The 2003 Aging Vulnerability Index

An Assessment of the Capacity of Twelve Developed Countries to Meet the Aging Challenge

Center for Strategic and
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An Assessment of the Capacity of Twelve Developed Countries to Meet the Aging Challenge

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The Center for Strategic and International Studies

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EXECUTIVE SUMMARY

The rapid aging of the developed countries will pose a major challenge for global prosperity and stability during the first half of the twenty-first century.

Today, there are 30 pension-eligible elders in the developed world for every 100 working-age adults. By the year 2040, there will be 70. In Italy, Japan, and Spain, the fastest-aging countries, there will be 100. In other words, there will be as many retirees as workers. This rising old-age dependency ratio will translate into a sharply rising cost rate for pay-as-you-go retirement programs — and a heavy burden on the budget, on the economy, and on working-age adults in any country that does not take serious steps to prepare.

Ten years ago, global aging barely registered as a policy issue. Today, with the retirement of large postwar baby-boom generations looming just over the horizon, it is the focus of growing concern among political and policy leaders worldwide. From Australia to Sweden, the developed countries are beginning to debate — and enact — major reforms. Yet despite all the new attention, there exists no satisfactory measure of the magnitude of the challenge.

The CSIS *Aging Vulnerability Index* assesses the "vulnerability" of the developed countries to rising old-age dependency costs. In this first edition, the *Index* covers twelve countries — Australia, Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, the United Kingdom, and the United States. In future editions, the *Index* may be expanded to include the rest of the developed world — or, data allowing, selected developing countries.

The *Index* gives each country an overall ranking and score. The scores show that the twelve countries fall into three clear groups — a low, a medium, and a high vulnerability group.

Low Vulnerability Group

In the 2003 *Index*, the low vulnerability group includes *Australia (1),* the *United Kingdom (2),* and the *United States (3).* These English-speaking countries win the first three places thanks to their favorable demographics, their relatively inexpensive public benefit systems, and their well-developed private alternatives. The group does face some real challenges. The UK, for example, is finding it difficult to keep costs down without hurting elder living standards, while the United States must grapple with runaway health care spending. Still, all of these countries are in relatively good shape. Australia, in particular, is implementing a far-sighted strategy of mandatory private pension coverage that promises excellent results on all fronts.

Medium Vulnerability Group

There are six medium vulnerability countries: *Canada (4),* the English-speaking straggler; *Sweden (5)* and *Germany (7),* two continental

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Aging Vulnerability Index
2003 Edition

Rankings from Least to Most Vulnerable

Low Vulnerability
1. AUSTRALIA
2. UNITED KINGDOM
3. UNITED STATES

Medium Vulnerability
4. CANADA
5. SWEDEN
6. JAPAN
7. GERMANY
8. NETHERLANDS
9. BELGIUM

High Vulnerability
10. FRANCE
11. ITALY
12. SPAIN

European countries that have recently enacted major benefit reforms; *Japan (6),* which ranks much higher in the *Index* than its massive age wave might indicate; and the *Netherlands (8)* and *Belgium (9),* two countries with generous and unreformed benefit systems. All of the medium vulnerability countries, including Canada, face more serious demographic challenges than the low vulnerability countries. And despite recent reforms, all, including Sweden and Germany, face heavier old-age dependency burdens.

High Vulnerability Group

The high vulnerability group includes three major continental European countries that all face a daunting fiscal and economic future: *France (10), Italy (11),* and *Spain (12).* Their poor scores can be attributed, in varying degrees, to severe demographics, lavish benefit formulas, early retirement, and heavy elder dependence on pay-as-you-go public support. It is unclear whether they can change course without economic and social turmoil. Italy has scheduled big reductions in future pension benefits, but only after grandfathering nearly everyone old enough to vote. France and Spain have yet to initiate major reforms of elder benefit programs.

The *Index* is compiled from indicators in four basic categories, each dealing with a crucial dimension of the challenge:

- *Public-burden indicators,* which track the sheer magnitude of the public spending burden in each country

- *Fiscal-room indicators,* which track each country's ability to accommodate the growth in old-age benefits via higher taxes, cuts in other spending, or public borrowing

- *Benefit-dependence indicators,* which track how dependent the elderly are on public benefits and thus how politically difficult it may be to reduce their generosity

- *Elder-affluence indicators,* which track the relative affluence of the old versus the young — another trend that could critically affect the future politics of benefit reform

The projections underlying the *Index* are based on a "historical trends" scenario, a no-wishful-thinking baseline that assumes a continuation of established demographic and economic trends. According to the projections, public benefits to the elderly will reach an average of 25 percent of GDP in the developed countries by 2040, double today's level. In Japan, they will reach 27 percent of GDP; in France, they will reach 29 percent; and in Italy and Spain, they will exceed 30 percent. This growth will throw into question the sustainability of today's retirement systems — and indeed, society's very ability to provide a decent standard of living for the old without overburdening the young.

The *Aging Vulnerability Index* is the first attempt to develop a comprehensive measure of the old-age dependency challenge that is comparable across the developed countries. As such, it must be regarded as experimental. We offer this first edition of the *Index* in the hope that it will stimulate debate and focus attention on the need for reform. The *Index* clearly shows that global aging is pushing much of the developed world toward fiscal and economic meltdown. There is still time to avert crisis. But time is running short, and the problem is worse than is generally supposed.
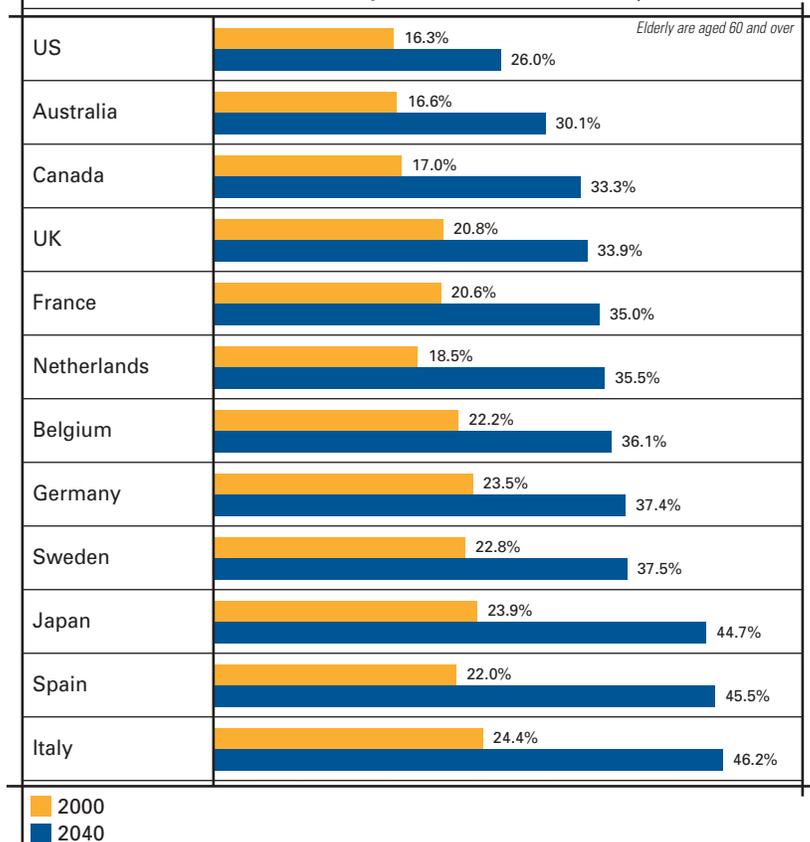
ACKNOWLEDGMENTS

INTRODUCTION

We live in an era defined by many challenges, from global warming to global terrorism. But none is as certain as global aging. And none is as likely to have as large and enduring an effect — on the size and shape of government budgets, on the future growth in living standards, and on the stability of the global economy and even the world order.

The whole world is aging, and the developed countries are leading the way. For most of history, the elderly — here defined as adults aged 60 and over — comprised only a tiny fraction of the population, never more than five percent in any country. Today in the developed countries, they comprise 20 percent. Forty years from now, the share will reach roughly 35 percent. And that's just the average. In Japan and some of the fast-aging countries of continental Europe, where the median age is expected to exceed 50, the share will be approaching 50 percent (see Figure 1).

Longer lives may be a great personal boon, but they also pose a great collective challenge. Over the next half century, global aging will divert a rising share of society's economic resources from young to old. Much of this transfer will occur through public benefit systems. All of the developed countries have universal or near-universal public pension and health care benefit programs that tax current workers to pay benefits to current retirees. In many countries, the typical elder is almost entirely dependent on a government check. Global aging will throw into question the sustainability of today's pay-as-you-go retirement systems — and indeed, society's very ability to provide a decent standard of living for the old without overburdening the young.

Ten years ago, global aging barely registered as a policy issue. Today, with the retirement of large postwar baby-boom generations looming just over the horizon, it is the focus of growing concern among leaders worldwide. From Australia

F I G U R E 1 : Number of Elderly, as a Percent of the Population

Elderly are aged 60 and over

	2000	2040
US	16.3%	26.0%
Australia	16.6%	30.1%
Canada	17.0%	33.3%
UK	20.8%	33.9%
France	20.6%	35.0%
Netherlands	18.5%	35.5%
Belgium	22.2%	36.1%
Germany	23.5%	37.4%
Sweden	22.8%	37.5%
Japan	23.9%	44.7%
Spain	22.0%	45.5%
Italy	24.4%	46.2%

to Sweden, the developed countries are beginning to debate — and enact — major reforms.

Yet despite all the attention, there exists no satisfactory measure of the magnitude of the challenge to guide leaders in their policy choices. Not all national governments make long-term cost projections, and those that do rarely include all benefit programs. In any case, the national projections are not comparable across countries. Recent multi-country projections by the Organization for Economic Co-operation and Development (OECD) have begun to address the comparability problem, but they assume a variety of fiscally favorable developments — more babies, more working women, slower growth in health care spending, and slower growth in life expectancy — that may greatly understate future costs.

The CSIS *Aging Vulnerability Index* offers a more complete and realistic assessment of the "vulnerability" of the developed countries to rising old-age dependency costs. The projections underlying the *Index* are based on a "historical trends" demographic and economic scenario, a no-wishful-thinking baseline that assumes a continuation of established trends in fertility, longevity, labor-force participation, and productivity growth. The *Index*'s core indicators quantify the magnitude of the public-benefit burden. In addition to tracking total old-age benefits as a share of GDP, the *Index* calculates the after-tax cost of benefits to the elderly as a share of the income of the nonelderly. This innovative "net-transfer" indicator directly measures the impact of current social policy toward the old on the living standard of the young.

The sheer magnitude of the future public-benefit burden, of course, is not the only circumstance affecting the vulnerability of the developed countries. The overall fiscal, economic, and social environment also matters. The *Index* therefore goes a step further and looks at a variety of broader factors that may mitigate or aggravate the public burden.

These additional indicators are grouped into three categories: fiscal room, benefit dependence, and elder affluence. The fiscal-room indicators take into account the differing "room" that governments may have to raise taxes, cut other spending, or borrow in order to accommodate the growth in old-age benefits. With its small public sector, Japan, for instance, may have more room to raise taxes than Sweden — while Sweden, with its small public debt, may have more room to borrow than Japan.

The benefit-dependence indicators take into account the extent of elder reliance on public benefits, the availability of alternative means of support, including earnings and private pensions, and the strength of extended families.

The elder-affluence indicators take into account the relative economic well-being of society's elderly and nonelderly members. Trends in each of these areas will influence the ability of countries to reduce the public burden by enacting or following through with cost-cutting reforms.

The bottom line is an *Index* that ranks the major developed countries in terms of their overall vulnerability to the costs of rising old-age dependency. The *Index* now covers twelve countries: Australia, Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, the United Kingdom, and the United States. In the future, it may be expanded to include the rest of the developed world — or, data allowing, selected developing countries.

Part I of the report briefly describes the projection scenario, then discusses the individual indicators that make up the *Index* — why they were selected, how they are calculated, and what they reveal. Part II gathers together the strands of the story. It describes how the individual indicators are combined into an *Index*. It also presents the overall rankings and summarizes the country findings. A Technical Appendix contains a more complete discussion of the model, methodology, and data sources used in constructing the *Index*.

The *Aging Vulnerability Index* is the first attempt to develop a comprehensive measure of the old-age dependency challenge that is comparable across the developed countries. As such, it must be regarded as experimental. We offer this first edition of the *Index* in the hope that it will stimulate debate and focus attention on the need for reform. The *Index* clearly shows that global aging is pushing much of the developed world toward fiscal and economic meltdown. There is still time to avert crisis. But time is running short, and the problem is worse than is generally supposed.
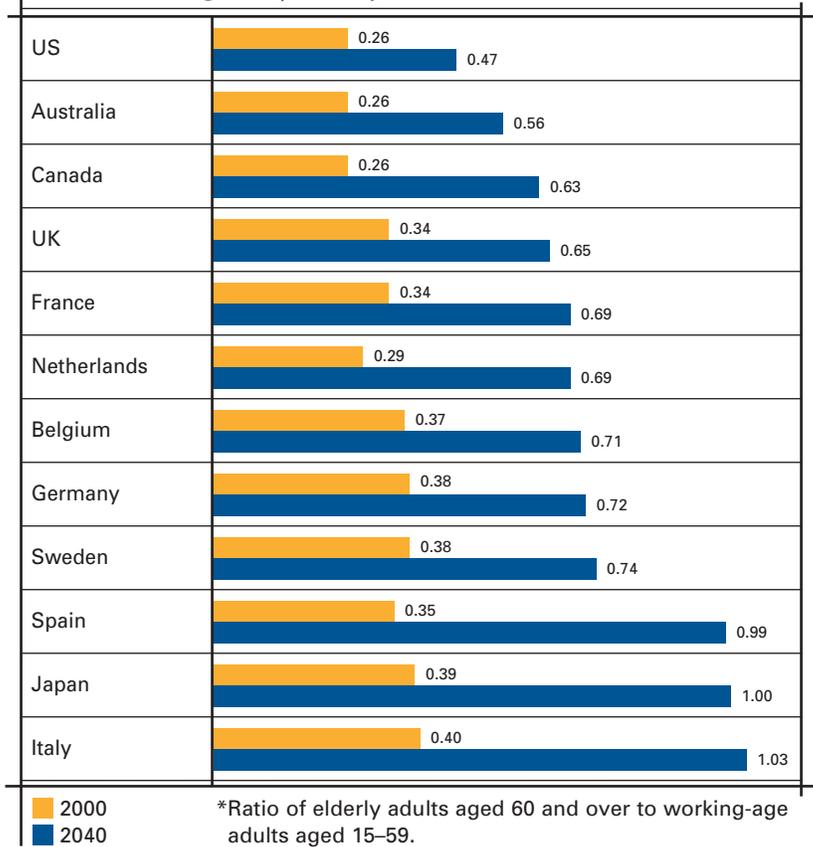
PART I. THE INDICATORS

During the early postwar decades, when the developed countries greatly expanded government's role in providing old-age benefits, they decided to pay for nearly all the benefits on a pay-as-you-go basis. The pay-as-you-go model was attractive because it allowed early participants to receive benefits far in excess of their contributions. At the time, the model also appeared to be affordable. Because the number of retirees was small and the number of workers was growing rapidly, the total cost seemed easily bearable even after allowing for steady benefit hikes. What's more, everyone expected this situation to continue indefinitely.

In more recent decades — especially since the mid-1970s — these expectations have crumbled. The developed countries stand on the brink of a great demographic transformation that no one predicted when the pay-as-you-go model was adopted. It's called global aging, and it will soon be putting enormous pressure on public budgets and national economies. In a few countries, that pressure is already building.

There are two forces behind global aging. The first force is falling fertility. People are having fewer babies, which decreases the relative number of young in the population. As recently as the mid-1960s, every developed country was at or above the so-called 2.1 replacement rate needed to maintain a stable population from one generation to the next. Today every country is at or below it, some far below it. In Japan, the fertility rate is 1.4; in Germany, it is 1.3; and in Italy, Spain, and much of southern and central Europe, it is 1.2. Only the United States remains at the replacement rate — barely.

The second force behind global aging is rising life expectancy. People are living longer, and this boosts the relative number of old in the population. Over the past fifty years, life expectancy at birth has risen by roughly two

FIGURE 2: Aged Dependency Ratio*

Country	2000	2040
US	0.26	0.47
Australia	0.26	0.56
Canada	0.26	0.63
UK	0.34	0.65
France	0.34	0.69
Netherlands	0.29	0.69
Belgium	0.37	0.71
Germany	0.38	0.72
Sweden	0.38	0.74
Spain	0.35	0.99
Japan	0.39	1.00
Italy	0.40	1.03

- 2000
- 2040

*Ratio of elderly adults aged 60 and over to working-age adults aged 15–59.

and a half months per year in the developed countries, for a cumulative gain of about ten years. Few demographers expect this trend to slow — and a growing number believe that it may accelerate.

