WORKING PAPER | ISSUE 24/2025 | 7 OCTOBER 2025

THE MACROECONOMIC IMPACT OF AGEING, EU IMMIGRATION POLICY AND PENSION EXPENDITURES

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The European Union population is ageing increasingly rapidly, with dependency ratios and shares of the elderly in the total population rising across the continent. While aggregate projected increases in age-related public spending in the EU are manageable, there are substantial differences between EU countries. A low probability of a sustained rebound in fertility rates effectively leaves the EU with continuingly high positive net-migration levels as the only route to mitigate the economic effects of ageing. EU potential growth rates are set to fall, driven down by shrinking labour forces and likely slowing total factor productivity, adding to the fiscal challenges from an ageing population.

Facing slowing growth and rising fiscal costs from ageing, and with only net migration as a possible offsetting policy lever, it is particularly economically important for EU countries to ensure that inward migration leads to a positive net contribution to public finances. Evidence from several member states suggests this requires the share of employment-based migration in total migration to be increased, and shares of asylum and family-based migration in particular to be reduced.

Divergent but rising EU public pension costs across member states arise from different replacement rates, expected years in retirement and life expectancies at high ages. Overall, retiring baby-boomer generations in the EU look set to enjoy longer lives in retirement than either their parents or children, though diverging life expectancies across the income distribution makes it complicated to raise average retirement ages in many EU countries.

Differences in the degree of reliance on private pre-funded pension schemes in the EU impact the financial market and sustainability implications of pension schemes, while needed pension reforms must, for equity reasons, also take into account gender and coverage differentials among the covered populations. Lastly, ageing populations will put additional pressure on long-term care worker supply, with only limited scope for robotic substitution.

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Recommended citation:
Pinkus, D. and J. F. Kirkegaard (2025) 'The macroeconomic impact of ageing, EU immigration policy and pension expenditures', *Working Paper* 24/2025, Bruegel

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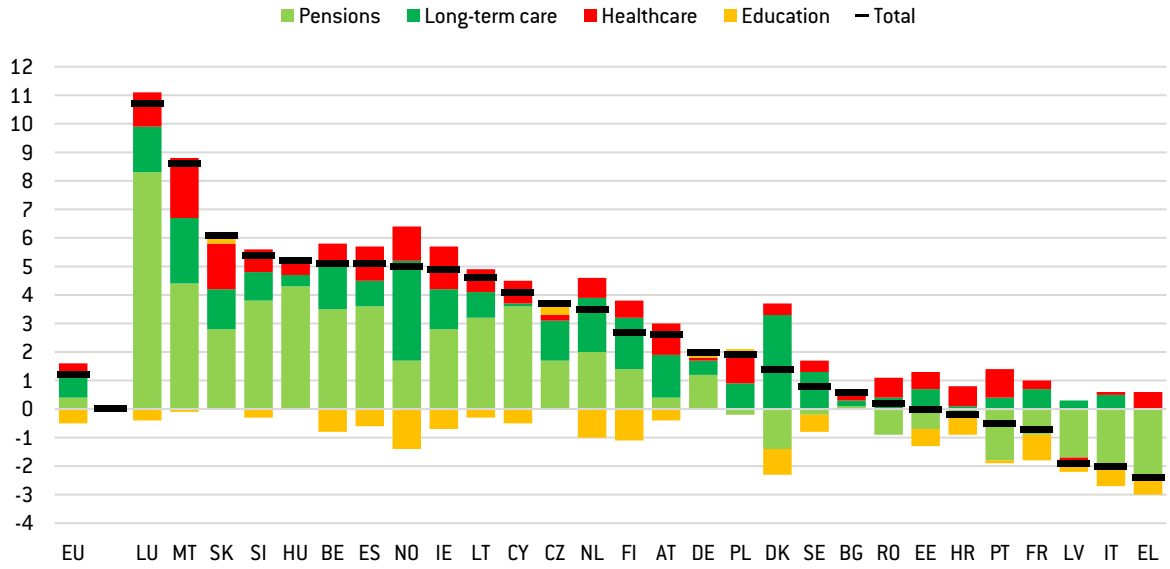
1 Introduction

The European Union faces an accelerated ageing process in the coming decades, though its speed will be different in different EU countries. This inevitable societal development will have major and broadly negative implications for the continent's economic growth prospects. Most EU countries have already started far-reaching economic reforms to try to alleviate the effects of ageing. The European Commission's regular Ageing Reports, published every three years since 2003, outline the projected economic and budgetary consequences of ageing in terms of member state expenditure on pensions, healthcare, long-term care and education (Figure 1). Reports also identify major reforms member states should implement. Figure 1 outlines the drivers of EU ageing-related cost increases from 2022-2070.

Figure 1: Baseline projection changes in ageing costs 2022-2070, % of GDP



Source: Bruegel based on European Commission (2024a), Table 1.

Figure 1 makes clear the range of expected changes in annual ageing-related costs: from a hike of over 10 percentage points of GDP in Luxembourg, to an expected decline of over two percent of GDP in Greece and Italy over the next five decades. On average, ageing related costs in the EU are expected to rise by a little over one percentage point of GDP by 2070. On average for the continental sized EU economy, this would be a manageable expected increase in public ageing-related expenditures over the next 50 years, and contrasts dramatically with the projected ageing-related increases in other large economies, such as the United States and China, where ageing-related spending is expected to rise by about five to more than nine times as much as in Europe[1]. It is not, in other words, the cost of European welfare states that is 'out of control' as the whole world ages. The real risks lie elsewhere.

Figure 1 further underlines how most of the variation between projected ageing-related spending increases in EU countries originates with pensions and long-term care. In contrast, projected

[1] CBO (2025) estimates that US federal government healthcare and pension expenditures will rise by about four to five percentage points of GDP from 2025-2055. Meanwhile, the debt sustainability analysis (DSA) included in the 2024 Article IV Report for China includes International Monetary Fund staff estimates for Chinese government pension spending alone rising by nine percentage points of GDP from 2023 to 2052 (IMF, 2024, p.77).

expenditure increases in healthcare costs are quite uniform across countries, as are expected declines in education expenditure from fewer children. Consequently, this paper focuses on the analysis of the cost developments in the pension and long-term care sectors, which mainly depend on the numerical changes in the numbers of older Europeans, and the challenges for policy in these two sectors[2].

Section 2 starts by presenting the most pertinent demographic trends in the EU. Section 3 discusses how ageing will affect countries' potential growth rates. It is generally agreed – and indeed assumed in current long-term population and economic projections for the EU[3] – that the EU will continue to receive ongoing significant inward migration, which could offset parts of the negative economic impact of ageing. Research suggests that the budgetary implications for at least the more comprehensive European welfare states vary greatly, depending on who entering migrants are. Consequently, section 4 argues that EU migration policy design must strive to ensure a composition of inward migration that will be most likely to contribute positively to the fiscal outlooks of EU countries. Section 5 then analyses the challenges associated with implementing the arguably most intuitive and cost-effective pension reform available to governments today – raising effective retirement ages. Section 6 analyses the divergent impact of ageing on pension systems and financial markets. Section 7 looks at the impact of ageing on long-term care systems. Section 8 summarises and offers a series of policy recommendations to improve the resilience of EU pension systems in the face of population ageing.

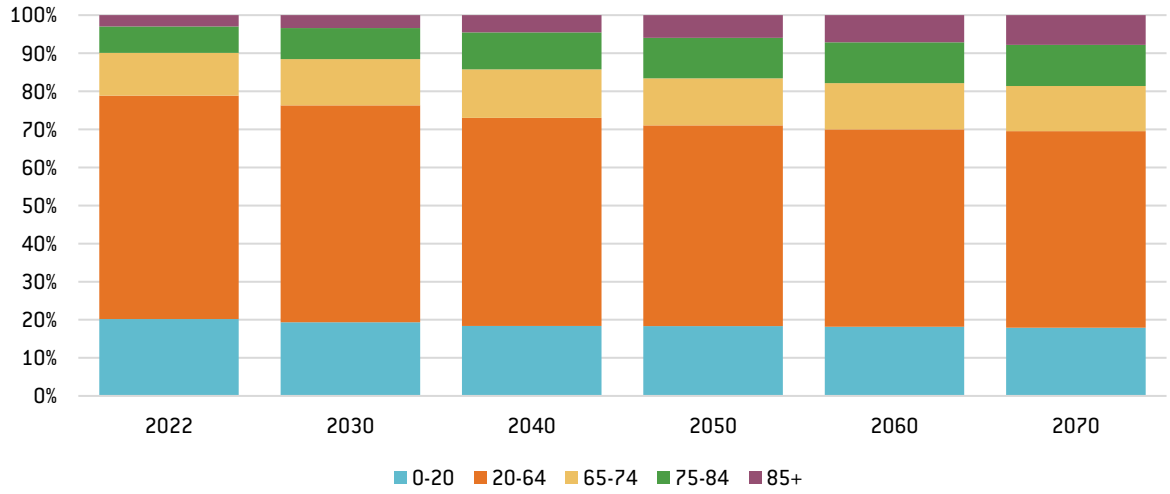
2 Demographic trends

The composition of EU populations in terms of age has changed in recent decades, and is projected to continue to do so. Figure 2 shows the projected composition of the EU-level population up to 2070. These projections clearly show a transition to an older population, with a relative decrease in the shares of working-age individuals (aged 20-64) and those younger than 20. Importantly, relative growth is projected to be strongest in the oldest categories, with those aged 85+ growing the most. We discuss the implications of this in section 6.

[2] The decision to de-emphasise the analysis of healthcare costs follows from both the uniformity of estimated cost increases in Figure 1 and their relatively limited impact, compared to other spending categories. As discussed in European Commission (2024a, chapter 2), the drivers of future healthcare costs in the EU are complex and have directionally different impacts. While it is the case that ageing, especially to very old ages, can drive up healthcare costs, this trend is not deterministic. As noted in European Commission (2024a, p. 87): *"Longer working lives accompanied by a healthier working population can mitigate the impact of ageing. In addition, many researchers have shown that ageing has contributed much less than widely thought to the observed growth in expenditure and in many Member States an actual reduction in per capita spending at very old age (85+) can be observed. This is because alongside real needs, social, economic and cultural considerations determine the allocation of resources to the sector and use of resources across different age groups"*.

[3] Eurostat's medium, or baseline, population forecast scenario includes assumed ongoing levels of net migration guided by the most recent decade or so of recorded net migration levels in the EU. Eurostat also publishes population projections assuming higher, lower or zero net migration.

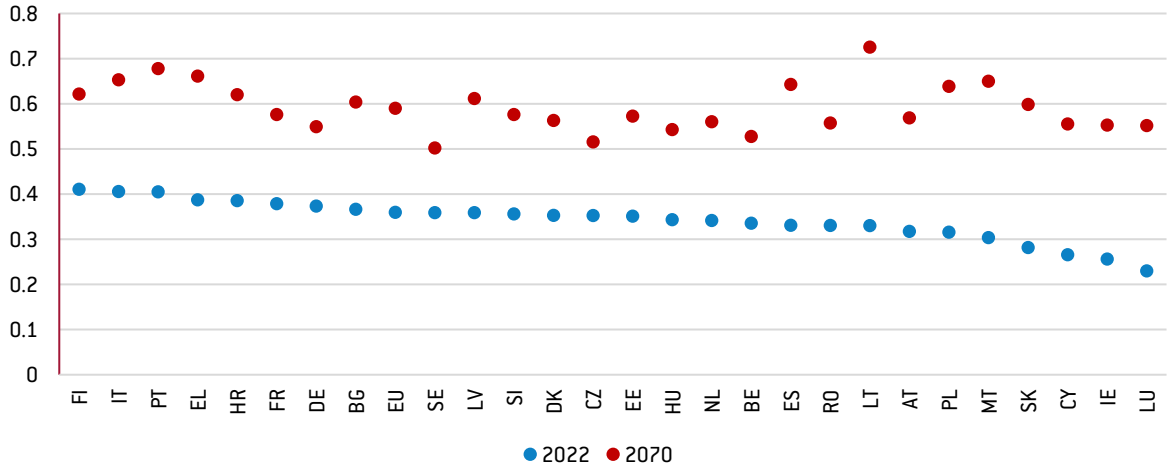
Figure 2: EU population shares by age groups (%)



Source: Bruegel based on Eurostat.

As a direct consequence, the old-age dependency ratio, calculated as the number of individuals aged 65+ divided by the number of working-age individuals, is projected to increase drastically in all EU countries (Figure 3). At EU level, the ratio is projected to go from 0.36 in 2022 to 0.59 in 2070, an increase of over 60 percent. While the ratio is projected to increase in all countries, population ageing is projected to happen at different speeds in different EU countries and regions (Pinkus and Ruer, 2025).

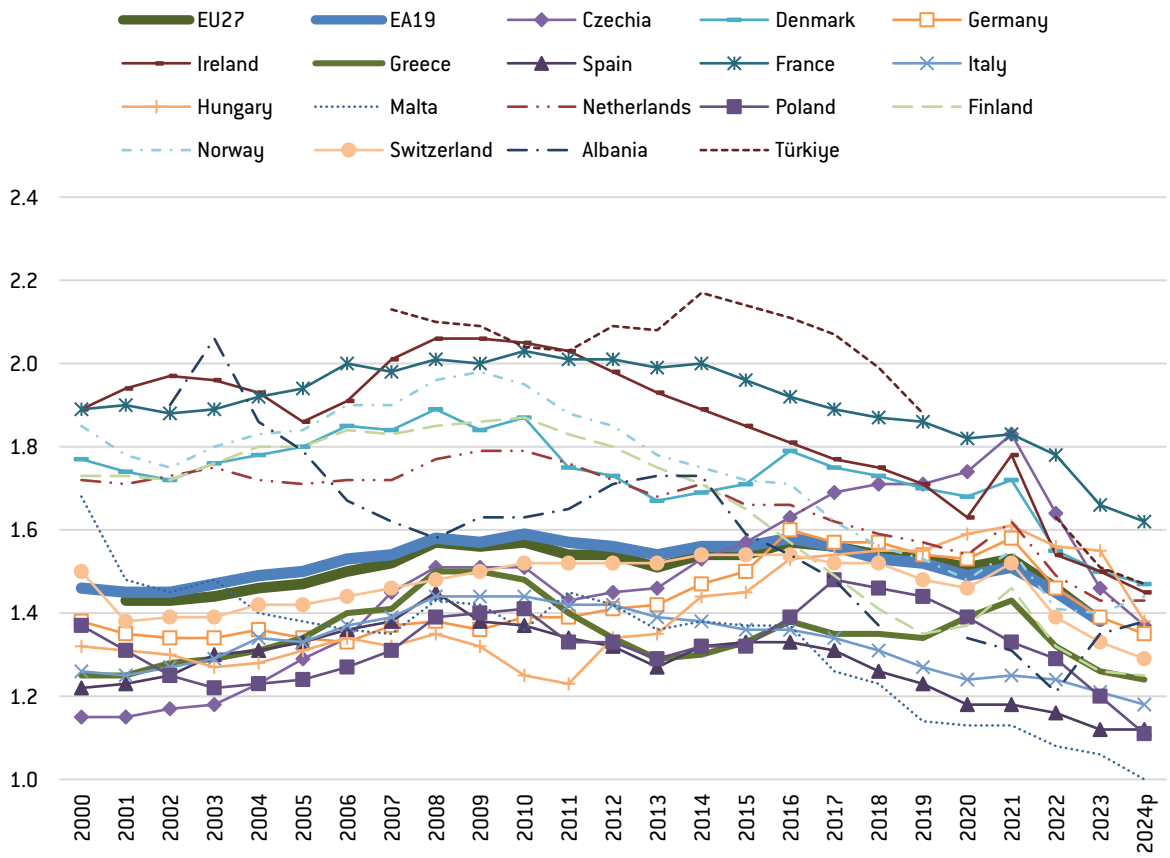
Figure 3: Old-age dependency ratio



Source: Bruegel based on Eurostat.

Population ageing results from the combination of two purely demographic trends: lower fertility and increased longevity. The third factor, migration, will be further discussed in section 4.

Figure 4: Total fertility rates, EU27, EA19, and select European countries, 2000-2024



Source: Bruegel based on Eurostat, National Vital Statistics. Note: 2024 rates are projected.

