

IV. FISCAL IMPLICATIONS OF AGEING: PROJECTIONS OF AGE-RELATED SPENDING

Introduction

The combination of the baby boom in the early post-war period, the subsequent fall in fertility rates from the end of the 1960s and increasing life expectancy is leading to a progressive ageing of the population in virtually all OECD countries. This will begin to affect public finances significantly as the baby boom generation progressively reaches retirement age over the next few decades. The impact of these developments on public finances is an issue of concern and debate in most OECD countries, and a substantial number of policy reforms have been introduced over the past decade. This paper reviews these public finance developments on the basis of more up-to-date estimates covering the next half century. The estimates are based on results generated by Member countries, using the models of national administrations or research institutes in order to ensure that better account is taken of institutional detail affecting expenditures than has been possible in previous OECD work.¹ At the same time, consistency and comparability across countries have been strengthened by using a set of population projections and common assumptions for establishing GDP growth and other key macroeconomic variables that were agreed between countries and the OECD. Because of the wide margins of uncertainty over such a long time horizon, sensitivity tests are also provided which show the impact of changes to key assumptions. On the basis of these results, the paper then assesses the need for further reforms and which kinds of reforms are likely to have the greatest impact on budget outcomes.²

New projections provide information on the fiscal impact of ageing to 2050 for OECD countries

A number of considerations need to be kept in mind when interpreting the results. First, the OECD has helped co-ordinate the preparation of the results, with the actual projections based on the work of national experts using their own models. This approach differs from previous OECD exercises – where a standardised modelling approach was used – but, as noted, has the advantage of providing richer institutional detail. Further, the OECD has not controlled the use of underlying assumptions within the models beyond those agreed by the participating countries (population and the macroeconomic environment). While the OECD believes that a reasonable

Country projections are based on different models, but broad cross-country consistency has been achieved

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1. See Hagemann and Nicoletti (1989), Van den Noord and Herd (1993, 1994), Leibfritz *et al.* (1995), Roseveare *et al.* (1996), OECD (1997, 1998 and 2000), Turner *et al.* (1998) and Visco (2000, 2001).
 2. This work has been carried out in collaboration with the Working Group on Ageing of the Economic Policy Committee of the European Union. Both of these projects have been based on the same macroeconomic framework and population projections. However, the public expenditure components covered as well as the timing of the studies have differed somewhat. Preliminary results for the European Union countries were presented to the Economic Policy Committee of the European Union (2000).

Table IV.1. Assumptions for fertility, life expectancy and immigration

	Fertility (children per woman)		Life expectancy at birth for males		
	2000	2050	2000	2050	
Australia	1.72	1.56	Australia	76.7	82.6
Austria	1.31	1.50	Austria	75.0	80.3
Belgium	1.54	1.80	Belgium	75.3	80.5
Canada	1.62	1.50	Canada	75.5	80.0
Czech Republic	1.14	1.50	Czech Republic	71.5	75.2
Denmark	1.77	1.80	Denmark	74.8	79.1
Finland	1.73	1.70	Finland	73.9	79.9
France	1.73	1.80	France	74.8	80.0
Germany	1.40	1.50	Germany	74.7	80.0
Hungary	1.30	1.60	Hungary	66.8	74.6
Italy	1.22	1.50	Italy	75.5	81.0
Japan	1.38	1.61	Japan	77.4	79.4
Korea	1.71	1.59	Korea	70.6	76.2
Netherlands	1.71	1.80	Netherlands	75.5	80.0
New Zealand	..	..	New Zealand ^a	74.3	79.5
Norway	1.80	1.80	Norway	75.7	80.0
Poland	1.34	1.58	Poland	69.9	78.5
Portugal	1.53	1.70	Portugal	72.0	78.0
Spain	1.19	1.50	Spain	74.9	79.0
Sweden	1.50	1.80	Sweden	77.3	82.0
United Kingdom	1.72	1.80	United Kingdom	75.2	80.0
United States	2.05	1.95	United States	73.9	79.1
Average of countries above^b	1.54	1.66	Average of countries above^b	74.1	79.3
	Immigration (per cent of total population)		Life expectancy at birth for females		
	2000	2050	2000	2050	
Australia	0.90	0.41	Australia	82.2	87.8
Austria	0.12	0.26	Austria	81.2	86.0
Belgium	0.10	0.15	Belgium	81.4	85.5
Canada	0.60	0.43	Canada	81.3	84.0
Czech Republic	0.09	0.18	Czech Republic	78.4	81.5
Denmark	0.20	0.18	Denmark	79.2	82.8
Finland	0.11	0.10	Finland	81.1	85.0
France	0.08	0.08	France	82.8	87.0
Germany	0.36	0.26	Germany	80.8	85.0
Hungary	-0.09	-0.04	Hungary	75.2	81.1
Italy	0.09	0.17	Italy	82.0	86.0
Japan	..	..	Japan	84.1	86.5
Korea	..	..	Korea	78.1	83.0
Netherlands	0.21	0.20	Netherlands	80.9	85.0
New Zealand	..	..	New Zealand ^a	81.0	85.5
Norway	0.30	0.19	Norway	81.4	84.5
Poland	..	..	Poland	78.2	84.7
Portugal	0.12	0.23	Portugal	79.2	84.0
Spain	0.08	0.17	Spain	82.1	85.0
Sweden	0.17	0.22	Sweden	82.0	86.0
United Kingdom	0.15	0.11	United Kingdom	80.0	85.0
United States	0.33	0.25	United States	79.6	83.5
Average of countries above^b	0.22	0.20	Average of countries above^b	80.6	84.7

a) Data are for 1996 and 2051.

b) OECD average is unweighted and excludes countries where information is not available.

Source: OECD.

degree of uniformity has been obtained, complete consistency across countries in assumptions and approach has not necessarily been achieved. Second, it should also be noted that the projections presented below may differ from those used by national administrations in their “most likely” scenarios, because of differences in assumptions.

Third, in any case, projections over such a long period are, by their nature, highly uncertain as economies will evolve and policies will change in ways that cannot be foreseen.

The baseline projections

Underlying assumptions

Estimates of the degree of ageing over the next 50 years were based on the middle variant of Eurostat population projections for the countries in the European Union (EU) and national projections for the remaining countries. While there is considerable cross-country variation, these projections show an average increase in fertility of around 8 per cent and a lengthening in average lifetimes of about 4½ years (Table IV.1). Generally speaking, these developments lead over the period as a whole to:

- Very modest growth or declines in the total population (except in Australia, Canada, the Netherlands, New Zealand and Norway).
- A fall in the working age population (20 to 64 years of age) (except in Australia, Canada, New Zealand, Norway, and the United States), and, increases in the number of elderly and, particularly, in those over 80.
- A near doubling, on average, in the ratio of the elderly (individuals 65+) to the working-age population (individuals 20-64) between 2000 and mid-century (the old-age dependency ratio) (Figure IV.1). For most countries, the ratio is projected to increase until about 2035 to 2045 (depending on the country), and then to stabilise or decline by a small amount thereafter. However, in Australia, the Czech Republic, Hungary, Japan, Poland, Spain, and, to a lesser degree, Canada and Korea, ageing appears to be increasing even at the end of the period, suggesting that these countries may experience further pressures on spending from ageing beyond 2050.
- A rise in the average age both of the working-age population and of the elderly, *i.e.* both the share of those aged 55 to 64 in the population aged 20 to 64 and the share of the very old (aged 80+) among the elderly (aged 65+) increase (Table IV.2). This latter development reflects the passing of the baby-boom generation and longer life expectancy.
- In contrast, a small decline in the ratio of youth (individuals less than 20) to the working-age population, suggesting some minor offsetting declines in spending on children (Table IV.2).

Projections to 2050 show declining working-age populations and rising numbers of retired people

The old-age dependency ratios double by 2050, reflecting the baby-boom generation entering retirement