"Demography is destiny," it is sometimes said. When it comes to public budgets, the prophecy is irrefutable. Rising longevity and falling fertility translate directly into a rising ratio of retired beneficiaries to taxpaying workers. Overall, CSIS projects that the ratio of "elderly" adults aged 60 and over to "nonelderly" adults aged 15–59 in the developed world will increase from 30 percent today to 70 percent by 2040. In Italy, Japan, and Spain, the fastest aging of the twelve *Index* countries, this old-age dependency ratio will increase to 100 percent by 2040 — meaning that there will be as many adults over the age of 60 as under (see Figure 2).* A rising

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*As explained below, age 60 was chosen as the threshold between elderly and nonelderly because it is much closer to the typical age of retirement on public benefits in most countries than the more conventional age 65 threshold.

old-age dependency ratio will in turn translate into a rising cost rate for pay-as-you-go retirement programs — and a growing burden on the budget, on the economy, and on working-age adults.

The purpose of the CSIS *Aging Vulnerability Index* is to measure and compare the magnitude of this burden in different countries and, by extension, the "vulnerability" of those countries to demographic aging. The *Index* is calculated by combining country scores on eleven separate indicators. The indicators are grouped into four categories, each dealing with a distinct dimension of the problem:

■ The first and most important category is *public burden.* It contains three indicators that measure the sheer magnitude of each country's projected public old-age dependency burden.

■ The second category is *fiscal room.* It contains three indicators that measure each country's ability to accommodate the growth in its public old-age dependency burden via higher taxes, cuts in other spending, or government borrowing.

■ The third category is *benefit dependence.* It contains three indicators that measure how dependent the elderly in each country are on public benefits and thus how politically difficult it may be to reduce those benefits beneath current law — or even to carry out reductions in benefits that are already scheduled to take place.

■ The fourth category is *elder affluence.* It contains two indicators that measure per capita elderly income in each country relative to nonelderly income — another factor that could critically affect the future politics of reform.

The CSIS *Aging Vulnerability Index* is constructed as follows. For each of the indicators, we generate an indicator ranking, from one (best) to twelve (worst). We also transform the indicator results into an index and generate an index score for each country. For each indicator, the mean result is set to an index value of 50; results that lie above and below the mean by one standard deviation are set, respectively, to index values of 100 and zero. The index scores thus preserve the indicator rankings while also reflecting the relative distance of each ranked country, positively or negatively, from the "center of the pack." (Countries located far from the mean can and sometimes do have index scores greater than 100 or less than zero.)

For each of the four categories, a category score is then calculated as an average of the indicator index scores. The category score determines the overall category rankings. Finally, the category scores themselves are averaged as follows: A weight of one-third is given to the first public-burden category, one-third to the second fiscal-room category, and one-third to the third and fourth "policy-climate" categories combined. A country's final combined average for the four categories determines its ranking in the overall *Index*.

Each of the indicators tells an interesting story and is worth examining in detail. Before looking at the results, however, it is essential to understand the basic scenario and assumptions that underlie all of the projections.

The Projection Scenario
The projection scenario extends from 2000, the base year, through 2040. The 2040 end year was chosen because the "demographic transition" in most countries will by then be largely complete. Even after 2040, rising longevity will continue to push the cost of retirement benefits steadily and indefinitely upward. But the era of swiftest growth, which in most countries accompanies the full retirement of a postwar

baby boom, will occur sometime between the mid-2010s and the mid-2030s. A country that can successfully navigate the fiscal rapids over the next four decades will, presumably, be quite prepared to manage the gentler current thereafter. A country that fails to meet the challenge by 2040 will be far more concerned with confronting the destructive legacy of that failure (from high tax levels to runaway debt) than with managing any new demographic developments after 2040.

All of the projections assume a continuation of historical demographic and economic trends. Fertility is assumed to remain constant, mortality to continue declining at its historical pace, and productivity and real wages to continue rising in line with their average growth rate over the last twenty-five years. Rates of labor-force participation by age group are also assumed to remain unchanged, with the two exceptions noted below. In general, so is the composition of national income by type of factor income — "asset income" from capital and "earnings income" from labor — although, as populations age, the distribution of each type between age groups will of course shift.

A few exceptions to this "historical trends" rule are permitted. The scenario allows for an increase in labor-force participation among middle-aged women as a new generation of working women now in their twenties and thirties bring new habits with them into their forties and fifties. It also allows for a modest rise in labor-force participation among the elderly in a number of countries, notably Germany and Italy, where recent pension reforms have begun to change work incentives.

As for policy, the projections assume a continuation of current old-age benefit provisions. Public pension programs continue to function according to the same benefit rules that are in place in the base year. Exceptions (important in some countries) are allowed only where

future changes in benefit rules have already been explicitly enacted into law. Health care benefits are a special case, since health care spending per beneficiary typically grows rapidly yet unpredictably even with no change in benefit rules. Here, the assumption is that growth in per-beneficiary health care spending will initially follow the historical trend in each country, but that growth in all countries will gradually converge, by 2040, to the rate of growth in per capita GDP plus one percent. In most countries, this implies that cost growth will be slower in the future than it has been in the past. While there is little evidence that costs are yet slowing, all experts agree that they must do so eventually to avoid impossible outcomes — such as total health care spending crowding out every other category of consumption.

The *Index* makes two other major policy assumptions. The first is debt neutrality: In the first year of the projection, each country is assumed to move to a general government deficit which, when continued unchanged as a share of GDP in all future years, will keep net government debt unchanged as a share of GDP. While unrealistic as a short-term projection, debt neutrality is a standard assumption in long-term budget models. Year to year, the budget balance shows a great deal of variability, usually rising and falling with the business cycle. To suppose that the balance in any single base year will continue indefinitely is an arbitrary and often an unsustainable assumption. Each country is assumed to achieve its new budget balance by an increase (or decrease) in taxes combined with an equal decrease (or increase) in government spending.

We considered — but decided against — making an exception for countries that are proposing a long-term policy of budget surpluses as a partial solution to the aging challenge. The historical failure of governments throughout the developed world to validate retirement

"trust-fund" savings by running sustained general government surpluses raises serious questions about the feasibility of this approach. Among the twelve *Index* countries, only one — Canada — has announced plans to pursue such a policy. While Canada may succeed where others have failed, the projected level of "prefunding" is small relative to the projected size of its dependency burden. Even if factored into the *Index*, it would not alter Canada's overall ranking.

The other assumption is that, once debt neutrality is achieved, nonbenefit spending will remain constant as a share of GDP and taxes will be raised (or lowered) in each future year in accordance with the projected change in benefit spending. In every country in almost every year, of course, this means that taxes must be raised. This "rising tax" assumption is only relaxed for two of the fiscal-room indicators, where the object is to assess alternative means of paying for the growth in benefit costs.

Throughout the *Index*, the "elderly" are defined as persons aged 60 and over, the "nonelderly" as persons aged 15–59. The income (and taxation) of each age group refers to the income of all individuals within that age group, with the single exception of spouses of heads of households, who are considered to belong to the same age group as the head of household. Other than in the case of spouses, income to households containing both elderly and non-elderly adults is split between the two groups. The age 60 threshold between elderly and non-elderly may strike some people as a bit early, since in today's world most 60-year-olds seem relatively "young." The threshold, however, is not meant to indicate anything about health, capacity, or vigor. Age 60 was chosen because it is close to the typical age of retirement on public benefits in most countries — much closer, in fact, than age 65. Before age 60, the majority of people are net contributors. After age 60, the majority become net beneficiaries.

The data underlying the projection scenario come from a wide variety of sources, the most important of which are discussed in the Technical Appendix. The basic demographic data come from the UN. Most of the fiscal and macroeconomic data are derived from standard OECD sources, from the National Accounts to the Social Expenditure Database. The detailed household data, from income by age to living arrangements, are derived from the Luxembourg Income Study for every country except Japan, where data from the Ministry of Health, Labor, and Welfare are used.

Let us now turn to the indicators. The public-burden indicators are presented first, since they focus most directly on the core challenge — the projected magnitude of the old-age dependency burden. The fiscal-room indicators, which focus on how easily each country can accommodate the growth in that burden, are presented second. The benefit-dependence and elder-affluence indicators, which focus on how easily each country can restrain the growth, are presented last.

Category One: Public-Burden Indicators

The public-burden category includes three indicators:

- *Public benefits to the elderly in 2040 as a percent of GDP* (the "benefit-level" indicator)

- *The growth from 2000 to 2040 in public benefits to the elderly as a percent of GDP* (the "benefit-growth" indicator)

- *Public benefits to the elderly in 2040 as a percent of the income of the nonelderly* (the "net-transfer" indicator)

The first two indicators track the claim that old-age benefits will place on society's total economic resources. The third measures the direct transfer burden that old-age benefits

will place on the income of the working-age population. Together, they provide a comprehensive measure of the public burden of population aging.

Let's start with the benefit-level indicator. CSIS projects that public benefits to the elderly in the twelve *Index* countries will grow to an average of 24.8 percent of GDP by 2040, double today's level. Of this total, 13.5 percent of GDP will be going to pensions, 8.7 percent to health care benefits, and 2.6 percent to miscellaneous programs, from unemployment insurance to housing subsidies and food stamps.

The average projection masks a wide range of outcomes (see Figure 3). Total old-age benefits in Australia, the UK, and the United States are projected to grow to between 17 and 20 percent of GDP by 2040. In Belgium, Canada, France, Germany, Japan, the Netherlands, and Sweden, they are projected to grow to between 23 and 29 percent. And in Italy and Spain, they are projected to exceed 30 percent. The differences are due in part to demographics, and in part to the varying generosity of benefit systems, especially pensions. The lower-burden English-speaking counties both spend less per capita on old-age benefits and are due to age less. The higher-burden countries of continental Europe have the most lavish benefit formulas, the earliest retirement ages, and the fastest-aging populations. Japan is a special case. It faces a massive age wave, but has a relatively stingy benefit system — which is what keeps total Japanese benefit spending from shooting off the charts.

There are some important differences in rankings between the benefit-level and benefit-growth indicators (see Figure 4). A few countries, notably Canada and the United States, score better on level than on growth. In the case of Canada, the difference is dramatic: a ranking of four versus a ranking of nine. The reason lies mainly in Canada's demographics. With a fertility rate of only 1.6,

FIGURE 3: Public Benefits to the Elderly, as a Percent of GDP

Elderly are aged 60 and over

Country	2000	2040
Australia	9.0%	16.6%
UK	12.1%	17.6%
US	9.4%	20.3%
Canada	8.9%	22.9%
Sweden	13.3%	23.0%
Belgium	12.7%	24.5%
Germany	15.1%	25.5%
Netherlands	11.7%	25.6%
Japan	11.8%	27.0%
France	15.8%	29.3%
Italy	17.3%	32.0%
Spain	12.6%	33.1%
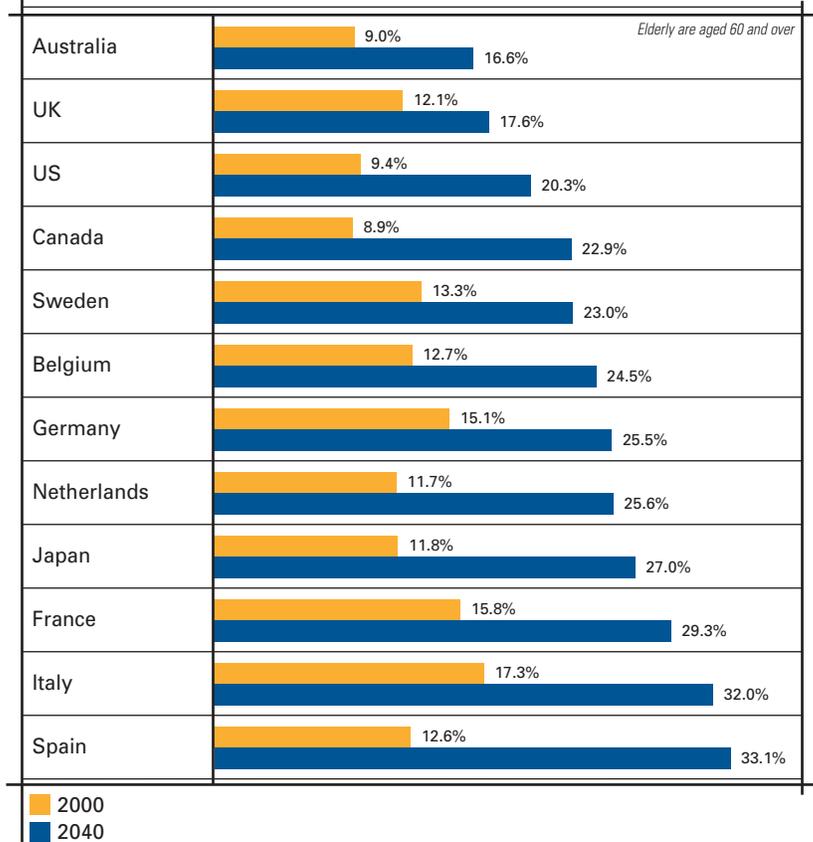
■ 2000
■ 2040

FIGURE 4: Growth in Public Benefits to the Elderly from 2000 to 2040, as a Percent of GDP

Elderly are aged 60 and over

Country	Growth
UK	5.5%
Australia	7.6%
Sweden	9.7%
Germany	10.4%
US	11.0%
Belgium	11.8%
France	13.6%
Netherlands	13.9%
Canada	14.0%
Italy	14.7%
Japan	15.2%
Spain	20.5%

Country	Elderly are aged 60 and over
UK	14.0% (2000), 19.3% (2040)
Australia	12.4% (2000), 22.1% (2040)
US	12.8% (2000), 26.8% (2040)
Sweden	17.7% (2000), 27.3% (2040)
Canada	12.9% (2000), 29.8% (2040)
Belgium	17.2% (2000), 31.5% (2040)
Netherlands	16.5% (2000), 35.3% (2040)
Germany	20.8% (2000), 35.4% (2040)
Japan	15.4% (2000), 35.9% (2040)
France	20.3% (2000), 36.1% (2040)
Italy	21.6% (2000), 37.2% (2040)
Spain	17.2% (2000), 42.7% (2040)

■ 2000
■ 2040

*Public benefits to the elderly (aged 60 and over), net of taxes, as a percent of the income of the nonelderly (aged 15–59), measured after taxes for the rest of government but before taxes for benefits to the elderly.

benefit costs. Alone among the twelve *Index* countries, however, it faces virtually no growth in pension costs.

Most countries will begin to experience severe fiscal pressure at about the same time. Almost everywhere, old-age benefits are projected to rise relatively slowly over the next decade, a period during which large postwar baby booms will still be in the workforce. This window of opportunity closes abruptly in the early 2010s. Thereafter, benefit spending rises steeply for two decades before slowing or plateauing during the 2030s. Japan and Spain are exceptions to this pattern. In Japan, whose massive age wave is breaking early, spending is already rising rapidly. In Spain, spending doesn't begin to ramp up until the 2010s, but once it does, it continues to grow rapidly throughout the entire projection period and beyond.

So what's more important — level or growth? The question is probably unfair, since each indicator adds a different perspective to the *Index*. The absolute spending level as a share of GDP is clearly the simplest measure of the total resource burden. From this perspective, the English-speaking countries are substantially better off. Yet the rise in spending is also important, since some societies may be institutionally and culturally better equipped to handle high levels of public-benefit spending than others. From this perspective, the road ahead may not be so smooth for Canada and the United States.

Thus far, we have focused on the projected claims that public old-age benefits will place on society's total economic resources. To isolate specifically the burden on the working-age population, the third indicator tracks total public benefits to the elderly as a share of the total income of the nonelderly. Here both benefits and income are measured after taxes. Benefits to the elderly are measured "net" — that is, they are reduced by an estimate of the

its aging trajectory is much closer to that of continental Europe than to the other English-speaking countries. In the case of the United States, the reason for the poorer growth score is government health care benefit spending, which is projected to rise faster in the United States than in other countries.