Recorded total fertility rates (TFR) in the EU hit a record low of just 1.37 in 2023, and preliminary member-state data for 2024 suggests a continued decline (Figure 4). This decline has accelerated since 2016, and in the aggregate now more than offsets the early twenty-first century recovery in European fertility rates witnessed especially in Eastern Europe. Figure 4 further shows how several EU countries, including Malta at 1.0, Poland at 1.11, Spain at 1.12 and Italy at 1.18, are expected in 2024 to see TFRs at around just half of the replacement rate of 2.1 – levels previously only seen in some advanced Asian economies.

Meanwhile, the Scandinavian countries, typically associated with the most comprehensive implementation of family-friendly public policies, have also seen declines in recent years to TFRs of about 1.4-1.5, while the EU's traditional fertility champions of France and Ireland are also today well below replacement rate levels. This is also true in poorer neighbouring countries including Albania (1.38) and Turkey (1.47) (2024 figures), underlining the breadth of the recent decline in fertility levels across the region. Figure 4 lastly shows how the pro-natalist policies of the government of Viktor Orbán in Hungary have not stopped Hungarian fertility from falling back to the very low levels seen in the

2000s, underlining the finding that even very generous fiscal transfers and birth bonuses do not sustainably increase fertility rates[4].

Meanwhile, longevity has substantially increased across the EU in recent decades. Life expectancy at birth has increased from 75.1 years in 2005 to 78.7 years in 2023 for males, and from 81.5 to 85 years for females[5]. Life expectancy is also projected to continue increasing in the future, according to Eurostat. While longer lives are a substantial achievement and should be recognised as such, they entail policy challenges that we discuss in this paper. The fact that people are living longer but not necessarily healthier poses particular challenges for long-term care and healthcare policies (Pinkus *et al*, 2023).

3 Ageing and EU potential growth

3.1 Ageing and the EU potential growth rate outlook

Countries' long-term economic, or potential[6], GDP growth rates comprise the contributions of three main components: the growth rate of the potential workforce[7], capital[8] and the residual estimated total factor productivity (TFP) growth. Different estimates uniformly indicate that the EU potential growth rate has dropped from two percent in the early 2000s to a level of about 1.4 percent in 2024. By projecting the expected developments of growth components, the 2024 European Commission Ageing Report projected the long-term average growth rate of EU real GDP from 2022-2070 to be 1.3 percent (European Commission, 2024a, Table 4, p.11). Maintaining the EU's potential growth rate at 1.3 percent per year in the next half century will not be easy, and will require what has been a steady decline in potential growth in recent decades to be stopped.

The European Central Bank regularly surveys a large pool of professional economic forecasters, asking them, among other things, what they believe the euro area's long-term (five years into the future)

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[4] A tax exemption in Hungary for mothers of two or three children is potentially extremely generous, but highlights the complexity of fiscally centred pro-natalist policies. A tax exemption typically will only have value if the recipient is employed, which for mothers of multiple, especially young, children may be difficult without available public childcare and a spouse fully participating (even in the absence of a tax exemption) in household work. See *Reuters*, 'Hungary's Orban launches tax exemption for mothers, cap on housing loan rates', 22 February 2025, https://www.reuters.com/world/europe/hungarys-orban-launches-tax-exemption-mothers-cap-housing-loan-rates-2025-02-22/.

[5] Eurostat, 'Life expectancy by age and sex', https://ec.europa.eu/eurostat/databrowser/view/demo_mlexpec/default/table?lang=en. 2023 estimates are provisional.

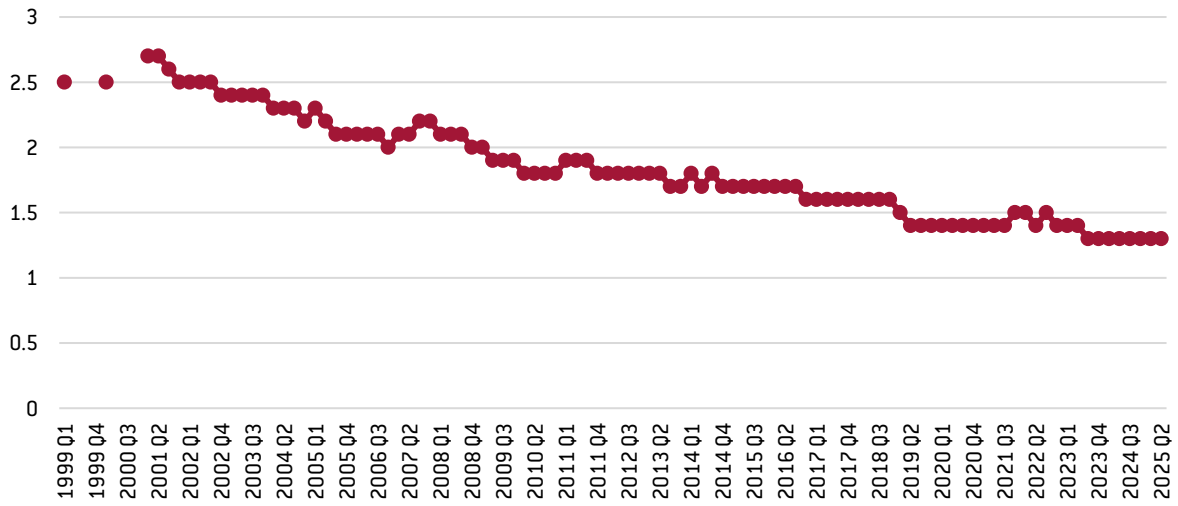
[6] Potential growth rates are usually defined as the highest achievable level of GDP growth consistent with stable inflation at the desired level (in the euro area, two percent). In a standard New Keynesian macroeconomic framework, actual GDP growth rates may be above or below potential growth rates, giving rise to positive or negative output gaps.

[7] In practice, the economic concept of 'potential employment' is usually utilised in model estimations. Potential employment is a more detailed description of the actual additional number of people in an economy that may become gainfully employed, rather than the entire working-age population. It typically, in addition to the working-age population growth rate, incorporates the effects of a country's structural level of unemployment (ie the non-accelerating inflation rate of unemployment, or NAIRU), and trend labour-force participation. The latter refers to the age and gender profile of a country's workforce, which affects aggregate labour-force participation through gender effects as women typically have lower participation rates, and the fact that participation tends to decline steeply beyond certain age thresholds. An increased share of older workers will lower average labour-force participation and potential employment. A wide variety of government policies – availability of unemployment benefits, access to early retirement, access to education, retirement ages – hence affect a country's potential employment level.

[8] Estimates of countries' 'capital stocks' often exclude housing to focus on 'productive capital', while some models may also separate out growth rates of 'human capital'.

growth rate will be. This long-term growth indicator is a good proxy for what the economics profession and financial markets at any moment in time believe EU (or in this case, the closely related euro area) potential growth rate is. It has more than halved since 1999 to just 1.3 percent today (Figure 5). The perception of steadily declining EU potential growth rates among observers of, and investors in, Europe is, in other words, longstanding and likely deeply entrenched. More dramatically successful policy initiatives from EU leaders are needed to alter this perception of the EU economy.

Figure 5: Survey expectations for euro-area 5-year ahead growth rate, Q1 1999 to Q2 2025

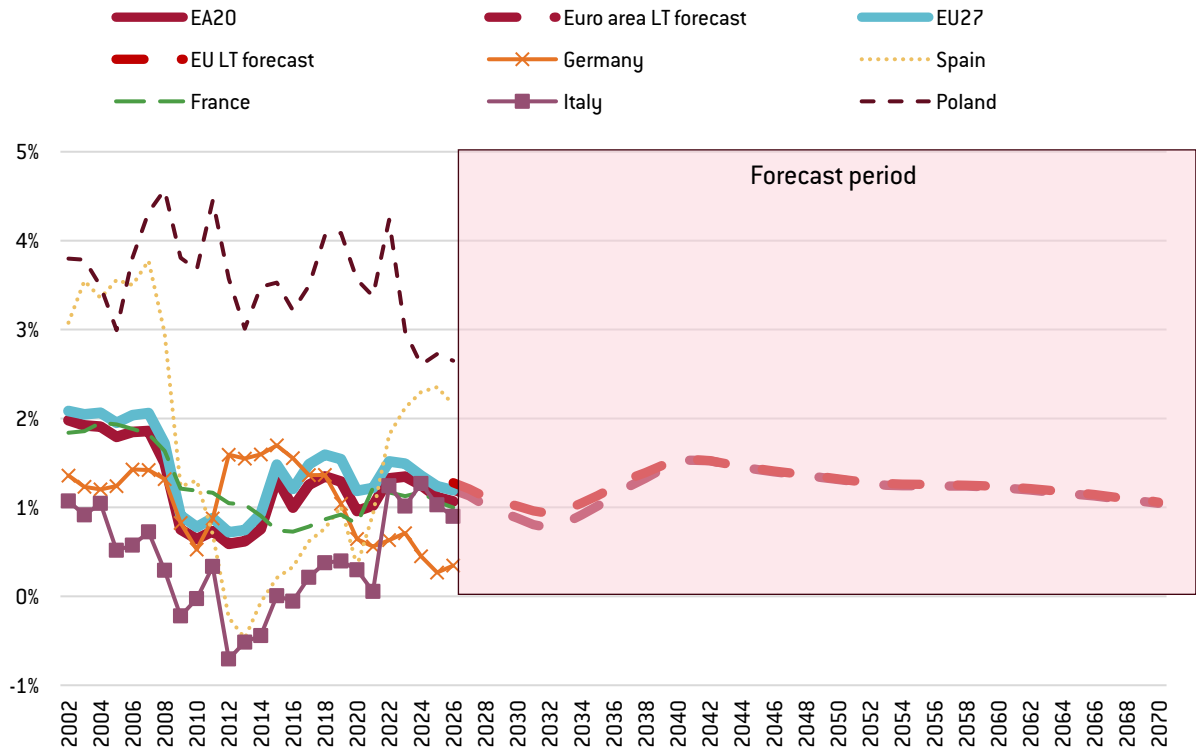


Source: ECB Survey of Professional Forecasters. Note: mean expectations for the 5-year ahead euro-area growth rate.

Potential growth rates can be estimated based on a production function utilised to assess the European economy's productive capacity, eg potential growth rate, at a given point in time. While in principle potential growth estimations should not be influenced by cyclical developments, model estimates – which often involve various smoothing algorithms – tend to vary over time with the business cycle. Figure 6 illustrates this for the EU[9], showing the dramatic estimated decline in the EU potential growth rate from around two percent to below one percent of GDP during the global financial and euro crises from 2008-2013. While Figure 6 shows that estimated EU GDP potential growth rates have since recovered somewhat, they are nonetheless again on a declining trajectory and are projected in 2025-2026 to be essentially similar to the ECB survey results for the euro area of about 1.3 percent. Figure 6 also includes the long-run Commission forecast for potential growth in the euro area and EU; this can be seen to vary in the coming decades, rising to near 1.5 percent in the early 2040s before dropping gradually to about 1 percent by 2070. This variation predominantly arises from changes in European labour force growth rates over the period, and averages out to about 1.3 percent for the entire period to 2070.

[9] Figure 2 data from 2001-2026 is from the AMECO database, which is estimated according to the Council of the EU approved production function methodology for the EU economy found in Havik *et al* (2014).

Figure 6: EU, euro area and large EU members' potential GDP growth rates, 2002-2070



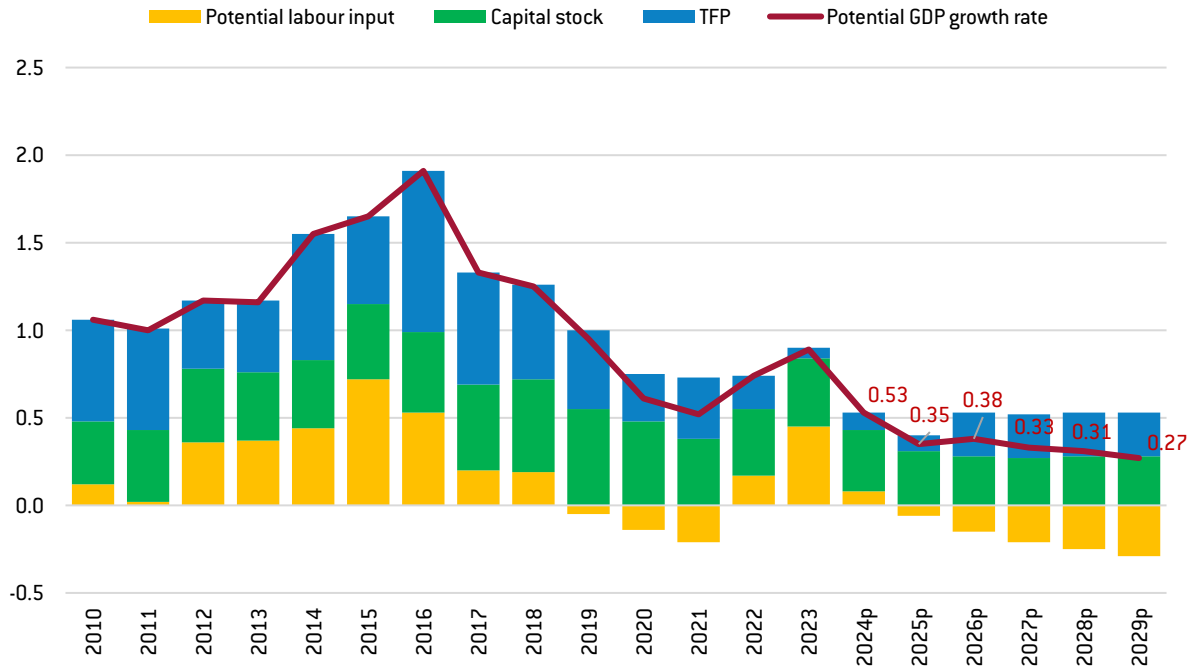
Source: Bruegel based on DG ECFIN AMECO; European Commission (2024a).

Figure 6 also illustrates how potential growth rates in the EU remain marginally higher than in the euro area, driven predominantly by the persistently higher estimated rates in Poland. Figure 6 shows the dramatic decline in Spanish potential growth rates from over 3 percent during its real-estate bubble to negative rates in 2012-13, before rebounding in recent years. French rates have been the most stable among large EU members, while Italy has experienced the lowest potential growth rates. Figure 6 lastly underlines how in recent years Germany has had the lowest potential growth rates among the large EU countries.

The rate of potential growth can over the medium and long term be raised through economic policies that grow the labour supply, provide incentives for additional investment and/or increase productivity. Dramatically increasing investment in the EU to also increase longer-term European productivity growth is arguably the principal policy recommendation from the 2024 report by former prime minister of Italy Mario Draghi (Draghi, 2024), and is one of the cornerstones of the second von der Leyen Commission's economic plan. As Draghi (2024) noted, *"Europe's need for growth is rising. The EU is entering the first period in its recent history in which growth will not be supported by rising populations"*. According to Draghi, the EU faces an existential crisis, and at its root is accelerated population ageing and decline that will turn the labour input component of potential growth rates sharply negative.

A detailed study of the potential growth slowdown in Germany by the German Council of Economic Advisors (2024) illustrates how impactful an ageing population will be for EU members such as Germany (Figure 7).

Figure 7: German potential GDP growth rate 2010-2029, % of GDP



Source: Bruegel based on German Council of Economic Advisors (2024).

It can be seen how contributions from capital deepening in Germany (in green) are quite stable, but productivity fell significantly after 2016, though is projected to rebound somewhat from 2026[10]. The main reason, however, for Germany's catastrophically low projected potential growth rate of just 0.3-0.4 percent annually from 2025-2029 is the persistent swing into negative values of the country's potential labour input growth levels. Figure 7 highlights how difficult it is to maintain an economy's potential growth rates above just one percent, when labour force size is declining rapidly. As noted above, most EU countries will face in the next few decades a variation of Germany's more immediate problems.

