

# THE FISCAL IMPACT OF POPULATION CHANGE: DISCUSSION

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Ronald Lee and Ryan Edwards have provided a comprehensive analysis of the prospective budgetary implications of the aging of the U.S. population over the period to 2100. They cover a lot of ground but two major points stand out: Their analysis suggests that the budget pressures that aging will imply will be intense and very possibly greater than many other analyses would suggest; and the most important pressure is less likely to come from Social Security payments of old-age pensions than from demand for medical care. Their most important policy message relates to the need for policymakers and the wider public to be educated to the realities aging will imply, in order to facilitate the difficult decisions that will be needed. I can only endorse this message and note that the necessary decisions become more difficult as they are delayed.

At the OECD we have endeavored to call attention to the implications of population aging for many years, at least since 1989.<sup>1</sup> I have been encouraged by the organizers to draw on some of this work to supplement the analysis of Professors Lee and Edwards by providing some evidence as to how aging will affect other countries. This request is very timely, as we have just completed a substantial study designed to re-

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\*Head of the General Economic Assessment Division, Economics Department, Organisation for Economic Co-operation and Development. The author is grateful to Howard Oxley for extensive discussions about this issue and for helpful comments. The analytical work done at the OECD reported in this paper is drawn from Dang, Antolin, and Oxley (2001), which has been synthesized in "Fiscal Implications of Ageing: Projections of Age-Related Spending," *OECD Economic Outlook* 69, June 2001. The article also provides background material and detail underlying the analysis.

<sup>1</sup> 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). Work on age-related policies is continuing at the OECD in a number of areas.

flect institutional details of pension systems in member countries better than previous OECD studies, while maintaining a reasonable degree of cross-country comparability. The main results, including sensitivity analysis and a discussion of policy options, have just been released as a chapter in the June issue of *OECD Economic Outlook*. I cannot cover it all in this note, but I would like to do three things: (1) briefly describe the study; (2) compare the results for the United States with those reported by Lee and Edwards; and (3) put the results for the United States into an international perspective.

## THE OECD STUDY

The OECD study, which has been carried out in collaboration with the Working Group on Ageing of the Economic Policy Committee of the European Union, was a collaborative effort in which the OECD secretariat coordinated the analysis carried out by national administrations in member countries and synthesized the results. Countries agreed on a common set of assumptions affecting demographics (see Box 1) and key macroeconomic variables (see Box 2). These assumptions were then used as the starting point for an analysis of age-related expenditures, revenues, and government deficits, using models of national administrations or research institutes. Our direct interlocutor in the United States was the Council of Economic Advisers but the results reported here were provided by the Office of Management and Budget (OMB).

The study, like the Lee and Edwards paper, goes beyond old-age pension programs to cover other expenditure items affected by demographic change. These include those facilitating early withdrawal from the labor market, health care and long-term care for the frail elderly, family/child benefits, and education. Where countries provided information on this range of expenditure items they represent between 40 and 60 percent of total general government spending.<sup>2</sup> Some points to note:

- The *time horizon* covered by the OECD study is 2050, somewhat shorter than that of Lee and Edwards.
- *Old-age pension spending* includes, in principle, all old-age pensions, all early retirement pension spending that is an integral part of the public pensions system, and survivors' and minimum pensions. Comparisons with OECD sources<sup>3</sup> suggest that the program coverage in the projections may be understated in several countries, including the United States, and, hence, for these countries, the spending projections reported here may be understated.

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<sup>2</sup> Coverage across countries for old-age pensions is much more complete than for these other items.

<sup>3</sup> Compared with the OECD Social Expenditure Data File (SOCX). See Dang et al. (2001) for details.

### **Box 1: Population Projections and Demographic Assumptions of the OECD Study**

#### ***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 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 toward 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 almost five years for males and four 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 in Poland, which has 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, Germany, and Norway), contributes to a more rapid rise in the working-age population toward the end of the period.