There are also a number of countries that score better on growth than on level. Germany, Italy, and Sweden all enacted reforms in the 1990s that are scheduled to cut average pension benefits relative to average wages over the next few decades. These countries spend a lot on old-age benefits today and will spend even more tomorrow. But total spending will grow less than demographics alone would suggest. There is also one low-burden country — the UK — that has enacted deep cuts in pension benefits. It still faces rising elder health care

FIGURE 6: Public-Burden Category*

Category Rank	Score	Benefit-Level Indicator Public Benefits to the Elderly in 2040, as a Percent of GDP		Benefit-Growth Indicator Growth in Public Benefits to the Elderly from 2000 to 2040, as a Percent of GDP		Net-Transfer Indicator Net Benefits to the Elderly in 2040, as a Percent of After-tax Nonelderly Income	
1 UK	-32	1 Australia	16.6%	1 UK	5.5%	1 UK	19.3%
2 Australia	-20	2 UK	17.6%	2 Australia	7.6%	2 Australia	22.1%
3 US	18	3 US	20.3%	3 Sweden	9.7%	3 US	26.8%
4 Sweden	22	4 Canada	22.9%	4 Germany	10.4%	4 Sweden	27.3%
5 Belgium	47	5 Sweden	23.0%	5 US	11.0%	5 Canada	29.8%
6 Canada	47	6 Belgium	24.5%	6 Belgium	11.8%	6 Belgium	31.5%
7 Germany	53	7 Germany	25.5%	7 France	13.6%	7 Netherlands	35.3%
8 Netherlands	68	8 Netherlands	25.6%	8 Netherlands	13.9%	8 Germany	35.4%
9 Japan	80	9 Japan	27.0%	9 Canada	14.0%	9 Japan	35.9%
10 France	81	10 France	29.3%	10 Italy	14.7%	10 France	36.1%
11 Italy	97	11 Italy	32.0%	11 Japan	15.2%	11 Italy	37.2%
12 Spain	139	12 Spain	33.1%	12 Spain	20.5%	12 Spain	42.7%

*Elderly are aged 60 and over; net transfers are public benefits to the elderly, net of taxes, as a percent of the income of the nonelderly (aged 15–59), measured after taxes for the rest of government but before taxes for benefits to the elderly.

share of benefits paid for by taxes on the elderly themselves. The income of the nonelderly is measured after all rest-of-government taxes — that is, after taking into account all taxes on the nonelderly except those required to pay for net benefits to the elderly.

By 2040, at the low end, net transfers to the elderly will be consuming 19 percent of the after-tax income of the nonelderly in the UK and 22 percent in Australia. In every other country, net transfers by 2040 will be consuming between 27 and 37 percent of nonelderly income, except for Spain, where they will weigh in at 43 percent (see Figure 5). In no country today do net transfers consume more than 22 percent of nonelderly income. Note that these shares do not refer to worker payroll, but to the total household income from all sources of all nonelderly adults.

The ranking of countries by the net-transfer indicator corresponds quite closely to the ranking by total benefit spending as a share of GDP. Since the net-transfer indicator takes into account differences in the distribution of the tax burden by age, we had expected to find more variation in the rankings. But apparently these tax differences do not play a decisive role. In a few countries like Sweden, the elderly pay for a somewhat larger share of their own transfers through taxes. Compared with other countries, Sweden relies relatively less on payroll taxation to fund old-age benefits and has relatively few senior tax breaks. It ranks better on the net-transfer indicator than on the benefit-level indicator. In a few other countries, the tax code leans the other way. In Spain, for instance, relatively heavy reliance on payroll taxation pushes up the net-transfer burden even faster than the overall benefit level.

Figure 6 summarizes the results for the public-burden category. Australia comes in first on the benefit-level indicator, the UK on the benefit-growth and net-transfer indicators. Spain comes in last on all three. Overall, the UK receives the best category score — Spain the worst.

Category Two: Fiscal-Room Indicators

A country's vulnerability to rising old-age dependency costs depends not only on the magnitude of the burden, but also on the fiscal room available to accommodate the burden. There are three ways in which countries can adjust to higher old-age benefit spending: pay for the growth by raising taxes, pay for the growth by cannibalizing other public programs, or pay for the growth by borrowing.

The fiscal-room category includes three indicators that evaluate the feasibility of these strategies:

■ *Total taxes as a percent of GDP in 2040* (the "tax-room" indicator, which assumes that benefit growth is paid for by raising taxes)
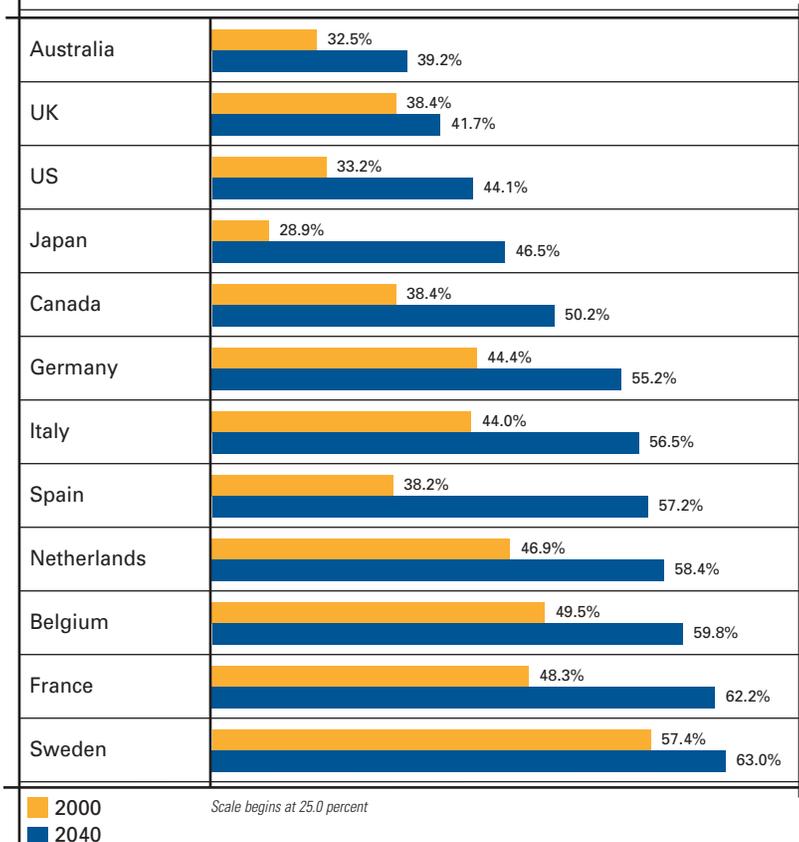
■ *Total benefits to the elderly in 2040 as a percent of total government outlays* (the "budget-room" indicator, which assumes that benefit growth is paid for by cuts in other government spending)

■ *The year that the net government debt reaches 150 percent of GDP* (the "borrowing-room" indicator, which assumes that benefit growth is paid for by government borrowing)

Of the three indicators, the results for the tax-room indicator are the most straightforward. Countries with the largest projected old-age dependency burdens tend to end up with the largest tax burdens. Since the overall tax burden also depends on the overall size of the public sector, however, there are some exceptions. A few countries with outsized public sectors score much worse on tax room than they do on the public-burden indicators. Sweden, for example, ranks fourth in its public-burden category score, but twelfth on tax room; Belgium ranks fifth in public burden, but tenth on tax room. For a few other countries with large old-age dependency burdens but relatively small public sectors, the reverse is true. Spain, for example, ranks twelfth in its public-burden category score, but eighth on tax room; Japan ranks ninth in public burden, but fourth on tax room.

What's most striking, however, is that the tax option would lead to extraordinary tax burdens in almost all countries. In every country except Australia, total taxes would consume at least 40 percent of GDP by 2040; in Belgium, Canada, Germany, Italy, the Netherlands, and Spain, they would consume at least 50 percent; and in France and Sweden, they would consume more than 60 percent (see Figure 7). Some European countries may literally find it impossible to raise taxes enough to pay for the full cost of the age wave. At some point, rather than generate new revenue, higher tax rates may simply slow the economy, exacerbate unemployment, and push more workers into a growing gray economy.

FIGURE 7: Total Taxes as a Percent of GDP, Assuming Tax Hikes Pay for All Growth in Public Benefits

Australia	32.5% (2000) / 39.2% (2040)
UK	38.4% (2000) / 41.7% (2040)
US	33.2% (2000) / 44.1% (2040)
Japan	28.9% (2000) / 46.5% (2040)
Canada	38.4% (2000) / 50.2% (2040)
Germany	44.4% (2000) / 55.2% (2040)
Italy	44.0% (2000) / 56.5% (2040)
Spain	38.2% (2000) / 57.2% (2040)
Netherlands	46.9% (2000) / 58.4% (2040)
Belgium	49.5% (2000) / 59.8% (2040)
France	48.3% (2000) / 62.2% (2040)
Sweden	57.4% (2000) / 63.0% (2040)

■ 2000
■ 2040

Scale begins at 25.0 percent

The obvious alternative to letting benefits grow outward is to let them grow inward. The budget-room indicator looks at what would happen if, instead of raising taxes, governments simply allowed old-age dependency costs to crowd out other spending "dollar for dollar." By 2040, benefits to the elderly would account for over 40 percent of total spending in ten of the twelve countries, over 50 percent in six of the twelve, and over 70 percent in one: Spain. In the country with the largest share today — Italy — they account for just 38 percent (see Figure 8).

There are important differences between the budget-room and tax-room rankings. Countries with large public sectors but relatively small old-age dependency burdens — Belgium and Sweden — score much better on budget room than tax room. The presumed opportunity implied by the indicator is that such countries may have a lot of ineffective government spending that can be cut without much cost to society. Countries with relatively small public sectors but fast-growing burdens — Japan and the United States — score worse. They may be able to accommodate relatively little growth in old-age spending without crowding out vital public services.

In theory, governments could also finance the growth in old-age benefits by borrowing. The debt-room indicator tracks the number of years that they could do so before exceeding the critical net-debt-to-GDP ratio of 150 percent, roughly the highest level any modern developed country has attained in peacetime. The higher a country's initial debt and the steeper the growth in its old-age benefit spending, the sooner it will exceed the threshold. Japan, where benefits are growing steeply even in the near term, breaches it first, in 2020. Italy and Belgium, which have the highest initial net debt, breach it second and third, in 2021 and 2022. With the exception of the UK, every country breaches it by 2040 (see Figure 9).

FIGURE 8: Public Benefits to the Elderly as a Percent of Total Government Outlays, Assuming Cuts in Other Spending Pay for All Growth in Public Benefits

Elderly are aged 60 and over

Country	2000	2040
Sweden	25.3%	37.2%
UK	31.6%	38.1%
Australia	27.2%	41.2%
Belgium	27.5%	44.6%
Canada	23.4%	48.6%
Germany	32.9%	49.0%
Netherlands	28.0%	51.7%
France	32.5%	52.9%
US	30.9%	52.9%
Italy	37.9%	60.3%
Japan	31.9%	65.8%
Spain	32.7%	72.1%

FIGURE 9: Net Government Debt in 2001 and Year Net Debt Reaches 150 Percent of GDP, Assuming Borrowing Pays for All Growth in Public Benefits

Country	Year	
UK	2046	30.9%
Australia	2038	10.8%
Sweden	2037	1.0%
Germany	2033	43.5%
Spain	2029	38.2%
Netherlands	2027	42.1%
US	2026	41.9%
Canada	2024	53.0%
France	2024	42.1%
Belgium	2022	98.9%
Italy	2021	96.5%
Japan	2020	58.5%

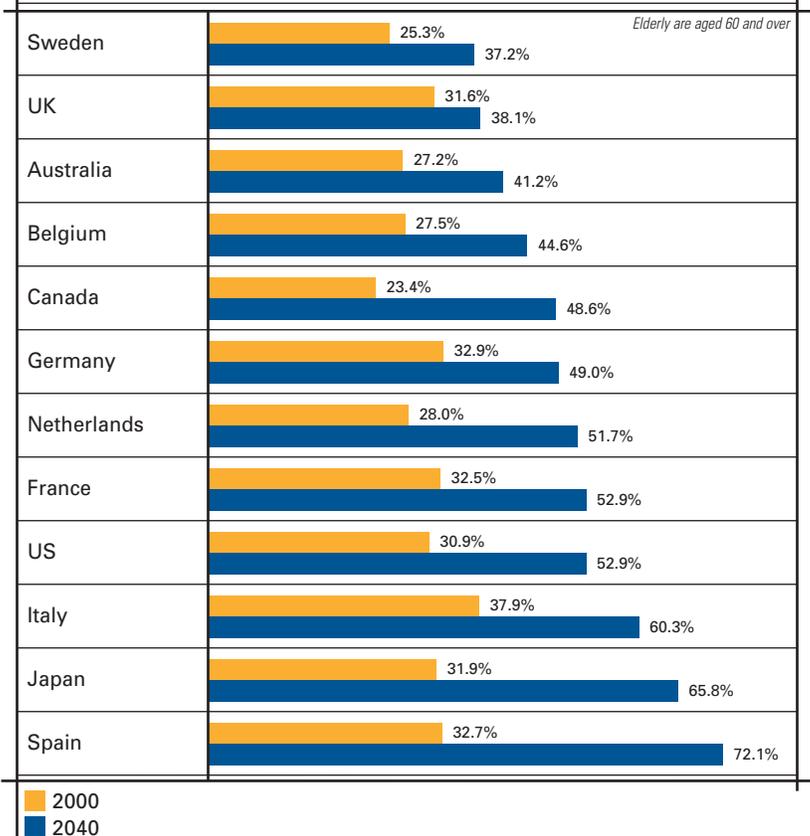| Category Rank	Score	Tax-Room Indicator Total Taxes as a Percent of GDP in 2040, Assuming Tax Hikes Pay for All Growth in Public Benefits		Budget-Room Indicator Public Benefits to the Elderly as a Percent of Total Government Outlays in 2040, Assuming Cuts in Other Spending Pay for All Growth in Public Benefits		Borrowing-Room Indicator Year Net Government Debt Reaches 150 Percent of GDP, Assuming Borrowing Pays for All Growth in Public Benefits	
1 UK	-28	1 Australia	39.2%	1 Sweden	37.2%	1 UK	2046
2 Australia	-12	2 UK	41.7%	2 UK	38.1%	2 Australia	2038
3 Sweden	32	3 US	44.1%	3 Australia	41.2%	3 Sweden	2037
4 US	41	4 Japan	46.5%	4 Belgium	44.6%	4 Germany	2033
5 Germany	43	5 Canada	50.2%	5 Canada	48.6%	5 Spain	2029
6 Canada	51	6 Germany	55.2%	6 Germany	49.0%	6 Netherlands	2027
7 Netherlands	66	7 Italy	56.5%	7 Netherlands	51.7%	7 US	2026
8 Belgium	68	8 Spain	57.2%	8 France	52.9%	8 Canada	2024
9 Japan	78	9 Netherlands	58.4%	9 US	52.9%	9 France	2024
10 France	82	10 Belgium	59.8%	10 Italy	60.3%	10 Belgium	2022
11 Italy	88	11 France	62.2%	11 Japan	65.8%	11 Italy	2021
12 Spain	91	12 Sweden	63.0%	12 Spain	72.1%	12 Japan	2020

It's worth recalling that the borrowing-room indicator, like the other fiscal-room indicators, is designed to isolate the impact of rising benefit costs. Apart from borrowing to pay for the growth in public benefit programs, each country is still assumed to pursue a debt-neutral fiscal policy in the rest of the budget. Even so, the net-debt-to-GDP ratio in eight of the twelve countries — Belgium, Canada, France, Italy, Japan, the Netherlands, Spain, and the United States — goes on to pass 300 percent of GDP by 2040. For most countries, borrowing simply isn't a long-term option.

Figure 10 summarizes the results for the fiscal-room category. Australia comes in first on tax room, Sweden last. Sweden comes in first on budget room, Spain last. The UK comes in first on borrowing room, Japan last. Once again, the UK receives the best overall score, Spain the worst.

Category Three: Benefit-Dependence Indicators

Up to now, we have assumed that old-age benefit programs will continue to function exactly as current law dictates. Yet in reality, every country is bound to enact many policy changes over the next forty years. And in some countries, these changes may have a dramatic impact on total benefit spending — either cutting it beneath what current law now authorizes (easing the dependency burden), or hiking it above what current law now authorizes (worsening the dependency burden). In this context, hiking benefit spending does not necessarily mean making benefits more generous than they are today. In several countries, the mere failure to follow through with future benefit cuts that are already scheduled by current law would have a dramatic impact. Italy, Germany, Sweden, and the UK are all countries whose future dependency burden will be much larger than current projections indicate if scheduled benefit cuts do not materialize.