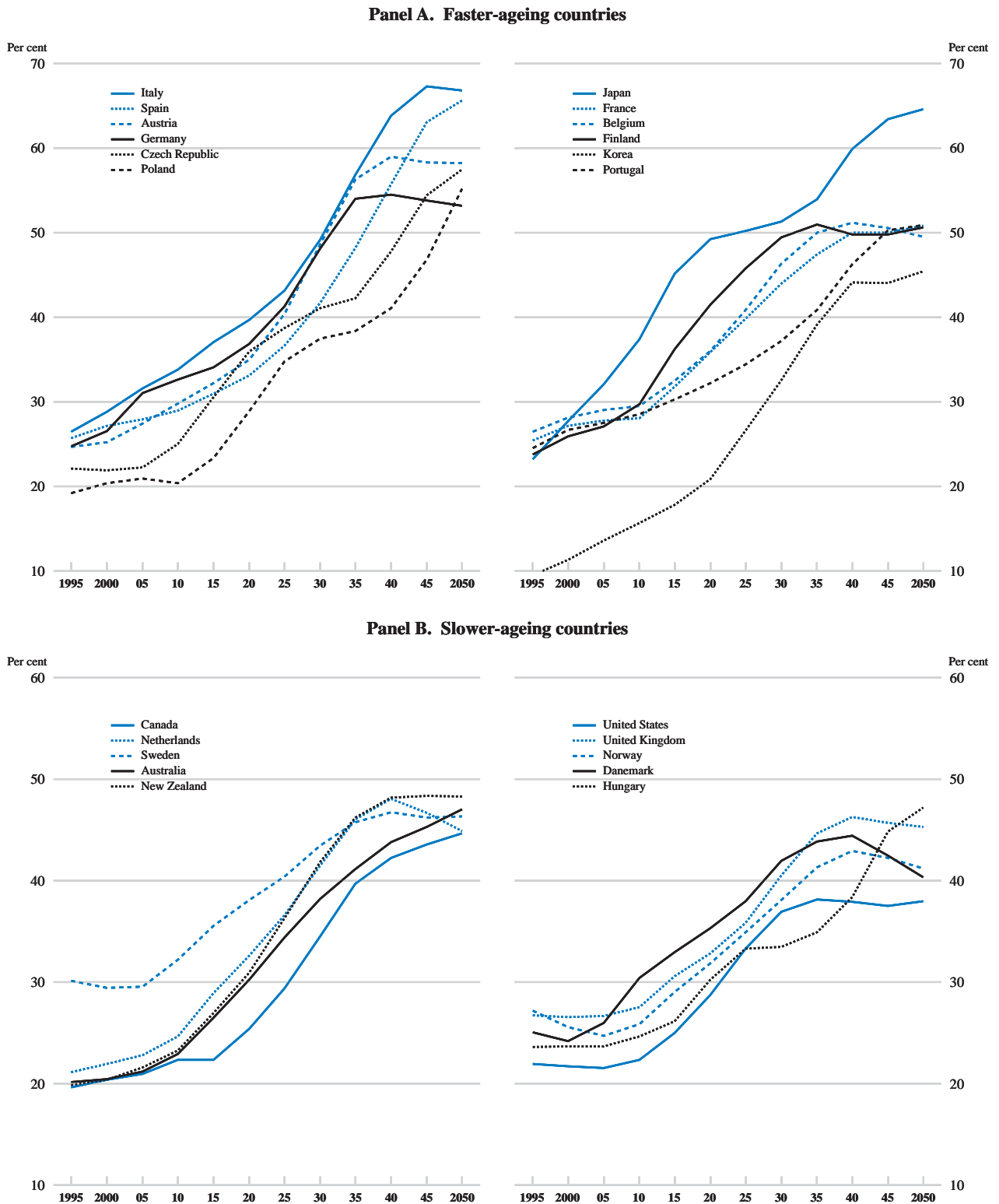
The number of very old people will increase as lifetimes lengthen...

... while the youth dependency ratios will fall slightly

The common assumptions on unemployment and participation rates (Box IV.1) imply that countries that now have high rates of unemployment relative to the OECD average and low participation rates of women (*e.g.* Italy and Spain) have more scope for growth over the period. In practice, however, the declines projected for the working-age population offset such effects in most countries and average employment growth over the period is either weakly positive or negative. Almost all of the GDP growth – which averages 1.9 per cent annually – is due to the increase in labour productivity, which was set to converge, from about 2020, to a trend rate of 1¾ per cent per annum (see Box IV.1 for details).

GDP grows by 1.9 per cent per annum over the period on average, mainly reflecting productivity growth

Figure IV.1. Trends in old-age¹ dependency ratios



1. The old-age dependency ratio is the elderly population [65+] as a percentage of the working-age population [20-64].

Source: OECD.

Table IV.2. Share of older workers (55-64), the very old (80+) and youth ratio (0-19)

(Per cent share and changes in percentage points)

	Older workers		The very old		Youth dependency ratio	
	Individuals aged 55-64 as a per cent of those 20-64		Individuals aged 80+ as a per cent of those 65+		Individuals aged 0-19 as a per cent of those 20-64	
	2000	Change, 2000-50	2000	Change, 2000-50	2000	Change, 2000-50
Australia	15.3	8.1	..	..	..	..
Austria	18.4	5.8	22.2	16.5	36.3	-4.0
Belgium	17.1	6.5	20.6	15.8	39.3	-0.6
Canada	14.8	9.4	23.8	12.3	41.9	-9.0
Czech Republic	17.1	9.8	..	..	36.1	-4.3
Denmark	20.8	2.2	26.3	8.2	39.7	-6.1
Finland	..	..	22.3	13.4	38.5	-3.5
France	15.8	7.0	22.5	15.1	43.6	-4.0
Germany	20.7	3.7	21.8	17.6	34.1	-1.4
Hungary	17.8	7.1	..	..	38.2	-3.5
Italy	19.0	5.6	21.7	17.2	31.7	0.9
Japan	20.8	2.6	..	..	33.0	2.5
Korea	12.8	9.6	..	..	47.0	-11.7
Netherlands	16.1	6.0	23.2	13.8	39.3	0.3
New Zealand	15.4	8.7	..	..	51.1	-10.0
Norway	16.4	5.7	..	..	43.8	-2.9
Poland	14.4	12.5	..	..	46.5	-12.7
Portugal	17.5	3.8	18.5	9.6	35.9	0.5
Spain	16.3	7.4	22.0	11.2	35.1	-1.5
Sweden	19.9	5.4	28.4	7.3	40.9	-3.1
United Kingdom	17.0	2.8	25.2	11.5	43.3	-5.4
United States	14.9	6.5	26.5	9.6	48.7	-4.4
Average of countries above^a	17.1	6.5	23.2	12.8	39.1	-3.8

a) OECD average is unweighted and excludes countries where information is not available.

Source: OECD.

The baseline projections for public expenditure

While much recent discussion has focused on old-age pension programmes, many other public expenditure programmes are affected by demographic shifts. These include programmes permitting early withdrawal from the labour market (long-term unemployment, disability, and early retirement programmes for labour market reasons), health care and long-term care for the frail elderly, family/child benefits and education. However, in this exercise, the coverage of projections for these other components is much less complete across countries than is the case for pensions.³ Based on information from countries that provided a wide range of spending items, spending components that are sensitive to the age structure of the population represent between 40 and 60 per cent of total public spending.⁴

Some 40 to 60 per cent of public spending is sensitive to the age structure

3. Thirteen countries provided information on programmes permitting early withdrawal from the labour market; eleven included child and family benefits and education and fourteen provided data for health and long-term care. Only eight countries provided data for all components of age-related spending, although, in some cases, this may reflect the fact that these programmes do not exist or that spending has been included under other components of age-related spending.

4. For further information see Dang *et al.* (forthcoming).

Box IV.1. Population projections and background assumptions

Population projections

Projections were based on the middle variant of national or, in the case of EU countries, Eurostat population projections. The profile of populations over time in these projections depends on assumptions about fertility, mortality and immigration (see Table IV.1). The Eurostat population projections were specially prepared for this exercise.

Fertility

In virtually all countries fertility rates are projected to rise from an average of around 1.5 towards levels ranging between 1.5 and 1.8 by 2050, with most of the increase occurring over the next two decades. The largest increases are expected to occur in low-fertility countries such as the Czech Republic, Hungary, Italy and Spain but increases are also substantial in Belgium and Sweden. Denmark, Finland and Norway are assumed to have fairly constant fertility rates. Only Australia, Canada and the United States are projected to experience significant declines.

Life expectancy

Life expectancy at birth is expected to increase, on average, by above 5 years for males and 4 years for females from 2000 to 2050, thus allowing some catch-up between the two sexes. Gains in life expectancy are similar across the majority of countries, although they are smaller for men in the Czech Republic and Japan and higher in Hungary and Poland which have a particularly low level at the beginning of the period. For women, the increases are smaller in Canada, the Czech Republic, Japan, Norway and Spain and significantly higher in Australia, Austria, Hungary, Poland and the United Kingdom.

Net immigration

Net immigration is difficult to predict since it will depend on countries' economic situation and policies. Countries with higher levels of immigration at the beginning of the period tend to project falls (Australia, Canada, Germany, Norway and the United States), while a number of countries with low levels project increases (Austria, Belgium, Italy and Spain). Once again, changes tend to be concentrated in the first half of the period.

Implications for dependency

These various developments contribute to the flattening in the dependency ratios toward the middle of the century. The replacement of the baby-boom generation by smaller cohorts leads to slower growth in the number of elderly. At the same time, the projected increase in fertility during the first few decades, combined with rising immigration (excluding North America, Australia, Germany and Norway), contributes to a more rapid rise in the working-age population towards the end of the period.

Main common background macroeconomic assumptions

Taking these population projections as the starting point, the profile of GDP to 2050 was calculated in the following manner:

- Participation rates for the period to 2010 are based on ILO projections (ILO, 1997). For the subsequent period, the participation rates stay constant for men aged 20 to 54 (prime age) and 55 to 64 (older workers) as well as for all retirement-age individuals and all persons under the age of 20. Participation rates for women aged 20 to 54 and 55 to 64 rise progressively towards a ceiling at the end of the period equal to 5 percentage points below those of men in countries with widely subsidised child-care and 10 percentage points below elsewhere. Some countries deviate marginally from these rules because of the expected impact of recent policies (*e.g.* higher retirement ages). However, with the exception of Austria,¹ these differences do not appear large enough to affect the results significantly.
- Unemployment rates converge to their structural levels (as defined by the OECD) in 2005, with unemployment rates held constant at the 2005 rate throughout the period to 2050, except for countries where existing labour-market reforms presupposed a further decline in structural unemployment over the period.² The authorities in Belgium, France and Italy built in this decline. The Spanish authorities allowed its unemployment rate to fall over the period to 4 per cent, well outside the agreed limits.
- Labour productivity growth (measured as GDP per worker) converges towards an annual rate of 1¼ per cent as from between 2020 and 2030. Some catch-up is allowed for initially low-productivity countries such as the Czech Republic, Hungary, Korea, Poland and Portugal. Assumptions for productivity growth were so high as to seriously compromise cross-country comparability in Portugal, and this country has been treated separately in this documentation. Average productivity growth rates are significantly lower in Canada and Norway. GDP was established by multiplying the number of employed by average productivity.