### **Box 2: Main Common Background Macroeconomic Assumptions of the OECD Study**

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 toward a ceiling at the end of the period equal to 5 percentage points below those of men in countries with widely subsidized child care and 10 percentage points below elsewhere. Some countries deviate marginally from these rules because of the expected impact of recent policies (for example, higher retirement ages). However, with the exception of Austria,<sup>a</sup> 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 labor-market reforms presupposed a further decline in structural unemployment over the period.<sup>b</sup> 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 percent, well outside the agreed limits.
- Labor productivity growth (measured as GDP per worker) converges toward an annual rate of 1.75 percent 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 aging 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 aging or from background assumptions—for example, 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.

<sup>a</sup> 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 percent, by the end of the period. This reflects the assumed impact of recent reforms to early-retirement policies.

<sup>b</sup> This adjustment was limited to one-third of the structural unemployment levels in 2005.

- Most countries have programs that provide *income support for those of working age*—for example, disability pensions, long-term unemployment benefits and early retirement arrangements for labor market reasons. These programs can be affected by aging, for example via larger numbers of older workers with their higher probabilities of becoming disabled. Such programs 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 programs and to limit benefits.
- Projections of *health-care spending* (including costs of care for the frail elderly) for most countries 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.<sup>4</sup> Non-age-related factors (such as higher income and technology change) have been taken into account to varying degrees.
- Spending on *child-related programs*, that is, education and family/child benefits, largely depends on youth dependency ratios.

### Comparison between Lee-Edwards and OECD Results for the United States

It will be seen below that although there are similarities between the OECD results reported here and the Lee-Edwards results, there are also significant differences. To facilitate comparisons I have attempted to replicate several of the Lee-Edwards figures using OECD data and projections as well as the relevant data helpfully provided by Professor Lee. Since the OECD results reported here were provided by the Office of Management and Budget, while Lee and Edwards have followed the Congressional Budget Office in at least a number of respects, the differences point to a high degree of sensitivity of the analysis of age-related spending pressures to differences in assumptions that different parts of the U.S. government appear to regard as plausible.

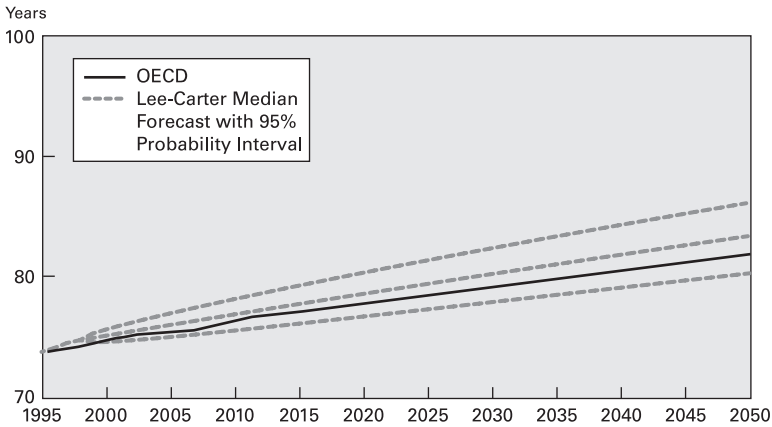
Many of the demographic assumptions underlying the two studies appear to be fairly similar. The fertility and immigration assumptions are essentially the same, but mortality assumptions in the OECD study are more in line with those of the Social Security Administration than the Lee-Carter projections that underlie the Lee-Edwards results.<sup>5</sup> Nevertheless, the old-age dependency ratio in the OECD study tracks the U.S.

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<sup>4</sup> However, the projections for the Netherlands allow for the fact that a large share of total lifetime health-care costs occur in the last year or two of life.

