ECONOMIC POLICY COMMITTEE

Progress report to the Ecofin Council

on the

Impact of ageing populations

on public pension systems

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*Progress report
on the
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Contents

1 Summary, assessment and future work

Background

In February 2000, ECOFIN asked the Economic Policy Committee (EPC) to prepare a first progress report on the impact of ageing populations on public pension systems by December 2000.

The March 2000 Special European Council in Lisbon gave a "*... mandate [to] the High Level Working Party on Social Protection, taking into consideration the work being done by the Economic Policy Committee, to .... prepare a study on the future evolution of social protection from a long-term point of view, giving particular attention to the sustainability of pensions systems in different time frameworks up to 2020 and beyond, where necessary. A progress report should be available by December 2000.*"

It also requested "*... the Council and the Commission, using the existing procedures, to present a report by Spring 2001 assessing the contribution of public finances to growth and employment, and assessing, on the basis of comparable data and indicators, whether adequate concrete measures are being taken in order to .... ensure the long-term sustainability of public finances, examining the different dimensions involved, including the impact of ageing populations, in the light of the report to be prepared by the High Level Working Party on Social Protection.*"

The present progress report has been prepared by the Working Group on the implications of ageing populations (AWG) set up by the EPC in December 1999 to analyse the impact on public finances that should characterise all European countries in the first half of the current century. All Member States were asked to participate in the Working Group recognising the importance of co-operation and co-ordination for the robustness of the analysis and comparability of the projections.[1]

The secretariat of the OECD also co-operates with the work of the AWG, to ensure that its on-going and parallel Paris-based exercise is consistent with this work. This active co-operation also helps avoid unnecessary duplication of effort by the EU members of the OECD's working group.

Beyond including an overview of the main characteristics of the pension systems in Member States, the report illustrates long-term simulations of public pension expenditure on the basis of demographic and macroeconomic assumptions commonly agreed during the AWG's meetings.[2] These common assumptions are a first step in an optimal trade-off, in so far as they allow the modellers to take account of certain national features without detracting from the desired comparability or read-across of the results.

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[1] See annex 3 for a list of the members of the group.

[2] It is important to note that long run simulations of the sort undertaken by the working group involve a considerable degree of uncertainty. On the one hand, projections of the old-age dependency ratio are fairly robust (today's workers and children are already alive and, barring some extreme event, we can calculate the number of pensioners in 50 years time with some accuracy). On the other hand, other demographic variables and economic assumptions have a high degree of uncertainty. Simulations based an a combination of all these factors are thus not forecasts in the usual sense, but are offered as pictures of a number of possible outcomes. Moreover, the limitations of the demographic and economic models themselves necessarily restrict the scope of the analysis. These qualifications must be kept in mind when drawing conclusions from this report.

Main characteristics of pension systems in Europe

Apart from some exceptions, the pension systems in European countries are characterised by a strong public component, also known as first pillar pensions.[3] In only three Member States (i.e. Denmark, the Netherlands and the UK), is the private component – also known as the second and third pillar – well developed.

Around half of the public pension systems in the European Union offer a universal pension scheme. This is usually means-tested. All Member States have comprehensive public pension systems and – except in the Netherlands – the regimes are labour-market-based covering workers in the private sector, in the public sector, and at least some of the self-employed. The financing system of the public schemes is usually pay-as-you-go (PAYG).[4] However, in many PAYG systems pension benefits are also financed through transfers from the state budget. In three Member States (Denmark, Sweden and Finland) the financing system is partly pre-funded. Funded schemes ensure that contributions are invested in funds for repayment to individuals after they have retired.

In most cases, the eligibility requirements for obtaining old-age benefits include a minimum age limit and a minimum period of contributions. Apart from some notable exceptions, 65 years will be the most common minimum age requirement for old age pensions for both men and women after 2004. The requirements for the minimum number of contribution years are much more varied across countries and this is not expected to change significantly in the near future. Currently, the average statutory retirement age for old age pensions currently ranges from 60 to 67 but in most countries it is close to 65. However, all Member States - except for the UK - offer early retirement schemes. Such schemes are usually much more generous in terms of their eligibility requirements. The average retirement age for these schemes can be as low as 56 in some Member States. As a result the participation rates in the 55-64 age group are low, even very low in some Member States, compared to international standards for high income countries.

Indexation of pension benefits is sometimes completely prices-based and sometimes completely wage-based. However, in most cases indexation is a mix of the two. In some countries it is also established, ad-hoc, for example during the budget process.

Overview of projections

The AWG took into consideration two main scenarios: a "current policy" scenario and a "Lisbon" scenario.

- In the "current policy" scenario (see chapter 6: Long term simulations of public pensions expenditure), macroeconomic assumptions were commonly agreed during several meetings at the OECD and EU level. These imply convergence of productivity growth in Member States to 1.7-1.8 per cent by the period 2020-2030. They also imply convergence of unemployment rates (although the levels are not assumed to be identical across countries). Participation rates should rise in most countries, especially for women.

- In the "Lisbon scenario" (see chapter 8: A "Lisbon" scenario) the macroeconomic assumptions were set in such a way as to model the effects of achieving consistency with the Lisbon

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[3] In this report "first pillar" indicates public schemes. "Second pillar" means privately-run pension funds originating in agreements between employers and employees. "Third pillar" covers individual pension schemes.
[4] In pay-as-you-go (PAYG) schemes the current contributions from workers are used to cover the costs of current payments to pensioners.

European Council conclusions.[5] The European Council conclusions set targets for 2010, but this scenario also assumes that both male and female participation rates and unemployment rates gradually converge to values achieved by the current EU best performers by the middle of the century.[6] In particular, the Lisbon scenario used for projections assumes a further increase of the employment rate of about 10 percentage points (from 70 percent to 80 percent) on average in the EU.[7] Moreover, it is assumed that during the first half of the current century European countries will witness convergence of their productivity to the most competitive levels in the world (i.e. the level and growth registered in the US by 2050 where productivity growth is assumed to be around 1 per cent on average in the first half of the current century).

For both scenarios, demographic assumptions for public pension projections were provided by EUROSTAT. In the current policy scenario, the AWG used the mean-variant (or central) demographic projections. They show that starting from around 2020 the EU population is expected to decline, due especially to low fertility rates. By 2050 the population may be more than 3 per cent lower than the current level. As the so called *baby-boomer* generation starts to retire, the old age dependency ratio (i.e. the population over 65 as a ratio of working age population) should nearly double from the current 27 per cent to 53 per cent by the middle of the century.

In the Lisbon scenario, the AWG used the high-variant demographic projections.[8] These differ from the mean-variant because they assume higher fertility rates, higher life expectancies at birth and higher net migration levels. In this scenario, the EU population is expected to increase by around 17 per cent from now to 2050. However, it should be noted that for many countries the high-variant demographic projections do not necessarily translate into lower age dependency ratios, as the higher increase in the numbers of young people tends to be compensated by a higher increase in the old.

On the basis of these demographic and macroeconomic scenarios, Member States provided simulations for public pension expenditure as a percentage of GDP. In the current policy scenario this is predicted to rise in all Member States (except in the UK, where it should fall) over the next few decades. In some countries, the rise is substantial. However, the peak is not reached at the same time in all Member States. More precisely:

- In only a handful of Member States do the spending pressures rise slightly, with the peak demand expected to add less than 2 per cent of GDP to pension expenditure, i.e. Italy and Sweden (1.7 percent, peaking by 2030).

- In the majority of cases the effects of ageing will add roughly 3-5 per cent of GDP to pension expenditure, i.e. Belgium (3.7 percent, peaking in 2040), Denmark (4.5 percent, by 2030),

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[5] The **Lisbon European Council Conclusions** state that: "…the European Council needs to set a goal for full employment in Europe in an emerging new society which is more adapted to the personal choices of women and men. If the measures set out below are implemented against a sound macro-economic background, an average economic growth rate of around 3% should be a realistic prospect for the coming years." (Paragraph 6) and also "The European Council considers that the overall aim of these measures should be, on the basis of the available statistics, to raise the employment rate from an average of 61% today to as close as possible to 70% by 2010 and to increase the number of women in employment from an average of 51% today to more than 60% by 2010. Recognising their different starting points, Member States should consider setting national targets for an increased employment rate. This, by enlarging the labour force, will reinforce the sustainability of social protection systems." (Paragraph 30).

[6] In some cases, these assumptions might imply a change in the pension eligibility requirements in order to increase labour force participation by the elderly. That is to say, some reform of pension systems is already implicitly assumed in this Lisbon scenario in order to meet the objectives set by the Lisbon European Council.

[7] This assumption implies that countries characterised by lower (higher) starting values for the employment rate should experience an increase of more (less) than 10 percentage points.

[8] Except for Portugal which used the mean-variant scenario.

Germany (4.3 percent, by 2050 or after), France (3.9 percent, by 2030), Ireland (4.4 percent, by 2050 of after), Austria (3.1 percent by 2030) and Finland (4.7 percent, by 2040).

- In a smaller number of cases the upward pressure is even higher, i.e. in Spain the pressure on the pension system could add 8.3 percent (by 2050 or after), in both the Netherlands and Portugal it could amount to an extra 6.2 percent of GDP (by 2040 and 2030, respectively).

When the Lisbon scenario is considered, projections show a lower rise of pension expenditure as a percentage of GDP for all countries. The improvement is most pronounced in Portugal (where the change between the year 2000 and the peak year is reduced from 6.2 to 4.1 percentage points of GDP), Belgium (from 3.7 to 1.6 percentage points), and Germany (from 4.3 to 2.3 percentage points). For Sweden and Italy this scenario implies that pension expenditure, as a percentage of GDP, should almost stabilise at 2000 levels. Nevertheless, even in this very favourable scenario the rise of pension expenditures as a percentage of GDP remains high for most countries of the European Union.

The effects on public debt may be significant. An increase in public expenditures on pensions of some 4 to 5 percentage points of GDP, even if spread out over several decades, poses a considerable challenge for the sustainability of public finances and the debt burden. The pressure on public finances could be even greater if health care is taken into account.[9] The impact of health care and these other age-related expenditures will be studied in a next stage of this project. The long-term simulations of the first stage of this project show that the evolution of public debt over the projection period depends not only on the increase in pension expenditures, but upon the level of debt and primary surplus in 2000 (the latter influenced by the cyclical position of the economy in 2000). The results suggest that high debt countries may have problems in meeting the costs of ageing populations if the primary surplus in 2000 - which is assumed to be held constant over the projection period - is relatively low. On the other hand, a rapidly falling debt stock should help lower the interest rate burden and provide some room for increasing pension expenditure. Nevertheless, a lower interest burden may not, in most cases, be sufficient to compensate for all additional age-related expenditure increases.

In some countries, the cost of the pension system is made more sustainable by the presence of a strong funded component. But it should be borne in mind that the such funded components have incurred costs in the past (such as start-up costs) which allow for current benefits. Moves to introduce such systems would have public finance implications. In this respect, it is necessary to study carefully the impact of ageing on such components of the pension system.

More specifically, in Denmark and the Netherlands the second pillar is quite well developed. Such characteristics have a direct positive effect on the public pension system by reducing the burden of ageing populations on first pillar pensions. However, there is also an important indirect implication: taxes on future pension benefits (which are drawn from the private funds) are expected to be quite high and may partially counterbalance the rise in public pension benefits. In Finland, and to some extent in Sweden, the financing of the labour-market-based pension systems is a combination of a fully-funded and a pay-as-you-go system. Pension funds are currently accumulating assets that are also earning interest which – following the assumptions of the simulation – contribute to higher primary surpluses for the general government. This stock of assets, coupled with a high primary surplus, seems to insure the sustainability of the public pensions for these countries in the medium

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[9] On the other hand, some other age-related expenditures - such as child allowances and education - could reduce this pressure.

term.[10] In Finland and Sweden the overall tax ratio is, however, high compared with most other EU countries. Scenarios are based on the assumption that these high tax ratios are sustainable.

Member States provided projections using the high-variant and low-variant demographic projections by EUROSTAT. As mentioned earlier, such variants do not necessarily lead to higher or lower rising trends for the old age dependency ratios. As a result, in only a few countries (e.g. in Spain and to a lesser extent Germany) does the high population assumption lead to a visible reduction in the rise of pension expenditures as a percentage of GDP. At the same time, only in Spain and Sweden does the low population variant imply a significant increase in the upward trend of the pension expenditure-GDP ratio.

The AWG also assessed to what extent results were sensitive to assumptions regarding the participation rate, the unemployment rate, productivity growth and the interest rate.

- Regarding the assumptions on the participation rate, sensitivity tests show that a gradual increase (decrease) of participation rates in the order of 5 percentage points above (below) the current policy scenario would imply a lower (higher) rise of the pension expenditure-GDP ratio which ranges in most countries of between 0.3 and 0.8 percent.[11]

- The sensitivity to assumptions on the unemployment rate is less pronounced. In fact, even a return to levels of the structural unemployment rate around 4-5 percent would not lead to a pension expenditure:GDP ratio significantly different from the one observed in the current policy scenario. These results confirm the need for European countries to direct labour market policies not only to the reduction of the structural unemployment rate but also to a significant increase in labour force participation. As stressed by the Luxembourg Process and the Lisbon conclusions, substantial margins for improvement are possible if appropriate policies are implemented or reinforced to increase equal opportunities between genders, to eliminate incentives for early retirement for older workers, and to promote school and academic curriculums with better integration between education and work experience.

- The sensitivity analysis on productivity growth assumptions show that Member States can be divided in two broad sub-groups. In some countries (including Spain, Italy, Portugal, Finland, the UK and to a lesser extent Belgium and Sweden), the impact of different productivity growth assumption is relevant. In general, in these countries the link between pension benefits and wages is not contemporaneous so that higher (lower) productivity growth translates only later in higher (lower) pension benefits. In such cases, an acceleration (deceleration) in productivity would lead to a significant decrease (increase) of the rise in pension expenditure:GDP ratio in the short to medium term. In the remaining countries, pension benefits are linked more closely to wage (and, hence, productivity) developments so that the effect of different productivity growth assumptions is practically nil, both in the short and long term. These results point to a greater uncertainty in the projections for the first group of countries given that a wide range of plausible assumptions for productivity growth can be envisaged over the next few decades.

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[10] A similar outcome is reached by the creation of an appropriate reserve fund, as currently being tested in France and Spain where contributions are accumulated in order to pay future pension benefits for the baby boom generation. In Ireland a reserve fund has been established on a statutory basis.
[11] More relevant changes are observed in Spain and Portugal.

- The impact of the interest rate assumption on public pension expenditure is relevant only in those countries where the public pension system is characterised by a significant fully funded contribution-defined component.[12] [13]

Assessment

The analysis of the Working Group on the Implications of Ageing Populations suggests that demographic developments will soon result in pressures on public pension expenditure. However, the intensity of these effects will vary across Member States. These differences reflect both the different impact and timing of demographic pressures and a significant differences between pension regimes in Europe.

Member States should adopt appropriate measures to make sure that such pressures do not undermine the long-term sustainability of their public finances. In some Member States such measures are presently being legislated.

The EPC has studied these issues in the past and has offered a number of recommendations to the Council and Commission in a previous Opinion.[14] To recall, those recommendations suggested:

(i) The containment of the benefits should represent the main instrument for guaranteeing the solvency of the pay-as-you-go pension system. In order to limit the reduction in the standard of living of the elderly, reforms should primarily aim at delaying retirement.

(ii) The breathing space that pension expenditure projections outline for the next few years should be used to meet the ageing of the baby-boom generation and put it on a sounder fiscal policy footing. Public debt decumulation would also smooth the changes to be implemented in present pension policies.

(iii) The link between social contributions and benefits at the individual level should be strengthened in order to limit the negative effects of contributions and benefits on the labour market and employment.

(iv) The role of funded schemes should be gradually increased. Public policies should support this development by providing a legal and fiscal framework, but without hampering the process of budgetary consolidation.

The analysis that led to these earlier recommendations is still valid. The EPC continues to believe that significant progress could be made if policy choices were to take greater account of these recommendations.

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[12] Of course, changes in the interest rate assumption have an important effect on the corresponding evolution of the debt to GDP ratio. It should also be noted that in some national models a change in real interest rates leads to a different capital labour ratio and, hence, wage levels. On the demand side, GDP is affected by a shift in the demand for investment consequent to an interest rate change. These channels lead to a slightly different evolution of pension expenditure as a percentage of GDP with respect to the current policy scenario.

[13] This component is important only in Sweden where the rise in the pension expenditure:GDP ratio between 2000 and the peak year moves from 1.7 percentage points in the current policy scenario to 2.3, when the interest rate is increased by 1 percentage point (and 1.5 percentage points when it is decreased by 1 percentage point).

[14] Economic Policy Committee, *The reform of European pension systems*: Opinion Addressed to the Council and Commission (II/220/97-EN final, 6 October 1997).

One of the aims of this work is to explore ways to control the possible rising claim of social expenditure on public finances and to compensate for its impact on debt accumulation. This report highlights several.