Where countries have short- to medium-term budget projections up to 2005, the ageing projections were run off these. Non-age-related expenditures and government revenues are kept constant as a share of GDP after this point, except to the degree that there are clearly identified effects arising from ageing or from background assumptions – *e.g.* reduced spending on unemployment insurance as unemployment falls or higher tax revenues as a result of pensions paid from tax-sheltered savings in pension funds.

1. Instead of broad constancy in the participation rates for older male workers after 2010, the Austrian projections assume that they will rise by 33 percentage points, to 71 per cent, by the end of the period. This reflects the assumed impact of recent reforms to early-retirement policies.

2. This adjustment was limited to one third of the structural unemployment levels in 2005.

Old-age pension spending

Levels of spending around 2000

Old-age pension spending includes, in principle, all old-age pension spending, all early retirement pension spending which is an integral part of the public pension system, and survivors and minimum pensions. Currently, public old-age pension spending, as drawn from the national projection data, represents around 7½ per cent of GDP. Comparisons with OECD sources⁵ suggest that the programme coverage in the projections may be less than full for Austria, Korea, the Netherlands, Norway, the United Kingdom and the United States and, hence, for these countries, the spending projections reported here may involve some degree of underestimation. Little of the cross-country variation in pension spending in 2000 is explained by the degree of ageing as measured by the old-age dependency ratio. Rather, differences reflect wide variation in programme characteristics, including the degree of system maturity, and the degree to which pensions are financed through the public sector:

- In countries with programmes where benefits are largely paid through state-run or bi- or tri-partite earnings-related (ER) schemes, public retirement income is linked to past work and/or contribution histories, although flat-rate elements are nearly always present in the form of minimum pensions.⁶ Virtually all countries with well-developed and mature public-sector earnings-related systems (Austria, Belgium, France, Germany, Italy, Poland, Spain and Sweden) tend to have above average pension spending, although the level of spending varies with the generosity of benefits and the age of retirement (Figure IV.2, Panel A). The US system provides low average benefits relative to previous earnings and has a higher retirement age compared with most of the European countries just referred to. In Korea and Norway, the pension system is still maturing;⁷
- In other countries, predominately flat rate (FR) schemes generally aim to provide a minimum basic income for the elderly irrespective of their work history. Spending under these systems is lower (Figure IV.2, Panel B), partly reflecting the fact that the basic pension component often serves as a safety net (and is therefore set at a lower level), with a larger share of income in retirement coming from private sources than for most countries with ER systems. For many countries with flat-rate schemes, the retirement age is 65 with little opportunity to receive pension benefits before this age. Such FR arrangements can be complemented by mandatory labour-market arrangements of a public or private nature and with various degrees of funding. The public component of these add-ons is, at present, generally less generous than in ER schemes.⁸

Public old-age pension spending averages currently 7½ per cent of GDP

Public earnings-related systems are more costly to the budget...

... than flat-rate pension arrangements

5. Compared with the OECD Social Expenditure Data File (SOCX). See Dang *et al.* (forthcoming) for details.

6. In some of these countries, there are additional, compulsory complementary pension arrangements negotiated on an industrial sector or professional basis (*e.g.* blue-collar or white-collar), and often managed by the social partners (*e.g.* France), although this spending does not always appear in the government accounts.

7. While Korea is currently closer to a flat-rate system, spending increases are driven by a maturing earnings-related scheme introduced in 1988.

8. The maturing of the Canada and Quebec Pension Plans may lead to a greater role for ER schemes in the future.

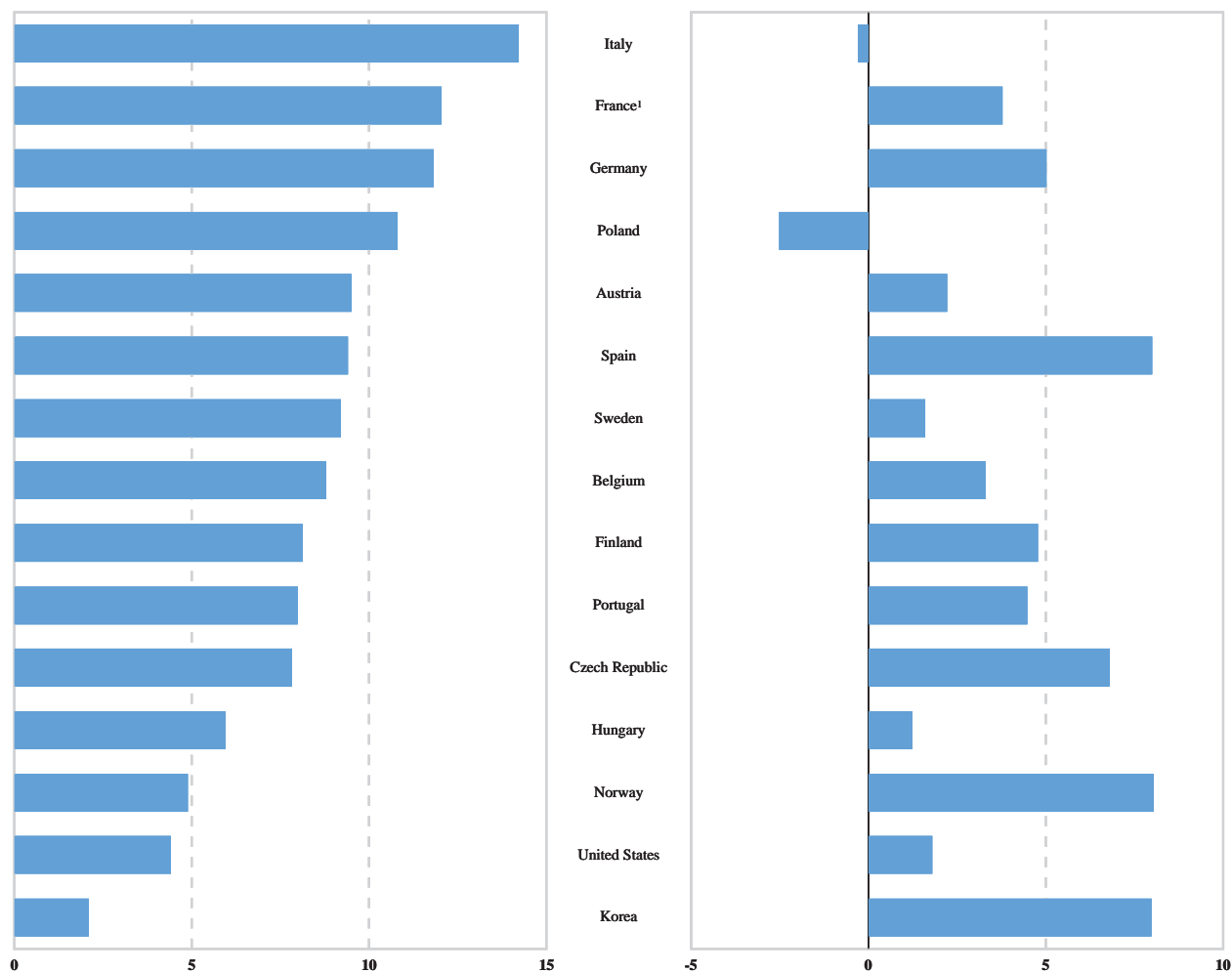
Figure IV.2. Public pension spending in 2000 and changes 2000-2050

Levels in per cent of GDP and changes in percentage points

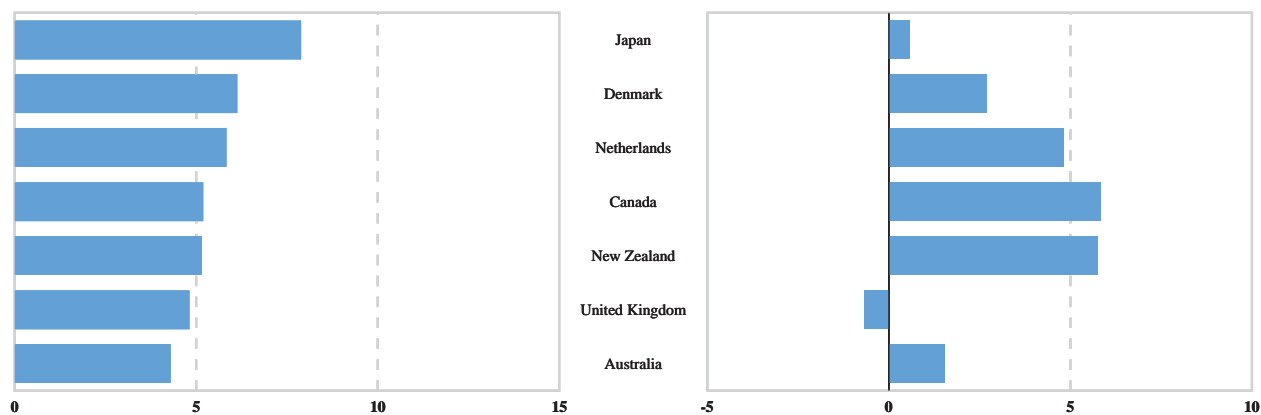
Level in 2000

Change between 2000 and 2050

Panel A. Mainly earnings related pension schemes



Panel B. Mainly flat-rate pension schemes



1. For France, estimations refer to the period from 2000 to 2040.

Source: OECD.