3.2 Ageing and total factor productivity growth

While the impact of ageing on future EU labour input is determinant and very large, the impact of ageing – and in many member states outright declining working age and total populations – on the prospects for future capital deepening and TFP growth are less certain. As argued in the 'secular stagnation' hypothesis originally formulated by Hansen (1939) and revisited by Summers (2013), a declining number of workers also depresses potential growth by driving up the capital/labour ratio (by lowering the denominator), resulting in a declining marginal return on investments made in the domestic economy[11]. Reduced incentives to invest lower the overall demand for capital in an economy, exerting downward pressure on its price (eg the interest rate). As ageing progresses and the total population possibly begins to decline, too, businesses face the prospect of selling their products in a domestic market that is continuously shrinking in the aggregate. While demand shifts will naturally

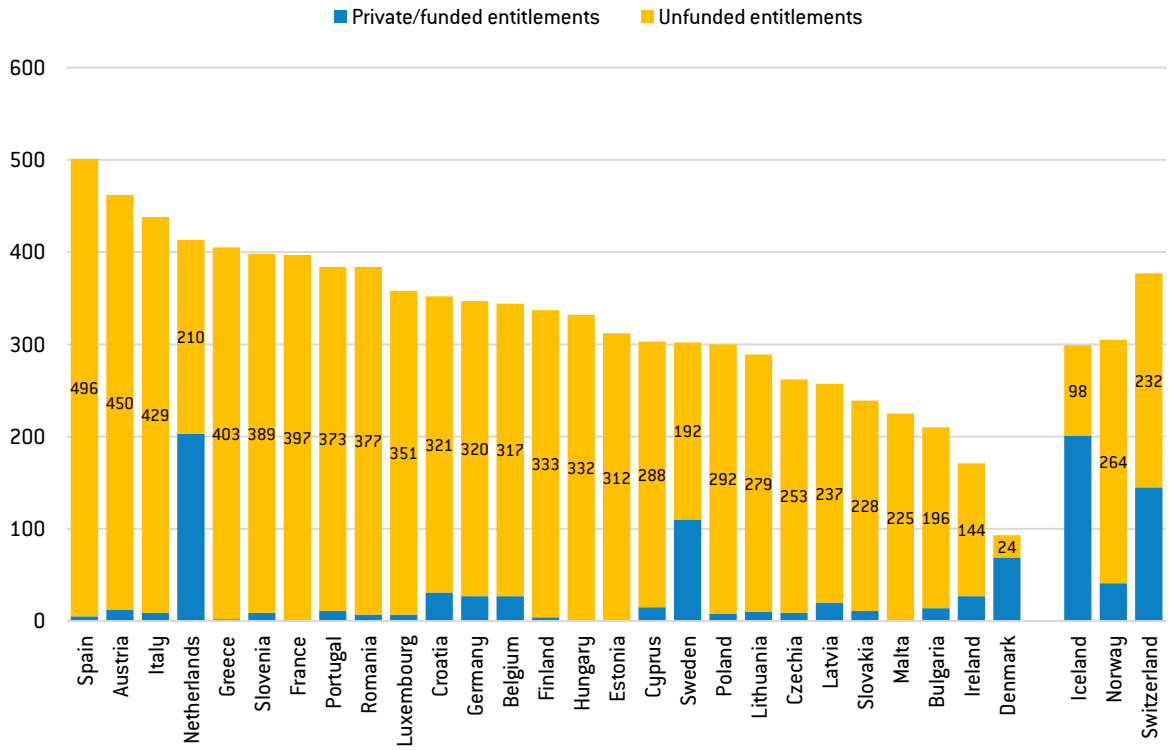
[10] In comparison, the 2024 Ageing Report (European Commission, 2024a) assumed relatively unchanged German capital deepening contributions of 0.4 percent of GDP from 2022-2070, but a future TFP growth level of 0.8 percent, or two to three times Germany's recent actual level.

[11] Incentives for domestic investors to invest abroad rise correspondingly.

occur among particular product categories demanded by different age cohorts, such a scenario will see local businesses reduce the overall capital stock expansion needed today in preparation to service a smaller market tomorrow. Again, the demand for capital and investment is reduced, and downward pressure on equilibrium interest rates is created.

Population ageing also forcefully impacts individual and aggregate savings behaviour, which in turn affects the capital available to fund future investments. Here rising life expectancy in the EU among older cohorts[12] will increase individuals' longevity risk, ie the risk that they live for longer in retirement than their assets (excluding desired bequests at their time of death) can sustain a stable and comfortable standard of living. Given the already unsustainably high level of accrued unfunded pension entitlements in almost all EU countries (yellow bars in Figure 8), it seems likely that ageing EU residents in almost all member states will have to finance a rising share of the rising total costs of their (often longer) retirements through their own savings[13].

Figure 8: 2021 year-end accrued pension entitlements, % of GDP



Source: Bruegel based on Eurostat nasa_10_pens1 timeseries. Note: unfunded pension entitlements shown in the figure come from government provided PAYG defined benefit (DB) pension schemes. The recorded estimated DB pension entitlements are equal to amounts due to be paid in retirement to past and present employees, projected by actuarial methods and then discounted to present value. In the base scenario, these PAYG scheme estimates rely on the discount rate from the overall assumptions being used by EU's Ageing Working Group: two percent real, four percent nominal interest rates.

[12] Life expectancy at 65 of age is projected to rise 5.3 and 4.0 years respectively for men and women in the EU from 2022 to 2070 (European Commission, 2024a, Tables II.1.4/5).

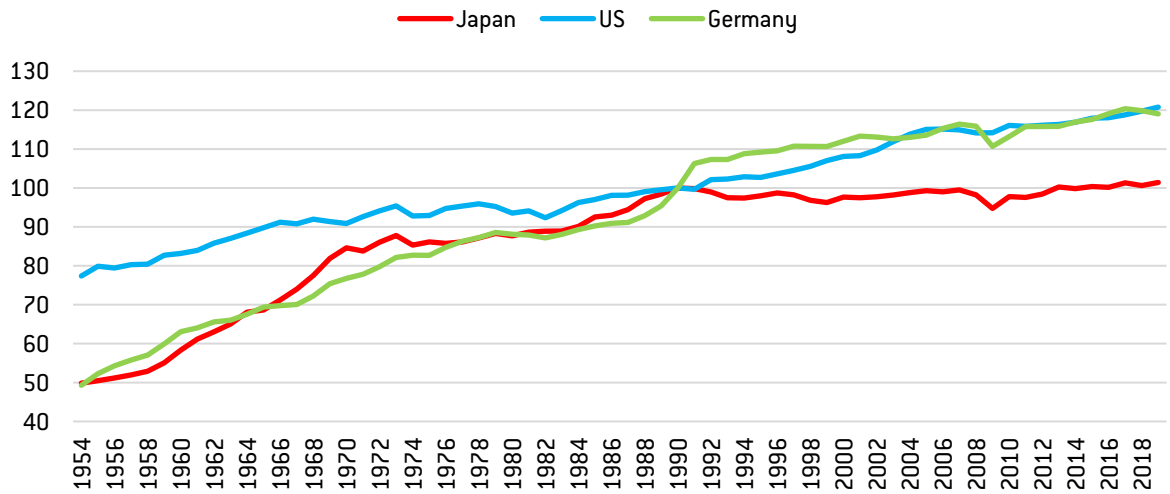
[13] This is amplified by the likely need for many EU countries to implement future pension reforms to public PAYGO systems that will reduce the generosity towards retirees. Reduced public pension benefits in the future must be offset by higher private savings for an unchanged expected living standard in retirement.

Incentives to save more towards their own retirements will consequently increase for most Europeans, a trend that at the macrolevel will run counter to the aggregate drawdown of savings associated with more Europeans entering retirement. The theoretically expected decline[14] in aggregate national savings associated with population ageing may consequently be more gradual in most EU countries than is often assumed[15]. This in turn will make relatively more (eg savings levels decline less than expected) capital available for future investments, which, combined with falling demand for investments, should keep equilibrium interest rates low.

Future investments in the EU can, as the population ages, thus likely be financed at a low cost of capital, which should increase their expected scope and help sustain future capital deepening. It is consequently most likely that declining future market sizes, rather than the expected cost of capital, will depress future capital deepening in ageing EU economies. As we discuss in sections 6 and 7 – and which is at least implied in Figure 8 – the possibility of significant future reductions in the generosity of unfunded public pension benefits ought also, via the consequent expansion of private funded pension schemes, lead to higher aggregate savings in some EU countries.

Ageing may also play a significant role in determining future EU TFP levels. The Japanese experience in recent decades suggests its impact will be materially negative. Figure 9 shows the TFP growth trends in the United States, Germany and Japan from 1954-2019. A dramatic stagnation in Japan since roughly 1990 is visible[16].

Figure 9: Total factor productivity at constant national prices, 1954-2019, 1990 = 100



Source: Bruegel based on FedFred Database.

[14] Lifetime consumption smoothing would predict national dissaving from accumulated assets towards retirement, as the population ages.

[15] See for instance Blanchard (2023) and Auclert *et al* (2024) for analysis of how demographic transitions and ageing are likely to increase savings, rather than reduce them.

[16] Japan's stagnating TFP performance has been explored extensively by Japanese and international scholars; see for instance Fukao (2013) and Fukao *et al* (2017). The decline in economic growth from shrinking populations is viewed as having reduced the opportunities for new innovative firms to emerge in Japan, and hence erode the TFP-enhancing effects of new firm entrants. Smaller cohorts of young entrepreneurs, typically associated with disruptive upstart companies, have a similar effect.

This inflection point corresponded not only with the bursting of the Japanese asset bubble, but also with the onset of its accelerated ageing process from the mid-1990s. While the initial productivity stagnation in Japan was likely related to the fallout from the bubble burst, the stagnation continued for more than 30 years, making it clear that a structural explanation – demographic transition – is needed to explain Japan's prolonged productivity slowdown. With many EU countries today essentially at the stage of ageing Japan reached in the mid-1990s, this is an ominous indicator for the future of European TFP growth.

TFP is measured as a residual in economic models. However, most studies of long-term potential economic growth and TFP suggest that factors such as increasing educational attainment, competitive intensity to ensure rapid knowledge diffusion, high levels of R&D and new capital investments, and the constant entry into the economy of new innovative business upstarts (or more generally a stable – and low – average age of firms), are some of the main drivers of long-term TFP growth in advanced economies[17].

Ageing and a demographic turnaround have generally negative implications for a number of these channels. It is not the case, however, that an ageing workforce is generally associated with a decline in productivity because of the presence of more older workers in the labour force. This will be true in some physically demanding occupations, but such occupations are generally limited and in decline as a share of the knowledge-driven economies of advanced countries. There is little evidence to suggest a general individual-level link between age and productivity[18].

At the same time the ongoing retirements in many EU countries of relatively well-educated baby-boomers is removing a large number of highly educated workers from the European workforce. Unlike during the passage into retirement of earlier, less-educated generations during the twentieth century, highly educated baby-boomers are often 'only' replaced by younger workers who have similar tertiary or other levels of education. This implies a relative educational stagnation associated with current generational turnover (compared to earlier shifts), and accordingly suggests a slower future rate of increase in educational attainment in the EU. This in turn may put downward pressure on EU future productivity growth, compared to earlier decades.

Should the savings and investment behaviours discussed above lead to a sustained decline in the equilibrium rate of interest, it could pose an additional long-run productivity issue in the EU economy, which is already associated with too little competitive intensity and firm-level turnover. A low future cost of capital might be facilitated through lax enforcement of bankruptcy codes and political preferences for maintaining stability, in order to keep less-productive 'zombie firms' in business. This would raise the marketplace entry bar for new and more productive upstart companies and would reduce longer-term knowledge diffusion. The most productive firms in the EU economy would be

[17] See OECD (2015) and the literature cited therein.

[18] Most value adding production in advanced economies is today the outcome of complex processes involving teams of workers at many physical locations. With teams typically comprised of workers of all ages, isolating and estimating an individual-level link between age and productivity is extremely difficult. See van Ours (2010) and Börsch-Supan and Weiss (2016).

unable to grow as fast as they should, as low-productivity competitors could still manage to survive financially thanks to low interest rates[19].

An important generator of productivity growth is entrepreneurship and the formation of new innovative firms, and the link between ageing populations and generally declining long-term business dynamism is a major concern. This is particularly the case for the EU economy, already affected by relatively few fast-growing entrepreneurial upstart firms. Karahan *et al* (2019), using US data[20], showed how two-thirds of the decline in the share of US business startups in recent decades can be attributed to demographic factors: noticeably smaller younger (and more disruptively entrepreneurial) cohorts and the overall slowing growth of the US labour force. It seems reasonable to assume that similar ageing-related factors will negatively affect EU firm formation, given how European populations are ageing far faster than in the US. Recalling how Draghi (2024) highlighted the low levels of successful entrepreneurship in the EU as an impediment to future increased productivity growth, the overall risk is high that ageing will adversely affect future EU TFP growth.

Overall, the EU ageing process is likely to exert downward pressure on all three main components of potential growth: labour input, capital deepening and productivity growth. This highlights the multifaceted challenge facing EU policymakers in creating the economic foundation for the continent's continued economic prosperity during the ageing era.

4 Ageing and EU immigration policy

Population ageing itself cannot be mitigated by public policies. There are two main means though which public policies can meaningfully affect future population trends: fertility and net migration[21].

4.1 The EU fertility outlook and population change

A significant economic policy literature has analysed the effects of social and other policies on fertility rates. The arguably definitive meta study in Bergsvik *et al* (2021), which reviewed 17,000 papers analysing policy measures to increase fertility after 1970 in Europe, the US, Canada and Australia, concluded that so-called *"family-friendly policies"* have a positive boosting effect on fertility levels in advanced economies. Generally, these policies focus, through provision of relevant government services or fiscal transfers, on improving the social and economic situation of working mothers and women of childrearing age in general. Measures such as publicly provided childcare and paid parental leave were found to lastingly boost both fertility levels and prime age female labour-force participation.

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[19] The problem of 'zombie firms', ie firms allowed to remain in existence by extremely low debt costs despite no real profits or free cash flow from operations, in the Japanese economy after the 1990 has been analysed extensively by economists. See for instance Ahearne and Shinada (2005) and Caballero *et al* (2008).

[20] US data on business dynamics and entrepreneurship goes back to the 1960s. Eurostat's business demography data for almost all EU countries began only in 2008, and it is therefore not possible to discern a longer-term European trend across multiple business cycles relevant for the analysis of the impact of demographic factors. See the time series meta data explanation at Eurostat, 'Annual enterprise statistics by size class for special aggregates of NACE Rev.2 activities (2005-2020)', https://ec.europa.eu/eurostat/databrowser/view/sbs_sc_sca_r2/default/table?lang=en&category=bsd.sbs.sbs_h.sbs_na_h.

[21] Mortality rates of course also play a role in long-term population forecasting, but have been steadily declining over at least the last century. Enlightened public health policies have been key, but given the stability in mortality declines, they are the most predictable part of long-term population forecasting. Shifting to 'bad public health policies' or wars can of course also affect mortality rates, but these options will not be covered here.

But large cash transfers in the form of child bonuses merely tend to affect the precise timing of childbirths, rather than increase their overall level.

Figure 6, however, has shown the increasingly dire fertility outcomes across the EU and other neighbouring countries, notwithstanding such policies in some countries.

Bergsvik *et al* (2021) is modestly and appropriately titled 'Can Policies Stall the Fertility Fall?' Its policy findings and recommendations – as illustrated by Figure 6's rapidly declining recent EU TFR trend – should not be interpreted as plausible solutions that will return the EU to anywhere near replacement-rate fertility levels. 'Family oriented pro-natalist policies' should perhaps be pursued to mitigate and limit the decline in fertility rates and to promote gender equality in the labour market, but they are unlikely to have a material near or medium-term impact on the population ageing process in the EU.