- One way to achieve this objective is to tighten some of the parameters characterising current eligibility requirements, indexation and benefit calculation for public pensions. In particular, given the low average retirement age and the rising life expectancy of the elderly, reforms in existing pension systems should consider increases in the retirement age especially in early retirement schemes as a priority action point. Increases in the average retirement age have the advantage of smoothing the pension expenditure trend without reducing the living standard of the elderly.[15] Moreover, it should be noted that the "Lisbon" scenario presented here *already makes* a number of implicit assumptions about the success of future policies to raise the retirement age in order to boost the labour force.

- It is also clear that measures to improve labour market participation rates, especially amongst women, would have significant positive effects. Higher participation rates would help reduce public debt and go some way to offsetting the need for more severe expenditure cuts or higher tax rates.

- Furthermore, measures designed to improve the participation of older workers (i.e. the over 50s) in the labour market will help to improve Member States' fiscal positions both through higher tax contributions, but also from lower claims on public expenditure from fewer public pensions and unemployment benefit payments.

Another clear option is to restrict the debt accumulation in the longer term, to improve the fiscal position in the next few years before the costs of ageing populations start to bite. Budgetary surpluses and the resulting decrease in debt and the related interest payments would balance the expected increase in pension expenditure.

Finally, all measures conducive to growth in the long run will help to shoulder the burden arising from rising pension expenditures, because a higher standard of living would alleviate tensions from the impact of ageing populations.

Future work

The Working Group intends to investigate the merits of different pension systems and take a more normative approach in its work on ways to stabilise public finances, in the next stage of its work.

Further work will be carried out to assess possible reforms of PAYG and the extent to which the development of funded systems is advisable for European countries and how these can complement existing systems.

The analysis of the Working Group has confirmed the importance of studying (i) the development of privately-run schemes (both collective and individual pension schemes); and (ii) how the increase of the fully funded component of public pension regimes could help in offering better pensions to future generations. These may complement existing PAYG systems while preserving their financial sustainability. But more work is needed to assess both the *costs* (e.g. a short-run fall

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[15] This depends on the way early retirement schemes are financed. In some member states, such as the Netherlands, the impact might be neutral.

in tax revenues where pension fund contributions receive tax breaks, and the higher contribution burden on the changeover generation) and *benefits* (e.g. the longer-run boost to national savings and knock-on implications for investment) of introducing funded schemes.

In addition, the group is thinking about broadening the scope of its work, to include research on the impact of ageing on healthcare and other age-related costs.

2 Main characteristics of pension systems in European countries

General framework

Table 2.1.1 (over page) summarises the main features of the pension systems in the Member States.

In this report, the term "first pillar" indicates that it is a public scheme. "Second pillar" means privately-run pension funds originating from agreements between employers and employees. "Third pillar" covers individual pension schemes.

As for the first pillar, nine of the Member States (Denmark, Spain, France[16], Ireland, the Netherlands, Portugal, Finland, Sweden, and the UK) offer universal state pension regimes. In all these countries (except for France and the Netherlands) these regimes are means-tested. All Member States (except for the Netherlands) offer labour-market-based public pension schemes. All of them are mandatory for workers in the private sector, the public sector and at least some of the self employed. The regimes for the private sector and the self employed are usually almost identical as far as the financing regime is concerned.[17] They usually represent pay-as-you-go (PAYG) schemes sometimes together with state budget financing (i.e. in Belgium, Germany, Greece, Spain, France, Italy, Luxembourg, Austria, and Portugal). In two Member States (Finland and Sweden), the system for the private sector is partly fully funded whereas in Denmark it is entirely state financed.

The pension schemes for the public sector present a more diversified financing system. In four Member States (i.e. in Belgium, Denmark, Germany[18], and Greece), the regime for civil servants is financed only by the State budget, whereas in the UK and Ireland the scheme for the public sector is entirely PAYG. In Finland, the financing system is partly funded whereas Sweden has a combination of the three systems. All the other countries are characterised by a system which is partly PAYG and partly financed by the State budget.

The second pillar is rarely mandatory in either the public or the private sector for Member States. There are several major exceptions. In the Netherlands the second pillar is mandatory for the public sector and for most of the private sector. The scheme is mandatory only for the private sector in France[19], and in Denmark (where it is mandatory for individuals and is agreed between the employers and employees). The second pillar is mandatory for wage and salary earners in the German public sector.

Information from Member States on the third pillar pension schemes is not readily available as such schemes have just been introduced in most Member States.

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[16] In France, a unique public scheme for basic pensions does not exist. However, there is a guarantee that all elderly persons (or households to which they belong) have the right to a minimum level of resources.
[17] Although in the UK the self employed are not included in the State Earnings Related Pension system (SERPS).
[18] In Germany, wage and salary earners within the public sector are included in the general statutory scheme.
[19] More precisely, for part of the private sector.

Table 2.1.1 Summary of the general framework in Member States

	B	DK	D	EL	E	F	IRL	I	L	NL	OS	P	FI	S	UK
FIRST PILLAR															
Universal	No	Yes	No	No	Yes	Yes §	Yes	No	No	Yes †	No	Yes	Yes	Yes	Yes
Means-tested	-	Yes	-	-	Yes	No	Yes	-	-	No	Yes**	Yes	Yes	Yes	Yes
Labour-market-based	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Private sector															
Mandatory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
PAYG/FF/SF*	PAYG/ SF	SF	PAYG /SF	PAYG /SF	PAYG /SF	PAYG /SF	PAYG	PAYG/ SF	PAYG /SF	-	PAYG/ SF	PAYG/ SF	PAYG/ FF	PAYG/ FF/SF	PAYG
Public sector															
Mandatory	Yes	Yes	Yes∃	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
PAYG/FF/SF*	SF	SF	SF	SF	PAYG /SF	PAYG /SF	PAYG	PAYG/ SF	PAYG/ SF	-	PAYG/ SF	PAYG/ SF	PAYG/ FF	PAYG/ FF/SF	PAYG
Self employed															
Mandatory	Yes	Yes**	Yes	Yes+	Yes	Yes ***	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
PAYG/FF/SF*	PAYG/ SF	SF	PAYG /SF	PAYG /SF	PAYG /SF	PAYG /SF	PAYG	PAYG/ SF	PAYG/ SF	-	PAYG/ SF	PAYG/ SF	PAYG/ SF	PAYG/ FF/SF	PAYG
SECOND PILLAR															
Private sector															
Mandatory	No	No #	No	No	No	Yes++	No	No	No	Yes ‡	No	No	No	No	No
Public sector															
Mandatory	No	No #	Yes	No	No	No	Yes	No	No	Yes	No	No	No	No	No

Notes:

 - (Not applicable)

* PAYG (Pay as you go); FF (Fully funded); SF (Financed by state budget)

** Partial

*** The basic scheme is mandatory whereas the complementary scheme is voluntary.

§ In France, a unique public scheme for basic pensions does not exist. However, there is a guarantee that all elderly persons (or households to which they belong) have the right to a minimum level of resources.

Mandatory for the individual, but voluntary in the sense that contributions are negotiated between employers and unions.

† Application to the system depends on the years of permanent residence in the Netherlands between the age of 15 and 65 years; therefore a division of the system by sector is not relevant.

‡ A vast majority of all employed persons (more than 90%) takes part in an occupational pension scheme.

$ Special pension scheme for civil servants with lifetime status. Wage and salary earners in the public sector, however, belong to the general statutory pension scheme. In their case the same features as for wage and salary earners in the private sector apply.

+ Mandatory for only part of the self-employed.

++ For part of the private sector.

Eligibility requirements

Tables 2.1.2-2.1.3 summarise the eligibility requirements for old age and early retirement pensions in Member States.

Table 2.1.2 shows that 65 years will be the most common minimum age requirement for old age pensions for men and women after 2004[20] for both the public and private sector pensions in many countries. Exceptions are: (1) Portugal where for the public sector the requirement is 60 years of age or 36 years service whichever materialises first; (2) Greece where the minimum age for women is 60 in the private sector and 55 for both men and women in the public counterpart; (3) France where the minimum age for both men and women is 60 in both the private and the public sector[21]; (4) Italy where the minimum age is 65 and 60 for, respectively, men and women in both the earnings-related and mixed systems.[22]

The requirements for contribution years are more heterogeneous among countries. They range from no lower limit for the length of employment in the earnings-related system for both the private and public sector in Finland; the absence of minimum contribution years for the private sector[23] and 15 years for the public sector in France; 10 years of contributions in Luxembourg; 15 years for Greece, Spain, Austria and Portugal in the private sector and, respectively 20, 15, 10 (or 15 for those entered after 1995) and 5 in the public sector. Germany, for the private sector, requires 5 years for men and women if they retire at 65, and 15 years for women if they retire at 60 (10 of these years acquired after reaching 40 years of age). Italy's requirements for contributions in both the public and private sectors are 19 years for earnings-related and mixed systems (20 years starting from 2001) and 5 years in the new contribution-based system. Moreover, the new contribution-based system requires pension benefits to be at least 1.2 times the social assistance benefit. Denmark only requires living in Denmark for at least 37 years.

Overall, systems for the public and the private sectors are similar for a number of Member States (i.e. in Denmark, Ireland, Italy, Luxembourg, Netherlands, Finland, Sweden, United Kingdom). In some Member States, the public sector is somewhat more generous as for the minimum age requirements. However, this characteristic is often counterbalanced by a higher number of years of minimum contributions required. For example, in Greece the public sector allows for 55 years of minimum age with at least 20 years of contributions (against 65 minimum age with 15 years of contributions in the private sector). Similar reasoning applies in France where the private sector does not have a minimum requirement of contribution years (against almost 15 years are needed for the public sectors). The French public sector also allows exceptions for certain groups of workers. In Spain, both the public and the private sectors require the same minimum age (65) and the same number of contribution years (15). Austria and Portugal show some public sector features that are more generous than the private counterpart for both the minimum age and the minimum contribution.

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[20] The German retirement age for women is being phased in to 65 over the period 2000-2004. The UK retirement age for women is being phased up to 65 over the period 2010 to 2020. Similarly, in Austria the minimum age for women is 60 until 2023 in the private sector pointing towards 65 afterwards. Thus, it is noticeable that where retirement ages between genders differ, a realignment at the higher age is being introduced in several Member States.

[21] For certain positions in the public sector, the minimum age can be lower. Moreover, France does not impose age conditions for civil servants retired on invalidity grounds and for female civil servants who are mothers of 3 children.

[22] With the new contribution-based system, workers can retire before 65 with an actuarial correction of benefits.

[23] However, a "validation" of at least one quarter is required. This means that workers must have paid contributions on an annual wage higher than 200 times the minimum wage at least for one quarter.

Table 2.1.3 summarises the eligibility requirements for early retirement pensions in Member States. In only one Member State - the UK – is it not possible to take early retirement for first pillar pensions (but it is possible to take a pension from a second of third pillar scheme from age 50). In Spain, early retirement is possible in the public sector under CPE at the age of 60, provided the individual has contributed for 30 years or more. In the private sector it is possible at the age of 60, provided the individual has been contributing since 1967.

In four Member States (France, Luxembourg, Netherlands and Italy), it is possible for both men and women with public and private sector pension schemes to retire early before the age of 60. For example, Italy allows for 55 years (57 from 2002) and 54 years (57 from 2002), for both men and women, respectively, in the private and the public sectors, under the conditions of the minimum contribution years of 35 (or 37 without any age requirement, rising to 40 from 2008). France and Luxembourg allow for early retirement before the age of 60 in general, if balanced by 40 years of contributions. The Netherlands allows on average early retirement at the age of 60 years in both sectors for both men and women; currently early retirement schemes are being changed as to give retirees the choice between the age of (early) retirement and the level of the pension benefit. Ireland allows for early retirement in the private sector depending on individual pension schemes, whereas the public sector reduces the minimum age to 60 with 40 years of contributions. An analogous scheme for early retirement is present in Austria, which indicates the minimum age of early retirement as 60 (61.5 after 2002 in the private sector) for men and 55 (56.5 after 2002 in the private sector) for women in case of at least 37.5 years of contributions (*vs.* much lower requirements for old age pensions).

It is also noticeable that early retirement is being fully harmonised across both the public and private sectors and between men and women in many countries (Denmark, Italy, Luxembourg, the Netherlands, Sweden and the UK). Denmark allows for early retirement at 60 with the requirement of 20 years of participation in unemployment insurance funds (gradually increasing to 25 years starting from 2005). Sweden allows for early retirement at 61 of age with no other requirements (although in this case, the benefits obtained are an income or pre-funded pension whose amount is reduced accordingly). Germany offers early retirement up to 2 years earlier until now. However, 35 years of contribution are required. Early retirement age without adequate reduction in pension is being phased in from 63 to 65 in the period 2000-2001. In the period 2002-2011, early retirement will be possible at 63 with a 7.2 percent reduction in pension and from 2012 on at 62 with a 20.8 percent cut.

Belgium indicates a flexible minimum retirement age between 60 and 64 after 5 years of contributions in the public sector for both men and women. For the private sector, Belgium distinguishes the following cases (1) a flexible minimum retirement age between 60 and 64 with minimum of 22 years of contribution in 1998 which will increase to a minimum of 35 years of contributions in 2005; (2) "Pre-retirement" for private employees only of 58 years of age (52 for firms in financial crisis) with a minimum of 25 years of private employee. In Greece, the private sector allows for 5 years of early retirement with at least 15 years of minimum contributions. The public sector requires 15-20 years of contributions, but distinguishes between men (age of 55 for workers hired before 1983 and 60 for workers hired after 1983) and women (age of 42 for workers hired before 1983 and 55 for workers hired after 1983, with children). Finland indicates the age of 60 for both men and women in either sector. In Finland the unemployment benefit paid to 55 to 59 year olds can also be seen as a kind of early-retirement scheme. In practise, unemployed people (55-59) do not have the obligation to look actively for work. This is the so called "unemployment pipeline to retirement". The unemployment pension is available from the age of 60 to 64.

Table 2.1.2 Eligibility requirements for old age pension

	OLD AGE PENSION							
	Private sector							Men
	Men			Women				
	Minimum Age	Contribution years	Other	Minimum Age	Contribution years	Other	Minimum Age	Contribution years
Belgium	65	Maximum 45, Taken into Account		61 in 1998, 65 starting from 2009	Maximum 41 in 1998, maximum 45 starting from 2009, taken into account		65	5
Denmark	67, 65 starting from 2004		Living for at least 37 years in Denmark	67, 65 starting from 2004		living for at least 37 years in Denmark	67, 65 starting from 2004	
Germany[24]	65	5		60, 65 starting from 2005	15 with more than 10 years of these after reaching 40 years of age or 5 with minimum age of at least 65		65	
Greece	65	15		60	15		55	20
Spain	Under INSS 65	15		Under INSS 65	15		Under INSS 65 Under CPE 65	15

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[24] Eligibility requirements for wage and salary earners in the public sector are the same as in the private sector, since both are c
The information indicated under "public sector" only applies to civil servants with life-time status.

France	60	No minimum but "validation" for at least one quarter required		60	No minimum but "validation" for at least one quarter required		60 (50 or 55 for certain professions). No age conditions for civil servants retired on invalidity grounds.	15	
Ireland	65/66			65/66			65/66		
Italy	earning-related and mixed system 65 new contribution-based system 57/65 with actuarial correction of benefits	earning-related and mixed system 19, 20 starting from 2001 new contribution-based system 5	new contribution-based system: pension benefits have to be at least 1.2 times the social assistance benefit	earning-related and mixed system 60 new contribution-based system 57/65 with actuarial correction of benefits	Earning-Related and mixed system 19, 20 starting from 2001 new contribution-based system 5	new contribution-based system: pension benefits have to be at least 1.2 times the social assistance benefit	Earning-Related and Mixed system 65 new contribution-based system 57/65 with actuarial correction of benefits	earning-related and mixed system 19, 20 starting from 2001 new contribution-based system 5	c b t 1
Luxembourg	65	10		65	10		65	10	
Netherlands	65	35 to 40 years of contribution are required to receive a pension equal to 70% of the final earnings (thus each year 1.75% to 2% of this pension is accumulated).		65	35 to 40 years of contribution are required to receive a pension equal to 70% of the final earnings (thus each year 1.75% to 2% of this pension is accumulated).		65	50 years of permanent residence in The Netherlands between the age of 15 and 65 years is required to receive the full old age pension (thus each year 2% of this pension is accumulated)	
Austria	65	15	25 years of insured time	60 (65 phasing in 2028-2033)	15	25 years of insured time	65	10 (15 years if entered after 1.5.1995)	3 i
Portugal	65	15		65	15		60 years or 36 years service (whichever materialises first)	5	

Finland	65	No lower limit for the length of employment in the earnings-related system		65	No lower limit for the length of employment in the earnings-related system		65	No lower limit for the length of employment in the earnings-related system
Sweden	65 for the guarantee pensions and 61 for the income and pre-funded pensions			65 for the guarantee pensions and 61 for the income and pre-funded pensions			65 for the guarantee pensions and 61 for the income and pre-funded pensions	
United Kingdom	65			phased up to 65 over the period 2010 to 2020.			65	

Table 2.1.3 Eligibility requirements for early retirement

	EARLY RETIREMENT							
	Private sector							
	Men			Women			Men	
	Minimum Age	*Contribution years*	*Other*	*Minimum Age*	*Contribution years*	*Other*	*Minimum Age*	*Contribution years*
Belgium	"Flexible Pension" between 60 and 64 "Pre-retirement: private employees only" 58 (52 for firms in difficulty)	Minimum of 22 in 1998, minimum of 35 in 2005 "Pre-retirement: private employees only" Minimum of 25 of private employee		"Flexible Pension" between 60 and 64 "Pre-retirement: private employees only" 58 (52 for firms in difficulty)	Minimum of 22 in 1998, minimum of 35 in 2005 "Pre-retirement: private employees only" minimum of 25 of private employee		"Flexible Pension" between 60 and 64	5

Country									
Denmark	60		20 years of participation in unemployment insurance funds, gradually increasing to 25 years starting from 2005	60		20 years of participation in unemployment insurance funds, gradually increasing to 25 years starting from 2005	60		2... p... un... i... ... in... f...
Germany [25]	63, 65 without reduction and 63 with 7.2% reduction starting from 2002, and 62 with a reduction of 10.8% reduction starting from 2012	35		63, 65 without reduction and 63 with 7.2% reduction starting from 2002, and 62 with a reduction of 10.8% reduction starting from 2012	35		63		
Greece	60	15		55	15		55 for workers hired before 1983, 60 for workers hired after 1983	15-20	
Spain	Under INSS 60	Have been contributing since 1967		Under INSS 60	Have been contributing since 1967		Under INSS 60 Under CPE 60	30	
France	58 (55 in some scheme)	40 (in general)		58 (55 in some scheme)	40 (in general)		56	40	

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[25] Eligibility requirements for wage and salary earners in the public sector are the same as in the private sector, since both are c... The information indicated under "public sector" only applies to civil servants with life-time status.