Old-age pension spending trends to 2050

Projections based on assumptions of unchanged policy – though taking into account legislated but-not-yet implemented reforms – suggest that old-age pension spending will rise on average by around 3 to 4 percentage points of GDP in the period to 2050 (Table IV.3, Panel B), but with considerable cross-country variation. Pension spending is projected to fall as a share of GDP over the period for Poland, where shifts are taking place towards private pension arrangements, as well as for the United Kingdom, and to remain broadly stable for Italy, partly reflecting recent reforms. In contrast, increases of more than 4 percentage points of GDP are projected for ten countries (including Portugal) and for seven among these, it will be 5 percentage points or more. Spending relative to GDP starts to rise quickly in the latter part of the current decade, but then slows from around 2035-40, with declines in a few countries.⁹ Indeed, significant differences between the change to the peak and the change over the entire period are projected by Austria, Belgium, Denmark, Italy, Japan, the Netherlands, Sweden and the United Kingdom.

Old-age pension spending rises by 3 to 4 percentage points of GDP to 2050, but by more than this in many countries

To illustrate the forces driving the change in the share of spending in GDP over the period 2000-2050, Table IV.4 breaks it into four factors:¹⁰

This spending increase is mainly driven by population ageing...

- A dependency or population-ageing effect, reflecting changes in the ratio of those aged 55+ to the population aged 20 to 64.¹¹
- An employment effect, driven by changes in the ratio of the population aged 20 to 64 to employment.
- The benefit effect, related to changes in the average pension benefit relative to GDP per worker.
- An eligibility effect, corresponding to changes in the share of those receiving benefits in the 55+ age group.¹²

The results show the increase in spending associated with the change in each one of these components taken independently. The last two factors are measures of the changing generosity of pension systems.

While the results of such decompositions need to be treated with caution, they suggest that increased ageing/dependency is the key factor driving pension spending over the period (Table IV.4, third column). The average impact of ageing taken alone is around 5 percentage points of GDP. The ageing-induced increases are highest in a

9. Projected effects of reforms in a few countries (e.g. Italy and Sweden) contribute to this result.

10. This is based on the following multiplicative formula:

$$\frac{PENS}{GDP} = \frac{POP(55+)}{POP(20-64)} \times \frac{POP(20-64)}{EMPL} \times \frac{AVBEN}{AVPDTY} \times \frac{REC}{POP(55+)}, \text{ where}$$

PENS/GDP is the ratio of old-age pension spending to GDP, POP(55+) is the population 55 and over, POP(20-64) is the population 20-64, EMPL is employment, AVBEN is total old-age pension spending divided by the number of recipients, AVPDTY is labour productivity and REC is the number of recipients. 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.* (forthcoming).

11. This takes into account the fact that a considerable number of older workers retire before 65.

12. For France, Japan, Sweden and the United Kingdom, it was necessary to assume that the number of beneficiaries equalled the non-active share of the population aged 55+. This approximation for the eligibility ratio leads to an overestimation of the number of beneficiaries. Correspondingly, with average benefits defined as total pension expenditure in any year divided by the number of beneficiaries, this procedure leads to an underestimation in the average benefit (calculated as the residual) for these countries.

Table IV.3. Age-related spending

(Levels in per cent of GDP, changes in percentage points)

	Total age-related spending			Old-age pension			“Early retirement” programmes			Health care and long-term care			Child/Family benefits and education		
	Panel A			Panel B			Panel C			Panel D			Panel E		
	level 2000	change 2000-peak ^a	change 2000-50	level 2000	change 2000-peak ^b	change 2000-50	level 2000	change 2000-peak ^c	change 2000-50	level 2000	change 2000-peak ^d	change 2000-50	level 2000	change 2000-peak ^e	change 2000-50
Australia	16.7	5.6	5.6	3.0	1.6	1.6	0.9	0.2	0.2	6.8	6.2	6.2	6.1	0.0	-2.3
Austria ^f	10.4	4.6	2.3	9.5	4.3	2.2	..	..	..	..	..	..	..	..	..
Belgium	22.1	5.4	5.2	8.8	3.7	3.3	1.1	0.1	0.1	6.2	3.0	3.0	6.0	0.0	-1.3
Canada	17.9	8.7	8.7	5.1	5.8	5.8	..	..	..	6.3	4.2	4.2	6.4	0.0	-1.3
Czech Republic	23.1	6.9	6.9	7.8	6.8	6.8	1.8	-0.7	-0.7	7.5	2.0	2.0	6.0	..	-1.2
Denmark ^g	29.3	7.3	5.7	6.1	3.6	2.7	4.0	0.8	0.2	6.6	2.7	2.7	6.3	0.3	0.0
Finland	19.4	8.5	8.5	8.1	4.8	4.8	3.1	-0.1	-0.1	8.1	3.8	3.8	..	..	..
France ^h	..	..	..	12.1	4.0	3.9	..	..	..	..	..	..	..	..	..
Germany	..	..	..	11.8	5.0	5.0	..	..	..	..	..	..	..	..	..
Hungary ⁱ	7.1	1.6	1.6	6.0	1.2	1.2	1.2	0.3	0.3	..	..	..	..	..	..
Italy	..	..	..	14.2	1.7	-0.3	..	..	..	..	..	..	..	..	..
Japan	13.7	3.0	3.0	7.9	1.0	0.6	..	..	..	5.8	2.4	2.4	..	..	..
Korea	3.1	8.5	8.5	2.1	8.0	8.0	0.3	0.0	0.0	0.7	0.8	0.5	..	..	..
Netherlands ^j	19.1	10.1	9.9	5.2	5.3	4.8	1.2	0.4	0.4	7.2	4.8	4.8	5.4	0.1	0.0
New Zealand	18.7	8.4	8.4	4.8	5.7	5.7	..	..	..	6.7	4.0	4.0	7.2	0.0	-1.3
Norway	17.9	13.7	13.4	4.9	8.2	8.0	2.4	1.6	1.6	5.2	3.5	3.2	5.5	0.5	0.5
Poland ^d	12.2	-2.6	-2.6	10.8	-2.5	-2.5	1.4	0.2	-0.1	..	..	..	..	..	..
Spain	..	..	..	9.4	8.0	8.0	..	..	..	..	..	..	..	..	..
Sweden	29.0	3.4	3.2	9.2	2.2	1.6	1.9	-0.2	-0.4	8.1	3.2	3.2	9.8	0.0	-1.2
United Kingdom	15.6	0.8	0.2	4.3	0.0	-0.7	..	..	..	5.6	1.8	1.7	5.7	0.0	-0.9
United States	11.2	5.5	5.5	4.4	1.8	1.8	0.2	0.3	0.3	2.6	4.4	4.4	3.9	0.0	-1.0
Average of countries above^k	16.9	5.9	5.5	7.4	3.8	3.4	1.6	0.3	0.2	6.0	3.3	3.3	6.2	..	-0.9
Average of countries which provide all or nearly all spending components	18.7	7.2	6.9												
Portugal ^l	15.6	6.6	4.3	8.0	4.5	4.5	2.5	0.4	-0.4	..	..	..	..	..	..

a) The peak values are in 2050 except for Denmark (2030), Sweden and the United Kingdom (2035), and Belgium, Norway, the Netherlands and Korea (2040).

b) The peak values are in 2050 except for Japan (2015), the United Kingdom and Italy (2030), the United States, Sweden, Austria, Denmark and France (2035), the United States, Sweden, Austria, Denmark and France (2035), the Netherlands, Norway and Belgium (2040).

c) The peak values are in 2050 except for Belgium and Denmark (2025), Finland (2010), the Netherlands (2020), Poland (2035) and Sweden (2005). For Czech Republic the highest level is in 2000.

d) The peak values are in 2050 except for Denmark and Korea (2035), Norway and the United Kingdom (2040).

e) 0.0 indicates the highest level is in 2000. The peak values are in 2035 for Denmark and in 2040 for Norway and the Netherlands.

f) Total pension spending includes other age-related spending which does not fall within the definition in Panels B to E. This represented 0.9 per cent of GDP in 2000 and rises by 0.1 percentage point in the period to 2050.

g) Total includes other age related spending not classifiable under the other headings. This represents 6.3 per cent of GDP in 2000 and increases by 0.2 percentage points from 2000 to 2050.

h) For France, the latest available year is 2040.

i) Total includes old-age pension spending and “early retirement” programmes only.

j) “Early retirement” programmes only include spending on persons 55+.

k) OECD average excludes countries where information is not available and Portugal which is less comparable than other countries.

l) Portugal provided an estimate for total age-related spending but did not provide expenditure for all of the spending components.

Source: OECD.

