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In the mid2030s, the health of the baby boomers will have deteriorated and many in these large cohorts will be in need of formal and/or informal long-term care.

This "**care wave**" will transform two generations: the baby boomers in need of care and their children who may supply care. It will have significant implications for labour supply, especially for women, saving behaviour, and therefore for productivity, economic growth and its inclusiveness.

The overarching objective of BB-Future is to understand the size and the implications of the care wave on economic and social outcomes, to appreciate the quality of this second ageing-related transformation and to develop policy recommendations for advance planning on the EU and Member State levels.

This deliverable studies the fiscal interdependence of public pension systems and long-term care (LTC) systems. In France and Germany, an older than baseline population will increase public pension costs as much as the expected increase LTC costs and squeeze the social insurance budget. Such a danger is amplified in France due to its high implicit and explicit debts. In Italy, a fiscal squeeze is possible around the mid2030s but thereafter pension costs are expected to decline about as fast as LTC costs rise. The main danger here is the remaining high indebtedness. A fiscal squeeze generated by the pension system is less likely in Poland but here the costs of the LTC system are increasing dramatically. Sweden is the country with the least fiscal challenges. While LTC costs will also rise, especially if morbidity expands, the low current implicit and explicit debts make a fiscal squeeze for LTC spending less likely.

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The Sustainability of Pension Systems in Europe and their Impact on LTC Systems: International Comparisons

Axel Börsch-Supan and Johannes Rausch, September 2026

1. Introduction

Pension systems and long-term care (LTC) systems are not independent from each other. Arguably, the most direct dependency is of a fiscal nature: the social budget in a country is not unlimited, and spending more on public pensions makes it harder to spend more on publicly financed LTC. This dependency is particularly threatening since both pension and LTC systems face massive cost increases due to population aging. The dependency is somewhat attenuated by the fact that the peak of pension expenditures is earlier than the peak of LTC expenditures but there is a phase of about 15-20 years in which both systems – and the health care system as well – will have very high expenditures as compared to now.

This deliverable presents two sets of results from the BB-Future project that show the extent to which the large costs of public pension systems may crowd out public spending on LTC. Section 2 presents cost estimates of public LTC, public healthcare and public pension systems from 2025 to 2070. In addition, Section 3 delivers an assessment how sustainable pension systems in the five BB-Future countries (France, Germany, Italy, Poland, and Sweden) are. Section 4 concludes.

Pension systems and LTC are also interdependent because working longer as demanded by many pension reforms that increase the retirement age may take time away from providing informal care. This has been studied with the help of the micro and macro models in the BB-Future project and is reported in the associated deliverables.

2. Cost projections

Cost projections of the pension, healthcare and LTC systems are regularly computed by the EU's Ageing Working Group (AWG), a group of experts commissioned by the Economic Policy Committee and the Social Protection Committee. We use their baseline projection and add two scenarios ("young population" and "old population") to reflect the uncertainty of future developments.

BB-Future contributes to the AWG's work by adding different health scenarios to the three different demographic scenarios of the cost projections of healthcare and LTC systems. This reflects the sensitivity of cost projections not only with respect to fertility, migration and mortality but also to morbidity, and, importantly and different from the AWG, their interactions. Moreover, we separate LTC expenditures for individuals younger than age 65 from those of older individuals because BB-Future is specifically interested in care provided by the younger generation to the older generation.

Our cost projections are computed using the Social Insurance Model of BB-Future, also called MEA-SOCSIM, described in Deliverable 5.1 (Rausch 2023). The projections rely on many assumptions, formulated as scenarios. They are briefly described in Subsection 2.1. Detailed sources are relegated to an appendix. Subsection 2.2 delivers our results.

2.1 Scenarios

We employ three different demographic scenarios: baseline, young population and old population, defined by assumptions on future fertility, migration and mortality. For the healthcare and LTC projections, they are displayed in Table 1.

Table 1: Demographic scenarios

Scenario	Fertility (2024 – 2070)	Migration (Ø 2024 – 2070)	Life Expectancy (male/female in 2070)
Germany			
Young population	1.85 – 1.95	372,398	84.0/88.0
Baseline population	1.54 – 1.63	264,768	86.0/90.0
Old population	1.23 – 1.30	159,204	88.0/92.0
France			
Young population	2.18 – 2.15	151,362	84.7/ 89.3
Baseline population	1.82 – 1.79	86,648	86.7/91.3
Old population	1.45 – 1.43	23,372	88.7/93.3
Italy			
Young population	1.50 – 1.74	330,896	85.1/89.0
Baseline population	1.25 – 1.45	250,029	87.1/91.0
Old population	1.00 – 1.16	169,374	89.1/93.0
Poland			
Young population	1.69 – 1.93	58,311	82.1/87.5
Baseline population	1.41 – 1.61	31,249	82.1/89.5
Old population	1.13 – 1.29	4,201	86.1/91.5
Sweden			
Young population	2.03 – 2.11	43,911	85.0/ 88.7
Baseline population	1.70 – 1.76	30,102	87.0/90.7
Old population	1.36 – 1.40	16,551	89.0/92.7

Source: own table.

Relative to the baseline, which closely corresponds to the assumptions of the EUROPOP projections also used by the AWG, the young population scenario has higher fertility, higher migration and lower life expectancy; the old population scenario the opposite. The main difference to the EUROPOP projections is a lower migration rate in Sweden, to better match the actual development in recent years.

For the pension projections, we literally use the AWG baseline projection and add two scenarios similar to those for healthcare and LTC. The AWG provides alternative scenarios for higher life expectancy, lower and higher migration, and lower fertility but not the combinations corresponding to a younger or older population. For the older population, we add the AWG-provided deviations for a lower fertility, lower migration and higher life expectancy; for the younger population, we add the AWG-provided deviation of a higher migration and subtract the AWG-provided deviations for lower fertility and higher life expectancy. Compared to our own definitions this will exaggerate the range of future

uncertainty since this additive approach ignores the correlations among the demographic variables.

Social insurance projections also need assumptions on labor force participation (including retirement age and share of part-time work) and the development of wages. Their computations are documented in Rausch (2023). The projections consider the same assumption as the AWG.

The main innovation of this work is to interact the demographic assumptions with assumptions on the development of health. The costs of LTC and healthcare systems crucially depend on whether morbidity will expand, remain constant or, in the most optimistic case, compress. We use three scenarios, based on age-specific impairment probabilities derived from the SHARE data (Deliverable 4.4, Börsch-Supan and Horton 2026):

- The most pessimistic assumption is called „strong morbidity expansion“ and assumes that the age-specific impairment probabilities stay the same although life expectancy increases, i.e., we add impaired life-years at the end of life.
- The most optimistic assumption is called „no expansion“ and assumes that the age-specific impairment probabilities are shifted exactly by the same number of years as life expectancy increases, i.e., we add healthy life-years at young ages.
- A medium assumption shifts by half of the increase in life expectancy.

One could make a more optimistic assumption and assume that morbidity will compress, i.e., the onset of poor health will shift by more years than life expectancy but the already observable worsening health of the baby boomers' children at midlife makes such a scenario unrealistic (Börsch-Supan et al. 2021).

2.2 Results

Figures 1 through 5 show the cost developments of the public LTC, healthcare and pension systems for the five BB-Future countries, expressed as percentage of GDP. LTC and healthcare show ten lines: in black the AWG projection, and then all nine combinations of demographic and morbidity scenarios. The costs of the public pension systems have three lines: AWG baseline and then our constructed young and old populations.