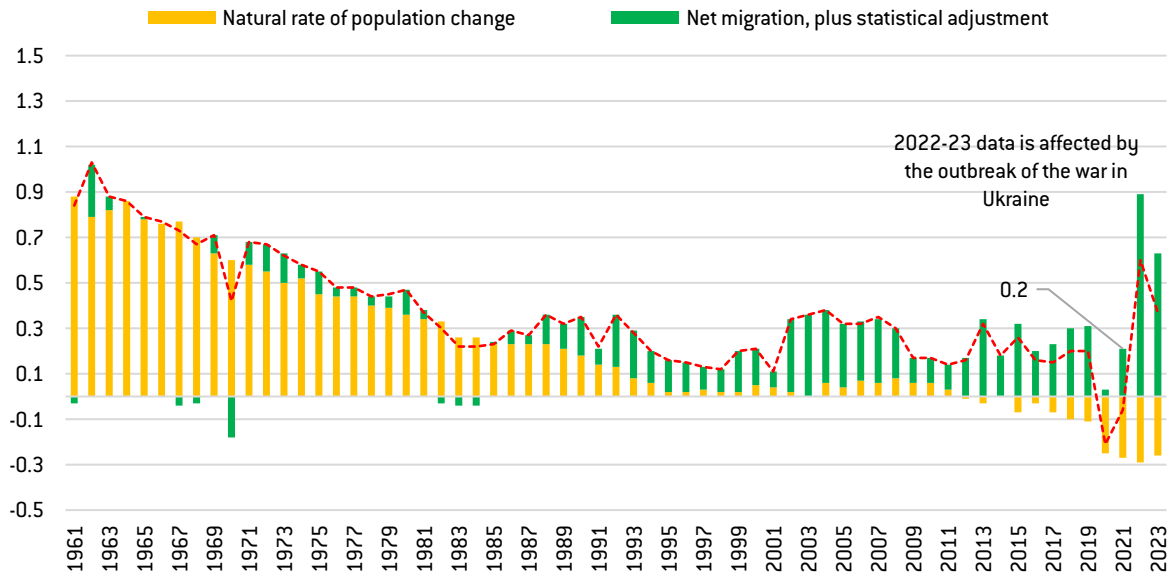
This conclusion is supported by the medical literature consensus, which points increasingly to the great difficulty in restoring higher TFRs across the world. The authoritative global medical fertility forecasting study from Hay *et al* (2024) suggested falling fertility levels globally throughout the twenty-first century – noticeably in many EU countries. Hay *et al* (2024, 32) further analysed the effects of pronatalist policies implemented around the world and concluded there was little data to *"show that such policies have led to strong, sustained rebounds in fertility, with empirical evidence suggesting an effect size of no more than 0.2 additional livebirths per female."* There is thus no likely straightforward way for high-income EU countries in which TFRs have already declined to close to 1.0 to see a dramatic rebound to replacement rate fertility levels.

The findings in Hay *et al* (2024) further contrast with some of the fertility assumptions embedded in the UN Population Division's World Population Prospects forecast, and by extension to Eurostat's population forecasts for the EU. This is discussed in Hay *et al* (2024, 22f). In its baseline medium forecast scenario, the UN Population Division assumes that by the end of the twenty-first century, all high-income countries will rebound towards a historical mean TFR of around 1.6. Similarly, Eurostat's baseline projection assumes a fertility rebound to 1.69 by the end of the twenty-first century. This, in light of the ongoing decline in EU fertility levels, and following Hay *et al* (2024), appears very optimistic. At the very minimum, the EU's fertility outlook implies that the only likely effective public policy with which to affect EU population, even in the long run, is immigration policy. It is in other words crucial that EU governments get this right.

On aggregate, net migration to the EU has been high for many years, and has served to postpone overall population decline for at least the last decade. Figure 10 shows the annual population change in the EU27 from 1961-2023, broken out by the natural change (births minus deaths) and net migration[22].

[22] The term 'statistical adjustment' refers to the effects on the legal resident population of recurring legalisations by EU countries of irregular migrants within their territory.

Figure 10: EU27 annual population change, 1961 – 2023, %



Source: Bruegel based on Eurostat.

It can be seen how total population growth in the EU since at least the mid-1990s has been driven by net migration, and how immigration has since 2015 has generally more than offset the accelerating natural decline of the EU population. In short, EU countries (immigration is overwhelmingly a national responsibility) have for several decades adopted an aggregate immigration policy able to offset at least parts of the quantitative population effects of ageing. Without it, the EU population would already be in fast decline (Pinkus and Ruer, 2025).

4.2 The channels of net migration into the EU

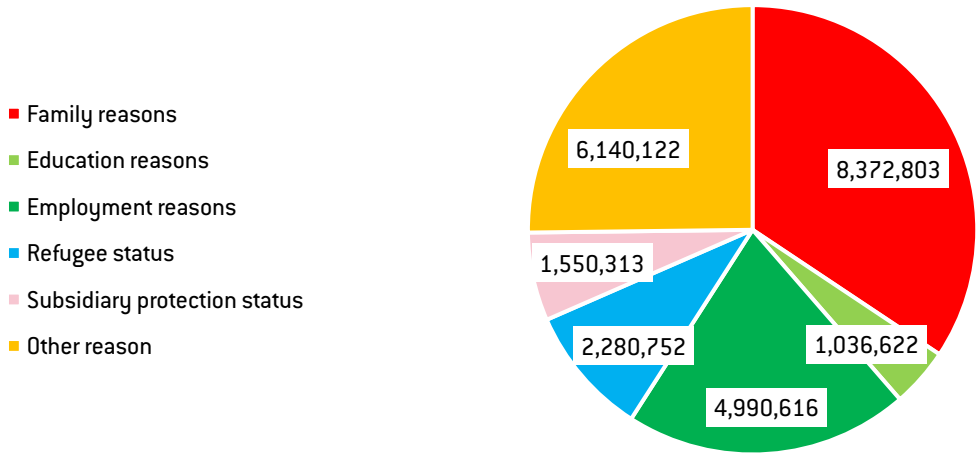
At the same time, however, as the EU has stabilised its overall population growth rate through rising net migration, it becomes ever more important for member states to ensure that rising net migration levels are also associated with actually improved long-term economic prospects and improved public finances. As discussed in Fernandez-Villaverde (2025), broadly speaking[23], in the welfare state model most prevalent among EU members, the bottom 70 percent of the national income distribution are net lifetime recipients of payments (and services) from their national governments, the eighth and ninth deciles are approximately net neutral in terms of lifetime budget impact, while the top income decile contains the net lifetime welfare state budget contributors. While many migrants will only arrive when they have already reached working age, and hence will not affect public primary or secondary educational expenditure, this, as is discussed below, shows that many, perhaps most, migrants coming to Europe risk actually worsening the long-term fiscal position of EU member states.

This puts an increasing policy focus on the differences between different channels of inward migration to the EU in terms of economic impact in destination countries. Harmonised Eurostat data includes six categories of justification for the issuance of residence permits: 1) reasons related to family formation

[23] Comprehensive European style consumption taxes are regressive in nature, but not as regressive as income taxation is progressive in Europe. Meanwhile, the cumulative use of all public welfare state services over a lifetime will, by welfare state design, tilt towards lower-income groups, yielding the outcome noted in Fernandez-Villaverde (2025).

and reunification; 2) reasons related to education and study; 3) reasons related to remunerated activities; and 4) refugee status, 5) subsidiary protection[24], and 6) other reasons[25]. Figure 11 shows the total number of outstanding residence permits valid for any length for 24 EU members as of the end of 2023.

Figure 11: Total outstanding residence permits, EU countries, end-2023, by reason



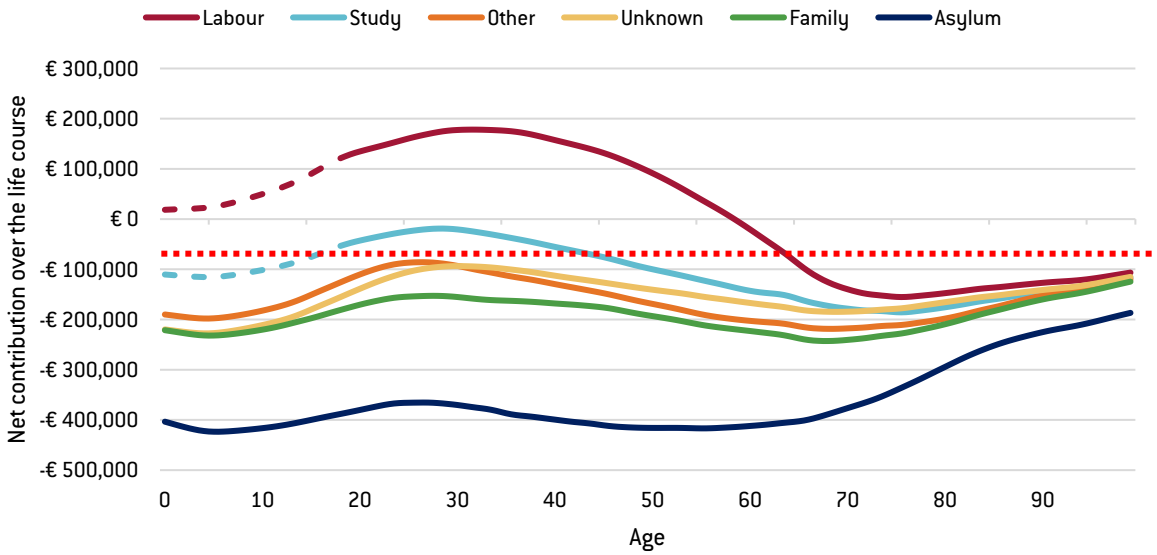
Source: Bruegel based on Eurostat (time series migr_resvalid). Note: The figure does not include data for Hungary, Malta and Austria (a total of 867,000 residency permits, or 3.4 percent of the EU total for 2023), as these members have not broken out data by reason. Also does not include immigrants who have obtained citizenship in an EU member state, and as such represents only a partial overview of the entry channels for the foreign-born population in the EU. Given possible national differences in the access to citizenship, depending via which immigration channel a newly arrived migrant utilised, this may result in biases in the data presented in the figure relative to the entire foreign-born population in the EU.

Just over a third of EU residence permits are issued for family reasons, approximately four percent for education, 20 percent for employment, 15 percent for asylum/subsidiary protection status, and 25 percent for all other reasons. Residence permit data does not include the foreign-born population who have received national citizenship and thus represents only a partial breakdown of the reasons why foreign nationals are present in the EU. Given the variety of large national groups in the 'other' category, it seems likely that most residence permits in this category should be roughly evenly split, mostly between the family, employment and refugee categories. This in turn would suggest that EU residence permits were in fact broadly distributed equally among these three groups in 2023. Given, as detailed below, very different fiscal implications of different immigration channels to the EU, this is an outcome that may not be economically sustainable in many EU members.

[24] Subsidiary protection refers to individuals who do not qualify as refugees, but face a real risk of serious harm in their home country and hence are allowed to stay in an EU country.
[25] Other reasons include EEA 'free movement' related categories, diplomats, consular officer treated individual as exempt from control; retired persons of independent means; all other passengers given limited leave to enter who are not included in any other category; and non-asylum discretionary permissions. The biggest group of nationals among 'others' are nationals of the UK, Morocco, Algeria, Ukraine and China.

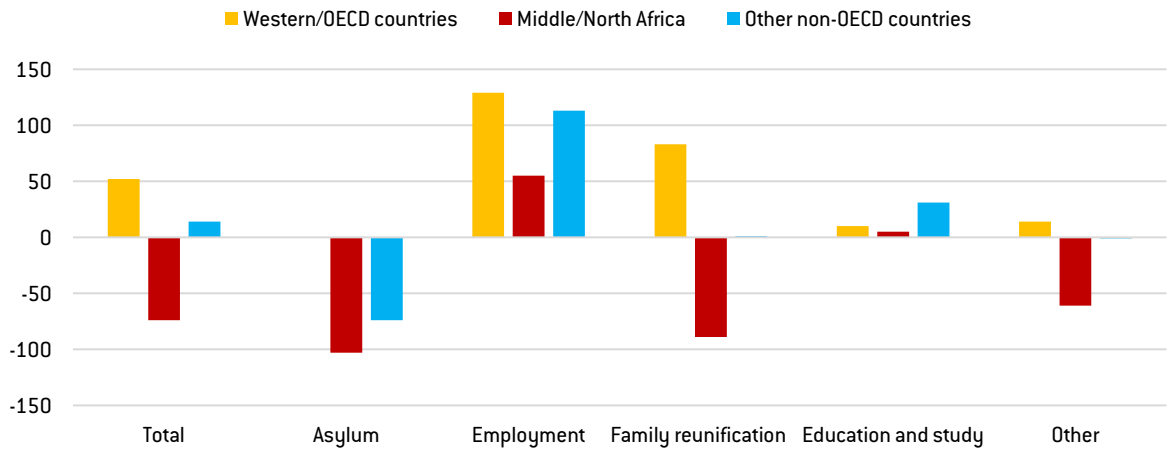
An extensive economic literature has analysed the different economic and, especially, the fiscal impact of different categories of migrants in the EU[26], concluding broadly that it is employment-based migration that generates positive effects from migration on public finances. Micro-level analyses from the Netherlands and Denmark support these earlier findings and show how designing a national immigration system to promote particular channels of inward migration is important to ensure a generally positive economic effect on public finances (Figures 12 and 13).

Figure 12: Net fiscal contribution from first generation migrants to the Netherlands, by reason for migration and age



Source: van de Beek *et al* (2024). Note: for study and work immigrants, the numbers for young ages are low and the profile is wholly or partly synthetic, as indicated by a dotted line.

Figure 13: Immigrants and descendants' net contributions to Danish public finances, by origin and reason for residency, 2019, thousands of Danish kroner



Source: Danish Ministry of Finance (2023).

[26] See the literature reviewed in Batsaikhan *et al* (2018, chapter 4).

Figure 12 shows the net fiscal contribution to Dutch public finances of first-generation migrants by age and reason for entry into the Netherlands. Only employment-based migrants of working age on average are net contributors to Dutch public finances, while all other categories of first-generation migrants on average draw on resources from the Dutch state across their entire lifespans. The negative net contribution is most evident for recipients of asylum in the Netherlands, but is true even for study-based migrants of any age in the Netherlands.

These results strongly suggest that the Netherlands, if the government wants to ensure a positive net contribution to public finances, ought to strongly prioritise employment-based migration. This could be done by implementing new employment-based migration programmes and by revising existing legislation governing asylum and family reunification procedures. If the priority in terms of net migration into the Netherlands is positive economic effects, the administration of asylum and family reunifications should be carried out with a restrictive mindset. With only 19 percent of all outstanding residency permits at end-2023 related to employment, there appears to be scope to alter Dutch migration policy.

Figure 13 shows largely similar, though arguably more encouraging, results for Denmark in 2019. As in the Netherlands, employment-based migration is strongly associated with positive net contributions to Danish public finances from immigrants and their descendants. Unlike in the Netherlands, this is also true – though at lower absolute levels – for education and study-based residency in Denmark, likely reflecting a higher retention rate of graduate students remaining in Denmark after the end of their education process. Figure 13 also shows strongly negative net fiscal contributions for asylum-based migration, something that is also the case for family reunifications and the 'other' category migrants coming from the Middle East and North Africa.

Like the Netherlands, Denmark should, if it wants to promote inward migration to boost public finances, pursue a migration policy that facilitates the granting of employment-based residence, along with education-based migrants, while seeking to reduce access for asylum seekers and some family-reunification-based migrants.

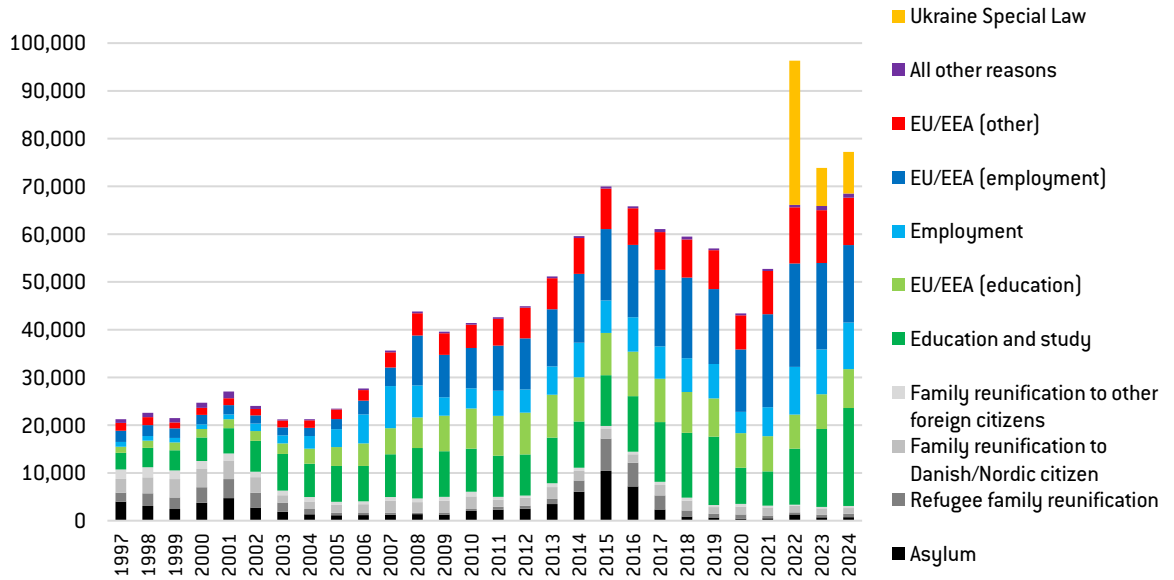
These micro-level results from the study of migration outcomes in the Netherlands and Denmark highlights the multiple policy preferences embedded in any migration system. Evidently, securing positive net financial contributions to public finances is only one of these, though it is of rapidly rising importance for EU countries' economic sustainability. The desire of EU countries to embody hospitality towards refugees is another motivation[27], and a desire to allow residents to choose their spouse where they want to, and to live with their families, is likely a third. With multiple and, given the likely limits to the political acceptance of rising overall migration levels, competing justifications for inward migration in many EU countries, the design of migration systems will invariably be surrounded by perpetual controversy and political confrontation.

