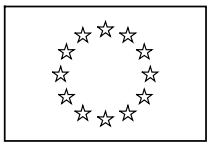


ECONOMIC POLICY COMMITTEE

Brussels, 24 October 2001
EPC/ECFIN/655/01-EN final

Budgetary challenges posed by ageing populations:

the impact on public spending on pensions, health and long-term care for the elderly and possible indicators of the long-term sustainability of public finances.

This report, along with the country fiche prepared by national authorities, is available on the web-sites of the Economic Policy Committee and the Directorate General for Economic and Financial Affairs of the European Commission.

http://europa.eu.int/comm/economy_finance/epc_en.htm
http://europa.eu.int/comm/economy_finance/publications/european_economy/reportsandstudies0401_en.htm

Preface

Demographic changes in coming decades will alter the size and age-profile of populations in all EU countries, and pose significant economic, budgetary and social challenges. Although many such challenges will arise in fields such as pensions and health where primary responsibility rests with national authorities in accordance with the subsidiarity principle, there are considerable gains from analysing these issues together at European level.

This report brings together the work undertaken in past two years by a group on ageing populations attached to the Economic Policy Committee. It responds to various mandates of the ECOFIN Council, and contains:

- revised projections, up to 2050 for spending on public pensions: this follows an interim report examined by the Council on 6 November 2000, which was prepared under the Chairmanship of Professor Vittorio Grilli;

- projections for the impact of ageing population on public spending on health care and long-term care for the elderly;

- some indicators, which on the basis of the projections for age-related expenditures, could help in assessing the overall impact of ageing populations on the long-term sustainability of public finances.

The main goal of this exercise has been to improve the quality and comparability of data and information in public policy domains related to ageing populations. Comparable indicators will help member countries to pursue reform strategies in line with the commitment to ensure sound public finances at all times. We hope that this report contributes to the public debate on ageing populations, and would welcome any comments and reactions.

Finally, we would like to thank all the officials in national authorities, the Commission, the EPC secretariat and the OECD secretariat who contributed to the report. In particular, we would like to thank the main authors, Declan Costello (pensions) and Mandeep Bains (health care), from the Directorate-General for Economic and Financial Affairs of the European Commission.

Henri Bogaert

Chairman of the Working
Group on Ageing Populations

Jean-Philippe Cotis

Chairman of the
Economic Policy Committee

TABLE OF CONTENTS

List of tables

List of Graphs

1. BACKGROUND AND OUTLINE OF THE REPORT

The Economic Policy Committee working group on ageing populations

In coming decades, the size and age-profile of the EU's population will change substantially as the post-war baby-boom generation reaches retirement age, fertility rates remain low and life expectancy continues to increase. Successive European Councils have recognised the need to address the profound public policy implications of ageing populations at European level.

The Economic Policy Committee (EPC) established a specific working group to examine the economic and budgetary implications of ageing populations (hereafter referred to as the Ageing Working Group – AWG) in late 1999.[1] This group is made up of experts from national administrations, the European Commission, the European Central Bank and the OECD.[2] As a first step, the AWG decided to examine the impact of demographic changes on age-related public expenditures with a view to assessing the long-term sustainability of public finances. Fiscal sustainability issues have acquired added significance in EMU given the commitment to ensure sound public finances at all times and the need to avoid negative spillover effects that could complicate the implementation of a single monetary policy.

Scope and outline of the report

This report brings together the work carried out by the AWG in the past two years, and is divided into four sections, as follows:

- *demographic projections*: section 2 summarises the demographic projections up to 2050 which have been used by the Member States in making the projection of the impact of ageing on pensions, health and long-term care expenditure. They were prepared by Eurostat specifically for this report.

- *public expenditure on pensions*: section 3 presents projections for the impact of ageing populations on public pension expenditures. It builds upon an interim report presented to the Ecofin Council in November 2000, in a number of respects.[3] Projections are now available for all Member States, and in some cases they have been updated to incorporate the impact of recent reforms. In addition, the results have been decomposed with a view to identifying the driving forces behind the changes in projected expenditure. Finally, each Member State has prepared a

---

1 For a review of the economic and budgetary implications of ageing populations, see European Commission (2001a), chapter IV.2.

2 A list of members of the AWG is contained in Annex 1. The projections for public expenditure on pensions were conducted in parallel with an exercise of the OECD. Identical demographic and macroeconomic assumptions were used in both exercises, although there are some differences as regards the time frame and coverage of the projections. The results are presented in OECD (2001) and Dang, Antolin and Oxley (2001). It should be noted that the health care projections in the OECD papers are national projections, and are not equivalent to the projections presented in section 4 of this report, which use a common approach agreed by the AWG. The group would like to thank Thai-Than Dang, Stefan Jacobzone and Howard Oxley of the OECD Secretariat for their very valuable contribution to this report.

3 Economic Policy Committee (2000). The projections contained in the interim report were also used in the report of the Social Protection Committee (2001) to the Göteborg European Council.

paper (country fiche) in which they describe their pension system, the projection model(s) used and the main factors driving the results.

- *public expenditure on health and long-term care*: section 4 presents a set of projections which measure the direct impact of ageing populations on public expenditures on health and long-term care for fourteen Member States.

- *the sustainability of public finances*: section 5 considers how the projections for age-related public expenditures could be used to examine the overall sustainability of public finances. A number of indicators are developed along with an exposition of factors which should be taken into account when interpreting results.

How the report can feed into the policy debate at EU level

A comprehensive strategy to examine the budgetary, economic and social implications of ageing populations is being put in place at European level. The analysis and results contained in this report can usefully feed into a variety of policy processes and initiatives. In particular, it could form the basis for the EPC and ECOFIN Council's response to the:

- mandate given to the Economic Policy Committee by the Ecofin in its report on the contribution of public finances to growth and employment to the Stockholm European Council of 23/24 March 2001 for a comprehensive report assessing the overall impact of ageing populations on public finances, including the effects on tax systems, to be submitted in 2002.

- mandate of the Stockholm European Council of 23/24 March 2001 to the Economic Policy Committee and the Social Protection Committee to prepare a report for the European Council "*on the quality and sustainability of pensions in the light of demographic challenge."*

- request of the European Council of Göteborg of 15/16 June 2001 which called for "… *an initial report for the Spring 2002 European Council on orientations in the field of health care and care for the elderly."* This is to be made on the basis of a joint report from the Social Protection Committee and the Economic Policy Committee.

Moreover, the projections presented in this report could be used as input in:

- the assessment of the sustainability of public finances. The Stockholm European Council decided that "*The Council should regularly review the long-term sustainability of public finances, including the expected strains caused by the demographic changes ahead. This should be done both under the guidelines and in the context of stability and convergence programmes*.' An updated Code of Content on the content and presentation of stability and convergence programmes was endorsed in July 2001, which *inter alia* requires Member States to include a table on estimates for the impact of ageing on public finances. The projections for age-related expenditures presented in this report could be used in this context.

- the open method of co-ordination in the area of pensions. The Stockholm European Council concluded that "*Where appropriate, the potential of the open method of co-ordination should be used to the full, particularly in the field of pensions, taking due account of the principle of subsidiarity*". The open-method of co-ordination involves developing objectives, translating these objectives into national policy strategies and monitoring progress on the basis of commonly

agreed and defined indicators.[4] The projections for public spending on pensions could be used in this context.

Working method and the need for caution when interpreting results

Member States made projections for public spending using their own models, although some national authorities out-sourced the work to other national institutions, e.g. economic research institutes. For pensions, in particular, this working method has the advantage of accurately capturing the complex institutional arrangements of national pension systems. The expenditure projections were, however, made on the basis of the latest Eurostat demographic forecasts and agreed assumptions on key economic parameters such as labour market developments, productivity growth and real interest rates. The aim is to improve the consistency and comparability of projections and to facilitate the debate on the economic and budgetary challenges of ageing populations at EU level. The 'baseline' or 'current policy' scenarios do not necessarily represent what Member States consider to be the most likely scenario, but rather the consensus reached in the group as to what would constitute a prudent and reasonable starting point.

While a fair degree of consistency across Member States has been achieved, the projections need to be interpreted with caution. The modelling approach used differed across Member States, and full uniformity was not achieved as regards the assumptions employed or in terms of the coverage of the projections. Moreover, all long-term projections are uncertain, as small changes in either starting conditions or the evolution of key parameters can have a large impact on the projections, in particular the further out the projections go. In other words, the simulations are not forecasts, but rather projections of possible outcomes.

[4] European Commission (2001b).

2. DEMOGRAPHIC PROJECTIONS

2.1. Underlying assumptions

The demographic projections on which the age-related expenditure projections are based were prepared by Eurostat in 2000. Changes in the size and age-profile of a population depend upon assumptions regarding fertility rates, life expectancy and migration. In the baseline scenario of Eurostat, the following assumptions were made (see table 2.1):

- *fertility rates*: the average EU fertility rate in 2000 stood at 1.5, but range from 1.2 in Spain and Italy to 1.8 and 1.9 in Denmark and Ireland respectively. Fertility rates are projected to converge upwards to an average of 1.7 for the EU by 2050, with most of the increase occurring in the coming two decades. However, even these fertility rates are too low to ensure a natural replacement of the population or to stabilise its age structure.

Table 2.1 Fertility rates, life expectancy and migration flows

Fertility Rate

	2000	2025	2050	change
B	1,5	1,8	1,8	0,3
DK	1,8	1,8	1,8	0,0
D	1,4	1,5	1,5	0,1
EL	1,3	1,6	1,6	0,3
E	1,2	1,5	1,5	0,3
F	1,7	1,8	1,8	0,1
IRL	1,9	1,8	1,8	-0,1
I	1,2	1,5	1,5	0,3
L	1,7	1,8	1,8	0,1
NL	1,7	1,8	1,8	0,1
A	1,3	1,5	1,5	0,2
P	1,5	1,7	1,7	0,2
FIN	1,7	1,7	1,7	0,0
S	1,5	1,7	1,8	0,3
UK	1,7	1,8	1,8	0,1
EU	1,5	1,6	1,7	0,2

Male Life Expectancy

	2000	2025	2050	change
B	75,3	79,7	80,5	5,2
DK	75,2	78,6	79,4	4,2
D	74,7	78,7	80,0	5,3
EL	75,9	80,0	81,0	5,1
E	74,9	77,5	79,0	4,1
F	74,8	78,8	80,0	5,2
IRL	74,0	77,7	79,0	5,0
I	75,5	79,6	81,0	5,5
L	74,4	79,3	80,0	5,6
NL	75,5	78,7	80,0	4,5
A	75,0	77,9	81,0	6,0
P	72,0	76,1	78,0	6,0
FIN	73,9	78,2	80,0	6,1
S	77,3	79,5	82,0	4,7
UK	75,2	78,9	80,0	4,8
EU	75,0	78,7	80,0	5,0

Female Life Expentancy

	2000	2025	2050	change
B	81,4	84,9	85,5	4,0
DK	79,6	82,1	83,1	3,5
D	80,8	83,9	85,0	4,2
EL	81,0	83,9	85,0	4,0
E	82,1	84,5	85,0	2,9
F	82,8	85,9	87,0	4,2
IRL	79,4	82,8	84,0	4,6
I	82,0	85,0	86,0	4,1
L	80,8	84,1	85,0	4,2
NL	80,9	83,6	85,0	4,1
A	81,2	83,5	86,0	4,8
P	79,2	82,6	84,0	4,8
FIN	81,1	84,0	85,0	3,9
S	82,0	83,9	86,0	4,0
UK	80,0	83,6	85,0	5,0
EU	81,3	84,3	85,5	4,2

Migration

	2000		2050	
	Volume(1)	% of Pop	Volume(1)	% of Pop
B	10	0,10	15	0,15
DK	11	0,20	10	0,18
D	300	0,36	200	0,26
EL	22	0,21	25	0,24
E	31	0,08	60	0,17
F	50	0,08	50	0,08
IRL	18	0,46	5	0,11
I	50	0,09	80	0,16
L	3	0,71	2	0,36
NL	33	0,21	35	0,20
A	10	0,12	20	0,26
P	12	0,12	25	0,23
FIN	6	0,11	5	0,10
S	15	0,17	20	0,23
UK	90	0,15	70	0,11
EU	661	0,17	622	0,17

* Thousands of persons

Source: Eurostat – central demographic scenario

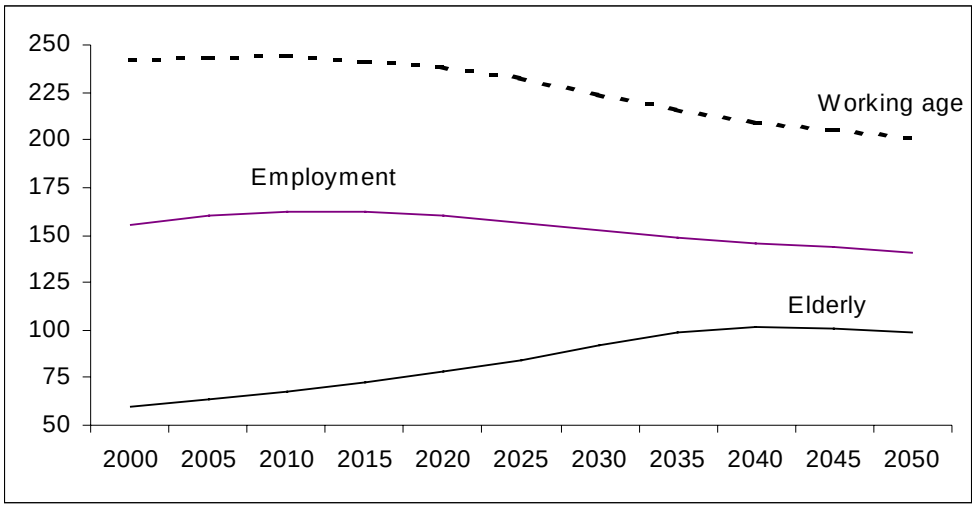
- *migration flows* are difficult to project, since in part they are driven by economic developments both inside and outside the EU and, unlike fertility rates and life expectancy, can be more directly influenced by policy choices. The baseline scenario of Eurostat assumes net inward migration to EU Member States of +/- 640.000 persons annually over the projection period, constituting approximately 0.2% of the total population. All Member States are projected to have net inward migration throughout the projection period, including countries such as Spain, Ireland and Portugal which have experienced substantial emigration in the recent past. However, there are substantial differences as regards the projected flows as a percentage of the total population, with annual immigration of more than 0.2% of the total population recorded for Germany, Greece, Luxembourg, Austria, Portugal and Sweden.

- *life expectancy* is projected to steadily increase over the projection period. Having risen from 67 in 1960 to 75 in 2000, average life expectancy at birth for men is projected to rise by five years to of 80 by 2050. For women, it is also projected to rise from 81 in 2000 to 85 by 2050.

2.2. Main trends[5]

As a result of these demographic developments, the total size of the EU population will continue to grow slowly from 376 million in 2000 to 386 million in 2020, see table 2.2. Thereafter, it starts to fall reaching 364 million in 2050, a drop of some 12 million compared with 2000. This aggregate picture for the EU masks large differences in the timing and scale of the changes amongst Member States. Whereas large falls are projected in the size of the total population in Italy, Spain and Germany over the projection period (17%, 11% and 8% respectively), the total population is projected to grow in a number of countries, including France and the UK (by 5% and 4%) with the largest increases projected for Luxembourg and Ireland (29% and 26%). Moreover, as regards the timing of changes, the total population size is projected to keep growing in France and the UK until 2040, whilst it is already starting to fall in Italy and declines are projected to commence in 2010 in Spain and 2015 in Germany.

Graph 2.1 Projected size the EU working-age and elderly population (millions)



Note: Working age population refers to persons aged 15 to 64.
Elderly population refers to persons aged 65 and above
Source: Eurostat and projections of the EPC working group on ageing populations.

[5] The demographic projections are presented in more detail in annex 2.

The EU working age population (persons aged between 15 and 64) will stay broadly stable at some 246 million until 2015, after which it will decline to 203 million by 2050, a drop of some 18%. In percentage terms, the largest declines are projected for Spain (-29%) and Italy (-33%), with only Ireland projected to see an increase (+5%). As well as declining in size, the labour force will be greying, with workers aged between 55 and 64 accounting for an increased share of the total workforce.

At the same time, the numbers of elderly persons aged 65 and above will rise from 61 million in 2000 to 103 million by 2050, an increase of some 70**%**. All Member States register increases of over 50% with the largest increase taking place in countries having a low starting position (the number of elderly will more than double in Ireland, Luxembourg and the Netherlands).

Table 2.2 Total population and evolution of demographic dependency ratios

	Total Population				Share of older workers in working age population			
			Change				Change	
	2000	2050	Absolute	%	2000	2050	Absolute	%
B	10,2	10,1	-0,1	-1	16	22	6	38
DK	5,4	5,5	0,1	3	19	21	2	10
D	82,3	75,6	-6,8	-8	19	22	3	18
GR	10,5	10,2	-0,3	-3	17	21	4	26
E	39,4	35,1	-4,3	-11	15	22	7	48
F	59,2	62,2	3,0	5	14	21	7	46
IRE	3,8	4,8	1,0	26	13	20	7	50
I	57,6	48,1	-9,5	-17	17	23	5	29
L	0,4	0,6	0,1	29	15	20	4	29
NL	15,9	17,7	1,8	11	15	20	5	36
A	8,1	7,6	-0,5	-6	17	23	6	38
P	10,0	10,9	0,9	9	16	19	4	23
FIN	5,2	5,0	-0,2	-4	16	22	6	40
S	8,9	9,2	0,3	4	18	23	5	28
UK	59,5	61,8	2,3	4	16	21	6	38
EU	376,4	364,2	-12,2	-3	16	18	2	10
					Pop. aged 55-64 as % of pop. aged 15-64			

	Very old as a % of elderly				Old Age Dependency Ratio			
			Change				Change	
	2000	2050	Absolute	%	2000	2050	Absolute	%
B	21	37	16	74	26	45	20	76
DK	26	35	8	31	22	36	14	65
D	22	39	18	81	24	49	25	101
GR	20	33	13	62	26	54	28	110
E	22	33	11	51	25	60	36	146
F	22	38	15	67	24	46	30	89
IRE	23	27	4	18	17	40	23	139
I	22	39	17	79	27	61	35	131
L	21	38	16	76	21	38	16	76
NL	23	37	14	60	20	41	21	103
A	23	42	18	77	23	54	31	133
P	19	31	12	63	23	46	24	104
FIN	22	36	13	60	22	44	22	98
S	29	36	6	22	27	42	16	58
UK	25	37	12	46	24	42	18	76
EU	23	37	14	64	24	49	26	100
	Pop. aged 80+ as % of pop. aged 65+				Pop. aged 65+ as % pop. aged 15-64			

Source: Eurostat

As shown on table 2.2, the old-age dependency ratio (defined as persons aged over 65 as a percentage of working age population 15-64) will more than double from 24% in 2000 to 49% in 2050 for the EU. In other words, the EU will move from having 4 to only 2 persons of working age for every elderly person aged 65 and over by 2050. Striking differences across Member States are evident. In terms of starting position, Ireland has the lowest old-age dependency ratio at 17% compared with ratios of 25% in Belgium, Greece, France, Spain, Sweden and Italy. In most Member

States, the old-age dependency ratio will reach a new plateau around 2040, with the highest ratios of some 60% in 2050 forecast for Spain and Italy.

A further key development is that the largest increase in population size is projected to take place amongst the very old (population aged 80 and above), whose numbers will almost triple from 14 million in 2000 to 38 million in 2050. As will be shown in section 4, this development is particularly important in the context of the projections for public spending on health and long-term care for the elderly.

2.3. The reliability of long-term demographic projections

Caution must be exercised when using long-term population projections. Demographic projections become more and more uncertain the further into the future one goes. Nonetheless, the demographic projections provide reliable evidence that substantial changes will take place in coming decades. This is because the old-age dependency ratio largely depends upon past fertility rates and the age profile (both of which are known) and life expectancy of the population currently alive (which tend to change in a stable fashion). Higher levels of inward migration could offset the projected decline of the total and working age populations projected, but would have to reach levels far above those experienced in the past to have a significant impact.[6]

Several arguments augur in favour of repeating projections of age-related public expenditures when revised demographic projections become available:

- a number of Member States have pointed out that the demographic projections of Eurostat differ from projections made by their national statistical institutes (NSI), and that the assumptions employed by Eurostat do not fully match with their own experiences.[7] For example, the Belgian authorities have queried the assumptions on the age profile of immigrants. Prior to any future projection exercise, it would be useful to have an in-depth discussion on the proposed demographic framework and to involve demographers more closely in the work of the AWG.

- a number of sensitivity tests were run in the pension projection exercise using "high" and "low" population scenarios developed by Eurostat. These scenarios are ranked in accordance with the absolute size of the total population and not in terms of the old-age dependency ratio (which is of paramount importance in the pension projection exercise). For example, whilst there are very large differences as regards the absolute size of the population between the three scenarios, the evolution of the old-age dependency ratio is very similar, and in fact is highest at the end of the projection period in the baseline scenario.[8] A future pension projection exercise might consider undertaking alternative sensitivity tests for demographic developments which examine both a more and less favourable evolution of the old-age dependency ratios.

---

6 United Nations (1999).

7 Some academics have queried the accuracy of official national population projections, and in particular have argued that they may underestimate the impact of the demographic changes underway, see Schieber and Hewitt (2000), Lee and Skinner (1999),. Anderson, Tuljapurkar and Li. (2001)

8 Compared with a population for the EU of 364 million in 2050 and an old-age dependency ratio of 51% in the baseline scenario, the "high" and "low" population scenarios provide for a population of 439 and 307 million in 2050 and old age dependency ratios of 46% and 47% respectively.

- several demographic trends, which will have a very important impact on the size and age-structure of the EU's population, should be observable in the medium-run. For example, the baseline scenario assumes a substantial increase in the fertility rate in the coming two decades, and assumes a certain level of inward migration. The accuracy of these assumptions (and consequently the reliability of the projections for age related public expenditures) needs to be checked when updated population data is available. Many Member States undertook a census of the population in 2001.

3. PUBLIC PENSIONS: HOW AGEING POPULATIONS WILL AFFECT SPENDING[9]

3.1. Coverage of Member States' pensions projections

The pension systems of EU are very diverse, but all are characterised by a strong public component. Around half of the public pension systems offer a universal pension scheme, which is usually means-tested. Except in the Netherlands, the regimes are labour-market-based, covering workers in the private and public sector, and some of the self-employed. The financing of the public schemes is usually pay-as-you-go (PAYG),[10] although some schemes are also financed through transfers from the State budget. In four Member States (Denmark, Ireland, Sweden and Finland), the financing of public pension schemes is partly funded.[11] Summary tables of the main characteristics of Member States' pension systems are contained in Annex 2. A more detailed description is set down in the country fiche prepared by the national authorities.

The projection exercise of the AWG was designed to cover all public pensions and income transfers to the elderly, i.e. those schemes classified as general government expenditures in a national accounting framework and thus have a direct impact upon public finances. The pension projection exercise therefore encompasses several schemes including old-age pensions, early-retirement pensions, survivors and children's pensions, disability pensions and other transfers to the elderly. Member States were asked to report projections for both contributory and non-contributory pensions covering minimum pensions, public and private sector employees as well as schemes for the self employed. It is therefore important to note that figures for "pensions" in this report refer to all replacement revenue for older persons and not what is traditionally referred to as old age pensions.

In practice, however, the coverage of projections differs across countries as shown on table 3. In some instances, Member States have been unable to make projections for all public pensions schemes, particularly relatively smaller regimes applying to specific industries or professions. Moreover, not all Member States have been able to include projections for early-retirement pensions or disability transfers to the elderly. A detailed explanation of the coverage of the projections is contained in each country fiche, together with disaggregated projections for various pension schemes. The differences in coverage of projections means that the results are not completely comparable across Member States. Any future projections of public pension expenditures at EU level should be based on more comparable and transparent coverage.

The projections for pension (or replacement revenues) expenditures are expressed as a share of GDP before taxes. Old age pensions are subject to income tax in most member States, although special rules or limits apply in some countries: a description of the taxation regime applying to pensions is provided in annex 2. Tax revenues on pensions may be substantial in some Member States.

---

9 An interim report, containing projections for 12 Member States was published in November 2000, see EPC 2000. This interim report was prepared under the Chairmanship of Vittorio Grilli of the Italian Ministero del Tesoro. The group would like to express their gratitude to Professor Grilli, and his colleagues Flavio Padrini and Silvia Fedeli, for the work in paring the interim report.

10 In pay-as-you-go (PAYG) schemes the current contributions from workers are used to cover the costs of current payments to pensioners.

11 Funding means that contributions are invested in income generating assets. Other countries, notably Denmark, the Netherlands and the UK have large funded pension systems. However, these occupational and private pension schemes do not form part of the government sector.

Table 3.1 Coverage of the EPC pension projections

Country	Included	Cut-off reporting date
B	Legal old age and survivors pensions for wage-earners, civil servants (including disability) and self employed. Also includes minimum pensions, public pensions for "anciens cadres d'Afrique", survivors and child pensions, old age means-tested benefits. Some pensions of public enterprises financed or subsided by government budget. Includes early retirement scheme for private sector employees; disability and unemployment benefits for those aged 55 or more.	2001
DK	Public old-age pensions, labour market supplementary pensions, civil servants pensions, early retirement spending including disability and unemployment pensions.	2001
D	All public pensions, including civil servants pensions.	November 2000 and therefore does not include pension reform of 2001
EL	Public pensions for private and public sector employees as well as for the self employed. Also includes minimum pensions, survivor and child pensions, disability pensions and early retirement pensions.	December 2000
E	Old age pensions and early retirement pensions, disability pensions for public and private sector employees and self employed.. Also includes survivors pensions, war pensions and other non-contributory pensions.	2000
F	Almost all public and private sector pensions. Includes survivors pension and minimum pensions. Does not include early-retirement transfers or most disability pensions.	2000
IRL	Public old-age contributory and non-contributory pensions, retirement pension, invalidity pensions and survivors pension. Also includes public service PAYG schemes.	2000
I	Whole compulsory public pension system and social pensions.	August 2001
L	Public pension system for wage earners of the private sector and self-employed. Public pension system for state and municipal civil servants and wage earners and assimilated sectors (e.g. railway company).	2000
NL	Public pension scheme (AOW), all disability benefits (WAO, WAZ and WAJOJONG schemes) and survivor benefits (ANW). Early retirement pensions are not included as these are private arrangements.	
A	Includes old-age, early retirement, disability survivor and child benefits for public and private sector employees as well as for self employed and farmers.	October 2000
P	Covers private and public sector employees for old-age pensions, survivors pensions and disability pensions.	Does not cover the recent reform
FIN	Covers private and public sector employees for old-age pensions, survivors pensions and disability pensions.	
S	Covers old-age pensions, occupational pensions for civil servants (central and local government), survivor pensions and means-tested housing subsidies for old-age pensioners.	
UK	The projections are the sum of the National Insurance Fund and the Minimum Income Guarantee. The projections include the State earnings related pensions (SERPs) and its successor S2P. They do not include public sector pensions	

3.2. Pension expenditure projections for a "current policy" scenario

3.2.1. Labour market developments

Participation and unemployment rates

Long-run projections for public expenditures on pensions are heavily influenced by assumptions on labour market developments. To ensure a consistent and prudent approach, the AWG used the same assumptions agreed in the OECD projection exercise, as follows:

- *labour force participation rates* up to 2010 should be based on projections by the ILO (1997). Thereafter it was agreed that participation rates for men would remain constant. However, participation rates for women were allowed to converge to within 5 percentage points of the participation rate for men by 2050 in countries that have well developed child-care facilities or to within 10 percentage points otherwise.

- *unemployment rates* are assumed to fall to their structural level, as defined by the OECD, by 2005 and to stay constant thereafter: for the EU, this resulted in unemployment falling to 8%. However, a further reduction of no more than one third of the 2005 structural level was provided for to cater for the lagged effects of labour market reforms already enacted. This margin was used by Belgium, Spain, France and Italy, with a smaller decline introduced by Austria. Spain projected a decline in unemployment rates to 4%, substantially below the rate provided for in the agreement of AWG: however, this is unlikely to substantially alter the projections for public spending on pensions.

Table 3.2 presents an overview of the participation rates used by the Member States when making the projections. In most countries, participation rates of men aged 15 to 54 are assumed to remain stable over the projection period. However, for older male workers (aged 55 to 64), they rise on average by 3.5 percentage points **(**for the EU as a whole, with large increases assumed in Greece, Italy and Austria: the assumed increase in the effective retirement age is attributed to reforms that have restricted access to early retirement programmes and which have altered the parameters of pension systems to provide stronger incentives for older workers to remain in the labour market).

Female participation rates are assumed to rise substantially in all Member States, on average by 10 percentage points for women aged 15-54 and by some 17 percentage points for females aged 55 to 64. The largest changes are assumed in countries where current female participation rates are relatively low, e.g. Belgium, Greece, Spain , Ireland, Italy, Netherlands and Portugal. These assumed increases stem from the higher participation rates amongst younger female age-cohorts compared with earlier generations.

Table 3.2: Labour market participation rates used in the projections[12]

	MALE								
	15-54			55-64			65 +		
	2000	2050	change	2000	2050	change	2000	2050	change
B	78,4	77,8	-0,6	34,0	38,6	4,6	1,4	1,3	-0,1
DK	89,1	86,4	-2,7	65,5	59,1	-6,4	9,4	8,1	-1,3
D	86,6	84,3	-2,3	55,7	62,4	6,7	4,5	2,4	-2,1
EL	81,0	81,5	0,5	54,6	51,6	-2,9	9,6	7,9	-1,7
E 1)	88,1	90,3	2,2	58,3	58,3	0,0	2,8	2,8	0,0
F	80,9	80,8	-0,1	42,4	39,9	-2,5	2,1	1,7	-0,4
IRL 1)	91,3	91,3	0,0	67,9	64,4	-3,5	13,6	11,7	-1,9
I	79,4	80,0	0,6	41,5	57,1	15,6	5,5	3,7	-1,8
L 2)	113,8	148,4	34,7						
NL	82,9	80,8	-2,2	45,6	49,6	3,9	1,0	1,0	1,0
A	81,5	83,5	2,0	37,0	57,5	20,5	2,0	6,0	4,0
P	91,8	91,8	0,0	62,6	61,1	-1,5	16,7	14,3	-2,4
FIN	80,2	79,0	-1,1	45,7	46,5	0,8	4,0	2,5	-1,5
S 3)	83,2	86,1	2,9	72,3	70,1	-2,2	6,8	7,2	0,4
UK 1)	92,2	91,0	-1,2	66,4	62,9	-3,5	6,8	5,8	-1,0
EU	85,1	84,6	-0,4	52,6	56,0	3,3	5,0	3,9	-1,1

	FEMALE								
	15-54			55-64			65 +		
	2000	2050	change	2000	2050	change	2000	2050	change
B	66,6	73,6	7,0	16,9	37,2	20,3	0,5	0,6	0,1
DK	83,9	86,2	2,2	46,3	54,1	7,8	2,7	2,4	-0,3
D	71,8	76,3	4,5	37,0	51,4	14,4	1,7	1,1	-0,6
EL	51,8	72,4	20,6	23,0	41,7	18,7	3,7	3,2	-0,5
E 1)	61,0	80,3	19,3	21,8	48,3	26,5	1,1	1,1	0,0
F	67,7	75,9	8,1	29,5	34,9	5,4	1,2	1,0	-0,2
IRL 1)	63,0	81,3	18,3	19,0	44,4	25,4	2,4	2,0	-0,4
I	53,0	71,8	18,8	16,3	44,9	28,5	1,5	1,4	-0,1
L 2)	74,3	115,0	40,7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
NL	61,8	76,7	14,9	17,7	38,1	20,3	1,0	1,0	1,0
A	66,9	72,0	5,1	13,5	47,5	34,0	1,0	5,0	4,0
P	72,8	86,8	14,0	33,7	54,5	20,8	7,1	6,5	-0,6
FIN	78,8	80,5	1,7	43,7	45,5	1,8	1,4	1,0	-0,4
S 3)	79,0	85,3	6,3	65,4	70,1	4,7	3,5	3,9	0,4
UK 1)	76,1	80,7	4,6	40,0	51,9	11,9	2,7	2,4	-0,3
EU	67,0	77,1	10,2	29,9	46,7	16,8	1,9	1,7	-0,2

Notes: (1) population aged 20-54
(2) population 15 to 64
(3) population aged 16 to 54

Source: EPC working group on ageing populations.

By and large, Member States adhered to the agreed framework as regards labour force participation rates. The largest overall increase for persons of working age (15-64) is 11 percentage points in Italy, followed by Greece, Ireland and Austria each of which project an increase of over 8 percentage points. Given the below average participation rates in 2000 in these countries, the framework agreed by the AWG permitted a relatively more favourable evolution of labour market

[12] The very high participation rate for Luxembourg stems from the assumed increase in the number of cross-border workers

developments: these assumptions should be borne in mind when considering the projections for pension expenditure in these countries.

In the case of Italy, the rise is achieved by a very large (40%) increase for females in all age cohorts and amongst older men. In Greece, overall participation rates of men will fall marginally, but female participation rates will rise by 40% over the projection period. In Austria, an overall rise of 8 percentage points mainly results from large increases in the participation rates of older workers to 57% by 2050 (up 21 percentage points compared with its 2000 level) and 47% for females (up 35 percentage points). This projection appears to be more on the optimistic side, even when factoring in major reforms to the public pension system and the tightening of eligibility conditions for early retirement schemes leading to an increase in the effective retirement age of 1.5 years.