Table IV.4. Decomposition of changes in old-age pension spending: 2000-2050^a

(Level in per cent of GDP, changes in percentage points)

	Total old-age pension spending, level in 2000	Total old-age pension spending, change from 2000 to 2050	Contributions of :			
			Old-age dependency ratio	Employment ratio	Benefit ratio ^b	Eligibility ratio
Australia	3.0	1.6	2.5	-0.1	-0.5	-0.2
Austria	9.5	2.2	7.6	-1.9	-1.1	-2.4
Belgium	8.8	3.3	4.7	-0.7	-1.6	1.0
Canada	5.1	5.8	5.1	0.0	-0.6	1.3
Czech Republic	7.8	6.8	8.2	-0.8	-0.1	-0.1
Denmark	6.1	2.7	2.7	-0.3	-1.5	1.7
Finland	8.1	4.8	5.2	-0.1	-0.2	0.0
France ^c	12.1	3.8	7.6	-0.5	-3.4	0.4
Germany	11.8	5.0	6.4	-0.7	-2.7	2.1
Hungary	6.0	1.2	2.9	-1.0	-0.3	-0.4
Italy ^d	14.2	-0.3	10.1	-3.2	-5.5	-1.5
Japan ^d	7.9	0.6	5.1	-1.2	-3.9	0.9
Korea	2.1	8.0	4.8	-1.0	0.2	5.0
Netherlands	5.2	4.8	3.8	-0.5	0.2	1.4
New Zealand	4.8	5.7	4.7	-0.1	1.0	0.0
Norway	4.9	8.0	3.0	0.1	3.9	1.2
Poland	10.8	-2.5	7.3	-1.3	-5.9	-2.1
Spain	9.4	8.0	8.6	-2.6	0.0	2.0
Sweden ^d	9.2	1.6	3.9	-0.5	-2.1	0.4
United Kingdom ^d	4.3	-0.7	1.7	0.1	-2.5	0.1
United States	4.4	1.8	2.4	-0.1	-0.2	-0.3
Average of countries above^e	7.4	3.4	5.2	-0.8	-1.3	0.5
Portugal	8.0	4.5	6.1	-1.0	-2.7	1.1

a) See Dang *et al.* (forthcoming) for methodology and detailed information on the time profile. Columns do not add up because linear approximations are used.

b) The associated percent declines in average benefits relative to average productivity over the period 2000 to 2050 is particularly important in the following countries: Belgium (-16), Denmark (-11), France (-21), Germany (-20), Italy (-30), Japan (-38), Poland (-51), Sweden (-22) and the United Kingdom (-47) per cent. All other countries are under 10 per cent except Norway where the average benefit is projected to rise by 53.6 per cent.

c) For France, data are available for 2040.

d) For these countries information on the number of pension recipients and average pensions was not available. These variables were estimated by the OECD except for Italy, where data refer to the number of pensions and not the number of pensioners.

e) Average excludes countries where national information is not available and Portugal which is less comparable than other countries.

Source: OECD.

number of European countries which have fully developed and generous earnings-related pension schemes and/or rapid ageing (*e.g.* Austria, the Czech Republic, France, Germany, Italy, Poland, Portugal and Spain). Smaller increases are found in countries with limited ageing and low initial spending levels (*e.g.* Denmark, Hungary, the Netherlands, Norway, the United Kingdom and the United States).

Almost all country projections have increasing employment ratios as a result of assumed higher female participation rates, lower unemployment or increased average retirement ages. This boosts output and reduces the cost of pension systems taken as a share of GDP. This effect is stronger in countries with currently low female participation rates and/or high unemployment rates at the beginning of the period (especially Austria, Hungary, Italy, Japan, Korea, Poland as well as Spain, where unemployment is assumed to fall to the same levels as in the early 1970s).

As a general rule, the effects of the two aspects of system generosity reflect maturing pension systems, changes in behaviour and the impact of reforms.¹³ Most

... offset by the effects of assumed higher participation rates and lower unemployment on GDP...

13. A recent review of reforms can be found in OECD (2000).

countries project increases in the share of beneficiaries in the population aged 55 and over. Higher assumed employment of women and maturing pension systems should lead, by themselves, to an increase in the share of beneficiaries but be offset by the reforms undertaken in a significant number of countries aimed at directly increasing the effective age of retirement. But aside from Austria, Italy and Poland, these do not appear to be considered sufficient to reduce significantly the overall share of pensioners in the target population over the period.

... and by lower average benefits

In contrast, the projections indicate widespread declines in average benefits relative to productivity, making for a fall in expenditure averaging around 1½ percentage points of GDP. Once again, this reflects a range of offsetting factors. There have been important reforms aimed at reducing benefit rates: shifts from indexation of pensions on wages towards prices¹⁴ (Finland, France, Hungary, Italy, Japan, Korea) or from pre-tax to after-tax wages (Germany), lengthening of the contribution period for a full pension (France) and lengthening of the reference period for calculating pensions (Belgium, the Czech Republic, Finland, France, Italy and Spain). These changes appear to have been large enough to offset a number of effects associated with the higher labour-market participation of women,¹⁵ lengthening contribution periods¹⁶ and composition effects as the baby boom generation enters retirement.¹⁷

Many changes in average benefits reflect earlier reforms or assumptions regarding the development of real benefits

Relative declines in benefits are particularly marked in a few countries. Italy will shift to a system where benefits are contribution-based, indexed to prices and actuarially adjusted to allow for increasing life expectancy. This is projected to lead to a reduction in average benefits equivalent to 5 to 6 percentage points of GDP. Similar reforms in Sweden are also expected to lead to substantial declines in average benefits. The sharp fall for Japan reflects legislation that requires benefits to be adjusted every five years to bring the pension system into balance. For France, the shift to indexing on prices, the lengthening of contribution periods and of the reference period for calculating pensions will progressively impact on spending. Declines in pension benefits in Poland reflect shifts to a private system. In the United Kingdom, the overall fall in pension spending reflects the assumed constancy in real terms of the flat-rate basic pension. Such policy reforms will lead to falls in average benefits relative to wages – 20 per cent or more in some countries. These changes are sufficiently large as to require a build-up in private pension saving if income adequacy in retire-

14. This refers to earnings-related schemes. This change, in general, does not affect the individual's level of benefit at the time of retirement. However, over the retirement period, real benefits will grow by less than productivity. This will lead to a fall in total public pension spending during a transition period, as a progressively larger share of pensioners experience indexing only to prices through all of their retirement period. Estimated average benefits calculated over all retirees fall during the transition period, though eventually pensions increase at the same (constant) rate of productivity growth.

15. The assumed increase in women's participation should also lead to a progressive decline in the number of individuals on widows and survivor benefits and an increase in regular pension benefits which are generally higher in ER schemes. But outcomes will depend on hours worked and the development of male-female wage differentials.

16. Where pensions are linked to the number of years of work or contribution, average benefits will increase as pension systems mature. Many of the currently retired have short contribution histories and receive minimum pensions. Longer contribution periods, particularly for women, will be reflected in higher average pensions.

17. In the case of an earnings-related schemes with pensions indexed to prices, those entering retirement have higher pensions than those at the end of their lifetimes. The baby boom cohorts are larger than the current cohorts in retirement. As a consequence, they will weigh more heavily in the total number of pensioners when they enter retirement. Since they have higher benefits than the average when they retire, the average benefit (calculated over all pensioners) will tend to rise. This process will be reversed towards the end of the period as these cohorts are replaced by the smaller cohorts that follow them.

ment is to be maintained for all. Failing this, lower incomes and increased poverty among the elderly raise the risk of political pressure for a reversal of these policies, particularly as the elderly will make up a growing share of the electorate. This underlines the need for creating conditions that encourage private savings for retirement.

Programmes permitting early withdrawal from the labour market (“early retirement” programmes)

In addition to old-age pensions, most countries have programmes that provide income support for those of working age – for example, disability pensions, long-term unemployment benefits and early-retirement arrangements for labour-market reasons. In a number of countries, expenditure on these programmes is high, and they are often seen as an integral part of overall pension arrangements (e.g. Denmark, Finland, Norway). These programmes can be affected by ageing, for example *via* larger numbers of older workers with their higher probabilities of becoming disabled. They are also sensitive to labour-market developments as these programmes have often been used to provide income support for older workers who have difficulties finding employment, or remaining in employment, until retirement age is reached. Such programmes have contributed in many countries to the marked fall in the participation rates of older male workers over the past several decades. Many countries have introduced reforms to tighten access to these programmes and to limit benefits.

While the coverage varies across countries, these programmes represent around 1½ percentage points of GDP in the countries providing data, although considerably more in Denmark, Finland, Norway and Portugal (Table IV.3, Panel C). Despite the increasing average age of the working population over the period, countries providing these data generally project broad stability or marginal declines in expenditures, possibly reflecting programme reforms already undertaken and declining unemployment. Significant increases over the full 50-year period are projected only by Norway.

Spending on “early retirement” may remain broadly stable

Health care

Public health-care and long-term care spending varies considerably across countries, even among those at the same level of per capita income, reflecting a wide range of historical and institutional factors, including the fact that the share of total spending which is paid for directly by households (including via private insurance schemes) can vary substantially. Reported public health- and long-term care spending averages around 6 per cent of GDP in 2000 (Table IV.3, Panel D), although some differences in coverage mean that these results may not be rigorously comparable across countries.

