3

The Distributional Challenge

We can never insure one hundred percent of the population against one hundred percent of the hazards and vicissitudes of life, but we have tried to frame a law which will give some measure of protection to the average citizen and to his family against the loss of a job and against poverty-ridden old age.

—Franklin Delano Roosevelt, Presidential Statement
Signing the Social Security Act, August 14, 1935

Public pension income is such an integral part of the livelihood of so many people in developed economies today that any discussion of the subject—whether focusing on benefit levels, duration, access, or longer-term sustainability—invariably ends with the classic political question: "Who gets what, when, and how much?"[1] However, as we saw in the previous chapter, pension expenditures in several OECD countries may, if left unreformed, soon reach levels that will cause severe problems for overall government finances. Many retirees risk losing the pensions and income levels they thought they had been promised, while others—the younger members of society—risk exorbitant taxation levels to pay for those promises. The questions then become "How do we determine a fair outcome for retirees and other groups?" and "How do we judge pension systems on their ability to distribute wealth across generations and among different social and economic groups within any given generation?" In this chapter we try to answer these questions by presenting data

1. Adapted from Lasswell (1990).

on the crucial challenges to the distribution of resources as pension systems are under increasing demographic pressure.

We look at distributional challenges in six sections. First, we explain the historical roots of the two principal approaches to pension provision—insurance and universal means testing—and show that the OECD insurance-based systems are generally far more generous than universal systems. The US Social Security program falls in the middle among OECD members in terms of the progressivity of its pension benefit payments, although it is substantially less progressive than other English-speaking countries.

Second, we analyze the extent of poverty among the elderly (those age 65 and older) and show that it is substantially greater than for the working age population and that all but the top income quintile of elderly in the United States and most other OECD countries receive most of their income from public pensions. Both issues suggest limited possibilities for significant across-the-board pension benefit cuts in the United States and many other OECD countries to salvage fiscal sustainability; any such cuts will instead have to be targeted to selected groups to avoid large increases in old age poverty.

Third, we discuss intergenerational transfers, particularly the fact that current retiring generations can look forward to considerably longer "leisure shares" of their life in retirement than could previous generations. We then present an approach to link retirement ages with rising life expectancies to achieve pension reforms that more fairly reflect the fraction of life spent at paid work.

Fourth, we consider whether the use of national average retirement ages in the face of widely diverging life expectancies among subgroups of developed countries' populations is a policy issue. Some countries still have provisions allowing women to retire earlier than men; we argue that these should be phased out as women live longer than men, on average. More generally, the case for specifying different retirement ages for different social groups raises many impenetrable issues—particularly surrounding estimations of the causes of longer life expectancies for certain groups—and the practice should be avoided.

Fifth, we look at the distributional issues of pension systems for public-sector workers. In all OECD countries, these employees have more generous pension systems than the general population, although they also face more adverse demographics. In the final section of the chapter we focus on the characteristics, financial outlook, and accounting rules concerning US state and local government employees' pension systems, and emphasize the prospects for a pension crisis among some state and local governments in the coming years.

We conclude that a financial solution similar to that implemented for private-sector employee pensions in recent years—which have seen substantial cutbacks in future benefit levels—is likely.

The Two Philosophies of Pension Provision: Universality versus Insurance

Pension systems tend to be long-lived beasts, politically nearly impossible to reform in the absence of definitive political events (such as in Eastern Europe after the collapse of the Berlin Wall in 1989). Once national pension systems have come into being, they usually develop incrementally and expand in cost and coverage. Given this degree of permanency, it makes sense, when considering what particular distributional challenges pension systems face at the outset, to briefly define the two historical ideal type pension systems.

Whether a public pension program is termed "social security" or "social insurance" may seem innocuous, but the distinction frequently reveals an important difference in the pension system's goals. Most countries' current pension systems are hybrids that evolved from two main historical models: the British universal means-tested model and the German contributory insurance model.[2]

- **The British Universal Means-Tested Model.** This model originated with the Old Age Pension Act of 1908, which granted a universal old age flat rate pension for certain persons over the age of 70 of initially five shillings a week for singles and seven shillings and sixpence for a married couple.[3] This flat rate pension was paid out of the general funds of the UK Treasury and required no prior contributions from workers or employers. But the pension was means-tested, and only relatively poor people with an annual income of less than 31pounds 10shillings were eligible (Brabrook 1908). Recipients had to have been a British citizen for at least ten years and have resided in the United Kingdom for no fewer than 12 years since attaining the age of 50 (if a national-born citizen) and no fewer than 20 years since attaining the age of 50 (if a naturalized citizen; thus naturalized citizens had to have resided permanently in the United Kingdom for the 20 years prior to be eligible for a pension at age 70). Applicants lost their pension eligibility if they had been detained in an insane asylum or imprisoned, or

2. We note that both Denmark (from 1891) and New Zealand (from 1898) had universal means-tested programs that predated the British program from 1908. However, both the Danish and New Zealand programs were more akin to "general (noncontributory) poverty alleviation programs" available to all, with a few special additional provisions for the elderly. As such, in our opinion they do not constitute independent old age only, universalist means-tested programs.