Ireland	dependant on individual pension schemes			dependant on individual pension schemes			60	40
Italy	55, 57 starting from 2002	35, or 37 without any age requirement (40 starting from 2008)		55, 57 starting from 2002	35, or 37 without any age requirement (40 starting from 2008)		54, 57 starting from 2002	35, or 37 without any age requirement (40 starting from 2008)
Luxembourg	57	480 months		57	480 months		57	480 months
Netherlands	60 years (on average)			60 years (on average)			60 years (on average)-	
Austria	60 (61.5 phasing in 2002)	37.5	being unemployed	55 (56.5 phasing in 2002), 60 phasing in from 2019 to 2024	37.5	being unemployed	60 (61.5 phasing in 2002)	37.5
Portugal	60	15						
Finland	60			60			60	
Sweden	61			61			61	

United Kingdom	Not possible			not possible			not possible		

Indexation schemes and taxation regimes

The indexation schemes and the taxation regimes for the main pension systems are summarised in the following table.

Table 2.1.4 Indexation schemes and taxation regimes

	Indexation Scheme[26]	*Taxation Regime*
Belgium	For private sector: automatic indexation to prices for benefits and fixed transfers and to wages for ceilings; some limited targeted increases of benefits in real terms are possible. For civil servants: automatic indexation to wages for benefits.	Normal taxation regime with some deductions.
Denmark	Indexation to wages. If wages increase by more than 2.3 percent, then 0.3 percent is deducted.	Taxed as personal income.
Germany	Indexation to net wages in the previous year. In 2000 and 2001, temporarily indexed to prices. Refers to General Statutory Pension Scheme.	Taxed as "other income" in the income tax. Only part of the pension payments is included in the personal income tax base.
Greece	Primary pensions for state and private sector employees are linked to increases in public sector wages. For the self employed and the professionals (as well as for the supplementary pensions) increases in pensions are ad hoc.	Taxed as personal labour income.
Spain	Indexation to projected price increases with lump-sum compensation in case actual inflation is higher than projected one.	Taxed as labour income. Favourable tax treatment for private funds. However, most types of disability pensions are tax-exempt.
France	For Regime General, indexation to projected price increase with lump-sum compensation in case actual inflation is higher than projected. For civil servants, indexation to wages of public employees.	Subject to CSG (6.2 per cent) and CRDS (0.5 per cent). Complementary pensions are subject to a supplementary health contribution (1 per cent). All pensions are included in the household taxable income.
Ireland	Pension increases are decided during the budgetary process and are usually ahead of inflation	Subject to income tax.
Italy	In general, full indexation to prices (CPI index). Partial indexation to prices for higher pensions.	Taxed as wage income, but pensions below a minimum amount (if the pensioner has no other income) are tax-exempt.
Luxembourg	Pensions automatically indexed to price developments. Adjustment to wages by special law.	For tax purposes, social security benefits are treated as wages.
Netherlands	The AOW benefit is linked to the minimum wage level. For almost all occupational schemes, indexation is contingent on the financial development of the related pension fund. 15 per cent of occupational schemes are indexed to prices and 65 per cent to wages.	AOW benefits are taxed as labour income. For occupational schemes, contributions are tax deductible and benefits are taxed as labour income. Persons above 65 years are exempt from contributions to the AOW. Returns from pension funds are tax-exempt.

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[26] The indexation schemes in table 2.1.4 refer to indexation of pension benefits for pensioners after retirement. The implicit or explicit indexation or calculation of the level of pension benefits for people moving towards the age of retirement can differ from the indexation of pension benefits after retirement. In some countries the pension benefit level for a future pensioner is calculated using an explicit indexation to prices or wages. In other countries the pension benefit level for a future pensioner depends on the wage level at the time of retirement, so that the pension benefits in the period towards the time of retirement are implicitly following an indexation to wages.

	Indexation Scheme	*Taxation Regime*
Austria	On an ad hoc basis, reflecting the development of net wages, by and large.	Taxed as personal income taxation. Also subject to health care contributions at a rate of 3.95 per cent in the civil servants' scheme and at a rate of 3.75 per cent in ASVG, the self employed and farmers. The civil service pensions are also subject to a pension security contribution of 2.3 percent.
Portugal	For the public sector, the indexation scheme is related to public employees' wages. Conversely, for the private sector the indexation scheme is ad hoc.	Taxed as wage income beyond a certain threshold. Contributions to third pillar schemes (PPRs) receive a favourable tax treatment.
Finland	For the national pension scheme, indexation is related to prices (CPI). For the earning-related pension scheme, indexation is based on a weighted average of wage and price changes.	Taxed as wage income. Small pensions are entitled to special pension deductions.
Sweden	Indexation formulas related to average income.	All public pensions taxed as wage income.
UK	Indexation to prices (Retail Price Index)	In general, the pensions are liable for income tax. However, around two-thirds of pensioners are below the income threshold for paying tax.

Considering the different indexation systems used, the Member States can be broadly divided into three groups:

I. A first group only using indexation to prices: Spain (indexation to projected price increase with lump-sum compensation in case actual inflation is higher than projected one); Italy (full indexation to prices with the CPI index and partial indexation to prices for higher pensions); Luxembourg (pensions automatically indexed to price developments; adjustments to wages are allowed only by special law); UK (indexation to Retail Price Index).

II. A second group basically using indexation to wages: Denmark (indexation to wages; if wages increase by more than 2.3 percent, then 0.3 percent is deducted); Germany (indexation to net wages in the preceding year with a temporary exception in 2000 and 2001 using indexation to prices).

III. A third group using mixed indexation or ad hoc systems: Austria refers to the development of net wages and inflation; Finland uses indexation related to prices (CPI) for the national pension scheme, and indexation based on a weighted average of wage and price changes for the earning-related pension scheme; Portugal where for the public sector, the indexation scheme is related to public employees' wages, whereas for the private sector the indexation scheme is ad hoc; Belgium reports that for private sector an automatic indexation to prices is used for benefits and fixed transfers and to wages for ceilings (some limited targeted increases of benefits in real terms are possible), whereas for civil servants have automatic indexation to wages for benefits; the Netherlands where the AOW benefit is linked to the minimum wage level, whereas for almost all occupational schemes indexation is contingent to the financial development of the related pension fund (15 per cent of occupational schemes are indexed to prices and 65 per cent to wages); France reports, for Regime General, indexation to projected price increases with lump-sum compensation in case of actual inflation higher than projected, whereas, for civil servants, indexation to wages of public employees; Greece where the primary pensions for state and private sector employees are linked to increases in public sector wages whereas for the self employed and the professionals (as well as for the supplementary pensions) indexation of pensions is ad hoc; Ireland where pension

increases are decided during the budgetary process and are usually ahead of inflation; Sweden where the indexation relates to the average income.

As for the taxation regimes, Member States indicate that pensions are broadly subject to income taxation at some point with deductions and/or exemptions. For example:

- The <u>UK</u> and <u>Ireland</u> reports that, in general, pensions are liable for income tax. At the same time, in the UK about two-thirds of pensioners are below the income threshold for paying tax.

- In <u>Denmark</u> and <u>Austria</u>, pensions are taxed as personal income. In Austria, pensions are also subject to health care contributions at a rate of 3.95 per cent in the civil servants' scheme and at a rate of 3.75 per cent in ASVG, the self employed and farmers.

- <u>Germany</u> taxes pensions as "other income" in the income tax. Only part of the pension payments is included in the personal income tax base.

- In <u>France</u>, pensions are subject to CSG (6.2 per cent) and CRDS (0.5 per cent). Complementary pensions are subject to a supplementary health contribution (1 per cent). All pensions are included in the household taxable income.

- Greece, Spain and Netherlands treat pensions as labour income. In particular, in <u>Greece</u> pensions are taxed as personal labour income. In <u>Spain</u>, they are taxed as labour income with favourable tax treatment for private funds and tax-exemption for most types of disability pensions. In <u>Netherlands</u>, AOW benefits are taxed as labour income; for occupational schemes, contributions are tax-deductible and benefits are taxed as labour income. Moreover, persons above 65 years are exempt from contributions to the AOW, as well as the returns from pension funds are tax-exempt.

- In <u>Italy</u>, <u>Luxembourg</u>, <u>Portugal</u>, <u>Finland</u> and <u>Sweden</u>, pensions are taxed as wage income. In Italy and Portugal, however, pensions below a minimum amount (if the pensioner has no other income) are tax-exempt. In Finland, small pensions are entitled to special pension deductions.

Average age at retirement and average replacement rate

Table 2.1.5 provides estimates of the average retirement age in 1998. Among the estimates received from Member States, the average retirement age for old age pensions ranges from 60.7 in Greece (for women and men in the private sector, respectively; in the public sector the estimate is 55) to 67 in Denmark. However, the information given on average retirement age is quite scattered, in particular for early retirement and disability pensions. From the data received, the average retirement age for early retirement varies from 55.6 (in Italy and Belgium) to 62 in Sweden, whereas the average retirement age for disability pensions ranges from 46.4 in Finland (based on data for earnings-related pension scheme) to 53.2 in Portugal.

Table 2.1.5 Average retirement age in 1998

	Old age	*Early retirement*	*Disability*
Belgium	62.6*	55.6	N.A.
Denmark	67.0	61.0	47.0
Germany	62.6 †	-	51.6
Greece	60.7 ±	N.A.	51.4
Spain	65.3	60.9	50.3
France	61.8	N.A.	N.A.
Ireland	62.0 §	N.A.	N.A.
Italy	61.4	55.6	50.5
Luxembourg	N.A.	N.A.	N.A.
Netherlands	65.0	60.0	N.A.
Austria	64.1	57.9	49.6
Portugal	65.8	N.A.	53.2
Finland #	65.4 (64.5)	60.4 (60.4)	49.1 (46.4)
Sweden	64.5	62.0	50.0
UK	N.A.	N.A.	N.A.

* Self-employed are not included (and pre-retirement in included under "early retirement")
† Data for general statutory pension scheme. Old age and early retirement combined.
± For women and men in the private sector. In the public sector the estimate is 55.
§ For occupational pension schemes in 1995
# Data for national pension scheme (in brackets: data for earnings-related pension scheme)

The estimates of the average replacement rate for old age pensions in 1998 are shown in Table 2.1.6. The availability of this estimate is quite low (the figures for five Member States are not available). On this basis, it seems that the lowest estimate is 33 per cent in Germany (Old Bundeslander Statutory Pension Scheme) and the highest is 85 per cent observed in France (for average earnings of non-executive employees in the private sector). The Netherlands indicates 70 percent for private sector employees, 54 for the self-employed, 90 for professionals, 109 for the public sector, and more than 60 for the post-1993 entrants.

Table 2.1.6 Average replacement rate for old age pensions in 1998

Belgium *	35.5
Denmark	56
Germany †	33
Greece	N.A.
Spain	65
France	85+
Ireland	N.A.
Italy	53
Luxembourg	N.A.
Netherlands ‡	70
Austria	65
Portugal	N.A.
Finland #	50
Sweden	65
UK	N.A.

* Does not include self-employed

† Old Bundeslander Statutory Pension Scheme, defined as the ratio between average first pension and average last wage for new beneficiaries in 1998. If another definition were to be used a different figure would result. The gross level of the standard pension (standard pension after 45 years of insurance/average earnings of all insured persons), for example was 48.5% in 1998.

‡ Private sector employees. 54 for the self-employed, 90 for professionals, 109 for the public sector, and lower than 60 for the post-1993 entrants.

Data for earning-related pension scheme.

+ For average earnings of non-executive employees in the private sector.

3   Definition of public pension expenditure

Table 3.1.1 illustrates the public pension expenditure as a percentage of GDP in 1998 provided by Member States.[27]   According to these data, public pension expenditure as a percentage of GDP ranges from 3 per cent in Ireland (the data provided are net of social insurance contributions) to 14.6 per cent in Austria. For nine Member States (Denmark, Germany, Greece, France, Italy, Luxembourg, Austria, Finland and Sweden), the public pension expenditure in 1998 was above 10 percent of GDP.

Not all the projection models cover the whole expenditure reported. For example, Sweden covers 83 percent, Germany and Finland 91 percent; France and Spain 95 per cent and 97 per cent, respectively.

3.1.1   Public pension expenditure in 1998
(before taxes, as a percentage of GDP)

	Questionnaire	*Percentage Covered in models*
Belgium	9.5	100
Denmark	10.2	100
Germany †	12.4	91
Greece	12.1	NA
Spain	9.6	97
France	12.7	95
Ireland	3.0[*]	100
Italy	14.2	100
Luxembourg	10.6	NA
Netherlands[**]	8.2	100
Austria §	14.6	100
Portugal	9.8	100
Finland ±	11.5	91
Sweden	11.5	83
UK #	5.3	100

* Data provided net of social insurance contributions.

** Include administrative costs equal to 0.04% of GDP in the Netherlands.

§ Includes administrative costs equal to 0.2% of GDP in Austria.

± Data include both the income-tested national pension scheme and the earnings-related pension scheme.

The UK allows a significant degree of non-state provision. In addition, the UK figures do not include public sector occupational pensions. As the pension figures include all contributory benefits so they cover more than just pensions.

† Data cited for Germany encompass the general statutory pension scheme as well as the special civil servants' scheme.

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[27] Germany, Finland and Austria have provided separated information according to different sectors or according to different pension schemes. To calculate the tables of this section, we have aggregated the information provided separately. For Denmark, data refers to 1997.

Table 3.1.2 shows the share of the total of the different types of pension expenditure. From the data provided, it seems that most of the expenditure finances old age and early retirement. The share of old age and early retirement pensions over total reported expenditures ranges from 55 per cent in Spain to 86 per cent in Germany and France. Belgium and France indicate that public pension expenditure does not cover disability pensions. In Germany, the share of disability pensions is about 9 per cent. In Greece, Italy, Ireland, Luxembourg, Austria, Portugal, Sweden and the UK the share is between 10 and 20 per cent, whereas in Spain, Netherlands and Finland it stands above 20 per cent. The share of survivor pensions ranges from 4.5 per cent in Germany to 26.5 per cent in Ireland.

3.1.2   Public pension expenditure by type
(share of total, percentage values)

	Old age and Early retirement	*Disability*	*Survivors*
Belgium	78*	0	22
Denmark	81	19 †	-
Germany ‡	86.5	9	4.5
Greece	74	10	16
Spain	55	25	20
France	86	0	14
Ireland	62	11.5	26.5
Italy	69	13	18
Luxembourg	57	17	26
Netherlands	61	34	5
Austria	68	13	19
Portugal	75	12	13
Finland	65	27	9
Sweden	77	17	6
UK #	70	15	15

* It includes "Pre-Retirement".

† Mainly disability (but includes survivor pensions).

‡ Data refer to total expenditure (statutory pension scheme plus civil servants' pension scheme).

Survivors includes widows over pension age.

Table 3.1.3 shows the countries' welfare expenditures included in the public pensions. The most striking feature is that Luxembourg, Netherlands, Austria, Sweden and the UK did not include any welfare expenditure in the definition.[28] No country reported the inclusion of family allowances (except France). Only Germany, Spain and Finland allow for work injury pensions and other compensatory schemes for 3.4 percent to 5.4 percent. Belgium, Germany, Spain, France and Italy allow for social assistance benefits. Belgium and Denmark report a fairly large share of earlier retirement redundancy schemes (5.9 percent and 15.1 percent of total pension expenditure, respectively) followed by Finland (3.3 percent) and Italy (0.8 percent). Greece did not indicate whether or not some type of welfare expenditure is included in the definition.