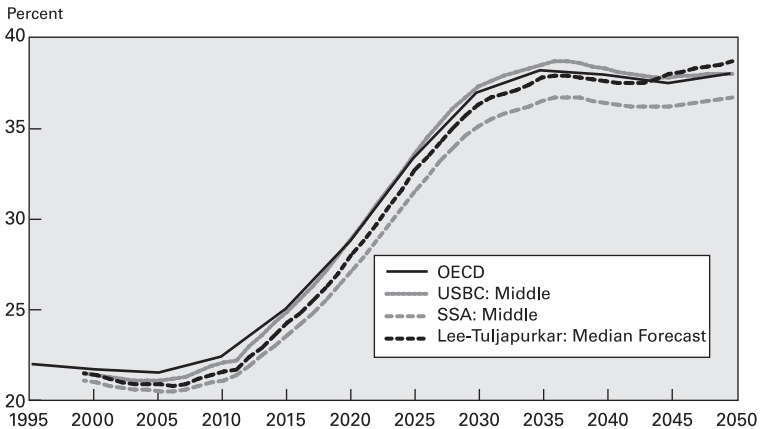
<sup>5</sup> Issues relating to the best way to project mortality along the lines of those discussed by Lee-Edwards were acknowledged and sensitivity tests show that results vary significantly with changes in assumptions made about longevity. The risk that longevity may be understated was recognized by contributors to the OECD study.

**Figure 1**  
**U.S. Life Expectancy at Birth**



**Old-Age Dependency Ratio**

Population Aged 65 and Over as a Percent of Population Aged 20 to 64

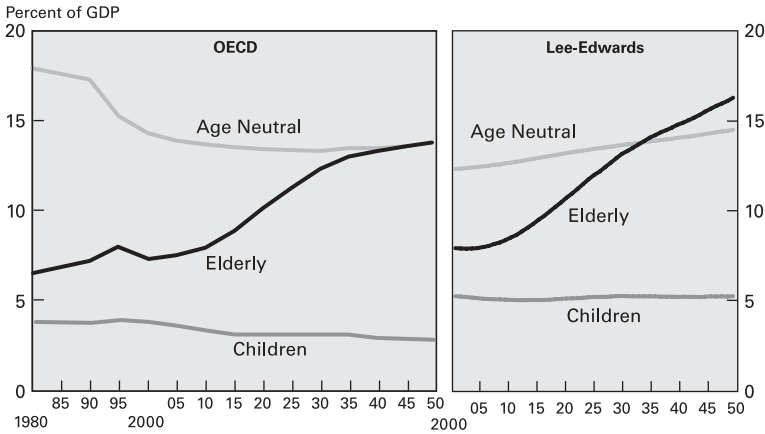


Source: Underlying data base for "Fiscal Implications of Ageing: Projections of Age-related Spending," OECD Economic Outlook 69, Paris; "The Fiscal Impact of Population Change," Ronald Lee and Ryan Edwards, May 2001.

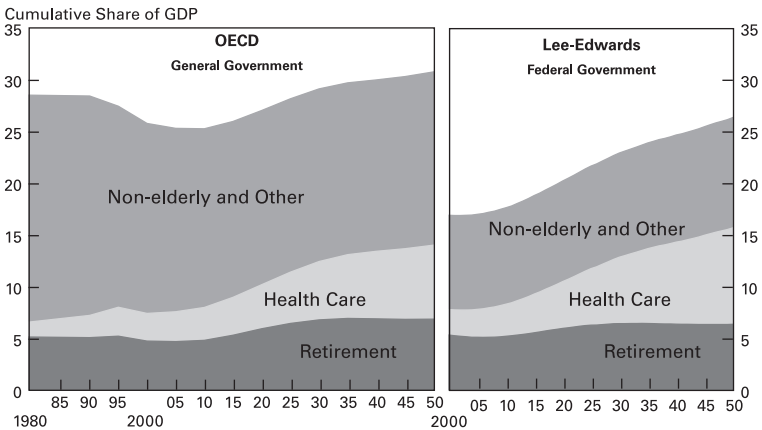
Census Bureau projections fairly closely (Figure 1) and in 2050 they are only slightly below the Lee-Tuljapurkar median projections used by Lee-Edwards. Nevertheless, the underlying differences in treatment of mortality may be enough to have a significant influence on the projections of benefit costs.

