effective design of minimum income guarantee programmes, may include:

- guarantee of adequate and predictable income security, to conform to the European Code of Social Security and ILO Social Security Convention 102 (ratified by nearly all EU member States);
- ensure universality of protection, based on social solidarity; and
- achieve an adequate level of income for all through (redistributive) social insurance provisions, in order to provide minimum income guarantees, and where appropriate to achieve specific social policy aims; this may require complementary provision through other forms of social protection, notably tax-financed benefits for those not protected by social insurance, and fiscal measures.

In the context of assessing the effectiveness of minimum income guarantee policies in mitigating poverty, it is important to:

- determine an appropriate definition and methodologically-sound measurement of poverty, which would take into account its multi-dimensional aspects and reflect better the aim of securing a minimum, basic standard of living for the elderly after retirement; and
- develop an explicit, analytical framework based on which the chosen poverty risk measure is properly analysed and monitored, based on the use of appropriate leading indicators of the key drivers of the poverty risk intensity. The relevant data could be used in order to provide ‘early warning’ signs, and to monitor progress in relation to risk prevention and mitigation.

It is also strongly desirable, from the actuarial perspective, that tax-financed social assistance guarantees, that may be targeted to the poor, should be put or remain in place, as the residual component of national income security policies, offering complementary provision when social insurance is insufficient.

### 3.2.1 WAKE UP CALL

Raising public awareness of pension issues, to help people to avoid old-age poverty, is an important, but challenging task.

General public awareness is certainly lacking as to the means by which individuals may plan for and deal with, their own needs in relation to retirement income, and in that light, it is of particular importance that a well-planned public pension system is in place. More broadly, a wide variety of approaches is needed, underpinned in general by ensuring that ‘default’ scheme rules and conditions are well-tailored to members’ needs<sup>63</sup>. As actuaries, we have the expertise to contribute to such an approach.

There are two kinds (at least) of challenges for us, as Social Security Actuaries: Firstly, in bringing forward and mediating content for discussion that is often of a technical nature, and secondly, the need for a two-way communication process with a wider, public audience. Communication in this sense should focus on a) people’s understanding as to how social security contributes to economic security and b) our understanding of the broad needs as perceived by people themselves<sup>64</sup>.

The better people understand the world of pensions, the more possibilities they may be expected to see for their future.

63 AAE discussion paper: Meeting the challenge of Ageing in the EU, March 2019

64 Our future role as Social Security Actuaries in Europe, SSSC discussion paper, May 2021

## 4 A NEW HOPE FOR HEALTH CARE

Living longer is primarily an opportunity. Living longer in good health, so following active lives, is the real objective which should be realized for as many European citizens as possible.

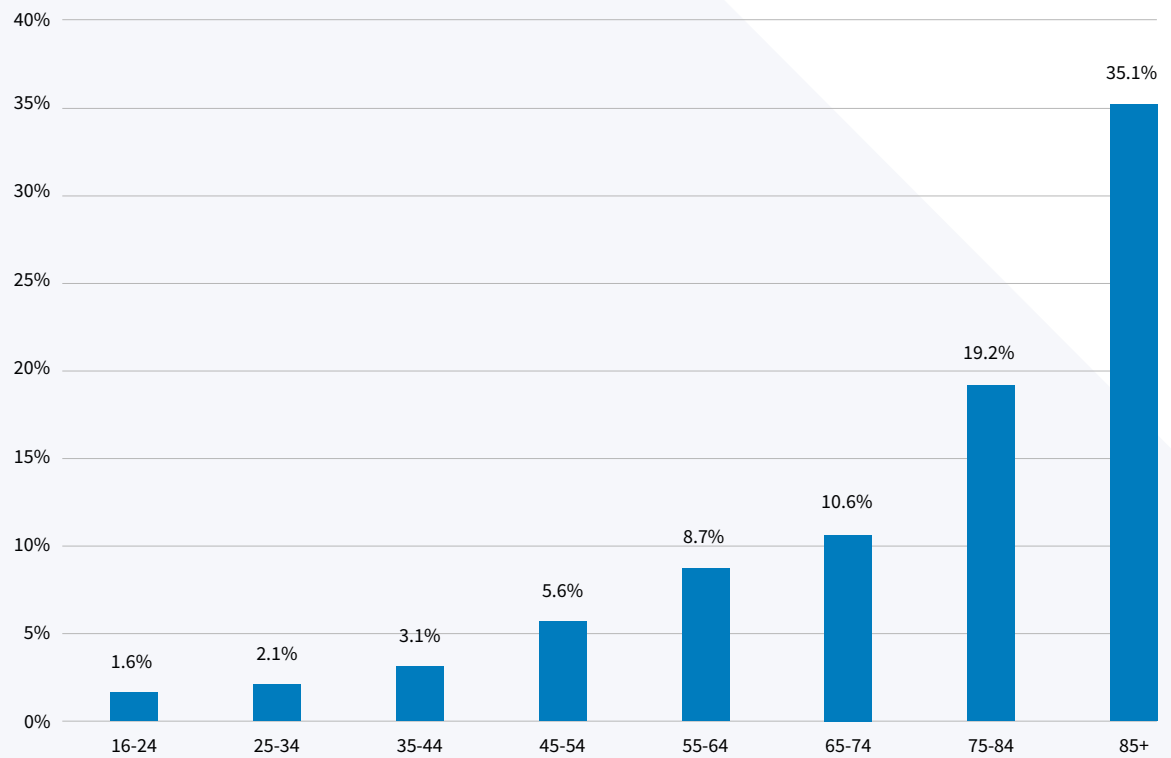
The ageing of the European population is progressing rapidly while at the same time highlighting different needs of senior citizens, in terms of long-term care services provided in the community, the types and suitability of housing units, and their access to an age-friendly environment matched to their functional capacities. In view of the pace of population change we identify the needs to develop new economic and social models for urban environments and new types of long-term care insurance, adapted especially to supporting the modes of ageing seen as longevity increases.