3.1.3   Welfare expenditures included in public pensions
(as a percentage of public pension expenditure)

	Family allowances	*Work injury pensions and other compensatory schemes*	*Social assistance benefits*	*Earlier retirement redundancy schemes*
Belgium	No	No	1.1	5.9*
Denmark	No	No	No	15.1
Germany	No	4.4	0.7	No
Greece	N.A.	N.A.	N.A.	N.A.
Spain	No	3.4	4.4	No
France	8.5	No	0.2+	No
Ireland	No	No	N.A. †	No
Italy	No	No	1.3	0.8
Luxembourg	No	No	No	No
Netherlands	No	No	No	No
Austria	No	No	No	No
Portugal	No	No	No	N.A.#
Finland	No	5.4	No	3.3
Sweden	No	No	No	No
UK	No	No	No	No

*It represents the "pre-retirement"

† The amount is €583 million. Given that pension expenditure was provided net of contributions, it was not possible to calculate the figure as a percentage of pension expenditure.
# The questionnaire indicated that the item is included in the public pension expenditure but the amount is not available.
+ For those who are not covered by regimes linked to their profession.

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[28] Portugal included the earlier retirement redundancy schemes but did not provide the amount.

The following Table 3.1.4 reports the public pension expenditures divided by sector. For some countries this split by sector is irrelevant, as old-age pensions are similar regardless of whether people have been employed in the public or private sector (hence not all countries could provide this information and the data for Denmark, Germany, Ireland, Netherlands, UK, Sweden are not available).

The received answers basically show that the highest share of public pension expenditure is devoted to private employees and the smallest share is for self employed. Spain reports the highest share (83 per cent) devoted to private employees. The minimum for the private sector is observed in Finland (48 per cent), whose data, however, refer only to the earnings-related pension scheme. Finland and Portugal have the highest share for the public sector (38 and 37 per cent, respectively). The highest share for the self employed is observed in Italy (14 per cent).

3.1.4 **Public pension expenditure by sector**
(share of total, percentage values)

	Private employees	*Public employees*	*Self−employed*
Belgium	66	26	8
Denmark	N.A.	N.A.	N.A.
Germany	N.A.	N.A.	N.A.
Greece	57	31*	12
Spain	83	10	7
France	62	28+	10§
Ireland	N.A.	N.A.	N.A.
Italy	62	24	14
Luxembourg	66	24	10
Netherlands †	N.A.	N.A.	N.A.
Austria	61	28	11
Portugal	63 ‡	37	-
Finland #	48	38	10
Sweden	NA	NA	NA
UK	NA	NA	NA

* It includes civil servants and employees of public enterprises and state-owned banks.

§ The figures for the public sector include a number of schemes, including those for large nationalised industries).

† AOW benefit is only dependent on the years of permanent residence in the Netherlands between the age of 15 and 65. Information by sector is not available.

‡ Private employees + self employed.

Data refer only to the earnings-related pension scheme.

+ It includes special regimes especially relating

4 Demographic scenarios for European countries

There are a number of key messages to be drawn from the demographic projections used in this report. These new projections were especially commissioned from EUROSTAT by the working group.

Falling size of the population after 2020

The overall size of the population in the EU is expected to stay almost unchanged over the coming 20 years (see Table 4.1.1). Around 2020, the population will gradually start to diminish, albeit at a slow pace. Considerable differences exist among Member States. Italy is set to experience a steady decline in its population, whereas the Irish population will grow significantly from a little less than 3.8 million in 2000 to more than 4.7 million in 2050.

4.1.1 Baseline projections of total population in EU Member States
(beginning of the year, millions of persons)

	2000	*2010*	*2020*	*2030*	*2040*	*2050*
BE	10.2	10.4	10.5	10.5	10.4	10.1
DK	5.3	5.5	5.6	5.6	5.6	5.6
DE	82.1	83.4	83.3	82.0	79.6	76.0
GR	10.5	10.8	10.8	10.7	10.6	10.2
ES	39.4	39.9	39.5	38.6	37.3	35.1
FR	59.2	61.4	62.8	63.7	63.5	62.2
IRL	3.8	4.1	4.4	4.6	4.7	4.8
IT	57.6	57.3	56.0	54.0	51.5	48.1
LU	0.4	0.5	0.5	0.5	0.5	0.6
NL	15.9	16.7	17.3	17.7	17.9	17.7
AT	8.1	8.1	8.2	8.1	7.9	7.6
PT	10.0	10.3	10.5	10.7	10.8	10.7
FI	5.2	5.3	5.3	5.3	5.1	5.0
SE	8.9	9.0	9.1	9.3	9.2	9.2
UK	59.5	60.9	62.2	63.2	62.9	61.8
EU-15	376.2	383.4	386.0	384.6	377.6	364.5

Large increase in the old-age dependency ratio

In addition to the size of the population, there will be large changes in its age profile. The EU young-age dependency ratio (those aged 1-19 as a percentage of those aged 20-64) will fall from 35 percent in 2000 to some 32 percent in 2020, but thereafter increase to just over 34 percent by 2040. However, as shown in Table 4.1.2 below, the old-age dependency ratio (the ratio of people 65 and over to working age population) will undergo a sharp increase from just under 27 per cent in 2000 for the EU to over 53 per cent in 2040 when the demographic age profile starts to stabilise. This implies an increase in the old-age dependency ratio of around 27 percentage points in less than 40 years.

These figures mask large differences between the Member States in terms of the size and timing of the increase. In 2040 ratios will vary from around 36 percent in Ireland to almost 67 in Italy. The path of change differs in other respects too, with some Member States starting out from a relatively low level (nearly 20 per cent in Ireland), and others already close to the 30 percent mark.

4.1.2   Projections of old age dependency in EU Member States
(ratio of people over 64 to working age population, per cent)

	2000	*2010*	*2020*	*2030*	*2040*	*2050*
BE	28.1	29.4	35.6	45.8	51.3	49.7
DK	24.1	27.2	33.7	39.2	44.5	41.9
DE	26.0	32.9	36.3	46.7	54.7	53.3
GR	28.3	31.6	35.8	41.7	51.4	58.7
ES	27.1	28.9	33.1	41.7	55.7	65.7
FR	27.2	28.1	35.9	44.0	50.0	50.8
IRL	19.4	19.1	24.5	30.3	36.0	44.2
IT	28.8	33.8	39.7	49.2	63.9	66.8
LU	23.4	26.2	31.0	39.8	45.4	41.8
NL	21.9	24.6	32.6	41.5	48.1	44.9
AT	25.1	28.8	32.4	43.6	54.5	55.0
PT	25.1	26.7	30.3	35.0	43.1	48.7
FI	24.5	27.5	38.9	46.9	47.4	48.1
SE	29.6	31.4	37.6	42.7	46.7	46.1
UK	26.4	26.9	32.0	40.2	47.0	46.1
EU-15	26.7	29.8	35.1	43.8	52.4	53.4

Significant increase in the total age dependency ratios

With a stable young-age dependency ratio and a rising old-age dependency ratio, the total age dependency ratio (1-19 and 65+ as a ratio persons aged 20-64) will rise – see table 4.1.3. Member States will experience an increase starting from 2010, and accelerate between 2020 and 2040. After 2040 the effect trails off in most Member States, but some will experience further increases, ending up with total age dependency ratios around or close to 100 percent (e.g. Greece, Spain and Italy).

4.1.3   Baseline projections of total age dependency ratios in EU Member States
(ratio of people 1-19 and 65+ to working age population, per cent)

	2000	*2010*	*2020*	*2030*	*2040*	*2050*
BE	67.5	65.6	70.8	83.8	89.9	88.3
DK	62.7	68.1	71.4	77.8	86.1	80.9
DE	60.2	65.3	67.2	79.1	87.8	86.0
GR	64.1	64.3	68.4	72.9	84.3	93.9
ES	62.3	60.3	63.7	70.4	86.6	99.3
FR	70.7	67.7	75.4	83.4	89.7	90.4
IRL	72.5	63.7	68.5	70.9	74.7	84.8
IT	60.6	64.4	68.9	78.0	95.7	99.5
LU	63.5	66.6	68.0	79.3	86.9	81.1
NL	61.2	63.8	70.4	80.0	89.1	84.5
AT	62.1	61.9	62.1	74.9	87.1	87.0
PT	63.6	64.5	67.9	70.2	80.1	87.1
FI	65.2	64.7	75.7	85.3	84.7	84.8
SE	70.9	68.9	72.9	81.1	85.4	83.8
UK	69.3	66.4	69.2	79.1	86.8	84.6
EU-15	64.4	65.1	69.2	78.4	88.3	89.5

The very-old-age dependency ratio increases especially fast

Table 4.1.4 illustrates one of the most dramatic changes in age profiles, namely the very rapid increase in the very-old-age dependency ratio (defined as the population aged over 85 as a percentage of those aged 20-64). In the baseline scenario, the ratio is estimated to nearly double in thirty years for the EU and to more than triple before 2050, i.e. to increase from over 3 per cent in 2000 to 10 per cent by 2050. This has important implications for a wide range of public policy areas beyond pensions, including healthcare.

4.1.4   Baseline projections of very-old-age dependency ratio in the EU
(ratio of people over 85 to working age population, per cent)

	2000	*2010*	*2020*	*2030*	*2040*	*2050*
EU-15	3.1	3.5	4.6	5.8	7.8	10.0

Demographic assumptions behind the scenarios

Overall, Member States adhered to the demographic assumptions provided by EUROSTAT when running national models of pension projections (Tables 4.1.5-4.1.8).[29]

Total fertility rates are currently ranging from around 1.2 in Spain and Italy to 1.8 and 1.9 in Denmark and Ireland, respectively. They are assumed to gradually converge to: 1.5 in Germany, Spain, Italy and Austria; 1.6 in Greece; 1.7 in Portugal and Finland; and 1.8 in all the other EU countries.

4.1.5   Total fertility rate

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*
B	1.54	1.61	1.68	1.74	1.77	1.80	1.80
DK	1.77	1.76	1.76	1.79	1.80	1.80	1.80
D	1.40	1.45	1.47	1.50	1.50	1.50	1.50
EL	1.34	1.42	1.45	1.52	1.56	1.60	1.60
E	1.19	1.28	1.34	1.42	1.48	1.50	1.50
F	1.73	1.78	1.79	1.80	1.80	1.80	1.80
IRL	1.89	1.85	1.83	1.82	1.81	1.80	1.80
I	1.22	1.31	1.36	1.43	1.48	1.50	1.50
L	1.72	1.74	1.75	1.79	1.80	1.80	1.80
NL	1.71	1.76	1.79	1.79	1.79	1.80	1.80
Ös	1.31	1.38	1.41	1.45	1.48	1.50	1.50
P	1.53	1.60	1.64	1.69	1.70	1.70	1.70
FI	1.73	1.71	1.69	1.70	1.70	1.70	1.70
S	1.50	1.56	1.61	1.70	1.77	1.80	1.80
UK	1.72	1.73	1.75	1.79	1.80	1.80	1.80

Male (and female) life expectancy at birth now ranges between around 72 (79) in Portugal (Denmark, Ireland and Portugal) and around 77 (83) in Sweden (France). It is expected to rise in all countries towards values ranging from 78 (83) in Portugal (Denmark) to 82 (87) in Sweden (France).

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[29]   Denmark assumed life expectancy at birth for both male and females slightly higher than in the EUROSTAT assumptions for the period to around 2030 and slightly lower afterwards.

4.1.6   Life expectancy at birth (males)

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*
B	75.3	76.6	77.6	79.2	80.1	80.4	80.5
DK	74.2	75.7	76.5	77.4	78.5	78.8	79.0
D	74.7	75.7	76.6	78.1	79.2	79.8	80.0
EL	75.9	76.9	77.7	79.1	80.2	80.8	81.0
E	74.9	75.4	75.9	77.0	78.0	78.8	79.0
F	74.8	75.8	76.8	78.3	79.3	79.8	80.0
IRL	74.0	74.9	75.8	77.2	78.2	78.8	79.0
I	75.5	76.5	77.4	79.0	80.1	80.7	81.0
L	74.4	75.8	77.1	78.8	79.7	80.0	80.0
NL	75.5	76.3	77.0	78.2	79.2	79.8	80.0
Ös	75.0	75.5	76.1	77.3	78.5	79.7	81.0
P	72.0	72.9	73.8	75.4	76.8	77.7	78.0
FI	73.9	74.9	75.7	77.4	78.7	79.6	80.0
S	77.3	77.7	78.2	79.1	80.0	81.0	82.0
UK	75.2	76.1	77.0	78.3	79.3	79.8	80.0

4.1.7   Life expectancy at birth (females)

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*
B	81.5	82.4	83.3	84.5	85.1	85.4	85.5
DK	79.0	79.7	80.2	81.1	82.0	82.5	83.0
D	80.8	81.6	82.3	83.5	84.3	84.8	85.0
EL	81.0	81.7	82.4	83.5	84.3	84.8	85.0
E	82.1	82.8	83.3	84.2	84.7	85.0	85.0
F	82.8	83.6	84.2	85.4	86.3	86.8	87.0
IRL	79.4	80.2	81.0	82.3	83.2	83.8	84.0
I	82.0.	82.7	83.4	84.5	85.3	85.8	86.0
L	80.8	81.7	82.5	83.7	84.5	84.9	85.0
NL	80.9	81.5	82.0	83.1	84.1	84.7	85.0
Ös	81.2	81.6	82.1	83.0	84.0	85.0	86.0
P	79.2	79.9	80.7	82.0	83.1	83.8	84.0
FI	81.1	81.8	82.5	83.6	84.4	84.9	85.0
S	82.0	82.4	82.8	83.5	84.3	85.1	86.0
UK	80.0	80.9	81.7	83.1	84.1	84.8	85.0

Finally, net migration flow is now quite substantial in Germany with almost 300,000 persons entering the country and is low in Luxembourg (around 3,100 persons). The migration assumptions are different from country to country: for around half the EU countries (Denmark, Germany, France, Ireland, Luxembourg, Finland and the UK) the flow is assumed to gradually decrease in the medium term whereas for the other countries it is assumed to gradually increase.

Migration levels may change as a consequence of unforeseen political developments or shortages in the labour market. In order to take into account this uncertainty, EUROSTAT have prepared high and low scenarios (when all three demographic improvements move in the same direction). Compared with a baseline estimate EU population of 364 million in 2050, the low scenario suggests a population of 307 million and the high scenario a population of 439 million.[30] Clearly, this would have major implications for the size of the labour force and the number of persons entering pension systems.

4.1.8   Annual net migration flows
(thousands of persons)

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*
B	10.2	12.6	15.0	15.0	15.0	15.0	15.0
DK	11.0	10.1	10.0	10.0	10.0	10.0	10.0
D	300.0	250.0	200.0	200.0	200.0	200.0	200.0
EL	21.7	23.3	25.0	25.0	25.0	25.0	25.0
E	31.1	45.5	60.0	60.0	60.0	60.0	60.0
F	50.1	50.0	50.0	50.0	50.0	50.0	50.0
IRL	17.5	10.0	5.0	5.0	5.0	5.0	5.0
I	50.0	65.0	80.0	80.0	80.0	80.0	80.0
L	3.1	2.3	2.0	2.0	2.0	2.0	2.0
NL	33.4	34.2	35.0	35.0	35.0	35.0	35.0
Ös	10.0	15.0	20.0	20.0	20.0	20.0	20.0
P	12.1	18.6	25.0	25.0	25.0	25.0	25.0
FI	5.6	5.3	5.0	5.0	5.0	5.0	5.0
S	15.2	17.6	20.0	20.0	20.0	20.0	20.0
UK	90.0	80.0	70.0	70.0	70.0	70.0	70.0

Some uncertainty on future development

There is always some uncertainty tied to demographic projections, since changes in fertility rates, life expectancy and migration flows are difficult to predict over the long term. Fertility only has a gradual and lagged effect on the demographic balance. Life expectancy may also increase faster than expected, if there are significant improvements in medical technology and medicines.

Two particular down-side risks exist in terms of pension sustainability. Firstly, fertility rates may not rise from their current low levels. Secondly, any significant and stronger increase in life expectancy would increase pressure on public pension systems. Outside the AWG some concern has been raised as to whether governments are being overly optimistic about future demographic developments.[31]

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[30] With respect to the baseline scenario, the low (high) scenario presents lower (higher) fertility rate by 0.2-0.3, lower (higher) male life expectancy by 2-3 years and lower (higher) female life expectancy by 3-4 years. Migration flows are assumed to be lower (higher) by a value ranging from a quarter to a half of the baseline projection.

[31] Tuljapurkar S., Lee N. and Anderson M. (2000), Stochastic population forecasts for the 7 countries, prepared by Mountain View Research

5   Macroeconomic assumptions

During its meetings, the Working Group broadly agreed on a common set of macroeconomic assumptions on which the pension projections should be calculated.

Regarding participation rates, it was decided to follow projections calculated by the International Labour Organisation (ILO) and by the OECD. However, it was decided that Member States could propose some adaptations of the projections so to reflect cross-country differences in labour market policy reforms and legislated reforms to social institutions. The projections for labour market would only take into account the impact of policy changes that have already been legislated.