The other difference in underlying assumptions that may influence

**Figure 2**  
**Government Expenditures by Age Group**



**Government Expenditures by Type of Spending**



Source: Underlying data base for "Fiscal Implications of Ageing: Projections of Age-related Spending," OECD Economic Outlook 69, Paris; "The Fiscal Impact of Population Change," Ronald Lee and Ryan Edwards, May 2001.

the results significantly concerns productivity growth. The OECD study assumed that labor productivity growth converges across countries to 1.75 percent by 2020 or just afterward. This is around 0.5 percent below the 2.3 percent used by Lee-Edwards.

Figure 2 provides a comparison of the results of the OECD study for

the United States with those of Lee-Edwards. In important respects the OECD results are consistent with the Lee-Edwards projections:

- Some time around 2010 federal spending will start rising sharply, driven by age-related spending on the elderly.
- The major source of pressure will be health care, while old-age pensions will account for a relatively modest proportion of the total increase.

At the same time, there are differences:

- While projected spending on old-age pensions in the two studies is fairly similar, the Lee-Edwards projections for medical spending are significantly higher, by around 2 percent of GDP in 2050, and rising faster than those the OECD received from OMB.
- The OECD study is more optimistic as regards child-related and age-neutral spending pressures, though only slightly.

Perhaps the most interesting feature of this comparison is the difference in projected health care spending. Since OMB has not reported all the underlying details of its analysis to OECD, there are limits to how well the reasons for this can be identified. The OECD study includes some sensitivity analysis that suggests that increased longevity more in line with the Lee-Edwards approach would add just over 1 percent of GDP to medical spending and around 2 percent of GDP to total age-related spending.<sup>6</sup> Sensitivity tests for productivity did not yield sensible results for the United States. However, if pooled results, that is, not based on results for any single country, could be applied to the United States, they would suggest that higher productivity in line with that assumed by Lee-Edwards would slightly, but not significantly, *reduce* the upward pressure on spending as a share of GDP.

Superficially, these assumptions by themselves do not appear to account fully for the difference. The obvious conjecture is that details of the specification of medical care costs are at the heart of the matter. In this regard, however, the different approaches to longevity may be playing a large role, since these influence assumptions about health status late in life and the number of beneficiaries at any particular stage. If Lee and Edwards are correct that most mortality projections, including those used in the OECD study, are underestimating longevity, they are calling attention to an important upside risk to future budget pressures.

Given the speculative nature of any long-term projections in this area, perhaps not too much should be made of the different numerical

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<sup>6</sup> Specifically, increased life expectancy of three years for men and two years for women would add 1.0 percent of GDP to old-age pensions spending, 1.2 percent of GDP to health and long-term care spending, and 2.1 percent of GDP to total age-related spending in 2050.



Table 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 <sup>a</sup>	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 <sup>b</sup>	1.54	1.66	Average of countries above <sup>b</sup>	74.1	79.3

results. The simple assumption by Lee-Edwards that Medicare and Medicaid benefits rise by a fixed margin over productivity growth is analytically tractable and may be sensible, but the arithmetic of compound interest has a powerful effect over a 50- to 100-year time horizon. More optimistic assumptions about our ability to control medical costs would lead to significantly different results. Similarly, work at the OECD suggests that if current trends toward reduced disability are projected forward, costs of long-term care for the frail elderly will be substantially lower. The important message here is the focus it puts on medical and long-term care costs in the overall aging cost picture, not the precise numbers.