The 2021 Report on Long-term Care, LTC, prepared jointly by the Social Protection Committee and the European Commission analyses common challenges faced by Member States in relation to long-term care. While acknowledging the diversity of long-term care systems and their close links to social protection, employment, and health policies, as well as continuing data gaps, the report highlights the following key points:

- the demand for high-quality long-term care is set to rise, and
- that reinforcing its provision can contribute to gender equality and social fairness

The figure below presents the share of people reliant on care during the period 2015-2019 across the EU member states.

**FIGURE 18: THE SHARE OF PEOPLE DEPENDENT ON THE HELP OF OTHER IN PERIOD 2015-2019  
IN EU MEMBER STATES**

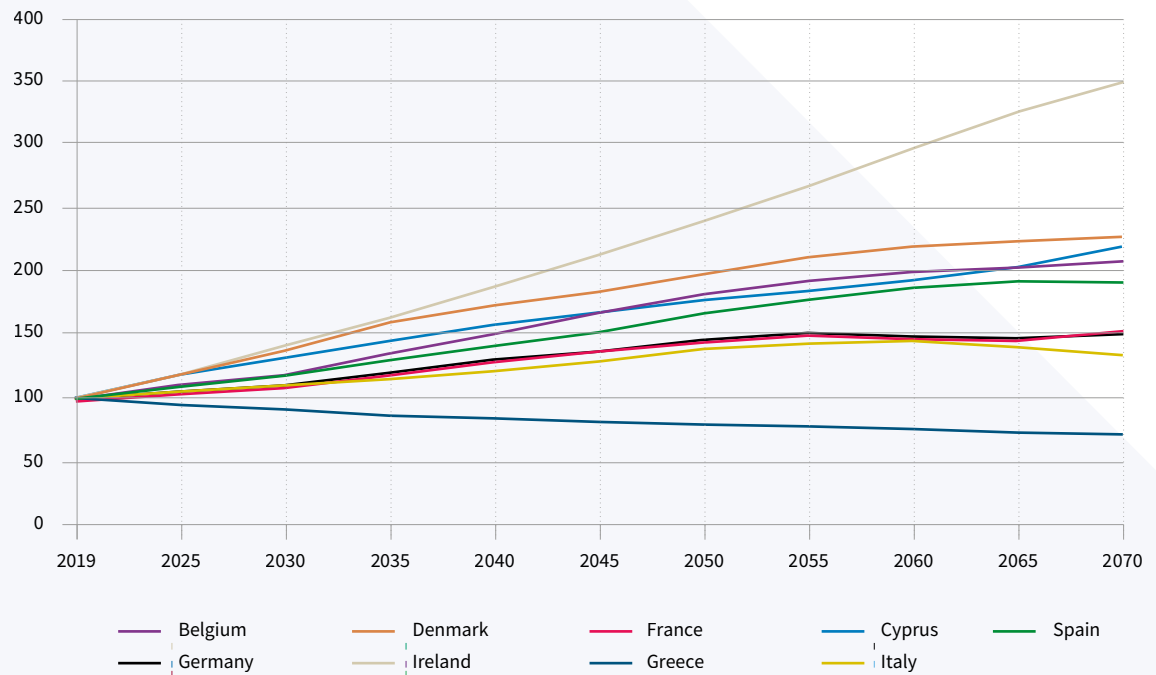


Source: [Green paper on Ageing 2021](#)

The total number of people aged 65 or over is projected to rise by 41 %, to 130.1 million, over the next 30 years, reflecting of course remarkable gains in life expectancy. The Report projects that the number of people potentially in need of long-term care in the EU-27 may rise from 30.8 million in 2019 to 33.7 million in 2030, and further to 38.1 million in 2050. In summary, population ageing is expected to result in a continuing strong increase in demand for long term care.