Regarding LTC costs, two observations catch the eye in all five countries. First, the level between the AWG and the BB-Future projections differs because the former includes disability costs for younger individuals. We added them to the general health expenditures in the figure below. Hence, total social insurance costs (here defined as costs of the public LTC, healthcare and pension systems) remain unaffected by this definitional change. However, the AWG projections do not generally coincide with one of the BB-Future scenarios. In Germany, the AWG projections are close to the mild morbidity expansion scenario but in Poland much closer to the pessimistic strong morbidity expansion scenario. One reason for the strong cost increase in Poland is that the increase of the Polish life expectancy is much larger than in the other countries, so more years with high age-specific impairment rates are added relative to today.

Second, the difference among the nine BB-Future scenarios is very large in all five countries. The pessimistic health scenario comes with more than double the costs of the optimistic health scenario in all five countries. On the other side, the effect of the demographic

assumption depends greatly on the health assumption. Under the optimistic assumption the development of the LTC-expenditures does only differ slightly between the demographic scenarios while we observe great differences under the pessimistic health assumptions.

In France, Germany, Italy and Sweden, LTC costs will rise dramatically more than predicted by the AWG if morbidity will expand relative to life expectancy. The likelihood of this happening is unclear at this point, however, the evidence of declining health for younger cohorts provided by Börsch-Supan et al. (2021) is a strong warning signal in this direction.

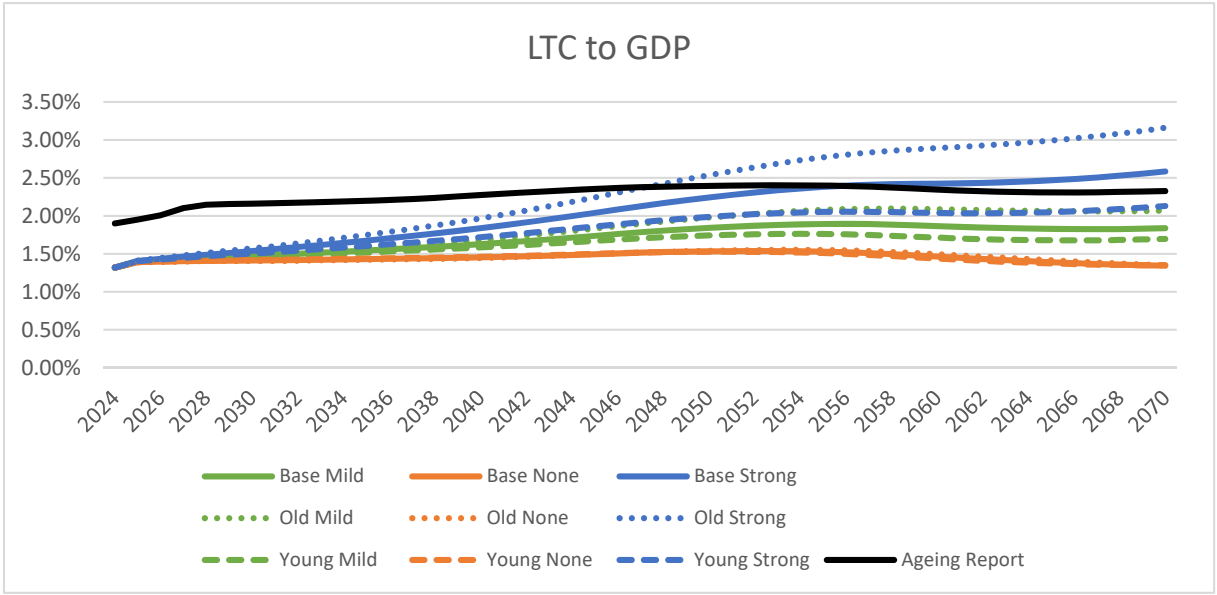
Healthcare costs are less sensitive to the morbidity assumptions since the expansion of morbidity shifts the probability to be impaired much more at older than at younger ages.[1]

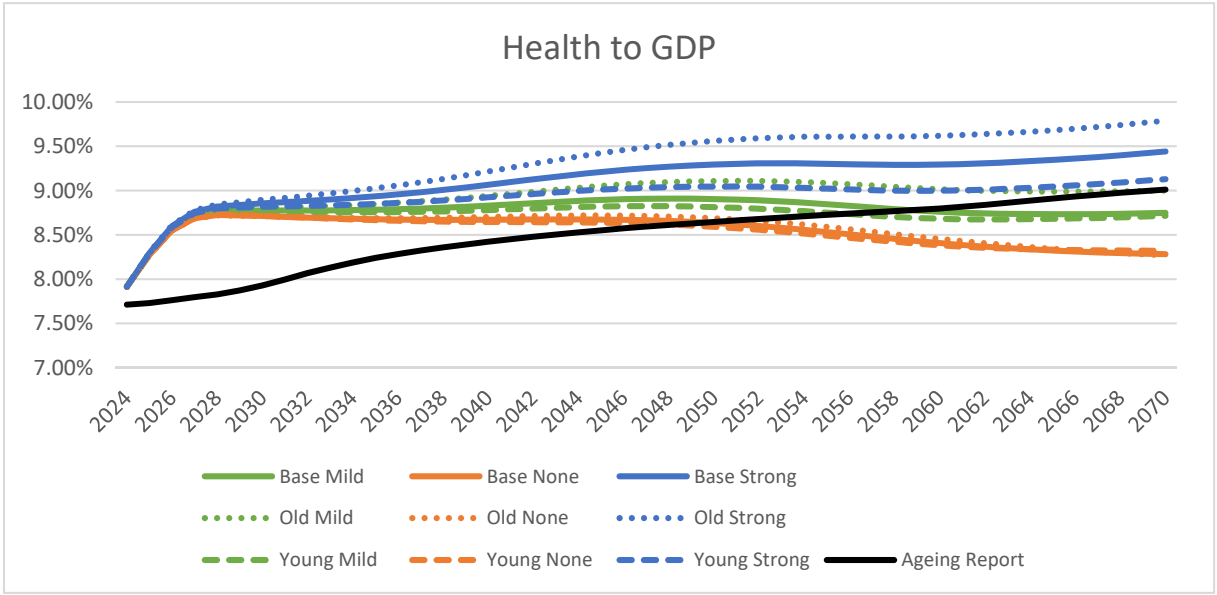
As opposed to LTC and healthcare, the costs of public pension systems are less sensitive to the underlying scenarios in relative terms. However, since pensions are so much costlier than LTC, the difference between young and old population is large in absolute terms (i.e., percentage points of GDP). The development of the baseline projections varies strongly across countries: Germany with its hybrid DB-DC system based on the "sustainability factor" exhibits a modest increase. However, the AWG assumption does not take into account the recently extended suspension of the "sustainability factor" until 2031 and thus underestimates future costs. France, still under the AWG assumption of an increasing retirement age, shows a modest decline and similarly Sweden, while Italy and Poland show a wave-like pattern. In Italy, the initial increase captures retirees under the old system and the following decrease is generated by younger cohorts covered by the NDC system. It is similar in Poland, but additionally, Poland has a second aging wave due to a second bulge in its population pyramid.