Economic dependency ratios

Higher participation and lower unemployment rates can offset some of the impact of demographic developments on the size of the working age population. The key variable is not so much the old-age dependency ratio (elderly as a percentage of the working age population) but rather the balance between economically active and inactive persons who must be supported. Two such economic dependency ratios are presented on table 3.3 below, based on the participation and employment rates used by Member States in making the pension projections.

Table 3.3: Economic dependency ratios

	Potential Economic Dependency Ratio				Effective economic Dependency Ratio			
	2000	2025	2050	change	2000	2025	2050	change
B	92	106	113	21	114	121	128	15
DK	49	67	66	17	58	77	76	18
D	68	82	94	26	82	93	105	23
GR	94	102	106	12	118	116	118	0
E	92	89	114	23	123	102	128	5
F	59	68	78	19	76	82	89	13
IRE	65	73	77	12	74	83	87	13
I	109	111	125	16	134	131	142	8
L	87	75	32	-55	34	0	-29	-63
NL	77	87	94	16	83	95	102	19
A	82	97	103	20	94	105	111	17
P	64	70	79	15	70	78	86	16
FIN	61	85	89	28	79	99	104	25
S	64	71	76	13	74	80	86	12
UK	60	75	84	24	69	85	95	26
EU	74	84	94	20	90	96	106	15

Note: Potential Economic dependency ratio = Population aged 15+ not in the labour force as a % of the number of persons in the labour force.
Effective Economic Dependency Ratio = Number of persons aged 15+ who are not employed as % of number of persons employed

Source: Commission calculations on the basis of the projections of the EPC working group on ageing populations

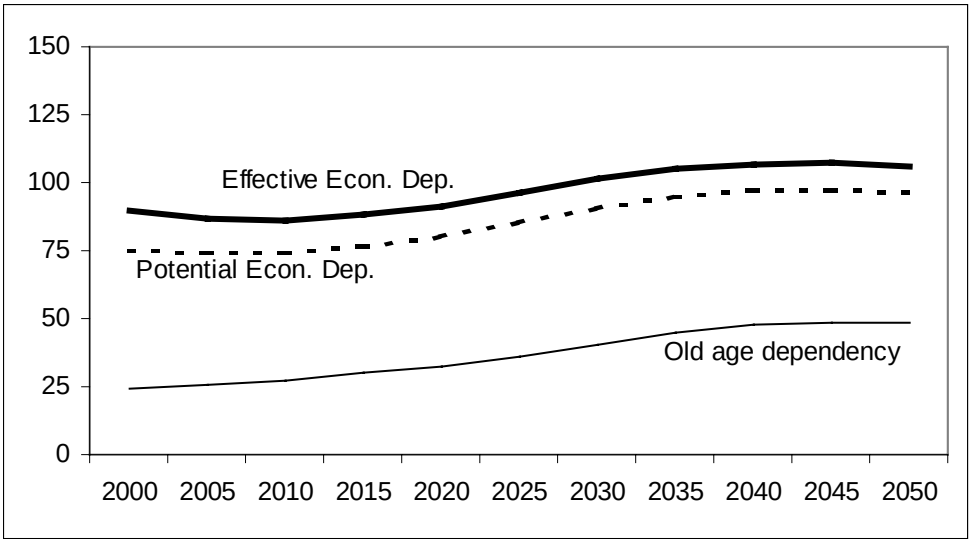
The "Potential Economic Dependency Ratio"[13] expresses the number of potentially inactive persons as a percentage of the total labour force. The "Effective Economic Dependency ratio"[14] expresses

[13] The "potentially inactive" population is elderly persons aged 65 and above as well as persons of working age (15 to 64) who are not in the labour force. Children (persons aged 0 to14) are not included.

the actual number of inactive persons as a percentage of the number of persons employed. Clearly, these ratios are higher than the old-age dependency ratio, and both rise over the projection period.[15] For the EU as a whole the potential economic dependency ratio increases from 74% in 2000 to 96% in 2050 and the effective economic dependency ratio increases from 90% to 106%.

The striking feature is that the increase in the economic dependency ratios is much lower that the increase in the old-age dependency ratio presented on graph 3.1. Whereas for the EU, the old-age dependency ratio is projected to double in coming decades, the potential economic dependency ratio will only increase by just under one third and the effective economic dependency ratio by one fifth. In some Member States (notably Italy and Ireland, although in the latter the fall in unemployment plays no role), there is little or no projected increase in the effective economic dependency ratios. In effect, the negative impact of demographic developments on the ratio between active and inactive persons is being substantially offset by more persons of working age participating in the labour market and lower levels of unemployment.

Graph 3.1 A comparison of demographic and economic dependency ratios



Source: Commission calculations on the basis of projections of the EPC working group on ageing populations.

Higher employment rates have important implications for the projections of pension expenditure. On the one hand, having more persons employed with longer working lives increases pension entitlements and spending. On the other hand, higher employment rates raises contributions to pensions schemes, increases the worker/pensioner ratio which determines the equilibrium contribution rate of PAYG systems, and reduces unemployment and other social transfers. Moreover, higher employment may lead to increases in other tax revenues, thus assisting the overall

---

[14] The " effective inactive" population is elderly persons aged 65 and above as well as persons of working age (15 to 64) who are not employed. Children (persons aged 0 to14) are not included. The difference between the potential and effective economic dependency ratio is the number of unemployed persons.

[15] Most measures of the potential and effective economic dependency ratios include children (persons age 0 to14) in the definition of the inactive population so as to give a complete picture of the ratio of active to inactive persons. When children are included, then for the EU as a whole the potential economic dependency ratio increases from 112% in 2000 to 131% in 2050 and the effective economic dependency ratio increases from 130% to 145% (i.e. each person employed in 2050 will have to support 1.45 inactive persons). However, children are excluded from the definition of inactive persons in this report to facilitate the comparison with the evolution of the old-age dependency ratio.

public finance situation. Perhaps the most important consideration, however, is that higher employment raises output GDP, and thus the stock of resources that can be shared between the active and retired population.

Overall, these results serve to highlight the critical importance of increasing employment rates as a means to meet the economic and budgetary challenges of ageing populations. The projected improvements in labour market performance are supposed to rely in policies already in place (the "no policy change" scenario). However, the assumed improvements in participation and employment rates may require some Member States to undertake further policy reforms. For example, higher female participation rates may require additional public expenditure (or tax incentives) on child-care facilities and may also result in higher spending on care (as less support is provided by families). Consideration also needs to be given to ensuring consistency between the demographic projections and labour market developments, for example, whether it is reasonable to assume an increase in fertility rates together with a continuous rise in female participation rates.

3.2.2. Macroeconomic assumptions

Tables 3.4 below presents a summary of the assumptions on labour productivity growth used by Member States and the resulting rate of GDP growth. The AWG agreed that labour productivity growth should converge towards an annual rate level of 1.75% by 2030, although some leeway for higher rates are provided for catching-up countries.

Table 3.4: Assumptions on labour market productivity and real GDP growth

	Productivity		Real GDP	
	2000-2005	2000-2050	2000-2005	2000-2050
B	1,7	1,8	2,5	1,7
DK	1,6	1,6	1,4	1,5
D	1,8	1,8	2,3	1,4
EL	2,3	2,0	3,4	2,0
E	1,8	2,1	3,3	1,8
F	1,6	1,7	2,1	1,7
IRL	3,1	2,1	5,0	2,6
I	1,8	1,8	2,5	1,4
L	2,0	2,1	5,2	4,0
NL	1,5	1,7	2,3	1,8
A	2,0	1,8	2,5	1,6
P	2,1	1,9	2,5	1,9
FIN	3,2	1,9	3,6	1,6
S	1,8	1,8	2,5	1,8
UK	2,0	1,8	2,2	1,7
EU	1,8	1,8	2,4	1,6

Note: annual average change
Source: EPC working group on ageing populations.

3.3. The results

Table 3.5 presents the projections for spending before taxes on public pensions as a percentage of GDP: note that pensions refers to all replacement revenues for the older population, e.g. including early retirement, disability and survivors pensions, and other transfers to the elderly (like unemployment benefits to people aged 55. As regards the starting position in 2000, spending on public pensions accounted for an average of 10% of GDP, albeit with considerable variation across

Member States. They range from low levels of 4.6% of GDP in Ireland[16] and 5.5% in the UK[17] to 14.5% in Austria and 13.8% in Italy. These difference, in part, stem from the fact the public pensions in some countries include earning-related schemes with entitlements dependent upon past contributions: this tends to lead to a higher level of public spending on pensions (see annex 2 for more details). In contrast, public pension schemes in other countries operate on a more flat-rate basis, often aiming at providing a minimum level of retirement income: these public pensions are supplemented with private occupational schemes and/or private savings (so-called third pillar arrangements) which fall outside the public sector, and consequently the scope of this projection exercise. Some of the differences may also arise from the variability in the coverage of the projections (see table 3.1).

Table 3.5: Public pension expenditures (including most public replacement revenues) to people aged 55 or over, before taxes

	2000	2010	2020	2030	2040	2050	peak change
B	10,0	9,9	11,4	13,3	13,7	13,3	*3,7*
DK 1)	10,5	12,5	13,8	14,5	14,0	13,3	*4,1*
D	11,8	11,2	12,6	15,5	16,6	16,9	*5,0*
EL	12,6	12,6	15,4	19,6	23,8	24,8	*12,2*
E	9,4	8,9	9,9	12,6	16,0	17,3	*7,9*
F	12,1	13,1	15,0	16,0	15,8		*4,0*
IRL 2)	4,6	5,0	6,7	7,6	8,3	9,0	*4,4*
I	13,8	13,9	14,8	15,7	15,7	14,1	*2,1*
L	7,4	7,5	8,2	9,2	9,5	9,3	*2,2*
NL 3)	7,9	9,1	11,1	13,1	14,1	13,6	*6,2*
A	14,5	14,9	16,0	18,1	18,3	17,0	*4,2*
P	9,8	11,8	13,1	13,6	13,8	13,2	*4,1*
FIN	11,3	11,6	12,9	14,9	16,0	15,9	*4,7*
S	9,0	9,6	10,7	11,4	11,4	10,7	*2,6*
UK	5,5	5,1	4,9	5,2	5,0	4,4	*-1,1*
EU	10,4	10,4	11,5	13,0	13,6	13,3	*3,2*

Notes: Results are % of GDP. For most Member States, these projections include most public replacement income for persons aged 55 and over: however, the coverage is not fully comparable across countries. The peak changes refers to the maximum change between 2000 and 2050 for any year (and not just the 10 year intervals reported on the table).
(1) For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP.
(2) Results for Ireland are expressed as a % of GNP and not GDP.
(3) For the Netherlands the second tier is quite well developed. Such characteristics have a direct positive effect on the public pension scheme by reducing the burden of ageing populations on first tier 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.
Source: EPC working group on ageing populations.

[16] The low level of spending on public pensions in Ireland in 2000 is explained by the fact that it is a flat rate system and by the relatively young population profile.

[17] The low level of public spending on pensions is due to fact that the UK is pursuing a very different approach towards modernising its pension system compared with other Member States. The State pension aims at providing a minimum retirement income and is backed up with other means-tested transfers. Citizens are expected, with the help of government incentives, to ensure that the bulk of their retirement income comes from other sources, in particular private occupational pensions.

The projections show a rise of public pension expenditure between 3% and 5% of GDP in most Member States over the next few decades. Although the projected rise in spending on public pensions is significant, they are for most countries below the increases projected in earlier studies.[18] The evolution of public pension expenditures can be considered by examining Member States in groups:

- the UK is the only Member State to actually project a decrease in public pension spending as a percentage of GDP. This is largely due to the indexation of pension benefits after retirement to inflation.

- relatively small increases in public spending of between 2% and 3% of GDP are projected in Italy, Luxembourg and Sweden. Luxembourg is a special case, as the evolution of public expenditures on pensions is extremely sensitive to assumptions on the numbers of cross-border workers.[19] Sweden and Italy are interesting cases as both introduced reforms in the 1990s to establish so-called "Notional Defined Contribution" pension schemes.[20] These schemes mimic the operation of funded pension schemes, but remain financed on a PAYG basis.[21] They limit the impact of ageing populations on public pension expenditures in two important manners. First, a close actuarial link is established between contributions and entitlements. Second, the pension annuity is determined by a formula which takes account of life expectancy at retirement age. Consequently, public finances are sheltered from the impact of future increases in life expectancy, i.e. most of the demographic risk is shifted to the individual.

- Belgium, Denmark, Germany, France, Ireland, Austria, Finland and to a lesser extent the Netherlands show average increases in the level of public spending on pensions. However, a number of important differences are worth noting. Account should be taken of the level (as well as the change) of spending on pensions as a share of GDP, with relatively high levels projected in Germany (pre 2001 reforms), France, Austria and Finland. Finally, there are important differences as regards financing of public pensions across these countries, with large funded components existing in Denmark, Ireland and Finland compared with almost full reliance on PAYG financing in the other Member States.

- The countries that face the biggest challenges on pension expenditure are Portugal (where increases of 6.2% of GDP are projected), Spain (8%) and Greece (12.2%), countries where public pension financed entirely on a PAYG basis. The main reason for Greece being an outlier in public expenditure growth is the pensions are indexed to prices plus 1 per cent.[22]

---

[18] Results of earlier projections are contained in Chand and Jaeger (1996), Roseveare, Liebfritz and Wurzel (1996) and OECD (1998).

[19] See the country fiche of Luxembourg.

[20] In a Notional Defined Contribution (NDC) scheme, each worker has an individual lifetime account that is credited with his/her contributions and accrued interest. This part of the pension system has a defined contribution formula, i.e. the amount in a person's account is converted into an annuity at the time of retirement.

[21] In Sweden, a proportion of NDC pensions are financed on a funded basis.

[22] The effect of indexing pensions after retirement to prices alone would limit the maximum increase in spending from 12.2 percentage points of GDP to 8.5 percentage points.

3.4. The factors driving the increase in public spending on pensions

To get a better understanding of the factors driving the increases in pension spending as a share of GDP, it is possible to decompose the results into four explanatory factors, namely:

- *a population ageing effect* which measures the changes over the projection period in the ratio of persons aged 55 over to the population aged 15 to 54. Note that this is different from that presented in table 2.2 as many persons aged between 55 and 64 retire and receive pensions;

- *an employment effect* which measures changes in the share of the population of working age (15 to 64) that are employed;

- *an eligibility effect* which measures the share of the population aged 55 and over that receive a pension;

- *a benefit effect* which captures changes in the average pension relative to output per worker.

Table 3.6 compares the changes in each of these ratios between 2000 and 2050, and table 3.7 presents the change in spending on pensions as a percentage of GDP due to each of these four factors.[23] Common trends are evident across countries as regards the direction of changes, but there are considerable difference in terms of the size of changes.

The dependency ratio rises very substantially in all countries placing a strong upward pressure on public pensions spending. The ageing of populations emerges as the dominant force driving public pensions expenditure upwards.

In most countries, the eligibility ratio also places some upward pressure on public pensions spending. Higher eligibility for pensions is caused by the increase in female participation rates which pushes up the share of the elderly who benefit from occupational pensions. However, this may be partly offset by a decline in the number of women receiving survivors pensions: moreover, an increase in the effective retirement age would also lower the share of persons over 55 receiving pensions, an effect which appears to be particularly strong in Italy and Austria (where the change in the eligibility ratio serves to lower rather than increase public spending on pensions).

---

[23] The following equation is used:

$$\frac{PensExp}{GDP} = \frac{AvPens}{GDP / Emp} \times \frac{Pens}{Pop > 55} \times \frac{Pop > 55}{Pop(15-64)} \times \frac{Pop(15-64)}{Employment}$$ where

PenExp/GDP is the ratio of old-age pension spending to GDP, AvPens is total old-age pension spending divided by the number of recipients, GDP/Emp is GDP per person employed, Pop>55 is the population 55 and over, Pop(20-64) is the population aged between 15 and 64. The change in spending associated with each component is roughly equal to the ratio of old-age pensions to GDP in 2000 multiplied by the growth rate of the component over the period. For further information see Dang *et al*. (2001).

Table 3.6: Four key ratios to decomposing the growth in pension expenditures

	Dependency ratio (1)			Inverse of employment ratio (2)		
	2000	2050	% change	2000	2050	% change
B	41	67	62	170	157	-7
DK	41	57	39	130	129	0
D	43	71	65	146	138	-6
EL	43	76	76	174	142	-18
E	39	82	109	179	142	-21
F	39	67	73	160	151	-6
IRL	30	60	100	149	133	-11
I	44	84	91	185	150	-19
L	37	57	56	110	52	-53
NL	35	61	75	153	143	-6
A	40	77	93	157	138	-12
P	38	66	71	139	127	-8
FIN	38	64	70	146	145	-1
S	45	65	46	137	131	-5
UK	40	65	60	134	135	1
EU	41	71	73	157	142	-10

	Benefit ratio (3)			Eligigibity ratio (4)		
	2000	2050	% change	2000	2050	% change
B	16	14	-16	88	94	7
DK	23	21	-12	84	88	4
D	19	15	-20	99	113	14
EL	25	32	29	68	72	7
E	17	16	-5	79	92	16
F	24	16	-34	82	85	4
IRL	20	19	-4	64	76	18
I	16	12	-27	107	97	-9
L						
NL	17	18	3	86	88	2
A	22	19	-16	104	86	-17
P	17	18	7	107	87	-19
FIN	22	22	-1	93	85	-9
S	24	19	-21	60	65	8
UK	14	7	-49	73	72	-2
EU	19	15	-21	88	90	2

Notes: (1) Population aged 55+ as % of Population aged 15 to64
(2) Population aged 15 to 64 as % of Number of persons employed
(3) Average Pension as % GDP per person employed
(4) Number of pension beneficiaries as % of persons aged 55+

Source: Commission calculations based on the projections of the EPC working group on ageing populations.

This pressure for increased spending on public pensions is partly offset by a fall in the inverse of the employment rate (on average 1% of GDP): this results from higher female participation, decreasing unemployment levels and increases in effective retirement ages. The employment effect is greatest in countries where the largest improvement in labour market performance is assumed, e.g. Greece, Spain, Ireland, Italy and Austria.[24]

[24] The result for Luxembourg is an outlier and is due to the assumption of a large increase in cross-border workers.

An ever greater offsetting effect, some 2.6% of GDP for the EU as a whole, results from a decline in the benefit ratio. It should be noted that the benefit ratio (average pension/GDP per worker) in tables 3.6 and table 3.7 deviates markedly from the commonly used replacement rate concept (average pension/average wage).[25] A fall in the benefit ratio does not imply that the average pension is falling in real prices, but rather that the average pension declines relative to average output per worker (which not the same as average wages).

Falls are recorded in all countries bar Finland (where the system is still maturing) and Greece (due to the indexation of pensions after retirement). The decline in benefit ratios is due to different factors:

- past reforms to pension systems that have curtailed entitlements and tightened up eligibility conditions for early retirement. Existing pensioners and 'new' pensioners whose entitlements are acquired in 'pre-reform' schemes tend to enjoy higher replacement rates. However, as these persons decease and decline in numbers, and more and more persons retire on post-reform pensions, then the average pension benefit will decline over time.[26]

- even in an earning-related scheme, ageing itself in a system where benefits are indexed to prices, because the weight of older pensioners with a lower pension increases;

- in some Member States, the increase in the number of households with two, possibly lower, pensions.

---

[25] The benefit ratio depends to a large extent on the distribution of GDP between wages (incl. employers' social security contributions) and profits (gross operating surplus). The benefit ratio is lower when the profit share in GDP is higher and vice versa. Thus in countries where the profit share is very large, the benefit ratio may be low even if the replacement rate (average pension/average wage) ratio is quite high. Moreover, the data for most countries refers to pensions and not the number of pension beneficiaries. As many persons receive multiple pensions, the benefit ratio will underestimate the level of the average pension. Note, the fact that the data refers to pensions and not number of pensioners leads to the eligibility ratio being overestimated. This is evident on table 3.6 when several Member States have more pensions that persons aged 55 and over.

[26] The Belgian authorities point out that due to increasing female participation rates, more and more men and women benefit from an individual pension instead of a family pension based on one income. If both pensions together exceed the family pension, the average pension per capita, however, is lower because the replacement rate for a family with one income is higher. This effect may be relevant in other Member States.

Table 3.7 Decomposing pension spending as a % of GDP between 2000 and 2050

	Dependency	Employment	Eligibility	Benefit	Total	Residual
B	5,2	-0,9	0,9	-2,0	3,3	0,0
DK	4,1	-0,2	0,5	-1,7	2,7	0,1
D	6,2	-0,7	2,0	-2,7	4,8	0,2
EL	9,9	-3,6	1,4	4,0	11,7	0,5
E	8,2	-2,4	2,0	-0,3	7,5	0,5
F	7,7	-0,9	0,7	-3,6	3,9	-0,1
IRL	4,5	-0,9	1,4	-0,7	4,3	0,1
I	9,5	-3,1	-1,4	-4,9	0,2	0,0
L						
NL	5,4	-0,6	0,5	0,2	5,5	0,2
A	10,5	-2,2	-3,0	-2,9	2,4	0,1
P	6,7	-1,1	-2,4	0,1	3,3	0,1
FIN	6,6	-0,1	-1,3	-0,1	5,0	-0,3
S	3,9	-0,5	0,8	-2,6	1,7	0,0
UK	2,4	0,0	-0,1	-3,4	-1,0	-0,1
EU	6,4	-1,1	0,6	-2,8	3,1	-0,2

Source: Calculations by Commission services based on the projections of the EPC working group on ageing populations.

The largest decrease in the benefit ratio is projected for Italy (-27%) and the UK (-49%) and suggests that the move towards indexation of pension benefits after retirement to prices has an especially strong effect. Information on average replacement ratios needs to be supplemented by a number of factors in order to come to any firm conclusion: this, however goes beyond the scope of the projection exercise. Such information, *inter alia*, encompasses distributional characteristics of public pension payments, the availability, cost and likely behaviour over time of 2nd and 3rd pillar pensions, saving behaviour and the existence of other assets, availability and the financing of long-term care services. Nevertheless, distinct issues arise at the two ends of the income distribution. If the bottom end is concerned, pension information needs to be supplemented by an analysis of social assistance and other measures to combat social exclusion. If the top end is concerned, pension information needs to be seen in the context of individual saving behaviour and the characteristics of non-pension sources of income.

3.5. Sensitivity tests and a 'Lisbon' scenario

Sensitivity tests

Given the inevitable uncertainty of long-run budgetary projections, the AWG examined the sensitivity of the projections to changes in various parameters that drive the results. Table 3.8 presents the results of seven such sensitivity tests. It shows the difference in pension spending as a share of GDP for those countries reporting results compared with the "current policy" scenario. More complete data for each Member State is report in annex 8, and detailed comments are contained in the country fiches.[27] Note that the sensitivity tests are conducted on the basis of current policies: what is occurring is one key parameter is being changed.

The sensitivity tests undertaken were as follows:

[27] Some of the country fiches also report results for additional sensitivity tests, and some alternative tests were conducted for the OECD projection exercise, see Dang. et al (2001)

- *high population*: using the high population projection of Eurostat;
- *low Population*: using the low population projection of Eurostat;
- *participation rate*: participation rates are 5 percentage points lower/higher than in the current policy scenario by 2050. To do so, most Member States modified female participation rates;
- *low unemployment rate*: unemployment rates are assumed to fall to between 3% and 5% by 2050, i.e. the levels experienced in the 1960s;
- *productivity rate*: labour productivity growth is assumed to converge to a level that is 0.5% lower/higher than in the current policy scenario;
- *interest rate*: real interest rates are assumed to be 1 percentage point lower/higher than in the current policy scenario.

It should be noted, however, that it was not possible to attach probabilities to the likelihood of each scenario occurring, and consequently caution should be exercised when drawing comparisons with the results.

Table 3.8: Sensitivity tests for pensions projections: difference vis à vis the current policy scenario

	Lisbon	High population	Low population	Low particpation rate	Low unemployment	Low productivity	High interest rate
B	-2,2	-0,6	0,1	0,3	-0,7	-0,6	0,0
DK	-1,5	-0,5		0,2	-0,2	-0,1	0,1
D	-2,8	-1,6	-0,9	0,4	-0,4	0,0	0,0
EL	-4,2				0,0		
E	-1,2	-1,7	1,3	1,0	-0,3	1,8	0,0
F	-1,1	-0,6	0,0	0,5	-0,4		0,0
IRL	-0,9	-0,5	0,1	0,6	-0,1		
I	0,3	-1,0	0,9	0,5	-0,2	1,2	0,0
L		0,0			0,0		
NL	-0,2	-0,2	-0,2	0,7		0,0	
A	-3,5	-2,8	0,4	2,4	0,0	-1,2	0,0
P	-0,7	0,2	-0,6	0,4	-0,1	0,1	
FIN	-0,3	-1,1	0,8	0,7	-0,3	1,7	
S	-0,8	-1,0	1,7		-0,1	1,0	0,7
UK	-0,6	-0,2	-0,2	0,1	-0,1	0,9	
EU	-1,3	-0,9	0,0	0,5	-0,3	0,6	0,1

(1) For Denmark, the results include the semi-funded labour market pension (ATP).
(2) Results for Ireland are expressed as a % of GNP and not GDP.
Source: EPC working group on ageing populations.

Table 3.8 presents the results of the sensitivity tests in terms of the difference vis-à-vis the current policy scenario: the figure for the EU is a weighted average of those countries which reported results. A positive figure indicates that pension spending is projected to be higher than in the current policy scenario and vice versa.

Overall, the sensitivity of the projections appears to be modest relative to the scale of the 'shocks' introduced. For the most part, the average difference in terms of pensions spending as a share of GDP compared with the "current policy" scenario was +/- 1% of GDP, changes which are not sufficient to alter the main conclusions of the "current policy" scenario.

For the demographic sensitivity tests, the impact is relatively small with the differences vis-à-vis the current policy scenario increasing towards the end of the projection period. The projections for Spain, Germany, Italy, Austria, Finland, Sweden and UK appear to be the most sensitive to demographic changes. However, it is difficult, based on these scenarios, to fully understand the impact of alternative demographic developments on public pension spending. This is because the high and low scenarios result from changes in a combination of underlying demographic assumptions, i.e. the assumptions for fertility rates, life expectancy and migration flows have all been modified compared with the baseline scenario of Eurostat. Moreover, the age profile of the population is very similar in the three scenarios: whereas the overall size of the population varies considerably, much less variation is observed in the old-age dependency ratio.[28]

Regarding the low participation rate test, pension spending as a share of GDP increased in all countries with lower labour force participation rates: however, the differences vis-à-vis the baseline scenario were modest with the highest levels recorded for Austria. This suggests that while higher participation and employment rates help meet the budgetary costs of ageing populations, on its own it cannot prevent pension spending as a share in GDP from rising. A lower unemployment rate reduced projected spending on pensions, but the effect was relatively small.

The impact of a higher/lower productivity rate on pension spending occurs through two mechanisms. A lower rate of productivity growth will reduce the rate of GDP growth (and thus increase pensions spending as a share of GDP). In addition, if pensions after retirement are indexed to wages or if it is an earnings related system, the pension benefits will move in line with GDP, and consequently, the level of pension spending as a share of GDP is almost unaffected. This is the case for Denmark. Finally, the change in the real interest does not appear to have much impact in many countries.

Lisbon scenario

Member States were also asked to run a so-called Lisbon scenario. The aim was to assess the level of public pensions expenditures as a share of GDP on the basis of the growth and employment goals set by Lisbon European Lisbon Council of March 2000 being reached.[29] This was done by introducing the following changes to the "current policy" scenario:

- male and female participation rates gradually converge to 83 per cent by 2045, i.e. the level attained on average by the three best performers in the second half of the 1990s;
- male and female unemployment rates gradually converge to 4 per cent by 2045;
- the projections for working age population are taken from the high scenario provided by EUROSTAT;

---

[28] The OECD ran separate sensitivity tests for changes in fertility rates (+15% relative to baseline), life expectancy (+3years for men and 2 years for women, and higher migration (+50%) calibrated to have a two-thirds probability of occurring on the basis of past projection errors. They found that on average for OECD countries reporting results, increased spending of between 0.4 and 1% of GDP would occur compared with a baseline scenario, which is relatively small given the scale of the demographic changes.

[29] The European Council set a target 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*.

- 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 assumed to be around 1% on average in the first half of this century.

The first two assumptions result in 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 on average, whereas the total employment rate is close to 70 per cent.

Considerable caution must be exercised when considering the results of this scenario. First, it should be borne in mind that this scenario assumes that planned labour market and structural reforms lead to very significant increases in employment rates. Secondly, it is highly questionable whether alternative demographic assumptions (the high population scenario) should have been used in the context of making such a 'policy' simulation. The reforms being introduced as part of the so-called Lisbon process may indeed prove successful in enhancing labour market performance and increasing the rate of productivity growth: however, it is dubious to suggest they will raise fertility rates and increase life expectancy.

Table 3.8 presents the results for all Member States, all of whom report lower levels of spending on public pensions over the projection period compared with the current policy scenario (on average some 1% of GDP). The largest reductions are projected in Belgium, Germany, Italy and Austria. However, as noted above, it is not possible to disentangle the reasons behind the fall relative to the current policy scenario. What is clear, however, is that even with the combined improvement in participation and employment rates (above the assumed improvements in the current policy scenario), a higher rate of productivity growth and more favourable demographic developments, there will continue to be upward pressure on public spending in all countries, and very significant increases in several Member States.

3.6. Lessons to be learned from this projection exercise

This report of the AWG is the first attempt at EU level to systematically examine the budgetary implication of ageing populations on public pensions systems and to improve the comparability of projections. A considerable amount of time, effort and resources have been devoted to the task at both national and European level during the past two years. Despite the limitations of all long-run budgetary projections, the AWG is confident that the results cast light on the timing and scale of budgetary pressures that are likely to emerge on public pension systems, and will provide a useful input to the evolving policy debate.

Recent decisions of the European Council make it likely that projections of this type will need to be remade periodically. In particular, the Stockholm European Council agreed that the issues relating to the long-run sustainability of public finances, including pensions, are to be examined in the context of stability and convergence programmes and the Broad Economic Policy Guidelines. Also, the European Council of Göteborg called for the open-method of co-ordination to be extended to cover pensions. With a view to improving the quality and efficiency of future projection exercises, the following lessons can be drawn from the AWG's work of the past two years:

- the projections show that notwithstanding reforms during the 1990s, ageing populations could lead to increased expenditure on public pensions of between 3 and 5 percentage points of GDP in most Member States in the coming decades up to 2050, with much larger increases projected in some countries. For the EU as a whole, public pension spending is projected to peak in 2040 at 13.6% of GDP, up from 10.4% in 2000. The design of pension systems plays a crucial role in

determining the budgetary impact of ageing populations. Meeting this additional cost of pensions represents a major budgetary challenge for the EU.

- given that pension systems are reformed infrequently, it is not necessary to remake long-run budgetary projections on an annual basis. A common projection exercise at EU level should usefully take place periodically to take account of the latest demographic projections, any reforms to pensions systems and improvements in projection models. Member States who introduce major reforms to their pension systems in the intervening period may wish to submit revised projections on an individual basis.

- making long-run projections is a time consuming and complex task that requires a considerable amount of resources. In some Member States, a great deal of co-ordination is required as projection models are spread across several Ministries or various pension institutions. Several national authorities do not have long-run budgetary forecasting models and consequently had to sub-contract the work to research institutions. This caused some delays in preparing projections and complications sometimes arose when changes were introduced to the exercise, e.g. the decision to make simulations of parametric reforms of pension systems. National authorities need to consider whether additional resources should be devoted to making long-run budgetary projections given that they are likely to form part of the regular EU work programme.

- some of the difficulties in making the projections could have been avoided via a clearer specification of the inputs and assumptions to be used at the start of the projection exercise. As mentioned earlier, it would be useful to have an in-depth exchange of views on the population projections with demographers. In addition, a fuller discussion should take place of the labour market assumptions to be used by Member States and, in particular, whether the assumed increase in participation rates of females and older males is consistent with current policies.[30] Finally, more consideration should be given to the type of sensitivity tests to be undertaken, and in particular to design tests.

- the current projection exercise has only considered pension expenditures and not revenues to pension systems, although some Member States did report data. Further work is needed to project revenues to pension systems, taking the specific financing arrangements in different Member States into account, and thus enable an estimate to be made of the projected financial balance of pensions systems.

- further analysis on the feasibility and usefulness of the best means to measure pension liabilities could be carried out. There is a long debate in the academic literature as to how pension liabilities should be measured.[31] Some authors argue that the current approach of recording pension expenditures and revenues on a cash flow basis in national accounts gives an inaccurate picture of government finances. They contend that unlike other public transfers, public pensions

---

[30] Cross-country studies suggest that access to early retirement programmes and the incentives embedded in pensions and tax systems encourage early withdrawal from the labour market, see Gruber and Wise (1997). There is now a very substantial gap (of 6 to 7 years) in most EU countries between the statutory retirement age and the effective retirement age. Since 1960, life expectancy at retirement age has risen by some 4 years, from 79 to 83 years. With the age of retirement decreasing by about 3 years over the same period, the average duration of receipt of a pension has increased by 7 years (i.e. from 13 to 20 years), which has substantially increased the costs of pensions, see Visco (2001).