Public health- and long-term care expenditure is about 6 per cent of GDP on average

Projections of health-care spending (including costs of care for the frail elderly) are considerably more uncertain than for pension expenditure. Pension legislation provides a framework for estimating future benefits. No equivalent set of rules is available for projecting the demand for and supply of health care. Further, there is a great deal of uncertainty as to which demographic features are most important for driving health-care spending – in particular, whether it is the fact of having a higher share of the population that are relatively old or whether it is having a higher share in the final years of their lives. Partly as a result, the method of projecting health-care spending can vary considerably. For most countries, projections are broadly based on projected per capita health-care expenditures by age group (which rise with age) multiplied by the number of people in each age group. However, the projections for the Netherlands allow for the fact that a large share of total lifetime health-care costs

While projecting health-care expenditure is uncertain,...

occur in the last year or two of life. Non-age-related factors (such as higher income and technology change) have been taken into account to varying degrees.

... spending is estimated to increase by more than 3 percentage points of GDP to 2050

The average increase over the 2000-2050 period for the 14 countries where this information is available is 3 to 3½ percentage points of GDP. But for five countries (Australia, Canada, the Netherlands, New Zealand and the United States) increases of 4 percentage points or more are projected. Slow ageing is partly responsible for the smaller increases in spending in Denmark, Sweden and the United Kingdom.

Child-related programmes

Child-related spending might offset these increases by around 1 percentage point of GDP on average

Spending on education and family/child benefits taken together average 6¼ per cent of GDP for the countries presenting data (Table IV.3, Panel E). With modest falls in youth dependency ratios expected over the projection period, these two programmes are projected to offset spending increases elsewhere to the extent of around 1 percentage point of GDP on average over the projection period. Falls in spending as a share of GDP are foreseen in all countries except Denmark, the Netherlands and Norway. There is no certainty that all of these potential economies will be reaped. In practice, it has been difficult to make cuts in these areas and there may well be further pressures arising from longer periods of education for the young, increased training for older workers and more demand for publicly-subsidised child care as the share of women working increases.

Total government spending, taxes and the primary deficit

Deficits increase...

The projections point to a generalised deterioration in the public-sector primary financial balance over the projection period reflecting:

- The increase in old-age pension spending.
- Changes to other age-related spending in countries providing such information.
- Changes to non-age-related spending and to revenues.

As regards the last item, it was agreed that, with some exceptions, the projections of revenues and non-age-related spending would be based on assumptions of unchanged shares in GDP over the projection period. However, some countries have taken into account changes to spending and/or revenues in the period to 2005 as a result of policies already enacted. Other changes in non-age-related spending can also be expected as a result of the macroeconomic assumptions, for example lower levels of spending on unemployment benefits. Moreover, Canada, Denmark and the Netherlands with large tax-sheltered private-sector pension schemes include increases in tax revenues from taxes paid on the associated pensions.

... by 6 to 7 percentage points of GDP on average

Bearing in mind these considerations, the projections point to a decline in the primary surplus or increase in the deficit of 6 to 7 percentage points of GDP, over the period 2000-2050 for countries projecting more spending categories than just old-age pensions (Table IV.5, Panel A). Excluding the effects of other age-related spending (column 4), the change in the deficit related to old-age pension spending across the same set of countries amounts to around 4½ percentage points of GDP, but with wide country variation. In the three countries providing projections for old-age pension spending only, there is a large reduction in the surplus for Spain, a more modest fall for Germany (where, like the Netherlands, the rise in pensions is partly offset by a substantial rise in revenues) and a limited increase for Italy (Table IV.5, Panel B).

Table IV.5. Changes in spending, revenues and the primary balance

(Per cent of GDP and changes in percentage points of GDP)

	Total revenue	Total spending	Primary deficit (-) / Surplus (+)	
			Primary balance Total	Old age pension spending only ^a
Panel A. Countries reporting age-related spending items in addition to old-age pensions				
Belgium				
2000, level	48.1	41.3	6.8	
Change 2000-2050	0.1	4.3	-4.2	-2.4
Canada				
2000, level	38.7	29.0	9.7	
Change 2000-2050	-1.2	8.2	-9.4	-6.6
Czech Republic				
2000, level	39.5	41.9	-2.4	
Change 2000-2050	0.0	6.8	-6.8	-6.7
Denmark				
2000, level	52.6	48.3	4.3	
Change 2000-2050	1.7	5.7	-4.0	-1.0
Finland				
2000, level	47.4	41.9	5.5	
Change 2000-2050	-1.7	8.5	-10.2	-6.4
Japan				
2000, level	29.4	32.3	-2.9	
Change 2000-2050	0.1	3.0	-2.9	-0.5
Korea				
2000, level	28.1	25.6	2.5	
Change 2000-2050	-1.8	8.4	-10.2	-9.7
Norway				
2000, level	49.8	43.2	6.6	
Change 2000-2050	-0.5	16.5	-17.0	-10.5
Netherlands				
2000, level	46.9	42.7	4.2	
Change 2000-2050	3.2	10.1	-6.9	-1.8
New Zealand				
2000, level	36.2	34.9	3.2	
Change 2000-2050	0.9	11.2	-10.3	-7.5
Poland^b				
2000, level	38.2	39.1	-0.9	
2000-2050	-1.2	-2.2	1.0	1.3
Sweden				
2000, level	56.5	52.2	4.3	
Change 2000-2050	-3.3	3.6	-7.0	-5.4
United Kingdom				
2000, level	40.1	36.1	4.0	
Change 2000-2050	-0.3	1.2	-1.5	-0.6
United States^c				
2000, level	29.7	25.5	4.2	
Change 2000-2050	-0.3	4.9	-5.2	-1.6
Average change for countries above	-0.3	6.4	-6.8	-4.2
Panel B. Countries reporting old-age pension spending only				
Germany				
2000, level	46.9	44.4	2.4	
2000-2050	2.8	5.0	..	-2.2
Italy				
2000, level	46.9	42.0	5.0	
2000-2050	0.0	-0.3	..	0.2
Spain				
2000, level	40.1	37.0	3.2	
2000-2050	0.0	8.0	..	-8.0
Average change for countries above	0.9	4.2	..	-3.3
Portugal				
2000, level	47.0	48.8	-1.8	
2000-2050	1.5	2.4	-0.9	..

a) Changes in the primary balance holding age-related spending other than pensions constant.

b) For Poland, total includes old-age spending and "early retirement" spending only.

c) Projections for revenues do not include the recent tax reduction proposals of the United States Administration.

Source: OECD.

Box IV.2. Ageing in a “stylised” country: the impact of deficits on debt

The change in debt associated with the rise in age-related spending is a better indicator for the overall fiscal impact of ageing than the change in the primary balance. However, debt profiles for individual countries are sensitive to assumptions and to the situation at the start of the projection period, making cross-country comparisons difficult to interpret. To provide some idea of likely magnitudes, this box traces developments of the impact of ageing on debt and of policy measures needed to offset this impact, using a “stylised” OECD country (one which has the features of the median OECD country as regards individual parameters) as an example. In 2000, pension spending of the “stylised” country represents around 8 per cent of GDP, the primary surplus 2.5 per cent and net debt 55 per cent of GDP. The profile of age-related spending over the 50-year period is constructed by using median values for the share of pensioners in the population, average relative pension benefits, health care spending and other age-related spending. This leads to a projected increase in age-related spending of around 6 percentage points of GDP.¹ Assuming other government spending and revenues remain constant as a share of GDP, the change in age-related spending is fully reflected in the overall primary balance.

The impact of ageing on primary balances and debt (Table IV.6, Panel A)

Assuming 1.9 per cent annual real GDP growth and a real interest rate of 4 per cent, debt would increase over the period to 2050 by almost 100 percentage points of GDP. This baseline increase can be broken down into two parts:

- A rise in net debt of around 200 percentage points of GDP from the increase in age-related spending alone, *i.e.* abstracting from the initial levels of debt and the primary surplus.
- A decline in debt or increase in assets of around 115 percentage points of GDP as a result of the initial primary surplus (the non-ageing related component of which is assumed unchanged through the period).²

Thus, for the “stylised” country, about half of the impact of age-related spending on debt can be offset by sustaining the initial “non-age-related” primary surplus over the entire period. In contrast, if a country had an initial primary deficit of 1 per cent of GDP, sustained throughout (compared to a surplus of 2.5 per cent in the baseline) its total debt would increase by more than 400 percentage points of GDP by the end of the period. It is also important to sustain initial surpluses over time. If, for example, non-age-related budget items changed so as to reduce the “non-ageing” surplus to

zero after 10 years, the debt would be almost triple the baseline value by the end of the period.

The following sensitivity tests provide some indication of the impact of different assumptions and circumstances in individual countries (changes are indicated relative to baseline):

- A sustained increase in the primary surplus of 1 percentage point of GDP over the baseline will lead to a broadly unchanged debt to GDP ratio at the end of the period.
- If age-related spending rose somewhat less rapidly, ending at 1 percentage point of GDP lower by the end of the period relative to baseline, the increase in net debt would be around 35 percentage points less.
- If debt at the beginning of the period were 10 percentage points lower, the rise in net debt would be around 20 percentage points of GDP less.
- If the interest rate were 1 percentage point lower through the period, the debt increase would be around 35 percentage points of GDP lower at the end of the period.