This section, however, in light of the otherwise dire outlook from population ageing for EU potential growth rates, and the Danish and Dutch results for net fiscal contributions, argues that most EU countries with fully-developed welfare states to finance have no other choice than to focus

[27] This motive has been powerfully illustrated by the large share of Ukrainian refugees hosted across the EU since the Russian invasion in 2022.

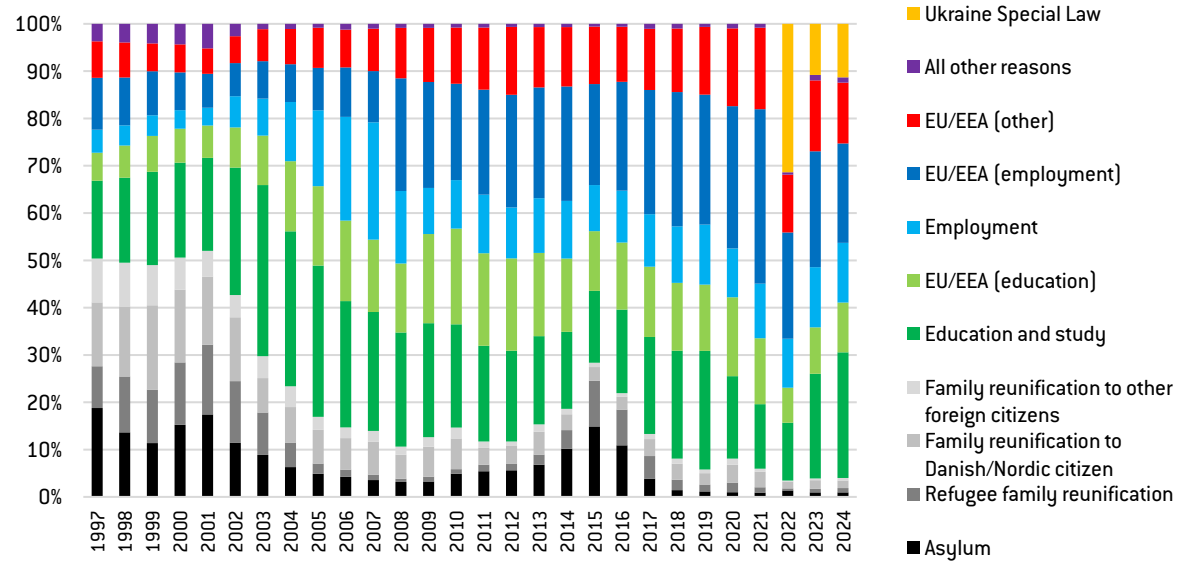
increasingly on the promotion of employment-based migration. They could also implement correspondingly more limited access to asylum-based migration in particular, to keep overall migration levels at a politically acceptable level. This will prove an economically necessary shift in migration policies for many EU countries. The experience of Denmark in recent decades shows that this is a feasible approach to the transition to a system of overall higher immigration levels and more employment- and education-oriented migration. This is illustrated in Figures 14a and 14b.

Figure 14a: Denmark annual new residence permits, 1997-2024, by reason



Source: Statistics Denmark (Series VAN8A).

Figure 14b: Denmark annual new residence permits 1997-2024, by reason, % of total



Source: Statistics Denmark (Series VAN8A).

Figures 14a and 14b shows how the overall annual issuance level of new residence permits in Denmark rose about threefold from roughly 20,000 in the late 1990s to mid-2000s to about 60,000 annually by 2014 (interrupted by a lockdown-induced decline during COVID-19 and not counting the arrival of Ukrainian refugees after 2022). As more detailed national Danish residence permit data also breaks out all EU/European Economic Area related flows, it can be seen how by 2018, asylum and refugee family-related family reunifications accounted for only about five percent of the total number of new residence permits, while by 2024, including other EU/EEA countries, education, accounted for about 35 percent, total employment-based another 35 percent, and Ukrainians and other EU/EEA-related migration the rest[28]. This is a level and composition of inward migration flows (Figures 14a and 14b) that points to a likely rising net financial contribution from overall inward migration in Denmark, also after 2019[29].

This policy outcome in Denmark should support the implementation of similar immigration systems in other EU members, characterised by rising overall levels and more employment- and education-based inward migration. Similar changes to immigration systems in other EU members would secure the biggest – and indeed necessary – positive effect from rising net migration on EU countries' future potential growth rates and fiscal sustainability.

5 Pension systems and rising retirement ages

5.1 A brief description of pension systems

In general, countries' pension systems have three components: a statutory public pension system managed by the state, an occupational pensions component that is privately managed, and a voluntary pension element. The components are often described as 'three pillars'.

Most EU countries rely heavily on the first pillar. Eurostat Labour Force Survey data from 2023 shows that at the EU level, 83 percent of respondents aged 50-74 who received an old-age pension only received a statutory old-age pension. Only 15 percent received a statutory and an occupational and/or private pension, while 2.1 percent received only occupational and/or private pensions[30]. There is also variation across the EU. Pillars two and three were the main sources of income in only three countries: Denmark, the Netherlands and Sweden.

We categorise pension systems according to: 1) how retirement benefits are financed, and 2) how contributions and benefits are linked. There are two main ways to finance retirement benefits. In pay-as-you-go (PAYG) pension schemes, also called unfunded schemes, the retirement benefits of current retirees are financed by the pension contributions of current workers. Shortfalls are filled by the public

[28] Denmark has over this period implicitly benefitted from relatively more permissive asylum legislation in neighbouring Germany and Sweden. This saw Denmark receive somewhat fewer asylum applications, as applicants instead looked for better odds nearby. Eurostat data for positive final decisions in asylum applications (time series migr_asydecfp) suggests that Denmark does not have a materially lower positive response rate when compared to other EU members or the regional average.

[29] The analysis in Danish Ministry of Finance (2023) showed such an improving overall level of net financial contributions from migration in Denmark already from 2017 to 2019.

[30] See Eurostat, 'Persons receiving an old-age pension by type (2023)', https://ec.europa.eu/eurostat/databrowser/view/lfso_23pens02/default/table?lang=en&category=labour.employ.lfso.lfso_23.

budget. Many countries, including most EU countries, rely heavily on PAYG pension schemes administered by the government.

In (fully) funded pension schemes, on the other hand, people contribute to the system while working and thus accumulate an asset base that is invested by pension funds. In retirement, individuals draw from the accumulated contributions and financial returns achieved.

In terms of the linking of contributions and benefits, in defined-benefit (DB) systems, the level of retirement benefits for an individual is calculated based on a pre-determined formula. Formulae vary across countries but often include the number of contribution periods, wage history and a number of set parameters. In some countries, it also includes other factors, eg the number of children. Importantly, DB systems derive their name from the fact that a set level of future retirement income is guaranteed by a government promise, not accounting for future changes in pension legislation. In other terms, DB systems create a liability in the form of pension promises that need to be met in the future.

In contrast, in defined-contribution (DC) systems, no such promise is made. Benefits depend on the level of contributions made and the uncertain investment return.

The crucial difference between DB and DC systems lies in which parameters are fixed. A DB system promises a fixed level or retirement income in the future. For the system to be financially healthy, parameters such as the contribution rate, the accrual rate and the retirement age have to adapt in case total system income (the sum of current worker contributions) changes significantly. In DC systems on the other hand, the contribution rate is fixed, but no benefit level is promised.

In the 1990s, a third way to link pension contributions and benefits emerged: notional defined contributions (NDC) (Börsch-Supan, 2014; Börsch-Supan *et al*, 2005; Holzmann, 2014). NDC is the main system used in Italy, Latvia, Poland, Sweden and Norway. NDC systems are PAYG systems that use DC-type accounting, meaning benefits are financed from current workers' contributions, but that contributions are registered to individual accounts, earning a rate of return set by policymakers. Differently to traditional DC schemes, workers' accrued capital only exists on paper; it is *"fictitious"* (Börsch-Supan, 2014).

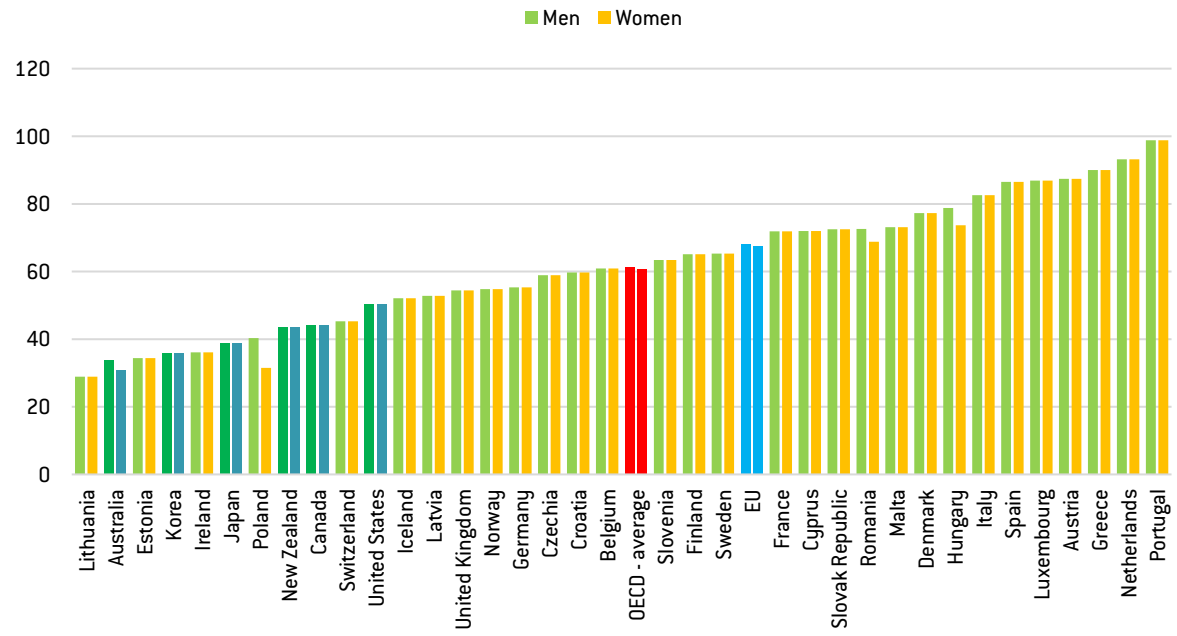
In practice, national pension systems vary widely and many combine elements of DB, DC, PAYG and funded systems. However, two global trends have emerged in recent decades in terms of pension reform. First, many governments have increasingly introduced a funded pensions component (OECD, 2024a). Second, countries are transitioning from DB systems to DC systems (Poterba *et al*, 2007; OECD, 2016; OECD, 2021). OECD private pensions data (OECD, 2024b) further shows how prefunded pension assets held by OECD pension providers rose from $15 trillion in 2021 to over $56 trillion in 2023, along with rising participation in private and voluntary pension schemes among most OECD member states. A rapid rise in prefunded assets held by pension providers has also been recorded among 55 non-OECD countries tracked in OECD (2024b). While there are many, sometimes country-specific, reasons for this shift to funded pensions, a common concern is the financial sustainability of unfunded DB systems in the context of increased life-expectancy, ageing populations and an extended period of low interest rates (OECD, 2022).

5.2 The drivers of public pension expenditures in the EU

Public pension spending, either in the form of direct publicly provided old-age pensions, early retirement financial support or the budgetary costs of preferential tax treatment intended to incentivise private pension savings, represents a large and, in most EU countries, still rising share of total public spending. Given the very close link between the number of old people in a country and the number of recipients of public pensions[31], how a country is ageing plays a very important role in determining a government's current and future pension expenditure costs. However, national pension systems are complex and are also the legacy of frequently long historical political traditions, economic crises and many different, potentially conflicting government policy goals, including fiscal sustainability, eradication of old-age poverty, inter-generational fairness or work incentives. Pensions remain a full member-state responsibility, and EU members have accordingly made very different choices about their pension systems, and as such face often dramatically different ageing challenges.

EU member-state pension systems differ dramatically in their intended 'generosity', ie their intended replacement of pre-retirement earnings with post-retirement pension benefits or, in other words, the intended ability of pension systems to provide a stable consumption level across individuals' work and retirement lives. The 'net replacement rate' measure for this is defined in the EU (and OECD) as the individual net pension entitlement divided by net pre-retirement earnings, taking into account personal income taxes and social security contributions paid by workers and pensioners. Figure 15 shows the wide variation among EU countries, and between most EU countries and other advanced economies.

Figure 15: Net pension replacement rates 2022, men and women



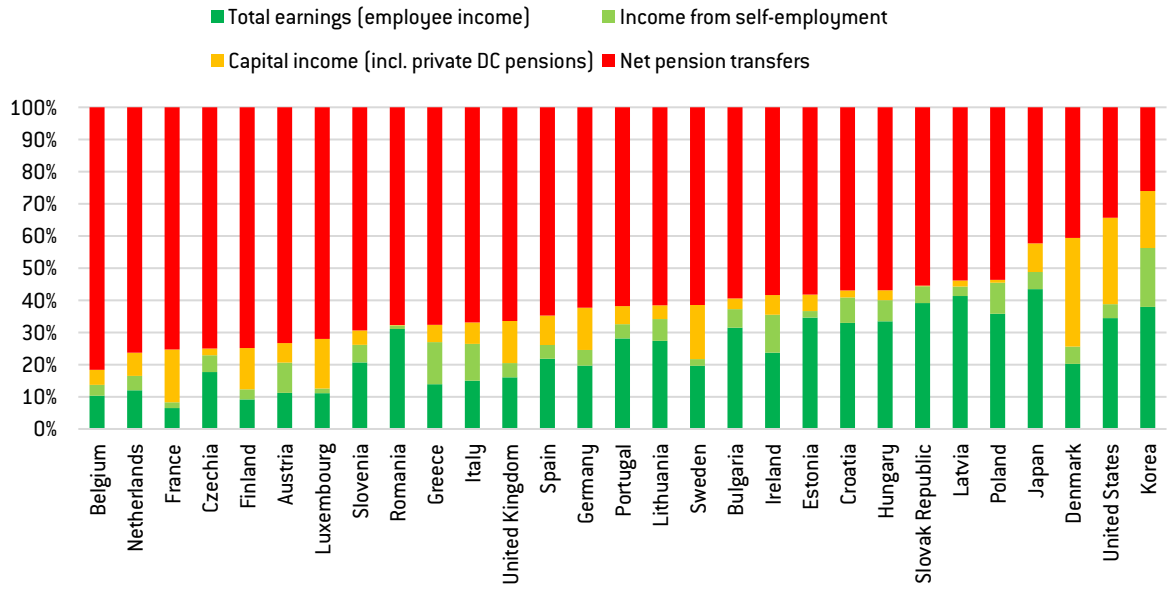
Source: Bruegel based on OECD.

[31] This correlation is however not quite 1, as some residents may not be fully vested in the national pension scheme because of a short residency period, and many affluent elderly may voluntarily forego public pension benefits.

Figure 15 shows how intended net replacement rates in the EU range between 90 percent or more in Greece, the Netherlands and Portugal, to under 30 percent in Lithuania. It can also be seen how only EU members rank above the OECD average, with advanced English-speaking and Asian economies targeting materially lower net replacement rates in retirement than almost all EU members. With the Portuguese pension system targeting near equivalent income replacement in retirement, while Lithuania aims for less than a third, the ageing-related increase in pension expenditures across EU countries will vary, while remaining larger than in other advanced economies.

An important additional consideration in thinking about the impact of population ageing on public pension expenditure relates to the weight of public pension benefits as a share of the total income for people above normal retirement age. Figure 16 breaks out the sources of income for over-65s in the EU and in select other OECD countries.