### Projections for the United States Compared to Twenty-One Other OECD Countries

The main demographic assumptions underlying the OECD study are reported in Table 1 and the profile of old-age dependency ratios that

Table 1 (continued)  
Assumptions for Fertility, Life Expectancy, and Immigration

	Immigration (percent of Total Population)		Life Expectancy at Birth for Females		
	2000	2050	2000	2050	
Australia	.90	.41	Australia	82.2	87.8
Austria	.12	.26	Austria	81.2	86.0
Belgium	.10	.15	Belgium	81.4	85.5
Canada	.60	.43	Canada	81.3	84.0
Czech Republic	.09	.18	Czech Republic	78.4	81.5
Denmark	.20	.18	Denmark	79.2	82.8
Finland	.11	.10	Finland	81.1	85.0
France	.08	.08	France	82.8	87.0
Germany	.36	.26	Germany	80.8	85.0
Hungary	-.09	-.04	Hungary	75.2	81.1
Italy	.09	.17	Italy	82.0	86.0
Japan	—	—	Japan	84.1	86.5
Korea	—	—	Korea	78.1	83.0
Netherlands	.21	.20	Netherlands	80.9	85.0
New Zealand	—	—	New Zealand <sup>a</sup>	81.0	85.5
Norway	.30	.19	Norway	81.4	84.5
Poland	—	—	Poland	78.2	84.7
Portugal	.12	.23	Portugal	79.2	84.0
Spain	.08	.17	Spain	82.1	85.0
Sweden	.17	.22	Sweden	82.0	86.0
United Kingdom	.15	.11	United Kingdom	80.0	85.0
United States	.33	.25	United States	79.6	83.5
Average of countries above <sup>b</sup>	.22	.20	Average of countries above <sup>b</sup>	80.6	84.7

— Indicates unavailable data.

<sup>a</sup> Data are for 1996 and 2051.

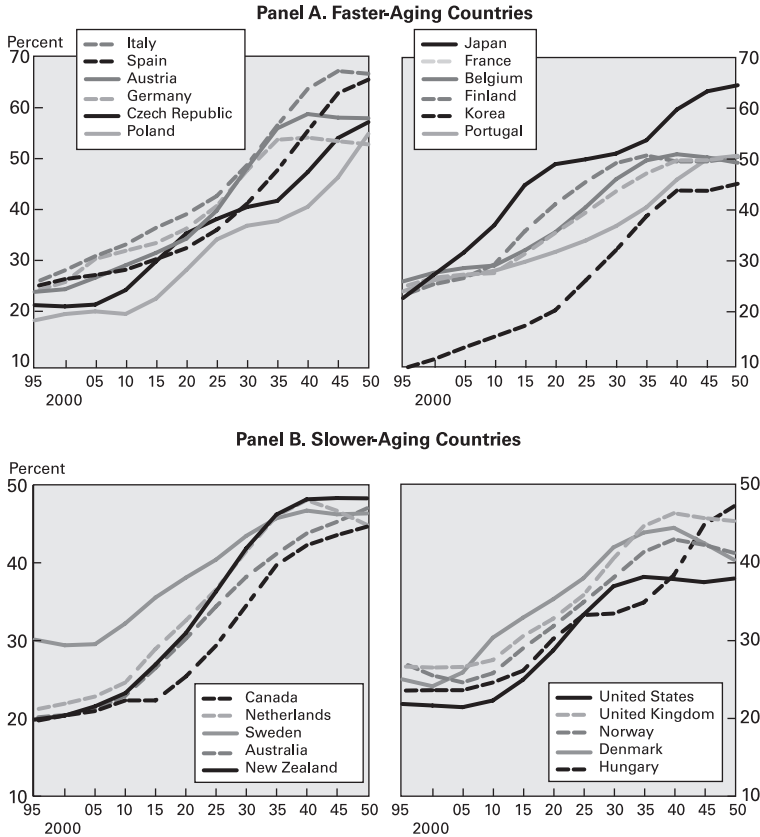
<sup>b</sup> OECD average is unweighted and excludes countries where information is not available.