[31] For a review, see Disney (2001).

schemes (at least labour market-based schemes) operate according to insurance principles: contributions to a pensions schemes result in the acquisition of 'rights' to a future stream of income, and current pension spending represents the discharging of an acquired liability.[32] Pension contributions and expenditures could therefore be recorded on an accrual basis, i.e. measuring the change in accrued pension liabilities resulting from receipt of pension contributions, net of pension payments, during the budgetary period. Further work along these lines could help develop indicators of the financial sustainability of pension systems for use in the open method of co-ordination on pension systems and in the examination of the sustainability of public finances (see section 5).

In brief, a firm commitment is needed to improve projections at EU level, their quality and comparability, in order to live up to mandate of the Stockholm European Council.

[32] However, pension entitlements are not equivalent to a formal contractual obligation, as the parameters of systems can be modified.

4. THE IMPACT OF AGEING POPULATIONS ON PUBLIC EXPENDITURE ON HEALTH AND LONG-TERM CARE

4.1. Introduction

The aim of this chapter is to provisionally present projections of public expenditure on health care and long-term care for the elderly, in view of ageing populations. These projections cover almost all of the fifteen EU Member States[33], and make initial projections of expenditure for the first half of the current century (2000-2050). The expenditure projections were produced using a common methodology, a common demographic projection and commonly agreed macroeconomic assumptions. Moreover, these assumptions were those used for the pensions projections reported in Chapter 3. Projections of health care expenditure[34] and long-term care expenditure were run separately in order to analyse the implications of ageing for the two different expenditure components.

In summary, the projections reveal that the impact of ageing for public finances, from increased public expenditure on health and long-term care, is likely to be significant in the first half of the current century. The results of the projections are to be understood as reflecting the impact of future demographic changes on overall levels of health and long-term care expenditure - one way of interpreting the projections is to treat them as a picture of what expenditure levels would be today if we had the demographic composition of future years. As such, these numbers are subject to both upside and downside risks. Upside risks stem from the fact that key non-demographic drivers of health and long-term care expenditure are not explicitly modelled in the projections. Moreover, assumptions for the developments of expenditures per head are mostly lower than those that would be predicted from long-term historical trends.[35] Downside risks stem from the fact that the relationship between age and health status, and thus age and care needs, is likely to change over time.

It should be noted at the outset however, that the economic implications of increased expenditure on health and long-term care are quite different (and thus more difficult to analyse) than in the case of increased pensions expenditure. This is because increased public expenditure on health and long-term care would also translate into an increase in the size of a relatively large sector of the economy, thus affecting the sectoral structure of the economy and overall economic development. An investigation of the implications for the economy of a larger health and long-term care sector, including possible macroeconomic feedback effects, was beyond the scope of the current exercise – macroeconomic developments were assumed to be exogenous.

This chapter forms only a provisional report of the AWG on its health and long-term care projections. Some Member States are still in the process of completing projections,

---

[33] Projections of public expenditure on health care are available for all Member States except Luxembourg. Projections of public expenditure on long-term care are available for ten Member States (B, DK, F, IRL, I, NL, A, FIN, S and UK).

[34] Throughout this report, a distinction will be applied between health care and long-term care, in line with the distinction broadly applied in the projections. See Annex 4 for expenditure definitions.

[35] The assumptions on the future development of costs per head can be one way of implicitly including the effect of all non-demographic drivers of expenditure.

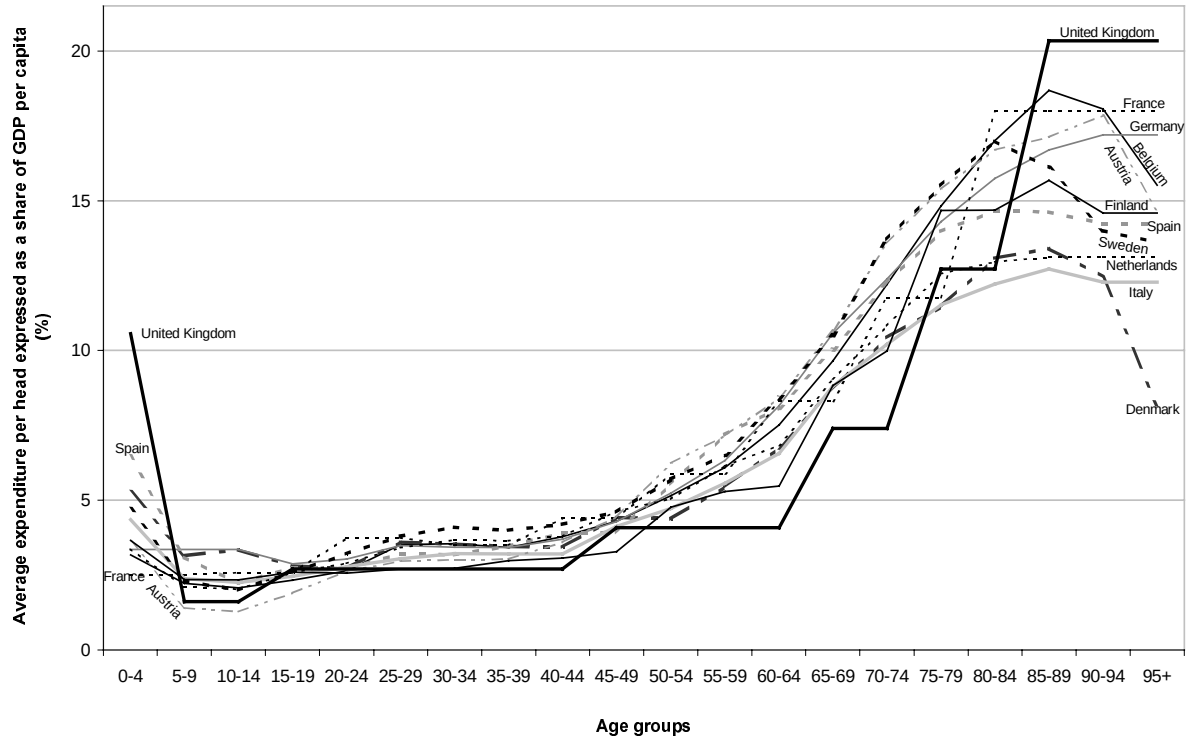
notably in the area of long-term care expenditure. In addition, more time will be required to analyse the projection results and their implications in greater detail – in particular, it would be useful to decompose the results in order to identify the key drivers of changes in expenditure levels over the projection period. It would also be useful to cross-check results in greater detail, and to ensure comparability of coverage of the expenditure projections across Member States.

This chapter is structured as follows. Section 4.2 discusses the relationship between ageing and patterns of expenditure on health and long-term care. Section 4.3 provides a description of the projections exercise, giving a short overview of the methodology applied and its implications. Section 4.4 provides a summary and analysis of the results of the baseline projections of health and long-term care expenditure. Section 4.5 presents the results of optional projections which attempt to extend the methodology used in the baseline projections. The final section provides some provisional conclusions.

4.2. Ageing and health and long-term care expenditure

Patterns of age-related expenditure on health care

Graph 4.1 Age profiles for public expenditure on health care



Notes:

(1) The age-related profiles expressed as a share of GDP per capita, were those used for running the projections of health care expenditure. The base year used for the projections varies slightly across Member States and so the profiles in the graph above refer to different years for different Member States: 1997 for France, 1998 for Belgium, Denmark, Spain and the United Kingdom; 1999 for Italy; and 2000 for Germany, Finland, Netherlands, Austria, and Sweden. (Profiles for Portugal are not presented here as a different age classification is used.)

(2)The expenditure profiles here relate to public expenditure on health care only. Notably, they exclude private expenditures and public expenditure on long-term care. See definition of expenditures for projections in Annex 4.

(3) Where the age-profile is flat at the tail-end of the age-distribution, this is generally because a breakdown across age-groups was not available at the highest ages in those Member States.

At first sight, health expenditure and ageing appear to be highly related. This is because, at a given point in time, older persons tend to consume more health care than other groups – this is especially the case for the highest age groups. This is revealed by looking

at the profile of average health expenditure per head across different age groups. Graph 4.1 presents age-related expenditure profiles for health care for some Member States.

Average expenditures per head on health care for different age groups (expressed as a share of GDP per capita) are quite similar across Member States for prime-age individuals – the largest differences between Member States are at the tail-end of the age-distribution. Nevertheless, in all Member States, after childhood, the age-related expenditure profiles reveal increasing per capita expenditure levels with age. However, in those Member States where expenditure levels for the highest age groups have been estimated separately (notably Belgium, Denmark, Austria and Sweden) expenditure on health care appears to decline somewhat for the highest age groups[36]. In some Member States, health expenditure for the youngest age groups is also high.[37] Data broken down by sex reveals that average levels of expenditure on women tend to be higher than those for men in middle age groups, due to pregnancy. Graph 4.2 gives shows the separate profiles for males and females for two representative Member States, Belgium and Sweden.

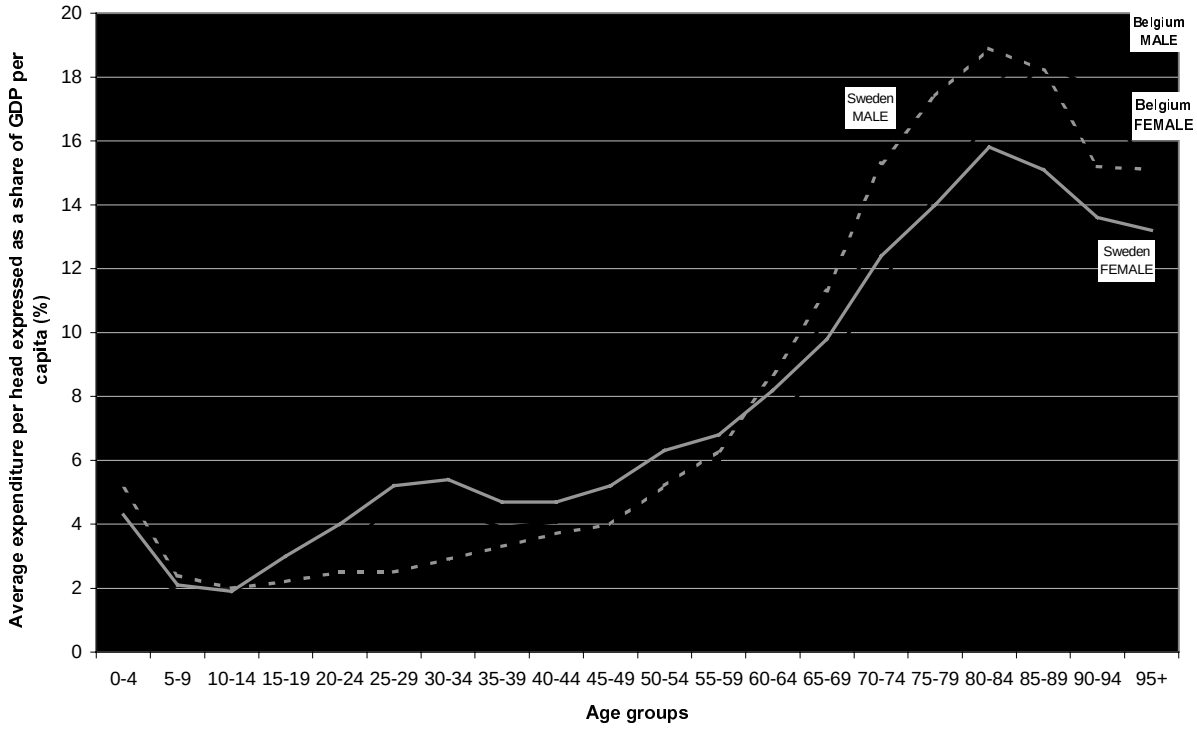
The age-profiles displayed above for each Member State give average expenditure levels across different age groups in a single year only. Analysing age-profiles for individual countries over time can illustrate important dynamics in the patterns of health care spending over time. In some countries, although not all, analyses of profiles over time reveal changes in the pattern of spending across age groups across time. Importantly, some countries have seen greater increases in average expenditure levels for older age groups than for other groups – i.e. the steepness of the age distribution has increased over time in the past.[38]

[36] To some extent this might reflect the fact that long-term care systems bear an increased burden vis-à-vis health care systems for caring for the very old, and thus some health expenses might be included in reported expenditures for long-term care. It should be recalled that in analysing data it is often difficult to distinguish between health and long-term care expenditures. However, some caution should be exercised in assessing these results, as estimates of expenditure for the highest parts of the age distribution are not likely to be very robust.

[37] The coverage of expenditures for the youngest groups are not strictly comparable. In some Member States, costs of birth are explicitly included in the health expenditure attributed to persons in the first year of life, notably in the UK (and Portugal).

[38] See Jacobzone (2001) for a summary of the results for some OECD countries. Data for Germany, France and the United States show steepening profiles at high age groups over time. Jacobzone notes that detailed studies for the US reveal that this is due to the increasingly intensive use of technology at older ages. Other countries however, e.g. Canada and Finland, see relatively homogeneous developments in expenditure levels per head across age groups.

Graph 4.2 Age profiles for public expenditure on health care for males and females



Notes: See notes for Graph 4.1 above.

Patterns of age-related expenditure on long-term care

Long-term care, as distinct from traditional health care intervention, is often required to help persons complete the essential tasks of daily living, which they may be prevented from completing themselves either due to chronic illness, disability or frailty. However, it should be noted that the boundary between health care and long-term care is difficult to draw. Thus, in analysing expenditure data, it is difficult to disentangle health care costs and long-term care costs. However, it is important to do this, as health and long-term care expenditures have different determinants, and thus different trends over time.

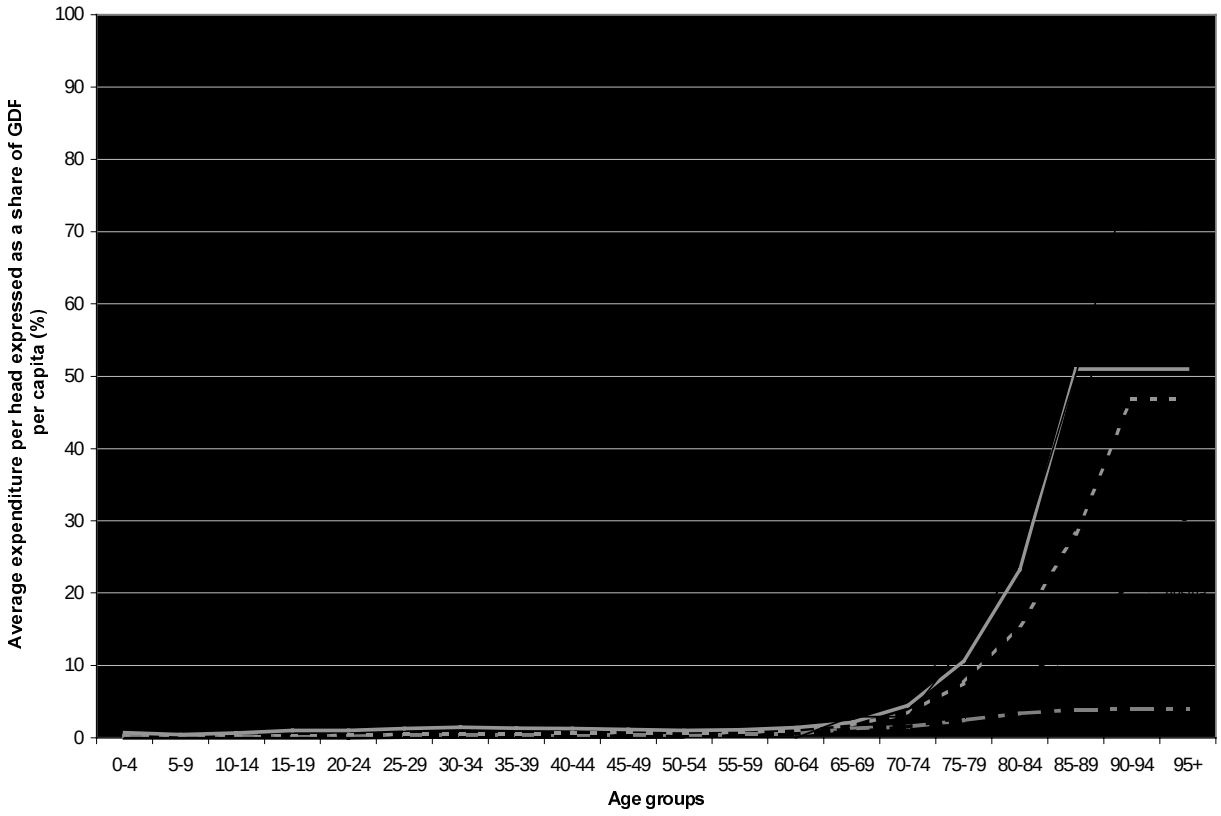
Graph 4.3 shows expenditure profiles for a number of Member States. Age profiles for long-term care expenditure in Member States, show very little or no expenditure for young and prime-age individuals[39], and then rapidly increasing levels of per capita expenditure for elderly persons. It is worth noting that whilst average expenditures per head on health care peak for almost all Member States at somewhere between 15 and 20% of GDP per capita, the average expenditures per head on long-term care peak at much higher levels. In Graph 4.3, the highest peak of average expenditures is for the age-group 95 years and over in Denmark, where expenditures are around 90% of GDP per capita.

One other striking feature of Graph 4.3 is that long-term care expenditure levels per head differ considerably between countries – this reflects radically different traditions in the

[39] There are differences in the coverage of long-term care expenditure across Member States – long-term care systems in some countries by definition only provide care for the elderly. These differences are due, inter alia, to different institutional structures for the provision of long-term care. Profiles are thus not completely comparable across Member States.

provision of care for the elderly. In some Member States, care for the elderly is in large part formal, with a large share of formal care provided in an institutional setting[40], rather than in the homes of the elderly – thus leading to high levels of public spending on long-term care. In other countries the tradition of care is more for informal provision by family members[41]. However, in those countries where there is limited public provision of formal care, some long-term care is likely to be provided through the health system, and thus is included in data on health care expenditure.

Graph 4.3 Age profiles for public expenditure on long-term care



Notes:

(1) The age-related profiles expressed as a share of GDP per capita, were those used for running the projections of long-term care expenditure. The base year used varies across Member States, and hence the profiles in the graph above refer to different years for different Member States: 1998 for Belgium, Denmark; 1999 for Italy; and 2000 for Austria, Finland, Netherlands, and Sweden.

(2)The expenditure profiles here relate to public expenditure on long-term care only. Notably, they exclude private expenditures.

(3) Where the age-profile is flat at the high-end of the age-distribution, this is generally because a breakdown across age-groups was not available at the highest ages in those Member States.

Graph 4.4 shows profiles of expenditure on long-term care broken down by sex, for two Member States – Denmark and Austria. Where data is broken down by sex, as in Graph

[40] Trends in OECD countries in recent years, including in some Member States, have been to reduce the share of formal care provided in an institutional setting, especially for the younger elderly. The trend has been towards care provided in elderly persons' homes, which is usually in line with their wishes, as well as implying much lower levels of expenditure. See OECD 2000b.

[41] There is great uncertainty as to how cross-country patterns of care will change with changing patterns of labour market participation, including in particular the increased formal labour market participation of women.

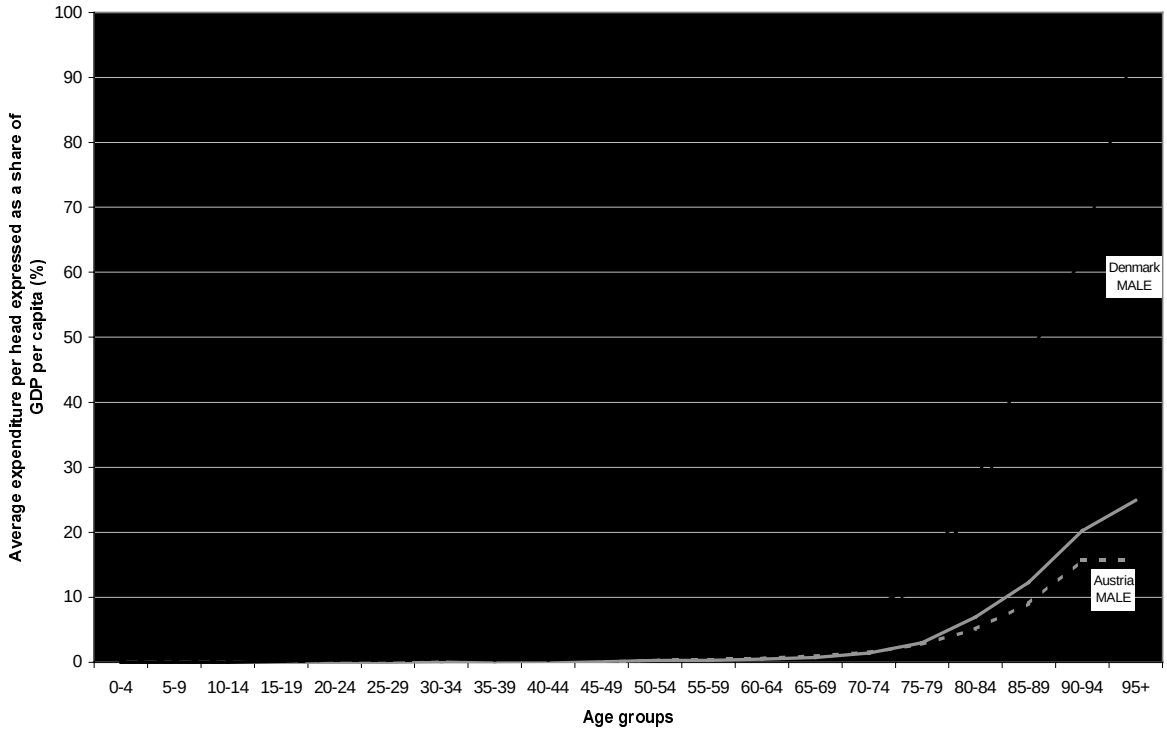
4.4, it generally reveals higher per capita expenditure on long-term care for women than men.

Ageing and expenditure on health and long-term care

The age-related pattern of health care expenditure per head combined with the ageing of the population initially fuelled concerns about the future fiscal impact of ageing populations. However, the situation is more complex than static age-related expenditure profiles suggest.

In fact, contrary to the impression created by age-specific profiles of average expenditure, empirical research reveals that population ageing has not been an important driver of aggregate levels of expenditure on health care - Jacobzone (2001) notes that at the aggregate level, no link exists between levels of spending and the relative demographic situation of countries.

Graph 4.4 Age profiles for public expenditure on long-term care for males and females



Notes: See notes for Graph 4.3.

Expenditure on health care grew substantially in Europe over the second half of the last century, with total public and private expenditure on health roughly doubling as a share of GDP over the period 1960-1990. Levels of public expenditure on health grew even more rapidly over this period as a result of increased coverage by public insurance. However, ageing was not a significant driving force of the increase in health expenditure. Empirical evidence on the evolution of health expenditure between the 1960s and the 1990s[42] suggests that other factors were more important. These factors included:

[42] See OECD, 1994, Oxley, MacFarlan, "Health Care Reform - Controlling Spending and Increasing Efficiency" for a summary.

increased coverage of public provision of health care or health insurance; increased demand/consumption of health care in line with increased prosperity; and supply-side factors such as the increased use of new and more expensive technology; and high medical price inflation.

One reason for the limited effect of population ageing on health care expenditure, is that health care expenditure over the lifetime of an individual tends to be concentrated at the end of life, irrespective of the age of death (these expenditures at the end of life are sometimes called "death costs"). Because mortality rates are higher at older age groups this concentration of expenditure at the end of life leads to an upwards bias in the distribution of health expenditure by age for these groups. Thus, to the extent that future population ageing in the form of increased numbers of elderly persons reflects increases in life expectancy (i.e. decreases in age-specific mortality rates), projections based on the static age-related expenditure profiles shown above are likely to overestimate the impact of ageing on future aggregate expenditure levels.

Life expectancy has increased significantly in Europe in the second half of the last century, and increases are also expected in the future. Increases in life expectancy have gone hand-in-hand with improvements in the average health status of the elderly, particularly for the young elderly (that is persons aged less than 80). On the other hand, very old age (over 80 or 85) continues to be characterised by illness, disability and/or frailty.

On long-term care, Jacobzone (2001) notes that changes in expenditure tend to be driven by trends in disability, institutionalisation, changes in social models[43] (which determine the extent of provision of care in an informal setting), and changes in policy on the provision of care. Results for OECD[44] countries reveal reductions in disability, and some reduction in institutionalisation of elderly persons, which may have some (limited) impact on public finances.

In summary, therefore, whilst at any given point in time a large share of the overall resources of health and long-term care systems is devoted to elderly people, this does not necessarily mean that ageing is or will be a key driver of expenditure increases. A simple combination of age-related expenditure profiles with future demographic projections, as is done in the expenditure projections reported here, gives a very simplistic view of the impact of ageing on health and long-term care expenditures. Notably this ignores a number of the underlying causes of increases in health care expenditure. Jacobzone (2001) notes that projections carried out in this fashion cannot be considered to be "real numbers" for the future, but more a snapshot of the simple effects of demography. Moreover, to the extent that health expenditures are concentrated at the end of life, and future demographic shifts reflect increased life expectancy, these simple projections are even likely to overestimate the importance of ageing on expenditure.

---

[43] In this context, future changes in labour market participation, notably the expected increase in the participation of women in formal labour markets, could significantly influence the pattern of care provision in some Member States.

[44] See Jacobzone et al, "Is the health of older persons in OECD countries improving fast enough to compensate for population ageing?", OECD Economic Studies No. 30, 2000/I

4.3. Description of the projections

Aim and scope of the projections exercise

The aim of the exercise was to run projections of public expenditure on health and long-term care in order to assess the impact of ageing populations on future expenditure levels. Projections of public expenditure on health and long-term care are required to inform the debate on the future impact of ageing populations for public finances. The expenditure projections carried out by the Member States attempt to measure the impact of ageing on health and long-term care expenditure in individual Member States in the first half of the current century. The projections for public expenditure on health care and public expenditure on long-term care are carried out separately in order to isolate the implications of demographic changes for the two different expenditure items.[45] The baseline projections were carried out using a common methodology[46], a common demographic projection, and commonly agreed macroeconomic assumptions. The demographic and macroeconomic assumptions are the same as those used in the pensions expenditure projection exercise – see Chapters 2 and 3.

However, the projections carried out in this exercise cannot be considered to be likely "real" levels of future public expenditure on health and long-term expenditure. This is primarily because the projections only really attempt to measure the impact of demographic changes, under two simple cost assumptions. The projections do not take into account the impact of other factors likely to drive future trends in health and long-term care expenditure, including notably technology. Moreover, the simple rules for the developments of expenditures per head employed in the projections, which can be thought of as implicitly encapsulating the impact of all non-demographic drivers of expenditure, are likely to underestimate future trends in expenditures per head (or unit costs). Finally, the core methodology employed for measuring the impact of demographic trends is likely to overestimate the importance of the demographic changes in determining overall levels of expenditure.

A number of projections were carried out for public expenditure on both health care and long-term care. Some of these projections constituted "Core" projections – these include baseline cases, as well as some projections using alternative demographic and macroeconomic assumptions. Most Member States were able to complete the majority of the core projections, although a number of Member States were not able to run projections for long-term care due to data constraints. A further set of projections were considered to be "Optional" projections – these projections generally extended the methodology employed in the baseline cases in order to address the key shortcomings of this methodology. Only a few Member States were able to complete optional projections.

The methodology for the core projections

The basic methodology employed for the core projections for public expenditure on health and long-term care expenditure was based on the **age-related expenditure**

[45] Fourteen Member States carried out projections of the impact of ageing on public expenditure on health-care, and ten Member States for long-term care.

[46] Projections for Ireland for both health and long-term care expenditure do not follow the common methodology precisely, but are essentially consistent with projections for other Member States.

profiles for health and long-term care expenditure discussed in Section 4.2. In all countries, separate profiles were available for men and women for health care, and in almost all for long-term care. Essentially, the age- and sex-related profiles of expenditure, defined by data from a base year, were matched to demographic projections for future years under two simple cost assumptions. (A formal explanation of the methodology can be found at Annex 3.) Whilst the level of average expenditure per head in each projection year is defined by the cost assumption made, the relative magnitudes of expenditures per head across age- and sex-groups remain the same in all projection years, and are the same as in the base year profiles. That is, in all projection years, expenditures across all age and sex groups are assumed to grow at the same rate.

One of the primary **advantages of the basic approach** used for the projections is that it generates projections which focus on the possible impact of demographic changes on expenditure levels, which was the main aim of the AWG expenditure projections. Another advantage of the approach is its relative simplicity (once the extremely difficult process of estimating age-related expenditure profiles is completed).

However, in terms of measuring the future burden for public finances, this approach has a number of **drawbacks**. Firstly, the approach assumes a simple relationship between age and health and long-term expenditure levels per capita, based on age- and sex-specific expenditure profiles for a base year. As discussed in Section 4.2, the actual future relationship is likely to be far more complex. Notably, the approach taken in these projections ignores the concentration of health expenditures at the end of life. Thus the projections undertaken are likely to overestimate the impact of future demographic changes on overall expenditure levels.

Secondly, the approach taken in the projections avoids explicitly modelling the other factors which are likely to be important in driving health and long-term care expenditures in the future. These include the diffusion of medical technology, relative prices for medical inputs, the intensity of care at older ages, and the extent to which long-term care is provided in a formal setting. Furthermore, the details of the institutional set up of different health care systems in different Member States also determine the way that different drivers of expenditures interact to produce aggregate levels of health expenditure – thus similar trends in different countries can have vastly different consequences for aggregate expenditure levels in different countries. These different expenditure determinants have not been taken into account in the projections using the basic methodology.

Whilst, these other non-demographic drivers of health and long-term care expenditures per head are not explicitly modelled, they are implicitly encapsulated in the development of expenditures per head over the projection period i.e. in the cost rules employed. However, the cost rules employed are relatively conservative, and thus are likely to underestimate future developments in expenditures per head.

Projections were carried out using two different **cost assumptions**. The first cost assumption employed was that expenditures per head on both health and long-term care (across all age- and sex-groups) grow at exactly the same rate as **GDP per capita**. The evolution of expenditure levels under this cost assumption, expressed as a share of GDP, can be considered to be neutral in macroeconomic terms – this is because if there were no change in the age structure of the population, then the share of the health and long-term care sectors in GDP would remain the same over the projection period even if the size of the population changed.

The second cost assumption employed is that expenditures per head (again across all age- and sex-groups) grow at the same rate as **GDP per worker**[47] (i.e. at the same rate as productivity[48]). The logic for this second cost assumption is that wages are a key determinant of costs in the health and long-term care sectors, as these two sectors are labour intensive. It is also assumed that wages in the health sector grow at the same rate as wages in the whole economy, and that wages in the whole economy generally follow the trend of economy-wide productivity. Hence, expenditures per head are assumed to grow at the same rate as productivity in the whole economy[49].

The main difference between the two assumptions relates to whether a change in the rate of participation in the labour market has an impact on the absolute level of health/long-term care expenditure (e.g. expressed in euros). Using the cost assumption of GDP per capita, higher participation and thus employment, leading to a higher GDP per capita is accompanied with a higher absolute level of expenditure, as the results expressed as a percentage of GDP are projected to be constant. Using the GDP per worker cost assumption, higher participation does not have an impact on the absolute level of health expenditure, thus leading to a decrease of expenditure when expressed as a share a GDP. The main implication of this difference is that under the GDP per capita cost assumption, higher participation does not help in cushioning the budgetary consequences of ageing on health expenditure, whereas under the GDP per worker cost assumption it does.

The two cost assumptions used assume that expenditures per head grow at exactly the same rate as either GDP per capita, or GDP per worker. That is it is assumed that there will be a unitary elasticity of expenditures to GDP per capita/worker over the long-term. However, in the past, the long-term elasticity of expenditures to income has been higher than one. This suggests that the assumptions used for the projections might underestimate the growth of costs/expenditures per head.

---

[47] Ireland only presents results under this cost assumption. Moreover, average expenditure per head is expressed as a share of GNP per capita rather than GDP per capita. However, as GNP per capita and GNP per worker grow by virtually the same amount over the projection period, the results for 2050 are expected to be the same under both cost assumptions.

[48] Where productivity is measured by person employed.

[49] This also implies that either: the health and long-term care sectors do not benefit from productivity gains, and that the volume of care services provided does not increase; or alternatively that both productivity in the health and long-term care sectors, and the volume of services provided grow in line with the rate of economy-wide productivity growth.

Optional projections

Some Member States were able to run a number of additional optional projections. These projections extended the core methodology, and in some cases tried to address some of the shortcomings of the methodology employed for the core projections. The results of these projections are reported in Section 4.5.

One of the optional projections attempts to project forward past trends in expenditures per head, using an elasticity of expenditures per head to GDP per capita of greater than one, in an attempt to capture the effects of non-demographic factors driving costs in health expenditure. Another of the optional projections for health care attempt to incorporate the concentration of health expenditures at the end of life – the so-called "death-costs" scenario. On long-term care specifically, some Member States undertook projections of long-term care which would incorporate possible future improvements in the health of the elderly. Another optional projection attempts to measure the impact of possible future changes in the share of formally provided long-term care.

However, these optional projections did not attempt to explicitly model institutional differences between Member States' care systems, or to explicitly model some of the key supply side cost factors which are likely to determine expenditures in the future. Indeed, this would be beyond the scope of the current AWG exercise.

Definition of expenditure[50]

As the aim of the projections is to measure the impact of ageing on public expenditures in view of the long-term sustainability of the public finances, the projections for both health and long-term care expenditure include only public expenditure on these items – in some Member States private expenditures can be significant.

Moreover, in order to analyse separately the results for health and long-term care expenditure, Member States were asked to use separate estimates for these two different components. In some Member States, where health and long-term care is closely intertwined, the split may have been somewhat artificial.