Figure 16: Sources of income age 65+, 2023 or latest available



Source: Bruegel based on OECD Income Distribution Database (IDD).

Figure 16 shows how the share of old-age income derived from net (after tax) public pension transfers varies substantially among EU members, but less among other advanced economies. In the EU, only in Denmark is the expected share of old-age income from public pension benefits (41 percent) less than 50 percent, with another 33 percent of the income of older Danes coming from capital income, overwhelmingly from large private (DC) pension savings[32].

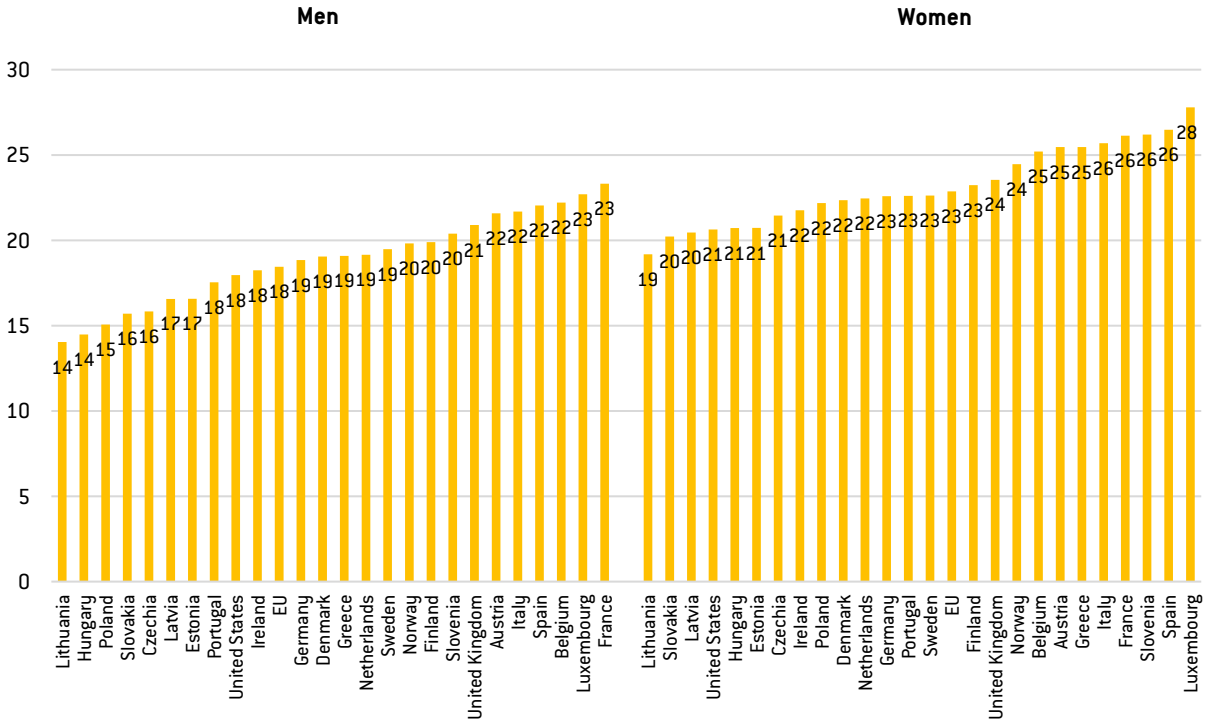
Meanwhile, the share of old-age income coming from work (the two green parts of the bars in Figure 16) for people aged above 65 in most eastern EU members is comparable to the roughly one third of old-age income in the United States, rather than the lower level seen in most Western European countries. Romania, Bulgaria, Estonia, Croatia, Hungary, Slovakia and Latvia all have old-age income

[32] Some degree of 'classification randomness' exists between what is in Figure 16 classified by the OECD as a public net pension transfer and what is capital income. Dutch pensions, while relying on prefunded (DB) assets, are mandatory, so classified as a public net pension transfer, while Danish prefunded (DC) are not explicitly mandatory, but only implemented through collective bargaining agreements, so are classified as 'capital income' from private pensions.

shares from work in excess of 30 percent, while in France, for instance, the share is less than 10 percent. Income from work declines with age, as older people drop out of remunerated work the longer they live past 65. Yet, it is evident from Figure 16 that western and southern EU countries have scope to increase the work share of income at ages above 65. While significant income inequality is present at older ages – typically only the highest paid choose to keep working – effective averages of work in retirement should rise.

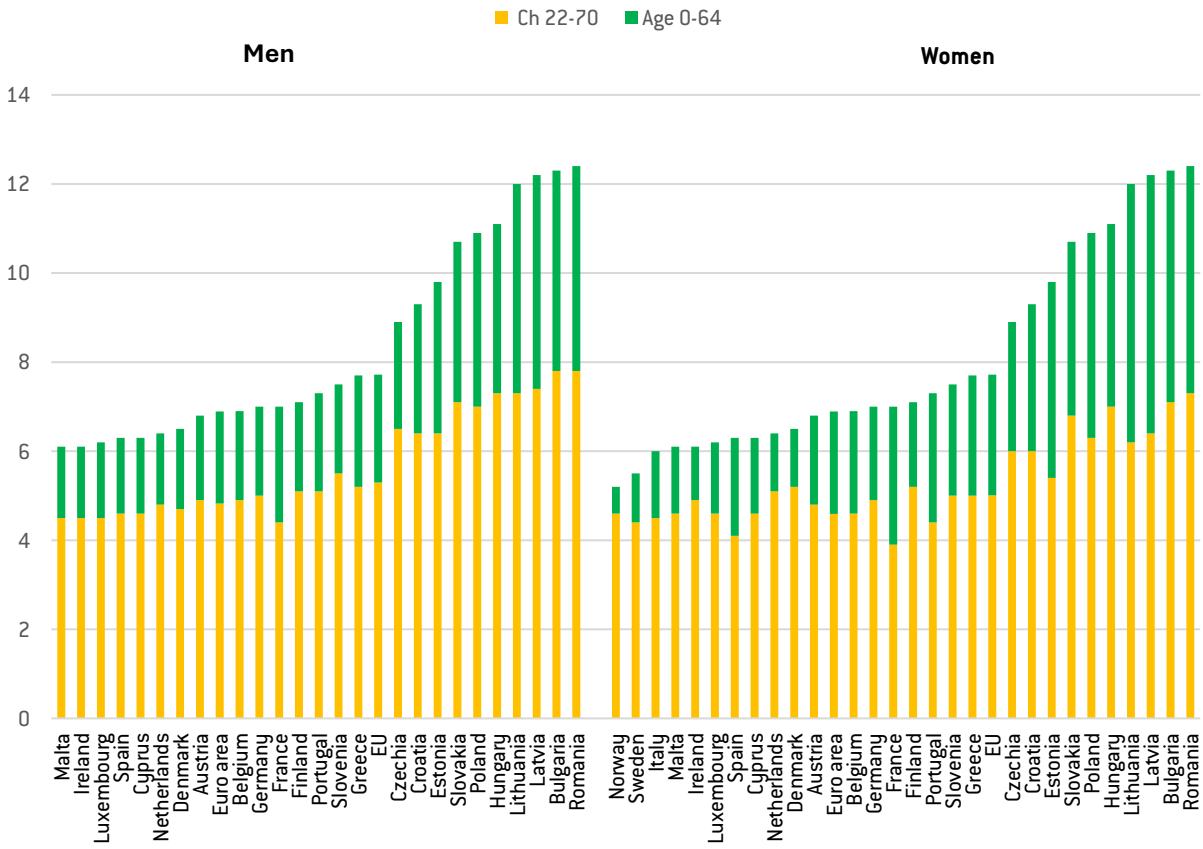
The need for many EU countries to increase effective retirement ages to mitigate rising life expectancies is underlined not just by the already large number of years spent in retirement (Figure 17), but also the continuing rise in life expectancies at older ages (Figure 18).

Figure 17: Expected years in retirement, 2022



Source: OECD (2023).

Figure 18: Expected increase in life expectancy 2022-2070, years by age group



Source: European Commission (2024a).

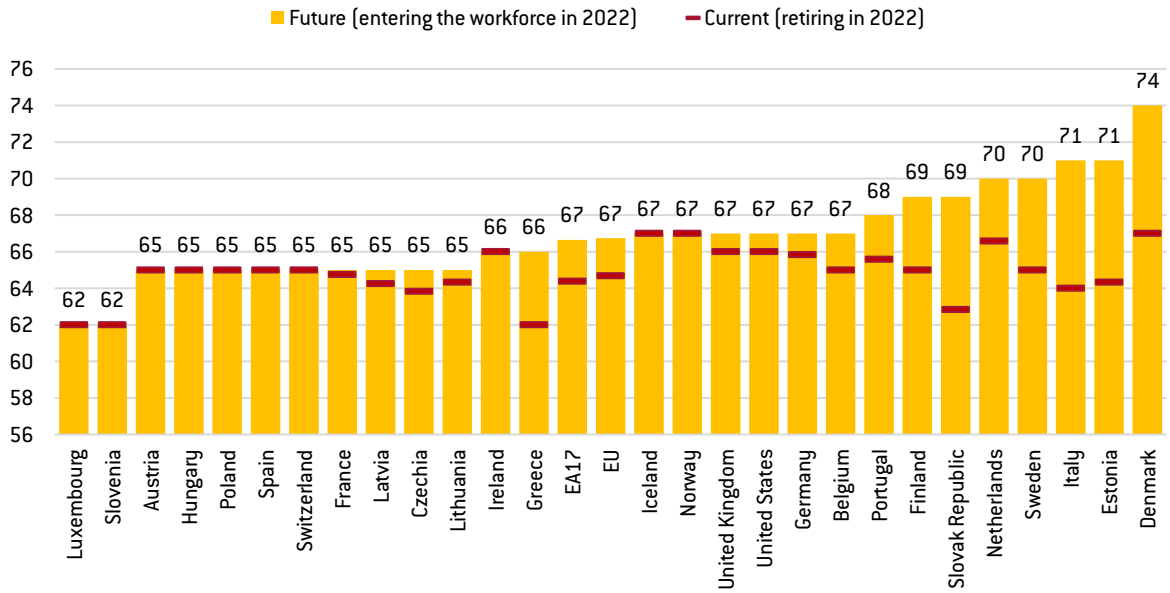
When, as can be seen in Figure 17, men in Luxembourg and France can already expect to live for 23 years in retirement (something true on average for EU women, too), it is clear that continued population ageing at old ages is associated with real 'longevity risk' (the risk of the individual (or firm from the point of view of insured clients) running out of assets in retirement, because of rising life expectancy). The risk is also real at macro level, especially in the context of the already very high levels of unfunded government pension liabilities in many EU countries (Figure 8 in section 3).

The continued expected disproportionate share of increased life expectancy in the EU that will come in the coming decades from increases among those aged above 65, underlines how this risk and these costs are set only to increase. Since raising the effective ages of withdrawal from the labour market (ie not only raising statutory retirement ages, but also, for instance, reducing options for early retirement, or offering greater financial incentives for people to keep working past statutory retirement age) is the only policy that both raises public revenues by keeping people employed for longer, and reduces retirement expenses by preventing full retirement, EU governments are likely to face insurmountable pressure to find ways to keep their workers employed for longer.

5.3 The increasing difficulty of raising average retirement ages

One increasingly used policy across the EU is to directly link statutory retirement ages to life expectancy, leading the former to rise by a pre-determined formula in relation to increases in the latter[33]. An important political consideration here is how far in advance workers will be told that their retirement age will rise along with their life expectancies. There is uncertainty about the speed of future rises in life expectancies, and governments could face political blowback from voters against perceived 'surprise' pension age increases. Figure 19 highlights the different situations in EU countries between the expected retirement age of a 'full career worker' leaving the labour market today, and a full career worker entering the workforce today at age 22 and leaving at the end of his working life at some point in the future.

Figure 19: Current normal and future expected retirement ages for male workers with full career from age 22



Source: OECD (2023). Note: the figure makes several assumptions. The normal retirement age is calculated for an individual with a full career from age 22. 'Current' refers to people retiring in 2022. 'Future' refers to the age from which someone is eligible to full retirement benefits from all mandatory components (without any reduction), assuming a full career from age 22 in 2022.

Figure 19 highlights several important aspects of ageing across Europe. First, it shows how the expected retirement age for a full career worker (defined here as entering the labour force at age 22) varies considerably today between 62 in Luxembourg, Slovenia and Greece to 67 in Iceland, Norway

[33] The precise formula will differ, depending on the pension system. Statutory retirement ages can rise, based on different policy goals. The aim may be to keep the number of expected years in retirement stable, or maybe reduce it, or keep the share of total life expectancy expected in retirement fixed, or seek to bring it back to the share of earlier generations for reasons of intergenerational fairness. In contributory systems in which retirement eligibility is determined by the number of years of contributions, the policy levers will work differently, but in the same direction towards achieving longer working lives.

and Denmark. Or put another way, a full career in the latter three today lasts roughly 45 years, while in the former group it is just 40 years.

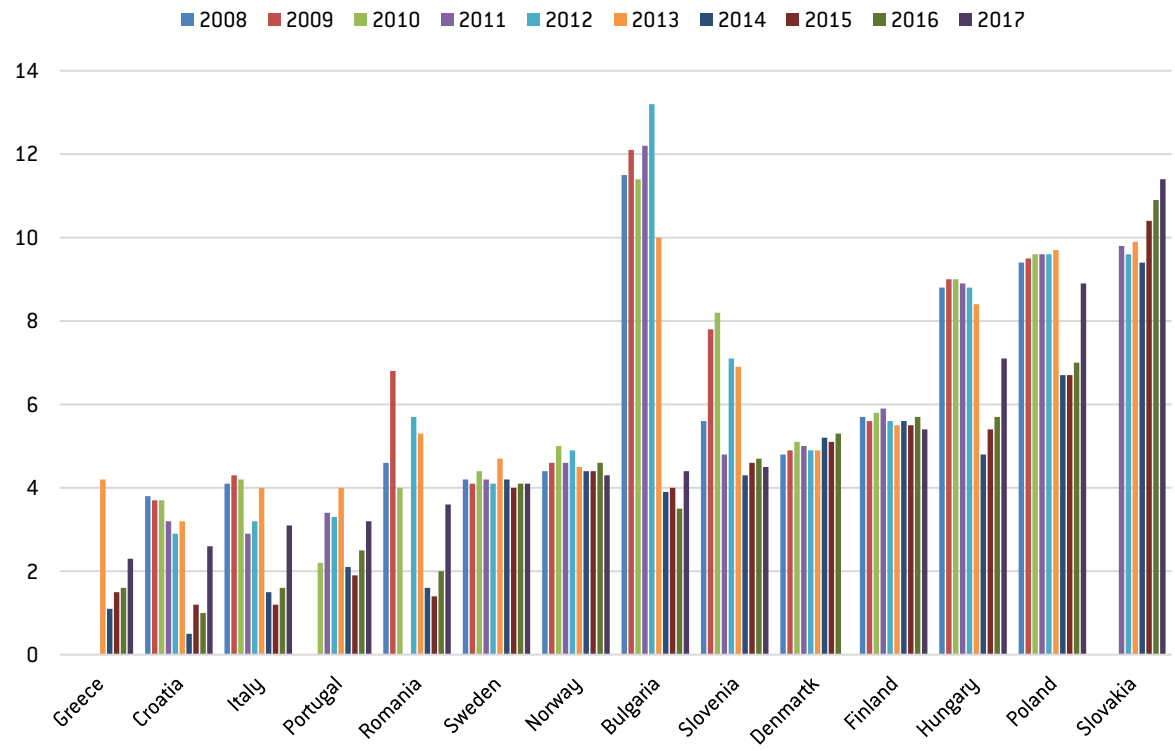
Figure 19 further shows how reforms implemented already will change the expected retirement ages of full career workers in at least some EU members. In Greece, for instance, this age will rise from 62 for people retiring now to 66 for full career workers entering the workforce today. In a number of EU countries, however, including both Luxembourg and Slovenia, no future increase in the expected retirement age for full career workers has been adopted at time of writing.