3. Notionally, the Old Age Pension Act of 1908 instituted a pension benefit that was graded by income. However, as described by Halsey (1934), the reality was that 99 percent of eligible retirees received the maximum benefit of five shillings for singles and seven shillings and sixpence for married couples.

if they had failed to work to their "full potential." This latter requirement penalized any persons who had been unemployed during their working age lives.[4] The explicit aim of this type of pension is to provide a minimum old age income security or, in the words of its principal author, British Chancellor of the Exchequer David Lloyd George, "to banish the poorhouse from the horizon of every [aging] workman in the country"(Grigg 1978). It is highly income redistributive, as it does not require direct personal participation in pension provision and is not available to the highest income earners.

- **The German Contributory Insurance Model.** This model originated in 1891 with Bismarck's welfare reforms,[5] which introduced a pension system for most German wage earners over the age of 70.[6] The system's finances were based predominantly on the (initially equal) contributions of workers and employers, with the German government at the start contributing a flat rate supplement of 50 marks per year per retiree.[7] Contributors were separated into four income categories, so that higher-wage workers contributed more and could look forward to a higher pension.[8] The aim of this model is, like the British model, to achieve income security in old age, but also to ensure that in the insurance quid pro quo, benefits paid out are directly related to contributions paid in; thus the model evens out living standards over periods of unemployment or lower wage earnings. This quid pro quo model is less income redistributive, as it requires individual participation in personal old age retirement provision and pension benefit levels are linked to levels of contributions.

A country's choice of pension model—whether to emphasize insurance or universality—has direct implications for the degree of redistribution built into a pension system. A universal pure flat rate pension system would be entirely redistributive, whereas a pure insurance-based system

4. See Gazeley (2003). It is evident that in the absence of the contributory financing requirement, the British government made substantial legal efforts to restrict eligibility to only those people who could reasonably be expected to have had *productive* lives. Given the lack of direct contributory financing, this is an obvious consequence of the otherwise large immediate demand on general government tax-based resources that such a retirement pension program entails.

5. In addition to pensions, contributory invalidity insurance was also introduced in 1891 (Sakmann 1934).

6. Bismarck's program excluded high-wage earners above a certain threshold and certain high-skilled professions (such as doctors and lawyers).

7. According to Sakmann (1934), this meant that, on average, the German government paid roughly one-third of costs on pensions.

8. See Brabrook (1908) and Hogarth (1896) for details of the Bismarckian old age pensions.

would imply no income redistribution at all among similarly aged participants (pure insurance-based pensions do not rule out large income redistribution between age cohorts and other subgroups).

To facilitate cross-country comparison of the degree of redistribution inherent in the pension benefit formulae, the OECD has estimated a 0–100 "index of progressivity,"[9] where 100 equals pure flat rate pensions and zero pure insurance-based provision.[10] In figure 3.1, this index is combined with the estimated average targeted gross pension level for men,[11] expressed as a percentage of average economywide earnings,[12] to give a combined expression of both the generosity of mandatory pension levels and their degree of redistribution. Figure 3.1 does not include voluntary (mostly occupational) pension systems, similar to those found in the United States, but does include the programs of three OECD countries—Denmark, the Netherlands, and Sweden—with nominally voluntary but de facto mandatory private-sector pension systems with a coverage rate of more than 90 percent.

Figure 3.1 shows a clear relation between the average level of generosity of mandatory pension levels and the degree of redistribution: In general, the higher the degree of redistribution, the lower the generosity of mandatory pension levels.[13] It is noteworthy that, in terms of the relative level of redistribution in pension benefits paid out (scoring about 50 on the y-axis), the mandatory US Social Security insurance system (including Supplemental Security Income [SSI]) is significantly less redistributive than similar systems in other English-speaking countries (clustered in the upper-left corner of figure 3.1) and only slightly more progressive than the OECD average. This suggests some room for additional redistribution in the US Social Security system.

The income distribution–weighted average replacement level of US Social Security pensions, compared with other nations' mandatory pension programs, is clearly at the less generous end of the spectrum (left side

9. The index is formally calculated as 100 minus the ratio of the Gini coefficient of pension entitlements divided by the Gini coefficient of earnings (expressed as percentages). In each case the Gini coefficients are calculated using the earnings distribution as the weight. See OECD (2005, annex I.3) for details.