4.4. Projections of future public expenditure on health and long-term care (core projections)

A number of core projections were carried out by Member States. These projections were for public expenditure on health and long-term care under different cost, demographic, and macroeconomic scenarios[51]. Projections for health care and long-term care were run separately. Almost all Member States completed projections for health care[52], but not all were able to run projections for long-term care[53]. Core projections

[50] For further details on the definition of the public share of expenditure, and on the split of expenditure between health and long-term care, see Annex 4.

[51] A large number of projections were carried out by the AWG. In order to ease the exposition, not all of the results are presented in this chapter. Some additional results can be found in Annex 5.

[52] Luxembourg is expected to complete its health expenditure projections in early 2002.

[53] In most Member States that did not run projections of long-term care, this is because age-/sex-specific expenditure estimates were not available.

were carried out using the methodology discussed in Section 4.3, and described in more detail in Annex 3.

Projections were carried out using two different cost assumptions (where expenditures per head grow at the same rate as GDP per capita or GDP per worker respectively). However, the two sets of results under the Current Policy macroeconomic scenario will be treated together in this chapter, as in general the results are not greatly different, and follow similar trends in the long-term[54]. This is because in the long-term the evolution of GDP per capita and GDP per worker is quite similar.

4.4.1. Results of baseline projections for public expenditure on both health and long-term care

Total public expenditure on health and long-term care

Table 4.1 Total public expenditure on health care and long-term care

Central demographic variant
Expressed as a share of GDP

	TOTAL HEALTH AND LONG-TERM CARE			HEALTH CARE			LONG-TERM CARE		
	Expenditure as a share of GDP in 2000	Increase in expenditure in per cent of GDP between 2000 and 2050		Expenditure as a share of GDP in 2000	Increase in expenditure in per cent of GDP between 2000 and 2050		Expenditure as a share of GDP in 2000	Increase in expenditure in per cent of GDP between 2000 and 2050	
		per capita	per worker		per capita	per worker		per capita	per worker
B	6.1%	+2.1	+2.4	5.3%	+1.3	+1.5	0.8%	+0.8	+0.8
DK	8.0%	+2.7	+3.5	5.1%	+0.7	+1.1	3.0%	+2.1	+2.5
D (1)				5.7%	+1.4	+2.1			
EL (1)				4.8%	+1.7	+1.6			
E (1)				5.0%	+1.7	+1.5			
F	6.9%	+1.7	+2.5	6.2%	+1.2	+1.9	0.7%	+0.5	+0.6
IRL (2)	6.6%		+2.5	5.9%		+2.3	0.7%		+0.2
I	5.5%	+1.9	+2.1	4.9%	+1.5	+1.7	0.6%	+0.4	+0.4
NL	7.2%	+3.2	+3.8	4.7%	+1.0	+1.3	2.5%	+2.2	+2.5
A	5.8%	+2.8	+3.1	5.1%	+1.7	+2.0	0.7%	+1.0	+1.1
P (1)				5.4%	+0.8	+1.3			
FIN	6.2%	+2.8	+3.9	4.6%	+1.2	+1.8	1.6%	+1.7	+2.1
S	8.8%	+3.0	+3.3	6.0%	+1.0	+1.2	2.8%	+2.0	+2.1
UK	6.3%	+1.8	+2.5	4.6%	+1.0	+1.4	1.7%	+0.8	+1.0
EU (weighted average) (3)	6.6%	+2.2	+2.7	5.3%	+1.3	+1.7	1.3%	+0.9	+1.0

Notes: (1) Results for public expenditure on long-term care are not yet available for a number of Member States.

(2) Results for Ireland are expressed as a share of GNP.

(3) Weights are calculated according to the Member States for which results are available. Therefore for health care it is a weight for the EU-14, and for long-term care, and total expenditure on health and long-term care, the average is for 10 Member States.

Table 4.1 reveals that for those Member States that have conducted projections of total public expenditure for both health care and long-term care, the pure consequences of

[54] Whilst differences between the two cost assumptions are not great by 2050, they can be more marked for some other projection years.

demographic changes on expenditure over the projection period would range from 1.7 to 3.9 per cent of GDP. For these Member States, overall levels of public expenditure would range between 7.5% of GDP (for Italy) to 12.1% of GDP in 2050 (in Sweden). This compares with a range of expenditures in 2000 ranging from 5.5% (again in Italy) to 8.8% of GDP (again in Sweden) in 2000. On average, the increases would lead to levels of public expenditure on health and long-term care in 2050 around 30 to 40 per cent greater than in 2000.

With the exception of Austria, all of the Member States that would experience the highest overall increases in total public expenditure on health and long-term care (over 3 percentage points of GDP), would experience the largest part of this increase through increased public expenditure on long-term care rather than health care. These are the Member States that have a strong tradition of formal provision of long-term care for the elderly (Denmark, the Netherlands, Sweden and Finland).[55]

In all almost all Member States (except for Greece and Spain) projection results under the GDP per worker cost assumption are higher than under the GDP per capita cost assumption. For those countries where there are results for both health expenditure and long-term care expenditure, the range of increase in expenditures over the projection period rises to 2.1 to 3.9 per cent of GDP in the GDP per worker cost case from 1.7 to 3.2 per cent of GDP in the per capita cost case. In most countries, the difference in the results between the two cost assumptions is not very great over the length of the projection period.

Table 4.2 Average employment and population growth over the projection period

	average growth in employment per annum between 2000 and 2050	average growth in population per annum between 2000 and 2050
B	-0,11%	-0,03%
DK	-0,09%	0,05%
D	-0,32%	-0,16%
EL	-0,02%	-0,22%
E	-0,20%	-0,22%
F	-0,03%	0,10%
I	-0,34%	-0,33%
IRL	0,51%	0,52%
NL	0,09%	0,23%
A	-0,19%	-0,12%
P	0,03%	0,18%
FIN	-0,29%	-0,09%
S	0,01%	0,07%
UK	-0,08%	0,08%

Where the results under the GDP per worker cost assumption are greater than under the GDP per capita cost assumption (i.e. for all countries except Greece and Spain), this is

[55] It general, although with some marked exceptions, those Member States that have high initial levels of expenditure also tend to be those that have the highest final levels of expenditure in 2050. To an important extent this is due to the methodology employed.

because employment growth over the projection period will be lower than population growth[56] – see Table 4.2 below. In these countries, the differing trends in overall population and employment are due largely to the changing age composition of the population, including notably a greying of the population.

Public expenditure on health care

Table 4.1 reveals that the mechanical impact of ageing on levels of public expenditure on health care would lead to increases in expenditure of between 0.7 and 2.3 percentage points of GDP over the fifty year projection period. This would lead to an average increase in public expenditure on health care of 25-30% over the projection period. Most Member States experience increases in the range of 1 to 2 percentage points of GDP, with only three Member States likely to experience increases above 2 per cent of GDP (Germany, Ireland and Austria). The impact of ageing on overall levels of public expenditure on health care would result in expenditure levels ranging from 5.6% (for Netherlands and the UK) to 8.2% of GDP in 2050 (for Ireland) compared with 4.6% to 6.2% of GDP in 2000. Three Member States (Germany, France and Ireland) could see public expenditure health care of around 8% of GDP in 2050.

A more detailed examination of results[57] over the projection period reveals that the impact of demographic changes on levels of health expenditure is likely to stabilise around 2040 for most Member States. This is in line with the overall demographic composition which also stabilises around this period.[58]

Moreover, a breakdown of the results by age group[59] reveals that demographic changes would lead to a decline in public expenditure on health care for all persons excluding the elderly (i.e. for the 0-64 age group) between 2000 and 2050. However, this decline in expenditure is more than compensated for, in all Member States, by an increase in expenditure on the elderly, and in particular on the very old (those aged 80 and over). Notably in Germany and Italy the growth in expenditure on the over-eighties group is over 200%.

Public expenditure on long-term care

The impact of demographic changes on levels of public expenditure on long-term care would lead to increases in expenditure ranging from 0.2 to 2.5 per cent of GDP over the

[56] Or equally that the decline in the population is smaller than the decline in the numbers of persons employed.

[57] See Annex 5.

[58] The results of the projections using the per worker cost assumption, expressed as a share of GDP, show slightly more variability over the projection period than the projections using the per capita cost assumption. In some periods, expenditure declines as a share of GDP. However, this is not to say that expenditure levels (in absolute terms decline) – when expenditure is expressed as a share of GDP, in some periods the impact of ageing is more than offset by the contribution of employment to GDP growth.

[59] See Annex 5.

fifty year projection period[60]. This would lead to an average increase in public expenditures on long-term care of around 70% over the 50 year projection period. In 2050, expenditure levels would range from 0.9% of GDP (in Ireland) to 5.5% of GDP (for Denmark).

It is possible to distinguish two groups from the ten Member States for which projections for long-term care are available: six Member States would experience increases in expenditure of up to and around 1 percentage point of GDP and the other four (Denmark, Netherlands, Finland and Sweden) would experience increases of between 1.7 and 2.5 percentage points of GDP. The second group are all countries with strong traditions of formal care for the elderly. However, low projected increases in expenditure in other Member States, which are the result of lower initial levels of public expenditure on long-term care, may not necessarily mean less of a risk of expenditure increases for these countries. This is because future sharp increases in the numbers of the very old combined with projected increases in labour market participation, particularly for women, might force policy changes which lead to increased formal provision of long-term care in those countries.

Unlike in the case of public expenditure on health care, expenditure on long-term care across the ten Member States does not tend to stabilise around 2040 – instead the impact of demographic changes would lead to growth in expenditure throughout the whole projection period.[61] This is in line with the continued growth of the share of the population aged 80 and over.[62]

A breakdown of the projections by age group[63] reveals that by far the largest part of the increase in expenditure over the fifty year period is due to increases in expenditure on the over-eighties age group, in all Member States. For example, in Italy, Netherlands, Finland and Austria, more than 90% of the increase in projected expenditure is due to increased expenditure for this group. Moreover, in Italy and Austria expenditure on this group in 2050 would be more than three times its level in 2000.

4.4.2. Sensitivity of projections of public expenditure on health and long-term care to different demographic assumptions

Projections of public expenditure on health and long-term care were run assuming two sets of alternative demographic scenarios: a high life expectancy scenario (where life expectancy is assumed to be greater than in the central variant, but where all other assumptions remain the same) and a high population scenario (where life expectancy, fertility and net migration are assumed to be greater than in the central variant). Whilst all of the demographic projections were produced using a common methodology, the different demographic variants nevertheless imply changes relative to the central variant

[60] As for health care, the GDP per worker cost assumption leads to expenditure levels in 2050 which are greater than under the GDP per capita cost assumption, for all ten Member States with projections of public expenditure on long-term care. However, the additional expenditure implied is not very great.

[61] See Annex 5 for details.

[62] In contrast, the share of the population aged over 65 tends to stabilise in a number of Member States around 2040.

[63] See Annex 5 for details.

of differing magnitudes across Member States.[64] Table 4.3 presents the results for public expenditure on health care, and Table 4.4 presents the results for public expenditure on long-term care.

Table 4.3 Sensitivity of developments in projected public expenditure on health care to different demographic assumptions

Expressed as a share of GDP

	Expenditure on health care as a share of GDP in 2000	Central demographic variant		High life expectancy demographic variant		High population demographic variant	
		Increase in expenditure in per cent of GDP between 2000 and 2050		Increase in expenditure in per cent of GDP between 2000 and 2050		Increase in expenditure in per cent of GDP between 2000 and 2050	
		per capita	per worker	per capita	per worker	per capita	per worker
B	5.3%	+1.3	+1.5	+1.6	+2.1	+1.2	+1.5
DK	5.1%	+0.7	+1.1	+0.7	+1.2	+0.6	+1.1
D	5.7%	+1.4	+2.1	+1.7	+2.7	+1.1	+1.7
EL (1)	4.8%	+1.7	+1.6			+1.4	
E	5.0%	+1.7	+1.5	+2.0	+2.0	+1.5	+1.4
F	6.2%	+1.2	+1.9	+1.4	+2.1	+1.0	+1.6
I	4.9%	+1.5	+1.7	+1.8	+2.2	+1.3	+1.5
NL	4.7%	+1.0	+1.3	+1.2	+1.8	+0.9	+1.3
A (1)	5.1%	+1.7	+2.0	+2.0		+1.3	
P	5.4%	+0.8	+1.3	+1.0	+1.5	+0.8	+1.2
FIN	4.6%	+1.2	+1.8	+1.5	+2.4	+1.0	+1.7
S	6.0%	+1.0	+1.2	+1.2	+1.6	+0.7	+1.1
UK	4.6%	+1.0	+1.4	+1.4	+2.0	+1.0	+1.5

Notes: (1) A full set of results for the alternative demographic variants were not available for Greece and Austria.
(2) See notes for Table 4.1.

In all Member States, the demographic variant with **higher life expectancy** adds to the increase in the public cost of health care over the fifty year projection period. Nevertheless, by the end of the projection period, the additional increase in the level of expenditures relative to the central demographic variant is not very great, ranging from an additional increase of around 0.1 percentage points of GDP by 2050 in Denmark, to 0.6 percentage points in a number of Member States.

Similarly, for public expenditure on long-term care, the high life expectancy demographic variant adds to the projected level of long-term care expenditure in 2050, but the scale of the additional expenditure shows greater variety across Member States than in the case of health care. For France, the additional burden implied by higher life expectancy in 2050 is only around 0.1 percentage points of GDP. For other countries it is much greater – for example, this is the case for Sweden where the size of the additional implied expenditure is 1.2 to 1.4 percentage points of GDP in 2050. In a situation where life expectancy is high, the demographic impact of population ageing could therefore lead to levels of expenditure in Sweden, Denmark and the Netherlands of 5 to 6 per cent of GDP. Thus the Member States that would suffer the greatest additional impact on public expenditure on long-term care under a higher life expectancy scenario, are also those with relatively

[64] See Chapter 2 of this report for a description of the demographic projections.

high levels of initial expenditure (and thus the highest increases in projected expenditure under the central demographic scenario).[65]

Table 4.4 Sensitivity of developments in projected public expenditure on long-term care to different demographic assumptions

Expressed as a share of GDP

	Expenditure on long-term care as a share of GDP in 2000	Central demographic variant		High life expectancy demographic variant		High population demographic variant	
		Increase in expenditure in per cent of GDP between 2000 and 2050		Increase in expenditure in per cent of GDP between 2000 and 2050		Increase in expenditure in per cent of GDP between 2000 and 2050	
		per capita	per worker	per capita	per worker	per capita	per worker
B	0.7%	+0.8	+0.8	+1.1	+1.2	+0.8	+0.9
DK	3.0%	+2.1	+2.5	+2.5	+2.6	+2.1	+2.6
F	0.4%	+0.5	+0.6	+0.5	+0.6	+0.4	+0.5
I	0.6%	+0.4	+0.4	+0.5	+0.6	+0.4	+0.4
NL	2.5%	+2.2	+2.5	+3.1	+3.6	+2.3	+2.7
A (1)	0.7%	+1.0	+1.1	+1.2		+0.8	
FIN	1.6%	+1.7	+2.1	+2.4	+3.1	+1.7	+2.1
S	2.8%	+2.0	+2.1	+3.2	+3.5	+2.1	+2.3
UK	1.7%	+0.8	+1.0	+1.2	+1.5	+0.8	+1.1

Notes: (1) A full set of results for the alternative demographic variants were not available for Austria.
(2) See notes for Table 4.1.

Under the **high population demographic variant**, public expenditure on health care in almost all Member States in 2050 would be the same or lower than under the central demographic variant. The effect of higher fertility and higher migration would outweigh the impact of higher life expectancy on expenditure levels when expressed as a share of GDP.[66] The difference in expenditure levels in 2050 between the central and the high population variants varies somewhat across Member States – for a number of Member States the reduced burden in expenditure levels in 2050 is very small, less than or around 0.1 per cent of GDP. For others, this could lead to an decrease of 0.4 per cent of GDP by 2050. Nevertheless, in general, the differences in expenditure levels implied by the high population demographic scenario relative to the central variant are not great.

For the Member States which have projections for long-term care, expenditure levels in 2050 under the **high population demographic variant**, are very close to those under the central variant demographic projection – slightly above for some Member States, and slightly below for others. So in the case of long-term care, increased fertility and migration leading to a higher population level, would outweigh (although not in all cases) the impact of higher life expectancy on overall expenditure levels when expressed as a share of GDP for most Member States.

[65] In general the additional burden on public finances implied by the high life expectancy scenario relative to the central demographic variant, is greater where average costs per head are assumed to grow at the same rate as GDP per worker.

[66] For example under the GDP per capita cost assumption, this is because higher population levels imply a lower rate of increase of GDP per capita for a given level of GDP, and thus a lower rate of growth of expenditures per head. This effect outweighs the effect of having a larger number of older persons who, under this methodology, imply high levels of expenditure per head. An analogous effect (in terms of the numbers of persons employed) is seen in the GDP per worker cost case.

In summary therefore, the results of projections for **public expenditure on health care** do not appear to be very sensitive to the choice of demographic scenario. Nor do the results for **public expenditure on long-term care** vary much between the central scenario and the high population scenario. However, the high life expectancy demographic variant could lead to a considerable additional burden in terms of long-term care expenditures in some Member States – notably those where expenditures on long-term care would already be high.[67]

4.4.3. Sensitivity of projections of public expenditure on health and long-term care to the cost assumptions

The projections reveal that the evolution of public expenditure on health and long-term care over the fifty years would not differ greatly for the majority of Member States between a case where expenditures per head grow at the same rate as GDP per worker, or GDP per capita. This is because, for most Member States, over the fifty year projection period the evolution of these two variables would be relatively similar.

Table 4.5 Sensitivity analysis of projections of public expenditure on health care to cost assumptions

Central demographic variant

	Expenditure on health care as a share of GDP in 2000	High cost growth variant		Central variant		Low cost growth variant	
		2050	Increase in expenditure in per cent of GDP between 2000 and 2050	2050	Increase in expenditure in per cent of GDP between 2000 and 2050	2050	Increase in expenditure in per cent of GDP between 2000 and 2050
B	**5.3%**	7.5%	**+2.2**	6.6%	**+1.3**	5.9%	**+0.5**
E	**5.5%**	8.2%	**+2.7**	7.2%	**+1.7**	6.4%	**+0.9**
IRL	**5.9%**	9.2%	**+3.3**	8.2%	**+2.3**	7.3%	**+1.4**
I	**4.9%**	7.3%	**+2.3**	6.5%	**+1.5**	5.7%	**+0.8**
NL	**4.7%**	6.4%	**+1.7**	5.6%	**+1.0**	5.0%	**+0.3**
P	**5.4%**	7.0%	**+1.6**	6.1%	**+0.8**	5.4%	**+0.1**
FIN	**4.6%**	6.5%	**+1.9**	5.7%	**+1.2**	5.1%	**+0.5**
S	**6.0%**	7.9%	**+1.9**	7.0%	**+1.0**	6.1%	**+0.1**
UK	**4.6%**	6.4%	**+1.7**	5.6%	**+1.0**	4.9%	**+0.3**

Cost assumptions:

Average health expenditure per capita grows at the same rate as GDP per capita in the central variant.

Average health expenditure per capita grows at 0.25 percentage points above the rate of growth of GDP per capita in the high cost growth variant.

Average health expenditure per capita grows at 0.25 percentage points below the rate of growth of GDP per capita in the low cost growth variant.

Notes: Sensitivity analysis on the cost assumption is not available for all Member States.

In addition to running the projections for these two different cost assumptions, some Member States also undertook a sensitivity analysis on costs. The aim of the projections was to see how much levels of public expenditure would vary if expenditures were

[67] Again expenditures for the different demographic variants tend to be higher where expenditures per head grow at the same rate as GDP per worker, compared with the GDP per capita case.

slightly above or below the central cases. As this was purely an illustrative exercise, this was only carried out around one of the central cost assumptions – the assumption where average expenditures per head grow at the same rate as GDP per capita. The sensitivity analysis involved making simple adjustments to the overall cost assumption. A high cost growth assumption assumed that average expenditure per head grows at 0.25 percentage points above the rate growth of GDP per capita in each projection year, and the low cost growth assumption assumes that average expenditure per head grows at 0.25 percentage points below the rate of growth of GDP per capita.[68] The results for public expenditure on health care are presented in Table 4.5, and for public expenditure on long-term care in Table 4.6.

Table 4.6 Sensitivity of developments in projected public expenditure on long-term care to cost assumptions

Central demographic variant

	Expenditure on long-term care as a share of GDP in 2000	High cost growth variant		Central variant		Low cost growth variant	
		2050	Increase in expenditure in per cent of GDP between 2000 and 2050	2050	Increase in expenditure in per cent of GDP between 2000 and 2050	2050	Increase in expenditure in per cent of GDP between 2000 and 2050
B	**0.8%**	1.7%	**+1.0**	1.5%	**+0.8**	1.3%	**+0.6**
IRL	**0.7%**	1.0%	**+0.3**	0.9%	**+0.2**	0.8%	**+0.1**
I	**0.6%**	1.2%	**+0.5**	1.0%	**+0.4**	0.9%	**+0.3**
NL	**2.5%**	5.4%	**+2.9**	4.7%	**+2.2**	4.2%	**+1.7**
FIN	**1.6%**	3.7%	**+2.1**	3.3%	**+1.7**	2.9%	**+1.3**
S	**2.8%**	5.4%	**+2.6**	4.8%	**+2.0**	4.2%	**+1.4**
UK	**1.7%**	2.9%	**+1.2**	2.6%	**+0.8**	2.3%	**+0.5**

Cost assumptions:

Average long-term care expenditure per capita grows at the same rate as GDP per capita in the central variant.

Average long-term care expenditure per capita grows at 0.25 percentage points above the rate of growth of GDP per capita in the high cost growth variant.

Average long-term care expenditure per capita grows at 0.25 percentage points below the rate of growth of GDP per capita in the low cost growth variant.

Notes: Sensitivity analysis on the cost assumption is not available for all Member States that ran projections for long-term care.

For **public expenditure on health care**, the increase in expenditures over the fifty year projection period ranged from 0.8 to 2.3 percentage points of GDP under the central GDP per capita cost assumption. Under the high cost growth assumption this range increases to 1.6 to 3.3 percentage points of GDP. Under the low cost growth assumption, the range declines to 0.1 to 1.4 percentage points of GDP. For **public expenditure on long-term care,** the central cost assumption implies an increase in the expenditure level by 2050 ranging from 0.2 to 2.2 percentage points of GDP. Under the high cost growth

[68] Thus in the high cost growth case, if GDP per capita were assumed to grow by 1% in a given projection year, then public expenditures on health and long-term per head (across all age- and sex-groups) would be assumed to grow by 1.25%.

assumption this range increases to 0.3 to 2.9 percentage points of GDP. Under the low cost growth assumption, the range declines to 0.1 to 1.7 percentage points of GDP. The differences between the different cost assumptions appear to the be greatest for those countries with high levels of initial expenditure.

Overall, the projections for public expenditure on health and long-term care reveal themselves to be relatively sensitive to alternative scenarios for the growth of expenditures per head.

4.4.4. Projections of public expenditure on health and long-term care under a different macroeconomic outlook – the Lisbon scenario

Under the assumption that expenditure per head grows at the same rate as GDP per worker, macroeconomic developments, and notably labour market and productivity developments enter into the key factors driving the projection results expressed as a share of GDP. It is therefore possible to also run the projections under alternative macroeconomic scenarios. A second set of projections were run using the so-called Lisbon scenario. To summarise, this scenario assumes the high population demographic projection, as well as more favourable labour market developments than the Current Policy macroeconomic scenario. These more favourable labour market developments imply a lower rate of growth of GDP per worker compared with the Current Policy macroeconomic scenario. The results for health expenditure are presented in Table 4.7, and for long-term care expenditure in Table 4.8.

Table 4.7 Projections of public expenditure on health care under an alternative macroeconomic scenario

Average long-term care expenditure per capita grows at the same rate as GDP per worker
Expressed as a share of GDP

	Expenditure on health care as a share of GDP in 2000	CURRENT POLICY MACROECONOMIC SCENARIO (central demographic variant)		LISBON MACROECONOMIC SCENARIO (1)		Comparison between the results in the CURRENT POLICY and the LISBON macroeconomic scenarios		
		Expenditure on health care as a share of GDP in 2050	Increase in expenditure in per cent of GDP between 2000 and 2050	Expenditure on health care as a share of GDP in 2050	Increase in expenditure in per cent of GDP between 2000 and 2050	Total difference between the two scenarios (Lisbon - Central)	Breakdown of difference: due to higher population in Lisbon scenario	Breakdown of difference: due to lower GDP per worker (or higher employment) in Lisbon scenario
B	5.2%	6.8%	+1.5	5.8%	+0.6	-0.9	-0.1	-0.9
DK	5.1%	6.2%	+1.1	5.9%	+0.8	-0.3	0.0	-0.3
D	5.7%	7.7%	+2.1	6.6%	+0.9	-1.2	-0.4	-0.8
E	5.0%	6.6%	+1.5	5.9%	+0.9	-0.7	-0.2	-0.5
F	6.1%	8.0%	+1.9	7.4%	+1.3	-0.6	-0.3	-0.3
I	4.9%	6.6%	+1.7	5.4%	+0.4	-1.2	-0.1	-1.1
NL	4.7%	5.9%	+1.3	6.0%	+1.3	0.0	0.0	0.0
A (2)	5.1%	7.1%	+2.0	6.0%	+0.9	-1.1		
P	5.4%	6.6%	+1.3	6.4%	+1.1	-0.2	-0.1	-0.1
FIN	4.6%	6.4%	+1.8	5.5%	+0.9	-0.9	-0.1	-0.8
S	6.0%	7.2%	+1.2	7.0%	+1.0	-0.2	-0.1	-0.1
UK	4.5%	6.0%	+1.4	5.5%	+0.9	-0.5	+0.1	-0.6

Notes: (1) The high population demographic variant is implicit to the Lisbon macroeconomic scenario.

(2) The breakdown of the difference in results between the Current Policy and the Lisbon macroeconomic scenarios are not available for Austria.

For all Member States the Lisbon macroeconomic scenario leads to lower overall levels of **public expenditure on health care** as a share of GDP in 2050. The projected increases in expenditure over the fifty years under the Lisbon scenario range from 0.4 to

1.3 percentage points of GDP compared with a range of 1.1 to 2.1 percentage points under the Current Policy macroeconomic scenario. For almost all Member States the largest part of the reduced expenditure implied by the Lisbon scenario is due to the more favourable outlook for the labour market and the lower growth of GDP per worker assumed under this scenario.[69] Only part of the decrease is due to the effect of the high population assumptions which are implicit to the Lisbon scenario. However, the balance between these two effects varies across Member States.

Unlike in the case of health expenditure, the Lisbon scenario for **long-term care** does not necessarily lead to a lower final level of expenditure in 2050 for all Member States. Firstly in all Member States, the high population component of the Lisbon scenario leads to equal or slightly higher expenditures in 2050 relative to the baseline. To recall, the high population demographic variant includes higher life expectancy to which long-term care expenditures seem to be particularly sensitive. Nevertheless, similarly to health care, lower rates of growth of GDP per worker under the Lisbon scenario have a dampening effect on increases in expenditure in all but two Member States.[70]

Table 4.8 Projections of public expenditure on long-term care under an alternative macroeconomic scenario

Average long-term care expenditure per capita grows at the same rate as GDP per worker
Expressed as a share of GDP

	Expenditure on long-term care as a share of GDP in 2000	CURRENT POLICY MACROECONOMIC SCENARIO (central demographic variant)		LISBON MACROECONOMIC SCENARIO (1)		Comparison between the results in the CURRENT POLICY and the LISBON macroeconomic scenarios		
		Expenditure on long-term care as a share of GDP in 2050	Increase in expenditure in per cent of GDP between 2000 and 2050	Expenditure on long-term care as a share of GDP in 2050	Increase in expenditure in per cent of GDP between 2000 and 2050	Total difference between the two scenarios (Lisbon - Central)	Breakdown of difference: due to higher population in Lisbon scenario	Breakdown of difference: due to lower GDP per worker (or higher employment) in Lisbon scenario
B	0.7%	1.6%	**+0.8**	1.4%	**+0.7**	**-0.2**	0.0	-0.2
DK	3.0%	5.5%	**+2.5**	5.4%	**+2.4**	**-0.1**	+0.1	-0.2
F	0.7%	1.2%	**+0.6**	1.1%	**+0.4**	**-0.1**	0.0	-0.1
I	0.6%	1.1%	**+0.4**	0.9%	**+0.2**	**-0.2**	0.0	-0.2
NL	2.5%	5.0%	**+2.5**	5.2%	**+2.7**	**+0.2**	+0.2	0.0
A (2)	0.7%	1.8%	**+1.1**	1.4%	**+0.7**	**-0.4**		
FIN	1.6%	3.7%	**+2.1**	3.3%	**+1.6**	**-0.4**	+0.1	-0.5
S	2.8%	4.9%	**+2.1**	5.1%	**+2.3**	**+0.2**	+0.2	0.0
UK	1.7%	2.7%	**+1.0**	2.5%	**+0.8**	**-0.3**	0.0	-0.3

Notes: see notes for Table 4.7.

In summary therefore, whilst the Lisbon macroeconomic scenario would lead to a reduced burden on the public finances in 2050 in terms of lower public expenditure on health care relative to the Current Policy macroeconomic scenario, this is not necessarily the case for long-term care. This is because, expenditure levels on long-term care are more sensitive (in an upwards direction) to the assumption of high life expectancy included in the Lisbon scenario. Thus the dampening effect of a lower rate of growth of

[69] This assumes that increased employment levels assumed in the Lisbon scenario are not extended to the health and long-term care sectors.

[70] Therefore the results for long-term care under the Lisbon scenario are lower than those under the central scenario for all but two Member States – the same two Member States which do not benefit in terms of lower expenditure levels from lower growth in GDP per worker.

GDP per worker in the Lisbon scenario is not always enough to compensate for increased numbers of elderly people (who are assumed to have much higher levels of expenditure on long-term care).

4.4.5. Summary of results for core projections and conclusions

Projections were made for public expenditures on health and long-term care. The results were run for two primary cost assumptions: the first being that health and long-term care expenditures per head grow at the same rate as GDP per capita, and the second being that expenditures per head grow at the same rate as GDP per worker. A number of alternative projections were produced using different demographic scenarios, an alternative macroeconomic scenario, and variations on the key cost scenarios.

The main conclusion to be drawn from the core projections is that the impact of ageing on public expenditure on health and long-term care is likely to be significant. Where Member States have presented results for both health care and long-term care, the consequences of demographic changes in terms of increased public expenditure would range from 1.7 to 3.9 percentage points of GDP. Among these Member States, with the exception of Ireland and Austria, the countries that would experience the highest overall increases in total public expenditure on both health and long-term care would see the largest part of this increase come from expenditures on long-term care. Moreover, on average, expenditures on long-term care are set to increase by 70 per cent over the projection period compared with a more modest 30 to 40 per cent for health care.

The results for public expenditure on health care expenditure reveal that the impact of demographic changes over the fifty year period would be in the range of 0.7 to 2.3 percentage points of GDP over the fifty year projection period. Three Member States, (Germany, Ireland and Austria) are expected to see increases in expenditure of around or above 2 percentage points of GDP over the projection period.

The impact of demographic changes on levels of public expenditure on long-term care would lead to increases in expenditure ranging from 0.2 to 2.5 percentage points of GDP over the fifty year projection period. However, it is possible to distinguish a sub-set of Member States where the implications of demographic changes are likely to be stronger - this includes Denmark, Netherlands, Finland and Sweden. These are the Member States which have strong traditions of formal provision of long-term care, and thus high initial levels of expenditure. However, low projected increases in expenditure in other Member States, may not necessarily mean a lower risk of sharp expenditure increases in these countries. This is because future growth in the numbers of the very old combined with projected increases in labour market participation, particularly among females, might force policy changes which could lead to increased formal provision of long-term care in those countries.

Projections using two alternative demographic variants were also run. For health care, the results under the alternative demographic scenarios were not significantly different than under for central variant. Similarly, for long-term care, the results for the high population demographic variant (which combines higher life expectancy, fertility and immigration than in the central variant) were not greatly different from the central demographic scenario. However, a demographic scenario with higher life expectancy alone does lead to a significant impact on long-term care expenditures over the projection period for some Member States – this is particularly the case in those countries with larger initial long-term care sectors.

On a note of caution, it is important to remember that the projections undertaken most likely overestimate the direct impact of population ageing on overall expenditure levels. On the other hand, it is also necessary to recall that other factors, which have driven increases in unit costs in health and long-term care sectors significantly in the past (thus driving increases in overall levels of expenditure) are not analysed explicitly here. Simple cost assumptions were made for the developments of expenditures per head, which implicitly include the non-demographic factors – these simple cost assumptions may significantly underestimate the impact of these factors in driving costs per head or per unit in these two sectors.

In conclusion therefore, the increased fiscal burden implied by the impact of demographic changes on health and long-term care expenditures is significant, and could have serious repercussions for fiscal sustainability and debt dynamics. In particular, the projections imply rapidly growing long-term care expenditures, which would imply a significant additional burden to public finances in those countries which have traditions of formally provided care. However, increases in health spending would also be significant for some, other, Member States.