Source: OECD.

emerges on the basis of these assumptions is shown in Figure 3. Several points stand out:

- The fertility rate in the United States is relatively high in an international context, currently around replacement level and projected (by the SSA) to decline only slightly in the future. Even though fertility was assumed to rise in most other countries, it was assumed to remain well below replacement rate and below the U.S. level in all countries considered.
- Assumed changes in immigration are probably too small to affect the analysis significantly except perhaps in Australia.
- Life expectancy was assumed to rise by around 4.5 years on average, below historical trend rates and with significant cross-country variation.

**Figure 3**  
**Trends in Old-Age Dependency Ratios**



Note: The old-age dependency ratio is the elderly population (65 and up) as percent of the working-age population (aged 20 to 64).  
Source: OECD.

- On the basis of the assumptions used here, old-age dependency profiles vary significantly across countries over the next fifty years, with ratios rising faster and generally by larger amounts in most of continental Europe outside Scandinavia and in Japan than elsewhere. Old-age dependency in the United States is projected to rise more slowly and by less than in almost all other countries considered here.

The main results are reported in Table 2. The pressures projected to emerge in the United States are somewhat below average in an international context (Panel A). Furthermore, the source of these pressures differs significantly from most other countries in that medical care, rather

than pensions, will be the main factor. Key points to note include the following:

- Projections based on assumptions of unchanged policy—although taking into account reforms legislated but not yet implemented—suggest that *old-age pension spending* will rise on average across countries by around 3 to 4 percentage points of GDP in the period to 2050 (Panel B), but with considerable cross-country variation. 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.<sup>7</sup> The projected increase for the United States over this period of less than 2 percentage points is modest in an international context.
- While the coverage varies across countries, “*early retirement*” programs<sup>8</sup> represent around 1.5 percentage points of GDP in the countries providing data, although considerably more in Denmark, Finland, Norway, and Portugal (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 program reforms already undertaken and declining unemployment. Significant increases over the full fifty-year period are projected only by Norway.
- *Public health care and long-term care spending* averaged around 6 percent of GDP in 2000 (Panel D), although some differences in coverage mean that these results may not be rigorously comparable across countries. The average increase over the 2000–50 period for the fourteen countries where this information is available is 3 to 3.5 percentage points of GDP. But for five countries, including the United States, increases of 4 percentage points or more are projected. Slow aging is partly responsible for the smaller increases in spending in Denmark, Sweden, and the United Kingdom.
- Reductions in *child-related spending* are projected to offset increases elsewhere to the extent of around 1 percentage point of GDP on average over the projection period (Panel E). The United States is around average in this regard. 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 further pressures may well arise from longer periods of education for the young, increased training

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<sup>7</sup> Projected effects of reforms in a few countries (for example, Italy and Sweden) contribute to this result.

<sup>8</sup> Excluding early retirement provisions within old-age pension systems themselves. This item covers programs permitting early withdrawal from the labor market, for example through disability programs.

Table 2  
Age-Related Spending  
(Levels in Percent of GDP, Changes in Percentage Points)

	Panel A			Panel B		
	Total Age-Related Spending			Old-Age Pension		
	Level 2000	Change 2000–Peak <sup>a</sup>	Change 2000–50	Level 2000	Change 2000–Peak <sup>b</sup>	Change 2000–50
Australia	16.7	5.6	5.6	3.0	1.6	1.6
Austria <sup>f</sup>	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
Canada	17.9	8.7	8.7	5.1	5.8	5.8
Czech Republic	23.1	6.9	6.9	7.8	6.8	6.8
Denmark <sup>g</sup>	29.3	7.3	5.7	6.1	3.6	2.7
Finland	19.4	8.5	8.5	8.1	4.8	4.8
France <sup>h</sup>	—	—	—	12.1	4.0	3.9
Germany	—	—	—	11.8	5.0	5.0
Hungary <sup>i</sup>	7.1	1.6	1.6	6.0	1.2	1.2
Italy	—	—	—	14.2	1.7	–0.3
Japan	13.7	3.0	3.0	7.9	1.0	0.6
Korea	3.1	8.5	8.5	2.1	8.0	8.0
Netherlands <sup>j</sup>	19.1	10.1	9.9	5.2	5.3	4.8
New Zealand	18.7	8.4	8.4	4.8	5.7	5.7
Norway	17.9	13.7	13.4	4.9	8.2	8.0
Poland <sup>i</sup>	12.2	–2.6	–2.6	10.8	–2.5	–2.5
Spain	—	—	—	9.4	8.0	8.0
Sweden	29.0	3.4	3.2	9.2	2.2	1.6
United Kingdom	15.6	.8	.2	4.3	.0	–.7
United States	11.2	5.5	5.5	4.4	1.8	1.8
Average of countries above <sup>e</sup>	16.9	5.9	5.5	7.4	3.8	3.4
Average of countries which provide all or nearly all spending components	18.7	7.2	6.9			
<i>Portugal<sup>f</sup></i>	<i>15.6</i>	<i>6.6</i>	<i>4.3</i>	<i>8.0</i>	<i>4.5</i>	<i>4.5</i>