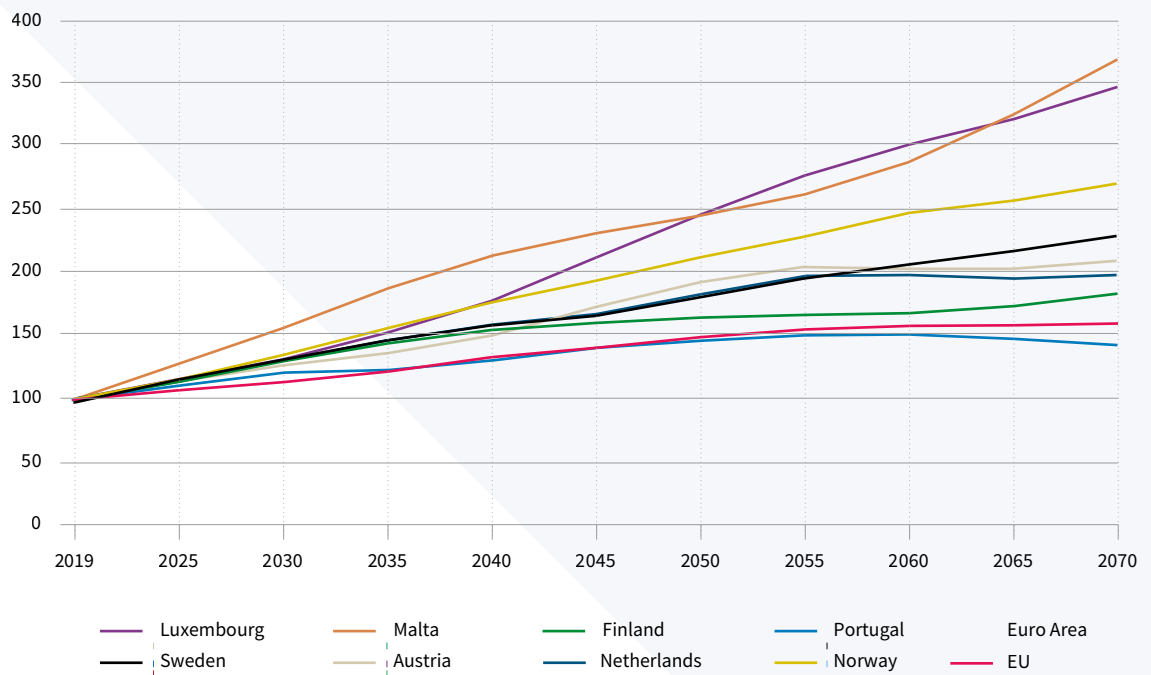
The dynamics of this growth will vary between the different EU Member States, as illustrated in indexed form in the two figures below; further commentary may be found in Appendix A to this paper.

FIGURE 19: INDEX OF INSTITUTIONAL CARE USERS – BASE YEAR 2019



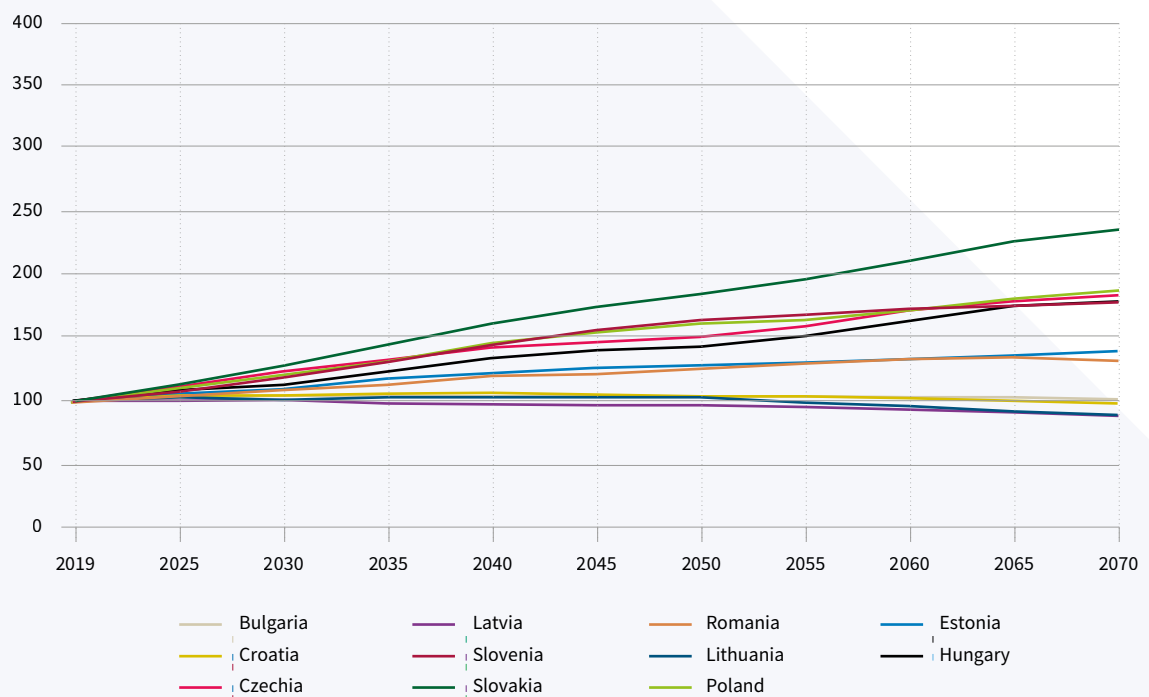
Source: [Ageing Report 2021, EC, 2021](#)

FIGURE 20: INDEX OF INSTITUTIONAL CARE USERS – BASE YEAR 2019



Source: [Ageing Report 2021, EC, 2021](#)

FIGURE 21: INDEX OF INSTITUTIONAL CARE USERS – BASE YEAR 2019



Source: [Ageing Report 2021, EC, 2021](#)

The Covid-19 pandemic has revealed major fissures in the current system of provisions in the EU; the chance should be taken to repair them without delay. Experience over the past 24 months has offered lessons to be learned, perhaps at great cost. Amongst these we note the need to value properly the many stakeholders in the system and their different perspectives; not least those of the providers – including hospital managers, doctors, health care workers and supporters – but also of the care receivers - patients, disabled people and older adults, together with the vulnerable and poor, many living on very low-incomes.