Is there any way to assess the likelihood that future policy changes will lean one way or the other? Clearly, one factor that will facilitate or obstruct reform is the degree of elder dependence on public benefits. Part of this depen-
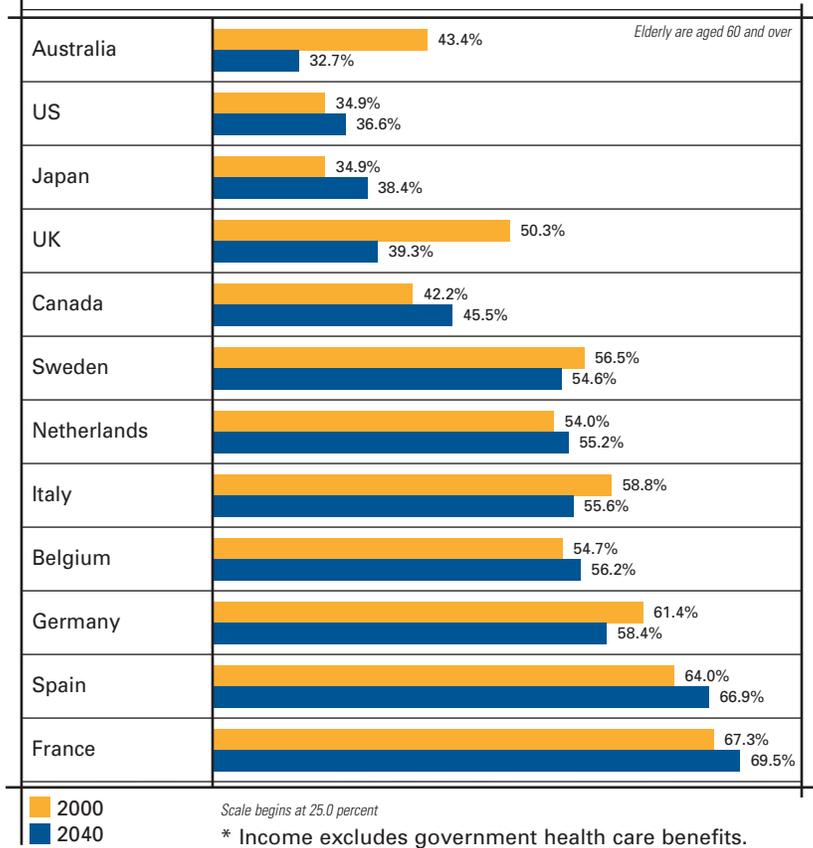
dence can be measured by looking at benefit income as a share of total household income. Another part can be measured by assessing the strength of informal sources of nonincome support, the most important of which is the extended family. A related issue is the extent to which reductions in public benefits would push elders into poverty, a concern to which most of today's developed societies appear to be very sensitive.

Accordingly, the benefit-dependence category includes three indicators:

■ *Public benefits as a percent of after-tax elderly income in 2040* (the "benefit-share" indicator)

■ *The percent of the elderly who live with their adult children* (the "family-ties" indicator)

■ *The percent of the elderly who would drop below the poverty line if public benefits were cut by 10 percent* (the "poverty-impact" indicator)
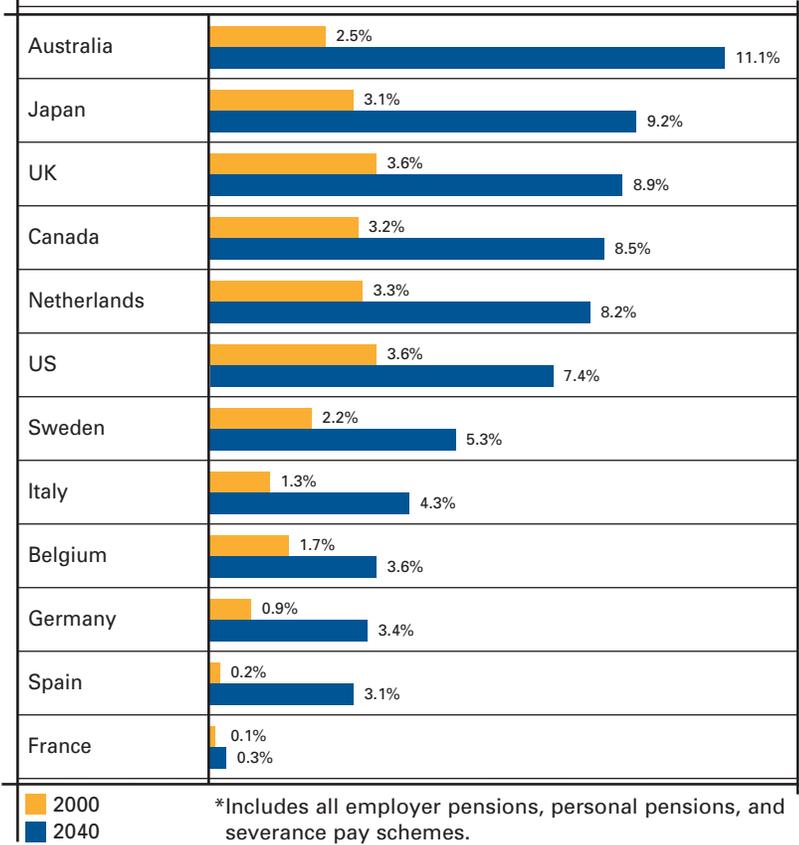
Dependence on government benefits varies a great deal among the developed countries. It is relatively low in the English-speaking world, and in two countries — Australia and the UK — it is projected to drop steadily in the future. In 2040, according to CSIS projections, public benefits will make up 33 percent of the after-tax income of the elderly in Australia, 37 percent in the United States, 39 percent in the UK, and 46 percent in Canada. In every continental European country, the share exceeds 50 percent today and will still exceed 50 percent in 2040, suggesting that the countries that most need to cut benefits may find it the most difficult to do so. Japan is an exception among high-burden countries. The public benefit share there is relatively low today and will still be low in 2040: just 38 percent, about what it will be in the United States (see Figure 11).

FIGURE 11: Public Benefits to the Elderly, as a Percent of After-tax Elderly Income*

	2000	2040
Australia	43.4%	32.7%
US	34.9%	36.6%
Japan	34.9%	38.4%
UK	50.3%	39.3%
Canada	42.2%	45.5%
Sweden	56.5%	54.6%
Netherlands	54.0%	55.2%
Italy	58.8%	55.6%
Belgium	54.7%	56.2%
Germany	61.4%	58.4%
Spain	64.0%	66.9%
France	67.3%	69.5%

Elderly are aged 60 and over

■ 2000
■ 2040

Scale begins at 25.0 percent

* Income excludes government health care benefits.

The benefit-share indicator probably underestimates the absolute level of elder dependence. It uses a cash measure of income that excludes health care benefits. Including health care benefits, public transfers are a significantly larger share of income. The indicator results, moreover, are averages for all elders, including the affluent. Currently, public benefits make up a larger share of the income of "typical" elders in the third quintile of the income distribution than they do for the average elder — roughly 55 percent of total income in the United States and between 70 and 85 percent of total income in Europe. While we did not project public benefits by income level, it is safe to say that the much greater dependence of middle- and low-income seniors is likely to persist in most countries. Australia is a likely exception. In fact, dependence among middle-income Australian elders is due to fall dramatically as the country's new, mandatory private pension system

Country	2000	2040
Australia	2.5%	11.1%
Japan	3.1%	9.2%
UK	3.6%	8.9%
Canada	3.2%	8.5%
Netherlands	3.3%	8.2%
US	3.6%	7.4%
Sweden	2.2%	5.3%
Italy	1.3%	4.3%
Belgium	1.7%	3.6%
Germany	0.9%	3.4%
Spain	0.2%	3.1%
France	0.1%	0.3%

■ 2000
■ 2040

*Includes all employer pensions, personal pensions, and severance pay schemes.

matures, elder incomes rise, and fewer retirees qualify for means-tested public pensions.

What about private sources of income? The *Index* tracks three broad income types: earnings income, including self-employment income; asset income other than private pensions; and private pension income. The last category includes all types of employer-provided retirement payments and personal pensions, both lump-sum and annuitized. The only restriction is that the arrangements be funded, whether externally through "autonomous" pension funds or internally through book reserves. While general asset income includes the return on much savings that is in effect retirement savings, the *Index* tracks private pension income separately because it represents a formal retirement provision that is often intended as a substitute for public benefits.

The countries with the lowest public-benefit dependence are also, of course, the countries where elders rely more heavily on private sources of income. In Japan and the English-speaking world, a significant share of elders continue to work. Earnings now make up 41 percent of elderly income in Japan, 26 percent in the United States, 23 percent in Australia, 18 percent in Canada, and 16 percent in the UK. With the exception of Sweden, continental Europe lags well behind. In Spain, earnings account for 10 percent of income; in France, 8 percent; in the Netherlands, just 7 percent.

It is also important to keep in mind that earnings among the elderly, even in the English-speaking countries, are highly skewed by income. Except in Japan, Sweden, and the United States, earnings make up less than 10 percent of the income of middle-income elders. By and large, it is affluent elders who work — or perhaps more accurately, working elders who are affluent.

Income from assets is generally more important than income from earnings, especially for middle-income elders. Even in Japan, with its tradition of working seniors, only a minority of the elderly have jobs. Most elderly everywhere, however, have at least some savings. Asset income now comprises about 20 to 25 percent of income for the average elder in most countries and about 15 to 20 percent of income for middle-income elders. The relative importance of asset income is projected to decline in the future, but not because total income from savings will be declining. Households will be saving more in the form of private pensions — and the projections assume that households will offset some of the growth in pension savings by reducing nonpension savings.
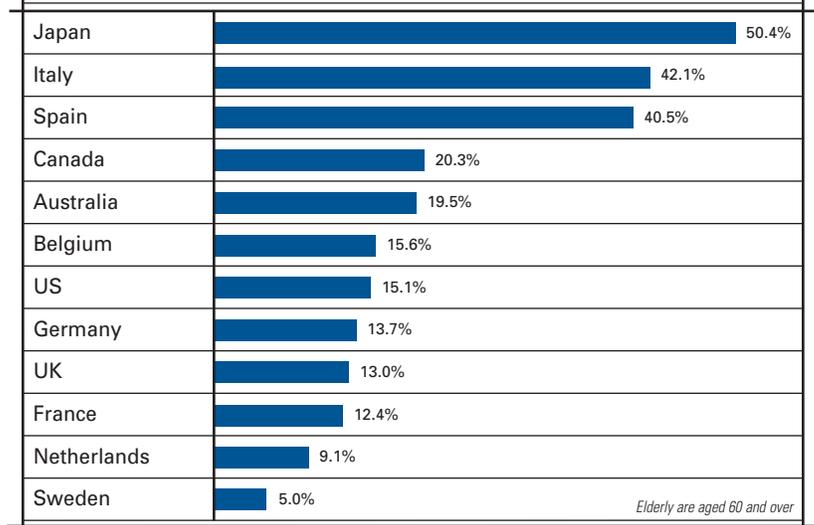
The growth in private pensions is due both to the maturation of existing systems and, in the case of Australia, Germany, Sweden, and the UK, to recent reforms that have added or expanded a second, funded "private" tier to public benefit systems. CSIS projections show

that by 2040 private pension benefits as a share of GDP will grow by at least 100 percent in every country — and by roughly 200 percent on average across all countries (see Figure 12). This is much faster than the growth in the elderly as a share of the adult population, which is roughly 70 percent on average across all countries. The relative importance of private pensions in elderly income will thus increase nearly everywhere. A few countries that now have underdeveloped private systems — Germany, Italy, and Spain — will see especially rapid growth. Since the growth is from a small base, however, private pensions in these countries will still be a small share of elderly income in 2040, about 10 percent. The only countries where private pensions will exceed 20 percent of elderly income — Australia, Canada, Japan, the Netherlands, the UK, and the United States — are countries where private provision is already relatively important today.

Along with their own income, elders may also be able to rely on the income of younger members of their extended families. Until now, all of the index measures have excluded the income of the nonelderly from calculations of elderly income, even if they live in the same household as elders. As a result, we can now look at the availability of private support from the young as a separate factor which, all other things being equal, may make it easier for some countries to cope with their rising old-age dependency burden. Ideally, the *Index* should look at all forms of family support, including cash transfers and unpaid caregiving. It would also net transfers from the old to the young, especially bequests, against transfers from the young to the old. As a first approximation of the importance of family support, the family-ties indicator simply looks at the prevalence of multigenerational living.

Specifically, the indicator measures the share of all elderly who now live in extended families with their adult children, whether the parents

FIGURE 13: Percent of the Elderly Living with Their Adult Children*

Country	Percent
Japan	50.4%
Italy	42.1%
Spain	40.5%
Canada	20.3%
Australia	19.5%
Belgium	15.6%
US	15.1%
Germany	13.7%
UK	13.0%
France	12.4%
Netherlands	9.1%
Sweden	5.0%

Elderly are aged 60 and over

*Data refer to latest year available, generally in mid-1990s.

live in their grown children's household or — what is much more common in most countries — the grown children live in their parents' household. Japan, where fully 50 percent of all elders live with their grown children, heads the list. In Italy and Spain, the two southern European countries in the *Index*, the share of elders living in multigenerational homes is also quite large: 42 and 41 percent, respectively. In the next runner up, Canada, the share is just 20 percent. All the other countries are in the teens or single digits (see Figure 13).

Multigenerational living constitutes a compensating advantage for countries like Italy, Japan, and Spain. It not only allows relatively poor elders to live with their more affluent adult children, it also allows relatively poor young adults to live with their more affluent parents. It mitigates the old-age dependency burden not just by providing an extra source of support for the old, but by providing a form of "trickle down" support for the young as well. The share of elders living with adult children has been declining over the past few decades in all countries and may continue to do so in the future. But unless the relative propensity for multigenerational living changes, those countries that score well today will continue to enjoy an advantage.

The 2003 Aging Vulnerability Index

CSIS and Watson Wyatt Worldwide

FIGURE 14: Percent of the Elderly Pushed into Poverty by a
10 Percent Cut in Public Benefits*

Country	Percent
Japan	2.0%
Italy	2.9%
US	2.9%
Spain	3.9%
Canada	3.9%
Australia	4.0%
UK	4.1%
Sweden	4.5%
Netherlands	4.8%
France	5.2%
Belgium	5.2%
Germany	5.7%

Elderly are aged 60 and over

*Poverty threshold is 50 percent of the median income for all households in each country; income excludes government health care benefits; data refer to latest year available, generally in mid-1990s.

The final benefit-dependence indicator looks at the percentage increase in the number of elderly beneath the poverty line that would be caused by an immediate 10 percent cut in public benefits. The standard international definition of poverty is used here: A person is "poor" if he or she lives in a household with an income that is less than 50 percent of the median income for all households in each country. Performance on this indicator is determined, first, by the distribution of elderly income around the poverty threshold and, second, by the degree of dependence on public benefits among elder households around the poverty threshold. Here income does include the income of nonelderly household members in order to get a complete household picture.

The results for this indicator are surprising — and instructive (see Figure 14). One might expect that the continental European countries, with their expansive welfare states, would score best on a poverty indicator. In fact, they score worst. One reason is the greater dependence on public benefits among elder households in these countries, which means that any given percentage cut in benefits translates into a larger percentage cut in total household income.

Another reason is precisely the success enjoyed by Europe's expansive welfare states in lifting the incomes of so many elder households above the poverty line — but often not far above the poverty line. Even a small cut in benefits could dump many of these households back into poverty, while in other countries they may never have been lifted out of poverty to begin with.

In the countries that do best on this indicator — Japan, Italy, and the United States — either the share of public benefits in elderly income is relatively low, the extent of multi-generational living is relatively high, or both. Although the poverty-impact indicator could not be projected into the future, the results for today provide a valuable indication of possible obstacles to reform.

Figure 15 summarizes the results for the benefit-dependence category. Australia comes in first on benefit share, France last. Japan comes in first on family ties, Sweden last. Japan also comes in first on the poverty-impact indicator, Germany last. Overall, Japan receives the best score, France the worst.

Category Four: Elder-Affluence Indicators

The size and direction of future policy changes may also be influenced by how societies perceive the relative affluence of the old and young. Analysis of voter attitudes toward government spending often suggests that political support for public benefits to the elderly is strongly associated with the perception that the elderly are much poorer on average than younger adults. If elder affluence is high or rising in the future, it may facilitate efforts to reduce public old-age dependency costs. If the old remain relatively poor despite a rising burden on the young, it may be harder to enact benefit cuts — or to follow through on cuts that are already scheduled but not yet implemented.