4.5. Optional projections

Some Member States, were able to run a number of additional optional projections. These projections extended the core methodology, and in some cases tried to address some shortcomings of the methodology employed for the core projections.[71]

4.5.1. Health care: extrapolation of past expenditure trends

There is much uncertainty about possible future trends in expenditure levels per head, or in other words about future developments in unit costs, in the health and long-term care expenditures. This is because a number of supply and demand factors are likely to drive expenditures per head[72], and these factors interact in varying ways in different institutional contexts to lead to sometimes substantially different outcomes in terms of aggregate expenditure levels.

In the core projections discussed in the previous section (where the aim was to analyse the impact of demographic changes only) no attempt was made to seriously address the question of future trends in expenditures per head. Instead, simple rules were used to map the developments of costs per head in the coming years. However, the limitations of using such an approach are explicitly recognised.

One way of addressing concerns about future cost trends is to analyse developments in the past, and to try to extrapolate past trends into the future – this was the aim behind the optional projection discussed below.

Simple retrojections using the methodology of the core projections

[71] Unless otherwise stated, the optional projections used the central demographic variant, and average costs per head which grow at the same rate as GDP per capita.

[72] See Section 4.2

One means of separating past trends in expenditures per head from past demographic changes is to use the methodology employed for the core projections to predict expenditure levels for past years. Thus age-related expenditure profiles for the base year (a recent year) are matched to historical demographic series and a fictional historical expenditure series is generated. Both Belgium and the UK ran this exercise. Belgium ran estimates back to 1948, using age-related profiles for 1998, under the two core cost assumptions[73] for total public expenditure on both health and long-term care. The UK, estimated expenditures back to 1990, using age-related profiles for 1998, under the GDP per capita cost assumption. For the UK, the estimates cover expenditures of the National Health Service which includes health care and some long-term care. The results are shown in Graph 4.5.

For Belgium, the retrojection reveals that there is little difference between the two fictional series despite the use of two different cost assumptions.[74] Secondly, these "retrojected" series are quite different from the development of actual levels of expenditure. For Belgium, the long time-series reveal that actual historical expenditure was much lower than predicted by the retrojected series, where the ratio of expenditure per head to GDP per capita or per worker in historical years is assumed to be the same as that of 1998. In other words, in Belgium, in the post-war period, the development of average expenditures per head has far outstripped the growth of GDP per capita or worker. Thus, if past trends were to be repeated, then the core projections would seriously underestimate the future fiscal burden implied by the health and long-term care sectors.[75]

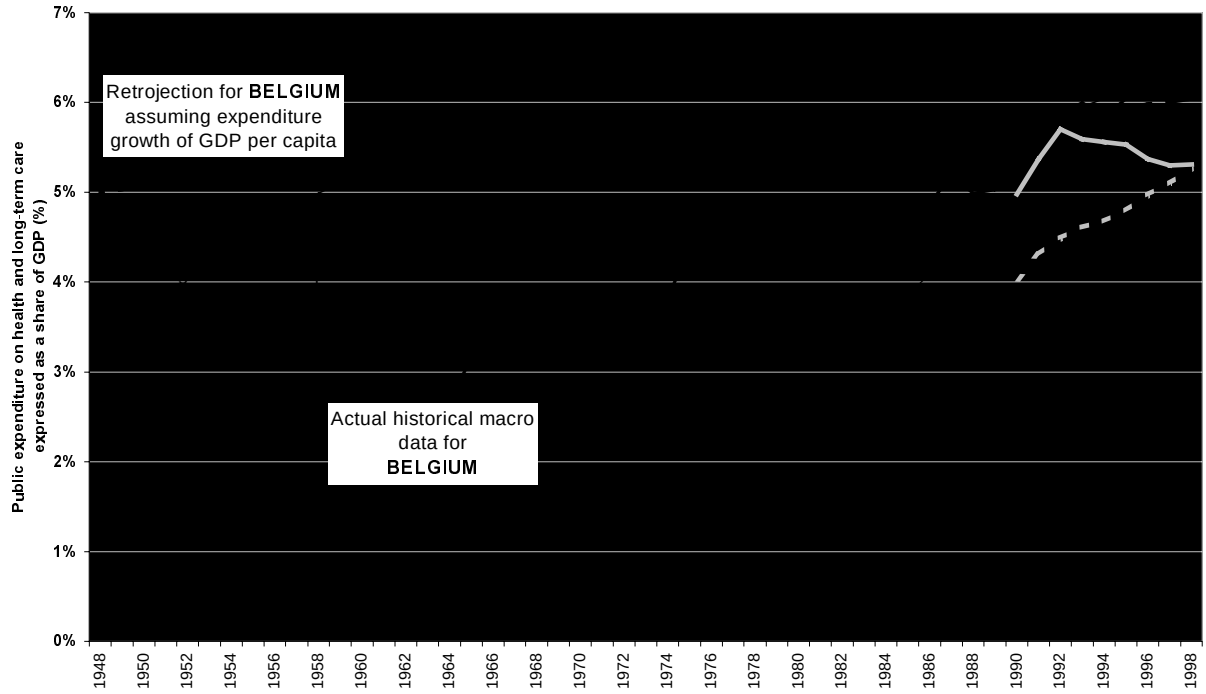
For the UK, the time series is much shorter, and so less can be concluded. However, the pattern is the opposite of that seen in Belgium over the longer time horizon. In the 1990s expenditures per head in the UK grew more slowly than GDP per capita. Thus, for the UK, if the trends of the nineties were to continue into the future, then the core projections would overestimate the fiscal burden of the National Health System in the coming decades.

[73] These cost assumptions are that average expenditures per head grow at either the rate of GDP per capita, or at the same rate as GDP per worker.

[74] This is consistent with the results of the core projections for the future reported in the previous section.

[75] However, it is extremely unlikely that the very rapid increase in health expenditures of the post-war period, which were related to unique conditions, would be repeated.

Graph 4.5 Actual and retrojected levels of health and long-term care expenditure for Belgium and the UK



Using an analysis of past expenditure trends to project future expenditures

For Belgium, past expenditure trends were further analysed and were used to project future trends. A regression was run on past data to estimate the elasticity of health care consumption to increases in GDP per capita. The regression revealed a long-term marginal propensity to consume of €11 for a €100 increase in GDP per capita – i.e. superior to the present share of health care expenses in GDP.

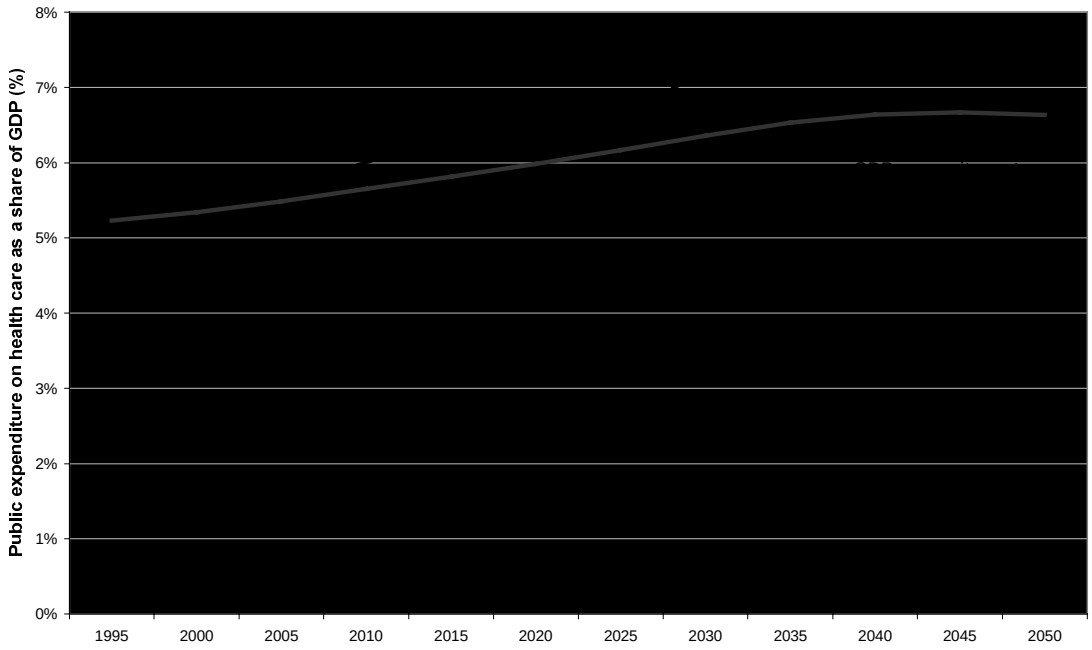
These results were extrapolated forward. In the functional form employed[76], the elasticity of average health expenditures per head is assumed to be about 1.2 in 2000 tending to 1 after an infinite number of years. The results for this projection are shown in Graph 4.5, where they are compared with the core projection of health expenditures growing in line with GDP per capita.

The results for Belgium extrapolating past trends gives a projection of health expenditure which is above the baseline core projection over the fifty year projection period. In the final year, expenditure on health care as a share of GDP is projected to be 0.8 percentage points higher than in the baseline core projection. Thus in 2050, expenditure would be 7.4% of GDP compared with 5.4% in 2000. Moreover, much of the increase in

[76] The projection was run using the Maltese model (2001). (See Federal Planning Bureau of Belgium (2001).) The model sets a linear relation between health care expenses per capita at unchanged demographic structure and deflated by GDP-prices, on the one hand, and GDP per capita and an autoregressive term, on the other hand. Thus the trend includes the volume effect and the effect of the difference between the price of health care and that of GDP. Some health-related expenses of sub-national governments, which were only identified some ten years ago, are excluded from the trend and kept constant as a share of GDP.

expenditure levels takes place in the early part of the projection period - already in 2025 the results of the optional projection are 0.8 percentage points above the baseline. This scenario would point to a significantly greater burden of the health care sector on the public finances than projected under the baseline scenarios.

Graph 4.6 Projections of health expenditure for Belgium: using past trends to project future expenditures



4.5.2. Health care: projection of health expenditure using estimates of "death-costs"

As discussed in Section 4.2, the use of static age-related expenditure profiles to project health expenditures for the future is unsatisfactory for a number of reasons. One of the reasons is that expenditures over the lifetime of an individual tend to be concentrated in the period before death – these expenditures at the end of life are sometimes called "death-costs".[77] As mortality rates tend to be greater for higher age groups, this leads to an upwards bias for average expenditures in these age-groups. One effect of this upwards bias is an overestimation of future levels of aggregate expenditure where projections are run using static age-related expenditure profiles in a situation where life expectancy is increasing (i.e. where age-specific mortality rates are declining for older age groups).

One way of addressing this problem is to estimate the "death-cost" component. One way of doing this is to split age-/sex-specific expenditures between those that survive a given year and those that don't. Another way is to estimate average expenditures for members of age- and sex- groups according to the remaining years of life of individuals.

Three Member States were able to run projections allowing for a "death-cost" component. However, these Member States all used somewhat different means of

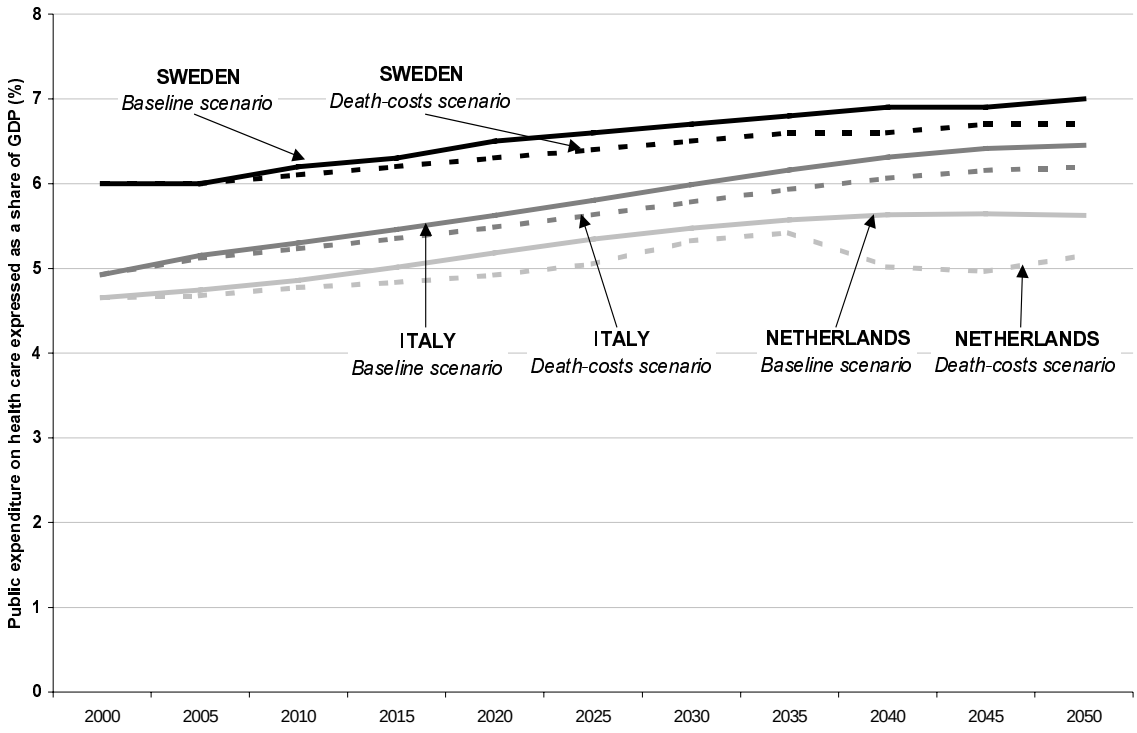
[77] One other way of expressing this problem is to say that expenditures are more related to the time remaining until death than they are to age (or time since birth).

estimating this component. Italy based its optional projections on age-specific costs which are split between survivors and non-survivors. The split between costs on survivors and non-survivors is made on the basis of a parameter which is distributed by age and sex. This parameter expresses the ratio of the health care costs of non-survivor to that of a survivor in a given year. For the Netherlands, the projections are based on estimates of expenditures of people in the last year of life. These costs appear to be roughly constant across age groups in the Netherlands. Using the estimate of death-costs and age-specific mortality rates, two different cost profiles are calculated for survivors and non-survivors. For Sweden, the approach is somewhat different than for the two other Member States. In Sweden, estimates are made of expenditures related to age, sex and the numbers of years of life remaining.[78] In all three countries the above information was then combined with age-specific mortality rates for the projection years in order to generate projections of health expenditure for future years.

Graph 4.7 gives the results of the projections using estimates of death-costs for all three countries, compared with the baseline projection made for the core projections. These estimates are based on the central variant demographic projection.

Graph 4.7 The "death costs" scenario for public expenditure on health

Central demographic variant



For all three Member States that undertook this projection, the death-costs scenario leads to a reduction (relative to the baseline projections) in projected expenditure levels for all

[78] For in-patient care, data are split by the years of life remaining. For out-patient care, data are divided between survivors and non-survivors. However, expenditure for the survivors is adjusted with a correction factor for remaining years of life.

years. The results for the Netherlands show the greatest difference over the projection period – and reach as high as 0.7 percentage points in 2045. In 2050, the differences in expenditure levels between the death-costs scenario and the baseline scenario are 0.4 percentage points for the Netherlands (where expenditure levels would only be 5.2% of GDP compared with 5.6% under the baseline scenario). The results for Italy and Sweden in 2050 would be 6.2% and 6.7% respectively, instead of 6.5% and 7.0% under the baseline scenario.[79]

Thus the use of estimates of death-costs can lead to a significant reduction in projected expenditure levels for future years relative to the baseline scenario, both at the end of the projection period, as well as earlier. The lower implied levels of expenditure on health care could have important implications in terms of containing the fiscal impacts of ageing populations on the size of the health sector.

4.5.3. Long-term care: improving health scenarios for long-term care

As for health care, the use of age-specific expenditure profiles to project future levels of expenditure on long-term care is problematic for a number of reasons[80]. One of the key reasons is that in past years, increases in life expectancy have gone hand in hand with improvements in the health status of the elderly, particularly for the young elderly (those aged below 80 or 85 years of age). Of particular relevance to long-term care costs have been reductions in disability. This is often because long-term care, rather than traditional acute health care interventions, are needed more to help with the essential tasks of daily living rather than for treating acute morbidity. Thus, to the extent that reductions in disability will continue, use of static age-related expenditure profiles for long-term care are likely to lead to an overestimation of future expenditures on long-term care.

Ideally, projections to take account of possible health improvements would be built up from observed past improvements in health - this has been possible in the case of Sweden. However, for the other Member States that ran this optional projection this was not possible. Instead, these Member States (Belgium, Italy, Finland and the UK) used a simple means of modelling this effect – by shifting age-specific expenditures across age groups broadly in line with changes in life expectancy. The results for these projections are discussed below.

---

[79] Two of the three Member States, Italy and Sweden, also undertook the projections using death-costs data with the high life expectancy variant demographic scenario. The differences under this demographic scenario are expected to be greater, because the upwards bias in the estimates of expenditure for older persons are likely to magnified in a situation with higher life expectancy. However, neither the overall levels of health expenditure, nor the differences between the baseline and the death costs proved to be very great under the high life expectancy variant. For Italy and Sweden in 2050, expenditure levels under the death-costs scenario would be 6.3% and 7% of GDP instead of 6.7% and 7.2% under the baseline-high life expectancy projection.

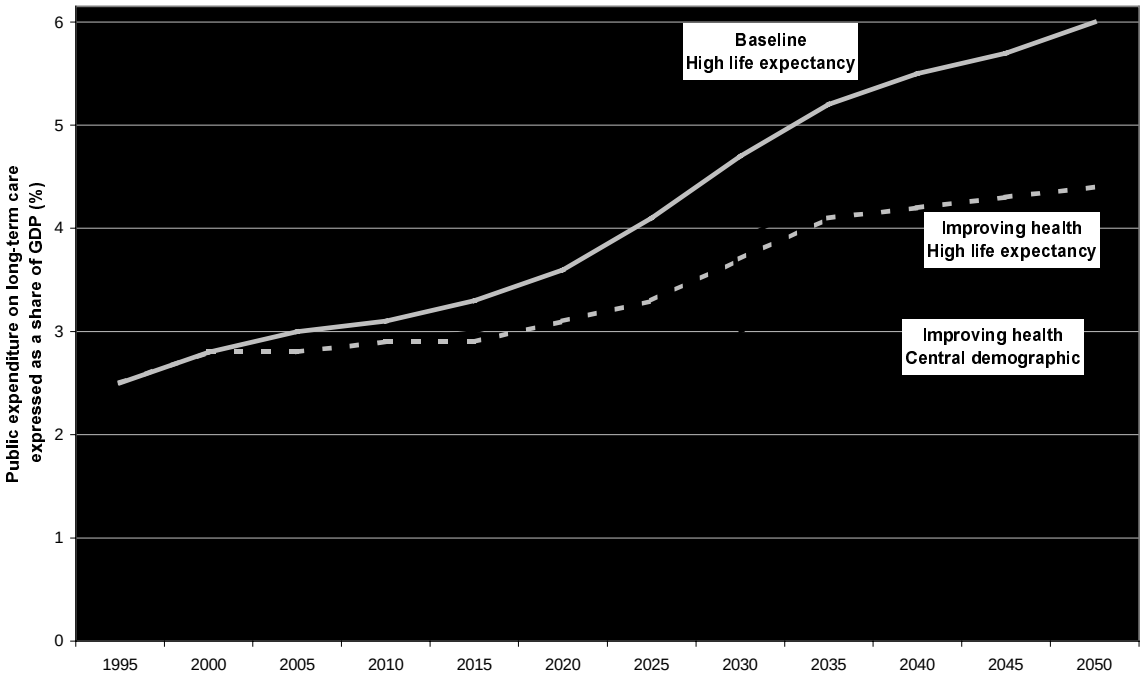
[80] See Section 4.2.

An improving health scenario for long-term care in SWEDEN

For Sweden, improvements in health status were modelled by adjusting age-related expenditure profiles for long-term care in line with past improvements in health status observed through the Swedish survey on living conditions. Projections under this scenario for Sweden were carried out for both the central and the high life expectancy demographic variant.

Graph 4.8 reveals that the implications of an improved health scenario for overall levels of public expenditure on long-term care for Sweden are striking. In the central demographic scenario, the expenditure levels predicted for 2050 fall from 4.8% of GDP in the baseline scenario to 3.3% with improved health. The reductions under the high life expectancy scenario are similar, with the improved health scenario implying levels of expenditure 1.5 percentage points lower in 2050.

Graph 4.8 An improving health scenario for long-term care expenditures in Sweden (under two different demographic scenarios)



SIMPLE improving health scenarios for long-term care in Belgium, Italy, Finland and the UK

For these four Member States, improvements in health status were modelled by shifting age-specific estimates of expenditure across age groups in line with improvements in life expectancy.[81] The overall effect is to slightly reduce expenditure levels for some groups

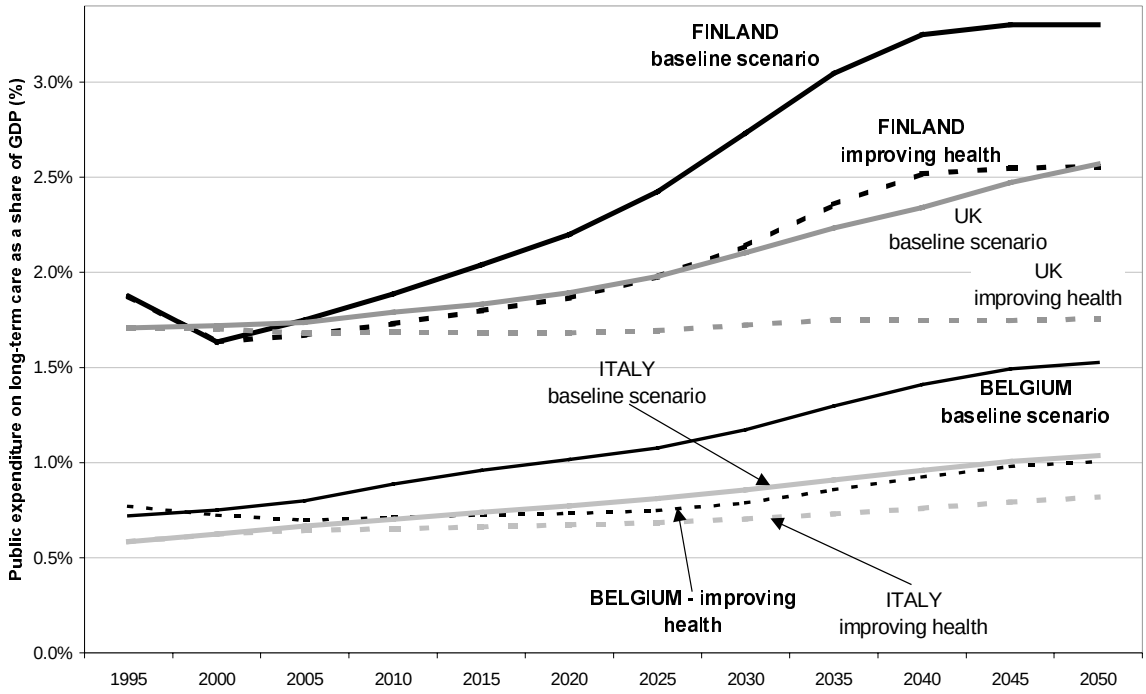
[81] One example of this would be the following: if improvements in life expectancy over the projection period are five years, then a 75 year old in 2050 would only spend as much on long-term care (as a ratio of GDP per capita) as a 70 year old would in 2000.

of the elderly over time. Each of the Member States used slightly different means of modelling improved health.[82]

The results, presented in Graph 4.9, show a relatively large difference in the overall levels of expenditure in 2050 between the baseline and the improving health scenario for the two Member States. The scale of the difference between scenarios is broadly proportional to the initial size of the care sector. Thus for the UK and Finland the difference in 2050 is 0.8 and 0.7 percentage points of GDP respectively. For Belgium and Italy, the difference in 2050 is 0.5 and 0.2 percentage points of GDP.[83]

Graph 4.9 An improving health scenario for long-term care expenditures in Belgium, Italy, Finland and the UK

Central demographic variant



4.5.4. Long-term care: changes in the balance between formal and informal care

One of the expected future drivers of average expenditures for long-term care is likely to be the balance between formal and informal provision of care. One of the key determinants of this balance, beyond the institutional and policy framework in Member

[82] For example, for the improving health scenario for Belgium, the baseline expenditure profiles were no longer considered to be related to the "average age at birth" (zero and constant), but instead related to the average life expectancy at birth (variable).

[83] Belgium, Italy and Finland also ran projections for improving health under the high life expectancy demographic scenario. The scale of the reductions in expenditure implied by an improving health scenario relative to the baseline, were again proportional to the scale of initial expenditures.

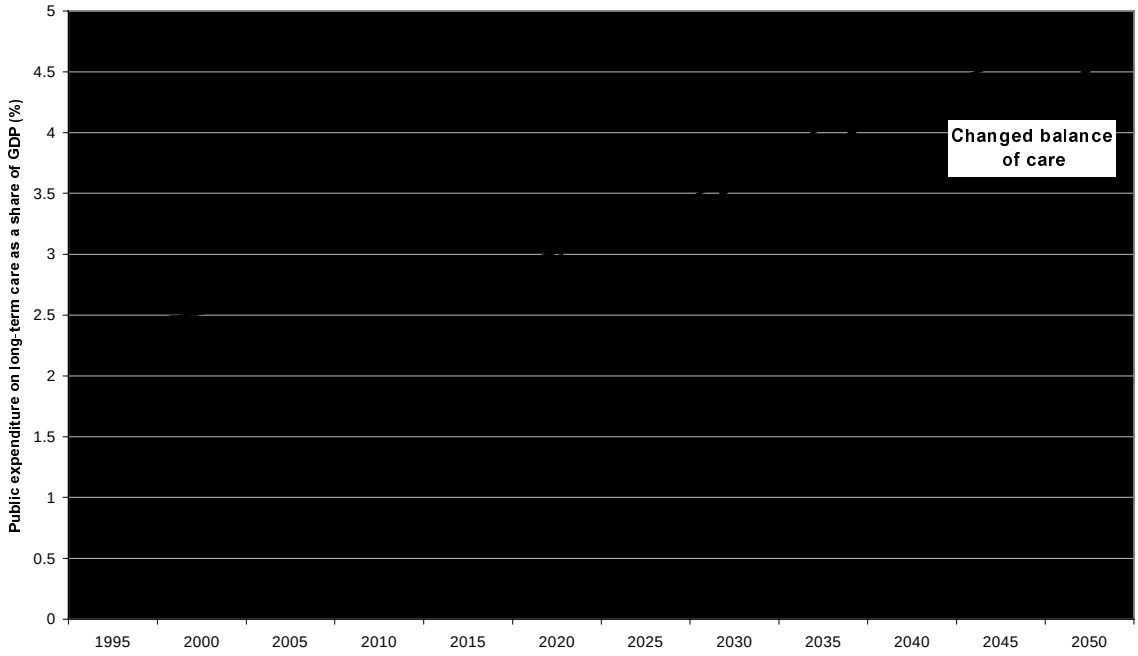
States, is the availability of informal care. One factor affecting the pattern of informal care is household structure. For example, fewer single-person elderly households might reduce the need for formal care.

The Netherlands, a country with a strong tradition of formal provision of long-term care, has run a projection attempting to model the impact of the catching-up of male life expectancy to that of women, insofar as it would lead to reduced need for formal care.[84]

Graph 4.10 reveals that the change in the aggregate costs of care for the Netherlands, relative to the baseline scenario are projected to be in the order of 0.25 percentage points in 2050.

Graph 4.10 A reduced formal care scenario for long-term care in the Netherlands

Central demographic variant



Whilst it might seem that the difference in the results is relatively modest, in other Member States other policy, societal or labour market trends are likely to have a much bigger impact on changing the balance of long-term care between the formal and the informal. In most Member States (excluding of course those already have large formal long-term care sectors) any such changes would be likely to lead to an additional increase in the long-term care sector relative to the baseline, rather than the decrease projected here for the Netherlands.

4.5.5. Summary of results for optional projections and conclusions

As outlined in Section 4.3, whilst the methodology employed to run the core projections had the advantages of allowing the maximum number of Member States to run projections that were broadly comparable, it is nevertheless subject to a number of

[84] The results of Lakdawalla and Philipson (1999) were used.

limitations. In order to address some of the key limitations emerging from this methodology Member States were invited, on an optional basis, to run additional projections extending the methodology.

One of the first shortcomings of the methodology for the core projections is that it only analyses the possible future impact of demographic changes on expenditure levels. None of the other factors that are likely to be important drivers of aggregate health expenditures in the future are analysed. Whilst it has not been possible to look at all other factors in detail – it is indeed beyond the scope of this exercise – it was possible to analyse past expenditure trends and to isolate the non-demographic component of past increases in expenditure. Past non-demographic trends can then be projected into the future along with future demographic trends. This exercise was run for Belgium. The result for Belgium stresses the need for caution in interpreting the baseline results – it points to significant upside risks.

A second shortcoming of the core methodology was for the projections of health care expenditure, where it does not take account of the concentration of health expenditures towards the end of a person's life irrespective of the age of death – so-called "death-costs". In a context of increasing life expectancy, this concentration of expenditure could be an important factor containing the increases in expenditure due to demographic changes. Four Member States were able to run projections which included estimates of death-costs. These led to significant reductions in expenditure levels over the projection period, and suggest that the baseline projections are likely to overestimate the impact of demographic changes on aggregate levels of health care.

Similarly, in the case of long-term care, the core methodology, based on static profiles of age-specific expenditures did not take into account possible improvements in the health status of the elderly and their possible impact on long-term care expenditures. Five countries ran optional projections under improving health scenarios. Notably these results showed striking reductions in the predicted burden of future long-term care expenditures relative to the baseline projection, with the reductions being broadly proportional to the initial level of expenditures on long-term care. Thus the core projections for long-term care could overestimate significantly the impact of demographic changes on aggregate levels of long-term care.

Therefore, in conclusion, the limited number of optional projections point to significant upside and downside risks to the baseline projections.

4.6. Conclusions

This chapter has presented the results of the Working Group on Ageing of the EPC on projecting the impact of demographic changes on aggregate levels of health and long-term care expenditure. The projections undertaken aimed to measure the impact of demographic changes on levels of public expenditure on health and long-term care expenditures, with a view to contributing to the debate on the overall sustainability of public finances in the EU over the long-term. This work represents a significant first step in this area, constituting the first attempt to make comparable projections of the impact of ageing populations in these sectors across EU Member States.

Projections were run for health and long-term care separately, under two different simple cost assumptions, and under a number of alternative demographic and macroeconomic scenarios. The methodology employed for the core projections matched current patterns

of expenditures across age groups to future demographic projections. Whilst this methodology has some limitations, it has the advantage of being relatively simple to apply, allowing for the widest possible coverage of Member States in the projections exercise.

The baseline projections suggest that the impact of ageing on public expenditure on health and long-term care is likely to be significant, thus implying an important additional burden for the public finances over the long-term. Where Member States have presented results for both health care and long-term care, the consequences of demographic changes in terms of increased public expenditure would range from 1.7 to 3.9 percentage points of GDP. Among these Member States, with one or two exceptions, the Member States that would experience the highest overall increases in total public expenditure on both health and long-term care would see the largest part of this increase come from expenditures on long-term care. Moreover, on average expenditures on long-term care are set to increase by 70 per cent over the projection period, compared with a more modest 30 to 40 per cent for health care.

However, the baseline projections face a number of both upside and downside risks. The key upside risk is that by not explicitly modelling the non-demographic factors which might drive expenditures per head, the projections could underestimate the future fiscal burden implied by the health and long-term care sectors. Moreover, the assumptions on the developments in expenditures per head, which implicitly encapsulate the developments of all non-demographic effects, might be considered to be conservative when seen in a historical perspective. On the other hand, the methodology used to model the impact of demographic factors, ignores possible improvements in the health status of the elderly over time which might help contain expenditure pressures. A discussion on the scale of these risks has been illuminated by additional results for some Member States – these additional results extend the core methodology used to run the projections. Whilst these additional results cover only a few Member States, their implications are very important – both upside and downside risks to the baseline projections are revealed to be significant.

In summary therefore, the projections of the AWG of public expenditure on health and long-term care suggest important implications for the long-term sustainability of public finances. Increases in the burden of expenditure emerging from these two sectors in the future could have serious repercussions for the long-term sustainability of the public finances.

5. POSSIBLE INDICATORS OF THE SUSTAINABILITY OF PUBLIC FINANCES

5.1. How to define and assess the sustainability of public finances

The projections in section 3 show that ageing populations could lead to increased expenditure on public pensions by between 3 and 5 percentage points of GDP in most Member States, with larger increases in several countries. Projections in section 4 show the impact of ageing populations on health care expenditure could lead to an increase in the range of 1 to 2% of GDP: for those Member States for which projections on both health and long-term care are available, the increases in expenditure levels over the fifty years ranges between 1.7% and 3.9% per cent of GDP. While the overall impact of ageing populations requires that account be taken of other expenditure items (such as child care, education and other social transfers), it is clear that significant pressures to increase public spending will occur in all Member States

This will inevitably place substantial pressure on Member States in sustaining sound public finance positions that comply with the requirements of EMU, and which facilitate growth and employment. Such concerns lie behind the decision of the Stockholm European Council that "*The Council should regularly review the long-term sustainability of public finances, including the expected strains caused by the demographic changes ahead."* The AWG was requested to consider how its age-related expenditure projections could help in the assessment of the long-term sustainability of public finances, and in particular whether indicators could be developed to this end.