Well-organized and managed public records can support improved forecasting of the capacity needed to care for the elderly, and hence overall levels of the human and other resources needed if seniors are to be offered services adapted to their differing levels of functional capacities. Models are being developed to support the planning of long-term care (whether financed through national or and insurance arrangements). One aspect of interest to actuaries is the use of demographic tables based on multi-state transitions on functional capacity. Where it is envisaged that responsibilities will be borne by regional and municipal authorities, an increasingly well-recognized issue is that of spatial planning. At present, however, no public statistical database is known to offer the relevant data. EUROSTAT should accordingly develop statistical research, with a view to ensuring that the collection of relevant data would be harmonised in all EU member states, and

that research regarding health care, long-term care and housing for older adults would be comparable between EU member states.

[On a positive note,] the potential combination of technological and social innovations in relation to providing health care and social care presents wide opportunities.

Not least these relate to the digital transformation of support networks for older adults living in the community. Specifically, digitally-based transformation of long-term care should facilitate deinstitutionalization, and radically transform the ways in which developed societies care for their more senior members, at the life-stages when their cognitive and physical abilities are on the decline.

Meanwhile, digitally-supported health care and social care services, to be provided in smart, age-friendly environments, should provide essential support to the ways in which EU member states will not only maintain, but significantly improve, the quality of life for older individuals<sup>65</sup>.

Actuaries will seek to develop more models for health management and care delivery, with the objectives of strengthening sustainability and increasing the effectiveness and resilience of health and care systems; these are crucially needed to deliver new treatments and effective care at an affordable cost, not least to address the manifest needs of patients living in remote rural areas.

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65 Gandarillas and Goswami, 2018

## 5 DESTINATION 2070

Surveys such as AR21 and PAR21 present projections of possible progress towards the year 2070 in a way which downplays the fact that analysis of that period – of the next 50 years – is radically different in nature from the next twenty-four hours.

With even the best of knowledge or the wisdom, it is impossible to picture, in any more than the vaguest way, what will actually happen to the world during those 50 years. The world is changing in highly unpredictable ways. All we can say with any ‘certainty’, is that the speed of change will accelerate; it will not slow.

*In this light, the important question to be asked is not: ‘where do we think we will be in the year 2070?’, but ‘where would we like the world to be in 2070?’*

This expresses our primary concern, as Social Security Actuaries, for the wellbeing of people; we would wish to see that sufficient pension benefits will be provided to all European citizens, to ensure, first and unconditionally, the prevention of poverty, but beyond that retirement incomes sufficient to assure human dignity in old age.

Moving, accordingly, along this 50-year time path we envisage the need to face a range of challenges, which are not necessarily ‘actuarial’ in a narrow sense, but which do impact on the objectives which actuaries seek to address. In particular:

### 5.1 PUTTING ASIDE OBSTACLES TO LIFELONG LEARNING

The skills and knowledge acquired by individuals over time can and should be seen as representing productive assets, but this is a perspective that has not until recently been given sufficiently weight.

Changing life patterns mean that this is less and less seen as a ‘one-off’ process, to be completed relatively early in life, but one which allows in later life for renewed learning, both by way of mental refreshment and stimulation, and to adapt to a changing employment landscape.

An important conclusion is therefore that increased support should be provided to the educational institutions of the Member States to enable a) the implementation of new learning technologies and experiential learning, b) the breaking down of boundaries between age groups and so facilitating inspirational mentorship and innovative thinking about ways to teach creativity, innovation, humanity and empathy, c) the development of practical and appropriate specialisms aligned with technology development, and d) the further development of digital technologies.

*Policymakers* should consider in increasingly flexible ways the distribution of educational resources not only to younger populations, but across the life course as a whole. It is notable that, in the United Kingdom, for example<sup>66</sup>, only 1% of the 2009 education budget was allocated to the oldest one third of the population. The range of learning opportunities needs to be adapted to the diversity of adult learners and to recognize both their needs and their strengths. Issues arising from specific health conditions, which may include, amongst others, aspects of nutrition, and which may impact disproportionately on older persons, may best be addressed by programmes of (re)education. In general, the means by which individuals may maximize their health status reflect the learning opportunities which are of equal importance across the age spectrum. We note also the value of learning opportunities for those, increasing in numbers, who may in their later years finally have time to undertake study for an academic degree.

There are however a number of barriers that need to be addressed to facilitate older people's involvement in lifelong learning. These may include, for different individuals:

- the need to overcome long-held personal attitudes not well aligned to a learning environment;
- barriers of a physical or material (notably financial) nature;
- barriers reflecting societal and related structures

Adverse stereotypes could be challenged through communication campaigns, aiming to increase knowledge about and understanding of the process of ageing, among the general public, policy-makers, teachers and service providers and as reflected in the media. Ireland, for example, has run an ongoing campaign to combat ageism, noting the wealth of evidence that negative stereotyping and discrimination against older people are pervasive and damaging.

## 5.2 UNLOCK CITIZENS' ACCESS TO THEIR PENSION INFORMATION

The access of an individual to his/her pension information is expected to become a necessity in the near future.

The development of digital pension tracking systems may be seen as a valuable starting point in this regard, enabling the provision of insights into the current and future patterns of an individual's income and expenses.

National tools, named as Pension Tracking Services - PTS - will be introduced in order to give citizens a clear understanding of their expected financial position in an easily accessible format. For the implementation of such a tool it is necessary to determine a) its role and its scope, b) the kind of information that should be provided to citizens,

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66 World Health Organization 2015: World Report on Ageing and Health

c) the data and technical requirements and standards to be established, and d) the appropriate governance structure, legal requirements and implementation strategy; see *Appendix B*.