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

<sup>b</sup> 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), and the Netherlands, Norway, and Belgium (2040).

<sup>c</sup> 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.

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

<sup>e</sup> 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.

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

Table 2 (continued)  
 Age-Related Spending  
 (Levels in Percent of GDP, Changes in Percentage Points)

Panel C			Panel D			Panel E		
"Early Retirement" Program			Health Care and Long-Term Care			Child/Family Benefits and Education		
Level 2000	Change 2000– peak <sup>c</sup>	Change 2000–50	Level 2000	Change 2000– Peak <sup>d</sup>	Change 2000–50	Level 2000	Change 2000– Peak <sup>e</sup>	Change 2000–50
.9	.2	.2	6.8	6.2	6.2	6.1	.0	–2.3
—	—	—	—	—	—	—	—	—
1.1	.1	.1	6.2	3.0	3.0	6.0	.0	–1.3
—	—	—	6.3	4.2	4.2	6.4	.0	–1.3
1.8	–.7	–.7	7.5	2.0	2.0	6.0	—	–1.2
4.0	.8	.2	6.6	2.7	2.7	6.3	.3	.0
3.1	–.1	–.1	8.1	3.8	3.8	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
1.2	.3	.3	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	5.8	2.4	2.4	—	—	—
.3	.0	.0	.7	.8	.5	—	—	—
1.2	.4	.4	7.2	4.8	4.8	5.4	.1	.0
—	—	—	6.7	4.0	4.0	7.2	.0	–1.3
2.4	1.6	1.6	5.2	3.5	3.2	5.5	.5	.5
1.4	.2	–.1	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
1.9	–.2	–.4	8.1	3.2	3.2	9.8	.0	–1.2
—	—	—	5.6	1.8	1.7	5.7	.0	–.9
.2	.3	.3	2.6	4.4	4.4	3.9	.0	–1.0
1.6	.3	.2	6.0	3.3	3.3	6.2	—	–.9
2.5	.4	–.4	—	—	—	—	—	—

<sup>g</sup> Total includes other age-related spending that cannot be classified under the other headings. This represents 6.3 percent of GDP in 2000 and increases by 0.2 percentage points from 2000 to 2050.

<sup>h</sup> For France, the latest available year is 2040.

<sup>i</sup> Total includes old-age pension spending and "early retirement" programs only.

<sup>j</sup> "Early retirement" programs only include spending on persons 55+.

<sup>k</sup> OECD average excludes countries where information is not available and Portugal, which is less comparable, than other countries.

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

Source: OECD.

for older workers, and more demand for publicly subsidized child care as the share of women working increases.

Finally, there is an important caveat about these projections for many countries that echoes Lee and Edwards' warning that difficult decisions will be needed. To illustrate the forces driving the change in pension spending, Table 3 breaks it into four factors:<sup>9</sup>

- A dependency or population-aging effect, reflecting changes in the ratio of those aged 55 and over to the population aged 20 to 64.<sup>10</sup>
- 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 and over age group.<sup>11</sup>

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.