Although intuitively straightforward, an operational definition of sustainability has proven elusive. The so-called Present Value Budget Constraint (PVBC)[85] implies that today's government debt has to be matched the present value of cumulated primary surpluses, and that permanent primary deficits are not sustainable. While conceptually important, the PVBC needs to be carefully explained if it is to provide an operational benchmark or guideline when determining current budget policy choices. This is because to satisfy that PVBC, it is possible to assume the necessary primary surpluses are generated by future (even unborn) generations, and/or that future governments will raise the necessary taxes.

In the absence of an agreed definition of sustainable public finances, the AWG took a pragmatic approach and assessed sustainable public finances in terms of compliance with the budgetary requirements of EMU, i.e. avoiding excessive deficits, keeping debt levels below the 60% of GDP reference value and respecting the "close to balance or in surplus" requirement of the Stability and Growth Pact (SGP)[86]. Although the SGP only imposes commitments on Member States for budgetary positions in the medium-term (3 to 5 years) and does not require explicit longer-term targets, sustainability is *de facto* ensured[87] provided budget balances respect the "close to balance or in surplus" target. This approach has the additional advantage of ensuring simplicity and

---

85 Formally, the present value budget constraint requires that future net tax revenues (i.e. tax revenues less transfers of current and all future generations measured in present value terms) are enough to cover the present value of future government consumption and to service the existing stock of government debt. Note, it does not assume that government debt is ever paid of. The PVBC measure is an important indicator of sustainability that is used in Denmark, see Danish Ministry of Economic Affairs (2000).

86 For a description and analysis of the Stability and Growth Pact see various chapters in Brunila, Buti, and Franco (eds.) (2001).

87 Balassone and Franco (2000)

transparency, with easy-to-understand results. Defining sustainability as non-violation of pre-determined levels of deficits and debt involves making a number of arbitrary assumptions and benchmarks: however, similar arbitrary assumptions are also found in the synthetic indicators proposed in the literature such as those developed by Buiter and Blanchard.[88]

The AWG recognises that the sustainability of public finances is a multi-faceted concept that goes beyond the avoidance of structural deficits and the accumulation of public debt. As noted in the joint Commission-Council report to the Stockholm European Council, sustainability also entails keeping the tax burden at reasonable levels and ensuring that non-age related expenditures are not crowded-out by increased spending on pensions and health care.[89] It is therefore helpful to examine several indicators which, although of a similar nature cast light on different aspects of the challenge and which take account of the fact that there is considerable uncertainty surrounding long-term budgetary projections.

5.2. Suggested approach for assessing the sustainability of public finances

The AWG considers that the following two-stage approach could help cast light on the sustainability of public finances. A first step would involve verifying whether existing budgetary policies can ensure continued compliance with the budget requirements of EMU. The second step involves estimating synthetic indicators of the scale of budgetary adjustment required (if any) for Member States to ensure sustainable public finances. The approaches are specified in full in annex 3.

Group 1: assessing the sustainability of public finances

To begin with, a baseline test is undertaken which involves extrapolating budget balances and debt levels on the basis of the baseline age-related expenditure projections. A set of assumptions are then required. The tax burden and non-age related expenditures are held constant, and a fixed interest-growth rate differential is maintained throughout the projected period (preferably the real GDP growth rates as used by the AWG in making its projections). It is then possible to estimate the evolution in public debt over the projection period, a result which hinges upon whether the starting primary surplus is sufficiently high so that the fall in the interest burden over time can absorb the additional age-related expenditures. A quick examination of results will then show whether the projected level of debt respects the requirement to stay below 60% of GDP reference level at all times (or in the case of high debt countries, to fall and then stay below this level), and whether the requirement to have balanced budget positions is fulfilled. Failure to do so would, *a priori,* indicate that public finances are not on a sustainable footing.

Given the sensitivity of the results to the underlying assumptions, a number of stress tests are done so as to ascertain whether public finances are sustainable under different circumstances. Three stress tests are proposed below:

- setting the initial total and primary budget balance at a more/less favourable level compared with the baseline scenario, as this illustrates the sensitivity of results to a less favourable budgetary performance.

---

[88] Buiter (1985) and Blanchard (1990).

[89] Council of the European Union (2001), European Commission (2000).

- assuming that age-related expenditure growth is above/below the level in the baseline scenario. The size of the shock to age-related expenditures could be based on the higher/lower bounds of the sensitivity tests for pensions and health care projections;

- a higher/lower interest rate-growth rate differential.

A breach of the reference values for either the budget balance or debt under the stress tests could *a priori* be considered as indicating a risk of unsustainable public finances.

Group 2: synthetic indicators of the required adjustment effort

A first synthetic indicator would consider the difference between the projected primary surplus based on the AWG projections and the 'required' primary surplus necessary to ensure a balanced budget in all years of the forecasts exercises. This can be done for both the baseline scenario and for the stress tests described above. As well as considering the difference between the projected and required primary surplus over the projection period, it is possible to measure the net present value of the required primary surplus over the projection period, and to calculate the average required primary surplus over the same period. These latter estimates give an indication on the "real budgetary adjustment" effort, and help mitigate the erroneous impression that high debt countries with substantial initial primary surpluses are better placed than lower debt countries to meet the costs of ageing populations.

A second synthetic indicator is a financing gap (which is usually referred to as a tax gap in the economic literature). This measures the difference between the current tax ratio (which is held constant over the projection period) and the constant tax ratio needed to achieve a pre-determined budgetary target at a specified date in the future. The choice of the budgetary target and the date when it should be achieved are arbitrary. One approach would be determine which constant tax rate is required to reach the same debt level in 2050 as would result from a continued balanced budget position over the projection period: this has the advantage that the target to be achieved is consistent with the budgetary framework of the SGP (2050 is chosen as this is the time horizon of available projections for age-related expenditures). An alternative approach suggested by the Dutch authorities (and which is traditionally used in the economic literature) does not have cut-off date. Instead it estimates the financing gap needed to finance expenditures to infinity whilst servicing the debt. This of course requires additional assumptions on age-related expenditures after 2050, e.g. such as they remain constant at their 2050 level

5.3. A stylised application of the indicators

This section applies the indicators mentioned above for two stylised countries, i.e. an "average debt" country where the initial level of public debt is 60% of GDP, and a "high debt" country where initial public debt is set at 100% of GDP.

In both cases, non-age related expenditure is assumed by to be constant at 23% of GDP. Age-related expenditure is assumed to stay constant at 16% of GDP until 2010: thereafter it increases in a linear fashion by 5 percentage points of GDP by 2030 and stays constant at 21% of GDP until 2050.

In the baseline scenario, both countries are assumed to be in a position of budget balance in 2005. In accordance with the assumptions made in the overall exercise, real interest rates are fixed at 4% and inflation at 2%. Nominal GDP growth is assumed to be constant at 4% over the period in these illustrative examples. Of course, in this setting the lower interest burden in the "average debt" country results in a lower constant tax burden than in the "high debt" country.

The stress tests are conducted as follows:

- in the "initial budget position" stress test, the primary and actual budget balance are increased/ lowered by 1% point of GDP compared with the baseline scenario. This is done by altering the level of non-age related expenditure.

- in the "age-related expenditure" stress test, age-related expenditures increase/decrease by 0.5% of GDP over the projection period. This is equivalent to the rate of growth in age-related expenditures being 10% above/below the baseline scenario.

- in the "interest-growth differential" stress test, the differential is increased/lowered by 1% point compared to the base-line

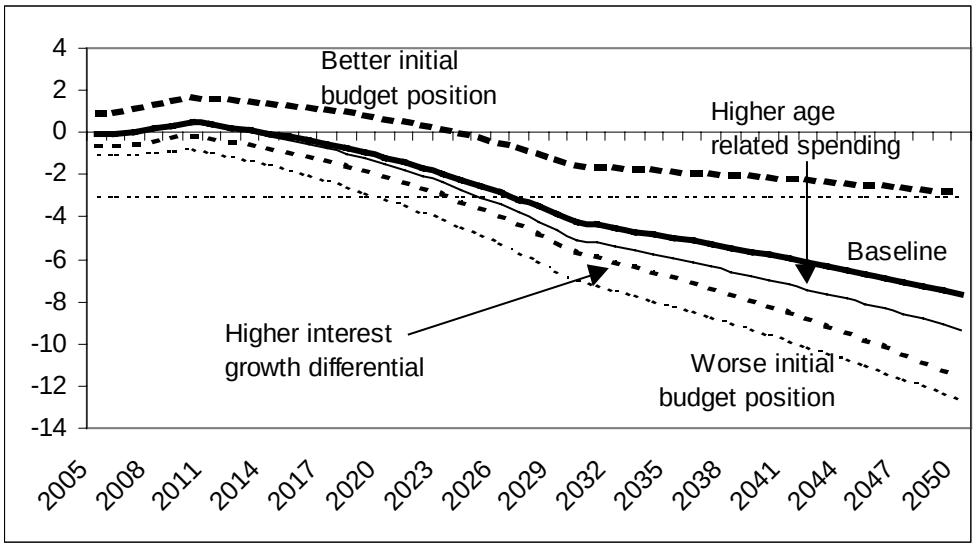
An "average debt" country

Group 1 tests - assessing compliance with the budgetary requirements of EMU: In the baseline scenario, a budgetary position below the 3% reference value is maintained until 2025, see graph 5.1. Thereafter, deficits increase to unsustainable levels as debt levels increase. Government debt (graph 5.2) stays below the 60% reference value until about 2035 in the baseline scenario, but the reference value is breached some 10 to 15 years earlier in the negative stress tests. Overall, these results suggest that public finances are not fully sustainable in the baseline scenario, and that there is a substantial risk under less favourable circumstances.

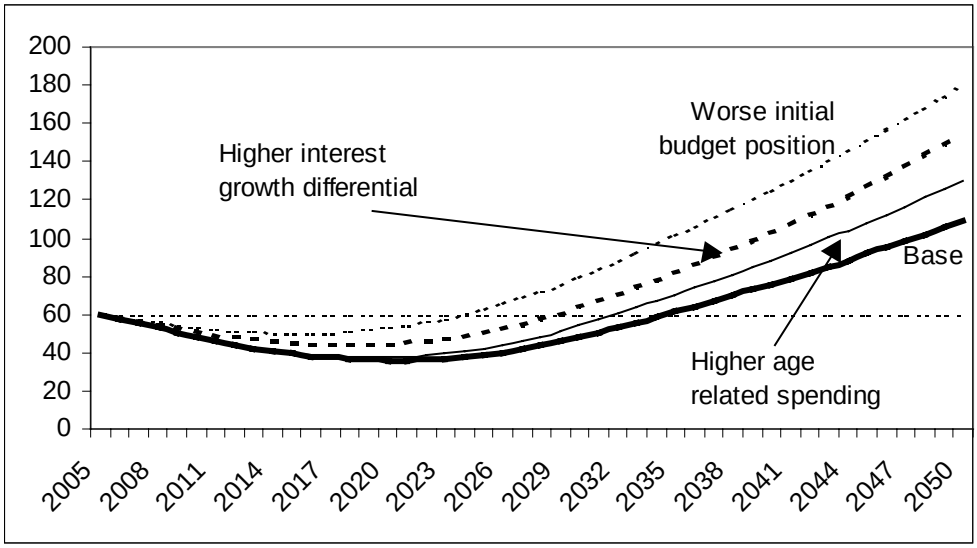
Group 2 tests – assessing the required level of adjustment: the difference between the projected primary surplus and the required primary surplus necessary to achieve a balance budget position is shown in the second section of table 5.1. They show that the projected primary surplus is above the required primary surplus until 2015 in the baseline scenario, see graph 5.3. Thereafter, the opposite is true and it remains so until the end of the projection period. This is also valid for the stress test scenarios. These results point to two important conclusions. First, countries that have not yet reached the balanced budget requirement need to continue the process of budgetary consolidation. Second, countries that already have a balanced budget position may wish to lower their primary surplus in the medium-run (say by cutting the tax burden): however, such policies may be inconsistent with ensuring long-term sustainability, as they would have to be reversed at a later stage in order to ensure balanced budget positions.

An indication of the required adjustment margin is presented by the financing gap indicator in the third section of the table 5.1. The financing gap is positive in all cases including the stress tests, and for both measures, i.e. that required to achieve the debt level assuming a balanced budget position is maintained under 2050 (the SGP financing gap), and the 'traditional measure which runs to infinity. For example in the baseline scenario, there is financing (SGP)gap of 1.4% of GDP. This result suggests that for public finances to be sustainable in this setting, further budgetary consolidation is required, and that the projected reduction in interest burden will not be sufficient enough to contain the increase in age-related expenditures.

Graph 5.1 Projected budget balance: average debt country



Graph 5.2 Projected level of government debt: average debt country



Graph 5.3 Required and projected primary balances: average debt country

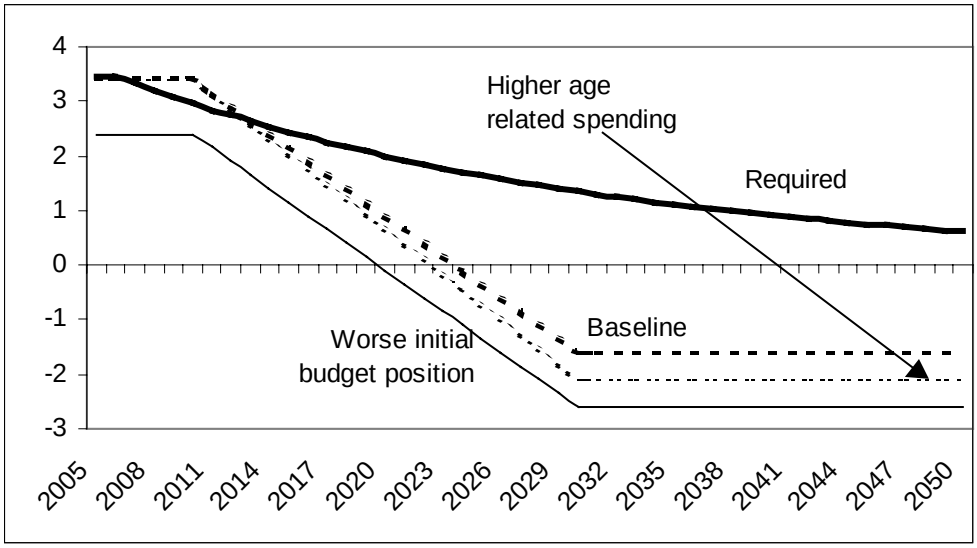


Table 5.1 Indicators of the sustainable public finances: average debt country

	2005	2010	2020	2030	2040	2050
Required Primary balance	3,5	3,0	2,0	1,4	0,9	0,6
Difference between required and projected primary surplus						
- Baseline	0,1	-0,4	1,1	3,0	2,5	2,2
- Worse initial primary surplus	1,1	0,6	2,1	4,0	3,5	3,2
- Better initial primary surplus	-0,9	-1,4	0,1	2,0	1,5	1,2
- Higher age-related exenditure	0,1	-0,4	1,3	3,5	3,0	2,7
- Lower age-related expenditure	0,1	-0,4	0,8	2,5	2,0	1,7

	Financing gap		NPV of PB (1)	Average PB (2)
	SGP	Traditional		
Baseline scenario	1,4	1,6	22	0,1
Required			45	1,7
Worse initial primary surplus	2,4	2,6	1	-0,9
Better initial primary surplus	0,4	0,6	43	1,1
Higher age-related expenditure	1,7	2,0	17	-0,2
Lower age-related expenditure	1,1	1,2	27	0,4
Higher interest-growth differential	1,5	1,7		
Lower interest-growth differential	1,3	1,5		

(1) NPV of PB = net present value of all primary balances over the period 2000-2050 % of GDP
(2) Average PB = simple annual average of primary balances over the period 2000-2050

A "high debt" country (with a larger initial primary surplus)

Group 1 tests - assessing compliance with the budgetary requirements of EMU: in the baseline scenario, the deficit gradually increases but remains below 1.5% of GDP over the projection period (see graph 5.4). Public debt falls and stays below the 60% reference value (see graph 5.5). Even so, in the negative stress tests deficit and debt levels tend to increase above reference values in the end of the period.

Group 2 tests – assessing the required level of adjustment: the projected primary surplus is above the required primary surplus until 2025 in both the baseline scenario and the higher age-related expenditure scenario (see graph 5.6). Thereafter, the opposite is true and remains so until the end of the projection period. The stress test for the interest-growth rate differential clearly show the additional risk exposure of high-debt countries to changes in interest rates. In addition, the stress test for a worse initial budgetary position clearly shows tax cuts which are not matched by expenditure reductions can rapidly lead to a situation where the required primary surplus is much higher than the projected primary surplus.

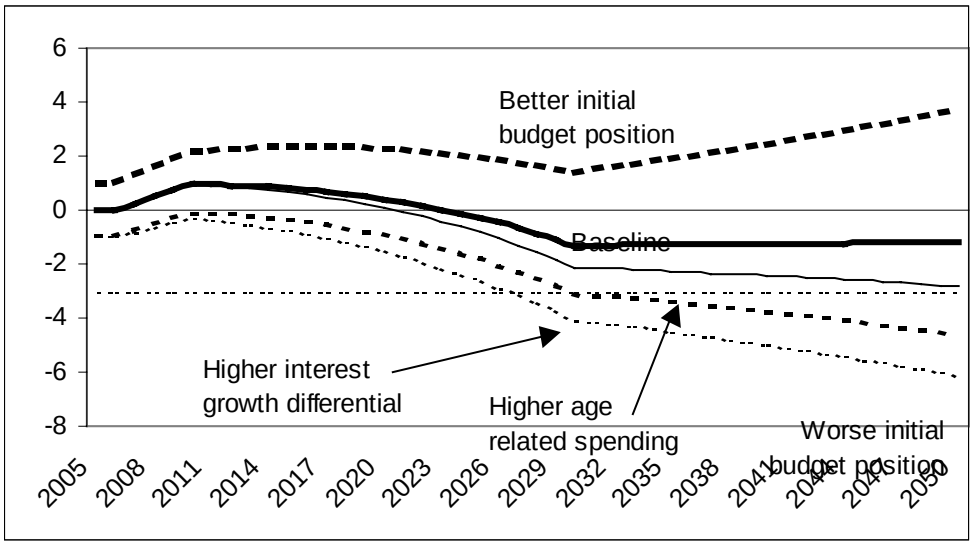
The results for high debt countries may appear somewhat paradoxical, in that their public finances seems to be closer to meeting the requirements for sustainability compared with the average debt country. For example the baseline financing gap is substantially lower than in the average debt case. This is not surprising given the assumptions of a constant tax ratio and constant non-age-related expenditure ratio which implies a high starting primary surplus that is sufficient to absord the additional age related expenditures.

In effect, the high debt countries in the above example is in a good position to meet the costs of ageing populations because it has a high primary surplus to begin with (just an average debt country with a similar primary surplus). By building up a primary surplus, high-debt countries could practically eliminate any positive gap between required and projected primary surplus (see stress test with better initial primary surplus, see tables 5.1 and 5.2). However, this does not mean that high debt countries will find it easy to meet the budgetary challenge of ageing populations, since

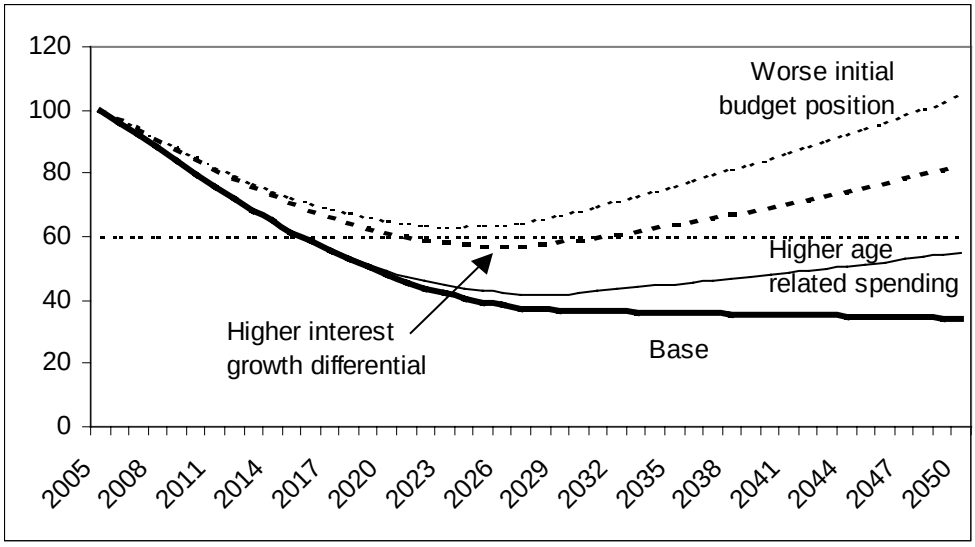
past experience shows that it is difficult to sustain sound budgetary performance over the very long run. To guage the pressure or real budgetary effort required to meet the costs of ageing populations, it is worthwhile considering the levels as well changes in budgetary aggregates.

For example, a comparison on of the required primary surpluses in the average and high debt countries on graphs 5.1 and 5.4 respectively show that the high debt country needs maintain substantially higher primary surpluses over the next the twenty to thirty years compared with the average debt country. The average required primary surplus to ensure a balanced budget position up to 2050 is 1.7% of GDP for an average debt country compared with 2.8% for a high debt country: this is a substantial additional burden for the taxpayers of the later country.

Graph 5.4 Projected budget balance: high debt country



Graph 5.5 Projected level of government debt: high debt country



Graph 5.6 Required and projected primary balances: high debt country

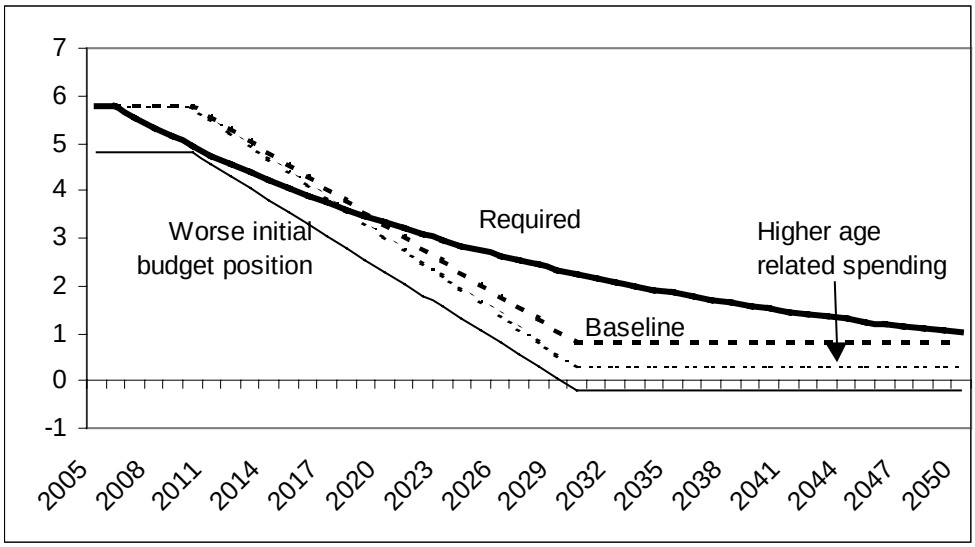


Table 5.2 Indicators of the sustainable public finances: high debt country

	2005	2010	2020	2030	2040	2050
Required Primary balance	5,8	4,9	3,3	2,3	1,5	1,0
Difference between required and projected primary surplus						
- Baseline	0,0	-0,9	0,0	1,5	0,7	0,2
- Worse initial primary surplus	1,0	0,1	1,0	2,5	1,7	1,2
- Better initial primary surplus	-1,0	-1,9	-1,0	0,5	-0,3	-0,8
- Higher age-related exenditure	0,0	-0,9	0,3	2,0	1,2	0,7
- Lower age-related expenditure	0,0	-0,9	-0,2	1,0	0,2	-0,3

	Financing Gaps		NPV of PB (1)	Average PB (2)
	SGP	Traditional		
Baseline scenario	0,2	-0,1	72	2,5
Required			74	2,8
Worse initial primary surplus	1,2	0,9	51	1,5
Better initial primary surplus	-0,5	-1,1	93	3,5
Higher age-related expenditure	0,5	0,3	67	2,2
Lower age-related expenditure	-0,1	-0,4	77	2,8
Higher interest-growth differential	0,6	0,4		
Lower interest-growth differential	-0,1	-0,5		

(1) NPV of PB = net present value of all primary balances over the period 2000-2050 % of GDP
(2) Average PB = simple annual average of primary balances over the period 2000-2050

5.4. Factors to consider when examining the indicators

Section 5.3 illustrates the difficulty in arriving at a definitive conclusion as to whether the public finances of a particular country are sustainable or not. The indicators are sensitive to public finance positions in the base year and a number of underlying assumptions, some of which are arbitrarily fixed. It is also important to recognise that these indicators presented are based on a partial equilibrium analysis and consequently feedback effects are not adequately cater for. This implies the need for caution when interpreting results and drawing policy conclusions. The AWG considers that the following factors need to be taken into account when calculating the indicators and interpreting results.

Including other age-related expenditure projections: the impact of ageing populations on public finances is not limited to spending on pensions, health and long-term care for the elderly. Other public expenditures may also be affected by demographic changes. For example, Belgium in its country fiche reports that public spending on other social transfers and education are projected to fall by 1.2% and 0.4% of GDP between 2000 and 2050 (which offsets by one third the increase in

spending on pensions and health care). Projections for child, family benefits and education are also reported for Denmark, the Netherlands, Spain and the UK in OECD (2001), which on average point to a decline in public spending of 1% of GDP over the projection for those countries which reported results. However, it should be noted that these projections were made by national authorities and not on a common basis with an agreed modelling approach. Moreover, projections for Denmark and the Netherlands actually pointed to an increase in public spending on these items over the projection period. Countries that currently have low levels of public spending on child care, but which expect large increases in female participation rates, may see such expenditures rise.

This availability of projections for additional age-related public expenditures in some Member States poses two questions. First, should they be included in the assessment of the sustainability of public finances at EU level? The AWG considers that these national projections should be used in such an assessment. Although, this will lead to different treatment across Member States, it is reasonable that the Commission and Council take account of all reliable information at its disposal when making policy assessments. The second question is whether the AWG should make common projections to assess the budgetary impact of ageing populations on other social transfers, education and child care. It is not possible to give a clear-cut answer to this question at this stage. However, it is worth noting that the demographic impact is likely to be small relative to projected changes on pensions and health care. Perhaps a useful way forward would be for those Member States which have projections, to explain the approach they followed and to indicate the main factors driving results.

The impact of ageing on tax revenues: demographic changes may have a large impact on the size and sources of tax revenues, and consequently is central to any examination of the sustainability of public finances. The indicators presented above do not address this issue, but instead assume that tax revenues as a share of GDP remain constant over the projection period. However, several Member States have argued that a more rigorous approach would be to hold tax regimes constant (i.e. bases and rates), and project revenues as a share of GDP taking on board the effects of demographic changes.

Several Member States already have made projections of this nature. In the country fiche of the Netherlands, projections show that tax revenues as a share of GDP will rise by 5% of GDP as a result of ageing population, 3% from additional indirect tax revenues and 2% of GDP from taxes on pension income. The latter increase occurs as contributions to funded pension schemes and income on investments are exempted from taxes which only become liable when pensions are paid out. In brief, these effects are likely to be greatest in countries that have a large funded second pillar pensions where taxes are deferred until pension income is drawn, e.g. Denmark, the Netherlands, the UK.

Given the potentially large impact of ageing populations on tax revenues, the AWG could examine this issue in more detail. As above, it would be useful to take first stock of existing analysis and research before contemplating undertaking a common projection exercise at EU level.[90] Also as above, it would be reasonable for the Commission and Council to take on board these projected tax revenues as a share of GDP in the assessment of the sustainability of public finances for the Member States.

---

[90] Some preliminary work on this issue has already been undertaken in DG ECFIN, see Martinez Mongay (2000) and Cambridge Econometrics (1997).

Coping with the uncertainties of long-run projections: one of main difficulties with using these indicators is their sensitivity to starting budget positions and certain underlying assumptions, in particular the interest-growth rate differential. This can make it difficult to draw firm policy conclusions, and moreover would make it relatively easy for a Member State to contest an unfavourable assessment of the Commission or Council on the sustainability of public finances. However, the AWG does not consider that the sensitivity of the results undermines the utility of the indicators in assessing the sustainability of public finances. Instead, further work may be needed both to minimise the sources of uncertainty and/or to get a better understanding of the likely direction and scale of changes to key variables. Regarding the uncertainties in the three stress tests above, the following approach could be followed:

- uncertainty on age-related expenditures and revenues: as noted above, this could be addressed by improving the scope (e.g. to include new expenditure items) and quality of projections (see suggestions in section 3.6);

- uncertainty on the starting budget position: this could largely be overcome by taking the budget balance and debt levels for the base year from the stability and convergence programmes. In particular, the targets set by Member States for the end of their respective programme is a good proxy for the 'steady state' budgetary target.

- uncertainty on the interest-growth rate differential: the AWG could analyse the possible impact of ageing populations on key macroeconomic aggregates such as labour productivity growth, aggregate savings and real interest rates.[91] Inevitably, a degree of uncertainty will remain, but it might be possible to get a better understanding of the likely direction and scale of changes which could help in design of stress test.

Need to look at levels as well as changes in budgetary aggregates: by only looking at projected changes in primary balances, a paradoxical policy conclusion emerges that high-debt countries are better placed than low debt countries to meet the budgetary cost of ageing. This is because high-debt countries are currently running very large primary surpluses in order to cover interest payments and at the same time respect the "close to balance or in surplus" requirement of the SGP. Under a no policy change scenario, the very high primary surpluses lead to a fast pace of debt reduction and a rapid decline in the interest burden: this is sufficient to absorb the increases in age-related spending. In contrast, low debt countries currently have much lower primary surpluses, and thus have less scope to offset increased age-related expenditures via a reduction in the interest burden. However, this focus on the changes in primary surpluses overlooks the fact that high-debt countries will have to sustain a greater degree of "budgetary effort". They will be required to run large primary surpluses, substantially above the EU average, over the very long-run, an especially difficult challenge in periods of slow economic growth. Moreover, a proper assessment of the sustainability of public finances also required an examination of the levels of budgetary variables such as the tax burdens as a share of GDP and levels of non-age related expenditures.

Other measures of the sustainability of public finances: supplementary indicators to assess the sustainability of public finances are available compared with those presented above. In particular, it

---

[91] Some work on these issues has been carried out by the OECD, see Turner, Giorno, De Serres, Vourc'h and Richardson (1998). The impact of ageing populations on aggregate savings, the rate of productivity growth and real interest rates is also considered by McMorrow and Röger (1999) using the QUEST model of the European Commission.

has been argued that indicators should take account of contingent liabilities (e.g. such as implicit pension debt mentioned in section 3.6) which will lead to future government spending. To this end, generational accounts have been developed for several Member States which measure whether current policies ensure respect of the inter-temporal budget constraint. An additional advantage of this approach is that it illustrates whether inter-generational transfers are occurring. It has also been argued that the current generation should build reserves in order to alleviate the load to be left to future generations. Partial funding implied can take place within the public sector or by creating a privately managed fully funded pillar.[92] The AWG could consider whether these alternative indicators of the sustainability of public finances could be usefully developed at EU level. However, given the heavy data requirements to prepare generational accounts, the first step should be to take stock of existing material and to consider whether they provide insights that could usefully feed into the policy debate at EU level.[93]

[92] Note that a pure PAYG pension system is always in balance, if it is assumed that pension contributions or transfers from government budget are adjusted to cover the expenditure. However, based on the projections of increasing expenditure, the substantive economic questions are, firstly, what the implied tax rates would mean for 'dead weight loss' of taxes and tax evasion, and secondly for distribution of income between generations, see Oksanen (2001).

[93] The European Commission financed a study to produce generational accounts for 12 Member States taking 1995 as a base year, see European Commission (1999). Also see, Auerbach, Kotlikoff and Liebfritz (1999)

BIBLIOGRAPHY

Anderson M., Tuljapurkar S. and Li N. (2001): "How accurate are demographic projections used in forecasting pension expenditure?", in Boeri, T., A Börsch-Supan, A. Brugiavini, R. Disney, A. Kapteyn and F. Peracchi (eds.) (2001).

Auerbach A-J. L-J. Kotlikoff and W. Liebfritz (1999), *Generational accounting around the world*, The University of Chicago Press, Chicago and London.

Balassone F. and Franco D. (2000): "Assessing Fiscal Sustainability: A Review of Methods with a view to EMU" in Banca d'Italia (2000).

Banca d'Italia (2000), *Fiscal sustainability*, Public Finance Workshop, Research Department, Rome.

Blanchard, O. (1990) "Suggestions for a New Set of Fiscal Indicators", OECD Working Paper, 79.

Blanchet D. - Kessler D. (1990), "Prévoir les effets économiques du vieillissement", *Economie et Statistique*, No. 233, June.

Bonin H., Raffelhueschen B. and Walliser J. (1999), "Germany: unification and ageing", in *Generational accounting in Europe, European Economy*, 1999, n. 6.

Boyle S. - Le Grand J. (1995), "Le financement de l'assurance maladie au Royaume-Uni", *Revue d'Économie Financière*, No. 34, Fall, pp. 281-305.

Boeri, T., A Börsch-Supan, A. Brugiavini, R. Disney, A. Kapteyn and F. Peracchi (eds.) (2001): *Pensions: more information, less ideology. Assessing the long-term sustainability of European pension systems: data requirements, analysis and evaluations*, Kluwer (forthcoming).

Brunila A, M. Buti, and D. Franco (eds.) (2001), *The Stability and Growth Pact – The Fiscal Architecture of EMU*, Palgrave.