From an actuarial perspective we consider the following aspects:

A service should be established that will be trustworthy and provide an objective overview of future retirement income. Its main goal should be to provide information that is individualised, objective and impartial, to citizens (and other rights' holders as appropriate) about their accrued entitlements and projected retirement income, in a simple and understandable manner. ***It is important for individuals that they understand the nature of their benefits and the projections before going on to consider the detailed estimates.***

This tool represents an important approach to overcoming the problems which can be seen to have arisen in recent years from market failures and from 'limited rationality'. It also offers a new opportunity to present useful information to scheme members regarding benefit provisions relating to three potentially important labour-related events: (a) retirement from active service, (b) suffering incapacity for work, and (c) pensions payable on death to surviving spouses (or in some cases children). The great majority will expect to qualify for benefits on 'normal' retirement, and the first priority will be to develop PTSs to the point where they provide clear and accurate (as far as possible) estimates relating to this contingency. Information on other benefits may be added at a later stage.

A governance tool of this kind represents a public good. This is perhaps its most important characteristic, and it should be presented publicly in that light.

Despite the need of regular and accurate information, however, it is unlikely that the provision of information as such will be sufficient to ensure that citizens claim in full their rights to adequate retirement benefits. Attempts to date to provide relevant information have fallen short of empowering beneficiaries; it is too often the case that an individual has inadequate understanding of figures presented, and so is unable to act in their own best interests. It is important to seek ways to overcome this deficit in understanding, and to actively assist beneficiaries in making the right personal choices, but it would also be appropriate to ensure that a default option exists by way of a pension plan suited as far as possible to the needs of the majority.

### **5.3 NECESSARY SERVICES TO ENSURE THE AUTONOMY OF OLDER PEOPLE AND THEIR PARTICIPATION IN SOCIETY**

According to the World Health Organisation (WHO), physical and social environments are key determinants of whether people can remain healthy, independent and autonomous long into their old age.

An age-friendly environment should be created, by optimising the location of, and investing in specialised housing and other facilities for, older persons. A consequential advantage may be a reduction in the costs of social care<sup>67</sup>.

Two (amongst many) essential requirements are the reduction of loneliness, and minimizing the risk of falls. Because the built environment and (especially) the technical features of housing influence decisions on relocation, three options are proposed in countries where low pension income is prevalent:

1. subsidising investments in the adaptation of seniors' homes to reduce their healthcare expenditures<sup>68</sup> (noting the need to treat health and social services, and their costs, in a more integrated way than hitherto); or
2. subsidising better-organised community care, helped by minimizing the dispersal of housing for seniors; or
3. encouraging senior citizens to move to locations allowing improved concentration of institutional care.

Declines in cognitive capacities and sensory functions, together with increasing social isolation issues too often lead to low quality of life. This situation can be mitigated by Ambient Assisted Living<sup>69</sup> - AAL - technologies<sup>70</sup>; *for some further approaches see Appendix C.*

The advantages for older people of remaining for as long as possible in the community are evident, and can be facilitated by Ambient Assisted Living (AAL) technologies, which bring health care and long-term care services to the homes of their users. They are becoming an essential part of the infrastructures of 'smart cities' in ageing societies<sup>71</sup>.

The level of functional capacities that can be supported in smart, age-friendly environments depends crucially on the available health and social care services and assistive technologies.

In this context, digital health tools combine a wide range of technologies to support health processes. The potential of these technologies to support healthcare transformation effectively is widely accepted<sup>72</sup>.

67 Bogataj et al, 2019

68 Wood, 2017

69 See no 9

70 Berridge, 2017; Blackman et al., 2016

71 Dlodlo, Gcaba, and Smith, 2016; Doukas et al., 2011

72 Baltaxe, E. et al., 2019

## 5.4 ENSURING SUSTAINABILITY OF SOCIAL SECURITY PENSION PROMISES

In both Europe and worldwide, the realization, at last, of the issues around population ageing, is now testing the resilience of social systems.

Governments must now develop appropriate responses to the impact of increasing life expectancy (and engage in a process of dialogue with their populations), which should include primarily an assurance of adequate, mainly pension, income for the elderly.

It is vital that pension promises can be maintained in the future. This is indeed complex issue, into which many factors play, and many of which have been discussed elsewhere in this paper. Notable among these is the tracking and evaluation of pension scheme and their implementation; an important aspect here is the frequency of scheme reviews to facilitate discussions and advance planning, between governments and specialist advisers.

An important advance was made in 2019, with the introduction of disclosures relating to pension entitlements of households or pension liabilities of contributory social security pension schemes, through the supplementary Table 29 of each country's national accounts<sup>73</sup>. This responded to the call by the EU for disclosure of pension liabilities, and has been accomplished through the supplementary Table 29, rather than in the core national accounts. Issues remain to be resolved in relation to the accrued-to-date benefit basis adopted for this purpose by Eurostat, effectively depicting the financing position in the event of a winding-up of a scheme at the date of the accounts. Whilst this approach can be interpreted usefully in relation to occupational pensions provided by employers, the accrued-to-date liability figures, presented in isolation, do not provide meaningful information about the financial position of a Social Security Pension Systems operated on a PAYG basis, and have no obvious validity in that context.