The elder-affluence category, like the benefit-dependence category, is an effort to monitor

FIGURE 15: Benefit-Dependence Category*

Category Rank	Score	Benefit-Share Indicator Public Benefits to the Elderly in 2040, as a Percent of After-tax Elderly Income		Family-Ties Indicator Percent of the Elderly Living with Their Adult Children: Most Recent Year Available		Poverty-Impact Indicator Percent of the Elderly Pushed into Poverty by a 10 Percent Cut in Public Benefits: Most Recent Year Available	
1 Japan	-32	1 Australia	32.7%	1 Japan	50.4%	1 Japan	2.0%
2 Italy	14	2 US	36.6%	2 Italy	42.1%	2 Italy	2.9%
3 US	19	3 Japan	38.4%	3 Spain	40.5%	3 US	2.9%
4 Australia	26	4 UK	39.3%	4 Canada	20.3%	4 Spain	3.9%
5 Canada	42	5 Canada	45.5%	5 Australia	19.5%	5 Canada	3.9%
6 UK	45	6 Sweden	54.6%	6 Belgium	15.6%	6 Australia	4.0%
7 Spain	47	7 Netherlands	55.2%	7 US	15.1%	7 UK	4.1%
8 Sweden	80	8 Italy	55.6%	8 Germany	13.7%	8 Sweden	4.5%
9 Netherlands	81	9 Belgium	56.2%	9 UK	13.0%	9 Netherlands	4.8%
10 Belgium	82	10 Germany	58.4%	10 France	12.4%	10 France	5.2%
11 Germany	93	11 Spain	66.9%	11 Netherlands	9.1%	11 Belgium	5.2%
12 France	103	12 France	69.5%	12 Sweden	5.0%	12 Germany	5.7%

*Elderly are aged 60 and over; income excludes governement health care benefits; poverty threshold is 50 percent of the median income for all households in each country.

the social and political environment for reform. It includes two indicators:

■ *The ratio of the per capita income of the elderly to the per capita income of the nonelderly in 2040* (the "elder-affluence-level" indicator)

■ *The percentage change in that ratio between now and 2040* (the "elder-affluence-trend" indicator)
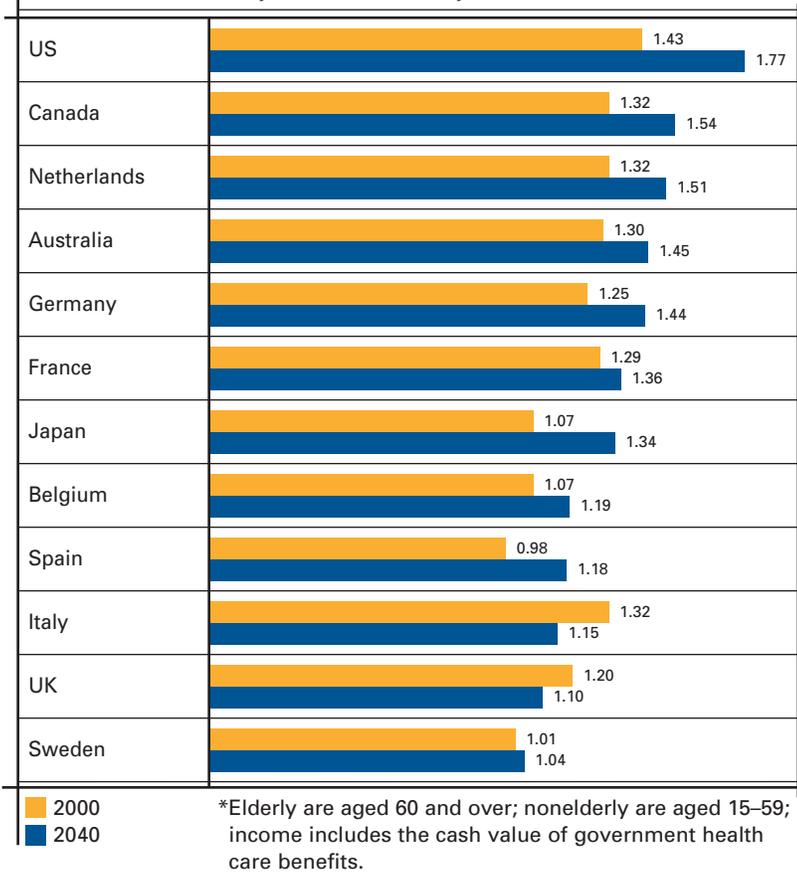
The elder-affluence indicators refer to after-tax income. The income of both the elderly and nonelderly includes the average cash value of government health care benefits. For each age group, however, income excludes the income of persons of the other age group (except spouses) living in the same household.

The level and trend indicators each offer an important and independent perspective. The level indicator is critical if one assumes that society compares the living standard of the old and the young directly against each other according to an absolute dollar-value metric

that translates into equivalent size of home, model of car, length of vacation, and so forth. The trend indicator is preferable, on the other hand, if one assumes that society evaluates the relative affluence of the old and young against some customary standard of generational fairness that may have nothing to do with dollar-value equivalence and may be different for every culture.

As it turns out, the rankings for the two indicators generally overlap — that is, the countries where the elderly are projected to be relatively affluent in 2040 are also the countries where elder affluence is trending upwards, and vice versa. Canada and the United States are near the top of both rankings. In both countries, the elderly start out well off relative to the young today and keep getting better off. The reason for the upward trend: minimal scheduled cuts in current-law pensions combined with large long-term increases in per capita health care benefits. These results suggest that, over the long run, worries about elder destitution are unlikely to deter cost-saving reform (see Figure 16).

FIGURE 16: Per Capita Ratio of the After-tax Income of the
Elderly to the Nonelderly*

Country	2000	2040
US	1.43	1.77
Canada	1.32	1.54
Netherlands	1.32	1.51
Australia	1.30	1.45
Germany	1.25	1.44
France	1.29	1.36
Japan	1.07	1.34
Belgium	1.07	1.19
Spain	0.98	1.18
Italy	1.32	1.15
UK	1.20	1.10
Sweden	1.01	1.04

■ 2000
■ 2040

*Elderly are aged 60 and over; nonelderly are aged 15–59;
income includes the cash value of government health
care benefits.

Italy, Sweden, and the UK, on the other hand, are near the bottom of both rankings. The reason for the downward trend: large scheduled cuts in current-law pension benefits and, in the case of Sweden, relatively slow growth in health care benefits. The very low rankings of these countries suggest that they may find it politically difficult simply to follow through with already scheduled benefit cuts. The UK may shrug at such a warning, since its long-term cost outlook is so favorable. Italy and Sweden cannot afford to be complacent, since both must contemplate cost reductions beyond those already scheduled.

Figure 17 summarizes the results for the elder-affluence category. The United States comes in first on the affluence-level indicator, Sweden last. Japan comes in first on the affluence-trend indicator, Italy last. Overall, the United States receives the best score, Italy the worst.

FIGURE 17: Elder-Affluence Category*

Category Rank	Score	Affluence-Level Indicator Per Capita Ratio of the After-tax Income of the Elderly to the Nonelderly in 2040		Affluence-Trend Indicator Percentage Change in the Affluence-Level Indicator from 2000 to 2040	
1 US	-29	1 US	1.77	1 Japan	25.9%
2 Canada	14	2 Canada	1.54	2 US	23.9%
3 Japan	17	3 Netherlands	1.51	3 Spain	19.7%
4 Netherlands	22	4 Australia	1.45	4 Canada	16.5%
5 Germany	28	5 Germany	1.44	5 Germany	15.3%
6 Australia	34	6 France	1.36	6 Netherlands	14.4%
7 Spain	49	7 Japan	1.34	7 Australia	12.0%
8 France	58	8 Belgium	1.19	8 Belgium	10.9%
9 Belgium	67	9 Spain	1.18	9 France	5.5%
10 Sweden	100	10 Italy	1.15	10 Sweden	3.0%
11 UK	117	11 UK	1.10	11 UK	-8.1%
12 Italy	121	12 Sweden	1.04	12 Italy	-12.9%

*Elderly are aged 60 and over; nonelderly are aged 15–59; income includes the cash value of
government health care benefits.

PART II. THE INDEX RESULTS

It's time to gather together the strands of the story — and present the final results.

As already explained, the *Index* is constructed as follows. For each of the indicators, we generate an indicator ranking, from one (best) to twelve (worst). We also transform the indicator results into an index and generate an index score for each country. For each indicator, the mean result is set to an index value of 50; results that lie above and below the mean by one standard deviation are set, respectively, to index values of 100 and zero. The index scores thus preserve the indicator rankings while also reflecting the relative distance of each ranked country, positively or negatively, from the "center of the pack." (Countries located far from the mean can and sometimes do have index scores greater than 100 or less than zero.)

For each of the four categories, a category score is then calculated as an average of the indicator index scores. The category score determines the overall category rankings. Finally, the category scores themselves are averaged as follows: A weight of one-third is given to the first public-burden category, one-third to the second fiscal-room category, and one-third to the third and fourth "policy-climate" categories combined. A country's final combined average for the four categories determines its ranking in the overall *Index*.

A glance at the index scores reveals that the countries clearly sort themselves into three groups. Australia, the UK, and the United States are well ahead of the next runners-up. At the other end, France, Italy, and Spain lag the rest by an equally wide margin. The other six are clustered in the middle. This suggests a three-fold division of the *Index* into low vulnerability, medium vulnerability, and high vulnerability groups.

This three-fold division is in fact much more robust than the rankings themselves. Relatively

small changes in assumptions can change the ordering of countries within the three categories. Germany, Japan, and Sweden easily change places, since their scores are virtually identical. The same is true of Belgium and the Netherlands. Large changes in several indicators, however, would be required to push a country from one group to another. Absent such changes, the three low vulnerability countries always end up on top, and the three high vulnerability countries always end up on the bottom.

Low Vulnerability Countries

Rank	Country	*Index* Score
1	Australia	–1
2	United Kingdom	+7
3	United States	+18

In the 2003 *Index,* the low vulnerability group includes *Australia (1),* the *United Kingdom (2),* and the *United States (3).* These English-speaking countries win the first three places thanks to their favorable demographics, their relatively inexpensive public benefit systems, and their well-developed private alternatives. The group does face some real challenges. The UK, for example, is finding it difficult to keep costs down without hurting elder living standards, while the United States must grapple with runaway health care spending. Still, all of these countries are in relatively good shape. Australia, in particular, is implementing a far-sighted strategy of mandatory private pension coverage that promises excellent results on all fronts.

Medium Vulnerability Countries

Rank	Country	*Index* Score
4	Canada	+ 42
5	Sweden	+ 48
6	Japan	+ 50
7	Germany	+ 52
8	Netherlands	+ 62
9	Belgium	+ 63

OVERALL INDEX			Public Burden		Fiscal Room		Benefit Dependence		Elder Affluence	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Australia	1	-1	2	-20	2	-12	4	26	6	34
UK	2	7	1	-32	1	-28	6	45	11	117
US	3	18	3	18	4	41	3	19	1	-29
Canada	4	42	6	47	6	51	5	42	2	14
Sweden	5	48	4	22	3	32	8	80	10	100
Japan	6	50	9	80	9	78	1	-32	3	17
Germany	7	52	7	53	5	43	11	93	5	28
Netherlands	8	62	8	68	7	66	9	81	4	22
Belgium	9	63	5	47	8	68	10	82	9	67
France	10	81	10	81	10	82	12	103	8	58
Italy	11	84	11	97	11	88	2	14	12	121
Spain	12	93	12	139	12	91	7	47	7	49

*The public-burden and fiscal-room categories are each weighted one-third; the benefit-dependence and elder-affluence categories are weighted a combined one-third.

There are six medium vulnerability countries: *Canada (4),* the English-speaking straggler; *Sweden (5)* and *Germany (7),* two continental European countries that have recently enacted major benefit reforms; *Japan (6),* which ranks much higher in the index than its massive age wave might indicate; and the *Netherlands (8)* and *Belgium (9),* two countries with generous and unreformed benefit systems. All of the medium vulnerability countries, including Canada, face more serious demographic challenges than the low vulnerability countries. And despite recent reforms, all, including Sweden and Germany, face heavier old-age dependency burdens.

High Vulnerability Countries

Rank	Country	*Index* Score
10	France	+ 81
11	Italy	+ 84
12	Spain	+ 93

The high vulnerability group includes three major continental European countries that all face a daunting fiscal and economic future: *France (10), Italy (11),* and *Spain (12).* Their poor scores can be attributed, in varying

degrees, to severe demographics, lavish benefit formulas, early retirement, and heavy elder dependence on pay-as-you-go public support. It is unclear whether they can change course without economic and social turmoil. Italy has scheduled big reductions in future pension benefits, but only after grandfathering nearly everyone old enough to vote. France and Spain have yet to initiate major reforms of elder benefit programs.

Although countries that rank near each other in the *Index* typically share key characteristics in common, they sometimes differ in critical and even surprising respects. So while the overall rankings show the basic elevation of the terrain, the individual indicators reveal plenty of cross-cutting ridges and canyons.

The UK, for example, does best overall in the public-burden category, but next-to-worst in elder affluence. Sweden scores at the bottom on tax room — but near the very top on budget and borrowing room. Japan faces as severe a demographic challenge as any country, but climbs up in the *Index* because its modest public benefits, high rates of elder

employment, and strong family ties largely insulate elders from the pain of cost-cutting reform. Italy has scheduled deep cuts in future benefits that raise its public-burden ranking — but only at the expense of impoverishing its future elderly. The Netherlands has continental Europe's largest private pension system, yet nonetheless scores poorly on both public burden and benefit dependence. Figure 18 shows all of this graphically by lining up each country's category rankings side-by-side.

Let's conclude by taking a quick look at the twelve countries — and what the *Index* reveals about where each is heading and whether it is likely to change course.

Low Vulnerability Countries
Number 1: Australia
Australia is either number one or two on six different indicators and scores especially well (number two) on the two most critical category rankings: public burden and fiscal room. Australia starts out with favorable demographics, a lean public sector, and a low-cost, largely means-tested old-age safety net. In the early 1990s, it began to phase in a very large system of mandatory and funded retirement accounts (called the Superannuation Guarantee). In the years and decades to come, the "Super" will provide increasingly generous support for elders while actually reducing the pay-as-you-go burden on working-age adults. By 2040, the payout from funded private pensions will reach 11 percent of GDP, far exceeding the payout of any other country. Australia overtakes its only close competitor, the UK, due to its higher ranking on every benefit-dependence and elderly-affluence indicator. Alone among the twelve, Australia is meeting and winning the old-age dependency challenge with a long-term strategy that has no obvious shortcomings.

Number 2: United Kingdom
The UK takes first place in both of the core public-burden and fiscal-room categories. Like Australia, the UK is helped by its relative youth and favorable demographic future. Its public pensions are not projected to grow at all as a share of GDP, due to systematic reductions in per capita benefits initiated under Prime Minister Thatcher and continued under Major and Blair. As for health care benefits, spending on elders under its famously frugal national health care system is projected to grow only modestly. The UK is trying to expand worker participation in private occupational pensions and personal accounts. But unlike Australia, the participation is not mandatory, leaving large gaps in coverage. As a result, the UK earns only an average ranking in the benefit-dependence category and a next-to-last-place ranking in elder affluence. Overall, the vulnerability outlook for the UK is excellent. Yet the *Index* also reveals some doubts about its ability to stay the course.

Number 3: United States
Of all the developed countries, the United States faces the most favorable demographic future. With the highest fertility rate and one of the highest immigration rates, it will be far and away the youngest of the twelve *Index* countries by 2040. Given this demographic advantage, together with a modest Social Security benefit formula, a relatively high rate of elder employment, and a well-developed private pension system, the United States could easily have ranked number one in the *Index*. But it did not, mostly due to the high projected growth in government health care benefits. The United States ranks third on the benefit-level and net-transfer indicators, but fifth on the benefit-growth indicator, lower than two of Europe's biggest welfare states, Sweden and Germany. Also, unlike Australia or the UK, the United States has no overall policy in place to expand its private pension coverage in the future. The growing relative affluence of US elders, however, augurs well for possible cost-cutting reforms down the road.

Medium Vulnerability Countries
Number 4: Canada

At number four, Canada comes in last among the English-speaking countries. To begin with, Canada faces a less favorable demographic future than the others. It also starts out with a larger public sector, no plans for future cuts in public pensions, and a projected rate of health care benefit growth that is nearly equal to that of the United States. As a result, the cost of Canada's public old-age benefits as a share of GDP is due to grow to two and a half times the current cost by 2040 — giving it an even worse ranking on benefit growth than the United States (ninth place, just between the Netherlands and Italy). As shown by the tax-room indicator, the Canadian public sector will weigh in at 50 percent of GDP by 2040, 6 percent more than the United States and 11 percent more than Australia. Even so, Canada does better on benefit level and tax room than any country in continental Europe. As in the United States, moreover, the rising affluence of its elders could favor future reform efforts.