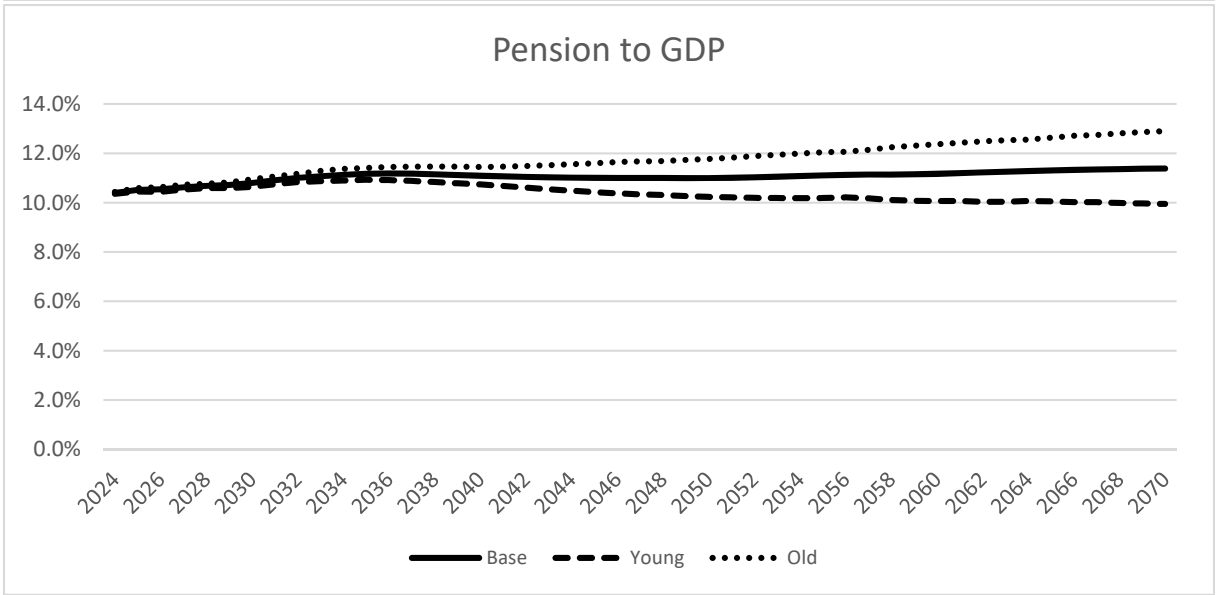
Comparing the costs of the public LTC systems with the public pension costs gives a first answer to the key question in this deliverable. This answer differs across the five countries. In France and Germany, an older than baseline population will increase public pension costs as much as the expected increase LTC costs and squeeze the social insurance budget. This is less likely in Poland and Sweden. In Italy, a squeeze is possible around the mid2030s, but thereafter pension costs are expected to decline about as fast as LTC costs rise.

[1] The strong increase of the German healthcare costs between 2024 and 2026 follows the actual development BMG (2025a) and preliminary estimates of BAS (2025).

Figure 1: Germany







Source: own figures.