Policy measures to limit the impact of ageing (Table IV.6, Panel B)

Two stylised reforms of pension systems are considered in Table IV.6, Panel B: a reduction in average pension benefits and a fall in the number of pension beneficiaries (reflecting delayed retirement) that would be required to keep debt in 2050 at the same level in terms of GDP as in 2000.³ The results suggest that the required per cent fall in the number of pensioners would be lower than for average pensions, reflecting the feedback effects of fewer pensioners on GDP (through higher employment), as well as increased tax revenues.⁴

Delaying the implementation of reforms by 10 years (to 2015) would increase the required adjustment in either the number of pension beneficiaries or average benefits by around one-fourth, while delaying them by 20 years would require an increase of around three-quarters.

Alternatively, countries could offset higher age-related spending through a sustained increase in the primary surplus (from the baseline value of 2.5 per cent) at the beginning of the period. In this case, the increase in the primary surplus needed to keep debt unchanged at the 2000 level of 55 per cent of GDP would be 1.1 percentage points of GDP. To eliminate debt entirely by 2050, the primary surplus would have to increase by 1.8 percentage points of GDP.

1. This is broadly equivalent to the sum of the averages of each component of age-related spending in Panels B to E of Table IV.3.

2. The change in the primary surplus over the period 2000 to 2050 is the sum of the change due to age-related spending and the change arising from the net effect of the development of non-age-related spending and of revenues. Since both non-age-related spending and revenues are held constant as a share of GDP in these simulations, the second component remains unchanged after 2005.

3. The reduction in both the number of pensioners and average pension benefits is implemented in 2005 and sustained over the period until 2050.

4. This assumes that people postponing retirement will remain employed. For further details on the method, see Dang *et al.* (forthcoming).

Table IV.6. The impact of ageing in a “stylised” country, 2000-2050^a

(difference between 2000 and 2050 in percentage points of GDP)

	Change in:		Difference relative to baseline
	Primary balance	Debt	
Panel A. Changes in primary balances and net debt for a “stylised” country			
<i>Baseline</i>			
Impact of all age-related spending on the “stylised” country	-6.1	-96	
– Impact abstracting from initial debt and primary surpluses ^b	-6.1	-210	
– Impact of initial and sustained primary surpluses ^c		115	
Impact of pension spending alone ^d	-4.2	-74	22
<i>Policy simulations</i>			
Sustained primary deficit of 1 per cent of GDP ^e	-6.1	-435	-340
Primary surpluses disappear after 10 years	-8.6	-274	-178
<i>Sensitivity test</i>			
Sustained increase in the primary surplus of 1 percentage point of GDP ^f	-6.1	-1	97
Age-related spending is 1 percentage point lower in 2050	-5.1	-62	34
Initial debt is 10 percentage points lower	-6.1	-75	21
Real interest rates are one percentage point lower	-6.1	-61	35
Year policy measure takes effect:			
	2005^g	2015^g	2025^g
Panel B. Policy measures to keep debt constant as a share of GDP at the end of the period			
Reduction in the number of pension beneficiaries (per cent)	7.7	9.5	12.3
Reduction in average pension benefits (per cent)	17.3	21.3	29.9
Increase in the primary surplus needed to keep debt constant at the level in 2000 ^h	1.1		
<i>Memorandum item:</i>			
Increase in the primary surplus needed to eliminate all debt by 2050 ^h	1.8		

a) The “stylised” country has pension spending equal to 8 per cent of GDP, a primary surplus of 2.5 per cent and net debt to 55 per cent of GDP. This country experiences an ageing-related shock measured by the median value in country submissions for the number of pensioners, average pensions, health-care spending and other age-related spending over the period.

b) Initial debt and primary balances, excluding the effects of ageing, are set to zero.

c) Assumes that age-related spending increases in line with GDP.

d) Assumes that other age-related spending increases in line with GDP.

e) The primary deficit is assumed to be 1 per cent of GDP initially (compared to a surplus of 2.5 per cent in the baseline). The deficit is assumed to remain constant over the period, excluding the effect of ageing. The impact of ageing is then introduced in this new baseline.

f) Increase throughout the period from 2000 excluding the effect of ageing. The impact of ageing is then introduced in this new baseline.

g) The reduction is fully implemented in the corresponding year and sustained through the period.

h) The surpluses are sustained throughout the period.

Source: OECD.

The projected deterioration in the primary balance is likely to be substantially larger than the impact of old-age pension spending alone in the countries which project only the latter. This can be seen by examining the projections for countries providing estimates of age-related budget items other than pensions (Table IV.5, Panel A). For those countries, the additional deterioration in the primary balance due to non-pension age-related spending is 2½ percentage points of GDP (Table IV.5, Panel A, third and fourth columns).

Projections of old-age pension spending alone seriously underestimate the overall budget impact of ageing

The overall impact on the fiscal situation of these developments will depend on the cumulated change in the primary balance over the projection period, coupled with the associated change in debt-interest payments. The outcome in terms of debt as a share of GDP is highly sensitive to the initial levels of debt and primary balance, the change in the primary balance through the period and the assumed interest rate (relative to GDP growth). As is shown in Box IV.2, small changes can lead to substantial

Despite the improvement in the underlying fiscal situation in the 1990s, ageing will put upward pressure on debt

differences by the end of the period for a “stylised” country,¹⁸ making simulations of debt outcomes for individual countries highly uncertain. Nonetheless, the results shown in Box IV.2 suggest, first, that countries will be in a better position to confront ageing pressures if their primary surpluses are sufficiently high for them to reduce their net-debt positions rapidly in the period before dependency ratios begin to rise sharply. This seems to be the case, for example, in Belgium and Canada (which each have high debt levels currently). Thus, measures to move the primary balance into surplus are desirable, on these grounds, in the near future, and this is all the more the case where countries already have high levels of debt. However, it is important not only to achieve appropriate levels of the primary surplus but also to maintain them over the long-term. Second, for the “stylised” country the accumulated impact on public debt of ageing is large, approximately 200 percentage points of GDP.

Sensitivity tests

For estimates over such a long time frame, it is particularly important to have information on the robustness and the degree of uncertainty surrounding the projections. Sensitivity analysis has been performed for seven of the most important assumptions underlying the projections (Box IV.3) for 13 countries at the level of pension and total age-related spending.

The projections are relatively robust to changes in assumptions

Taken individually, the sensitivity shocks do not appear to alter significantly the broad message of the baseline projections (Table IV.7).¹⁹ The simulation of increased longevity – which has been set, like the simulations of increased fertility, to have a two-thirds probability of occurring on the basis of past projection

Box IV.3. Assumptions subject to sensitivity analysis

Demographic assumptions

1. *Higher fertility rate.* Fertility rates for all age groups are assumed to rise by 15 per cent relative to the baseline until 2029 and remain constant at the higher level thereafter.
2. *Longer life expectancy.* Mortality rates are assumed to fall by 30 per cent and 20 per cent respectively for males and females for all age groups by 2050. This corresponds broadly to an extra 3 years of life expectancy at birth for males and 2 years for females by 2050.
3. *Higher migration flows.* Net migration in numbers of persons gradually increases from year 2000 to 50 per cent above the baseline level in 2010, remaining constant over the rest of the period.

Macroeconomic assumptions

4. *Lower participation rates for older workers.* Participation rates of older workers (55 to 64) are set 5 percentage points lower than assumed in the baseline by 2050.
5. *Lower female participation rates.* Total female participation rates (20-54) are 5 percentage points lower than assumed in the baseline projection by 2050.
6. *Lower unemployment rate.* The structural unemployment rate falls by the end of the period to levels experienced in the 1960s (unemployment rates of 3 to 5 per cent).
7. *Lower productivity gains.* Productivity growth is 0.5 percentage points per annum lower than the baseline starting in 2005 and ending in 2050.

18. The “stylised” country was constructed using a set of parameters which, in each case, were close to the middle range for actual OECD countries. See Box IV.2 for details.

19. For individual country detail see Dang *et al.* (forthcoming).

Table IV.7. Average impact of sensitivity tests on total age-related spending: 2000-2050^a

(Percentage points of GDP)

	Old-age pensions	Total age-related spending		Old-age pensions	Total age-related spending
Increased longevity (+3 years for males and +2 years for females relative to baseline)	1.0	1.4	Fall in unemployment rates (decline to levels experienced in late 1960s)	-0.2 ^b	-0.4 ^b
Higher fertility (+15% relative to baseline)	-0.7	-0.7	Lower older worker participation rates (5 percentage points lower by 2050 relative to baseline)	0.3	0.5
Higher migration (+50% by end of period relative to baseline)	-0.4	-0.7	Lower female participation rates (5 percentage points lower in 2050 relative to baseline)	0.3	0.5
Fall in labour productivity growth (fall in growth rate by 1/2 point relative to baseline)	0.5	0.6 ^c			

a) For old-age pensions, average of Belgium, Canada, the Czech Republic, Denmark, France, Germany, Italy, Japan, the Netherlands, Poland, Spain, Sweden and the United States. France, Germany, Italy and Spain are excluded from total age-related spending. Results are defined relative to baseline at the end of the period.

b) This indicates the impact relative to baseline. However, the baseline forecasts included some decline in unemployment rates particularly for Belgium, Italy, France and Spain, such that the impact of the total fall in unemployment over the period would be larger than reported here.

c) Excluding the Czech Republic and the United States because projections of spending on health and long-term care and education are insensitive to the change in productivity growth in these two countries, *i.e.* lower productivity growth does not lead to a fall in wage growth relative to baseline in these two countries.