At the other end of the spectrum, in Italy for instance, the expected retirement age for a full career worker is under current law predicted to rise by seven years from 64 for current retirees to 71 for Italians starting work today. A similar seven rise to 74 is predicted under today's rules in Denmark, and in five EU countries, current pension rules assume retirement ages of at least 70 for full career workers entering the labour force today. However, taking into account that the increase in life expectancy above age 65 in both Denmark and Italy is expected to be only about four to five years by 2070 (Figure 18), it is likely that some pension systems – at least Denmark – may be over-compensating (raising retirement ages by seven years) for future improved longevity. Both Denmark and Italy, however, illustrate that is it possible to design European national pension systems to adjust to rising life expectancies.

The Italian and Danish cases highlight the complicating issue of 'inter-generational fairness' in pension systems: current labour-market entrants in both countries can seemingly be expected to work longer than the predicted rise in life expectancy would dictate. This clearly puts future Italian and Danish workers at a disadvantage relative to current retirees in both countries, in terms of the expected shares of their lives enjoyed in retirement (especially when considering the share of expected healthy years in retirement). A fuller measure of intergenerational fairness in public pension systems would, in addition to time spent in retirement, also account for the real value of pension benefits received and contributions paid in across different generations. Given how retiring workers in the OECD now can expect to retire younger, and enjoy five to six years more in retirement, than Europeans withdrawing from the labour market forty or fifty years ago (OECD, 2023a, Figure 6.16), it is uncontroversial to note that retiring 'European baby boomers' will likely enjoy a generally more favourable retirement than either their parents or children.

Intergenerational fairness is, however, not necessarily the most challenging aspect of pension-system design, when it comes to how and by how much to raise future expected effective labour market withdrawal ages (or of course potentially to adjust benefit levels to smaller contributions in PAYGO systems). The policy (and political) problem is the differences in life expectancy across educational attainment and income groups in the workforce. These differences can be very large in some EU members, and in some is rising (Figure 20).

Figure 20: Difference in life expectancy between 'tertiary educational attainment' and 'less than secondary educational attainment', 2008-2017, life years at birth



Source: Bruegel based on Eurostat (timeseries demo_mlexpecedu). Note: the dramatic decline witnessed in Bulgaria in the figure appears to be related to a change in statistical methodology.

Figure 20 shows how in a number of EU countries, life expectancy differentials between the low-educated and high-educated exceed the expected future increases in average life expectancy at older ages (Figure 18). This risks making dramatic future increases in expected average ages of effective labour market withdrawal highly regressive in nature, as lower-educated workers on average will die before they get to enjoy the amount of time in retirement enjoyed by high-educated people. This would be the case in Italy and Denmark, for example. In contributory or PAYGO systems, the low-educated could end up indirectly subsidising the on-average longer periods in retirement of the high-educated.

While raising the average age of effective withdrawal from the labour market is this likely the best way financially (both by raising revenues and lowering benefit payments) to mitigate the fiscal effects of ageing on public pension systems, such reforms must be planned with care. They must, to avoid unfair regressiveness, be complemented with features to enable typically low-educated workers, who frequently will have started their working lives much younger than university educated people, to retire earlier. The trade-off between fairness and pension system solvency[34] is straightforward, and care must be taken between raising generally applicable retirement ages and maintaining some

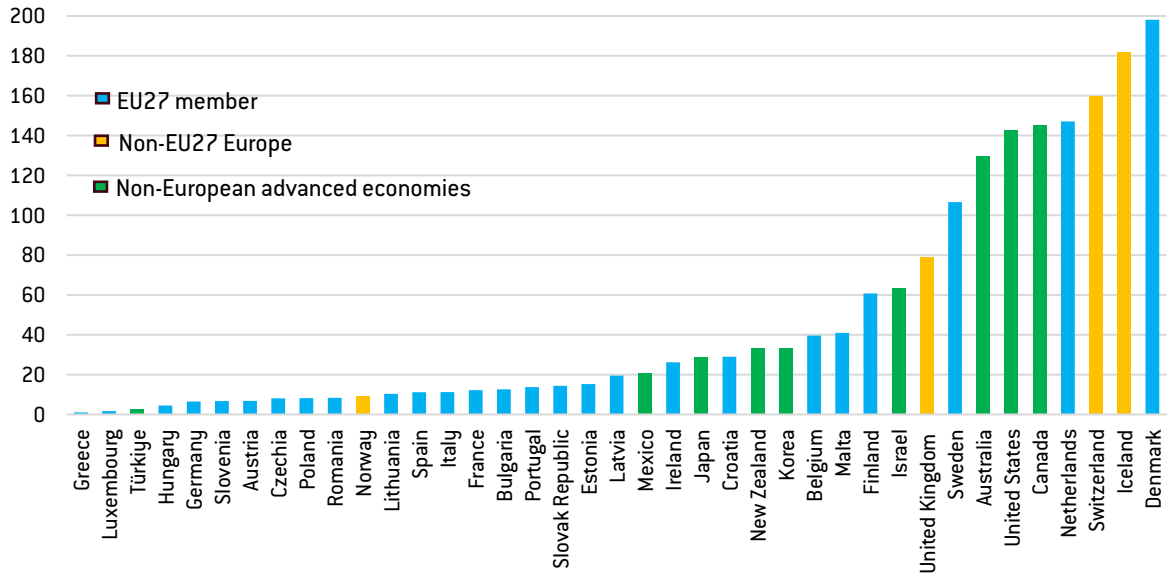
[34] Pension system solvency is only relevant in PAYGO or DB systems, as benefit levels in prefunded DC systems automatically adjust to available assets, with the retiree bearing the entire longevity risk.

access to earlier retirement for low life-expectancy groups. This could involve medical certification requirements or a very young ages of starting work and a high number of years in employment.

5.4 Reforming EU pension systems, including pre-funded schemes

Accounting for the institutional and design divergence among EU national pension systems is crucial when contemplating the overall impact of ageing on EU economies. Different EU countries emphasise the different pension system pillars[35]. Figure 8 in section 3 shows the large current differences between EU countries in future unfunded government pension liabilities. An even greater variation exists among EU and other advanced economies in terms of current levels of pre-funded private assets held by pension providers. Figure 21 shows the latest data (end 2023) for pre-funded private pension assets.

Figure 21: Total pre-funded assets of private pension providers, 2023, % of GDP



Source: Bruegel based on OECD Pension Statistics (2024).

It is evident that private prefunded assets are only really material in three (or four if Finland at about 60 percent of GDP is included), EU countries: Sweden at 107 percent, the Netherlands at 147 and Denmark at 198 percent. Other European countries, including Iceland, Switzerland and the UK, also have material private prefunded pension assets, as do a number of other English-speaking economies. Most EU countries, including all the large member states, however, do not today have significant national funded pension assets as part of their old-age income provision systems or national financial systems.

[35] The standard description of pension systems pillars (section 5.1) includes five different categories. 'Pillar 0' generally describes explicit old-age income support programmes aimed at providing the most basic social protection and income security to the elderly. 'Pillar 1' generally includes mandatory public pension programmes, designed to secure some life-long income security and stability for the elderly. 'Pillar 2' includes employer and employee privately funded pension schemes. 'Pillar 3' includes individual voluntary pension plans. 'Pillar 4' lastly includes non-standard sources of old-age income support, including family support, home ownership or reverse mortgages.

While pre-funded components in pension systems have become more common (section 5.1) as the finances of PAYG systems come under pressure because of population ageing, they are insufficient to make pension systems resilient to population ageing. Population ageing has different implications for PAYG and funded pension systems or pillars.

The impact of population ageing on PAYG DB schemes drives the projected increase in pension expenditure depicted in Figure 8 (section 3). For a PAYG scheme to be financially sustainable, revenues need to cover the total benefits to be paid out at any point in time. The system's revenues are, simply put, a product of the contribution rate and the number of workers. Its expenditure, on the other hand, depends on the number of pensioners, the level of promised benefits and the number of years people spend in retirement. From a public-expenditure point of view, the last factor is estimated based on life expectancy at retirement.

The significant increase of the dependency ratio depicted in Figure 3 (section 2), therefore, means that, all else being equal, PAYG scheme expenditure relative to revenue will increase. Population ageing, holding everything else constant, directly worsens the financial position of PAYG schemes. Several countries have taken steps to partially address this issue, including by increasing the retirement age or increasing future contributions, but PAYG DB systems still face significant financial challenges.

The impact of population ageing is different for funded DC systems. These systems are financially healthy by definition, since expenditure is the sum of collected contributions and investment return. No promises are made, and thus no liabilities created. The issue for DC systems is that more pensioners mean that there is more pressure on delivering adequate retirement benefits. Increased longevity may also challenge risk-sharing mechanisms during the pay-out phase.

Since most EU countries rely heavily on PAYG DB schemes, illustrated by the large unfunded pension liabilities in Figure 8 (section 3), public finances will be directly impacted by demographic change, resulting in pension expenditure driving ageing costs. To improve the financial position of PAYG schemes, governments generally have three policy levers.

First, governments can increase pension contribution rates. This should reduce the net incomes of current workers and increase revenues, at least in the short term. Second, governments can raise the retirement age. Many EU countries have implemented such reforms recently. However, they are often politically challenging. Furthermore, while raising the statutory retirement age helps pension finances, the effective retirement age remains below the statutory retirement age in many countries (Jedynak, 2019). Third, governments can reduce the generosity of pension benefits, but such measures are politically extremely difficult. When considering any of the three levers, it is important to keep pension adequacy in mind. We discuss this below.

Besides changing the parameters of DB PAYG schemes, governments can also take measures to expand coverage of the pension system. In most EU countries, occupational pensions are still only a minor part of retirement income, as discussed earlier in this section. Expanding the coverage of occupational and private pension savings has received renewed attention, for example in the European Commission's Communication on the Savings and Investments Union published in March 2025 (European Commission, 2025). The presence of significant prefunded pension savings in only a

few EU countries today poses a significant political challenge in integrating European capital markets, as the availability of basic components of capital markets – saved assets outside the banking system – diverge dramatically among member states.

The significant fiscal pressures of PAYG DB systems under demographic change have led to a rise in funded DC components[36]. These transfer two important risks from government to individuals.

First, future retirement income in funded DC schemes is made dependent on investment returns, and not guaranteed by the government. Second, funded DC schemes move longevity risk from the government to the worker: if the individual lives longer than expected, the government is not committed to paying retirement benefits for the additional years. To mitigate this risk, the individual can, for example, buy an annuity on retirement.

While the distribution of these risks between government and individual are important, a PAYG scheme also comes with risks for the individual. The substantial financial challenges faced by PAYG schemes outlined in this paper make likely reforms that will reduce the benefits of PAYG schemes in the future.

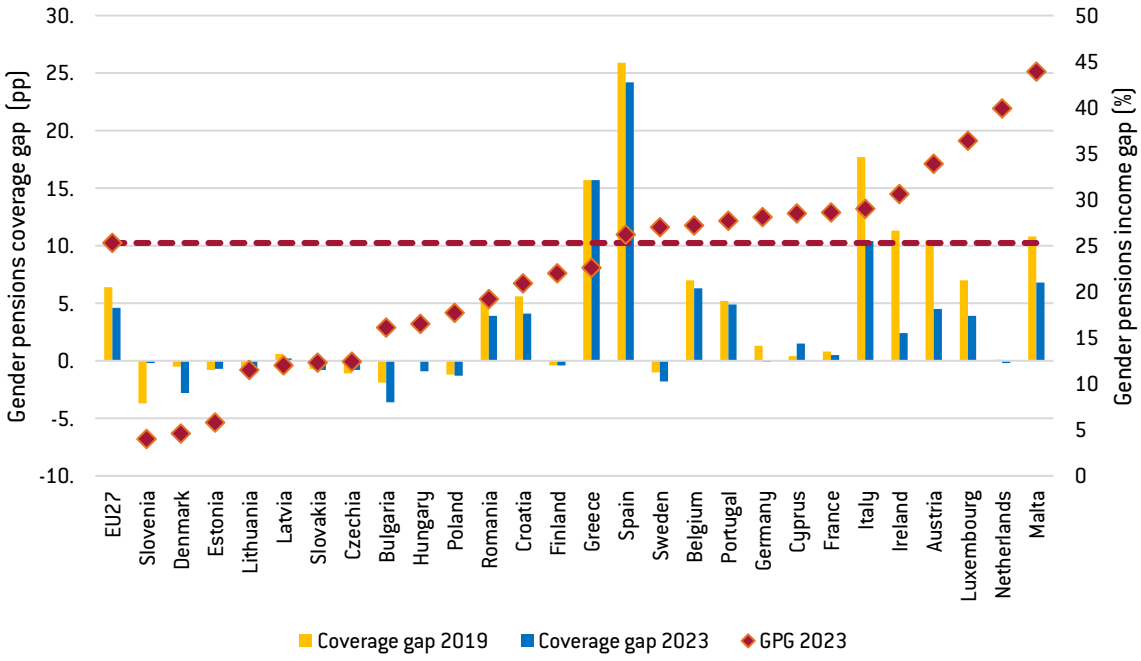
When planning pension policy in the face of demographic challenges, the conversation often centres on financial sustainability. However, it is very important not to forget pension adequacy. A pension system that is financially sound but delivers benefits that are insufficient for a decent retirement fails its purpose completely. Old-age poverty is already common in Europe, with selected groups particularly at risk. The European Commission's 2024 Pension Adequacy Report (European Commission, 2024b) stated that in 2022 in the EU, one-fifth of people aged 65 or more were at risk of poverty or social exclusion, and that this number could rise because of both rising poverty rates and population ageing.

Pension reforms also need to take into account gender differences and the impact on equity. Today, there is a substantial gender pensions income gap (GPIG) in the EU. In 2023, among those aged 65-79 receiving a pension[37], the average gross pension income was 25.3 percent lower for women than men at EU level (Figure 22). The GPIG only measures gender differences among those that receive a pension. The gender pensions coverage gap (GPCG) shown in Figure 22 illustrates differences between the share of men and women receiving a pension. The GPCG is defined as the difference (in percentage points) between the share of women aged 65-79 who do not receive a pension and the share of men in the same age group who do not receive a pension. At EU level, that gap stood at 4.6 percentage points in 2023. Notably, Italy, Ireland, Austria, Luxembourg and Malta have made progress towards reducing the coverage gap since 2019.

[36] The Pension Adequacy Report (European Commission 2024b, Table 4) showed how Bulgaria, Cyprus, Estonia, Spain, Italy, Latvia, Lithuania, Malta, Netherlands, Romania, Sweden and Slovakia strengthened funded pension entitlements between 2020 and 2023.

[37] Including data for the age group above 65 would bias the measures upwards because of a large share of women aged 80 and above with very low pensions (European Commission, 2024b).

Figure 22: Gender pensions income gap and gender pensions coverage gap



Source: Bruegel based on Eurostat.

EU countries differ significantly in both the GPIG and the GPCG. The GPIG, for instance, ranges from three percent in Slovenia to almost 44 percent in Malta. While most EU countries have a positive GPIG, meaning that on average women receive less pension income than men, among those receiving a pension, Slovenia, Denmark and Estonia have significant negative gaps. On the coverage side, Greece and Spain and Italy have significant GPIGs.

There are several, interconnected issues behind the gender pensions gap. The gender pay gap, the higher part-time employment rate of women, women's more frequent career breaks and lower propensity to invest linked to lower financial literacy all contribute to the gender pensions gap (European Commission, 2024b; Scholer and Pătulea, 2024; OECD, 2023b). Women are more likely than men to reduce working time due to care responsibilities inside the family, and therefore to reduce the accumulation of pension savings and entitlements. In addition, on average, men enter the labour market earlier and exit it later than women (European Commission, 2024b).

Even if most EU pension systems allow for short career breaks for childcare, they fail to account completely for the penalty in salary evolution resulting from early-stage career breaks, resulting in lower lifetime accumulation of pension benefits (European Commission, 2024b). Periods of maternity leave fully count towards the accumulation of pension entitlements in pillar I pension schemes in all EU countries, while there is more variation for paternity leave (European Commission, 2024c). Benefits for care leave strongly depend on the type of leave, with long-term care leave, especially cases of care for adults, much less well covered.

The structure of the pension system also influences the gender pensions gap. Heavy reliance on occupational and private pension schemes can entail a wider gender pensions gap because women

are less likely to enrol and because women tend to contribute less to such schemes (European Commission, 2024b; OECD, 2023b). Occupational and private pensions, at least theoretically, establish a stronger link between the accumulated contributions over one's working life and benefits in retirement, compared to public pensions.