Figure 2: France

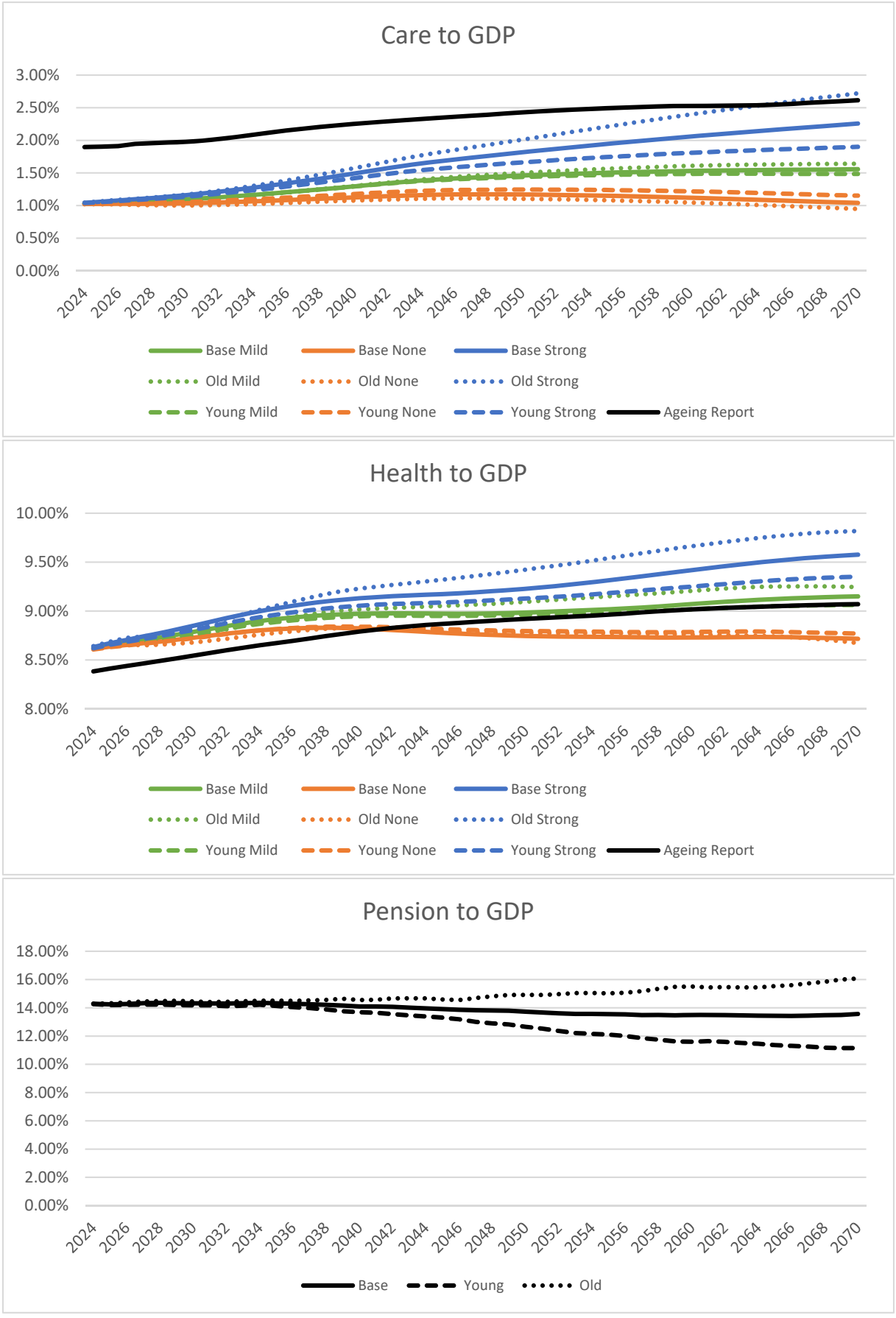


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Figure 3: Italy

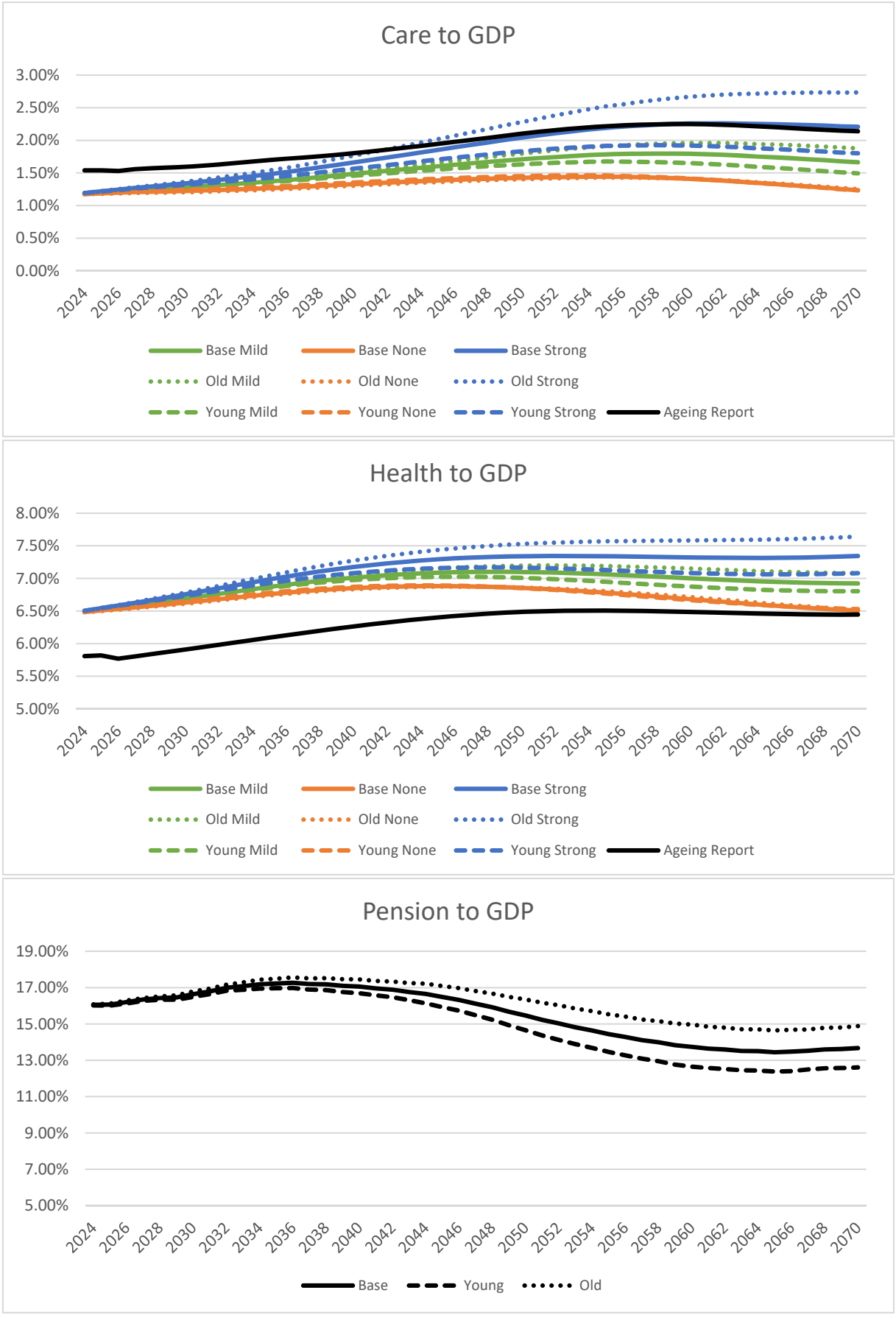

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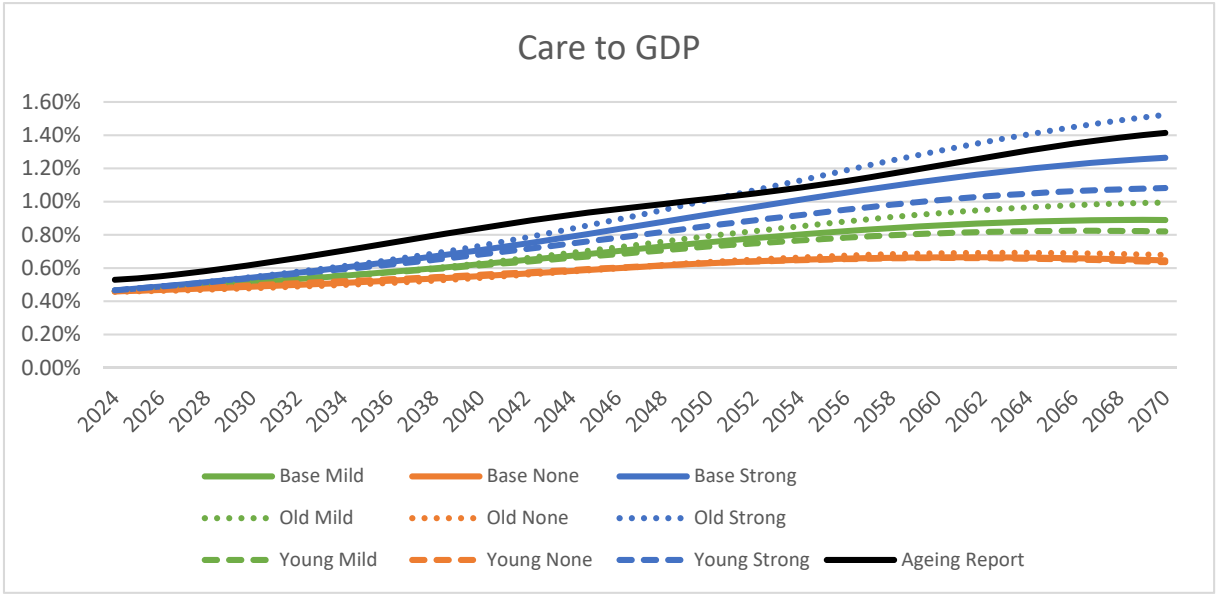
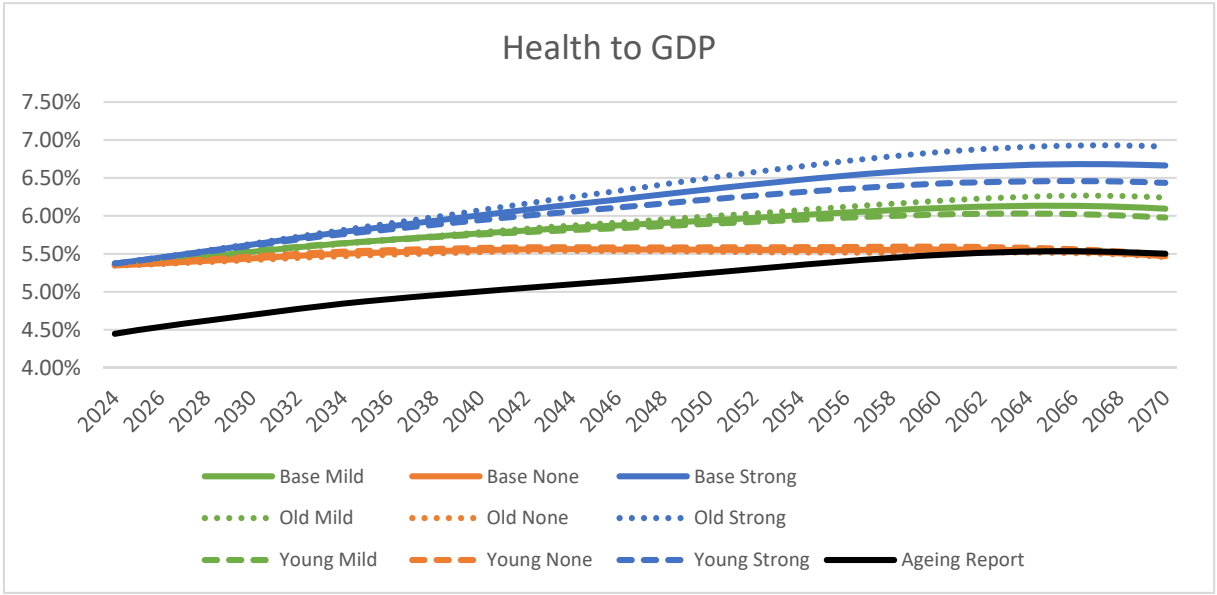
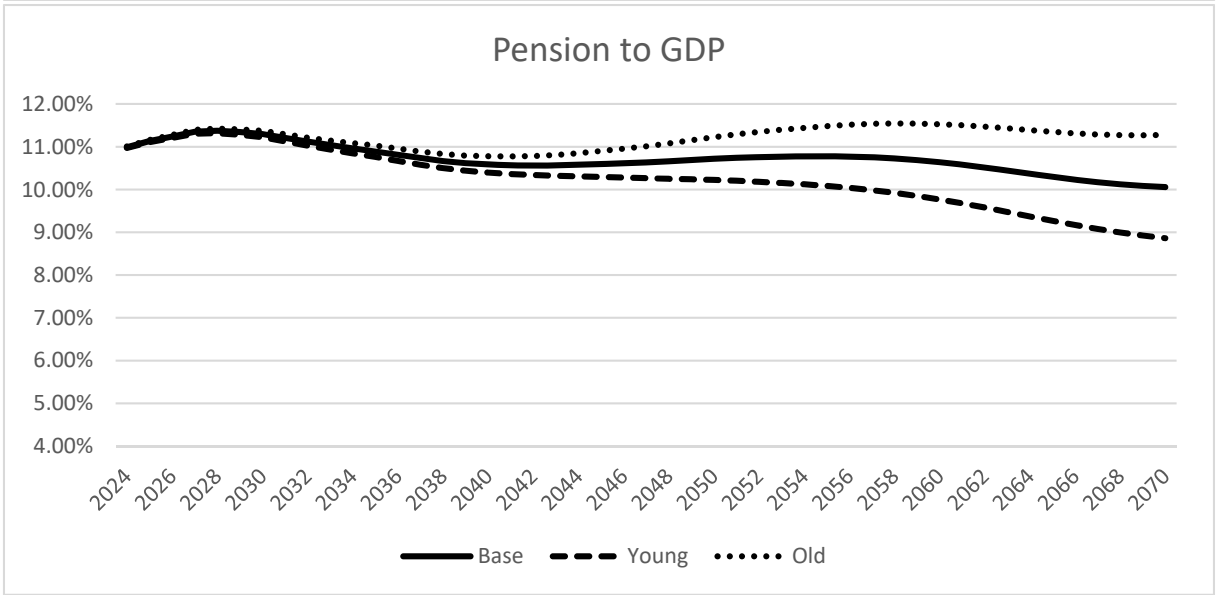
Figure 4: Poland