Buiter, W. (1985), "A Guide to Public Sector Debt and Deficits", *Economic Policy*, 1: 13-79.

Cambridge econometrics (1997), *Long-term perspectives in public revenues*, Report submitted to the European Commission, DG ECFIN, mimeo.

Central Planning Bureau of the Netherlands (2000), "*Ageing in the Netherlands*." Den Haag, SDU Uitgevers & Centraal Planbureau,

Central Planning Bureau of the Netherlands (2000a), The CPB-methodology of projecting health care expenditures, *Note for the Working Group of Ageing of the EPC.*

Chand S. and A. Jaeger (1996), "Ageing Populations and Public Pension Schemes", *IMF Occasional Paper, 147*.

Council of the European Union (2001), "The Contribution of Public Finances to Growth and Employment: Improving Quality and Sustainability", *Report of the Commission and the (ECOFIN) Council to the European Council (Stockholm 23/24 March 2001), 6997/01.*

Dang, T-T, P. Antolin and H. Oxley (2001), "The fiscal implications of ageing: projections of age-related spending, *OECD Economics Department Working Papers, ECO/WKP(2001)31, Paris*.

Danish Ministry of Economic Affairs (2000): *A sustainable pension system.*

Disney R. (2001): "How should we measure pension liabilities in EU countries" in Boeri, T., A Börsch-Supan, A. Brugiavini, R. Disney, A. Kapteyn and F. Peracchi (eds.) (2001).

Economic Policy Committee (2000), "*Progress Report to the Ecofin Council on the Impact of Ageing Populations on Public Pension Systems*", EPC/ECFIN/581/00-Rev.1, November.

European Commission (1999), Directorate General for Economic and Financial Affairs, ECFIN/701/1999, "*Health Care Expenditure and Cost Containment – Implications for Fiscal Sustainability*"

European Commission (1999), "Generational Accounting in Europe", *European Economy Reports and Studies*, N°6, Directorate General for Economic and Financial Affairs.

European Commission (2000), "*The Contribution of Public Finances to Growth and Employment: Quality and Sustainability*", Communication from the Commission to the Council and European Parliament, COM(2000) 846.

European Commission (2001a): 'Public finances in EMU – 2001', *European Economy Report and Studies*, N°3, Directorate General for Economic and Financial Affairs.

European Commission (2001b): "Supporting national strategies for safe and sustainable pensions through an integrated approach". *Communication from the Commission to the Council and the European Parliament*, COM(2001) 362, final.

Federal Planning Bureau of Belgium (2000), Long-term evolution of health care expenditure, *Note for the Working Group of Ageing of the EPC*.

Federal Planning Bureau of Belgium (2001 (forthcoming)) "Perspectives financières de la sécurité sociale 2000-2050", *Planning Paper*

Franco, D. and Munzi T. (1997), "Ageing and fiscal policy in the European Union", in "The welfare state in Europe", *European Economy*, No. 4, pp. 239-388.

Gerdtham U.-G. (1993), "The impact of aging on health care expenditure in Sweden", *Health Policy*, No. 24, pp. 1-8.

Gruber J and Wise D. (1997): "Social Security Programmes and Retirement Income around the World", NBER Working Paper, 6134.

Hagemann, P. and C. John (1995), "The fiscal stance in Sweden: a Generational Accounting perspective", *IMF Working Paper*, No 105.

International Labour Organisation (1997), *Economically Active Population*, Geneva.

Jacobzone et al, (2000), "Is the health of older persons in OECD countries improving fast enough to compensate for population ageing?", *OECD Economic Studies No. 30*, 2000/I

Jacobzone, Stephane (2001) “Healthy ageing and the challenges of new technologies – can OECD social and health care systems provide for the future?”, *Proceedings of the proceedings of the "Tokyo workshop on healthy ageing and the biotechnologies"* organised jointly by the OECD and the Ministry of Health Labour and Welfare in Japan

Jensen, S.E.H. and Raffelhueschen B. (1999), “Denmark: challenges ahead and need for social security reform”, in *Generational accounting in Europe, European Economy*, 1999, n. 6.

Lambrecht, M., N. Fasquelle and S. Weemaes (1994), “L'évolution démographique de long-terme et son incidence isolée sur quelques grandeurs socio-économiques (1992-2050)”, *Federal Planning Bureau of Belgium - Planning Papers*, No 68.

Lee R. and J. Skinner (1999): “Will ageing baby boomers bust the Federal budget”, *Journal of Economic Perspectives,* Volume 13, N°1, Winter 1999, pp. 117-140.

Mäki, T., P. Parkinnen and R. Vanne (1996), “Kehdosta hautaan - suomalainen hyvinvointiyhteiskuntansa hoivassa (From Cradle to Grave - In Care of the Finnish Welfare Society)”, *Government Institute for Economic Research - Discussion Paper*, No 119.

Mårten lagergen and Ilija Batljan, Stockholm 2000, “*Will There Be a Helping Hand - Macroeconomic scenarios of future needs and costs of health and social care for the elderly in Sweden, 2000-30”,* Annex 8 to The Long-Term Survey 1999/2000

Martinez Mongay (2000), “The long-run determinant of government receipts”, in Banca d’Italia (2000).

McMorrow K. and W. Röger (1999), “The Economic Consequences of Ageing: A Comparison of the EU, US and Japan”, *Economic Papers 138*, Directorate General for Economic and Financial Affairs, European Commission.

Ministry of Economic Affairs of Denmark (2000*),* Age divide health expenditures in Denmark, *Note for the Working Group of Ageing of the EPC*.

Mizrahi A. - Mizrahi A. (1995), “Les mutations de la demande de soins”, *Revue d’Économie Financière*, No. 34, Fall, pp. 83-102.

OECD (1985), “Social expenditure 1960-1990 - Problems of growth and control*”, Social Policy Studies*.

OECD (1990), “Health care systems in transition - The search for efficiency”, *Social Policy Studies*, No. 7.

OECD (1993), “OECD health systems - Facts and trends 1960-1991 - Vol. 1”, *Health Policy Studies*, No. 3.

OECD, 1994, Oxley, MacFarlan, “*Health Care Reform - Controlling Spending and Increasing Efficiency*”.

OECD (1995), “New directions in health care policy”, *Health Policy Studies*, No. 7.

OECD (1996), “Ageing in OECD countries - A critical policy challenge”, *Social Policy Studies*, No. 20.

OECD (1998), *Maintaining prosperity in an ageing society*, Paris.

OECD (2000a), *Reforms for an Ageing Society*, Paris.

OECD (2000b), "Is the health of older persons in OECD countries improving fast enough to compensate for population ageing?" S. Jacobzone, E Cambois, J.M. Robine, *Economic studies n° 30*

OECD, DEELSA/ELSA/WP1(99)3, September 1999, *Working Party on Social Policy*, "What Causes Variations in the Performance of Health Care Systems?"

OECD (2001), *Economic Outlook*, N°69, June 2001, Paris.

Oksanen, H. (2001), "A Case for Partial Funding of Pensions with an Application to the EU Candidate Countries", Economic Papers 149, Directorate General for Economic and Financial Affairs, European Commission.

Prognos (1995), "Prognos-Gutachten 1995 - Perspektiven der gesetzlichen Renten-versicherung für Gesamtdeutschland vor dem Hintergrund veränderter politischer und ökonomischer Rahmbedingungen", Verband Deutscher Rentenversicherungsträger, *DRV-Schriften*, Band 4, April.

Roseveare D., W. Liebfritz, D. Fore and E. Wurzel (1996): "Ageing Populations, Pension Systems and Government Budgets: Simulations for 20 OECD Countries", *OECD Economics Department Working Paper, 168*.

Social Protection Committee (2001) "*Adequate and sustainable pensions*", June 2001.

Swedish Parliamentary Committee on Health Care, (1996), "Behov och resurser i våen analys", *Delbetäkande av HSU2000*, SOU, 163.

Ter Rele, H. (1997), "Generational accounts for the Dutch public sector", *CPB Netherlands Bureau for Economic Policy Analysis - Research Memorandum*, No 135, May.

Turner, D., C. Giorno, A. De Serres, A. Vourc'h and P. Richardson (1998), "The Macroeconomic Implications of Ageing in a Global Context", *OECD Working Paper, 193*.

United Nations (1999), *World Population Prospects: the 1998 Revision*, United Nations, New York.

Visco, I. (2001), "Paying for Pensions: How Important Is Economic Growth?", paper presented at the Center for Strategic and International Studies Conference on 'Managing the Global Ageing Transition: a Policy Summit of the Global Ageing Initiative'.

Warshawsky M. J. (1991), "Projections of health care expenditures as a share of GNP: actuarial and economic approaches", Federal Reserve Board, Division of Monetary Affairs, Division of Research and Statistics, *Finance and Economics Discussion Series*, No. 170, October.

WHO*, Global Programme on Evidence for Health Policy (GPE) Discussion Paper no. 6*, Murray, Frenk, "A WHO Framework for Health System Performance Assessment"

WHO, WHO Report 2000

Zweifel P. - Felder S. - Meier M. (Institute for Empirical Research in Economics, University of Zurich) (1995), *"Ageing of population and health care expenditure: a red herring?*", paper

presented to the International Conference on Ageing and Old-Age Econometrics, Health Care Econometrics - IX, University of Athens, May 18-19.

ANNEX 1 MEMBERS OF THE EPC WORKING GROUP ON AGEING POPULATIONS

CHAIRMAN

Mr. Henri BOGAERT	Bureau Fédéral du Plan

BELGIUM

Ms Nicole FASQUELLE	Bureau Fédéral du Plan
Ms Marie-Jeanne FESTJENS	Bureau Fédéral du Plan
Mr Koen HENDRICKX	Bureau Fédéral du Plan
Ms Micheline LAMBRECHT	Bureau Fédéral du Plan
Mr Luc MASURE	Bureau Fédéral du Plan
Mr Michel SAINTRAIN	Bureau Fédéral du Plan
Ms Catherine STREEL	Bureau Fédéral du Plan
Mr Saskia WEEMAES	Bureau Fédéral du Plan
Mr Michel ENGLERT	Bureau Fédéral du Plan

DENMARK

Mr Ulrik NODGAARD	Ministry of Economic Affairs
Mr Rasmus Westerlin NIELSEN	Ministry of Economic Affairs

GERMANY

Ms Britta VELLEUER	Federal Ministry of Finance
Mr Joachim STEINRUCK	Federal Ministry of Labour and Social Affairs

GREECE

Mr Platon TINIOS	Prime Minister's Office
Ms Alexandra TRAGAKI	Ministry of National Economy

SPAIN

Mr Juan BURDIEL	Ministry of Economy
Mr Juan VARELA	Ministry of Finance
Mr Pablo Hernandez DE COS	Banco de Espana
Ms Angela BLANCO	Ministry for Health and Consumption Affairs

FRANCE

Ms Nathalie DESTAIS	Ministère de l'Economie des finances et industrie
Ms Claire LOUPIAS	Ministère de l'Economie des finances et industrie
Mr Bernard SALZMANN	Ministère de l'Economie des finances et industrie
Ms Laurence ASSOUS	Ministère de l'Economie des finances et industrie
Mr Antoine DERUENNES	Ministère de l'Economie des finances et industrie
Mr Michel GRIGNON	Centre de Recherche d'Etude et de Documentation en Economie de la santé

IRELAND

Mr Cathal O'LOGHLIN	Department of Finance
Mr Alan BARRETT	Department of Finance

ITALY

Mr Rocco APRILE	Dipartimento della Ragioneria Generale
Mr Daniele FRANCO	Banca d'Italia
Mr Flavio PADRINI	Dipartimento del Tesoro
Mr Francesco MASSICI	Dipartimento della Ragioneria Generale

LUXEMBOURG

Ms Alexandra GUARDA-RAUCHS	Ministry of Economy
Mr Raymond WAGENER	IGSS (General Inspection for Social Security)
Mr Serge ALLEGREZZA	Ministry of Economy

NETHERLANDS

Mr Bertholt LEEFTINK	Ministry of Finance
Mr Harry TER RELE	Central Planning Bureau

AUSTRIA

Mr Peter PART	Ministry of Finance

PORTUGAL

Mr Pedro RODRIGUES	Ministry of Finance

FINLAND

Mr Jorma TUUKKANEN	Ministry of Finance

SWEDEN

Mr Tomas NORDSTRÖM	Ministry of Finance
Ms Anna KLEEN	Ministry of Finance
Ms Anna WESTERBERG	Ministry of Finance

UNITED KINGDOM

Mr Frank EICH	HM Treasury
Mr Andrew KILPATRICK	HM Treasury

EUROPEAN COMMISSION

Ms Mandeep BAINS	DG Economic and Financial Affairs
Mr Marco BUTI	DG Economic and Financial Affairs
Mr Declan COSTELLO	DG Economic and Financial Affairs
Mr Jonas FISCHER	DG Economic and Financial Affairs
Mr Bertrand MARTINOT	DG Economic and Financial Affairs
Ms Mary McCARTHY	DG Economic and Financial Affairs
Mr Kieran McMORROW	DG Economic and Financial Affairs
Mr Heikki OKSANEN	DG Economic and Financial Affairs
Ms Aino SALOMAKI	DG Economic and Financial Affairs

OECD

Mr Howard OXLEY
Mr Nicholas VANSTON
Ms Thai-Thank DANG
Mr Stephane JACOBZONE

Secretariat of the ECONOMIC POLICY COMMITTEE

Heinz SCHERRER

ANNEX 2 CHARACTERISTICS OF EU PUBLIC PENSION SYSTEMS

General framework

Regarding first pillar pensions, nine of the Member States (Denmark, Spain, France[94], Ireland, the Netherlands, Portugal, Finland, Sweden, and the UK) offer universal state pension regimes, see table A2.1. 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. For some Member States (such as Sweden), the mandaory pension schemes is not arranged according to sector, but covers all individuals with labour market income. The regimes for the private sector and the self employed are usually almost identical as far as the financing regime is concerned.[95] 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). Public pensions in Denmark are generally State financed: This will change, however, as a larger share (14% by 2050) will be based on semi-funded and contribution-related scheme called ATP/SP.

The pension schemes for the public sector present a more diversified financing system. In four Member States (i.e. in Belgium, Denmark, Germany[96], 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[97]. 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.

---

94 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.

95 Although in the UK the self employed are not included in the State Earnings Related Pension system (SERPS).

96 In Germany, wage and salary earners within the public sector are included in the general statutory scheme.

97 More precisely, for part of the private sector.

Table A2.1 Overview of 1st and 2nd pillar pensions in EU Member States

	B	DK	D	EL	E	F	IRL	I	L	NL	OS	P	FIN	S	UK
FIRST PILLAR															
General															
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 for old age pensions

Tables A2.2 summarise the eligibility requirements for old age. It shows that the minimum age requirement for old age pensions for men and women will usually be 65 after 2004[98] in both the public and private sector. Exceptions are: Portugal where for the public sector the requirement is 60 years of age or 36 years service whichever materialises first; Greece where the minimum age for women is 60 in the private sector and 55 for both men and women in the public counterpart; France where the minimum age for both men and women is 60 in both the private and the public sector[99];

[98] The retirement age for women in Germany 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.

[99] 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.

Italy where the minimum age is 65 and 60 for, respectively, men and women in both the earnings-related and mixed systems.[100]

The requirements for contribution years are more heterogeneous. 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[101] 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[102], 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.

---

[100] With the new contribution-based system, workers can retire before 65, but not under 57, provided they have matured an amount of pension at least 1.2 times the social assistance benefit. .

[101] 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.

[102] People living less than 37 years in Denmark receive reduced pensions in accordance with the length of their stay.

Table 2.1.2 Eligibility requirements for old age pension

OLD AGE PENSION												
	Private sector						Public sector					
	Men			Women			Men			Women		
	Minimum Age	*Contribution years*	*Other*	*Minimum Age*	*Contribution years*	*Other*	*Minimum Age*	*Contribution years*	*Other*	*Minimum Age*	*Contribution years*	*Other*
B	65	Maximum 45, Taken into Account		61 in 1998, 65 starting from 2009	Maximum 41 in 1998, maximum 45 starting from 2009,		65	5		65	5	
DK	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		living for at least 37 years in Denmark	67, 65 starting from 2004		Living for at least 37 years in Denmark
D[103]	65	5		60, 65 starting from 2005	15 with more than 10 years after reaching 40 years of age or 5 with min. age of at least 65		65			65		
EL	65	15		60	15		55	20		55	20	
E	Under INSS 65	15		Under INSS 65	15		Under INSS 65 Under CPE 65	15		Under INSS 65 Under CPE 65	15	

[103] Eligibility requirements for wage and salary earners in the public sector are the same as in the private sector, since both are covered by the general statutory pension scheme. The information indicated under “public sector” only applies to civil servants with life-time status.

F	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		60 (50 or 55 for certain professions). No age conditions for civil servants retired on invalidity grounds. Or for female civil servants who are mothers of 3 children.	15	
IRL	65/66			65/66			65/66			65/66		
I	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	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
L	65	10		65	10		65	10		65	10	
NL	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)		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)	

A	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)	37.5 years of insured time	65	10 (15 years if entered after 1.5.1995)	37.5 years of insured time
P	65	15		65	15		60 years or 36 years service (whichever materialises first)	5		60 years or 36 years service (whichever materialises first)	5	
FIN	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		65	No lower limit for the length of employment in the earnings-related system	
S	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			65 for the guarantee pensions and 61 for the income and pre-funded pensions		
UK	65			phased up to 65 over the period 2010 to 2020.			65			phased up to 65 over the period 2010 to 2020.		

Eligibility requirements of early retirement

Table A2.3 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). Luxembourg allows 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 A2.3 Eligibility requirements for early retirement programmes in EU Member States												
	Private sector						Public sector					
	Men			Women			Men			Women		
	Min Age	*Contrib. Years*	*Other*	*Minimum Age*	*Contribution years*	*Other*	*Minimum Age*	*Contribution years*	*Other*	*Minimum Age*	*Contribution years*	*Other*
B	"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		"Flexible Pension" between 60 and 64	5	
DK	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		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

D[104]	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			63		
EL	60	15		55	15		55 for workers hired before 1983, 60 for workers hired after 1983	15-20		42 for workers hired before 1983, 55 for workers hired after 1983	15-20	children
E	Under INSS 60	Have been contributing since 1967		Under INSS 60	Have been contributing since 1967		Under INSS 60 Under CPE 60	30		Under INSS 60 Under CPE 60	30	
F	58 (55 in some scheme)	40 (in general)		58 (55 in some scheme)	40 (in general)		56	40		56	40	
IRL	dependant on individual pension schemes			dependant on individual pension schemes			60	40		60	40	

[104] Eligibility requirements for wage and salary earners in the public sector are the same as in the private sector, since both are covered by the general statutory pension scheme. The information indicated under “public sector” only applies to civil servants with life-time status.

I[105]	55, 57 starting from 2002 For self-employed, 58 starting from 2001	35, or 37 without any age requirement (40 starting from 2008) For the self-employed, 35 or 40 without any age limitations.		55, 57 starting from 2002 For self-employed, 58 starting from 2001	35, or 37 without any age requirement (40 starting from 2008) For the self-employed, 35 or 40 without any age limitations.		54, 57 starting from 2004 and 2006 for white collar	35, or 37 without any age requirement (40 starting from 2008)		54, 57 starting from 2004 and 2006 for white collar	35, or 37 without any age requirement (40 starting from 2008)	
L	57	480 months		57	480 months		57	480 months		57	480 months	
NL	60 years (on average)			60 years (on average)			60 years (on average)-			60 years (on average)		
A	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		60 (61.5 phasing in 2002)	37.5	
P	60	15										
FIN	60			60			60			60		

[105] No early retirement is provided for under the contribution based system.

S	61			61			61			61		
UK	Not possible			not possible			not possible			not possible		

Indexation schemes and taxation regimes

The indexation rules and the taxation regimes for the main pension systems are summarised table A2-4 below. The rules 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.

The indexation rules after retirement can be broadly divided into three groups:

- *indexation to prices*: Spain, Italy, Luxembourg and the UK;
- *indexation to wages*: Denmark and Germany;
- *mixed indexation or ad hoc systems*; Belgium Greece Portugal France Ireland Netherlands Austria Finland Sweden.

Table A2-4 Indexation rules and taxation regimes applying to public pensions

	Indexation Scheme[106]	*Taxation Regime*
B	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.
DK	Indexation to wages. If wages increase by more than 2.3 percent, then 0.3 percent is deducted.	Taxed as personal income.
D	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.
EL	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.
E	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.
F	For Régime Général, 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.
IRL	Pension increases are decided during the budgetary process and are usually ahead of inflation	Subject to income tax.
I	In general, just under 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.
L	Pensions automatically indexed to price developments. Adjustment to wages by special law.	For tax purposes, social security benefits are treated as wages.
NL	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.
A	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.
P	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.
FIN	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.
S	Indexation formulas related to average income.	All old-age 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.

106

ANNEX 3 METHODOLOGY FOR CORE PROJECTIONS FOR HEALTH AND LONG-TERM CARE EXPENDITURES

EXPLANATION

General approach – under the assumption that average expenditures per head grow at the same rate as GDP per capita

The basic approach to be applied to the projections for both acute health care and long-term care expenditure is the following:

1. establish current age-related expenditure profiles, by estimating the average amount spent by members of each age- and sex- group (in national currency terms);[107]

2. divide the base year expenditure profiles by base year GDP per capita;

3. for each projection year, match the deflated age-profiles (from step 2) to the expected future structure of the population and sum. The sum gives you the total expenditure in the projection year expressed as a share of GDP per capita ***under the assumption that GDP per capita and average expenditures per head are growing at the same rate***; and

4. express the results in terms of national GDP for each projection year. This is done by dividing the sum (from step 3) for each projection year by the projected population level in each projection year.

This generates projections of health expenditure, expressed as a share of GDP, where average costs per head in each projection year grow at the same rate as GDP per capita under the first cost.

General approach – under the assumption that average expenditures per head grow at the same rate as GDP per worker

The basic approach to be applied to the projections for both acute health care and long-term care expenditure is the following:

1. establish current age-related expenditure profiles, by estimating the average amount spent by members of each age- and sex- group (in national currency terms);

2. divide the base year expenditure profiles by base year GDP per worker;

3. for each projection year, match the deflated age-profiles (from step 2) to the expected future structure of the population and sum. The sum gives you the total expenditure in the projection year expressed as a share of GDP per worker ***under the assumption that GDP per worker and average expenditures per head are growing at the same rate***; and

[107] E.g. this would involve estimating the average amount spent in Euros by women aged 60-64

4. express the results in terms of national GDP for each projection year. This is done by dividing the sum (from step 3) for each projection year by the projected total number of persons employed for each projection year.

This generates projections of health expenditure, expressed as a share of GDP, where average costs per head in each projection year grow at the same rate as GDP per worker.

FORMAL ILLUSTRATION – FOR THE CASE WHERE EXPENDITURES GROW AT THE SAME RATE AS GDP PER CAPITA [108]

Step 1 Estimation of current age-related expenditure profiles for both males and females

Using estimates of age- and sex-related expenditures[109], total health expenditure (H) [110] in the base year b should be allocated between different age- and sex-groups i according to the following identity:

$$H^b = \sum_i hh_i^b \times P_i^b$$

Where H^t = total expenditure on health care in year t in national currency;

hh_i^t = average health expenditures for each age- and sex-group i in year t expressed in national currency;

P_i^t = numbers of persons in each age- and sex-group i in a given year t;

i = denotes different age- and sex-groups (e.g. the group of men aged 35-39); and

b = base year.

Step 2 Expressing age-related expenditure profiles in terms of per capita GDP

Base year health expenditure profiles (hh_i^b) should be deflated by base-year per capita GDP, such that:

$$h_i^b = \frac{hh_i^b}{\left(GDP^b / P^b\right)}$$

[108] For ease, only health expenditure will be referred to here, but the methodology is identical for long-term care also.

[109] Which may not cover the whole population or the whole of health expenditures.

[110] Which may be estimated from macroeconomic sources, or should at least be consistent with macroeconomic data.

where: h_i^b = average health expenditure for each age group *i* in the base year *b*, expressed as a share of base year per capita GDP;

$P^t = \sum_i P_i^t$ i.e. total population in year *t*; and

GDP^t = national GDP in projection year *t*.

Step 3 Matching the base-year profiles to the future population structure

The deflated expenditure profiles for the base year h are then matched to the population matrix P_i^j for each of the projection years *j* from 2000-2050 as follows:

$$\frac{\overline{H^j}}{\left(GDP^j / P^j\right)} = \sum_i \left(h_i^b \times P_i^j\right)$$

where $\overline{H^j}$ = projected total health expenditure in projection year j (the bar above the variable denotes that it is projection); and

This step generates the projected total expenditure expressed as a share of GDP per capita, under the implicit assumption that average expenditures per head grow at the same rate as GDP per capita.

Step 4 Expressing the results as a share of projected national GDP for each projection year[111]

The results can then be expressed in terms of projected national GDP for each of the projection years by dividing by projected population levels as follows:

$$\frac{\overline{H^j}}{GDP^j} = \frac{\sum_i \left(h_i^b \times P_i^j\right)}{P^j}$$

Thus, projections of health expenditure as a share of GDP can be generated using only age-related expenditure profiles, GDP levels in the base year, and demographic projections.[112]

[111] Results can further be expressed in nominal terms by projecting GDP for each future year.

[112] In the GDP per worker cost case, it is also necessary to generate projections of numbers of employed persons in order to generate projections of health expenditure as a share of GDP

ANNEX 4 DEFINITIONS OF PUBLIC EXPENDITURE ON ACUTE HEALTH CARE AND LONG-TERM CARE

A4.1 DEFINING THE SPLIT BETWEEN HEALTH CARE AND LONG-TERM CARE

Method for gathering data

The boundaries between expenditure on acute health care services and long-term care services are difficult to draw. Member States were asked to broadly conform to the definitions provided below and to report clearly on any difficulties in matching empirical data with these definitions. In particular, Member States were asked to use the definitions included in OECD System of Health Accounts to define total expenditure (on health and long-term care).[113]

Member States were then recommended to:

1. gather data for overall public expenditure on acute health care and long-term care in line with the definitions provided below from the OECD System of Health Accounts;

2. estimate public expenditure on long-term care in line with the definition below; and

3. subtract this from overall expenditure to give public expenditure on health care.

Definition of total expenditure (on health and long-term care) from OECD System of Health Accounts:

Total expenditure (on health and long-term care) includes:

services of curative care (HC1);
services of rehabilitative care (HC2);
services of long-term nursing care (HC3);
ancillary services to health care (HC4);
medical goods dispensed to outpatients (HC5);
prevention and public health services (HC6); and
health administration and health insurance (HC7), plus investment in medical facilities.

Definition of long-term care:

Long-term care includes:

care for dependent older persons;
home care;
institutional care other than hospitalisation; and
homes and services for the disabled.

In case of ambiguities, particularly relating to institutional care, Member States were asked to use the following rule. Institutional care should be included under health care

[113] .See "A System of Health Accounts", page 114.

expenditure where hospitalisation is necessary to provide acute medical interventions. Institutional care beyond any initial period of acute health care, should be reported under long-term care, when the institutionalisation is mainly due to the inability of the person to stay at home.[114]

A4.2. DEFINING THE PUBLIC COMPONENT OF EXPENDITURE

As the projections were only concerned with public expenditures, Member States were asked to ensure that only public expenditures would be included in the expenditure covered.

Definition of the public component of expenditure on health and long-term care:

Public expenditure on health care should include:

publicly-funded health care which is provided by both publicly and privately owned providers (where public funds are provided by State, Regional and Local Government bodies, and social security schemes);

public capital expenditure in the health sector. This includes publicly-financed investment in health facilities; capital transfers to the private sector for hospital construction and equipment; and subsidies from the government to health service providers; and

health funds for state employees.

[114] There would of course continue to be a health component to this care, but the majority of the expenditure would be on nursing care.

ANNEX 5 DETAILED RESULTS HEALTH AND LONG-TERM CARE PROJECTIONS

Table A5-1 Public expenditure on health care under the assumption that expenditures per head grow at the same rate as GDP per capita

Central demographic variant

Expressed as a share of GDP

	2000	2010	2020	2030	2040	2050	Increase in expenditure in per cent of GDP between 2000 and 2050
B	5.3%	5.7%	6.0%	6.4%	6.6%	6.6%	+1.3
DK	5.1%	5.2%	5.5%	5.7%	5.7%	5.7%	+0.7
D	5.7%	6.0%	6.4%	6.7%	7.0%	7.1%	+1.4
EL	4.8%	5.1%	5.5%	5.9%	6.3%	6.6%	+1.7
E	5.5%	5.8%	6.1%	6.5%	7.0%	7.2%	+1.7
F	6.2%	6.4%	6.8%	7.1%	7.4%	7.4%	+1.2
I	4.9%	5.3%	5.6%	6.0%	6.3%	6.5%	+1.5
NL	4.7%	4.9%	5.2%	5.5%	5.6%	5.6%	+1.0
A	5.1%	5.5%	5.9%	6.3%	6.7%	6.8%	+1.7
P	5.4%	5.3%	5.5%	5.8%	6.0%	6.1%	+0.8
FIN	4.6%	4.9%	5.2%	5.6%	5.7%	5.7%	+1.2
S	6.0%	6.2%	6.5%	6.7%	6.9%	7.0%	+1.0
UK	4.6%	4.7%	4.9%	5.2%	5.4%	5.6%	+1.0

Notes: (1) Results under this cost assumption are not available for Ireland.

Table A5-2 Public expenditure on health care under the assumption that expenditures per head grow at the same rate as GDP per worker

Central demographic variant

Expressed as a share of GDP

	2000	2010	2020	2030	2040	2050	Increase in expenditure in per cent of GDP between 2000 and 2050
B	5.2%	5.3%	5.7%	6.5%	6.8%	6.8%	+1.5
DK	5.1%	5.6%	5.9%	6.3%	6.4%	6.2%	+1.1
D	5.7%	5.8%	6.4%	7.2%	7.7%	7.7%	+2.1
EL	4.7%	4.1%	5.1%	5.6%	6.1%	6.3%	+1.6
E	5.0%	4.7%	4.9%	5.4%	6.2%	6.6%	+1.5
F	6.1%	6.4%	7.2%	7.8%	8.1%	8.0%	+1.9
IRL (1)	5.9%	6.5%	7.0%	7.4%	7.8%	8.2%	+2.3
I	4.9%	5.1%	5.4%	6.0%	6.5%	6.6%	+1.7
NL	4.7%	4.8%	5.2%	5.8%	6.1%	5.9%	+1.3
A	5.1%	5.3%	5.9%	6.6%	7.1%	7.1%	+2.0
P	5.4%	5.5%	5.7%	6.0%	6.5%	6.6%	+1.3
FIN	4.6%	4.9%	5.6%	6.3%	6.4%	6.4%	+1.8
S	6.0%	5.9%	6.4%	6.9%	7.1%	7.2%	+1.2
UK	4.5%	4.5%	4.9%	5.4%	5.9%	6.0%	+1.4

Notes: (1) Results for Ireland are expressed as a share of GNP. The results for Ireland are only broadly comparable with those of other Member States for the per worker case, as the methodology employed is different.

Table A5-3 Public expenditure on health care for different age groups

Central demographic variant

Average health expenditure per capita grows at the same rate as GDP per capita

	Public expenditure on health care as a share of GDP		Increase in expenditure in per cent of GDP between 2000 and 2050	Breakdown of increase between 2000 and 2050 by age groups		
	2000	2050		0-64	65-79	80+
B	5.3%	6.6%	**+1.3**	-0.2	+0.5	+1.1
DK	5.1%	5.7%	**+0.7**	-0.3	+0.4	+0.5
DK	5.7%	7.1%	**+1.4**	-0.4	+0.6	+1.2
EL	5.5%	7.2%	**+1.7**	-0.5	+1.1	+1.1
I	4.9%	6.5%	**+1.5**	-0.4	+0.8	+1.2
NL	4.7%	5.6%	**+1.0**	-0.3	+0.5	+0.7
P (1)	5.4%	6.1%	**+0.8**	*-0.7*	*+0.3*	*+1.2*
FIN	4.6%	5.7%	**+1.2**	-0.3	+0.6	+0.9
S	6.0%	7.0%	**+1.0**	-0.2	+0.5	+0.7
UK (2)	4.6%	5.6%	**+1.0**	*-0.3*	*+0.7*	*+0.6*

Notes:

(1) the age breakdown for Portugal is as follows: 0-64, 65-74, and 75+

(2) the age breakdown for the UK is as follows: 0-64, 65-84, and 85+

Table A5-4 Public expenditure on long-term care under the assumption that expenditures per head grow at the same rate as GDP per capita

Central demographic variant

Expressed as a share of GDP

	2000	2010	2020	2030	2040	2050	Increase in expenditure in per cent of GDP between 2000 and 2050
B	0.8%	0.9%	1.0%	1.2%	1.4%	1.5%	**+0.8**
DK	3.0%	3.1%	3.7%	4.4%	4.8%	5.0%	**+2.1**
F	0.7%	0.7%	0.9%	1.0%	1.1%	1.1%	**+0.5**
I	0.6%	0.7%	0.8%	0.9%	1.0%	1.0%	**+0.4**
NL	2.5%	2.7%	3.0%	3.6%	4.3%	4.7%	**+2.2**
A	0.7%	0.8%	1.0%	1.2%	1.4%	1.7%	**+1.0**
FIN	1.6%	1.9%	2.2%	2.7%	3.2%	3.3%	**+1.7**
S	2.8%	2.9%	3.2%	3.9%	4.4%	4.8%	**+2.0**
UK	1.7%	1.8%	1.9%	2.1%	2.3%	2.6%	**+0.8**

Table A5-5 Public expenditure on long-term care under the assumption that expenditures per head grow at the same rate as GDP per worker

Central demographic variant

Expressed as a share of GDP

	2000	2010	2020	2030	2040	2050	Increase in expenditure in per cent of GDP between 2000 and 2050
B	0.7%	0.8%	1.0%	1.2%	1.4%	1.6%	**+0.8**
DK	3.0%	3.3%	4.0%	5.0%	5.3%	5.5%	**+2.5**
F	0.7%	0.7%	0.9%	1.1%	1.2%	1.2%	**+0.6**
IRL (1)	0.7%	0.6%	0.7%	0.7%	0.8%	0.9%	**+0.2**
I	0.6%	0.7%	0.7%	0.9%	1.0%	1.1%	**+0.4**
NL	2.5%	2.7%	3.0%	3.9%	4.7%	5.0%	**+2.5**
A	0.7%	0.8%	0.9%	1.2%	1.5%	1.8%	**+1.1**
FIN	1.6%	1.9%	2.4%	3.0%	3.6%	3.7%	**+2.1**
S	2.8%	2.8%	3.1%	4.0%	4.5%	4.9%	**+2.1**
UK	1.7%	1.7%	1.9%	2.2%	2.5%	2.7%	**+1.0**

Notes: (1) Results for Ireland are expressed as a share of GNP. The results for Ireland are only broadly comparable with those of other Member States for the per worker case, as the methodology employed is different.