Number 5: Sweden

Remarkably, it is Sweden — the very symbol of welfare state excess — that ranks highest among the countries of continental Europe. To be sure, Sweden's overall score is pulled down by the vast size of its public sector (which gives it a last-place rank on tax room). On the other hand, Sweden did enact in 1999 a major and effective program of old-age benefit reform. It scheduled significant future cuts in its pay-as-you-go public pensions and added a supplementary system of mandatory and funded personal accounts. It earns a number three rank on the benefit-growth indicator and a number four rank in the entire public-burden category. It also ranks number one on budget room and number three on borrowing room. There are caution lights. Swedish elders lack strong family ties (last place), are very vulnerable on both affluence indicators, and are projected to remain highly dependent on public benefits.

Number 6: Japan

Now aging faster than any other developed country, Japan is projected to have one of the highest old-age dependency ratios in the world. It finishes ninth on the benefit-level and net-transfer indicators, eleventh on benefit growth and budget room, and twelfth on borrowing room. So how does Japan manage to rise to the middle of the overall rankings, with an index score of exactly 50? For one thing, Japan's public pensions are relatively stingy and its public sector is relatively small. This keeps the overall cost of old-age benefits from rising even higher than it does, while allowing Japan a fourth-place finish on tax room. Over the long term, moreover, the social and political reform environment in Japan appears surprisingly favorable. Japan ranks number three in the elder-affluence category. And it ranks number one in the benefit-dependence category, with a first-place rank on family ties, a first-place rank on poverty impact, and (due to very high rates of elder employment and a broad-based private pension system) a third-place rank on benefit share. No other country with comparable demographics and a comparable public burden enjoys as many offsetting advantages.

Number 7: Germany

Like Sweden, Germany recently enacted a major reform (the so-called Riester Reform) that combines scheduled future cuts in public pension benefits with an effort to expand private pension coverage. But Germany's reform does less on both counts, a fact reflected in its poorer overall ranking. Like many older European countries, it scores better (number four) on benefit growth than it does on benefit level (number seven). It has an average ranking in the fiscal-room category (number five), doing worse than Sweden on all indicators except tax room. In the elder-affluence category, Germany is again about average. But in the benefit-dependence category, it ranks second-to-last — with a number eight ranking on family ties, a number ten ranking on benefit share, and a

dead-last ranking on poverty impact. This poor showing calls into question Germany's ability even to follow through on the modest benefit reductions it has already enacted — much less to initiate any new cost-cutting reform.

Number 8: Netherlands

The Netherlands is a prime example of an affluent and aging welfare state that lingers in a condition of policy paralysis. With remarkable uniformity, nearly every indicator for the Netherlands reflects its lackluster eighth-place overall ranking. All three of its public-burden indicators, all three of its fiscal-room indicators, and two out of three of its benefit-dependence indicators come in between number six and number nine. The Netherlands does enjoy one large economic advantage: a mature and well-funded private pension system that is the envy of the rest of continental Europe. But its public pension benefits are so generous, its retirement age so early, and its family ties so weak that elders in the Netherlands are left just as vulnerable and dependent on public benefits as elsewhere. The Netherlands' relatively high rank in the elder-affluence category reflects this unique combination of generous public and generous private benefits — and offers some hope for future reform.

Number 9: Belgium

Like the Netherlands, Belgium epitomizes the troubled outlook for the aging societies of continental Europe. Its fertility rate is low, its public sector is large, its public pensions are generous, its retirement age is early, and its elders are heavily dependent on public benefits. Unlike Germany and Sweden, Belgium has yet to enact a major retirement reform package. In some respects, it does better than average. On the benefit-level and net-transfer indicators, it actually comes out ahead of every other country in continental Europe except Sweden. But in other respects, it does worse — for example, on tax room and borrowing room, where it ranks number ten due to its long

history of fiscal excess. Clearly this is a country, like most of continental Europe, that has yet to face up to its demographic future.

High Vulnerability Countries
Number 10: France

France is a curious case. Its demographics are no more severe than Germany's and Sweden's — or indeed, the UK's and Canada's. Yet France finishes in tenth place in the public-burden category, tenth place in the fiscal-room category, and twelfth place in the benefit-dependence category. Japan's stingy public benefits help to offset its demographic disadvantage. France is just the opposite. Its lavish public pensions overwhelm its milder demographics — and catapult it into the high vulnerability group. Even more serious than the sheer magnitude of projected dependency costs is the extreme degree of elder dependence on public benefits. Private pensions make up a smaller share of elder income in France (less than 1 percent) than in any other country; earnings make up a smaller share (8 percent) than in any country except the Netherlands. Its last-place ranking on benefit share suggests that cost-cutting reforms will meet with widespread resistance — as indeed, they already have in recent years. But such resistance may not be the main obstacle when, perhaps uniquely in France, it is difficult to find policy leaders who will even discuss the need for reform.

Number 11: Italy

By 2040, Italy will have one elder for every working-age adult — putting it in a dead heat with Japan and Spain for the developed world's worst demographics. On top of that, Italy's public pension spending as a share of GDP is already the highest in the *Index* countries, while the Italian elderly are among the least likely to be employed or to receive a private pension. Yet what's most worrisome is that Italy's overall eleventh-place ranking in the *Index* comes despite a series of pension reforms enacted in the 1990s (the "Amato" and "Dini"

reforms) that are scheduled to make steep cuts in future benefits. Without these reforms, Italy would surely be in last place. The open question is whether Italy is likely to make good on its reform promises. Its second-place ranking in the benefit-dependence category (with family ties second only to Japan) gives some hope. Yet Italy comes in last in the elder-affluence category, a reflection of how seriously future benefit cuts threaten elder living standards.

Number 12: Spain

Spain might be described as Italy without the reforms. These two countries face a very similar (and dire) demographic future. They both have generous public pension systems that support elders who have little employment or private pension income to fall back on. Unlike Italy, however, Spain's pension generosity is due to continue unchecked into the indefinite future. Spain finishes in last place on all three public-burden indicators, and on the net-transfer indicator it does so by a wide margin. Aside from its runaway pension projections, however, Spain hardly fits the stereotype of the bloated welfare state. Its public sector is still relatively small. Its net debt is modest. And to judge by its average rankings in the elder-affluence and public-dependence categories (it has the third-strongest family ties after Italy and Japan), reform may not be beyond its grasp.

TECHNICAL APPENDIX

The appendix describes the projection model, the methodology, and the most important data sources used in constructing the CSIS *Aging Vulnerability Index*.

1. Demographic Scenario

All of the projections underlying the *Index* assume a continuation of historical trends in fertility, longevity, and immigration. This distinguishes them from projections by the OECD, which assume a rebound in fertility, slower longevity gains, and large changes in net immigration.[1]

The CSIS demographic scenario is based on the UN's latest (2000 Revision) "constant-fertility" scenario, which assumes that rates of fertility (in all countries) and net immigration (in most countries) will continue at their 1995–2000 averages.[2] The UN scenario, however, also assumes that the historical rate of improvement in mortality will slow. We adjust the UN projections to reflect a continuation of the historical trend in mortality. Specifically, we assume that age-specific mortality rates will continue to decline at their long-term postwar (1950–94) average in each country. This assumption raises projected longevity relative to the UN scenario in every country except Germany, with the biggest adjustments in Australia, Canada, Italy, and Japan (see Table A).[3]

It's hard to find any evidence that a rebound in fertility is likely any time soon. All of the long-term trends that have depressed fertility over the past few decades, from more working women to more effective contraception, remain in force. In a number of countries, to be sure,

TABLE A: Demographic Assumptions

	Total Fertility Rate	Longevity at Birth		
	History & Projection 1995–2050	History 2000	UN Projection 2050	CSIS Projection 2050
Australia	1.8	79.5	83.0	86.7
Belgium	1.5	78.4	83.8	85.5
Canada	1.6	78.4	82.8	86.6
France	1.7	78.8	84.0	87.0
Germany	1.3	77.8	83.4	82.9
Italy	1.2	78.8	82.5	86.5
Japan	1.4	80.8	88.0	91.9
Netherlands	1.5	78.2	82.2	85.3
Spain	1.2	78.5	82.6	85.6
Sweden	1.5	79.7	84.6	86.9
UK	1.7	77.6	83.0	84.5
US	2.0	76.8	82.6	83.2

age-specific fertility rates are now rising among women in their thirties, suggesting that some women have merely been postponing having children rather than reducing the total number they plan to have. The impact of this timing shift, however, is relatively small — and in any case, it is being offset by continuing declines in fertility among younger women. In most of today's lowest fertility countries, moreover, there is no evidence of a timing shift at all. In Italy and Spain (as well as Austria and Greece), fertility rates are declining or flat across every age bracket and have been so for decades.

The case for a longevity slowdown is no more convincing. Demographers who expect one argue that life expectancy cannot keep rising, since medical progress will eventually push everybody up against the "natural limit" to the human life span. This thesis, however, implies

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[1] See *Fiscal Implications of Ageing: Projections of Age-Related Spending,* Economics Department Working Papers no. 305 (OECD; 2001).

[2] *World Population Prospects: The 2000 Revision*, 2 volumes and CD-ROM (UN, Population Division; 2001).

[3] These calculations are based on historical trends projections for the G-7 countries prepared by Shripad Tuljapurkar of Morning View Research and published in Paul Hewitt and Sylvester Schieber, "Demographic Risk in Industrial Societies," *World Economics,* I:4 (October–December 2000). The adjustments for the other five countries in the *Index* are estimated based on the G-7 average.

a number of consequences that are not borne out by observation. If there is a limit to the human life span, mortality improvements for the oldest elderly age brackets should be slowing relative to those for younger elderly age brackets. At the same time, variations in life expectancy should be narrowing as more people bunch up against the limit. None of this appears to be happening. Over the last couple of decades, the data show little tendency for mortality improvements to slow at advanced ages. Nor are variations in life expectancy diminishing, whether one looks at the data by country, by region, by income, or by education. Everywhere, people are living much longer. Yet everywhere, some groups continue to live much longer than others.

What happens to immigration over the next few decades, of course, is anyone's guess. It is both more volatile than the other two demographic variables and more directly controlled by policy. In the past, immigration in many countries has risen and fallen sharply, sometimes over the span of just a few years. It may do so again. Without a crystal ball, however, the most prudent assumption is that current law and current practice will continue.

2. Economic Scenario

The projections assume a continuation of historical economic trends. In particular, age-specific rates of labor-force participation are assumed to remain constant at their 2000 levels in each country, unemployment rates are assumed to remain constant at their 1990s averages, and productivity and real wages are assumed to grow at roughly their average historical rates over the past twenty-five years.

The projections make two exceptions to the labor-force participation rule. The first allows for a "cohort effect." In three countries in the *Index* — Italy, the Netherlands, and Spain —

women in their twenties and thirties now work at significantly higher rates than women in their forties and fifties. In our projections, we assume that women aged 40–55 in these countries will eventually work at the same rate as women aged 20–39. The second exception allows for a response to pension reforms that have scaled back early retirement options and improved work incentives. We base this adjustment on OECD estimates that recent policy changes will lead to a 10 to 15 percent increase in participation rates among men aged 55–64 in Australia, Belgium, Germany, and the Netherlands — and to a somewhat larger rise in Italy.[4]

A word about productivity and wage growth is in order. CSIS follows the OECD in assuming that that long-term productivity growth rates will average between 1.6 and 1.8 percent per year, roughly the historical record in most countries over the past twenty-five years. This assumption may be optimistic given the potentially negative impact of population aging on both private and public savings. Slower growth would mean a somewhat higher old-age dependency burden, whether measured as a share of GDP or of nonelderly income. The productivity growth assumption, however, is not decisive, since initial pension benefits in most countries are indexed to wages, and so grow (with or without a lag) along with per-worker GDP.

3. Projection Base and Horizon

The base for the *Index* is 2000, the latest year for which most demographic and economic data were available. Data series not available for 2000 were trended to 2000 based on series that were available. The projections are run through the year 2040. As already explained, this horizon was chosen because the demographic transition in most countries will by then be largely complete. Even after 2040,

[4] *Fiscal Implications of Ageing,* op. cit.

rising longevity will continue to push the cost of retirement benefits steadily and indefinitely upward. But the era of swiftest growth, which in most countries accompanies the full retirement of a postwar baby boom, will occur sometime between the mid-2010s and the mid-2030s.

4. Household Income and Taxes

The model uses a two-step approach to calculate household income in the base year. We first derived totals for broad categories of income from economy-wide data on the household and government sectors. We then allocated the totals to the elderly and nonelderly based on household survey data. This approach allows us to take into account society's total economic resources. It also makes our measure of income consistent with our GDP-based projections of government benefits, taxes, and outlays.

a. Income by Type

The economy-wide data on household income are mainly derived from the OECD National Accounts and OECD Social Expenditure Database.[5] The model divides all income into four broad categories: "earnings," or income from labor; "asset income," or income from capital except for private pensions; private pensions; and "public benefits." Public benefits include all government transfers, both cash and in-kind, and are divided into three sub-components: public pensions, health care benefits, and other benefits.

Earnings are equal to total employee compensation, including the employer share of payroll taxes and employer contributions to private pension and welfare plans, plus self-employment income. Employee compensation comes directly from the national accounts; self-employment income was estimated based on national accounts employment data. Asset income includes all financial returns to households, except returns to funded private pension plans. It is equal to household property and entrepreneurial income in the national accounts, minus withdrawals from private quasi-corporate enterprises and an estimate of private pension benefits. This estimate is based on OECD and national sources (see below). A small category of miscellaneous private transfers is included in asset income.

The totals for public benefits come directly from the OECD Social Expenditure Database. Public pensions equal old-age cash benefits plus survivors benefits and include government employee pensions and special early retirement programs. Health care benefits are equal to OECD's "health" category, plus one-half of "services for elderly and disabled people." One-half is our rough estimate of the share of this benefit category that constitutes spending on nursing homes, home care, and other long-term custodial services. Other benefits include all other programs, from unemployment insurance and disability benefits to housing subsidies and food stamps.

b. Income by Age

The model divides the totals for each source of household income between two age groups: the elderly (aged 60 and over) and the nonelderly (aged 15–59). The threshold for "elderly" was set at age 60 rather than the conventional age 65 because it is much closer to the typical retirement age in most countries. The income of each age group refers to the income of all individuals within that age group, with the single exception of spouses of heads of household, who are always considered to be of the same age group as the head of household. Other than in the case of spouses, income to households containing both elderly and nonelderly adults is split between the two groups.

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[5]We rely primarily on the 1999 edition of the National Accounts, the most recent to include a complete set of household accounts. The data were updated to 2000 based on broad aggregates available in the 2002 National Accounts. All data on government benefits are from the 2001 edition of the Social Expenditure Database.

The division of income by age was based on data from the Luxembourg Income Study (LIS) for all countries except Japan, where we used data from the Ministry of Health, Labor, and Welfare's *2001 Comprehensive Survey of Living Conditions*. Income ratios for the elderly and nonelderly were calculated for total income and the following components: wages, self-employment income, private pensions, asset income, public pensions, and other public benefits. Health care benefits, which are not counted in household surveys, were allocated using data on per capita spending by age from OECD's Health Data 2001 database.

Asset income presented a special problem. The national accounts concept of asset income used in the *Index* is broader than the household survey concept. In addition to interest, dividends, and rents actually received by households, it encompasses all financial returns that indirectly accrue to households in instruments such as annuities and life insurance policies. The types of asset income counted in household surveys, moreover, are more heavily skewed toward the elderly. We therefore allocated capital income as follows. We estimated, in each country, the share of total capital income accounted for by household-survey-type asset income and allocated it according to the household survey age-group shares for asset income. We then allocated the balance according to each age group's share in total income.

We also used LIS data to calculate income by source for each quintile of the elderly income distribution. (The available Ministry of Health, Labor, and Welfare data did not allow this for Japan.) The LIS quintile data were then normalized to our model's income totals. Although we could not project this quintile distribution, it provides a valuable additional perspective.

c. After-tax Income

The model calculates the total tax burden borne by the elderly and the nonelderly in the base year using the same two-step methodology employed for household income. Aggregate data for total taxes by type are first derived from the national accounts. The totals are then allocated to the elderly and nonelderly based on household survey data.