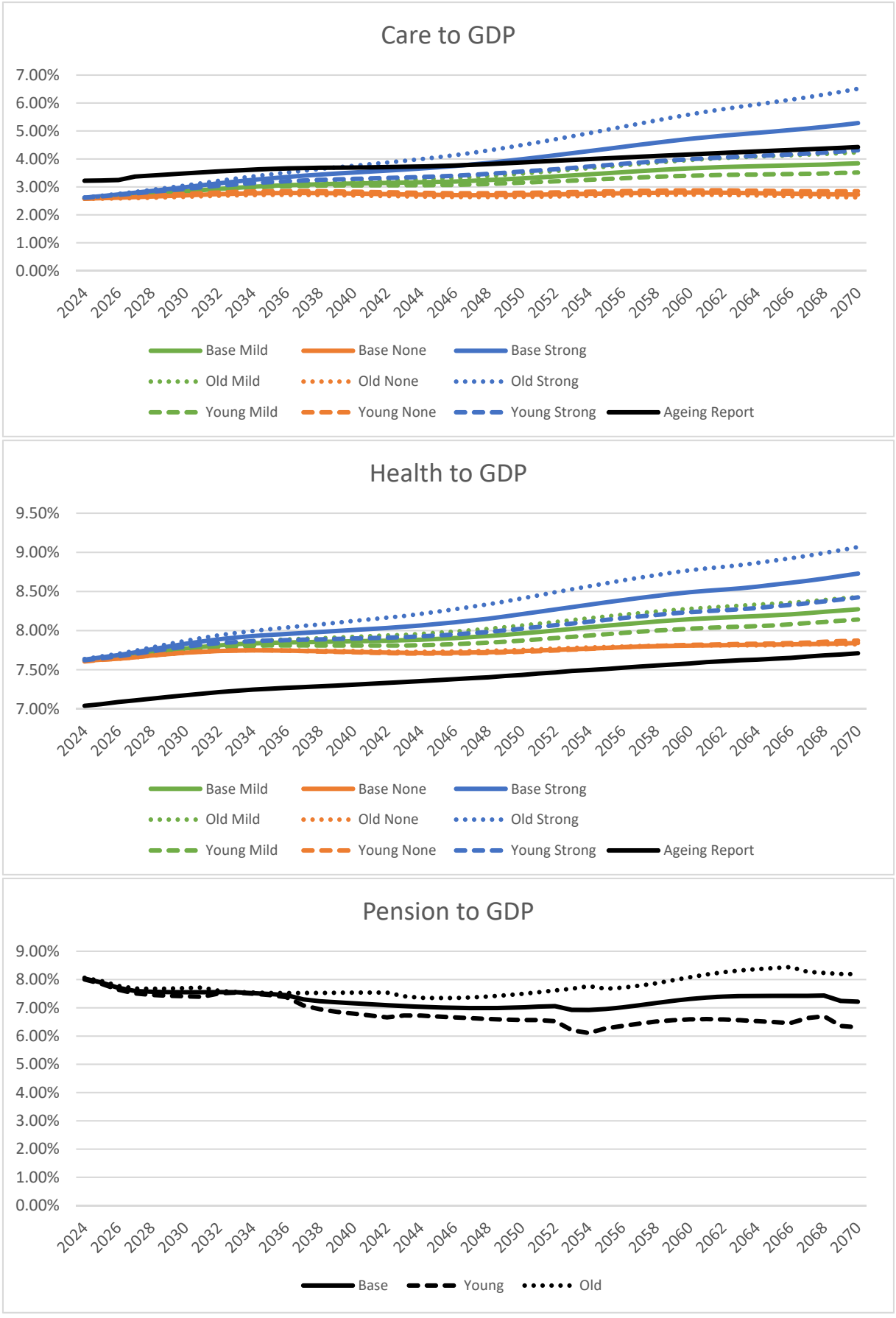






Source: own figures.

Figure 5: Sweden



Source: own figures.

3. Sustainability of pension systems

For a second answer, we take a much broader view of the pension systems in the five countries which also includes past indebtedness and the probability that the public pension systems remain stable as assumed by the AWG and BB-Future projections. It also takes into account that in some countries, the public pension system is the dominating if not exclusive source of old-age income (e.g. France and Italy), while in other countries, funded private and occupational complement public pensions (e.g. Sweden). Subsection 3.1 collects a broad set of indicators for financial sustainability, Subsection 3.2 looks at the accumulated implicit debt of public pensions, and Subsection 3.3 at flow-based sustainability indicators.

3.1 Indicators for financial sustainability

Table 2 provides some indicators for the financial sustainability of pension systems, now including both public and private pensions.

Table 2: Indicators of financial sustainability

Indicator	France	Germany	Italy	Poland	Sweden
Total fertility rate, 2024	1.6	1.5	1.2	1.3	1.4
Life expecancy at birth, 2023	83.0	81.1	83.5	78.4	83.4
Old-age dependency ratio (65+/15-64) in 2024	40.2	39.8	42.0	33.7	36.8
Old-age dependency ratio (65+/15-64) in 2054	53.4	59.7	76.6	67.8	49.4
Employment rate age 55-64, 2024	60.1	75.0	58.3	59.5	77.6
Employment rate age 65-69, 2024	11.1	20.8	16.1	12.2	29.3
Statutory retirement age (men/women), 2024	64.3	66.2	64.8/63.8	65/60	66.0
Share of WAP with retirement saving plan, 2024	42.3	66.0	26.7	80.5	99.4
Mandatory retirment savings (% earnings, 2024)	0.0	0.0	0.0	3.8	7.0
Retirement assets (% GDP, 2024)	20.1	7.4	17.1	10.3	149.1
Real economic growth (2018-2024)	1.1	0.2	1.1	3.1	1.4
Public pension expenditures (% GDP, 2021)	13.4	10.8	16.1	11.2	8.0
Government debt (% GDP, 2024)	116.7	62.8	148.7	72.9	49.8

Sources: OECD 2025, except economic growth (Worldbank 2026) and government debt (OECD 2026). Figures refer to 2024 or latest available year. Retirement assets include mandatory savings in occupational and premium pensions as well as private individual pension plans. WAP is working age population.