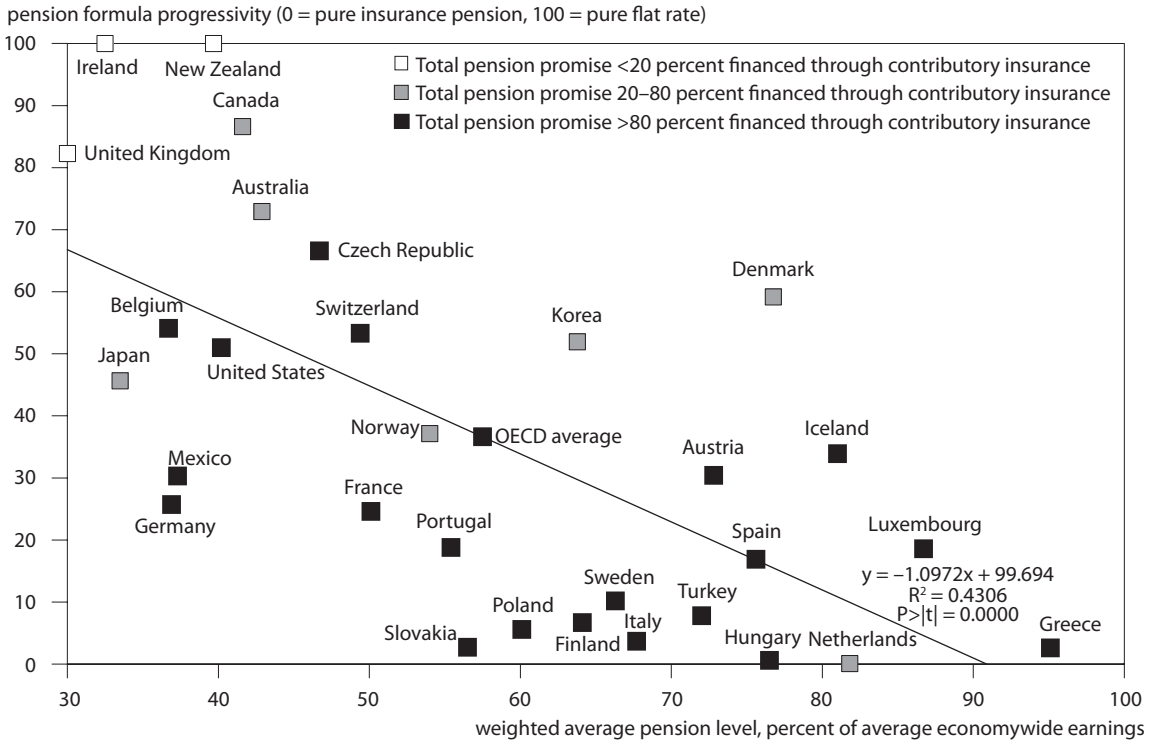
10. Only old age pensions are included in these comparative data.

11. Only the targeted level for men is available in the source of these data.

12. This relative pension level is the weighted average of replacement rates for incomes between 0.3 and 3.0 percent of average economywide earnings, with the corresponding earnings-distribution groups as weights. We also used this measure in chapter 2 to estimate the total present value of the pension promise to retirees (OECD 2007a, 49).

13. Figure 3.1 presents data from OECD (2007a, 45), which, where data are available (18 member states), uses national earnings distributions to estimate inequality in pension entitlements; for the remaining 12 countries, the average OECD distributions of earnings are used.

Figure 3.1 Mandatory pension progressivity and the weighted average mandatory pension replacement level (men), 2004



Source: OECD (2007a).

of figure 3.1) but comparable to other English-speaking countries and more generous than both Japan and Germany.[14] Continental European countries with more generous insurance-oriented mandatory pension systems cluster in the lower right corner of figure 3.1.

Another way to illustrate the degree of progressivity in US Social Security benefits is to estimate the inflation-adjusted internal rates of return for different earnings groups in a given age cohort. Duggan and colleagues (1993) estimated that for the US 1895–1922 age cohort, the internal rate of return for low-income participants was nearly double that of high earners—13.8 to 7.6 percent. The Congressional Budget Office (CBO 2006) estimates that including Social Security's three main benefits—old age, disability, and auxiliary—for all 10-year cohorts born after 1940, the net benefit, or benefit-to-tax ratio, for the lowest-income quintile is above 150 percent, while the middle quintile is close to 100 percent and the top quintile significantly below 100 percent. Moreover, CBO (2006) shows that the differences in net benefits between the recent age cohorts are relatively small compared to the differences between earnings groups.[15]

However, the relative progressivity of the entire US old age income security system is driven overwhelmingly by the progressivity of disability pensions, which go disproportionately to people with lower lifetime earnings. Old age Social Security pensions, viewed separately, are less progressive. It is important when discussing the progressivity of US Social Security to recall Liebman's (2001) report that most intracohort redistribution in Social Security originates in factors unrelated to income, primarily between people with low life expectancies and people with high life expectancies and between singles and dual-income/married single-income households.

Looking back at figure 3.1, it is perhaps counterintuitive that the most redistributive pension systems are at the same time the least generous, but the reason is cost. Universal pensions of the original British model, financed out of general tax revenue, could easily become prohibitively expensive for governments if they were not able to limit costs through means testing and relatively low promised benefit levels. Indeed, Halsey (1934), in her preparatory report on the experiences of other countries' pension provision, observes that the English experiences from 1908 onward indicate an inability to control costs due to the fact that "benefit provisions tend to become more liberal and qualifying conditions less exacting." The

14. The finding that Germany, despite its high public pension expenditure (as discussed in chapter 2), has a relatively ungenerous weighted average pension level, at 36.9 percent of average German wages (lower than the US average of 40.2 percent), is surprising. But, as we discuss in chapter 4, it is related to the country's extensive use of generous early retirement options, which significantly increase public pension expenditure.

15. CBO (2006) assumes that all benefits will be paid as scheduled and hence that no benefit cuts will occur after a Trust Fund exhaustion.

original writers of the US Social Security Act rejected limitations on costs through means testing in the longer term but, partly because of the UK experience, decided to implement the US Social Security Act as an insurance-based system.

Highly redistributive means-tested programs risk inducing moral hazard problems by creating extremely high implicit tax rates on employment for low-wage workers. But this work incentive problem evidently diminishes as people age, and low-wage workers are not likely to continue to work beyond the normal eligibility age for a full pension. Thus the main moral hazard lies in the availability of highly redistributive programs at an early age. Contributory insurance financing has the benefit of partly avoiding the problem by encouraging participants to work so that they can contribute to their own retirement. However, unless properly structured, contributory insurance financing risks creating other types of "labor input hazards" by incentivizing relatively early (i.e., premature from the perspective of sustainability) retirement, as might occur if the contributor/recipient reaches a very high level of pension benefits relatively early in his or her career, with a correspondingly reduced incentive to continue working. We revisit this topic in chapter 4.