Source: OECD.

errors²⁰ – indicates that old-age-pension spending could be, on average, about one percentage point of GDP higher, and total age-related spending some 1½ percentage points higher. The probability that the changes assumed in the other sensitivity tests might occur is difficult to assess. But for the magnitudes chosen, the impact is not large. The results for productivity suggest that very substantial increases in economic growth (through higher productivity) would be necessary to significantly offset the increased costs of ageing.²¹ Projected tax receipts varied little in the various sensitivity tests.

What are the policy options?

In sum, on the basis of present policies, age-related spending is likely to increase on average by 6 to 7 percentage points of GDP and significantly more in some cases. Spending projections could be still higher than those presented here if the extent of population ageing turns out to be underestimated (Schieber and Hewitt, 2000). These impacts have to be evaluated in the light of the improvement in underlying budget positions over the past half decade. Cyclically adjusted primary

Overall spending may increase by 6 to 7 percentage points of GDP and the improved fiscal situation gives no room for complacency

20. Eurostat has calculated, for each country, a probability distribution of errors on the basis of previous projections for both mortality and fertility. Taking this as a starting point, it then established changes in these two variables that were at the limit of a two-thirds confidence interval of this probability distribution. To increase the comparability across countries, a mean value for the limits of the confidence interval was established across countries and this common value was then applied to all OECD countries. These ensured similar movements in fertility and mortality across countries in the sensitivity tests shown in Table IV.7 and these changes are broadly consistent with a two-thirds chance of occurring.

21. Higher productivity growth increases both GDP growth and pension spending in the case of earnings-related-pension schemes. The size of the impact of the change in productivity growth will be larger in flat-rate schemes, but only if the gap between wages and benefits is allowed to widen.

balances have improved in most OECD countries, in many cases moving into surplus. Debt is falling as a result. If the non-age-related components of these surpluses can be sustained over time, a substantial part of the projected increase in age-related spending can be absorbed, thereby reducing the extent of fiscal strains. Nonetheless, there is no reason for complacency. First, higher non-ageing primary surpluses than currently registered, sustained over half a century, would be required to prevent debt-to-GDP ratios rising above current levels – which are already considered to be too high in many countries. Second, a few countries are still in primary deficit, and reforms in these countries are all the more urgent if rapid accumulation of debt is to be avoided as ageing accelerates. Third, large primary surpluses have been achieved, in most cases, by increases in tax pressure from an already high level, with accompanying distorting effects on markets, potentially leading to slower growth. Fourth, a large stock of public debt implies a high degree of vulnerability to changes in interest rates, particularly when a large share of the debt is short term. Fifth, most governments experience pressure to “spend” surpluses where they occur – either through higher expenditure or lower taxes – implying that these surpluses may not be easy to sustain. Finally, in most countries pension spending already accounts for a large share of social spending and this will progressively increase. This, in turn, will limit budget flexibility and the resources available for other spending programmes.

Comprehensive reforms are still needed in many countries...

As regards pensions, reforms have already been introduced in many countries. But, even if the overall fiscal situation appears better than several years ago, further reforms to age-related programmes are still needed in many countries. While a comprehensive range of policies will be required to limit the rise in spending (OECD, 1998), it is of interest to consider the relative effects of key individual policies taken in isolation, and in particular: a reduction in average benefits of old-age pensions; a reduction in the number of beneficiaries of old-age pensions reflecting delayed retirement; and, an increase in the primary surplus that is sustained throughout the period.

... and policies to encourage later retirement may have a larger fiscal impact than changes to average benefits

On the basis of a simplified methodology, and using the “stylised” country as the model, the OECD has calculated the required change in average benefits and in the number of pension beneficiaries in 2005 (and sustained throughout the period) to keep the debt-to-GDP ratio constant at around 55 per cent of GDP by 2050 (Table IV.6, Panel B).²² The results – which should only be considered as approximate – suggest that the required reduction in the number of beneficiaries could be close to 8 per cent – corresponding to a rise in the effective age of retirement of more than one year – while the required fall in average benefits might have to be more than double that, at around 17 per cent. The larger required action on pension benefits as opposed to pensioners reflects the feedback effects of fewer pensioners on higher employment and GDP, as well as the effect on tax revenues. In reality, however, cutbacks in pension generosity might well induce people to work longer, while later retirement in some countries automatically leads to higher pensions, suggesting that the separation of these two effects may not be so neat or the differences so marked.

A further improvement now in the primary balance would offset the impact of ageing on debt

Alternatively, countries could choose to increase further their primary surpluses now to offset the impact of ageing on the deficit through the remainder of the period. The simulations for the “stylised” country suggest, for example, that the age-related increase in spending, taken by itself, could be fully offset by an increase in the primary surplus of an additional 1 percentage point of GDP and sustained through the

22. It was assumed that the reduced number of beneficiaries was balanced by an equivalent increase in employment – *i.e.* there was no increase in the share of the unemployed or of the inactive.

period (Table IV.6, Panel B). This is because the higher non-age-related surplus, assumed unchanged, helps counteract the age-related fiscal pressures as they emerge.

There is a narrow window of opportunity before dependency ratios begin to rise rapidly. Countries can profit from this period by improving the overall fiscal situation and announcing reforms, especially as policies have to be phased in progressively so as to allow households the time to adjust. Clearly, if policies are implemented with a considerable delay, stronger measures will be required to achieve the same fiscal outcomes by mid century. For example, the required reductions in pension benefits and the number of beneficiaries to offset the impact of ageing on debt have been re-estimated assuming that reforms were implemented 10 years later (*i.e.* in 2015 rather than 2005). The results indicate that, to achieve the same objective in terms of debt reduction, the reforms would need to be one-quarter larger than if implemented immediately and a delay of 20 years would increase this amount to three-quarters (Table IV.6, Panel B).

In choosing which reforms to introduce, countries will also focus on the impact on incomes of the elderly. Sharp falls in average benefits may mean a widening gap between wage earners and incomes of the retired and increased poverty among the elderly. Where these changes are large, political pressure may build up to reverse these policies. To palliate such effects on incomes and increase the political sustainability of reforms, there may be a need for flanking policies that provide alternative sources of income in retirement – for example, funded private pension (or savings) arrangements, possibly of a mandatory nature, or scope for maintaining earnings. In this context, it is notable that policies that delay retirement allow fiscal goals to be achieved with less need to reduce retirement incomes, underlining once again the desirability of measures that encourage people to work longer in order to qualify for a full public pension.

In addressing long-term fiscal issues, countries need to consider a wider range of policy instruments than those just discussed and a number of these have been laid out in *Maintaining Prosperity in an Ageing Society* (OECD, 1998) and in the *OECD Jobs Strategy* (OECD, 1999).

- Policies permitting withdrawal of older workers from the labour market will have to be monitored closely. Even though all reporting countries except Norway project broad stability or declines in spending on these programmes as a share of GDP, the rising share of older workers in the working-age population may still put upward pressure on expenditure.
- The impact of later retirement, higher participation rates of older workers and immigration depends on whether the individuals concerned find employment. Their employment opportunities will be promoted by reforms to reduce structural unemployment and encourage rapid employment growth, as laid out in the *OECD Jobs Strategy*.

Closer attention to ways of controlling health- and long-term care costs is also desirable. Demand for publicly provided services will climb with the number of the elderly and of the very old. At the same time, increasing participation rates of the working-age population and smaller family sizes are likely to limit the scope for families to care for the elderly in the future. In this context, it is essential to increase both the efficiency and the effectiveness of the health-care and long-term care system. At the level of health care, budgetary caps remain the main method of spending control.

Early introduction of policies reduces the size of the needed adjustments

Attention should be paid to reform combinations which can be sustained over the long term

Comprehensive reforms may require further changes to labour market policies

The health-care system needs to improve efficiency and effectiveness of care

But such policies can lead to rationing and reduced quality of care. Introducing needed micro-economic reforms aimed at improving the efficiency and the effectiveness of health-care systems has proved much more difficult. Over the near future, policy-makers need to find ways of limiting the demand for and supply of those aspects of health care that are unnecessary, strengthening the effectiveness of delivery, and improving the match between health-care needs and the supply of services. Over the longer term, health-care expenditure will be driven – in addition to increased ageing – by incentives embedded in health-care systems, the diffusion of technology and relative prices for medical services, suggesting that a wide range of policies will need to be considered if the long-term costs of health care are to be kept under control.

Finding ways of maintaining the physical, as well as the economic, independence of the elderly is an important policy goal

Limiting the need for state-financed institutional care for the frail elderly will help contain costs of care significantly. In any case, ensuring that individuals are able to remain independent and to care for themselves for as long as possible is an important policy goal in its own right. Since the demand for services for the frail elderly is closely linked to disability, policies of a preventive nature may be a cost-effective response in certain cases (Jacobzone *et al.*, 2000). In addition, an appropriate level and mix of supply, including significant support to remain at home, should help limit costs by ensuring that the level of care is in line with the degree of disability and minimises overall costs – *e.g.* less need to keep elderly requiring long term-term nursing care in higher-cost acute-care institutions.

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