Italy has already a relatively old population and the increase of the old-age dependency ratio is far above average. Poland faces a similarly large increase between 2024 and 2040 but from a much lower base than Italy, which also has a relatively low old-age employment rate, especially compared to Sweden but also to Germany. Hence, taking demography and low old-age employment rates together, it is no surprise that pension expenditures as a percentage of GDP is also highest in these two countries, more than double the Swedish share. Recent economic growth is lowest in Germany, which worsens the outlook for financial sustainability.

The dominance of public pay-as-you-go (PAYG) financed pensions as retirement income vehicles is clearly reflected if retirement assets are compared to GDP. It hovers around 10% for France, Germany, Italy and Poland, while it is 150% in Sweden.

Mercer, the CFA Institute and Monash University have combined many of the elements of Table 2 into a single index and rated pension systems accordingly. The individual scores range from 0 (bad) to 10 (excellent) and the final assessment from 0 (bad) to 100 (excellent). While the weights of each element are normative and have no theoretical foundation, it is a frequently used way to rank the financial sustainability of pension systems shown in Table 3.

Table 3: The Mercer index and its components

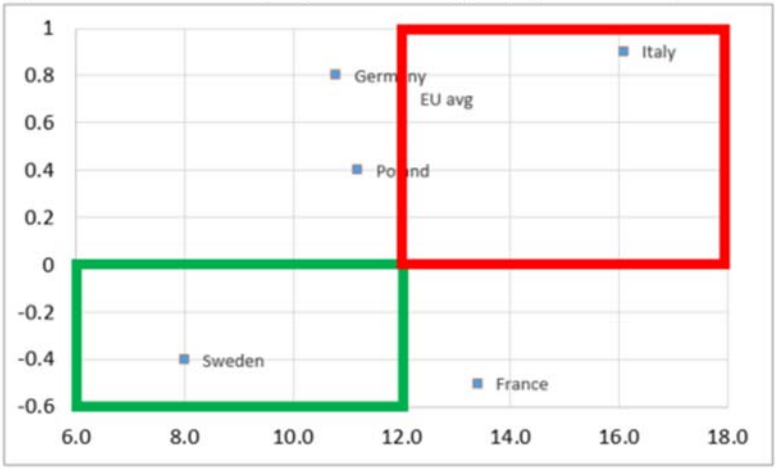
Components:	France	Germany	Italy	Poland	Sweden
Demographics	3.9	5.3	4.2	3.6	5.7
Labor force participation age 55+	5.0	8.0	4.6	4.5	8.9
Government debt and pension expenditures (% GDP)	3.0	5.6	1.1	4.9	7.5
Real economic growth (average seven years)	5.1	3.3	5.7	7.5	5.0
Share of WAP with retirement saving plan	9.7	5.8	1.5	9.7	10.0
Retirement assets (% GDP)	1.5	2.0	1.6	1.0	9.1
Mandatory retirment savings (% wage income)	0.0	0.0	1.5	2.4	5.7
Mercer 2025 sustainability score	**48.6**	**47.5**	**27.9**	**45.9**	**76.3**

Source: Mercer CFA Institute Global Pension Index 2025. Demographics include total fertility rate, life expectancy at retirement age and the old-age dependency ratio. WAP is working age population.

The overall rating and that of the individual criteria largely reflect the assessments in Table 2 with a more pessimistic outlook for France and Poland, mainly generated by the large weight of the Mercer index which is given to those indicators that describe funded pensions.

The difficulty of achieving financial sustainability does not only depend on a country's reform path in the future but also where a country currently stands. Figure 6 combines the level of pension current expenditures (2024, Table 2) with their expected changes until 2045. Countries in the green quadrant have low current expenditure levels relative to the EU average and expect declining expenditures. Sweden belongs to this group. Countries in the red quadrant have high current expenditure levels relative to the EU average and expect further increasing expenditures. Italy belongs to this group. Germany and Poland also expect increasing expenditures but from a relatively low level, while France has done reforms that are expected to reduce pension expenditures but these countries start from a very high current level.

Figure 6: Level and projected change of pension expenditures (2024-2045)



Source: European Commission, 2024 Ageing Report, OECD (2025)

3.2 The implicit debt of public pension systems

Pension systems promise current workers a pension in the future. This promise creates a kind of debt for the pension system. Unlike government debt which is financed by bonds which have to be sold on the capital market, and unlike a funded pension system, where people own a share of the fund, the public pension debt is implicit since there is no counterpart holding assets that cover the promises of a public pension system. Nevertheless, the accumulated promises can be calculated and juxtaposed to the expected accumulated revenues, creating an equivalent to the explicit debt of governments.

On first sight, this metric is an intuitive counterpart to the explicit government debt, and therefore also an indicator of the stability of a public pension system. Table 4 reports the explicit government debt according to OECD standards in 2018 and 2024 and calculations of the implicit pension debt by the European Commission (2020) which uses this most comprehensive "open system" definition of the net implicit pension debt and a discount rate of 5 percent. The implicit pension debt is based on data from the 2018 Ageing Report of the European Commission. The changes between 2018 and 2024 in Table 4 reflect the reforms (and their backlashes) during this period.

Table 4: Explicit government debt and implicit pension debt in Europe

Indicator (all in % GDP)	France	Germany	Italy	Poland	Sweden
Government debt, 2018	122.8	68.8	145.8	66.1	51.7
Government debt, 2024	116.7	62.8	148.7	72.9	49.8
Implicit pension debt, 2018	185.0	131.0	148.0	116.0	67.0

Sources: *Government debt: OECD 2026; Implicit pension debt: 2020 Debt Sustainability Monitor, Graph III.7, open system net implicit pension liabilities.*

Table 4 shows that France needs to continue the path shown in and Figure 2 to reduce its high implicit debt; however, the comparison between Table 4 and Figure 2 also indicates that leaving the reform path underlying Figure 2 will create to a large fiscal spill-over for the French LTC system. The same holds, also to a lesser extent, for Germany and Italy, while for Sweden the relatively low implicit debt is in line with the declining pension costs visible in Figure 5.

3.3 Flow-based sustainability indices

The main disadvantage of implicit debt as a measure of the sustainability of a pension system (or the lack of it) is that it is dominated by numbers that represent the stock of debt in the far future. The magnitude of the implicit debt therefore depends heavily on the chosen discount rate. High discount rates correspond to a short time horizon and thus underestimate future implicit indebtedness, while low discount rates produce very large magnitudes that are incommensurable with common notions of explicit debt. The EU Commission has therefore discontinued providing such numbers in spite of their intuitive signal.

The flow-based approach to express the financial sustainability of a pension system into a single number tries to minimize the discounting problem. It expresses the potential financial imbalance as a flow measured as share of current GDP rather than as a future stock. It is based on the same actuarial calculations as for the implicit pension debt. There are two variants. The first variant, called debt-reduction indicator S1, computes by which share of GDP the government's budget has to raise revenues from now on until a given date (e.g. 2070) to reduce the combined explicit and implicit debt to a certain limit (e.g. 60%) by that date. The

second variant, called debt-stabilization indicator S2, computes by which share of GDP the government's budget has to raise revenues from now on until eternity to stabilize the combined explicit and implicit debt at today's level.