From the short-term perspective of governments, contributory insurance can be largely self-financing through payments from an increasing number of contributors. In fact most of the insurance-based systems in the OECD were set up in periods of both young and rapidly rising populations.[16] Essentially by demographic determination, they initially generated large surpluses of contributions compared with the amounts paid out in benefits, allowing policymakers to provide generous benefits from the beginning of the program without running into immediate financing constraints. The OECD's pension models (described in chapter 2 and OECD 2007a) show that countries with mandatory pension systems targeting an average pension level of more than two-thirds[17] of average economywide earnings for full-career workers are overwhelmingly contributory insurance–based systems. This is illustrated in figure 3.1, too; it is clear that the three countries (Ireland, New Zealand, and the United Kingdom) with the least contributory insurance–based financing in their total pension promises have at once the most progressive and least generous mandatory pension systems in the OECD. At the same time, countries to the lower right in figure 3.1 have overwhelmingly insurance-financed, relatively nonprogressive, and, on average, quite generous mandatory pension plans. As

16. With the exceptions of Korea, Turkey, and Switzerland, which did not have a limited pension provision laws until 1973, 1949, and 1946, respectively, all OECD countries had pension provision laws in place by the end of World War II, when working-age populations were not only very young but also expanding relatively rapidly. See SSA (2006b, 2007).

17. The US Social Security target by the same metric in figure 3.1 is just below 40 percent.

we saw in chapter 2, many countries in this group are among those facing the largest sustainability problems from adverse demographics.

US Social Security has historically (box 3.1) been a hybrid pension program with both universal and contributory insurance aspects. In addition, although the program is overwhelmingly contribution funded,[18] it falls almost precisely halfway (with a score of 51 on the OECD's 0–100 scale; figure 3.1) between a flat rate pension and a completely mechanical link between contributions paid and benefits received. Its insurance-based funding principle notwithstanding, the progressivity of the Social Security benefit formula—which deviates from the pure insurance principle on which its funding relies—makes it a fairly redistributive pension system compared to other insurance-based pension systems similarly funded through direct contributions. Figure 3.1 shows that US Social Security is among the most progressive of the predominantly contribution-financed mandatory pension systems.

Progressivity and redistribution in insurance-based pension systems come through two main channels and typically from a combination of both. The benefit formula either restricts the benefits for the highest earners/highest contributors or boosts the benefits available to the lowest-income/lowest-contributing groups. Either way, the formula violates the implicit quid pro quo principle of contributory insurance–based pension systems. However, viewed from the perspective of long-term sustainability, *how* a contributory pension system becomes more progressive matters profoundly. Governments that make a pension system more progressive by capping benefit levels at the top increase progressivity through cost savings, whereas boosting benefit levels at the bottom increases progressivity through higher expenditures. In box 3.2 we explain that the Social Security benefit formula, as in most pension systems, does both. At the same time, figure 2.7 in the previous chapter showed that OECD countries differ substantially in the net retirement income rates offered to high earners and that the United States was among the OECD countries with a relatively low net retirement income for high earners. One of the main reasons why Social Security faces only modest long-term sustainability issues is that it has targeted a relatively modest average pension benefit level (in figure 3.1, about 40 percent of average earnings), achieved by restricting the scope of Social Security by limiting the overall participation of high-income Americans (i.e., both their contributions and guaranteed benefits).

18. In addition to contributions from payroll taxation, the OASDI Trust Funds also generate parts of their income through interest payments from the US Treasury on their holdings of Treasury bills, as well as parts of the tax revenue withheld from paid-out benefits. SSI, as noted in box 3.1, is also paid out of general government tax revenues. See chapter 2 and below.

Box 3.1 Historical overview of US Social Security

Most mandatory national pension systems today are hybrids—part noncontributory, part insurance.[1] Thus when the Social Security Act established the US public pension system in 1935, it distinguished between Federal Grants to States for Old-Age Assistance (Title I) and Federal Old-Age Benefits (Title II). The former were basically noncontributory, as it was left to the states to define their own criteria for eligibility. In 1972 the state-level programs became part of the Supplemental Security Income (SSI) program, run since its inception by the Social Security Administration (SSA).[2] However, unlike Social Security benefits, SSI is not paid by either the Social Security taxes or trust funds but through US Treasury general funds. SSI is means-tested and based on recipients' incomes, living conditions, and resources, and is thus broadly redistributive and closely related to the British Universal Means-Tested Model.

Federal Old-Age Benefits (Social Security as it is known today) have always been entirely funded by employer and employee contributions paid into the Social Security Trust Funds and so, despite the name, are an example of the German insurance model. The pure insurance model of pension benefits, however, was available to contributing workers only until 1940, when two new recipient categories were created: dependent benefits (for the spouse and minor children of a retired contributing worker) and survivor benefits (for the family in case of the premature death of the covered worker). This transition from an insurance system based on only the contributing worker to a family-based plan made the system more redistributive, as more people now had access to benefits from the same number of contributors. Today more than 7 million Americans draw dependent and survivor benefits.