Regarding unemployment, this was assumed to fall to its structural level (as defined by the OECD) in 2005 and be held at that rate to 2050. However, this rate could also be adjusted to reflect reforms to the labour market already enacted, provided the adjustment does not exceed one third of the estimated structural rate of unemployment in 2005.

Regarding labour productivity, this was assumed to converge towards 1.75 percent annually between 2020 and 2030. A risk-free real interest rate of 4 percent was assumed.

Member States broadly followed these macroeconomic assumptions commonly agreed. However not all followed the methodology exactly. The major exceptions are:

- Spain gradually decreased its unemployment rate to 4 per cent, below the structural levels estimated by the OECD.

- Portugal assumed a medium term productivity growth equal to around 3 per cent, while Denmark assumed that it would be 1.5 per cent.

- Finally, as a minor exception, the UK assumed productivity growth below 1.75 per cent after 2020, then an increase above this value, and finally convergence only at the end of the projection period.

The total participation rate is assumed to increase in all countries. However, while the female participation rate is assumed to rise, for males it is usually assumed to stay broadly stable or even decline. Unemployment rates are assumed to gradually decrease in all countries even if cross-country differences should not completely disappear in the medium term. In contrast, cross-country differences in productivity as well as price inflation should graduallydiminish.

See Annex 2: Tables: macro-economic assumptions, for a detailed presentation of the key variables.

6 Long term simulations of public pensions expenditure

The members of the working group were asked to construct a series of simulations for the effects of ageing on public pension expenditures, as a percentage of GDP. In this Chapter we look at the "current policy" case. In Chapter 8 of the report we consider the effects on public finances in a scenario where the EU meets all the macro-economic objectives set at the Lisbon European Council. In Chapter 9 we then proceed to explore a number of sensitivity analyses in order to test the robustness of these results.

Table 6.1.1 below shows the results of simulations calculated using the demographic and macroeconomic assumptions described in the preceding sections. However, it should be noted again that not all Member States followed this methodology exactly (see previous section). Such divergences make direct cross-country comparisons more difficult.

6.1.1 Pension expenditure projections
(as a percentage of GDP, before tax)

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*	*Change 2000-peak year*
B	9.3	8.7	9.0	10.4	12.5	13.0	12.6	*3.7*
DK	10.2	11.3	12.7	14.0	14.7	13.9	13.2	*4.5[32]*
D [33]	10.3	9.8	9.5	10.6	13.2	14.4	14.6	*4.3*
EL [34]	NA	NA	NA	NA	NA	NA	NA	*NA*
E	9.4	9.2	9.3	10.2	12.9	16.3	17.7	*8.3*
F	12.1	12.2	13.1	15.0	16.0	15.8	N.A.	*3.9*
IRL	4.6	4.5	5.0	6.7	7.6	8.3	9.0	*4.4*
I	14.2	14.1	14.3	14.9	15.9	15.7	13.9	*1.7*
L	NA	NA	NA	NA	NA	NA	NA	*NA*
NL	7.9	8.3	9.1	11.1	13.1	14.1	13.6	*6.2*
Ös	14.5	14.4	14.8	15.7	17.6	17.0	15.1	*3.1*
P	9.8	10.8	12.0	14.4	16.0	15.8	14.2	*6.2*
FI	11.3	10.9	11.6	14.0	15.7	16.0	16.0	*4.7*
S	9.0	8.8	9.2	10.2	10.7	10.7	10.0	*1.7*
UK	5.1	4.9	4.7	4.4	4.7	4.4	3.9	*0.0*

These simulations show that public pension expenditure, as a percentage of GDP, is predicted to rise substantially in all Member States over the next few decades (except in the UK, where it should decline). However, the effects of the demographic "time-bomb" are not even and the spending peak is not expected to be reached at the same time in all member states.

- Pension expenditure in Denmark, France, Italy, Austria, Portugal and Sweden should reach its peak around 2030.

- The peak is reached around 2040 in Belgium, Netherlands and Finland.

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[32] For Denmark, net of the supplementary semi-funded scheme (ATP), the increase from 2000 to the peak year is only 3.1 per cent of GDP

[33] Figures refer to the statutory pension scheme.

[34] Greece stated that, in preparation of a pension reform due in 2001, detailed projections of its pension system have been out-sourced. Projections will become available in January 2001.

- Germany, Spain, and Ireland can expect their pension expenditures to continue rising over the next half century and to peak at or after the end of the forecast period (around or after 2050).

Moreover, while most countries can expect spending on pensions (as a per cent of GDP) to increase significantly, the scale of the problem varies widely (see charts 6.1.2 over page).

- In only a handful of member states are the spending pressures rising slightly, with the peak demand expected to add less than 2 per cent of GDP to pension expenditure, i.e. Italy and Sweden (1.7 percent).

- In the majority of cases the effects of ageing will add between around 3 to 5 per cent of GDP to pension expenditure, i.e. Belgium (3.7 percent), Denmark (4.5 percent), Germany (4.3 percent), France (3.9 percent), Ireland (4.4 percent), Austria (3.1 percent), and Finland (4.7 percent).

- In a smaller number of cases the upward pressure is even higher, i.e. in Spain the pressure on the pension system could add 8.3 percent, and in the Netherlands and Portugal could amount to an extra 6.2 percent.

These results are displayed in the following charts.

6.1.2   Pension expenditure projections (as a percentage of GDP, before taxes): selected member states by the size of the increase with respect to 2000

Countries with an increase lower than 2 percentage points
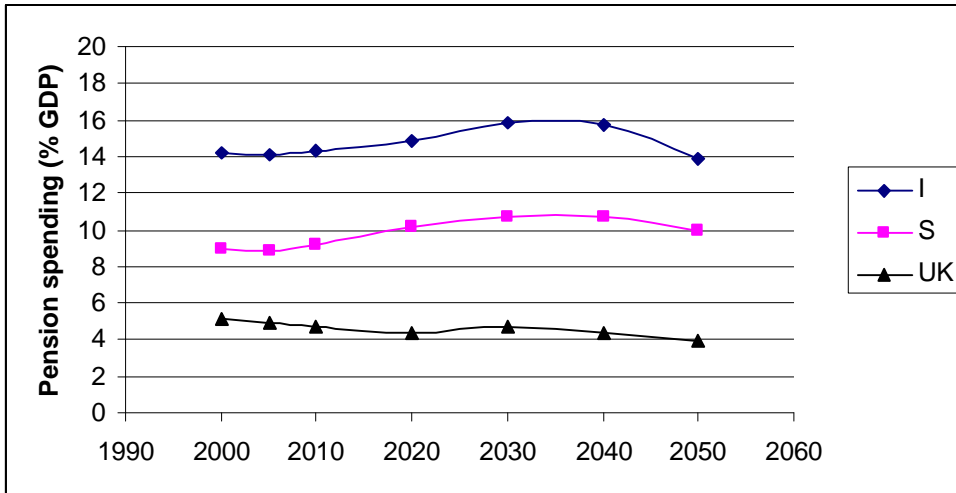
Countries with an increase between around 3 to 5 percentage points
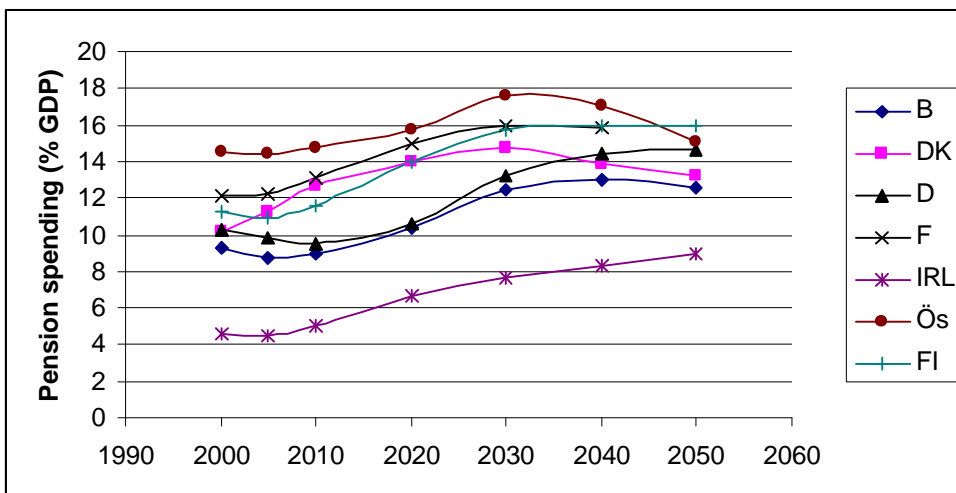
Countries with an increase higher than 5 percentage points
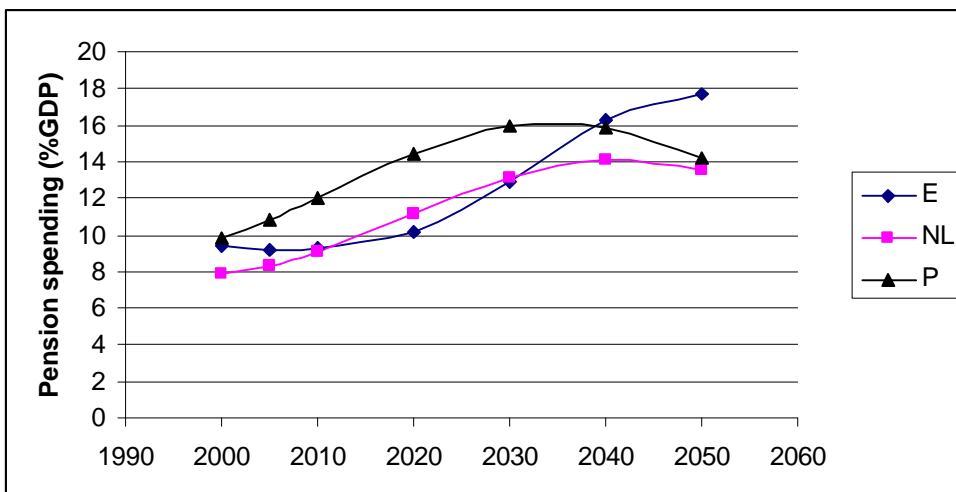
7 The impact on public debt

While caution must be exercised in interpreting the results in section 6, an increase in public expenditures on pensions of some 4 to 5 percentage points of GDP, even if spread out over several decades, poses a considerable challenge for the sustainability of public finances. The pressure on public finances could be even greater if account is taken of other age related expenditures, especially health care.

Additional age-related expenditures have to be financed. In order to identify the burden arising from pension expenditures, it was assumed that both revenues and primary expenditure other than pensions remain constant as a percentage of GDP over the whole forecasting period. An increase in pension expenditures therefore results in a lower primary surplus, which in turn impacts on the level of public debt. The evolution of public debt over the forecasting period therefore depends not only on the increase in pension expenditures, but critically hinges upon the level of debt and primary surplus in 2000 (the latter is influenced by the cyclical position of the economy in 2000).

If the initial primary surplus is not high enough to offset the increased pension expenditures, countries will start to accumulate debt, which according to the agreed assumptions would be capitalised at 4 percent in real terms.[35] Such projections show that debt in some Member States would explode to levels of over 200 percent of GDP.

In other countries, the primary surplus is sufficiently high in 2000 such that it more than offsets increased pension expenditure. On the assumption that this primary surplus is kept constant over time as a percentage of GDP, this would lead to the accumulation of net assets by the general government, in some cases to over 200% of GDP. Typically, countries with high debt levels in 2000 also have high primary surpluses on account of the commitment to budget discipline in EMU. Hence this assumption generates a paradoxical result, in that the evolution of public debt is most 'favourable' for the current high debt countries.

In practice, it is unrealistic to assume that governments would not react to mounting debt or to the accumulation of net assets. Equally, it would be difficult for countries to maintain large primary surpluses in the long run. (These are at historically high levels in high debt countries.) Nonetheless, the results illustrate the contribution which budget discipline can make via a lower interest burden to meeting the costs of ageing populations, especially in high debt countries. Overall, a lower interest burden will not be sufficient to compensate for all additional age-related expenditure increases. Hence there is a need for Member States to reform pension systems at source (such that there is a better actuarial balance between contributions and entitlements) and pursue labour market reform aimed at increasing participation rates, especially for older workers and for women.

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[35] On a technical level, the assumptions used in the projections provide for a high real interest rate / growth rate differential, which accentuates the tendency of the debt ratio to implode/explode.

8   A "Lisbon" scenario

Member States were also asked to run projections on the basis of a macroeconomic scenario consistent with the conclusions of the Lisbon European Council.

The Lisbon European Lisbon Council conclusions state that:

> …the European Council needs to set *a goal for full employment* in Europe in an emerging new society which is more adapted to the personal choices of women and men. If the measures set out below are implemented against a sound macro-economic background, *an average economic growth rate of around 3%* should be a realistic prospect for the coming years. (Paragraph 6)
>
> The European Council considers that the overall aim of these measures should be, on the basis of the available statistics, to *raise the employment rate from an average of 61% today to as close as possible to 70% by 2010* and to *increase the number of women in employment from an average of 51% today to more than 60% by 2010*. Recognising their different starting points, Member States should consider setting national targets for *an increased employment rate*. This, by enlarging the labour force, will reinforce the sustainability of social protection systems. (Paragraph 30)

Basic assumptions

The assumptions of a macroeconomic scenario consistent with the above conclusions are:

1) Both male and female participation rates gradually converge to 83 per cent by 2045. This has been attained on average by the three best EU-15 performers in the second half of the last decade (i.e. in the 1990s). In some cases this assumption implies a revision of the pension eligibility requirement in order to increase labour force participation by the elderly.

2) Both male and female unemployment rates gradually converge to 4 per cent by 2045. This has been attained on average by the three EU-15 best performers in the second half of the 1990s.[36]

3) The projections for working age population are taken from the high scenario provided by EUROSTAT.

4) Productivity levels and productivity growth are assumed to converge across European countries, and to the level and growth registered in the US, by 2050. Productivity growth in the US is assumed to be around 1 per cent on average in the first half of the current century. This assumption implies that the current US productivity growth (around 2.3 per cent) is not to be maintained in the medium term.

The first two assumptions imply an employment rate of slightly below 80 per cent in the long run. They also imply that by 2010 the female employment rate is around 63 per cent for the EU-15 on average, whereas total employment rate is close to 70 per cent, consistent with the Lisbon conclusions.

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[36] The rate of convergence for both the participation and the unemployment rates is assumed to be higher in the first part of the projections to take into account the higher impact of the reforms on the current stock of inactive persons.

All assumptions imply GDP growth rate at or above 3 per cent on average for the EU-15 in the period to 2007, consistent with the Lisbon conclusions. Afterwards, in the simulation GDP growth decreases for three main reasons: (i) the impact of labour market reforms is gradually fades because of convergence towards the best performers; (ii) decreasing growth of the working age population translates in lower labour force growth; (iii) productivity growth slightly declines.

Results of the simulations

The results of the "Lisbon" scenario are illustrated in Table 8.1.1. Not all members used the methodology outlined above.[37]

The projections show that in some countries (namely, Portugal, Denmark, the UK, Sweden , Spain, Belgium and France) pension expenditure as a percentage of GDP in the Lisbon scenario is below that of the continuity scenario from the beginning to the end of projection period.

- In <u>Portugal</u>, the difference between the projections of pension expenditure as a percentage of GDP in the Lisbon scenario and the continuity scenario starts from 0.5 percent in 2000 to reach 3.2 percent at the end of the forecasting period. The difference is of 2.6 percent in the peak year 2030, when the pension expenditure as a percentage of GDP is at 13.5 percent in the Lisbon scenario.

- In <u>Denmark</u>, the continuity scenario and Lisbon projections diverge throughout the whole period. The Lisbon scenario reaches almost 13.0, which is 1.7 percentage points below the peak of the central scenario.

- In the <u>UK</u>, pension expenditure as a percentage of GDP shows a decreasing trend similar to that of the central scenario ending up at 3.4 percent in 2050 (0.5 percentage points below the central). The positive result is due to higher participation and lower unemployment only partially offset by relatively lower productivity and by the higher population.

- In <u>Sweden</u>, the results of the projection indicate that pension expenditure as a share of GDP will be at the same level in the year 2050 as in the year 2000, i.e. one percentage point lower than in the central scenario.

- In <u>Spain</u>, pension expenditure as a percentage of GDP shows an increasing trend similar to the current policy scenario but below it. The difference of 0.1 percentage points in 2010 becomes about 1.9 percentage points at the end of the forecasting period. In fact, in 2050 the pension expenditure (as a percentage of GDP) in the central scenario is at 17.7 percent, whereas in the Lisbon scenario are at 15.8 percent. The lower increase at the beginning of the forecasting period seems to be mainly affected by higher participation and higher productivity, whereas it takes three decades to the higher population to affect the result.