Table 5 displays the two indicators and three of their components for 2024. The first component is the legacy component which comprises the initial budget position (i.e., current deficit or surplus) and, in the case of S1, the debt requirement (i.e., bringing down the current debt to 60%). The second component is the cost of aging which comprises pensions, healthcare, long-term care and education. The pension component reveals how much of a country's long-term budgetary gap is driven purely by its public PAYG pension system.

The numbers refer to calculations provided by the 2024 Ageing Reports of the European Commission. Positive numbers indicate the amount of additional revenues necessary to reach the debt targets of S1 and S2; negative numbers the "fiscal leeway" that government and/or pension systems have. The EU Commission stresses that this room for maneuver should not be used to increase the generosity of pension systems but to decrease other debt components.

Table 5: The flow-based S1 and S2 sustainability indicators in Europe

Indicator (all in % GDP)	France	Germany	Italy	Poland	Sweden
S1 debt reduction indicator, 2024	3.9	3.5	1.6	5.3	0.9
Legacy component	3.8	2.4	1.6	4.8	0.4
Total cost of ageing	0.0	1.1	0.1	0.5	0.4
Net pension component	-0.4	0.3	-0.5	-0.4	-0.2
S2 debt stabilization indicator, 2024	3.1	4.1	-1.0	5.6	2.6
Legacy component	3.1	2.7	0.1	4.8	1.8
Total cost of ageing	0.1	1.4	-1.0	0.7	0.8
Net pension component	-0.5	0.5	-1.6	-0.8	-0.3

Sources: *2025 Debt Sustainability Monitor*

In 2018, France and Italy had both high explicit government debts and high implicit pension debts. France had the largest implicit pension debt (185%) mainly due to very generous pension replacement rates and a low effective retirement age compared to the EU average. The total cost of aging components and the net pension component of the S1/S2 indicators in 2018 include the planned reform by President Macron. The negative values mean that the government actually has some leeway to reach the sustainability targets. However, only part of these reforms materialized, and the corresponding figures in 2024 have a slightly less positive outlook, and the overall S2 indicator actually worsened considerably as the non-pension cost of aging grew larger.

In 2018, Italy followed France closely with an implicit pension debt of 148% and an explicit government debt of 149%. However, the Dini and Fornero reforms which introduced and accelerated a NDC system and linked benefits to life expectancy have changed the outlook completely. The S1 debt reduction indicator decreased from 8.8% of GDP to 1.6%, and the pension component of the S2 debt stabilization indicator increased the leeway from 0.7% of GDP to 1.6%.

While Germany had an explicit government almost in line with the Maastricht rules (63%) in 2024, its implicit pension debt was high (131%) in 2018, and the outlook has substantially worsened between 2018 and 2024. As pointed out in the country paper, Germany has reverted the reforms in 2004 and 2007 and took the opposite road by increasing early retirement and

installing a fixed replacement rate in spite of the severe pressures that will be created when the large baby-boomer generation exits the labor market. All pension components show that the government needs additional funds to reduce or stabilize the sum of implicit and explicit debt, and both overall S1 and S2 indicators increase substantially from 2018 to 2024.

Poland shows a similar pattern as Germany in terms of a low government debt in 2018 and 2024 (66% of GDP and 73%, respectively) but a much higher implicit pension debt (116%). The outlook, however, is much more positive especially for the pension system's sustainability with both S1 and S2 pension components indicating fiscal leeway and a relatively low total cost of aging, mainly due to the NDC system which is still in place in spite of other reforms that went in the opposite direction, such as the 2017 decision to lower the retirement age. Moreover, strong economic growth currently buffers the GDP percentage (Table 2).

Sweden with its hybrid PAYG NDC and funded premium pension system has both low explicit and implicit debt (around 50% and 67%, respectively) due to its automatic adjustment mechanisms: if life expectancy increases, the pension benefits are automatically reduced. Both S1 and S2 pension components indicate fiscal leeway.

4. Summary and Conclusions

Main aim of this deliverable was to study the fiscal interdependence of public pension systems and long-term care (LTC) systems. Since the social budget in a country is not unlimited, spending more on public pensions makes it harder to spend more on publicly financed LTC. This dependency is particularly threatening since both pension and LTC systems face massive cost increases due to population aging.

In a first approach, we compared cost projections of the public LTC systems with cost projections of public pension costs. In a second and broader approach we investigated the financial sustainability of pension systems: how likely will they follow the path delineated in the first approach.

Combining the two approaches leads to the following conclusions. In France and Germany, an older than baseline population will increase public pension costs as much as the expected increase LTC costs and squeeze the social insurance budget. Such a danger is amplified in France due to its high implicit and explicit debts. The French outlook has worsened since some reforms (especially the increase of the retirement age) have been withdrawn since these numbers were calculated. In Italy, a fiscal squeeze is possible around the mid2030s but thereafter pension costs are expected to decline about as fast as LTC costs rise. The main danger here is the remaining high indebtedness. A fiscal squeeze generated by the pension system is less likely in Poland but here the costs of the LTC system are increasing dramatically (Figure 4). This is reflected in the very large S1 and S2 sustainability indicators. Sweden is the country with the least fiscal challenges. While LTC costs will also rise, especially if morbidity expands, the low current implicit and explicit debts make a fiscal squeeze for LTC spending less likely.

References:

Bundesamt für Soziale Sicherung (BAS) (2025): *GKV-Schätzerkreis schätzt die finanziellen Rahmenbedingungen der gesetzlichen Krankenversicherung für die Jahre 2025 und 2026*. https://www.bundesamtsozialesicherung.de/de/service/newsroom/detail/gkv-schaetzerkreis-schaetzt-die-finanziellen-rahmenbedingungen-der-gesetzlichen-krankenversicherung-fuer-die-jahre-2025-und-2026/

Bundesministerium für Gesundheit (BMG) (2025a): *Zahlen und Fakten zur Krankenversicherung*. https://www.bundesgesundheitsministerium.de/themen/krankenversicherung/zahlen-und-fakten-zur-krankenversicherung

Börsch-Supan, A., I. Ferrari, and L. Salerno (2021): *Long-run Health Trends in Europe*, Journal of the Economics of Ageing, Volume 18.

Börsch-Supan, A., and H. Horton (2026): *Projections of the care gap in selected European countries based on demographic and health projections*, Deliverable 4.4 of the BB-Future project funded under the European Union's Horizon 2020 research and innovation programme GA No: 101093849.

European Commission (2020): *Debt Sustainability Monitor 2020*, Directorate-General for Economic and Financial Affairs, Institutional Paper 143.

European Commission (2024): *2024 Ageing Report. Economic and Budgetary Projections for the EU Member States (2022–2070).* European Economy, Institutional Paper 279, Brussels. https://doi.org/10.2765/022983

European Commission (2025): *Debt Sustainability Monitor 2025*, Directorate-General for Economic and Financial Affairs, Institutional Paper 332.

Rausch, J. (2023): *The Social Insurance Model*, Deliverable 5.1 of the BB-Future project funded under the European Union's Horizon 2020 research and innovation programme GA No: 101093849.

OECD (2025): *Pensions at a Glance*, OECD, Paris.

OECD (2026): *Public finance main indicators - Government at a glance*, OECD, Paris.

World Bank (2026): *World Development Indicators*, https://databank.worldbank.org/source/world-development-indicators

Appendix

A1. Pension expenditures

The pension expenditure projections are taken from the 2024 Ageing Report (European Commission 2024).