The introduction of the pension reporting framework of Table 29 has resulted, moreover, in possible problems from an actuarial perspective of comparability with the AWG's Ageing Report. These arise from the differences between the so-called 'closed-group' methodology of the former, compared with the 'open-group' approach of the latter, with some risk of potential misuse of Supplementary Table 29 pension information; *see Appendix D for some further information on methodological differences.*

It is important, in our view as actuaries, to create a solid framework for effective communication and interpretation of the figures. The key objective of such a framework should be to provide all stakeholders with accurate, relevant and comprehensive information on the financial status of a social security pension scheme, that enables

73 National Accounts are drawn up under the European System of National and Regional Accounts (ESA 2010), which is based on the UN recommended System of National Accounts (SNA 2008).

informed decisions to be made<sup>74</sup>. On that basis, a robust framework for effective communication and interpretation of the social security pension information in Table 29 should be established.

We consider that improvement might be achieved through the use of an approach suing multiple disclosures, in the form of balance sheets, providing consistency with financing methods; this would offer conformity with international actuarial standards and guidelines. We note here the ILO-ISSA guidelines on actuarial work for Social Security and the International Standard of Actuarial Practice, ISAP2, referring to ‘Compliance with requirements of national and international statistical reporting’ and ‘Consistency with the Financing Method’, respectively, with which the actuarial methodologies noted in the foregoing Chapter 2 offer consistency.

For the purposes of assessing the financial sustainability of public pension systems, and from an actuarial perspective, the following should be considered:

- intensification of discussions on the sustainability and adequacy of social security pension systems in Member States. Actuaries can contribute inter alia to the analysis of inter-generational fairness, which is impacted by both intentional and non-intentional transfers between subgroups of insured persons, and the overall generosity or adequacy of the systems.
- encouraging Member States to implement a statutory requirement for regular actuarial reporting on the long-term finances of social security; this can be an important factor in ensuring sustainability of social security pension promises, as well as providing a sound financial monitoring environment.
- the importance of following international guidelines for analytical reporting on social security pensions and other benefits, both for actuarial work in individual Member States and for EU level exercises such as The Ageing Report and the Pension Adequacy Report.

## 5.5 EXPERT ADVICE MATTERS

The challenging period of the COVID 19 pandemic has highlighted the importance of engaging with and listening attentively to a range of experts.

As Social Security actuaries we offer deep expertise in relation to Social Security; underpinning the systemic understanding and necessary tools to implement solutions. Moreover, we are able to work in a way which is independent of commercial interests<sup>75</sup>.

74 Meeting the challenge of Ageing in the EU, AAE discussion paper, March 2019

75 Our future role as Social Security Actuaries in Europe, SSSC discussion paper, May 2021

As professionals with expertise in the quantification and management of long-term risks which are susceptible to mathematical modelling, we are well-placed to play an active role in analysing the impact of future changes on pension and social security provision and to advise EU and national institutions.

The Social Security Sub-Committee of the AAE has sought a more extensive understanding of the role which actuaries play in the social security systems of the EU Member States generally, and this regard sent a questionnaire to the SSSC members regarding the role of the Social Security Actuary in their countries<sup>76</sup>. Broadly, we note that actuaries are directly involved in the social security pensions' schemes in, at least, one third of the Member States. However, in most of these countries a statutory basis for the actuary's position is lacking. Actuaries are nevertheless employed in roles including statistical and financial analysis, and in planning departments. In most countries the forecasting of the social security pension system is part of the budget planning under the responsibility of the Ministry of Finance, and in some cases might be undertaken by a planning body<sup>77</sup>.

Based on (incomplete) responses received to the questionnaire, actuaries' role in social security pension schemes is summarised in the table below:

TABLE 4: THE ACTUARIES' ROLE IN SOCIAL SECURITY PENSION SCHEMES					
	Budgeting	Monitoring of the long-term feasibility	Assessment on the legislation effects	Benefits' calculation	Ch 19-70
Hungary HU	X		X		3.0
Bulgaria BG	X	X	X	X	1.4
Cyprus CY		X			2.9
Germany DE	X	X	X		-2.0
Greece EL	X	X			2.1
Finland FI		X			-2.3
Ireland IR		X	X		3.0
Italy IT	X	X	X		-3.8
Luxembourg LU	X	X	X		-2.1
The UK		X	X		-2.2
Austria AT			X		-0.7
The Netherlands NL	X				-1.8

Source: SSSC questionnaire

76 The SSSC asked its members about the roles of actuaries in their social security pension systems. I.e. were whether actuaries were employed in social security, were there any statutory requirements that need actuarial assessment, what kind of actuarial issues are communicated and by whom

77 The Centraal Plan Bureau in the Netherlands, the Conseil d'Orientation des Retraites (COR, a service of the Prime Minister), the Commission on Pension Provision in Austria

It is worth noting that, even though the role of Social Security Actuary is not formally regulated, in most European countries, national bodies representing actuaries generally take measures to enforce appropriate standards of professional conduct.

Actuarial modelling approaches and methodologies are built on projections of future cash flows, which facilitates assessment of the short, medium and long-term impact of pension policies and reforms on the adequacy and sustainability of pension system provision in an integrated way. The social security guidelines have been formalized by the International Social Security Association (ISSA); for almost a century, and it has been recognized that actuarial reporting forms a key element of good governance in relation to social security.

At the present time, as with any crisis, social security systems face many and serious challenges, and these may impact on benefit levels. A conceivable and regrettable long-term consequence may be that those who feel they have been unfairly disadvantaged, may dissociate themselves from orderly social dialogue.