- In <u>Belgium</u>, the assumptions in the Lisbon scenario affect both the growth rate of GDP and the pension expenditure. The increase of the latter is lower than the one of the former from the beginning. Therefore, the projection of the pension expenditure (as a percentage of GDP) is

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[37] For the Lisbon scenario, France assumed unemployment rates and participation rates below the ones described in this chapter. The participation rate is lower because no allowance is made for changes in the pension eligibility requirements to increase labour force participation by the elderly. France's assumptions provide a more optimistic scenario in the medium term (around 2010-2020) whereas the opposite occurs in the longer term. Italy's participation rates are lower than those described in the general methodology, whereas Spain's productivity growth is slightly higher after 2035.Portugal used the mean-variant population scenario rather than the high-variant.

below the baseline with increasing distance from it. In 2040, which is the peak year, the pension expenditure as a percentage of GDP in the Lisbon scenario is 2.2 percentage points below the current policy scenario. At the end of the forecasting period, the difference is 2.2 percentage points.

- In <u>France</u>, the Lisbon scenario increases both the growth rate of GDP (apparently fully bounded in the year of the augmentation) and the pension expenditure, which seems lower at the beginning. Thus, it takes some years for the structural change in the GDP growth rate to be fully transferred to pension expenditure. The differences in the growth rates of GDP are higher than the ones in pension expenditure for the first decade. However, after 2010 the gap remains almost unchanged until 2030. In the peak year (2030) the pension expenditures as a percentage of GDP start shrinking and the projections in the Lisbon scenario are 1.3 percentage points below the baseline. At the end of the forecasting period (2040 for France) the difference is 1.1 percentage points.

In Germany, Finland and Austria the results in terms of pension expenditure as a percentage of GDP follow similar paths, with the difference being in the length of the initial overlap between the Lisbon scenario and the continuity scenario, which is until 2020 in Germany, 2010 in Finland, 2005 in Austria. Afterwards, pension expenditure as a percentage of GDP is lower in the Lisbon scenario than the continuity scenario.

- In the Lisbon scenario, <u>Germany</u> shows an increasing difference to the continuity scenario ending up in 2050 at 12.3 percent (rather than 14.6 percent in the continuity scenario).

- For <u>Finland</u>, the maximum distance from the central is in 2030, when the pension expenditure (as a percentage of GDP) in the Lisbon scenario is 15.1 percent (and in the central it is 15.7 percent).

- In <u>Austria</u>, the pension expenditure as a percentage of GDP in the Lisbon scenario shows increasing differences from the baseline until the peak year (2030) when it is 15.8 percent whereas the base is 17.6. The distance from the base is constant until 2040, and decreasing afterwards.

In Ireland and the Netherlands, the impact of the potential outcome of the Lisbon objectives on the long-term sustainability is not uniform over the entire projection period. In both cases the projections of pension expenditure as a percentage of GDP in the Lisbon scenario cross over the continuity scenario. This happens in 2020 for Ireland, and in the decade 2030-2040 for the Netherlands.

- In particular, in <u>Ireland</u> the Lisbon assumptions determines higher expenditures as a percentage of GDP with respect to the continuity scenario in the period 2000-2020. Afterwards, pension expenditure as a percentage of GDP in the Lisbon scenarios lies below the central (-0.2 percentage points) and is identical in 2040. The two scenarios end up diverging in 2050, at 8.2 percent in the Lisbon scenario and 9 percent in the continuity scenario.

- In the <u>Netherlands</u>, after the initial overlap pension expenditure as a percentage of GDP in the Lisbon scenario slightly overtakes the continuity scenario (their maximum difference is 0.4 percentage points in 2020). In the decade 2030-2040, they cross each other. Afterwards, the Lisbon scenario is above the continuity scenario with a difference of around 0.2 percentage points until the end of the forecasting period.

In Italy, the ratio of pension expenditure to GDP settles much below the continuity scenario during the whole forecasting period, except in the very last years during which they cross each other. The greatest difference is reached in 2030 (1.3 percentage points). These results are mainly affected by (i) a higher level of GDP for the first part of the forecasting period, and by the assumed higher level of the retirement age in the second part; (ii) by the high population assumption which is responsible for one third of the reduction in the ratio of pensions to employees in 2050.

8.1.1   Pension expenditure projections (as a percentage of GDP, before taxes). "Lisbon" scenario

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*	*Change 2000-peak year*
B	9.2	7.9	7.6	8.7	10.3	10.8	10.4	*1.6*
DK	10.2	10.7	11.8	12.8	13.0	12.1	11.3	*2.8[38]*
D	10.3	9.8	9.5	10.5	12.2	12.6	12.3	*2.3*
EL[39]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.2	9.8	12.0	14.9	15.8	*6.4*
F	12.1	11.3	11.7	13.6	14.7	14.8	NA	*2.7*
IRL	4.6	4.6	5.5	6.7	7.4	8.3	8.2	*3.7*
I	14.2	13.9	13.9	14.0	14.6	14.5	14.1	*0.4*
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.3	9.2	11.5	13.3	13.9	13.4	*6.0*
Ös	14.5	14.4	14.4	14.7	15.8	15.2	13.5	*1.3*
P	9.4	10.1	11.0	12.7	13.5	12.7	11.0	*4.1*
FI	11.3	10.9	11.6	13.6	15.1	15.4	15.6	*4.3*
S	9.0	8.6	8.7	9.4	9.6	9.4	8.9	*0.6*
UK	5.1	4.8	4.4	4.0	4.0	3.8	3.4	*0.0*

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[38] For Denmark, net of the supplementary, semi-funded scheme, ATP, the increase from 200 to the peak year is only 2.7 per cent of GDP.
[39] Greece stated that projections will become available in January 2001.

9 Further sensitivity analysis

In this section we show to what extent the results for pension expenditure (as illustrated in the preceding sections) depend on the demographic and macroeconomic assumptions chosen for the central scenario. Eurostat provided a number of high and low scenarios around the central (or mean-variant) scenario.

Demographic variants

Section 4, described the central scenario prepared by EUROSTAT. Member States were asked to calculate projections using the high and low population scenarios. The results for public pensions are illustrated below and reported in greater detail in Annex 1: Tables: sensitivity analysis.

Swedish pension expenditure as a share of GDP reaches its peak in 2033 at a level of around 11 per cent when the central scenario is considered, a rise of 2 percentage points compared with the level registered in 2000. In the high population scenario, the number of pensioners are 16 per cent higher than in the central scenario in the year 2050. Pension expenditure growth, on the other hand, is only 9 per cent higher.[40] GDP is 20 per cent higher in the high population scenario than in the central scenario, due to a larger working age population. This leads to pension expenditure as a share of GDP peaking at 10.3 per cent in the period 2031-2034 (0.6 percentage points lower than in the central scenario). By the end of the simulation period, the difference with respect to the central scenario increases to 1 percentage point. In the low population scenario, the number of pensioners is 14 per cent lower than in the central scenario and the pension expenditure growth is only 4 per cent lower in the last projection year. GDP is also lower, due to a lower share of the population of working age. As a result, the pension expenditure projection as a percentage of GDP peaks at 12.1 per cent around 2040, which is about 1.3 percentage points higher than in the central scenario. In 2050, the difference increases to 1.7 per cent.

The qualitative results for Finland are close to those for Sweden. Finnish pension expenditure as a share of GDP in the central scenario reaches its peak in 2040 at a level of 16 per cent, with the same figure remaining unchanged until the end of the forecasting period. The two alternative demographic scenarios provided by Eurostat basically overlap the central scenario until 2020. Afterwards, the expenditure projections of low and high population lie over and below the central scenario, respectively. In the high population scenario, pension expenditure as a share of GDP reaches its peak at 15.3 per cent in 2030, which is 0.4 percentage points lower than in the central scenario. By the end of the simulation period, the difference increases to 1.2 per cent. In the low population scenario, the pension expenditure as a percentage of GDP peaks at 16.7 per cent at the end of the projection period, which is approximately 0.7 per cent point higher than in the central scenario.

For Italy, the expenditure/GDP ratios almost overlap during the first two decades of the forecasting period in all three demographic variants. The low variant scenario overtakes the central scenario starting from about 2020. On the contrary, the high variant scenario falls below the central during

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[40] These results are explained by features of the new Swedish pension system. A pension holding is built up during the active years which is, at the time of retirement, distributed over the expected remaining lifetime. Therefore, an increase in life expectancy reduces the annual pension for the pensioners.

the same period. As a consequence of these trends, the ratio of pension expenditure to GDP in 2050 will be 14.9 per cent and 12.9 per cent in the high and low variant, respectively.[41]

The results of the projections for <u>Spain</u> show that pension expenditures as a percentage of GDP are very close to the central scenario in the first two decades when they all show a slightly increasing trend (from 9.4 per cent in 2000 to 10.2 per cent in 2020). In all the variants, after 2020 a rapid increase is observed, with the low (high) population variant always over (below) the central until the end of the forecasting period. In 2050, pension expenditures as a percentage of GDP are at 19.5 percent, 17.7 per cent and 15.6 per cent in the low, central and high population variants, respectively.

The results of the projections for the <u>Netherlands</u> show that the ratios almost overlap during the first half of the forecasting period, showing little differences from each other. In fact, in 2020 the central, the high and the low variants are 11.1 per cent, 11.0 per cent and 10.9 per cent, respectively. Afterwards, the central scenario slightly overtakes the low variant scenario until the end of the forecasting period. In contrast, the high variant scenario overtakes the central until 2030 but ends up at 13 per cent which is 0.6 percentage points below the central scenario.

In <u>Portugal</u>, the projections of pension expenditures as a percentage of GDP in the high and low variant demographic scenarios mimic the central scenario with a peak reached in 2030 and a clear decrease afterwards until the end of the forecasting period (when the high variant is 14.3 per cent, the central is 14.2 per cent and the low variant is 12.8 per cent). Although the high variant scenario assumes a higher level of immigrants, life expectancy and total fertility rate than the central, no relevant differences with respect to the central variant can be observed and the two scenarios basically overlap for all the forecasting period. On the other side, the low population scenario is systematically below the central scenario and shows a gradually increasing gap from it. The main difference with the central is reached at the end of the forecasting period when the low variant is 1.3 percentage points below the central scenario.

In <u>Ireland</u>, the pension expenditure projections in the different population scenarios broadly follow the central scenario until 2030. They stay almost constant for the first five years of the forecasting period and then increasing from 2005 to 2040, when the differences between the scenarios becomes clearer. The projections for pension expenditure in the high population scenario will reach their peak in 2040, being 0.3 percentage points higher than in the central scenario. This effect, likely due to a larger working age population in the previous decades, disappears thereafter with pension expenditure as a share of GDP decreasing to 8.5 per cent in 2050, which is 0.5 percentage points below the central scenario. The central and the high variant scenarios cross each other three times: around 2030, between 2030 and 2040, and in the last decade when the high variant falls below the central. In the low population scenario, the number of pensioners is lower than in the central scenario. However, this does not produce any significant effect. Both scenarios follow the same path, basically overlapping each other until the end of the forecasting period when both reach their peak respectively at 9 per cent and 9.1 per cent.

In <u>Belgium</u>, the ratio of pension expenditure to GDP in the central scenario - after a slight decline in the first decade - shows an increase which reach the peak in 2040 at 13 per cent with a slow reduction at the end of the forecasting period. Both the population variants almost overlap the central path in the first decade. For a short time, the high population variant overtakes the central.

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[41] It has been indicated that such differences might depend on the increase of the ratio of the number of pensions to employees, while the ratio of average pension to labour productivity remains almost unchanged. The slight differences are only due to the ten-year revision of transformation coefficients according to what is stated in the present legal framework of the Italian pension system. Moreover, it has been suggested that part of the mentioned differences would be attributed to survivors' pensions.

Afterwards, high variant crosses the central and remains below it until 2050 (when the high variant is 12.1 per cent and the central is 12.6 per cent). On the other hand, the low population variant lies below the central from 2010 (when it is at 8.9 per cent whereas the central is at 9 per cent) to 2040 (12.7 per cent and 13 per cent, respectively). Afterwards, they start converging (in 2050 both are at 12.6 per cent).

Similar behaviour is observed in Austria, where the ratios of pension expenditure to GDP in the three demographic variants – which broadly follow the same path - show a slight decline in the first decade when the baseline overtakes the two variants. Afterwards, they increase until their peak years and then decrease again. On the one side, the low population variant closely follows the central until 2020 when they begin to diverge, with the current policy scenario reaching the peak at 17.6 percent in 2030 (when the low variant scenario is at 18.3 percent). The low variant scenario reaches the peak at 18.4 percent in 2040 (1.4 percentage points higher than in the current policy scenario). It starts decreasing afterwards reaching 17.4 percent at the end of the forecasting period. On the other side, the high population variant lies always below the central showing increasing differences from the latter until 2040, when it is 1.1 percentage points lower than the current policy scenario. The peak year for the high population variant, as well as the central, is 2030, when it is at 16.7 percent (0.9 percentage points below the current policy scenario). After 2030 it decreases ending up at 14.2 percent in 2050 (0.9 percentage points below the current policy scenario)

In the UK, the trend of pension expenditure (in each demographic variant) is a declines as a share of GDP over the projection period – apart from a slight rise between 2025 and 2030 when the ageing effect is at its strongest. The two population variants yield several effects. The first effect is the impact on the labour market contribution to economic growth. The overall effect on output is a variation of around 0.5 percentage point on either side of the central scenario. The second effect is on pension payments, which fall slightly as a share of GDP under both scenarios by 2050. In any case, in both the high and low population scenario, pension spending as a share of GDP does not differ significantly from the central scenario.

In Denmark the ratio of pension expenditure to GDP in the high population scenario overtakes the base until 2030 when both reach the peak at 4.7 per cent. During the last two decades of the forecasting period the high variant is below the base with increasing differences. In the high population scenario, the ratio of pension expenditure to GDP reaches 12.8 per cent in 2050 which is 0.4 percentage points lower than in the central scenario.[42]

In Germany and France, the three variants do not differ significantly from each other during the forecasting period. However, the demographic changes have ambiguous effects. In France, during the first two decades pension expenditure as a percentage of GDP in the high variant overtakes the base, which, in turn, is higher than the low variant. Moreover, after 2020 the high variant shows a decreasing trend (if compared with the other) and falls below the central scenario in 2030 ending up at 15.2 per cent in 2040 (i.e. 0.6 percentage points below the central scenario). On the other side, the low variant lies always below the central starting to converge after 2030. They are at the same value of 15.8 per cent in 2040.

In Germany during the first two decades the projections for the pension expenditures as a percentage of GDP in the high and low variants are respectively over and below the base. During 2020-2030, the central scenario overtakes both the alternative variants until the end of the forecasting period. The low and high variants have the same value in 2040 (13.6 percent). At the

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[42] Denmark did not provide simulations for the low population scenario, as the demographic projections imply an unrealistic long-term drop in the population of 80 per cent, that is approximately from 5 million people to 1 million over the next half-century.

end of the forecasting period the low variant overtakes the high variant being respectively 13.7 and 13.3 percent.

Different assumptions for the labour market, productivity and interest rates

Member States presented sensitivity tests results by using different assumptions regarding the labour market, productivity and the interest rates. More specifically the tests were run assuming that:

- participation rates are 5 percentage points higher/lower than in the central by 2050;[43]

- structural unemployment falls to levels experienced in the 1960s (3-5 per cent) by the end of the projection period;

- productivity growth is assumed to be 0.5 per cent higher/lower than in the central starting in 2005 and ending in 2050;

- real interest rates are assumed to be 1 percentage point higher/lower than in the central scenario.

Different hypotheses on productivity

The sensitivity analysis on productivity has concerned an increase and a decrease of 0.5 percent in the growth rate of productivity with respect to the central scenario starting from 2005. Under the two productivity variants, the growth rate of GDP results in a shift of the same size, in either direction from the central scenario.

In some countries (UK, Italy, Finland, Sweden, Spain and Portugal), because of the higher (lower) level of growth rate of GDP, the ratio of pension expenditure to GDP is lower (higher) than in the central for almost all the forecasting period.

- In the UK, pension payments are affected through those benefits that incorporate growth in wages. Thus, the low productivity scenario overtakes the central since 2010 with increasing differences; it peaks in 2030-2040 at 5.3 percent and is decreasing afterwards until it reaches 4.9 percent in 2050. The high productivity scenario lies below the central since 2010 showing increasing differences until 2050 when it is 3.1 percent (0.8 percentage points below the central).

- Similar features can be found in Sweden, Finland, Spain and Portugal, where the pension expenditure as a share of GDP in the productivity scenarios shows slightly increasing deviations from the central since 2005 and until the end of the forecasting period. For these countries, it seems that, on the one side, the increase (decrease) in the growth rate of productivity results in a corresponding increase (decrease) in the growth rate of GDP entirely bounded in the year of the augmentation. On the other side, the effect on the pension expenditure seems to be slighter at the beginning and it takes some year until the structural change in the growth rate of productivity fully transfers to pension expenditure. Therefore, the differences in the growth rates of GDP are higher than the ones in pension expenditure.

- Similar reasoning applies to Italy as for the firsts decades. However, after about 2030 the gap remains almost unchanged for about ten years before shrinking slightly towards the end of the

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[43] In general, such changes have been performed by modifying females' participation rates.

forecasting period. This is mainly due to the Italian legal framework of the pension system, which provides for a gradual shift from the earnings related to the contribution-based method.

In the Netherlands, Germany, Denmark and Ireland, the productivity variants do not determine relevant changes with respect to the central scenario.