A2. Health Expenditures

The detailed description of the modelling approach for the projection of public health expenditures can be found in Rausch (2023). The model was originally developed and implemented for Germany. However, its basic design can be readily applied to the other countries considered in this study. The public health expenditures are calculated by multiplying the population by age-specific average health expenditures. These expenditure profiles are subsequently adjusted annually in line with the assumed development of health care provision costs and changes in morbidity.[2]

For Germany, all required data are obtained from official sources (BAS 2021; BMG 2025a), including the age-specific health expenditure profiles. For Italy, France, Poland, and Sweden, the age-specific expenditure profiles were provided by the respective country teams of the Ageing Working Group. These profiles were subsequently scaled such that the resulting aggregate public health expenditures correspond to the actual observed expenditures in the basis year 2023 of the projection (DREES 2025; RGS 2025; GUS 2025; Statistics Sweden 2026a).

For the projections, the health expenditure profiles are adjusted annually in line with the development of gross wages per employee. In Germany, a somewhat stronger growth rate is assumed during the initial projection years, reflecting the actual observed development. This results in a comparatively strong increase in health expenditures relative to GDP during the initial projection period. In addition, the expenditure profiles are adjusted in line with the assumed changes in morbidity.

A3. Long-term care expenditures

In the case of long-term care (LTC), the expenditure calculation described in Rausch (2023) can be applied to France, but not to the remaining countries. The reason is that, unlike Germany and France, the remaining countries do not classify individuals requiring care into care levels that determine the amount of benefits provided. The following briefly describes the two approaches used for the respective groups of countries.

In Germany and France, LTC expenditures are calculated in two steps. First, the number of beneficiaries in each care level is determined based on age-specific rates of individuals receiving benefits in a given care level relative to the total population (BMG 2025b; DREES 2025b). The model additionally distinguishes between outpatient and institutional care. The resulting number of beneficiaries is then multiplied by the average benefits provided for the respective care level and type of care (BMG 2025b; La sécurité sociale 2026). Since the

[2] Since a significant share of the German population is covered by private health insurance, the age-specific expenditure profiles are applied only to the population covered by statutory health insurance. For the other countries, the expenditure profiles are applied to the total population.

prevalence of higher care levels increases with age, this approach implicitly results in higher average expenditures at older ages.

For Italy, Poland, and Sweden, the number of beneficiaries receiving institutional and outpatient care is also determined in a first step based on age-specific rates.[3] The resulting numbers of beneficiaries are subsequently multiplied by age-specific average LTC expenditures per beneficiary provided by the Ageing Working Group.

In both approaches, the final step consists of scaling the average benefits per care level or age-specific expenditure profiles such that the resulting LTC expenditures for the elderly correspond to the observed level in the base year 2023. The expenditure levels used for this calibration are taken from BMG (2025b), Destatis (2026), CNSA (2025), RGS (2025), GUS (2025), and Statistics Sweden (2026b).

For the projection of LTC expenditures, it is assumed, analogously to the health expenditure projections, that average expenditures per beneficiary increase in line with the development of gross wages per employee. In addition, the different morbidity scenarios are incorporated by adjusting the age-specific rates of individuals receiving LTC benefits in line with the assumed changes in morbidity.

References:

Bundesamt für Soziale Sicherung (BAS) (2021): *GKV-Ausgabenprofile nach Alter, Geschlecht und Hauptleistungsbereichen, 1996–2021*. https://www.bundesamtsozialesicherung.de/de/themen/risikostrukturausgleich/datenzusammenstellungen-und-auswertungen/

Bundesministerium für Gesundheit (BMG) (2025a): *Zahlen und Fakten zur Krankenversicherung*. https://www.bundesgesundheitsministerium.de/themen/krankenversicherung/zahlen-und-fakten-zur-krankenversicherung

Bundesministerium für Gesundheit (BMG) (2025b): *Zahlen und Fakten zur Pflegeversicherung*. https://www.bundesgesundheitsministerium.de/themen/pflege/pflegeversicherung-zahlen-und-fakten

Caisse nationale de solidarité pour l'autonomie (CNSA) (2025): *Les chiffres clés de l'aide à l'autonomie 2025*. 16. Auflage. https://www.cnsa.fr/sites/default/files/2025-06/PUB-CNSA_CC25-ACCESS.pdf

Destatis (2026): *Bruttoausgaben der Sozialhilfe: Deutschland, Jahre, Sozialhilfearten (Code: 22111-0004)*, GENESIS-Online Datenbank. https://genesis.destatis.de/datenbank/online/statistic/22111/table/22111-0004

[3] For Sweden, the age-specific shares of individuals receiving LTC support are derived from Socialstyrelsen (2025). For Italy, the age-specific rates are estimated based on information provided by RGS (2025). For Poland, no official data on the age distribution of LTC beneficiaries could be identified. Instead, the age-specific impairment profiles calculated by Deliverable 4.4 (Börsch-Supan and Horton 2026) are combined with information from the 2024 Ageing Report to estimate the corresponding beneficiary profiles.

Direction de la recherche, des études, de l'évaluation et des statistiques (DREES) (2025a): *Les dépenses de santé en 2024 : Résultats des comptes de la santé*. https://drees.solidarites-sante.gouv.fr/sites/default/files/2025-09/Les%20d%C3%A9penses%20de%20sant%C3%A9%20en%202024_MEL.pdf

Direction de la recherche, des études, de l'évaluation et des statistiques (DREES) (2025b): *Les caractéristiques des bénéficiaires de l'aide sociale départementale aux personnes âgées ou handicapées (APA, PCH, ASH, Aides ménagères, …), PA – Bénéficiaires par GIR, sexe et âge – APA-ASH-Aides ménagères – données 2024.xlsx*. Ministère de la Santé et de l'Accès aux soins. https://data.drees.solidarites-sante.gouv.fr/explore/dataset/les-caracteristiques-des-beneficiaires-de-l-aide-sociale-departementale-aux-pers/information/

European Commission (2024): *2024 Ageing Report. Economic and Budgetary Projections for the EU Member States (2022–2070).* European Economy, Institutional Paper 279, Brussels. https://doi.org/10.2765/022983

La sécurité sociale (2026): *Rapports à la Commission des comptes de la Sécurité sociale*. https://www.securite-sociale.fr/home/la-secu-en-detail/comptes-statistiques-et-etudes-de-la-s%C3%A9curit%C3%A9-sociale/rapports-a-la-commission-des-comptes-de-la-securite-sociale.html

Ragioneria Generale dello Stato (RGS) (2025): *Le tendenze di medio-lungo periodo del sistema pensionistico e socio-sanitario: Rapporto n. 26*. https://www.rgs.mef.gov.it/_Documenti/VERSIONE-I/Attivit--i/Spesa-soci/Attivita_di_previsione_RGS/2025/Rapporto-2025-n.26.pdf

Socialstyrelsen (2025): *Statistik om socialtjänstinsatser till äldre 2025*. https://www.socialstyrelsen.se/publikationer/statistik-om-socialtjanstinsatser-till-aldre-2025-2026-4-10218/

Statistics Poland (GUS) (2025): *Health care expenditure in 2022–2024*. https://stat.gov.pl/en/topics/health/health/health-care-expenditure-in-20222024,18,5.html

Statistics Sweden (2026a): *Total health care expenditures by function of health care (HC) and by source of funding (HF). Year 2001–2024*. https://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__NR__NR0109/HCHF/table/tableViewLayout1/

Statistics Sweden (2026b): *Costs and incomes of municipal services for the elderly and persons with disabilities. Year 2014–2025*. https://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__OE__OE0107__OE0107B/TkrAldFunktRN/