For example, coverage of childcare breaks in occupational schemes only exists in 13 EU countries, often depending on collective bargaining agreements rather than national legislation (European Commission, 2024c). The end result is that career breaks are likely to have a larger negative effect in occupational and private schemes than in public pension schemes, and women are more likely to suffer these consequences.

However, the link between the statutory-occupational pension mix and the gender pensions income gap and coverage gap is not straightforward. This becomes clear looking at Denmark and the Netherlands (Figure 22). Denmark has a negative gender pensions coverage gap, meaning that relatively more women than men aged 65-79 receive a pension, as well as a relatively small positive GPIG. The Netherlands has a coverage gap close to zero, but the second highest GPIG in the EU. However, in both countries, occupational pensions are an important source of income. Lis and Bonthuis (2019) reported that the type of pension scheme – whether DC or DB – does not significantly impact the gender pensions gap in EU countries; rather, they but attribute differences to gender differences in labour markets.

As occupational and private pension arrangements are becoming more common (OECD, 2023b; Lis and Bonthuis, 2019), they need to be designed carefully to not worsen gender inequality in pensions.

To summarise, the primary way of financing retirement income in the EU is still through large unfunded PAYG systems. These are increasingly coming under financial pressure as a direct consequence of population ageing. Demographic trends result in less income and more expenditure for these systems. Consequently, funded pension components have become more important in recent decades, and we argue that this will continue in the future. Through the expansion of funded pension systems, pension contributions are not transferred to retirees, but are invested in financial instruments through institutional investors, predominantly insurance companies and pension funds in the EU. Therefore, an expansion of funded pensions to respond to demographic trends could have significant consequences for capital markets and the investment ecosystem in the EU. We discuss this topic in the next section.

6 Ageing, pensions and financial markets

There are many options for reforming PAYG systems in response to demographic challenges. This does not necessarily mean making funded pensions the main retirement-income pillar for the population. Expanded funded pensions can also include efforts to expand the coverage of funded occupational pensions, or more subsidies for private pension saving products.

Whichever form such reforms take, initiatives to expand funded pensions can have significant impacts on financial markets. Khan *et al* (2025) found a strong relationship between fully-funded (quasi-) mandatory pension systems with individual accounts, and capital-market development. They concluded that well-designed funded pension systems can help an economy to move towards the optimal rate of household savings, and can support a better structure of such savings. But, importantly, only under the right enabling conditions.

Given the prominence of investment challenges in the EU, it is therefore unsurprising that institutional investors, in particular insurance companies and pension funds, which manage the vast majority of pension savings in the EU, have received increased attention in the context of discussions on how to increase investment levels in the EU. The Draghi report (Draghi, 2025) estimated an annual EU investment gap in excess of €800 billion annually between 2025 and 2030. The Letta report (Letta, 2024) stated that the institutional investor base in the EU remains underdeveloped.

The overarching goal of the European Commission's Savings and Investments Union project is to channel more EU savings into productive investments in the EU. In this discussion, it is often stated that EU households keep much more of their savings in currency and deposits than their US counterparts, and therefore invest less in financial markets. This is confirmed by the data. In 2022, assets of EU private pension funds and insurance companies totalled $11.9 trillion, compared to $42.5 trillion in the US (Arnold *et al*, 2024). This significant difference is, to a large extent, the result of different pension policies. In the US, funded pensions have a much higher penetration than in the EU.

The European Commission's Communication on the Savings and Investment Union (European Commission, 2025) specifically states the importance and goal of developing the supplementary pensions sector (occupational and private pensions) in Europe, in view of demographic challenges and the need to mobilise capital, as well as to grow the occupational pensions sector. Channelling more investment into equity and alternatives managed by insurance companies and pension funds is also an explicit aim of the Savings and Investments Union. Pension reform can create significant positive externalities for the real economy through the financial system. For example, US pension funds have become one of the main sources for venture capital in the US, following regulatory reform in 1979 that enabled such funds to invest in risky assets (Kortum and Lerner, 2000).

The introduction of auto-enrolment into workplace pensions in the UK offers some guidance on the impact of pension reforms on the financial landscape of a country. Starting in 2012, employers had to enrol employees earning above a certain threshold in workplace pension plans. Employees can opt out of these plans, but the reform has still proved to be a powerful tool to extend coverage among private-sector employees in particular. The reform was rolled out gradually from 2012 to 2018 and has led to significant growth of the occupational pensions sector.

The share of eligible private-sector employees participating in a workplace pension scheme in the UK surged from 42 percent in 2011 to 85 percent in 2018 and has remained rather stable since[38]. The UK example illustrates how a significant expansion of occupational and voluntary funded pensions could affect the institutional investor base. Successful pension reforms can increase the amount of capital managed by EU institutional investors and bolster financial markets, but other reforms to the financial sector are required to improve conditions for existing capital to be allocated to productive purposes.

As the EU seeks more long-term capital that can be invested in equity and certain alternative asset classes, reducing fragmentation in the European pension market is particularly important. Pension fund size is not only correlated with better investment returns (Dyck and Pomorski, 2011), but larger funds

[38] UK Department for Work and Pensions, 'Workplace pension participation and savings trends of eligible employees: 2009 to 2023', 31 July 2024, http://www.gov.uk/government/statistics/workplace-pension-participation-and-savings-trends-2009-to-2023/workplace-pension-participation-and-savings-trends-of-eligible-employees-2009-to-2023.

also invest more in alternative assets and are more likely to build in-house investment teams (De Vries *et al*, 2024). Furthermore, larger funds are able to negotiate lower fees for the external managers they hire (Begenau and Siriwardane, 2024; De Vries *et al*, 2023).

It should be noted that the reforms with the biggest impact, both on pension finances and capital markets, are under the authority of member states. While some aspects of fragmentation may be addressed through EU-level policy, major reforms to mandatory pension systems remain firmly member-state responsibilities.

While pension systems receive most of the attention in policy discussions related to ageing, demographic trends will also have significant implications for long-term care (LTC) systems. LTC is an essential service for the elderly and is the second largest driver of the projected increase in old-age expenditure over the coming decades in most EU countries (Figure 1). Social-security systems that deliver a high level of income in old age, but do not enable the elderly to access essential services that they need, such as LTC, miss an important part of old-age welfare. The next section thus discusses the implications of demographic trends for LTC systems.

7 Ageing and long-term care systems

Public LTC systems are already under strain in many EU countries. However, they will be needed more than ever in the future, because of demographic change and several other trends. While the dependency ratio of people aged 65+ to those of working age is a useful measure in the context of pension policy, the top end of the age distribution must be understood better to understand the challenges for LTC systems.

First, Figure 2 in section 2 shows that the share of people aged 85+ in the total EU population is projected to grow by more than any other age group in the coming decades. In 2050, almost six percent of the EU's population is projected to be aged 85 or above, representing double the population share of that group in 2022. In 2070, the share is projected to reach 7.8 percent of the total population. Second, the increase in the dependency ratio (65 years and older) depicted in Figure 2 will be driven by the stark increase in the share of populations aged 85+ (Pinkus and Ruer, 2024).

Third, data shows clearly that people are more likely to suffer from limitations in activity, and therefore more likely to need care, as they age (see, for example, Pinkus and Ruer, 2024; Belmonte et *al*, 2023). These two facts combined will almost certainly result in a stark increase in demand for LTC services in the EU over the coming decades, highlighting the importance of LTC policies for the future.

While predicting the number of people in need of LTC in the future is very challenging, the European Commission's Ageing Report projects that 38.4 million people in the EU will be dependent in 2070, an increase of 23 percent compared to 2020 (European Commission, 2024a). Belmonte et *al* (2023) predicted that the number of people aged 50 years and older in need of LTC will increase from 19.7 million in 2020 to 28.7 million in 2070 in the 19 EU countries under study.

This surge in demand will put additional pressure on public LTC systems across the EU[39]. LTC systems in many EU countries already struggle to meet demand today, resulting in significant unmet care

[39] This section heavily draws on insights from the BB-Future research project, funded by Horizon Europe. See https://www.mea-share.eu/bb-future/.

needs (Hougaard Jensen *et al*, 2024)[40]. An important factor behind this gap in supply is a lack of formal care workers because of low wages, high turnover rates, the demanding nature of care work and unattractive working conditions (OECD, 2023c). For example, gross hourly wages in residential and non-residential care sectors were respectively 80 percent and 81 percent below the economy-wide averages in OECD countries in 2018. Demographic trends will increase the demand for LTC, while making increasing the supply of LTC services more challenging because the relative reduction in the working-age population will reduce the numbers of potential workers.

An important aspect of the severity of future LTC labour-supply concerns is the prospects for digitalisation and especially robotisation to offset the impact of a shrinking worker pool. So-called 'care robots' have been designed to fulfil several different care tasks, including physical care (such as helping to lift elderly people of reduced mobility, provide exercise, feeding options and bathing opportunities) and cognitive engagement in the form of social and emotional stimulation to prevent cognitive decline and dementia-related conditions. In principle, care robots should reduce the number of caregivers needed and the physical strain of care provision. However, experience from Japan with the world's oldest population and a generally receptive public attitude towards direct engagement with robots, suggests the labour saving and care improvement opportunities from robotics in LTC are smaller than often assumed[41].

Ide *et al* (2021) showed how in 2021, despite decades of heavy investment in robotic care by the Japanese government, only two percent of caregivers regularly relied on any robotic aide. Japanese experiences suggest that care robots themselves require care and user operation when moved around, maintained, cleaned, rebooted, explained to residents, monitored and stored when not in use. While technologies may improve, these issues cannot easily be overcome in often small eldercare facilities. Use of robots in such facilities is very different from industrial robots in large manufacturing operations. Use of robots in Japan frequently was found to actually create more work tasks than they saved, reducing their appeal.

EU countries and the European Commission through the Horizon2020 research programme[42] have also tried to develop robotic care aides for LTC purposes, but have to date failed to achieve any noticeable success. It would thus be a mistake to assume that robotics offer a technological path to material alleviation of future shortages of human caregivers in the EU. There is similarly relatively limited scope for digitalisation in the core provision of LTC, even if the sector is able to benefit from the general improvement in administrative and management services provision available through improved technology services and artificial intelligence.

Given gaps in LTC supply, it is unsurprising that informal care has and is playing a pivotal role in care provision in the EU. Informal care, mostly provided by family members and friends, is estimated to make up around 80 percent of total care time in the EU (European Commission, 2021). Rocard and Llena-Nozal (2022) reported that 60 percent of older people receiving care in OECD countries rely only on informal care. However, this heavy reliance on informal care is unlikely to be realistic in the future for several

[40] For a more detailed discussion of the drivers of pressure on LTC systems see Hougaard Jensen *et al* (2024) and Pinkus *et al* (2023).
[41] See Wright (2023), Pearson *et al* (2021) and Vogt and Konig (2021).
[42] See European Commission news of 18 June 2014, 'Robot-Era project: robotic services for ageing well', https://ec.europa.eu/newsroom/horizon2020/items/16904/.

reasons. First, the demographic transition also means that people are having fewer children than in the past, reducing the capacity for informal care from family members. Second, children tend to live further away from parents than in the past, making caregiving more difficult (Steinbach *et al*, 2020). Third, patchwork families, for example with divorced parents and stepchildren, are more common than in the past. This could result in a lower likelihood of providing care to parents (Pezzin *et al*, 2008).

Fourth, female labour supply has increased over the past decades, limiting the ability of women to provide care in the future (Haberkern *et al*, 2015). The coming LTC challenges have a distinct gender dimension. Women make up 59 percent of informal carers in the EU (European Commission, 2021). Women are also more likely to provide more hours of care than men. Therefore, even more reliance on informal care in the future, coupled with rising care needs, is set to impact women more than men.

Progress made on this issue across the EU could therefore be put at risk by a rising pattern of dual responsibility for childcare and elderly care. Since women work less over their careers, such a scenario will then also have negative effects on the accumulation of the pension rights and pension savings of women.

8 Summary and policy recommendations

The EU population is ageing, which will lead to increases in ageing-related public expenditure in the coming decades in most EU countries, driven by developments in the cost of pensions and old-age care. Many of these structural issues facing EU economies are also the focus of EU Country Specific Recommendations (CSRs), issued regularly as part of the annual European Semester process overseen by the European Commission. The Commission maintains an extensive publicly available database for all 27 member states which compiles published CSRs by sector[43], including those covered in this paper, such as 'pension systems and active ageing' and 'long-term care'. Darvas *et al* (2024) analysed the effectiveness of the CSR process in addressing demography and debt sustainability in the EU and found the implementation record by member states underwhelming.

This paper focuses on many of the same issues. It highlights the currently bleak outlook for a material reversal in European fertility rates and analyses the multifaceted and negative impact of ageing on EU long-term potential growth rates. Labour-force growth will turn sharply negative in a number of EU countries, and ageing is also likely to weigh negatively on traditional drivers of total factor productivity, including new disruptive firm formation and rising educational attainment. At the same time, the savings and investment equilibrium in an ageing European economy with a shrinking aggregate market size is mostly likely to see interest rates and aggregate debt burden costs remain relatively low.

With few identified policies to materially improve EU fertility rates, the importance of maintaining positive net inward migration levels into the EU will increase. However, as highlighted by Dutch and Danish microlevel studies, only some categories of migration lead to persistently positive contributions to public finances. Consequently, this paper argues that EU member states wanting to rely on net migration to improve their fiscal outlooks must implement migration policies focusing on increasing the share of principally employment-based migration. Correspondingly, if the policy intent

[43] European Commission, 'Country-specific recommendations database', https://ec.europa.eu/economy_finance/country-specific-recommendations-database/.

is to improve long-term public finances, many member states should increase access to work permits, along lines similar to, for instance, the regular Italian programme that has 500,000 new work visas for 2026-2028[44]. At the same time, regulation of access to, in particular, asylum and family-reunification based migration should become more restrictive in most EU countries to safeguard the overall positive impact of inward migration on public finances. Danish data shows the political feasibility of both increasing aggregate inward migration through employment-based (and free movement) inflows, and introducing more restricted access to asylum-based migration.

Ageing will affect all pension systems through different drivers, but as many EU countries already have very large unfunded future public pension liabilities, it is likely to continue to drive the gradual shift towards a greater share of prefunded pension benefits in total retirement income. As raising effective retirement ages for Europeans both increases current and future pension scheme contributions and pushes out benefit payments, we argue that EU countries must continue to pursue this type of reform in response to population ageing. However, care must be taken to ensure intergenerational fairness when raising retirement ages, as future retirees should be able to look forward to shares of their expected healthy lifetime spent in retirement comparable to those of their parents. The risk that raising average effective retirement ages too aggressively *de facto* regressively penalises lower-income and lower-life expectancy groups must similarly be addressed by EU governments, though some conditional access to early retirement.

Funded pension systems are more resilient to population ageing than unfunded pension systems, which are the main way of financing retirement in most EU countries, particularly in the larger economies. The trend has been towards more funded pensions in recent decades, but reforms are often politically difficult and funded pensions face their own challenges and risks. Nevertheless, given the major demographic challenges and the low probability of reversal, EU countries should devise strategies to diversify the financing of retirement benefits beyond the contributions of current workers and government debt. This could, for example, take the form of an initially small additional contribution to a funded pension pillar that would grow over time.

More funded pensions in the EU could also unlock badly needed capital for the real economy. Households in the EU tend to keep a large share of their savings in currency and deposits, while financial markets remain small in the EU relative to the US. Reforms to retirement saving could help unlock capital for productive investment, not only addressing demographic challenges, but also the prevalent investment gap. Funded pensions, however, expose individuals to more risks, and therefore need to be designed carefully. Adequate provision also needs to be made for pension credits during career breaks related to care for children or the elderly, otherwise the already substantial gender pensions gap will deepen further.

Finally, long-term care plays an important role in the welfare of the elderly. While pensions grab most of the attention in policy discussions, this other aspect of ageing should not be forgotten. LTC systems already face substantial challenges in the EU and are set to face a surge in demand in all member states in the future. Robotic based capital-for-labour substitution is not likely to present a technology-based solution to labour shortages, and member states need to take measures to expand the provision

[44] *Reuters*, 'Italy to issue half million non-EU work visas over next three years', 30 June 2025, https://www.reuters.com/world/italy-issue-half-million-non-eu-work-visas-over-next-three-years-2025-06-30/.

of LTC services, such as by improving working conditions and support for carers that reduce their working hours to care for relatives.

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