From 1937 to 1940 (when monthly payments were initiated), Social Security benefits were paid out in a single lump sum. When the monthly payments began, their levels were fixed irrespective of cost of living. Combined with the relatively limited number of eligible Americans (only 222,000 in 1940, up to less than 3.5 million in 1950), the fixed-amount payments meant that by 1950 the value of Social Security's retirement benefits was frequently significantly below that of the means-tested state-level old age assistance (the precursor to SSI), which more Americans received than the Social Security benefits. In the early days, therefore, effective old age assistance in America was far more redistributive than today's Social Security. Yet this early redistributive character did not seem to seriously erode political support for the system at the time.

In 1951, the first cost of living allowance (COLA) of Social Security benefits was introduced, immediately raising benefits by 77 percent, followed by

Box 3.1 Historical overview of US Social Security *(continued)*

frequent additional legislative increases (only by 1975 did COLAs become automatic annual increases based on the US consumer price index).

Thus by the early 1950s America had effectively switched from relying predominantly on a British universal means-tested pension model to the German insurance-based model. Insurance-based Social Security is now the only public pension system that touches the vast majority of Americans. In 2006 it had almost seven times as many beneficiaries as the means-tested SSI, paying out approximately 11 times as much in benefits—roughly $460 billion, as against the $42 billion in SSI.

1. This box is based on, and all data are from, the official SSA history, available at www.ssa.gov/history.
2. President Franklin D. Roosevelt originally envisioned SSI as a temporary relief, to be phased out as more people were covered by Social Security in their old age.

The contributory insurance–based financing model of America's mandatory pension system has probably facilitated its relative progressivity, which goes to the heart of whether Americans perceive their payroll tax payments to the Social Security Trust Funds as "just another tax" or as "personal contributions."[19] The more progressive and redistributive a pension system is, the more the quid pro quo principle of contributing to one's own retirement is violated, and the more payroll tax payments start to look like just another tax rather than a personal contribution. And the more something is viewed as a tax, the more public hostility it is likely to engender. This matters particularly in the United States, as Americans are substantially more politically hostile to paying taxes than elsewhere in the OECD. It is, therefore, unlikely that a mandatory pension system could have achieved a relative progressivity similar to that of Social Security had it been financed directly through general tax revenues rather than through a contributory insurance–based system.

In summary, the US mandatory pension system in Social Security (plus SSI) is, partly as a result of its relatively modest scope at high incomes, quite progressive when compared with other OECD countries with higher mandatory contributory pensions for high-income groups. Yet it is

19. See discussion in chapter 8.

Box 3.2 Pension benefit calculation: Detail is a necessary evil to align conflicting policy goals

As with most public affairs, the level of any pension benefit is the outcome of a plethora of mostly conflicting public policy goals, usually old age poverty alleviation and progressivity, on the one hand, and fiscal sustainability and desired direct benefit-earnings linkages, on the other. The operational tool for estimating any given pensioner's benefit level—the mathematical benefit estimation formula—becomes a highly complex entity. A brief walk through how Social Security benefits are estimated in the United States in 2007 will be illustrative.[1]

Social Security is financed by direct contributions (taxes) from employers and employees, and the tax base for the plan rises every year with the average wage index. In 2007 the maximum tax base for Social Security contributions was 12.4 percent of $97,500, or up to $6,045 payable by both the employer and employee. An increase in the tax base to improve the long-term solvency of Social Security, without altering the benefit formula, would represent a move toward increased progressivity and fiscal sustainability, as Americans[2] with incomes over $97,500 would pay higher taxes without receiving a higher benefit in retirement. If the tax base threshold in 2007 had been $150,000, people earning that income would have paid $9,300 in Social Security taxes rather than the $6,045 they actually paid—a more than 50 percent increase in the contributions for this high-income group of Americans.

Social Security benefits are computed using the average of the highest earnings over up to 35 years. The 35-year average is far longer than is typically used in defined-benefit final salary-based pensions (see appendix 3A), for which the usual reference is the average of only the three to five highest income years. The longer the period over which average wages are calculated, the lower the resulting pension benefit. Thus estimation of Social Security benefits over all lifetime earnings, rather than "just" 35 years, without other changes to the benefit formula, would likely result in significantly lower benefits as it would include additional (early) years of low earnings.

The 35-year contribution history for Social Security benefit estimation raises the importance of what the Social Security Administration terms the average indexed monthly earnings (AIME) estimation (also sometimes referred to as valorization or preretirement indexation).[3] The AIME estimation covers years worked until the recipient turns 60 to protect the value of past earnings and account for changes in living standards between the time Social Security contributions were first made and the time at which benefits are claimed (this period could be more than 35 years in the United States).[4] The SSA, for benefit computation purposes, indexes earlier periods' earnings by the growth in national average

Box 3.2 Pension benefit calculation: Detail is a necessary evil to align conflicting policy goals *(continued)*

wages,[5] a method that captures rising living standards over a worker's contribution period. However, if Social Security were indexed for valorization purposes according to increases in inflation rather than wages (i.e., excluding real wage increases), the difference in benefit levels would be substantial and negative, due to the cumulative effects of interest compounding over long periods of time.[6]

The logic of the AIME estimation is similar to that of the more well-known automatic cost of living allowance (COLA) to Social Security benefits after the age of earliest eligibility (age 62) according to changes in the US consumer price index (CPI).[7] If COLAs were based on wage growth (similar to wage indexation) rather than the CPI for valorization purposes, the effect on (future) benefit levels would also be substantial, but positive. Wage or price indexation (or hybrids of the two) of both pension contributions (valorization) and benefits (COLAs) are the subject of some of the most important long-term policy decisions on pension benefit levels and pension sustainability.