- In the Netherlands, public pensions are linked to wages. A higher (lower) rate of productivity growth thus also leads to a higher (lower) level of pensions benefits. For these reasons the pension expenditure projection as a percentage of GDP does not change significantly with respect to the central.

- In Germany and Denmark, the full indexation to wages in previous years provides a slight effect on the pension expenditure projection as a percentage of GDP. In Germany and in Denmark, the effects are slightly more evident after 2030 and 2020, respectively.

- In Ireland, slight differences can be observed both at the very beginning and at the end of the forecasting period.

Finally in Austria, the pension expenditure as a share of GDP in the high productivity scenario shows slightly increasing deviations from the central from 2010 until the end of the forecasting period. This is due to the Austrian pension indexation system according to which wage growth (which is assumed to follow productivity growth) implies future pension adjustments. This mechanism leads to a higher pension expenditure:GDP ratio as a consequence of an acceleration in productivity.

Different hypotheses on the participation rate

The sensitivity analysis concerning a change in the participation rate applies a shift of 5 percent in either direction with respect to the value assumed in the central scenario starting from 2005.

In Italy, the effect on economic growth due to the different participation rates determines symmetric deviations of the pension expenditure/GDP ratio with respect to the central scenario. In particular, the deviations are increasing until about 2030 and decreasing afterwards until they become nil in 2050. During the first three decades of the forecasting period, such differences mainly reflects the difference in the growth rate of GDP. Moving towards 2050, this effect tends to fade away while a higher (lower) number of employees from previous years starts to produce a higher (lower) number of pensions. The ratios of pensions to employees corresponding to the two alternative hypotheses stop to diverge starting from around 2040. The slight difference between the percentage ratios of average pension to labour productivity is due both to the difference in the growth rate of GDP used to capitalise contributions and to a modification of the distribution of pensions by sex depending on the hypotheses on participation rates.

France, Germany, Spain, Portugal and Ireland show similar features since there are quite symmetric deviations of the growth rate of GDP with respect to the central scenario due to changes of the participation rate. The deviations are increasing in both the variants for all the forecasting period.

- At the end of the forecasting period, in Germany the projection of the pension expenditure as a percentage of GDP are 14.9 per cent and 14.3 per cent in the low and high participation scenarios, respectively, with the central scenario being equal to 14.6 percent.

- For <u>France</u>, in 2040 the pension expenditure as a percentage of GDP are 15.2 per cent and 16.3 per cent in the low and high participation scenarios, respectively, with the central equal to 15.8 percent.

- For <u>Spain</u>, in 2050 the two scenarios are 18.9 per cent and 16.6 per cent, respectively, with the central being 17.7 per cent.

In the <u>UK</u>, the labour force participation scenarios affect both the level of economic activity and the value of pensions (as well as other social security payments). However, these effects are not overly significant. Therefore, the pension expenditure as a share of GDP does not seem very sensitive to changes to the participation rates assumptions.

In <u>Denmark</u>, the different assumptions on participation rates produce an impact with respect to the central scenario ranging around 0.4-0.6 per cent starting from 2020.

Different hypotheses on the unemployment rate

As regards the unemployment rate, the sensitivity analysis proposed by the WGA applies a correction to the structural level in order to make it fall to the values experienced in the 1960s by the end of the forecasting period that is a range between 3-5 per cent depending on the country and the period considered.[44]

With lower unemployment rates, the path of pension expenditure (as a per cent of GDP) shows similar features in Ireland, Italy, Germany, Sweden, France, Belgium, Finland and Portugal.

- In particular, in <u>Sweden</u> the structural unemployment for the sensitivity analysis is assumed to be one percentage point lower than in the central scenario, which implies a level of the unemployment rate of about 4 per cent. This has very little effect on pension expenditure since unemployment benefits give the same rights as wages to future pensions. However, higher employment increases GDP, leading to both higher primary income and primary expenditure besides pensions.

- In <u>Ireland</u>, the difference from the central scenario is around 0.1 percentage points.

- In <u>Finland</u>, the difference from the central is of the order of 0.3 percentage points in 2020 and of 0.4 per cent in 2050.

- In <u>France</u>, pension expenditure as a percentage of GDP in the low unemployment scenario starts diverging from the central after 2010 ending up at 0.4 percentage points lower than the central scenario in 2040.

- In <u>Belgium</u>, pension expenditure as a percentage of GDP in the low unemployment scenario diverges from the central one after 2020 ending up at 0.5 percentage points lower than the central scenario in 2050.

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[44] The Netherlands and Austria considered that a further decline in the unemployment rate (with respect to that of the central scenario) was not plausible, and therefore gave for this exercise the same ratio pension expenditure-GDP as the central scenario. Spain did not perform this scenario because the unemployment rate assumed in the central scenario is already very low.

- In <u>Portugal</u>, pension expenditure as a percentage of GDP in the low unemployment scenario shows very little difference (between 0.1 and 0.2 per cent) with respect to the central scenario.

- In <u>Italy</u>, the low unemployment variant and the central scenario start to divergence slightly in 2030, when the former is 15.8 percent and the latter 15.9 percent. In 2050 they are, respectively, 13.7 percent and 13.9 percent.

- In <u>Germany</u>, The deviations between the projections become visible between 2030-2050 when the distance from the baseline passes from 0.1 percentage points in 2030 to 0.4 percentage points.

For all these countries pension expenditure (as a per cent of GDP) almost overlaps the central during the first decades and shows slight deviations afterwards. As for the effects on the ratio of pension expenditure to GDP, it emerges that, because of the small reduction in the unemployment rate, the corresponding pension expenditure settles slightly below the baseline in the last decades of the forecasting period in all the mentioned countries. This is mainly due to the higher growth rate of GDP which is not curbed significantly by a higher level of pension expenditure so that even the last decade of the forecasting period might be considered "too early" for the lower level of unemployment to determine a corresponding impact in the number of pensions.

In the <u>UK</u>, the assumption of a return to structural unemployment levels (falling to around 4 per cent) gives, as with other scenarios, an early effect on economic growth, which initially increases as a result of a higher number of workers. In the longer term, however, growth falls slightly as a greater number of workers retire relative to the central scenario. Therefore, under this scenario pension expenditure is not significantly different from the central scenario. The low unemployment scenario differs significantly from the central only in 2010, being 4.6 per cent and 5.1 per cent, respectively.

In <u>Denmark</u>, the assumption of lower unemployment has its full effects on the pension expenditure as a percentage of GDP from 2005, with the central scenario overtaking this variant by around 0.5 percentage points and keeping this difference over the whole period.

Different hypotheses on the interest rate

The sensitivity analysis on the interest rate is of major importance for those countries in which the financing system is partially or fully pre-funded.

However, this is not the case for many European countries even when the second and third pillars of the pension system are significantly developed. Therefore, for many countries (namely, Austria, Spain, France, Germany, the UK, the Netherlands, Italy, Belgium and Ireland)[45] different assumptions about the interest rate have little effect on the evolution of public pension expenditure. Of course, these different assumptions affect the evolution of public debt as a percentage of GDP by altering the amount of interest to be paid by the government.

In <u>Denmark</u> changes of the assumptions on the interest rate do not have a significant effect with respect to the central scenario. The difference of around 0.1-0.2 percentage points after about 2020

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[45] This result applies also to Finland even if this country show a relevant fully-funded component. However, the Finnish pension scheme is defined-benefit type, which means that the interest rate (rate of return) on pension funds' assets has no impact on pension expenditure but only on the pension contribution rate. Thus, the pension expenditure ratio (pensions as a share of GDP) both in the high and low interest rate scenario should be exactly the same as in the central scenario.

is due to the characteristics of the Danish projection model. In fact, lower interest rates raise the capital-labour ratio, hence the real wage ratio. This implies a rise in pension expenditures, which is indexed to wages. Although lower interest rates also expand GDP through rising investments, this effect is small compared to wage-indexation effect on pensions expenditures. Therefore pension expenditures are increased by lower interest rate.

In <u>Sweden</u>, changes to interest rate assumptions start to have their effects from about 2020 when the low interest rate scenario determines that pension expenditure as a share of GDP is always below the central scenario. The difference between the two scenarios reaches 0.6 percentage points in 2050. However, it the return on the general government financial assets is also lower. Almost symmetric effects are observed in the high interest rate scenario.

In <u>Portugal</u>, changes to interest rate assumptions start to have an effect immediately. The low interest rate scenario ensures that pension expenditure (as a share of GDP) is always (slightly) below the central scenario. The difference reaches 0.4 percentage points by 2050. Again, almost symmetric effects are observed in the high interest rate scenario.

Annex 1: Tables: sensitivity analysis

9.1.1   Pension expenditure projections (as a percentage of GDP, Before taxes). High population scenario

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*	*Change 2000-peak year*
B	9.4	8.8	9.1	10.6	12.3	12.6	12.1	3.2
DK	10.3	11.4	12.8	14.2	14.7	13.7	12.8	4.4
D	10.3	9.9	9.6	10.8	13.0	13.6	13.3	3.3
EL[46]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.3	10.2	12.4	15.1	15.6	6.2
F	12.1	12.2	13.2	15.2	15.8	15.2	NA	3.7
IRL	4.6	4.6	5.1	6.8	7.5	8.6	8.5	4.0
I	14.2	14.1	14.3	14.9	15.6	14.9	12.9	1.4
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.2	9.0	11.0	12.7	13.4	13.0	5.5
Ös	14.5	14.3	14.6	15.3	16.7	15.9	14.2	2.2
P	9.4	10.5	11.7	14.3	16.0	15.7	14.3	6.6
FI	11.3	10.8	11.6	13.8	15.3	15.3	14.8	4.0
S	9.0	8.8	9.2	10.1	10.2	9.9	9.1	1.2
UK	5.1	4.9	4.7	4.5	4.7	4.3	3.7	0.0

9.1.2   Pension expenditure projections (as a percentage of GDP, Before taxes). Low population scenario

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*	*Change 2000-peak year*
B	9.3	8.7	8.9	10.1	12.1	12.7	12.6	3.4
DK[47]	NA	NA	NA	NA	NA	NA	NA	NA
D	10.3	9.7	9.5	10.3	12.7	13.6	13.7	3.4
EL[48]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.1	9.2	10.2	13.2	17.4	19.5	10.1
F	12.1	12.1	13.0	14.7	15.7	15.8	NA	3.7
IRL	4.6	4.5	5.0	6.6	7.6	8.1	9.1	4.5
I	14.2	14.1	14.2	14.8	16.1	16.4	14.9	2.2
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.2	9.0	10.9	12.8	13.8	13.4	5.9
Ös	14.5	14.4	14.7	15.8	18.3	18.4	17.4	3.9
P	9.4	10.3	11.3	13.4	14.7	14.3	12.8	5.3
FI	11.3	10.9	11.8	14.1	15.9	16.3	16.7	5.4
S	9.0	8.9	9.4	10.7	11.6	12.1	11.7	3.1
UK	5.1	4.9	4.6	4.3	4.6	4.3	3.7	0.0

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[46] Greece stated that projections will become available in January 2001.

[47] For this scenario, model's results need further analysis.

[48] Greece stated that projections will become available in January 2001.

9.1.3   Pension expenditure projections (as a percentage of GDP, Before taxes). High participation scenario [49]

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*	*Change 2000-peak year*
B	NA	NA	NA	NA	NA	NA	NA	NA
DK	10.2	11.1	12.2	13.4	14.1	13.5	12.8	3.9
D	10.3	9.7	9.4	10.5	13.1	14.2	14.3	4.0
EL[50]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.2	10.0	12.4	15.5	16.6	7.2
F	12.1	12.2	13.1	14.8	15.5	15.2	NA	3.4
IRL	4.6	4.6	5.0	6.5	7.3	7.9	8.6	4.0
I	14.2	14.1	14.2	14.7	15.4	15.0	13.3	1.2
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.2	9.0	11.0	12.7	13.4	13.0	5.5
Ös[51]	NA	NA	NA	NA	NA	NA	NA	NA
P	9.4	10.3	11.4	13.6	15.1	14.9	13.3	5.7
FI	11.3	10.9	11.6	13.6	15.2	15.4	15.4	4.1
S	NA	NA	NA	NA	NA	NA	NA	NA
UK	5.1	4.9	4.7	4.4	4.7	4.4	3.8	0.0

9.1.4   Pension expenditure projections (as a percentage of GDP, Before taxes). Low participation scenario [52]

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*	*Change 2000-peak year*
B	9.4	8.7	9.0	10.6	12.8	13.3	12.9	3.9
DK	10.2	11.6	13.1	14.4	15.2	14.4	13.7	5.0
D	10.3	9.8	9.5	10.7	13.5	14.7	14.9	4.6
EL[53]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.3	10.4	13.4	17.3	18.9	9.5
F	12.1	12.2	13.2	15.2	16.3	16.3	NA	4.2
IRL	4.6	4.6	5.1	6.8	7.9	8.7	9.6	5.0
I	14.2	14.1	14.4	15.3	16.5	16.3	14.4	2.3
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.3	9.1	11.3	13.5	14.7	14.3	6.8
Ös[54]	NA	NA	NA	NA	NA	NA	NA	NA
P	10.3	11.4	12.7	15.4	17.3	17.2	15.5	7.0
FI	11.3	10.9	11.7	14.2	16.0	16.5	16.6	5.3
S	NA	NA	NA	NA	NA	NA	NA	NA
UK	5.1	4.9	4.7	4.5	4.8	4.5	4.0	0.0

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[49] In general, higher participation rates have been achieved by raising females' participation rates.
[50] Greece stated that projections will become available in January 2001.
[51] Results could be broadly similar to the Lisbon scenario.
[52] In general, lower participation rates have been achieved by reducing females' participation rates.
[53] Greece stated that projections will become available in January 2001.
[54] Results could be broadly similar to the low population scenario.

9.1.5   Pension expenditure projections (as a percentage of GDP, Before taxes). Low unemployment scenario

	2000	2005	2010	2020	2030	2040	2050	Change 2000-peak year
B	9.4	8.7	9.0	10.4	12.0	12.5	12.1	3.1
DK	10.2	10.9	12.2	13.4	14.1	13.4	12.8	3.9
D	10.3	9.8	9.5	10.6	13.1	14.2	14.2	3.9
EL[55]	NA	NA	NA	NA	NA	NA	NA	NA
E[56]	NA	NA	NA	NA	NA	NA	NA	NA
F	12.1	12.2	13.1	14.8	15.7	15.4	NA	3.6
IRL	4.6	4.5	5.0	6.6	7.5	8.2	8.9	4.3
I	14.2	14.1	14.3	14.9	15.8	15.5	13.7	1.6
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.3	9.1	11.1	13.1	14.1	13.6	6.2
Ös	14.5	14.4	14.8	15.7	17.6	17.0	15.1	3.1
P	9.8	10.8	11.9	14.3	15.9	15.7	14.1	6.1
FI	11.3	10.9	11.6	13.7	15.4	15.6	15.6	4.3
S	9.0	8.8	9.1	10.2	10.6	10.6	9.9	1.6
UK	5.1	4.9	4.6	4.4	4.7	4.4	3.9	0.0

9.1.6   Pension expenditure projections (as a percentage of GDP, Before taxes). High productivity scenario

	2000	2005	2010	2020	2030	2040	2050	Change 2000-peak year
B	9.4	8.7	9	10.4	12.2	12.5	12.0	3.1
DK	10.2	11.3	12.7	14.0	14.7	14.0	13.4	4.5
D	10.3	9.8	9.5	10.6	13.2	14.4	14.6	4.3
EL[57]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.1	9.6	11.7	14.6	15.4	6.0
F	NA	NA	NA	NA	NA	NA	NA	NA
IRL	4.6	4.6	5.0	6.7	7.6	8.3	9.1	4.5
I	14.2	14.0	13.9	14.1	14.8	14.5	12.9	0.6
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.3	9.1	11.1	13.1	14.1	13.7	6.2
Ös	14.6	14.5	14.9	16.0	18.0	17.6	15.8	3.4
P	9.8	10.6	11.5	13.4	14.3	13.5	11.7	4.5
FI	11.3	10.9	11.5	13.4	14.8	14.8	14.7	3.5
S	9.0	8.7	9.0	9.9	10.3	10.1	9.3	1.3
UK	5.1	4.9	4.5	4.1	4.1	3.7	3.1	0.0

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[55] Greece stated that projections will become available in January 2001.

[56] Low unemployment already assumed in the current policy scenario.

[57] Greece stated that projections will become available in January 2001.