Those results need to be treated with caution and are discussed at some length in the *OECD Economic Outlook* chapter. It suffices to note here that in a number of countries the projected spending numbers fail to give a good picture of the underlying pressures that will build up because the "difficult decisions" to which Lee and Edwards refer are built into the calculations. That is, they are assumed to take place notwithstanding the political issues they will raise. In particular, as noted in footnote *b* of Table 3, relative declines in benefits are particularly marked in a few countries. Italy will shift to a system where benefits are contribution-based, indexed

<sup>9</sup> 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 to 64, EMPL is employment, AVBEN is total old-age pension spending divided by the number of recipients, AVPDTY is labor 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. (2001).

<sup>10</sup> This takes into account the fact that a considerable number of older workers retire before age 65.

<sup>11</sup> For France, Japan, Sweden, and the United Kingdom, it was necessary to assume that the number of beneficiaries equaled the non-active share of the population aged 55 and older. 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 underestimate of the average benefit (calculated as the residual) for these countries.

Table 3  
Decomposition of Changes in Old-age Pension Spending: 2000–2050<sup>a</sup>  
(Level in per cent of GDP, changes in percentage points)

	Total Old-age Pension Spending		Contributions of:			
	Level in 2000	Change from 2000 to 2050	Old-age Dependency Ratio	Employment Ratio	Benefit Ratio <sup>b</sup>	Eligibility Ratio
Australia	3.0	1.6	2.5	-.1	-.5	-.2
Austria	9.5	2.2	7.6	-1.9	-1.1	-2.4
Belgium	8.8	3.3	4.7	-.7	-1.6	1.0
Canada	5.1	5.8	5.1	.0	-.6	1.3
Czech Republic	7.8	6.8	8.2	-.8	-.1	-.1
Denmark	6.1	2.7	2.7	-.3	-1.5	1.7
Finland	8.1	4.8	5.2	-.1	-.2	.0
France <sup>c</sup>	12.1	3.8	7.6	-.5	-3.4	.4
Germany	11.8	5.0	6.4	-.7	-2.7	2.1
Hungary	6.0	1.2	2.9	-1.0	-.3	-.4
Italy <sup>d</sup>	14.2	-.3	10.1	-3.2	-5.5	-1.5
Japan <sup>d</sup>	7.9	.6	5.1	-1.2	-3.9	.9
Korea	2.1	8.0	4.8	-1.0	.2	5.0
Netherlands	5.2	4.8	3.8	-.5	.2	1.4
New Zealand	4.8	5.7	4.7	-.1	1.0	.0
Norway	4.9	8.0	3.0	.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	2.0
Sweden <sup>d</sup>	9.2	1.6	3.9	-.5	-2.1	.4
United Kingdom <sup>d</sup>	4.3	-.7	1.7	.1	-2.5	.1
United States	4.4	1.8	2.4	-.1	-.2	-.3
Average of countries above <sup>e</sup>	7.4	3.4	5.2	-.8	-1.3	.5
<i>Portugal</i>	8.0	4.5	6.1	-1.0	-2.7	1.1

<sup>a</sup> See Dang et al. (2001) for methodology and detailed information on the time profile. Columns do not add up because linear approximations are used.

<sup>b</sup> The associated percent declines in average benefits relative to average productivity over the period 2000 to 2050 are 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) percent. All other countries are under 10 percent except Norway, where the average benefit is projected to rise by 53.6 percent.

<sup>c</sup> For France, data are available for 2040.

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

<sup>e</sup> Average excludes countries where national information is not available and Portugal, for which data are not comparable to those for other countries.

Source: OECD.

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 and the lengthening of contribution periods and of the reference period for calculating pensions will progressively affect spending. Declines in pension benefits in Poland and the relatively modest increases in Hungary 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. These changes are sufficiently large as to require a build-up in private pension saving if income adequacy in retirement 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.

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