Following estimation of the AIME, Social Security benefit levels are derived from the primary insurance amount (PIA), which is estimated from the AIME using a formula that relies on two formula bending points. In 2007 these points were $680 and $4,100[8]: For all AIME at or below $680, the Social Security recipient receives 90 cents on the dollar in monthly benefits; for all AIME between $680 and $4,100, the retiree receives 32 cents on the dollar; and for all AIME above $4,100, just 15 cents on the dollar. Thus the PIA formula is clearly the main progressive element of Social Security benefit regulations, as it ensures that the system redistributes in favor of lower-income retirees. Tweaking the PIA formula in either direction would easily amplify or reduce the level of progressivity in benefit estimation. If, for instance, benefits for AIME below $680 were raised relative to AIME above $680, Social Security progressivity would increase, and if the benefits were decreased, so would the progressivity.

Finally, in order to encourage Americans to retire at a later age, the PIA is adjusted for an early or delayed retirement age to arrive at the final level of initial Social Security benefits (subject to subsequent COLAs). The standard retirement age for full pension eligibility for Americans born in 1942 is 65 years and 10 months, while for those born in 1943–54 (i.e., between ages 53 and 64 in 2007), it is 66 years.[9] For those in the latter group—which includes many of the baby-boomers who retire at the earliest possible age (62) instead of 66—the PIA would be adjusted downward to 75 percent of what benefits would have been

(box continues on next page)

Box 3.2 Pension benefit calculation: Detail is a necessary evil to align conflicting policy goals *(continued)*

at retirement at age 66. Similarly, the PIA would rise by 8 percent annually (on top of COLA) for each year of postponed retirement until age 70. Hence, this retirement age adjustment formula is another complication for estimating Social Security benefits. The world is rarely simple, and pension benefit estimation never is.

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1. All data in this box are from the Social Security Administration website, www.ssa.gov.
2. It is important to note that immigrants on temporary employment visas, such as H1-B or L-1 visas, are not eligible for Social Security, despite the fact that they, via contributions, pay into the OASDI Trust Fund while working in the United States. As such, a numerical expansion of these groups would represent a strengthening of the finances of Social Security.
3. AIME equals the sum of the highest 35 years of contributions after valorization divided by the number of months in contribution years.
4. If pension benefits were based on just the final year of salary, obviously no valorization would be required.
5. OECD (2007a) notes that wage indexation is used for valorization in the overwhelming majority of OECD member states.
6. As Social Security earnings for benefit valorization purposes are always indexed to wages two years before the first year of eligibility (age 62), all recipients *lose at least two years of wage growth* in the valorization process. In other words, the indexing factor for valorization after age 60 is always 1. Extending this period of no valorization of earnings to more than two years would lower total benefits.
7. There is, therefore, a two-year gap from age 60 to 62 where no inflation protection indexation to either wages or prices is offered.
8. PIA formula bending points are themselves indexed to earnings. This indexation is relatively more generous in terms of benefit levels than price indexation of PIA formula bending points would have been.
9. This will rise gradually to 67 by 2027 for Americans born in 1960 or later.

far less progressive than mandatory pension systems in other English-speaking countries. Given that this section ignores the effects of private and voluntary pension schemes (which, as we shall see below and in chapter 7, are in the United States almost exclusively for high-income groups), this comparative analysis suggests that there is likely some political room for making Social Security more progressive. We base this conclusion on two insights. First, Social Security, regardless of its degree of progressivity, is based on the contributory insurance principle, which, ceteris paribus—with its implied link between contributions and benefits preventing it

from being viewed as a government handout—ought to blunt some of the political hostility toward increased progressivity in the benefit formula. Second, other English-speaking countries—Ireland, New Zealand, and the United Kingdom—have in place universalist, means-tested mandatory pension systems much more transparently progressive than US Social Security, yet there is nothing to indicate that this additional progressivity has undermined broad political support for redistribution in their pension systems. Comparative analysis, therefore, suggests that a more progressive Social Security system would not undermine broad political support in the United States.

How Well Do Different Pension Systems Alleviate Old Age Poverty?

One of the central aims of all mandatory pension systems, public and private alike, is to reduce old age poverty among retirees. This goal distinguishes them from private voluntary pension systems, which use the provision of a future pension as an alternative to cash wages to attract and retain talented employees.[20] In addition to these differing goals, in practice it is mostly public pensions that stand between lower-income elderly and poverty. Ideally, therefore, it would be useful to have data that separate public and private pension income. Unfortunately, however, such income data are not, to our knowledge, collected on a consistent basis across countries. As a result, the income data we use include the total income from all pensions, whether mandatory (public) or voluntary (private).[21]

Further data concerns include very big differences between income and consumption measures of poverty. Theoretically, the measure of individual comfort and welfare is derived from consumption. However, due to collection costs and the burden on respondents, total household-level consumption is rarely surveyed, and instead efforts to gauge the extent of poverty rely overwhelmingly on income-based measures. This approach raises problems, particularly in measures of poverty among older households/heads of households and individuals, who draw down wealth and savings toward the end of their lives. Elderly families or individuals with assets can consume in excess of their income and so may thus on the

20. This has certainly been the case in the United States, where many corporate pension systems originated with the wage controls put in place during World War II, which forced companies to offer employees noncash incentives. We explore this subject in detail in chapter 7.