To face the challenges of realities ‘on the ground’ we, as Social Security Actuaries, seek to strengthen our problem-solving approaches. This includes steps to define as clearly as possible the requirements for recognising and measuring social benefits. We recognize that many problems, are susceptible to a variety of feasible solutions. The actuarial approach should [help to] identify those solutions which are optimal<sup>78</sup>.

***Our over-arching objective is, in the long run, to guide the provision of pension benefits sufficient at least to prevent poverty, to all European citizens. Before we actually translate it into reality, we must be able to dream about it.***

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78 Our future role as Social Security Actuaries in Europe, SSSC discussion paper, May 2021

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## APPENDIX A

The implementation of publicly-provided Long Term Care (LTC) cannot be seen apart from social norms and cultural values. For instance, a negative relationship is generally found between family ties and expected coverage of LTC. Therefore, investigating social norms might add to the understanding as to why some countries were earlier than others to introduce LTC insurance. In societies seen as ‘individualist’, it is expected, broadly, that individuals will look after themselves and their direct family only. By contrast, ‘collectivist’ societies are characterised by people’s identification with larger groups and recognizing that group loyalty implies a duty of some wider form of care responsibilities. Countries characterised as having a ‘feminine’ outlook tend to display inclusivity and people value equality, solidarity and quality in their working lives. In such ‘feminine’ societies, caring for others and solidarity are dominant values, but the family structure is more flexible than the more traditional family structure in ‘masculine’ countries. Hence, although the demand is recognized in all societies that care arrangements are needed by the frail, the elderly and others similarly unable to care adequately for themselves, we can by no means assume automatically that provision is made within the family. The characteristic combination of individualism and social solidarity in the Netherlands, for example, may well explain the strong social support for extensive welfare state arrangements and the early adoption and subsequent expansion of a universal public LTC insurance scheme. Interestingly, a similar culture combining the ‘individualistic’ and ‘feminine’ aspects is found in Sweden, which has developed equally comprehensive, publicly-financed LTC arrangements. A comparative study on the provision of elderly care in Europe found that it is in the Scandinavian countries and the Netherlands that the state is most clearly regarded as being responsible for providing care, while there are no more than weak legal obligations for relatives to provide informal care. In the countries with family-based care systems, such as Germany, Austria and most of Mediterranean countries, the responsibility for the care of an older person with such needs is primarily borne by their relatives<sup>79</sup>.

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79 Financing Long Term Care, The Role of Culture and Social Norms, Peter Alders, Frederik Schut: Netspar 2020

## APPENDIX B

The Pension Tracking Service (PTS) tool should provide a first layer of basic information that will give an overview of a covered person's pension situation in a way that can be perceived as neutral, trustworthy, and independent. Amongst the basic recommendations, the 'landing page' (layer 1) of the PTS should display the expected monthly retirement income and the retirement date in a simple manner whilst the accrued entitlements and pension providers (i.e., breakdown by source) should be disclosed in a second, easily accessible layer. From this point onwards citizens will be encouraged to seek more information via the website of the pension provider, by accessing the pension provider's Pension Benefit Statement (PBS).

A PTS, at the bare minimum, could consist of the following fields: (a) user ID, (b) provider ID, (c) accumulated savings/accrued entitlements, (d) projected retirement income, (e) retirement age and (f) provider email or telephone number. The data standards could and should be set by an independent body. If and when it is proposed to show additional calculations, it may be advantageous to use the knowledge of independent specialists such as actuaries.

The data should be complete, updated in a timely manner, and consistent. The extent to which a PTS can or should apply its own checks to information taken from pension providers may depend on whether its architecture incorporates a database structure, which would allow within itself for some validation of data. This may not be possible if the PTS operates only as a conduit for data transmitted from the pension provider, in these circumstances the pension provider should be held responsible for the appropriate checking.

It could be useful, but may not be straightforward, to add to the the PTS framework a tool to allow estimation of the projected retirement income for a beneficiary net of taxes, i.e., the expected disposable income.

To implement the projection methodically, it will be necessary to specify 'basis' assumptions for a considerable number of parameters. At a minimum, those to be specified will include: (a) the interest (discount) rate, (b) the return on investments, (c) contributions payable year by year, (d) the rate of real wage growth, (e) the rate (or rates) of inflation, (f) the volatility of (and correlations between) asset classes, (h) expected state incentives such as tax privileges, (i) the estimated impact of administration costs of pension plan and retirement products, and (j) assumptions regarding changing longevity. The assumptions should, as far as possible, be unbiased, mutually compatible and reflect the best estimate of the variables that will determine the ultimate cost of providing post-employment benefits. We should consider, also, the desirability of transparency in the setting of basic assumptions. Actuaries, for whom the whole process of basis setting is an integral aspect of their normal professional practice, can add considerable value in doing

so for a PTS, and it is to be hoped that this will not only become normal practice, but will also contribute to maintaining peoples' trust in the work of specialists generally.

A key issue in developing the future framework for Pension Benefit Statement and Pension Tracking Services is the need for standardisation of basic elements and hence comparability between individuals. For certain elements, such as for example reference dates, it should be relatively straightforward to prescribe the requirements, and this may be recommended as a useful starting point.

Like most institutions in present times, pension providers are beginning to appreciate the need address concerns around 'ESG' - Environmental, Social, and Governance - aspects of their operations, and there is plenty of scope for relevant information to be provided to their beneficiaries through these rapidly developing information systems.

It is essential to maintain absolute confidentiality of the information relating to an individual beneficiary or citizen. Digital systems offer the best security in this regard, but it is important not to overlook the needs of those, maybe not small in number whose level of digital literacy is low, or non-existent. This will require the engagement of advisers of some kind, but who in any case must be adhere to the requirements for personal data protection.