9.1.7   Pension expenditure projections (as a percentage of GDP, Before taxes). Low productivity scenario

	2000	2005	2010	2020	2030	2040	2050	Change 2000-peak year
B	NA	NA	NA	NA	NA	NA	NA	NA
DK	10.2	11.4	12.7	14.0	14.7	14.0	13.4	4.5
D	10.3	9.8	9.5	10.6	13.3	14.5	14.7	4.4
EL[58]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.5	10.9	14.2	18.4	20.4	11.0
F	NA	NA	NA	NA	NA	NA	NA	NA
IRL	4.6	4.6	5.0	6.7	7.6	8.3	9.1	4.5
I	14.2	14.2	14.7	15.8	17.1	17.0	15.1	2.9
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.3	9.1	11.0	13.1	14.0	13.6	6.1
Ös [59]	NA	NA	NA	NA	NA	NA	NA	NA
P	9.9	11.0	12.4	15.5	18.0	18.6	17.3	8.7
FI	11.3	10.9	11.9	14.6	16.7	17.3	17.6	6.3
S	9.0	8.8	9.3	10.6	11.3	11.5	10.9	2.5
UK	5.1	4.9	4.8	4.8	5.3	5.3	4.9	0.2

9.1.8   Pension expenditure projections (as a percentage of GDP, Before taxes). High interest rate scenario

	2000	2005	2010	2020	2030	2040	2050	Change 2000-peak year
B	9.3	8.7	9.0	10.4	12.5	13.0	12.6	3.7
DK	10.2	11.3	12.6	13.9	14.5	13.8	13.1	4.3
D	10.3	9.8	9.5	10.6	13.3	14.4	14.6	4.3
EL[60]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.3	10.2	12.9	16.3	17.7	8.3
F	12.1	12.2	13.1	15.0	16.0	15.8	NA	3.9
IRL	4.6	4.6	5.0	6.7	7.6	8.3	9.1	4.5
I	14.2	14.1	14.3	14.9	15.9	15.7	13.9	1.7
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.3	9.1	11.1	13.1	14.1	13.6	6.2
Ös	14.5	14.4	14.8	15.7	17.6	17.0	15.1	3.1
P	9.9	10.9	12.2	14.7	16.5	16.4	14.8	6.6
FI	11.3	10.9	11.6	14.0	15.7	16.0	16.0	4.7
S	9.0	8.8	9.2	10.3	11.0	11.3	10.7	2.3
UK	5.1	4.9	4.7	4.4	4.7	4.4	3.9	0.0

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[58] Greece stated that projections will become available in January 2001.
[59] For this scenario, model's results need further analysis.
[60] Greece stated that projections will become available in January 2001.

9.1.9   Pension expenditure projections (as a percentage of GDP, Before taxes). Low interest rate scenario

	2000	*2005*	*2010*	*2020*	*2030*	*2040*	*2050*	*Change 2000-peak year*
B	9.3	8.7	9.0	10.4	12.5	13.0	12.6	3.7
DK	10.2	11.4	12.7	13.9	14.5	13.8	13.1	4.3
D	10.3	9.8	9.5	10.6	13.3	14.4	14.6	4.3
EL[61]	NA	NA	NA	NA	NA	NA	NA	NA
E	9.4	9.2	9.3	10.2	12.9	16.3	17.7	8.3
F	12.1	12.2	13.1	15.0	16.0	15.8	NA	3.9
IRL	4.6	4.6	5.0	6.7	7.6	8.3	9.1	4.5
I	14.2	14.1	14.3	14.9	15.9	15.7	13.9	1.7
L	NA	NA	NA	NA	NA	NA	NA	NA
NL	7.9	8.3	9.1	11.1	13.1	14.1	13.6	6.2
Ös	14.5	14.4	14.8	15.7	17.6	17.0	15.1	3.1
P	9.8	10.7	11.9	14.2	15.7	15.5	13.9	5.9
FI	11.3	10.9	11.6	14.0	15.7	16.0	16.0	4.7
S	9.0	8.8	9.2	10.2	10.5	10.3	9.4	1.5
UK	5.1	4.9	4.7	4.4	4.7	4.4	3.9	0.0

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[61] Greece stated that projections will become available in January 2001.

Annex 2: Tables: macro-economic assumptions

The detailed assumptions used by Member States in the central scenario are noted below. These refer to period averages except for the final year of the simulation (2050) where the value refers to a single year.[62]

9.1.10 Ratio of total labour force and total population between 15 and 64

	2000-2004	*2005-2009*	*2010-2014*	*2020-2024*	*2030-2034*	*2040-2044*	*2050*
B	65.8	65.8	65.7	66.1	67.0	67.6	67.8
DK	78.0	76.1	74.8	75.5	76.0	77.7	77.5
D	73.7	75.7	75.6	74.4	75.1	75.6	75.4
EL	NA	NA	NA	NA	NA	NA	NA
E [63]	66.4	68.2	69.5	70.4	71.2	73.1	74.6
F [64]	68.9	68.5	67.9	67.9	68,2	69.4	69.9
IRL	66.7	67.6	68.1	68.7	69.4	71.5	75.1
I	60.1	62.1	63.5	64.8	66.5	69.2	69.9
L	NA	NA	NA	NA	NA	NA	NA
NL	68.2	68.8	69.4	70.5	70.5	70.5	70.5
Ös	67.6	69.0	69.0	69.5	73.2	77.7	78.9
P	73.1	73.4	73.6	73.2	73.6	75.2	76.5
FI	75.0	73.4	72.8	74.0	74.7	74.4	74.5
S [65]	79.0	80.1	81.8	82.5	82.8	83.4	83.4
UK[66]	73.7	73.1	73.5	73.3	73.2	73.9	74.2

9.1.11 Ratio of male labour force and male population between 15 and 64

	2000-2004	*2005-2009*	*2010-2014*	*2020-2024*	*2030-2034*	*2040-2044*	*2050*
B	71.7	70.1	68.8	68.2	68.9	69.5	69.7
DK	82.4	80.0	78.3	78.6	78.6	79.5	78.7
D	80.9	81.6	80.9	79.0	79.3	79.6	79.4
EL	NA	NA	NA	NA	NA	NA	NA
E [67]	79.5	80.2	80.1	78.8	77.9	78.7	79.5
F [68]	75.6	74.3	73.1	72.7	72.3	72.7	72.5
IRL	79.7	81.0	81.5	80.5	79.9	79.8	80.2
I	73.8	75.5	76.3	76.0	75.1	75.0	74.7
L	NA	NA	NA	NA	NA	NA	NA
NL	-	-	-	-	-	-	-
Ös	76.0	76.8	76.6	77.1	80.0	83.5	84.7
P	-	-	-	-	-	-	-
FI	77.1	75.1	74.2	75.2	75.9	75.3	75.2
S [69]	81.3	82.5	84.1	84.1	83.8	83.8	83.5
UK [70]	81.9	80.2	79.5	79.3	79.1	79.2	79.0

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[62] The figures for UK in this section refer to 10-year averages rather than 5-year averages.
[63] Ratio of total labour force and total population between 16 and 64
[64] Beginning of the reference year.
[65] Ratio of total labour force and total population between 16 and 64
[66] Ratio of total labour force and total population between 16 and 64.
[67] Ratio of male labour force and male population between 16 and 64
[68] Beginning of the reference year.
[69] Ratio of male labour force and male population between 16 and 64
[70] Ratio of male labour force and male population between 16 and 64

9.1.12 Ratio of female labour force and female population between 15 and 64

	2000-2004	*2005-2009*	*2010-2014*	*2020-2024*	*2030-2034*	*2040-2044*	*2050*
B	59.9	61.5	62.6	64.0	65.0	65.6	65.8
DK	73.6	72.1	71.2	72.4	73.3	75.8	76.2
D	66.3	69.7	70.1	69.6	70.8	71.4	71.1
EL	NA	NA	NA	NA	NA	NA	NA
E [71]	53.2	56.1	58.9	62.0	64.3	67.3	69.5
F [72]	62.2	62.6	62.7	63.1	64.1	66.0	67.2
IRL	53.5	54	54.6	54.7	58.6	63.0	69.9
I	46.4	48.6	50.5	53.3	57.6	63.3	64.8
L	NA	NA	NA	NA	NA	NA	NA
NL	-	-	-	-	-	-	-
Ös	59.2	61.0	61.5	61.7	66.0	71.1	72.9
P	-	-	-	-	-	-	-
FI	72.8	71.5	71.2	72.4	73.5	73.5	73.8
S [73]	76.5	77.6	79.4	80.7	81.7	82.9	83.3
UK [74]	65.2	65.9	67.4	67.0	67.1	68.3	69.1

9.1.13 Ratio of total unemployed and total labour force

	2000-2004	*2005-2009*	*2010-2014*	*2020-2024*	*2030-2034*	*2040-2044*	*2050*
B	9.3	8.4	8.7	6.7	6.6	6.6	6.6
DK	6.2	5.9	6.6	5.5	5.3	5.3	5.5
D	6.9	6.4	6.1	5.6	5.6	5.6	5.6
EL	NA	NA	NA	NA	NA	NA	NA
E	11.3	7.5	6.6	5.3	4.4	4.0	4.0
F [75]	9.8	9.1	8.8	8.1	7.4	6.7	6.1
IRL	5.0	5.0	5.0	5.0	5.0	5.0	5.0
I	10.4	9.8	9.6	9.1	8.3	7.5	7.0
L	NA	NA	NA	NA	NA	NA	NA
NL	3.2	3.8	4.5	4.5	4.5	4.5	4.5
Ös	5.6	5.1	4.6	4.0	4.0	4.0	4.0
P	5.6	5.6	5.6	5.6	5.6	5.6	5.6
FI	7.7	7.2	7.0	7.0	7.0	7.0	7.0
S	5.2	5.2	5.1	5.1	5.1	5.1	5.1
UK	6	5.8	5.6	5.6	5.6	5.6	5.6

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[71] ratio of female labour force and female population between 16 and 64
[72] Beginning of the reference year.
[73] ratio of female labour force and female population between 16 and 64
[74] ratio of female labour force and female population between 16 and 64
[75] Beginning of the reference year.

9.1.14 Growth of real GDP per person employed

	2000-2004	*2005-2009*	*2010-2014*	*2020-2024*	*2030-2034*	*2040-2044*	*2050*
B	1.6	2.2	2.0	1.8	1.8	1.8	1.8
DK	1.7	1.5	1.3	1.5	1.4	1.3	1.5
D	1.8	1.8	1.8	1.8	1.8	1.8	1.8
EL	NA	NA	NA	NA	NA	NA	NA
E	0.8	2.0	2.5	2.4	1.8	1.8	1.8
F	1.6	1.6	1.7	1.8	1.8	1.8	1.8
IRL	-	-	-	-	-	-	-
I	2.0	1.9	1.8	1.8	1.8	1.8	1.8
L	NA	NA	NA	NA	NA	NA	NA
NL	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Ös	2.0	1.9	1.9	1.8	1.8	1.8	1.8
P	2.9	2.9	3.0	3.0	3.1	3.1	2.6
FI	2.1	2.6	2.4	1.8	1.8	1.8	1.8
S	1.8	1.8	1.8	1.8	1.8	1.8	1.8
UK	2.6	-	2.2	1.6	1.3	1.7	-

9.1.15 Real growth of GDP

	2000-2004	*2005-2009*	*2010-2014*	*2020-2024*	*2030-2034*	*2040-2044*	*2050*
B	2.5	2.2	2.0	1.3	1.4	1.6	1.4
DK	1.4	1.3	1.5	1.3	1.3	1.5	1.2
D	2.3	2.1	1.6	0.9	1.1	1.3	1.2
EL	NA	NA	NA	NA	NA	NA	NA
E	3.5	2.9	2.8	2.1	0.9	0.7	1.2
F	2.1	1.9	1.6	1.6	1.7	1.7	-
IRL	5.3	3.9	3	2.3	2.1	1.8	1.8
I	2.6	2.3	1.8	1.3	1.0	1.0	1.2
L	NA	NA	NA	NA	NA	NA	NA
NL	2.8	1.9	1.9	1.5	1.4	1.8	1.8
Ös	2.6	2.1	1.8	1.2	1.6	1.8	1.5
P	3.1	3.1	3.1	3.1	2.9	2.9	3.3
FI	3.1	2.4	1.9	1.2	1.4	1.4	1.3
S	2.6	2.4	1.7	1.5	1.6	1.8	1.7
UK	2.6	-	2.2	1.6	1.3	1.7	-

9.1.16 GDP deflator

	2000-2004	2005-2009	2010-2014	2020-2024	2030-2034	2040-2044	2050
B	1.5	1.7	1.7	1.7	1.7	1.7	1.7
DK	1.6	1.7	1.5	1.6	1.6	1.4	1.6
D	-	-	-	-	-	-	-
EL	NA	NA	NA	NA	NA	NA	NA
E	2.1	1.8	1.7	1.7	1.7	1.7	1.7
F	-	-	-	-	-	-	-
IRL	2.4	2.0	2.0	2.0	2.0	2.0	2.0
I	1.5	1.5	1.5	1.5	1.5	1.5	1.5
L	NA	NA	NA	NA	NA	NA	NA
NL	2.5	2.0	2.0	2.0	2.0	2.0	2.0
Ös	2.0	2.0	2.0	2.0	2.0	2.0	2.0
P	2.0	2.0	2.0	2.0	2.0	2.0	2.0
FI	2.0	2.0	2.0	2.0	2.0	2.0	2.0
S	2.0	2.0	2.0	2.0	2.0	2.0	2.0
UK	2.5	-	2.5	2.5	2.5	2.5	-

9.1.17 CPI inflation

	2000-2004	2005-2009	2010-2014	2020-2024	2030-2034	2040-2044	2050
B	1.5	1.7	1.7	1.7	1.7	1.7	1.7
DK	1.5	1.6	1.5	1.5	1.5	1.5	1.5
D	-	-	-	-	-	-	-
EL	NA	NA	NA	NA	NA	NA	NA
E	2.1	1.7	1.7	1.7	1.7	1.7	1.7
F	-	-	-	-	-	-	-
IRL	2.3	2.0	2.0	2.0	2.0	2.0	2.0
I	1.6	1.5	1.5	1.5	1.5	1.5	1.5
L	NA	NA	NA	NA	NA	NA	NA
NL	2.4	2.0	2.0	2.0	2.0	2.0	2.0
Ös	2.0	2.0	2.0	2.0	2.0	2.0	2.0
P	2.0	2.0	2.0	2.0	2.0	2.0	2.0
FI	2.0	2.0	2.0	2.0	2.0	2.0	2.0
S	2.0	2.0	2.0	2.0	2.0	2.0	2.0
UK	2.5	-	2.5	2.5	2.5	2.5	-

Annex 3: Members of the working group on ageing

Chairman : Prof. Vittorio GRILLI, Ministero del Tesoro (IT)

Mr. Henri BOGAERT, Bureau du Plan (B)
Mr. Michel ENGLERT, Bureau du Plan (B)
Mr. Ulrik NODGAARD, Ministry of Economic Affairs (DK)
Mr. Carsten BROGAARD, Ministry of Finance (DK)
Ms Britta VELLEUER, Ministry of Finance (D)
Mr. Joachim STEINRUCK, Ministry of Labour and Social Affairs (D)
Mr. Platon TINIOS, Prime Minister's Office (EL)
Ms Daphne NICOLITSAS, Ministry of National Economy (EL)
Mr. Juan BURDIEL, Ministerio de Economia Y Hacienda (E)
Mr. Juan VARELA, Ministerio de Economia Y Hacienda (E)
Mr. Vicente ANTÓN, Ministerio de Economia Y Hacienda (E)
Mr. Bernard SALZMANN, Ministère de l'Economie, des Finances et de l'Industrie (F)
Ms Claire LOUPIAS, Ministère de l'Economie, des Finances et de l'Industrie (F)
Mr. Robert WATT, Department of Finance (IRL)
Mr. Serge ALLEGREZZA, Ministère de l'Economie (LUX)
Ms Alexandra GUARDA-RAUCHS, Ministère de l'Economie (LUX)
Mr. Raymond WAGENER, Inspection Générale de la Securité Sociale (LUX)
Mr. Daniele FRANCO, Banca d'Italia (IT)
Mr. Francesco MASSICCI, Ragioneria Generale dello Stato (IT)
Mr. Rocco APRILE, Ragioneria Generale dello Stato (IT)
Mr. H.J.M. TER RELE, CPB - Bureau for Economic Policy Analysis (NL)
Mr. Maarten R.P.M. CAMPS, Ministry of Finance (NL)
Mr. Peter PART, Ministry of Finance (Ö)
Mr. Pedro RODRIGUES, Ministry of Finance (P)
Mr. Jorma TUUKKANEN, Ministry of Finance (FI)
Mr. Tomas NORDSTRÖM, Ministry of Finance (S)
Ms Anna RUDEN, Ministry of Finance (S)
Mr. Andrew KILPATRICK, HM Treasury (UK)
Mr. Stephen MINERS, HM Treasury (UK)

Mr. André DRAMAIS, European Commission (DG-Economic and Financial Affairs)
Mr. Marco BUTI, European Commission (DG-Economic and Financial Affairs)
Mr. Declan COSTELLO, European Commission (DG-Economic and Financial Affairs)
Mr. Kieran MC MORROW, European Commission (DG-Economic and Financial Affairs)
Mr. Jean-Luc ANNAERT, European Commission (DG-Economic and Financial Affairs)
Mr. Harri CRUIJSEN, Statistics Netherlands (on behalf of EUROSTAT)
Mr. Massimo ROSTAGNO, European Central Bank (ECB)

Mr. Howard OXLEY, OECD
Mr. Nicholas VANSTON, OECD
Ms Thai-Thanh DANG, OECD

Mr. Flavio PADRINI, Ministero del Tesoro (IT)
Prof. Silvia FEDELI, Ministero del Tesoro (IT)
Mr. Alan HOUMANN, EPC Secretariat