21. The comparability of cross-country income data for the older cohorts is reduced by the presence in some countries, like the United States, of substantial voluntary private pension schemes. Because the aim of such schemes is not to reduce poverty, their presence increases intracohort income inequality.

broader total consumption basis be less likely to experience poverty than those with only income,[22] as is particularly the case among the oldest individuals, who are typically widowed women.

Most of the data that we present below are from the OECD and are based on the concept of equivalent disposable household income.[23] This term includes all gross earnings, gross capital income, self-employment income, financial gains, real estate rents, occupational pensions, all other private transfers, and all types of cash transfers from public sources. The sum is adjusted for direct (but not indirect) taxation and employee Social Security contributions (if any). In accordance with the literature listed in footnote 22, this means that all household assets may not be included in these poverty data, which may therefore be substantially deflated relative to a consumption-based poverty indicator. For instance, Michael Hurd and Susann Rohwedder (2006) find that, based on longitudinal data from the Health and Retirement Study (HRS), US consumption-based poverty rates in 2001 were almost 30 percent lower for the oldest group of single men in America (75+ in their study) and 20 percent lower for single women in this category than was the case using the official Current Population Survey (CPS)–based poverty data.[24] The differences among the 65- to 74-year-olds are substantially smaller. The authors attribute this to the significantly negative post-tax savings rate among the 75+ age cohort but not among the younger group. The negative savings rate among the oldest cohort points to a substantial drawdown of assets, which will lift some of this cohort out of poverty despite their low incomes.

We caution that the data presented below concern only monetary income and taxes and do not take into account lower work-related expenditures (e.g., little or no commuting to work) and lower housing costs in retirement. This may exaggerate poverty risks among the elderly in these data, especially in countries where in-kind support is available through, for instance, subsidized rents.[25] The data in this section must therefore be approached with some skepticism about the precise numerical values and the focus on cross-country comparable data. Nonetheless, they offer valuable

22. A large number of studies have argued for the superiority of consumption as a better measure than income for measuring material welfare. See, for instance, Hurd and Rohwedder (2006), Cutler and Katz (1991), Jorgenson and Slesnick (1987), Slesnick (1993, 2001), Johnson, Smeeding, and Torrey (2005), and Meyer and Sullivan (2003).

23. See Förster and Pearson (2002) for a more detailed description.

24. Hurd and Rohwedder (2006) find that for couples, the differences are smaller, with the CPS data indicating a poverty rate only 0.5 percentage point higher at 4.5 percent.

25. Förster and Mira d'Ercole (2005) cite Ritakallio (2003) for estimates from Finland and Australia showing that when accounting for expenditures for utilities, mortgages, and interest costs, "after-housing poverty rates" are indeed lower for the elderly than for younger working-age cohorts. Other types of excluded "nonmonetary income" include food stamps, health benefits, and goods produced and consumed on farms.

insights into cross-border differences, and it is unlikely that an upward bias in the poverty data will materially change our policy conclusions.[26]

With these qualifications in mind, we use two main parameters to evaluate the effectiveness of mandatory pension systems in combating old age poverty: (1) How many retirees live in poverty, both absolutely and relatively to the working population—i.e., is it more likely or not that old people slip through the social safety net, as compared with the working age population? And (2) where do retirees get their income from—i.e., do they depend primarily on public benefits or do they have other sources of income?

How Many Old People Live in Poverty?

When determining the number of elderly people living in poverty, the most important piece of information is the threshold of poverty used for measurement. The politically explosive nature of poverty data, large cross-country differences, and the data issues discussed above present obstacles for the determination of an objectively acceptable poverty threshold. The threshold used in the OECD data presented here is 50 percent of the median equivalent disposable income of the entire population, a measure widely used in international comparative studies (Antolín, Dang, and Oxley 1999). This threshold eliminates the impact of most differences in overall country income levels. It is, however, significantly above the (very low) official US poverty threshold, published annually by the US Census. In 2000, the year of the comparative OECD data, the US definition of poverty—less than 50 percent of the median income that year—was $11,977 for a single adult and $20,745 for two adults with one child. This corresponds to the Census Bureau official US pretax poverty threshold in 2000 of $8,259 for singles (over 65) and $11,824 for two adults with one child (under 18 and the householder above 65). As such, the poverty threshold used here is substantially higher (45 and 75 percent, respectively, for singles or families with one child) than the official US poverty threshold.[27]

Any poverty threshold is exactly that—a threshold—and derived dichotomous above-or-below data provide no information about the income

26. It is not possible to easily discern the extent of cross-border differences—for example, in the fact that US retirees may have far more private assets to draw down than, say, retirees in Italy—between consumption and income-based poverty indicators.