All taxes are divided into three broad categories: payroll taxes, direct taxes, and indirect taxes. We were able to allocate direct taxes between the elderly and nonelderly based on income tax data from the LIS and Japan's *Comprehensive Survey of Living Conditions*. Payroll taxes and indirect taxes were allocated based on each age group's share of earnings and total income, respectively. Note that our model makes the standard economic assumption that all taxes are ultimately borne by households. We therefore gross up pretax household income by indirect taxes and corporate taxes.

5. Pension and Health Care Benefit Projections

Excluding the impact of growth in funded private pensions, the model assumes that the composition of national income by type of factor income ("asset income" from capital and "earnings income" from labor) remains unchanged in the future. As populations age, the distribution of each type between age groups will of course shift. The ratios between age groups of per capita earnings income and per capita asset income, however, remain unchanged, as do the per capita ratios of taxes by type of income.

Within this framework, public transfers and private pension benefits are projected as follows.

a. Public Pensions

The CSIS projections of public pension spending assume current law as of the year 2000. They are based on the latest official projections by the OECD, except for Japan, where they are based on national projections.[6] The OECD projections, which omit some programs in some countries, have been normalized to OECD Social Expenditure Database totals. More important, they have been adjusted to reflect the CSIS historical trends demographic and economic scenario described above in sections 1 and 2. On the demographic side, the OECD assumes rising fertility, slower growth in longevity, and, in some countries, significant shifts in net immigration. CSIS assumes a continuation of historical trends. On the economic side, the OECD assumes both falling unemployment and a greater rise in female labor participation than CSIS does. All adjustments to the OECD pension projections were made based on a sensitivity analysis published along with the projections.

b. Health Care Benefits

We base our health care projections on two critical assumptions. The first is that current per-beneficiary ratios of government health care benefit spending on the old to spending on the young will remain unchanged in the future. This represents a compromise between two competing models of aging and health: the "compression of morbidity" model, which assumes that rising longevity will be accompanied by a falling incidence of morbidity at older ages, and the "failure of success" model, which assumes the opposite.

The second assumption is that rates of growth in total per capita health care spending will initially follow their long-term historical trend in each country, but that they will gradually converge, by 2040, to the rate of growth in per

TABLE B: Health Care Benefit Assumptions

	Per Capita Spending Ratio: Old to Young*	Per Capita Spending Growth in Excess of Growth in Per Capita GDP**
Australia	4.1	0.9%
Belgium	3.2	1.5%
Canada	4.9	1.1%
France	3.0	1.5%
Germany	2.7	0.7%
Italy	3.2	1.4%
Japan	4.9	1.2%
Netherlands	3.9	0.5%
Spain	3.2	1.6%
Sweden	2.8	0.1%
UK	3.4	0.9%
US	7.8	2.0%

*Ratio of public health care spending on persons aged 65 and over to persons aged 0–64 in most recent year available.

**Growth rate in total per capita health care spending (1975–1998) minus the growth in per capita GDP.

capita GDP plus 1 percent. Per capita GDP plus 1 percent is roughly the average historical growth rate for all the developed countries over the past twenty-five years. For several countries (Belgium, France, Italy, Spain, and the United States) it represents a significant slowdown; for two countries (the Netherlands and Sweden) it represents a significant acceleration. Historical growth rates were calculated based on data from OECD's Health Data 2001 database (see Table B).

We decided against a simple projection of historical growth rates for two reasons. On the one hand, health care spending growth must eventually slow in high growth countries or else crowd all other consumption out of GDP. On the other hand, as affluence and expectations rise, governments in countries that have traditionally rationed health care are finding it harder — not easier — to control costs. The assumption of convergence at the average growth

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[6]The OECD public pension projections are published in *Fiscal Implications of Ageing,* op. cit. We do not utilize the OECD projection for Japan because it includes unlegislated "fiat" savings. Our projection is based instead on the *1999 Actuarial Valuation of the Employees' Pension Insurance and the National Pension* (Japanese Ministry of Health, Labor, and Welfare; 1999).

rate thus seems reasonable. Other assumptions, of course, are possible. We modeled an alternative scenario in which rates of per capita spending growth in all countries converge to GDP per capita by 2040, rather than to GDP plus 1 percent. Under this scenario, projected elder health care benefit spending in 2040 was roughly 1 to 2 percent of GDP lower in every country.

c. Private Pensions

The *Index* defines private pensions quite broadly. They include most types of formal private-sector retirement provision, whether they are occupational or personal, whether they result in a lump-sum severance payment or a lifetime annuity, *provided that the benefits are funded.* The definition of funding encompasses both external funding and book-reserve funding. However, we exclude all purely pay-as-you-go arrangements, such as France's ARRCO and AGIRC. If publicly mandated (which is effectively the case in France), these pay-as-you-go plans are included in public pension benefits.

Remarkably, there is no standard source for data on private pension provision in the developed countries. We base our estimates of base-year benefits on OECD data on private social welfare expenditures, adjusted to include large omissions in Japan and small omissions in France and Spain.[7] Our projections of future benefits build on the base-year numbers as follows:

(1) We make a "cohort adjustment" to reflect the fact that, even apart from policy changes, rates of participation in some countries are rising rapidly among younger workers. The adjustment affects two countries: Italy and Spain. (2) We make an "earnings maturation adjustment" to take into account the fact that, even assuming fixed participation rates, current per capita benefit levels do not reflect ultimate benefit levels because the average current retiree is receiving a benefit based on less than a full career. The adjustment affects all countries. (3) We make a "policy adjustment" to take into account important recent pension reforms in four countries: Australia (the "Super"), Germany (the "Riester" accounts), Sweden (2.5-percent-of-payroll personal accounts), and the UK (miscellaneous efforts to expand private pension coverage). (4) Finally, we make a "demographic adjustment" to reflect the changing age composition of the population. This adjustment affects all countries.

The model assumes that increases in pension savings will be partially offset by declines in other forms of household savings. The offset is assumed to be one-third. The other two-thirds of new pension savings will result in new national savings and new GDP. Since we do not use a general equilibrium model, however, we assume no further impact on national accounts or factor prices. One way to think about it is to imagine that all of the extra national savings will flow abroad, mainly to the developing countries, where it will generate income from foreign assets. A number of economists have hypothesized that a large capital flow from the developed to the developing countries would be an expected consequence of global aging.

6. Fiscal Scenario

As already explained, the model assumes that each country pursues a long-term policy of "debt neutrality." In the first year of the projection, each country is assumed to move to a general government deficit which, when continued unchanged as a share of GDP in all future years, will keep net government debt unchanged as a share of GDP at its 2001 level. Table C shows the budget balance that achieves this result. The calculations assume an inflation rate of 2 percent and a long-term real interest rate

[7]Willem Adema, *Net Social Welfare Expenditure,* 2nd edition, in Labor Market and Social Policy Occasional Papers no. 52 (OECD; 2001).

equal, in each country, to real GDP growth plus 1 percent.

Once debt neutrality is achieved, the model assumes that nonbenefit spending will remain constant as a share of GDP and that taxes will be raised (or lowered) in each future year in accordance with the projected change in bene-fit spending. In every country in almost every year, of course, this means that taxes must be raised. This "rising tax" assumption is only relaxed for two of the fiscal-room indicators, where the object is to assess alternative means of paying for the growth in benefit costs.

In apportioning the future tax changes between payroll taxes, direct taxes, and indirect taxes, the model follows a few simple rules. We first assume that payroll taxes will be raised such that they pay for the same proportion of total public transfers in the future that they do today. Additional taxes are then divided between direct and indirect taxes in proportion to their shares in total taxation today. We considered pro-jecting each country's specific tax rules, but deferred any attempt to a subsequent edition of the *Index*. The reason is that the task would be very complex. Consider that just one ben-efit program in the United States, Medicare, is financed by a combination of payroll taxes, user premiums, and general revenues — all of which are projected to grow at different rates over time.

7. Indicator Definitions
Benefit Level: Total public benefits to the elderly in 2040 as a percent of GDP.

Benefit Growth: The change from 2000 to 2040 in public benefits to the elderly as a percent of GDP.

Net Transfer: Public benefits to the elderly in 2040 as a percent of the income of the nonelderly. Both benefits and income are measured after taxes. Benefits to the elderly

TABLE C: Long-term Budget Balance under Debt Neutrality*

	Long-term Budget Balance (Percent of GDP)	Net Government Debt in 2001 (Percent of GDP)	Real GDP Growth Rate: 2000–50
Australia	-0.4%	10.8%	2.0%
Belgium	-3.3%	98.9%	1.3%
Canada	-1.9%	53.0%	1.6%
France	-1.4%	42.1%	1.3%
Germany	-1.3%	43.5%	0.9%
Italy	-2.5%	96.5%	0.6%
Japan	-1.5%	58.5%	0.6%
Netherlands	-1.4%	42.1%	1.3%
Spain	-1.0%	38.2%	0.7%
Sweden	0.0%	1.0%	1.1%
UK	-1.1%	30.9%	1.5%
US	-1.8%	41.9%	2.3%

*Assumes productivity growth rate of 1.75 percent, inflation rate of 2 percent, and real interest rate equal to GDP growth plus 1 percent.

are measured "net" — that is, they are reduced by an estimate of the share of benefits paid for by taxes on the elderly themselves. The income of the nonelderly is measured after all rest-of-government taxes — that is, after taking into account all taxes on the nonelderly except those required to pay for net benefits to the elderly. The indicator assumes that public old-age benefits are first paid for by payroll taxes, then, to the extent that payroll taxes are insufficient, that they are paid for by direct and indirect taxes in proportion to their shares in total taxation.

Tax Room: Total taxes in 2040 at all levels of government as a percent of GDP.

Budget Room: Total benefits to the elderly as a percent of total government outlays in 2040, assuming the special "budget room" scenario. Under this scenario, the rising cost of old-age benefits is paid for by cannibaliz-ing other spending. Except for the initial debt-neutrality adjustment, this indicator assumes no change in taxes.

Debt Room: Year that the net government debt reaches 150 percent of GDP, assuming the special "debt room" scenario. Under this scenario, the rising cost of old-age benefits is paid for by government borrowing. Except for the initial debt-neutrality adjustment, this indicator assumes no change in taxes. The calculations assume an inflation rate of 2 percent and a long-term real interest rate equal, in each country, to real GDP growth plus 1 percent.

Benefit Share: Public benefits to the elderly as a share of the after-tax income of the elderly in 2040. Benefits here exclude government health care benefits. Calculating this indicator required additional assumptions about tax incidence. We assume that payroll taxes are borne by labor income and that direct and indirect taxes are borne proportionally by all other types of income. Clearly, reality is more complicated. In many countries, income taxes fall more heavily on labor than on capital. Pensions and other cash benefits are sometimes tax-favored or even entirely tax-exempt. In future editions of the *Index*, we may try to model some of this institutional complexity.

Family Ties: Percent of the elderly living with their adult children aged 18 or older, whether in the household of the elderly person or the household of the child. As throughout the *Index*, nonelderly spouses of the elderly are counted as elderly. The data on living arrangements were derived from LIS, except for Japan, where they are from the Ministry of Health, Labor, and Welfare, and Sweden, where they are from the OECD. Data refer to the most recent year available, generally in the mid-1990s.

Poverty Impact: Percent of the elderly pushed into poverty by a 10 percent cut in public benefits. Poverty is defined as 50 percent of the median for all households in each country, the standard international definition. Unlike the other indicators, elderly income here includes the income of nonelderly household

members. It excludes, however, government health care benefits. For all countries except Japan, the indicator was calculated using LIS data. For Japan, it was calculated using data from the Ministry of Health, Labor, and Welfare. Data refer to the most recent year available, generally in the mid-1990s.

Affluence Level: Per capita ratio of the after-tax income of the elderly to the after-tax income of the nonelderly in 2040. Income includes the per capita cash value of government health care benefits.

Affluence Growth: Percentage change in the affluence-level indicator between 2000 and 2040.

8. Category and Overall Rankings

As already explained, the *Index* is constructed as follows. For each of the indicators, we generate an indicator ranking, from one (best) to twelve (worst). We also transform the indicator results into an index and generate an index score for each country. For each indicator, the mean result is set to an index value of 50; results that lie above and below the mean by one standard deviation are set, respectively, to index values of 100 and zero. The index scores thus preserve the indicator rankings while also reflecting the relative distance of each ranked country, positively or negatively, from the "center of the pack."

For each of the four categories, a category score is then calculated as an average of the indicator index scores. The category score determines the overall category rankings. Finally, the category scores themselves are averaged as follows: A weight of one-third is given to the first public-burden category, one-third to the second fiscal-room category, and one-third to the third and fourth "policy-climate" categories combined. A country's final combined average for the four categories determines its ranking in the overall *Index*.

DATA APPENDIX

	2000	2010	2020	2030	2040
Australia	0.26	0.32	0.41	0.50	0.56
Belgium	0.37	0.41	0.51	0.64	0.71
Canada	0.26	0.33	0.46	0.58	0.63
France	0.34	0.40	0.50	0.61	0.69
Germany	0.38	0.42	0.51	0.69	0.72
Italy	0.40	0.47	0.57	0.79	1.03
Japan	0.39	0.55	0.66	0.78	1.00
Netherlands	0.29	0.36	0.47	0.64	0.69
Spain	0.35	0.40	0.49	0.69	0.99
Sweden	0.38	0.46	0.55	0.67	0.74
UK	0.34	0.39	0.47	0.61	0.65
US	0.26	0.30	0.39	0.46	0.47

*Ratio of elderly adults aged 60 and over to
working-age adults aged 15–59.

TABLE 2: Public Benefits to the Elderly (Aged 60 and Over), as a Percent of GDP

	2000	2010	2020	2030	2040
Australia					
Total Benefits	9.0%	10.2%	12.7%	14.9%	16.6%
Public Pensions	4.2%	4.3%	5.2%	5.8%	6.1%
Health Benefits	2.7%	3.4%	4.6%	5.9%	7.0%
Other Benefits	2.2%	2.5%	2.9%	3.2%	3.4%
Belgium					
Total Benefits	12.7%	13.9%	17.3%	21.9%	24.5%
Public Pensions	8.8%	9.1%	11.0%	13.7%	15.0%
Health Benefits	3.0%	3.7%	5.0%	6.6%	7.8%
Other Benefits	1.0%	1.1%	1.3%	1.6%	1.7%
Canada					
Total Benefits	8.9%	11.2%	15.5%	20.2%	22.9%
Public Pensions	4.9%	6.0%	8.0%	10.5%	11.7%
Health Benefits	3.3%	4.4%	6.4%	8.3%	9.8%
Other Benefits	0.7%	0.8%	1.1%	1.3%	1.4%
France					
Total Benefits	15.8%	18.4%	22.9%	26.9%	29.3%
Public Pensions	11.3%	12.8%	15.5%	17.5%	18.2%
Health Benefits	3.3%	4.3%	5.9%	7.6%	9.2%
Other Benefits	1.1%	1.3%	1.5%	1.8%	2.0%
Germany					
Total Benefits	15.1%	15.4%	18.1%	23.2%	25.5%
Public Pensions	10.3%	9.9%	11.2%	14.2%	15.4%
Health Benefits	3.8%	4.4%	5.5%	7.3%	8.4%
Other Benefits	1.0%	1.1%	1.3%	1.7%	1.8%
Italy					
Total Benefits	17.3%	19.4%	22.8%	28.0%	32.0%
Public Pensions	12.1%	13.1%	15.2%	18.2%	20.0%
Health Benefits	3.0%	3.9%	5.1%	7.0%	9.0%
Other Benefits	2.2%	2.4%	2.5%	2.8%	3.0%

	2000	2010	2020	2030	2040
Japan					
Total Benefits	11.8%	16.4%	19.6%	22.1%	27.0%
Public Pensions	6.9%	9.7%	11.3%	12.1%	14.5%
Health Benefits	3.8%	5.4%	6.9%	8.6%	10.9%
Other Benefits	1.1%	1.3%	1.4%	1.5%	1.6%
Netherlands					
Total Benefits	11.7%	14.1%	18.1%	22.8%	25.6%
Public Pensions	6.5%	7.7%	9.9%	12.3%	13.8%
Health Benefits	3.0%	3.9%	5.1%	6.7%	7.8%
Other Benefits	2.2%	2.6%	3.1%	3.8%	4.0%
Spain					
Total Benefits	12.6%	13.8%	17.0%	23.9%	33.1%
Public Pensions	7.7%	7.9%	9.7%	14.1%	20.3%
Health Benefits	2.7%	3.5%	4.7%	6.7%	9.3%
Other Benefits	2.2%	2.3%	2.6%	3.1%	3.6%
Sweden					
Total Benefits	13.3%	15.2%	17.8%	20.9%	23.0%
Public Pensions	7.3%	8.0%	9.3%	10.6%	11.3%
Health Benefits	3.9%	4.7%	5.6%	6.8%	8.0%
Other Benefits	2.1%	2.5%	2.9%	3.4%	3.6%
UK					
Total Benefits	12.1%	12.7%	13.9%	16.6%	17.6%
Public Pensions	6.5%	6.2%	6.1%	6.6%	6.5%
Health Benefits	2.8%	3.4%	4.3%	5.7%	6.6%
Other Benefits	2.9%	3.2%	3.6%	4.4%	4.6%
US					
Total Benefits	9.4%	11.0%	15.2%	18.8%	20.3%
Public Pensions	5.2%	5.5%	7.4%	8.8%	9.1%
Health Benefits	3.7%	4.9%	7.1%	9.2%	10.5%
Other Benefits	0.5%	0.5%	0.7%	0.8%	0.8%

All Countries*	2000	2010	2020	2030	2040
Total Benefits	12.5%	14.3%	17.6%	21.7%	24.8%
Public Pensions	7.6%	8.4%	10.0%	12.0%	13.5%
Health Benefits	3.3%	4.2%	5.5%	7.2%	8.7%
Other Benefits	1.6%	1.8%	2.1%	2.4%	2.6%

*Figures are unweighted averages.