From one perspective, what is at stake is for individuals to realize the nature of a pension scheme as a vehicle to facilitate sufficient savings, mobilizing the advantage of collective arrangements, to assure adequate retirement income. It is important to ensure that information systems, do not encourage expectations at either too high or too low a level, and regulations should seek to ensure an approach to building systems which offer as far as possible, 'neutrality' in this regard. Attention will be needed to the difficulties of dealing properly with circumstances in which multiple pension benefits stand to be accumulated.

In seeking the best way to achieve the objective of information systems which are clear, understandable for users, and coherent, many actors have valuable input, to offer; these include government departments, pension providers, actuaries and other specialists, and discussion fora should embrace all of these.

At present, a considerable variety of projection methodologies have been developed, including IORP II, PRIIPs and PEPP<sup>80</sup>. It may be useful to review these methods with a view to achieving at least some integration. The Actuarial Association of Europe would

80 IORP: Institutional for Occupied Retirement Provisions

PRIIP: Packaged retail investment and insurance products (PRIIPs) are investment products that banks typically offer to consumers, for example, when they want to save for a specific objective such as a house purchase or for a child's education.

PEPP: Pan European Personal Pension Product

willingly offer their services to EIOPA<sup>81</sup> and the European Committee in this regard. It is a significant unknown as to the extent to which individuals will be willing to engage for lengthy periods with a pension information website. In that light, special attention should be paid in the design process to the need to not only provide reliable information but to be easy and efficient of access. Only on that basis will these systems lead individuals to make the 'right', or optimal choices for themselves; failing that the investment to be made in PTS will become a disinvestment!

Legislative measures are useful but not always necessary; it may be possible for the 'pension market' itself to setup a PTS. In DK and SE legislation has not been needed in order to launch a national PTS.

However, it is of value to consider measures regarding the supervision of PTSs. The effective implementation of a national PTS, should be facilitated by a progressive roll-out over time based on a well-defined strategy. This will allow adaptation to the different levels of readiness likely to be seen amongst providers' and the adjustments needed to ensure the complete and accurate transmission of personal data. National Actuarial Organizations could organize the resources need by countries to implement such a strategy.

The experience of those (several) countries that have already put a PTS in place will be of the greatest value and should be drawn upon to the maximum extent possible by those newly piloting such schemes.

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81 EIOPA: European Insurance and Occupational Pensions Authority

## APPENDIX C

As individuals move into ever older age brackets, it becomes an increasingly important objective to facilitate the monitoring of their daily activities. This can be facilitated through the construction of ‘smart’, age-friendly homes with a range of embedded sensors of different types, together with wearable devices, perhaps embedded in clothes. All of these can be connected to wireless networks; in this regard a useful concept is the ‘internet of things’<sup>82</sup> (IoT) as providing an infrastructure framework<sup>83</sup>. So-called ‘Big Data’ may be mobilised to identify and mitigate some of the specific risks to which older adults are exposed in their homes and in public places. It is expected that ‘Risk mitigation decision support’ systems will be developed, following the approaches of Artificial Intelligence (AI) and Ambient Intelligence, and based on analysis of real-time monitoring data describing behavioural patterns. Such systems may allow for the early identification of individuals likely to reach the ‘disability threshold’ (the stage of decline at which they are unable to live safely in their accustomed environments) and hence needing to move to more suitable living environments.

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82 The Internet of things (IoT) describes the network of physical objects— ‘things’ or objects—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet

83 Davis et al., 2016; Del Campo, 2016; Kaluza et al., 2014

## APPENDIX D

As experts, we strongly recommend to consider the open – group approach for the assessment of the financial sustainability of EU social security pension schemes. The differences between the closed-group and open-group approaches are presented in the table below<sup>84</sup>:

TABLE 5: CLOSED VERSUS OPEN GROUP APPROACH	
Closed – Group	Open- Group
only includes current pensioners and contributors	includes current pensioners and contributors as well as future contributors
No future entrants are taken into account	All future contributions are considered
ignores future contributions (largest asset)	All future benefits of current pensioners and contributors (past and future service) and future contributors are considered
No future accrual of new benefits	provides a complete and forward-looking financial picture of a SSPS
provides incomplete financial picture of a SSPS	
only reflects the performance of a SSPS in the past	

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84 Enhancing the communication of Table 29 social security pension figures under Eurostat ESA 2010 framework – an actuarial perspective, Costas Stavrakis, April 2021

## THE ACTUARIAL ASSOCIATION OF EUROPE

The Actuarial Association of Europe (AAE), founded in 1978 under the name of Groupe Consultatif Actuariel Européen, is the Brussels-based umbrella organisation, which brings together the 37 professional associations of actuaries in 36 countries of the EU, together with the countries of the European Economic Area and Switzerland and some EU candidate countries.

The AAE has established and keeps up-to-date a core syllabus of education requirements, a code of conduct and discipline scheme requirements, for all its full member associations. It is also developing model actuarial standards of practice for its members to use and it oversees a mutual recognition agreement, which facilitates actuaries being able to exercise their profession in any of the countries concerned.

The AAE also serves the public interest by providing advice and opinions, independent of industry interests, to the various institutions of the European Union - the Commission, The Council of Ministers, the European Parliament, ECB, EIOPA and their various committees - on actuarial issues in European legislation and regulation.



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