Table A5-6 Public expenditure on long-term care for different age groups

Central demographic variant

Average health expenditure per capita grows at the same rate as GDP per capita

	Public expenditure on long-term care as a share of GDP		Increase in expenditure in per cent of GDP between 2000 and 2050	Breakdown of increase between 2000 and 2050 by age groups	
	2000	2050		65-79	80+
B	0.8%	1.5%	**+0.8**	+0.1	+0.6
DK	3.0%	5.0%	**+2.1**	+0.4	+1.7
I	0.6%	1.0%	**+0.4**	+0.1	+0.3
NL	2.5%	4.7%	**+2.2**	+0.3	+2.0
FIN	1.6%	3.3%	**+1.7**	+0.2	+1.5
S	2.8%	4.8%	**+2.0**	+0.3	+1.8
UK (1)	1.7%	2.6%	**+0.8**	*+0.4*	*+0.5*

Notes:

(1) the age breakdown for the UK is as follows: 0-64, 65-84, and 85+

ANNEX 6 INDICATORS ON THE SUSTAINABILITY OF PUBLIC FINANCES

A6.1 Extrapolating the levels of the budget balance and government debt

Debt (b_t) and the budget balance (d_t) are projected forward as follows

$$b_t = \frac{b_{t-1}}{(1+y_t+\pi_t)} + d_t \qquad \text{and} \qquad d_t = g_t^a + \bar{g}_t^{NA} - \bar{t}_t + \bar{i}b_{t-1}$$

based on the profile for growing age-related expenditures g_t^a, non-age related expenditures g_t^{NA} and the tax burden t_t remain constant at their 2000 level. The interest rate is i_t is set at 6%. Inflation and growth $y_t + \pi_1$ are set at 4. The identities are

$$t_t = g_t^{NA} + g_t^a + \bar{i}b_{t-1} - \bar{d}_t$$

and

$$g_t^{NA} = \bar{d}_t - g_t^a + \bar{t}_t - \bar{i}b_{t-1}$$

A6.2 The difference between the 'required' and projected primary surplus

The requirement to keep a balanced budget implies a constant public debt in nominal terms:

$$\overset{o}{B} = D = -S + iB = 0$$

Hence the "required" nominal primary surplus is:

$$S^R = i\bar{B}$$

The "projected" primary surplus can be written as follows:

$$S_T^P = T_t - G_t^{na} - G_t^a$$

The projections for age-related spending G^a are given by the AWG. If we assume that tax receipts T and non-age-related spending G^{na} grow at the pace of nominal GDP, y, we obtain:

$$S_t^P = T_o(1+y)^t - G_o^{na}(1+y)^t - G_t^a$$

Hence, the difference between "projected" and "required" primary surplus as a share of GDP becomes:

$$\frac{s^R - s_t^P}{Y_t} = \frac{ib_o}{(1+y)^t} - t_o + g_o^{na} + g_o^a + \Delta g_t^a$$

Re-arranging, we obtain:

$$s^R - s_t^P = \left[\frac{ib_o}{(1+\gamma)^t} + \Delta g_t^a\right] - s_o \text{ , where: } s_o = t_o - g_a^{na} - g_o^a .$$

Clearly, a higher primary surplus at the beginning of the period – which is the case of high-debt countries – drags down the primary surplus gap. The effect of a high public debt at *t= 0* is highlighted by simply adding and subtracting the interest burden at the beginning of the period, ib_o, and re-arranging the expression. Considering that the budget is balanced over time, we obtain:

$$s^R - s_t^P = \Delta g_t^a - \left[(1+y)^t - 1\right]\frac{ib_o}{(1+y)^t}$$

since the term in square brackets is negative, $s^R - s_T^P$ is negatively related to the initial level of debt .

A6.3 Calculation of the financing (tax) gap assuming respect of the Stability and Growth Pact until 2050

Once a debt ratio has been defined for the end of the projection period, a useful indicator of the fiscal effort required is to calculate the **constant** tax rate consistent with the achievement of a given end-point debt. The tax gap is defined as the difference between this « sustainable » tax rate and the current tax rate.

The initial debt (at the end of 2005) is, by definition :

$$B_{2005} = \sum_{i=1}^{45}\frac{T_{2005+i}}{(1+r)^i} - \sum_{i=1}^{45}\frac{G^{NAR}{}_{2005+i}}{(1+r)^i} - \sum_{i=1}^{45}\frac{G^{AR}{}_{2005+i}}{(1+r)^i} + \frac{B_{2050}}{(1+r)^{45}}$$

where G_s^{AR}, G_s^{NAR} *and* T_s refer to age-related expenditure, non-age related expenditure and taxes, r is the nominal interest rate and *n* is the nominal growth rate.

In terms of GDP ratio, this yields :

$$b_{2005} = t^* \sum_{i=1}^{45}\theta_i (1+r)^{-i} - \sum_{i=1}^{45}\theta_i (1+r)^{-i} g^{NAR}_{2005+i} - \sum_{i=1}^{45}\theta_i (1+r)^{-i} g^{AR}_{2005+i} + b_{2050}\theta_{45}(1+r)^{-45}$$

with $\theta_i = \prod_{s=1}^{i}(1+n_s)$ and t^* being the sustainable tax rate.

Hence, for $1+\rho_i = \theta_i (1+r)^{-i}$

$$t^* = \frac{b_{2005} - b_{2050}(1+\rho_{45}) \; + \sum_{i=1}^{45}(1+\rho_i) \; g_{2005+i}^{NAR} + \sum_{i=1}^{45}(1+\rho_i) \; g_{2005+i}^{AR}}{\sum_{i=1}^{45}(1+\rho_i)}$$

It is then possible to calculate the sustainable tax rate for a given condition imposed on the debt ratio in 2050 and for given assumptions on the path of non-age related expenditure.

If the end-point debt in 2050 is the debt ratio consistent with maintained budget balance, as considered in the paper, then

$$b_{2050} = \frac{b_{2005}}{\theta_{45}}$$

In the particular case where you suppose that non-age related expenditure makes up a constant share in GDP, g_s^{NAR} is constant and t^* is given by :

$$t^* = \frac{b_{2005} - b_{2050}(1+\rho_{45}) \; + \sum_{i=1}^{45}(1+\rho_i) \; g_{2005+i}^{AR}}{\sum_{i=1}^{45}(1+\rho_i)} + g^{NAR}$$

A.6-4 The "tradition financing (tax) gap suggested by the Dutch authorities

If we assume that after 2050 the elderly dependency ratio changes only slightly, tax revenues and primary expenditure will (roughly) remain constant as a share of GDP. The tax gap can then be calculated by expressing the government intertemporal budget constraint in the following form:

$$(\sum_{i=1}^{48} \frac{T_{2001+i}}{(1+r)^{i-1}} + \frac{T_{2050}}{(r-n)(1+r)^{49}}) \; (1+adj) = B2001 + \sum_{i=1}^{48} \frac{G_{2001+i}}{(1+r)^{i-1}} + \frac{G_{2050}}{(r-n)(1+r)^{49}}$$

In this equation Ti and Gi respectively stand for tax revenues and primary expenditure (in current prices) in period if policies and unchanged, r and n respectively for the nominal interest and productivity growth rate and B2001 for the debt level at the end of 2001. The facto adj represents the required immediate adjustment of tax revenues (in percentage terms) that balances the present value of revenues with that of expenditure. The first term on the left hand side and the second term on the right hand side respectively stand for the present value of tax revenues and primary expenditure after 2049. The second term on the left hand side and the third term on the right hand side respectively cover the present value of tax revenues and primary expenditure after 2049. The expression assumes that after 2050 tax revenues and primary expenditure grow at an annual rate of n.

The tax gap, expressed as a ratio to GDP (gap), can then be derived by multiplying adj by the tax ratio:

$$\text{gap} = \text{adj} \times \frac{T}{Y}$$

Where Y is GDP.

ANNEX7 DEMOGRAPHIC PROJECTIONS

Table A7-1 Total population (millions)

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
B	10,2	10,3	10,4	10,4	10,5	10,5	10,5	10,5	10,4	10,2	10,1
DK	5,4	5,4	5,5	5,5	5,6	5,6	5,6	5,6	5,6	5,6	5,5
D	82,3	83,1	83,5	83,5	83,2	82,7	81,8	80,7	79,3	77,6	75,6
EL	10,5	10,7	10,8	10,8	10,8	10,8	10,7	10,7	10,6	10,4	10,2
E	39,4	39,7	39,9	39,8	39,5	39,1	38,6	38,1	37,3	36,4	35,1
F	59,2	60,3	61,4	62,2	62,8	63,3	63,7	63,8	63,5	62,9	62,2
IRL	3,8	4,0	4,1	4,3	4,4	4,5	4,6	4,7	4,7	4,8	4,8
I	57,6	57,5	57,3	56,8	56,0	55,1	54,0	52,9	51,5	49,9	48,1
L	0,4	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,6	0,6
NL	15,9	16,3	16,7	17,0	17,3	17,5	17,7	17,8	17,9	17,8	17,7
A	8,1	8,1	8,0	8,1	8,1	8,1	8,1	8,0	7,9	7,8	7,6
P	10,0	10,2	10,4	10,6	10,7	10,8	10,9	10,9	11,0	11,0	10,9
FIN	5,2	5,2	5,3	5,3	5,3	5,3	5,3	5,2	5,1	5,0	5,0
S	8,9	8,9	9,0	9,0	9,1	9,2	9,3	9,2	9,2	9,2	9,2
UK	59,5	60,3	60,9	61,5	62,2	62,8	63,2	63,2	62,9	62,4	61,8
EU	376,4	380,4	383,5	385,2	386,0	385,9	384,5	381,8	377,5	371,5	364,2

Source: Eurostat – central scenario

Table A7-2 Working-age population aged 15 to 64 (millions)

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
B	6,7	6,8	6,9	6,8	6,7	6,5	6,3	6,1	6,0	6,0	5,9
DK	3,6	3,6	3,6	3,6	3,6	3,5	3,4	3,4	3,3	3,4	3,4
D	55,9	55,3	55,1	54,8	53,7	51,8	49,2	46,9	46,1	45,3	44,2
EL	7,1	7,1	7,1	7,0	7,0	6,9	6,7	6,5	6,2	6,0	5,8
E	26,9	26,9	26,8	26,5	26,2	25,5	24,5	23,1	21,6	20,1	19,2
F	38,6	39,5	40,3	40,0	39,5	38,9	38,3	37,6	36,9	36,6	36,0
IRL	2,5	2,7	2,8	2,9	2,9	3,0	3,0	3,0	3,0	2,9	2,8
I	39,0	38,2	37,7	36,7	35,9	34,6	32,7	30,5	28,5	27,1	26,2
L	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
NL	10,8	11,0	11,2	11,2	11,2	11,0	10,8	10,5	10,4	10,5	10,6
A	5,5	5,5	5,4	5,4	5,3	5,1	4,8	4,6	4,5	4,4	4,3
P	6,8	6,8	6,9	6,9	6,9	7,0	6,9	6,8	6,6	6,4	6,3
FIN	3,5	3,5	3,5	3,4	3,3	3,2	3,1	3,1	3,1	3,0	2,9
S	5,7	5,9	5,9	5,8	5,7	5,7	5,6	5,5	5,5	5,5	5,5
UK	38,9	39,8	40,6	40,4	40,3	39,8	38,7	37,7	37,2	37,2	36,8
EU	251,7	252,9	254,1	251,7	248,4	242,8	234,3	225,7	219,3	214,7	210,3

Source: Eurostat – central scenario

Table A7-3 Elderly population aged 65 and over (millions)

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
B	1,7	1,8	1,8	2,0	2,2	2,4	2,6	2,8	2,8	2,7	2,7
DK	0,8	0,8	1,0	1,1	1,1	1,2	1,3	1,3	1,3	1,3	1,2
D	13,6	15,7	16,6	17,2	18,3	19,8	21,8	23,3	23,1	22,4	21,6
EL	1,8	2,0	2,1	2,2	2,3	2,4	2,6	2,8	2,9	3,1	3,1
E	6,6	6,9	7,2	7,6	8,0	8,6	9,4	10,3	11,2	11,7	11,6
F	9,4	9,9	10,3	11,6	12,9	14,1	15,3	16,2	16,7	16,6	16,6
IRL	0,4	0,4	0,5	0,6	0,6	0,7	0,8	0,9	1,0	1,1	1,1
I	10,3	11,2	11,8	12,6	13,2	13,8	14,9	16,1	16,8	16,8	16,1
L	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
NL	2,2	2,3	2,5	2,9	3,3	3,7	4,1	4,4	4,5	4,4	4,3
A	1,3	1,4	1,5	1,6	1,7	1,9	2,2	2,4	2,4	2,4	2,3
P	1,5	1,7	1,7	1,9	2,0	2,1	2,3	2,5	2,7	2,9	2,9
FIN	0,8	0,8	0,9	1,0	1,2	1,3	1,3	1,4	1,3	1,3	1,3
S	1,5	1,6	1,7	1,9	2,0	2,1	2,2	2,3	2,3	2,3	2,3
UK	9,3	9,4	9,8	10,9	11,7	12,7	14,2	15,4	15,8	15,6	15,4
EU	61,3	65,9	69,4	75,2	80,6	87,0	95,2	102,0	105,1	104,8	102,7

Source: Eurostat – central scenario

Table A7-4 Very elderly population aged 80 and over (millions)

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
B	0,4	0,4	0,5	0,6	0,6	0,6	0,7	0,8	0,9	1,0	1,0
DK	0,2	0,2	0,2	0,2	0,3	0,3	0,4	0,4	0,4	0,4	0,4
D	3,0	3,5	4,0	4,5	5,6	5,7	5,8	6,3	7,1	8,2	8,5
EL	0,4	0,4	0,5	0,6	0,7	0,7	0,7	0,8	0,9	1,0	1,0
E	1,5	1,7	2,1	2,3	2,3	2,4	2,6	2,8	3,2	3,5	3,9
F	2,1	2,7	3,2	3,5	3,6	3,7	4,5	5,3	5,8	6,1	6,2
IRL	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,3	0,3	0,3
I	2,2	2,8	3,3	3,7	4,0	4,2	4,6	4,8	5,2	5,7	6,3
L	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
NL	0,5	0,6	0,6	0,7	0,7	0,9	1,1	1,2	1,4	1,5	1,6
A	0,3	0,4	0,4	0,4	0,5	0,5	0,6	0,6	0,7	0,9	1,0
P	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7	0,8	0,8	0,9
FIN	0,2	0,2	0,2	0,2	0,3	0,3	0,4	0,4	0,5	0,5	0,5
S	0,5	0,5	0,5	0,5	0,5	0,6	0,7	0,7	0,7	0,8	0,8
UK	2,3	2,5	2,7	2,8	2,9	3,3	3,9	4,2	4,6	5,2	5,7
EU	13,9	16,4	18,7	20,6	22,7	23,9	26,9	29,5	32,4	35,9	38,1

Source: Eurostat – central scenario

Table A7-5 Old-age dependency ratio (%)

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
B	26	26	27	30	33	37	42	45	46	46	45
DK	22	23	27	29	32	34	38	39	40	38	36
D	24	28	30	31	34	38	44	50	50	49	49
EL	26	28	29	31	33	35	38	43	47	52	54
E	25	26	27	29	31	34	39	45	52	58	60
F	24	25	25	29	33	36	40	43	45	45	46
IRL	17	17	17	20	22	25	27	29	33	37	40
I	27	29	31	34	37	40	46	53	59	62	61
L	21	23	24	26	28	32	36	40	41	40	38
NL	20	21	22	26	30	33	38	42	44	42	41
A	23	25	27	30	32	37	45	52	54	54	54
P	23	25	25	27	29	31	33	37	41	45	46
FIN	22	23	25	31	36	39	43	44	43	43	44
S	27	27	29	33	35	37	40	41	42	42	42
UK	24	24	24	27	29	32	37	41	43	42	42
EU	24	26	27	30	32	36	41	45	48	49	49

Population aged 65+ as % of population aged 15 to 64

Source: Commission calculation based on Eurostat – central scenario

Table A7-6 Share of the very elderly in total elderly population (%)

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
B	21	25	28	28	27	25	27	29	32	35	37
DK	26	25	22	21	23	28	28	28	29	33	35
D	22	22	24	26	30	29	26	27	31	37	39
EL	20	21	26	29	30	29	29	29	30	31	33
E	22	25	29	30	29	28	28	27	28	30	33
F	22	27	31	30	28	26	30	33	35	37	38
IRL	23	23	23	21	21	21	24	26	27	27	27
I	22	25	28	29	31	30	31	30	31	34	39
L	21	23	26	27	27	26	26	28	31	35	38
NL	23	25	25	23	23	23	27	28	30	34	37
A	23	27	27	26	28	28	27	27	31	37	42
P	19	22	25	26	27	26	27	28	28	29	31
FIN	22	24	26	24	23	23	30	33	35	36	36
S	29	31	28	25	25	29	32	32	32	34	36
UK	25	27	27	25	25	26	28	28	29	34	37
EU	23	25	27	27	28	27	28	29	31	34	37

Population aged 80+ as % of population aged 65

Source: Commission calculation based on Eurostat – central scenario

ANNEX 8 DETAILED RESULTS FOR THE PENSION PROJECTIONS

Table A8-1 Unemployment rates used in the current policy scenario (%)

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	*change*
B	10,2	8,1	7,9	7,3	6,6	6,6	6,6	6,6	6,6	6,6	6,6	*-3,6*
DK	5,9	5,6	5,5	5,6	5,5	5,5	5,4	5,4	5,4	5,5	5,5	*-0,4*
D	7,9	6,6	6,3	6,0	5,6	5,6	5,6	5,6	5,6	5,6	5,6	*-2,3*
EL	11,0	8,2	8,0	7,7	7,4	7,0	6,7	6,3	6,0	5,7	5,5	*-5,5*
E	14,0	8,9	7,8	7,3	6,9	6,6	6,3	6,1	6,0	6,0	6,0	*-8,0*
F	9,8	9,1	8,8	8,4	8,1	7,8	7,4	7,1	6,7	6,4	6,1	*-3,7*
IRL	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	*0,0*
I	10,6	9,8	9,4	9,1	8,9	8,6	8,3	7,9	7,5	7,2	7,0	*-3,6*
L	2,8		2,5		2,3		2,1		1,8		1,5	*-1,3*
NL	3,2	3,3	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	*0,8*
A	5,9	5,3	4,7	4,1	4,0	4,0	4,0	4,0	4,0	4,0	4,0	*-1,9*
P	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	*0,0*
FIN	9,8	7,2	7,2	7,1	7,1	7,1	7,1	7,1	7,1	7,1	7,1	*-2,7*
S	6,0	5,1	5,1	5,1	5,1	5,1	5,1	5,1	5,1	5,1	5,1	*-0,9*
UK	5,3	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6	*0,3*

Table A8-2 Public pension expenditures including most public revenues to people aged 55 and over - Lisbon scenario

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
B	9,9	8,6	8,4	8,8	9,5	10,2	11,0	11,4	11,3	11,2	11,1	*1,5*
DK	10,4	11,1	12,1	12,7	13,1	13,3	13,4	13,2	12,8	12,2	11,8	*3,0*
D	11,8	11,4	11,2	11,8	12,4	13,3	14,2	14,6	14,5	14,2	14,0	*2,8*
EL	12,6	12,1	11,9	12,7	14,0	15,7	16,8	18,6	20,2	20,8	20,6	*8,2*
E	9,4	8,9	9,0	9,1	9,6	10,6	12,0	13,7	15,2	16,2	16,2	*6,8*
F	12,1	11,3	11,7	12,8	13,6	14,2	14,7	14,8	14,8	14,8	14,8	*2,8*
IRL	4,6	4,6	5,5	5,9	6,7	7,1	7,4	7,6	8,3	8,2	8,2	*3,7*
I	13,8	13,5	13,4	13,7	13,9	14,2	14,4	14,3	14,5	14,7	14,4	*0,9*
L												
NL	7,9	8,3	9,2	10,4	11,5	12,5	13,3	13,8	13,9	13,7	13,4	*6,0*
A	14,5	14,4	14,4	14,5	14,7	15,5	15,8	15,9	15,2	14,2	13,5	*1,4*
P	9,8	10,9	11,7	12,5	12,8	13,0	13,2	13,2	13,2	13,2	12,5	*3,4*
FIN	11,3	10,9	11,6	12,7	13,6	14,4	15,1	15,4	15,4	15,5	15,6	*4,3*
S	9,0	9,0	9,2	9,9	10,0	10,2	10,4	10,6	10,4	10,1	9,9	*1,6*
UK	5,5	5,3	4,8	4,6	4,4	4,3	4,4	4,3	4,2	4,0	3,8	*-1,7*
EU	10,4	10,0	10,0	10,4	10,9	11,4	12,0	12,2	12,3	12,2	12,0	*1,9*

For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP. Results for Ireland are expressed as a % of GNP and not GDP.

Table A8-3 Public pension expenditures including most public revenues to people aged 55 and over – High population scenario

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
B	10,0	9,6	10,0	10,6	11,4	12,4	13,1	13,4	13,3	13,0	12,7	*3,4*
DK	10,5	11,4	12,6	13,3	13,9	14,3	14,5	14,3	13,8	13,2	12,9	*4,0*
D	11,9	11,5	11,3	12,0	12,8	13,9	15,1	15,6	15,6	15,5	15,3	*3,8*
EL												
E	9,4	8,9	9,0	9,3	9,9	10,9	12,2	13,6	15,0	15,8	15,7	*6,4*
F	12,1	12,2	13,2	14,3	15,2	15,6	15,8	15,6	15,2	15,2	15,2	*3,7*
IRL	4,6	4,6	5,1	5,9	6,8	7,3	7,5	7,7	8,5	8,7	8,5	*4,1*
I	13,8	13,8	14,0	14,5	14,8	15,1	15,4	15,3	14,9	14,1	13,1	*1,6*
L	7,4	7,4	7,5		8,2		9,2		9,5		9,3	*2,2*
NL	7,9	8,3	9,1	10,2	11,2	12,1	13,1	13,8	13,9	13,7	13,4	*6,0*
A	14,5	14,3	14,6	14,9	15,3	16,2	16,7	16,7	15,9	14,9	14,2	*2,2*
P	9,8	11,0	12,0	13,0	13,6	13,8	14,1	14,1	14,1	14,1	13,4	*4,3*
FIN	11,3	10,8	11,6	12,8	13,8	14,6	15,3	15,5	15,3	15,0	14,8	*4,2*
S	9,0	9,1	9,5	10,2	10,4	10,5	10,7	10,7	10,5	10,0	9,7	*1,7*
UK	5,5	5,3	5,1	5,0	5,0	5,1	5,2	5,0	4,8	4,5	4,2	*-1,3*
EU	10,3	10,2	10,4	11,0	11,5	12,1	12,7	12,9	12,7	12,5	12,2	*2,5*

For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP. Results for Ireland are expressed as a % of GNP and not GDP.

Table A8-4 Public pension expenditures including most public revenues to people aged 55 and over – High population scenario

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
B	10,0	9,5	9,8	10,3	11,1	12,1	12,9	13,4	13,5	13,4	13,4	*3,5*
DK												
D	11,8	11,3	11,3	11,7	12,3	13,5	14,9	15,7	15,8	15,9	15,9	*4,1*
EL												
E	9,4	8,8	8,8	9,2	9,8	10,9	12,7	14,7	16,7	18,3	18,6	*9,2*
F	12,1	12,1	13,0	13,9	14,7	15,3	15,7	15,9	15,8	15,8	15,8	*3,8*
IRL	4,6	4,5	5,0	5,8	6,6	7,2	7,6	7,8	8,1	8,6	9,1	*4,5*
I	13,8	13,7	13,8	14,3	14,6	15,1	15,8	16,2	16,3	15,8	14,9	*2,5*
L												
NL	7,9	8,2	9,0	10,0	10,9	11,8	12,8	13,6	13,8	13,6	13,4	*5,9*
A	14,5	14,4	14,7	15,2	15,8	17,2	18,3	18,8	18,4	17,7	17,4	*4,3*
P	9,8	10,8	11,5	12,2	12,6	12,7	13,0	13,1	13,2	13,3	12,7	*3,5*
FIN	11,3	10,9	11,8	13,0	14,1	15,0	15,9	16,3	16,3	16,4	16,7	*5,4*
S	9,0	9,2	9,8	10,7	11,2	11,6	12,2	12,8	12,9	12,6	12,4	*3,9*
UK	5,5	5,3	5,0	4,8	4,8	4,9	5,1	4,9	4,8	4,5	4,2	*-1,3*
EU	10,3	10,1	10,3	10,7	11,2	11,9	12,7	13,2	13,3	13,3	13,1	*3,0*

For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP. Results for Ireland are expressed as a % of GNP and not GDP.

Table A8-5 Public pension expenditures including most public revenues to people aged 55 and over – low labour force participation rate scenario

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
B	10,0	9,6	10,0	10,6	11,6	12,6	13,5	14,0	14,0	13,8	13,6	*4,0*
DK	10,5	11,4	12,6	13,3	13,9	14,4	14,7	14,6	14,2	13,7	13,5	*4,2*
D	11,8	11,4	11,3	11,9	12,8	14,2	15,7	16,7	17,0	17,1	17,2	*5,4*
EL												
E	9,4	8,9	9,0	9,4	10,1	11,3	13,0	14,9	16,8	18,1	18,3	*8,9*
F	12,1	12,2	13,2	14,3	15,2	15,9	16,3	16,4	16,3	16,3	16,3	*4,4*
IRL	4,6	4,5	5,1	5,9	6,8	7,4	7,9	8,1	8,7	9,2	9,6	*5,0*
I	13,8	13,8	14,0	14,6	15,0	15,5	16,2	16,5	16,3	15,6	14,5	*2,6*
L												
NL	7,9	8,3	9,1	10,2	11,2	12,3	13,5	14,3	14,7	14,6	14,3	*6,8*
A	14,5	14,5	14,9	15,5	16,3	17,7	19,1	19,8	19,9	19,5	19,4	*5,4*
P	9,8	10,9	11,8	12,7	13,3	13,5	13,9	14,1	14,2	14,3	13,7	*4,5*
FIN	11,3	10,9	11,7	13,1	14,2	15,2	16,0	16,5	16,5	16,5	16,6	*5,3*
S												
UK	5,5	5,3	5,1	5,0	4,9	5,1	5,3	5,2	5,0	4,7	4,5	*-1,0*
EU	10,4	10,3	10,5	11,0	11,6	12,4	13,3	13,8	13,9	13,8	13,6	*3,5*

For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP. Results for Ireland are expressed as a % of GNP and not GDP.

Table A8-6 Public pension expenditures including most public revenues to people aged 55 and over – low unemployment rate scenario

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
B	10,0	9,5	9,9	10,5	11,3	12,0	12,6	13,0	13,0	12,8	12,6	*3,0*
DK	10,5	11,3	12,5	13,1	13,7	14,1	14,4	14,3	13,9	13,4	13,2	*3,9*
D	11,8	11,4	11,2	11,8	12,6	13,9	15,3	16,2	16,3	16,4	16,4	*4,6*
EL	12,6	12,4	12,6	13,7	15,4	17,6	19,6	21,7	23,8	24,7	24,8	*12,2*
E	9,4	8,8	8,9	9,2	9,8	10,8	12,4	14,1	15,7	16,9	17,1	*7,6*
F	12,1	12,2	13,1	14,1	14,8	15,4	15,7	15,7	15,4	15,4	15,4	*3,6*
IRL	4,6	4,5	5,0	5,8	6,6	7,1	7,5	7,7	8,2	8,6	8,9	*4,3*
I	13,8	13,8	14,0	14,4	14,7	15,1	15,6	15,7	15,5	14,8	13,9	*1,9*
L	7,4	7,4	7,5		8,2		9,2		9,5		9,3	*2,2*
NL												
A	14,5	14,5	14,9	15,4	16,0	17,2	18,1	18,7	18,3	17,5	17,0	*4,2*
P	9,8	10,9	11,7	12,5	13,0	13,2	13,5	13,6	13,7	13,8	13,1	*4,0*
FIN	11,3	10,9	11,6	12,7	13,7	14,7	15,4	15,7	15,6	15,6	15,6	*4,4*
S	9,0	9,2	9,5	10,3	10,6	10,9	11,2	11,5	11,3	10,9	10,6	*2,5*
UK	5,5	5,3	5,0	4,9	4,8	5,0	5,2	5,1	4,9	4,6	4,3	*-1,2*
EU	10,5	10,3	10,5	11,0	11,5	12,2	12,9	13,3	13,3	13,3	13,0	*2,8*

For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP. Results for Ireland are expressed as a % of GNP and not GDP.

Table A8-7 Public pension expenditures including most public revenues to people aged 55 and over – low productivity rate scenario

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
B	10,0	9,5	9,9	10,5	11,3	12,2	13,0	13,3	13,2	13,0	12,7	*3,3*
DK	10,6	11,4	12,5	13,2	13,8	14,2	14,5	14,4	14,0	13,5	13,2	*3,9*
D	11,8	11,4	11,2	11,8	12,7	14,0	15,5	16,4	16,7	16,8	16,9	*5,1*
EL												
E	9,4	8,8	9,1	9,6	10,4	11,7	13,5	15,5	17,4	18,9	19,1	*9,7*
F	12,1											
IRL												
I	13,8	13,8	14,3	15,1	15,6	16,2	16,9	17,2	17,0	16,3	15,3	*3,3*
L												
NL	7,9	8,3	9,1	10,1	11,0	12,0	13,0	13,8	14,0	13,9	13,6	
A	14,5	14,4	14,8	15,3	15,9	17,2	17,9	18,2	17,5	16,4	15,8	*3,7*
P	9,8	10,9	11,8	12,6	13,1	13,2	13,5	13,5	13,7	13,8	13,3	*4,0*
FIN	11,3	10,9	11,9	13,3	14,6	15,7	16,7	17,2	17,3	17,3	17,6	*6,3*
S	9,0	9,2	9,7	10,6	11,1	11,4	11,9	12,3	12,3	11,9	11,7	*3,3*
UK	5,5	5,3	5,2	5,2	5,2	5,5	5,8	5,9	5,8	5,5	5,3	*-0,2*
EU	10,4	9,9	10,0	10,5	11,1	11,9	12,8	13,4	13,5	13,4	13,1	*3,1*

For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP. Results for Ireland are expressed as a % of GNP and not GDP.

Table A8-8 Public pension expenditures including most public revenues to people aged 55 and over –high interest rate scenario

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	change
B	10,0	9,5	9,9	10,5	11,4	12,4	13,3	13,7	13,7	13,5	13,3	*3,7*
DK	10,4	11,3	12,5	13,2	13,8	14,3	14,6	14,5	14,1	13,6	13,4	*4,2*
D	11,8	11,4	11,2	11,8	12,6	14,0	15,5	16,4	16,6	16,8	16,9	*5,0*
EL												
E	9,4	8,8	8,9	9,3	9,9	11,0	12,6	14,3	16,0	17,3	17,3	*7,9*
F	12,1	12,2	13,1	14,2	15,0	15,6	16,0	16,0	15,8	15,8	15,8	*4,0*
IRL												
I	13,8	13,8	13,9	14,4	14,8	15,2	15,7	15,9	15,7	15,0	14,1	*2,1*
L												
NL												
A	14,5	14,5	14,9	15,4	16,0	17,2	18,1	18,7	18,3	17,5	17,0	*4,2*
P	9,9	10,9	12,2	13,5	14,7	15,9	16,5	16,5	16,4	15,8	14,8	*6,7*
FIN												
S	9,0	9,2	9,6	10,4	10,8	11,1	11,6	12,0	12,0	11,6	11,4	*3,0*
UK												
EU	11,8	11,7	11,9	12,6	13,3	14,2	15,1	15,7	15,9	15,9	15,7	*4,0*

For Denmark, the results include the semi-funded labour market pension (ATP). Excluding the ATP, the peak increase would be 2.7% of GDP. Results for Ireland are expressed as a % of GNP and not GDP.