TABLE 3: Net Public Benefits to the Elderly, as a Percent of After-tax Nonelderly Income*

	2000	2010	2020	2030	2040
Australia	12.4%	13.9%	17.2%	19.9%	22.1%
Belgium	17.2%	18.1%	22.5%	28.2%	31.5%
Canada	12.9%	15.4%	20.8%	26.5%	29.8%
France	20.3%	23.4%	28.9%	33.4%	36.1%
Germany	20.8%	21.4%	25.1%	32.2%	35.4%
Italy	21.6%	23.8%	27.6%	33.2%	37.2%
Japan	15.4%	22.3%	26.5%	29.8%	35.9%
Netherlands	16.5%	19.6%	25.0%	31.5%	35.3%
Spain	17.2%	18.5%	22.7%	31.4%	42.7%
Sweden	17.7%	19.2%	22.0%	25.1%	27.3%
UK	14.0%	14.4%	15.7%	18.3%	19.3%
US	12.8%	14.7%	20.2%	24.8%	26.8%

*Public benefits to the elderly (aged 60 and over), net of taxes, as a percent of the income of the nonelderly (aged 15–59), measured after taxes for the rest of government but before taxes for benefits to the elderly.

TABLE 4: Total Taxes as a Percent of GDP, Assuming Tax Hikes Pay for All Growth in Public Benefits

	2000	2010	2020	2030	2040
Australia	32.5%	33.3%	35.5%	37.4%	39.2%
Belgium	49.5%	49.1%	52.5%	57.0%	59.8%
Canada	38.4%	38.6%	42.7%	47.3%	50.2%
France	48.3%	51.2%	55.7%	59.7%	62.2%
Germany	44.4%	45.4%	47.9%	52.6%	55.2%
Italy	44.0%	45.4%	48.6%	53.1%	56.5%
Japan	28.9%	36.0%	39.3%	41.8%	46.5%
Netherlands	46.9%	48.1%	51.5%	55.5%	58.4%
Spain	38.2%	38.9%	42.1%	48.7%	57.2%
Sweden	57.4%	56.3%	58.4%	61.0%	63.0%
UK	38.4%	37.8%	38.7%	40.7%	41.7%
US	33.2%	33.9%	38.3%	42.1%	44.1%

TABLE 5: Public Benefits to the Elderly (Aged 60 and Over) as a Percent of Total Government Outlays, Assuming Cuts in Other Spending Pay for All Growth in Public Benefits

	2000	2010	2020	2030	2040
Australia	27.2%	29.8%	34.8%	38.7%	41.2%
Belgium	27.5%	28.2%	33.7%	41.1%	44.6%
Canada	23.4%	27.1%	35.6%	44.4%	48.6%
France	32.5%	37.0%	44.3%	50.1%	52.9%
Germany	32.9%	33.3%	37.4%	46.2%	49.0%
Italy	37.9%	41.0%	46.1%	54.5%	60.3%
Japan	31.9%	46.5%	52.6%	56.3%	65.8%
Netherlands	28.0%	32.4%	39.5%	47.8%	51.7%
Spain	32.7%	34.4%	40.3%	54.1%	72.1%
Sweden	25.3%	27.2%	30.6%	34.7%	37.2%
UK	31.6%	31.5%	32.8%	37.4%	38.1%
US	30.9%	33.7%	43.8%	51.1%	52.9%

TABLE 6: After-tax Income of the Elderly (Aged 60 and Over) by Source,
as a Percent of Total After-tax Elderly Income*

	2000	2010	2020	2030	2040		2000	2010	2020	2030	2040
Australia						**Japan**					
Earnings	23.3%	23.7%	23.5%	23.3%	22.9%	Earnings	40.5%	37.2%	35.6%	35.0%	32.4%
Private Pensions	13.2%	17.7%	23.1%	28.4%	33.1%	Private Pensions	12.5%	14.7%	16.3%	18.3%	21.1%
Asset Income	20.2%	18.8%	16.0%	13.5%	11.3%	Asset Income	12.0%	10.8%	10.0%	9.4%	8.1%
Public Benefits	43.4%	39.9%	37.4%	34.8%	32.7%	Public Benefits	34.9%	37.3%	38.2%	37.3%	38.4%
Belgium						**Netherlands**					
Earnings	10.9%	11.4%	11.1%	10.3%	9.9%	Earnings	7.4%	7.4%	7.0%	6.6%	6.1%
Private Pensions	8.5%	9.2%	10.1%	10.9%	11.5%	Private Pensions	18.7%	20.1%	21.6%	23.9%	24.4%
Asset Income	25.9%	26.1%	24.9%	23.2%	22.5%	Asset Income	19.9%	18.9%	17.1%	15.3%	14.3%
Public Benefits	54.7%	53.3%	53.9%	55.6%	56.2%	Public Benefits	54.0%	53.7%	54.4%	54.2%	55.2%
Canada						**Spain**					
Earnings	17.6%	17.7%	17.6%	17.0%	16.4%	Earnings	9.5%	9.9%	9.4%	8.0%	6.3%
Private Pensions	19.0%	20.7%	23.6%	25.5%	26.6%	Private Pensions	1.2%	2.5%	4.1%	5.8%	8.0%
Asset Income	21.3%	19.3%	15.8%	12.7%	11.4%	Asset Income	25.2%	25.5%	24.2%	21.5%	18.7%
Public Benefits	42.2%	42.4%	42.9%	44.8%	45.5%	Public Benefits	64.0%	62.1%	62.3%	64.7%	66.9%
France						**Sweden**					
Earnings	8.0%	7.7%	7.2%	6.7%	6.5%	Earnings	19.7%	20.6%	20.2%	19.9%	19.4%
Private Pensions	0.5%	0.6%	0.7%	0.8%	0.8%	Private Pensions	11.0%	12.5%	14.1%	16.1%	17.6%
Asset Income	24.1%	23.8%	23.0%	22.8%	23.1%	Asset Income	12.8%	11.9%	10.6%	9.2%	8.3%
Public Benefits	67.3%	67.9%	69.2%	69.7%	69.5%	Public Benefits	56.5%	55.0%	55.1%	54.8%	54.6%
Germany						**UK**					
Earnings	13.5%	14.1%	13.8%	12.9%	11.9%	Earnings	16.3%	17.2%	18.1%	18.9%	19.0%
Private Pensions	4.6%	6.1%	7.8%	9.9%	11.1%	Private Pensions	14.0%	16.5%	19.8%	24.1%	26.4%
Asset Income	20.5%	21.3%	20.8%	19.6%	18.6%	Asset Income	19.4%	19.2%	18.4%	16.1%	15.2%
Public Benefits	61.4%	58.6%	57.7%	57.6%	58.4%	Public Benefits	50.3%	47.0%	43.7%	40.9%	39.3%
Italy						**US**					
Earnings	12.2%	12.5%	12.2%	12.3%	12.4%	Earnings	25.5%	25.9%	24.8%	23.8%	23.1%
Private Pensions	4.1%	4.9%	5.7%	7.4%	9.3%	Private Pensions	16.7%	18.2%	20.5%	22.3%	23.0%
Asset Income	24.9%	24.9%	24.1%	23.3%	22.7%	Asset Income	22.9%	22.2%	19.7%	18.0%	17.6%
Public Benefits	58.8%	57.8%	58.0%	57.0%	55.6%	Public Benefits	34.9%	33.9%	35.3%	36.1%	36.6%

*Income excludes government health care benefits.

TABLE 7: Public Benefits to the Elderly (Aged 60 and Over), as a Percent of After-tax Elderly Income: With and Without Health Care Benefits

	2000	2010	2020	2030	2040
Australia					
Without	43.4%	39.9%	37.4%	34.8%	32.7%
With	52.8%	50.8%	49.4%	48.1%	47.2%
Belgium					
Without	54.7%	53.3%	53.9%	55.6%	56.2%
With	62.0%	61.9%	63.4%	65.3%	66.6%
Canada					
Without	42.2%	42.4%	42.9%	44.8%	45.5%
With	55.4%	56.6%	58.1%	60.4%	62.0%
France					
Without	67.3%	67.9%	69.2%	69.7%	69.5%
With	72.9%	74.2%	76.0%	77.2%	78.0%
Germany					
Without	61.4%	58.6%	57.7%	57.6%	58.4%
With	68.3%	66.9%	66.7%	67.1%	68.3%
Italy					
Without	58.8%	57.8%	58.0%	57.0%	55.6%
With	63.8%	63.8%	64.8%	65.1%	65.0%

	2000	2010	2020	2030	2040
Japan					
Without	34.9%	37.3%	38.2%	37.3%	38.4%
With	44.7%	47.7%	49.6%	50.3%	52.3%
Netherlands					
Without	54.0%	53.7%	54.4%	54.2%	55.2%
With	62.0%	62.2%	63.2%	63.5%	64.8%
Spain					
Without	64.0%	62.1%	62.3%	64.7%	66.9%
With	70.1%	69.6%	70.6%	72.9%	74.9%
Sweden					
Without	56.5%	55.0%	55.1%	54.8%	54.6%
With	66.9%	66.1%	66.5%	66.8%	67.6%
UK					
Without	50.3%	47.0%	43.7%	40.9%	39.3%
With	57.3%	55.4%	53.6%	52.2%	51.9%
US					
Without	34.9%	33.9%	35.3%	36.1%	36.6%
With	48.2%	49.6%	52.4%	54.7%	56.6%

TABLE 8: After-tax Income of the Elderly (Aged 60 and Over) by Source and Quintile in 2000, as a Percent of Total After-tax Elderly Income*

	1st	2nd	3rd	4th	5th		1st	2nd	3rd	4th	5th
Australia						**Japan**					
Earnings	0.1%	1.8%	2.3%	15.3%	43.6%	Earnings	NA	NA	NA	NA	NA
Private Pensions	1.3%	4.6%	6.2%	20.5%	15.4%	Private Pensions	NA	NA	NA	NA	NA
Asset Income	10.4%	11.7%	9.9%	21.1%	26.6%	Asset Income	NA	NA	NA	NA	NA
Public Benefits	88.1%	81.9%	81.6%	43.1%	14.3%	Public Benefits	NA	NA	NA	NA	NA
Belgium						**Netherlands**					
Earnings	0.5%	0.7%	1.5%	5.5%	19.5%	Earnings	0.6%	0.5%	1.5%	6.2%	14.1%
Private Pensions	0.0%	0.7%	5.1%	11.7%	10.5%	Private Pensions	2.9%	6.4%	12.8%	22.6%	26.3%
Asset Income	13.8%	11.2%	18.4%	21.8%	34.6%	Asset Income	3.0%	6.6%	11.5%	17.3%	33.0%
Public Benefits	85.7%	87.4%	75.0%	61.0%	35.4%	Public Benefits	93.4%	86.5%	74.2%	53.8%	26.7%
Canada						**Spain**					
Earnings	0.4%	2.6%	6.6%	12.8%	30.6%	Earnings	0.8%	1.7%	3.7%	9.5%	16.1%
Private Pensions	2.0%	9.6%	16.0%	25.6%	21.6%	Private Pensions	0.3%	0.5%	0.8%	1.4%	1.7%
Asset Income	7.6%	11.9%	15.5%	19.7%	28.9%	Asset Income	11.5%	15.1%	18.8%	25.9%	33.1%
Public Benefits	90.0%	75.9%	62.0%	41.9%	18.8%	Public Benefits	87.4%	82.7%	76.7%	63.1%	49.2%
France						**Sweden**					
Earnings	1.2%	1.8%	3.4%	7.2%	12.5%	Earnings	1.5%	1.8%	9.8%	13.3%	36.4%
Private Pensions	0.1%	0.3%	0.4%	0.7%	0.6%	Private Pensions	3.4%	6.2%	8.8%	11.4%	14.7%
Asset Income	13.6%	16.9%	18.0%	20.9%	32.0%	Asset Income	11.7%	9.0%	11.1%	11.9%	15.2%
Public Benefits	85.0%	81.0%	78.2%	71.2%	54.8%	Public Benefits	83.4%	82.9%	70.2%	63.5%	33.6%
Germany						**UK**					
Earnings	1.1%	2.2%	3.0%	7.1%	26.4%	Earnings	0.3%	1.3%	3.1%	12.7%	31.0%
Private Pensions	3.9%	2.6%	2.5%	3.7%	6.7%	Private Pensions	3.0%	7.0%	11.3%	18.6%	17.1%
Asset Income	3.7%	5.5%	10.2%	21.4%	30.1%	Asset Income	5.2%	6.9%	10.8%	18.0%	30.3%
Public Benefits	91.4%	89.7%	84.3%	67.8%	36.9%	Public Benefits	91.5%	84.8%	74.8%	50.7%	21.6%
Italy						**US**					
Earnings	0.5%	1.6%	4.3%	10.7%	18.9%	Earnings	2.4%	5.7%	10.6%	22.2%	36.0%
Private Pensions	0.6%	2.2%	3.1%	2.8%	5.8%	Private Pensions	6.2%	12.6%	20.9%	22.4%	14.6%
Asset Income	8.1%	8.5%	10.0%	18.9%	38.4%	Asset Income	6.1%	11.2%	14.3%	17.9%	30.9%
Public Benefits	90.7%	87.7%	82.7%	67.5%	36.8%	Public Benefits	85.3%	70.5%	54.2%	37.5%	18.5%

*Income excludes government health care benefits.

TABLE 9: Private Pension Benefits, as a Percent of GDP*					
	2000	**2010**	**2020**	**2030**	**2040**
Australia	2.5%	3.8%	6.0%	8.6%	11.1%
Belgium	1.7%	1.9%	2.5%	3.2%	3.6%
Canada	3.2%	4.0%	5.8%	7.6%	8.5%
France	0.1%	0.1%	0.2%	0.2%	0.3%
Germany	0.9%	1.2%	1.8%	2.9%	3.4%
Italy	1.3%	1.7%	2.1%	3.2%	4.3%
Japan	3.1%	4.6%	5.7%	7.0%	9.2%
Netherlands	3.3%	4.1%	5.4%	7.4%	8.2%
Spain	0.2%	0.5%	0.9%	1.7%	3.1%
Sweden	2.2%	2.7%	3.5%	4.5%	5.3%
UK	3.6%	4.3%	5.6%	7.8%	8.9%
US	3.6%	4.2%	5.8%	7.0%	7.4%

*Includes all employer pensions, personal pensions, and severance pay schemes.

TABLE 10: Per Capita Ratio of the After-tax Income of the Elderly to the Nonelderly*					
	2000	**2010**	**2020**	**2030**	**2040**
Australia	1.30	1.29	1.33	1.38	1.45
Belgium	1.07	1.04	1.07	1.13	1.19
Canada	1.32	1.33	1.36	1.45	1.54
France	1.29	1.31	1.35	1.36	1.36
Germany	1.25	1.22	1.25	1.33	1.44
Italy	1.32	1.26	1.25	1.19	1.15
Japan	1.07	1.15	1.21	1.24	1.34
Netherlands	1.32	1.31	1.36	1.41	1.51
Spain	0.98	0.95	0.97	1.05	1.18
Sweden	1.01	0.99	1.00	1.01	1.04
UK	1.20	1.15	1.11	1.09	1.10
US	1.43	1.46	1.56	1.67	1.77

*Elderly are aged 60 and over; nonelderly are aged 15–59; income includes the cash value of government health care benefits.

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