27. See US Census Bureau's webpage on poverty at www.census.gov/hhes/www/poverty. The US Census poverty threshold includes the following income: earnings, unemployment compensation, workers' compensation, Social Security, Supplemental Security Income, public assistance, veterans' payments, survivor benefits, pension or retirement income, interest, dividends, rents, royalties, income from estates, trusts, educational assistance, alimony, child support, assistance from outside the household, and other miscellaneous sources. Capital gains or losses are excluded. See appendix 3A for the implied poverty thresholds for all countries included.

distribution of the elderly. As a result, a country may look good in terms of its poverty threshold but have a very large population just above that threshold. One would thus predict that countries with mandatory universal flat rate pension systems would, if benefit levels were at appropriate levels, have low levels of absolute poverty but a lot of elderly just above the threshold. As we shall see below, this is the case for universalist New Zealand, which has very low old age poverty rates but a large elderly population just above the poverty threshold.[28]

Before the introduction of public old age pension systems, old people generally depended either on their families for support (at least one reason for having many children was as a retirement insurance policy) or on their own ability to continue working "until the end." Although such dependence has disappeared in the developed world, the two means of support still play a role in analyses of the income levels of old people. According to OECD data from household surveys,[29] roughly a third of all people living in "households with an elderly head" live alone (the "single elderly"). Furthermore, most elderly people, having retired, obviously do not work. Single people not working, regardless of age, are at a higher risk of poverty than other groups in society, and data from Michael Förster and Marco Mira d'Ercole (2005, 43) confirm that the overwhelming share of elderly poor are either unemployed or living alone or both.[30] One should therefore expect that these old people—irrespective of the pension system that provides their benefits—would have higher poverty rates than the average population. But this is not necessarily the case, as can be seen in figure 3.2.

In seven OECD countries—Canada, the Czech Republic, Germany, Hungary, the Netherlands, New Zealand, and Poland—the poverty rates for those over 65 are lower (to the left of the 45° line in figure 3.2) than for the working age population,[31] evidence that it is quite possible to construct a pension system that protects the elderly—if not entirely, then certainly more than the average population—against poverty. Eight continental European OECD countries—Austria, Denmark, Finland, France, Luxembourg, Norway, Sweden, and Switzerland—have slightly higher poverty rates for the elderly but still below the OECD-25 average for this age group and about the average of 10.2 percent for the total population.

Moving to the right in figure 3.2 we see that the situation for the elderly in other OECD countries is far less benign. In Australia, Greece, Ireland,

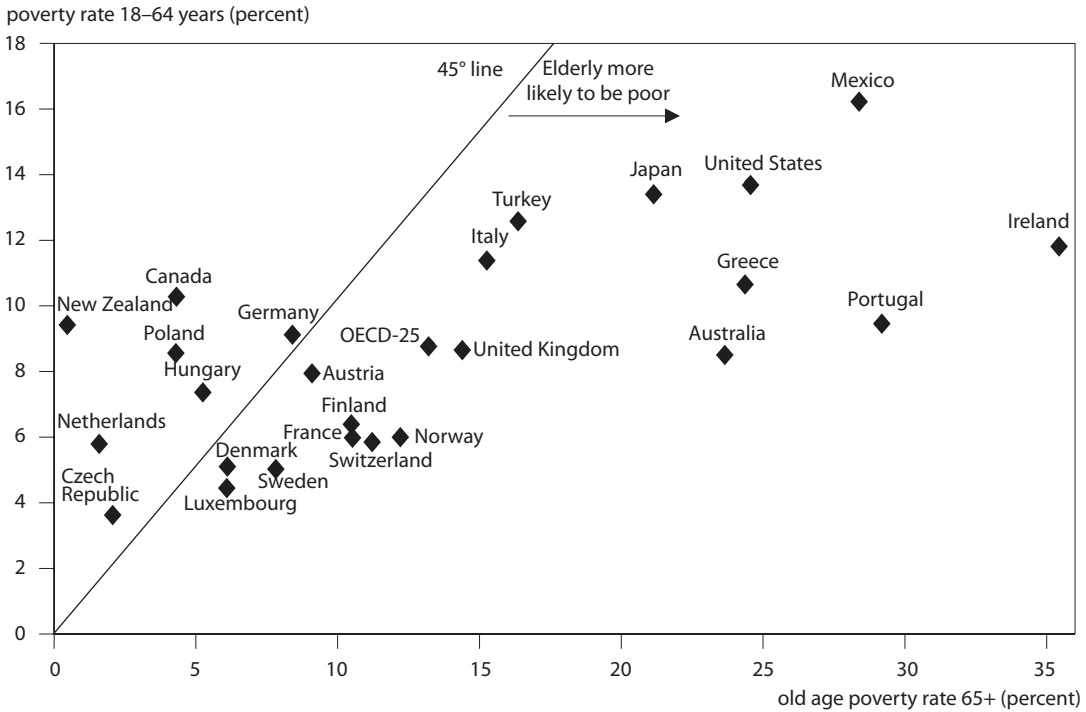
28. See old age income distribution data for New Zealand in OECD (2007c).

29. Förster and Mira d'Ercole (2005), based on member state–submitted data.

30. Dang and colleagues (2006) show that in all OECD countries covered by their survey, the share of elderly women in poverty far exceeds that of men, indicating the "widow problem."

31. Note that due to the assumption of parental support until legal age 18, the "working age population" for poverty issues is assumed here to be 18–64, not 15–64.

Figure 3.2 OECD poverty rates by age group, 2000



Note: Poverty rates are measured as the proportion of individuals with equivalized disposable income less than 50 percent of the median income of the entire population. 2000 data for all countries except 1999 for Australia, Austria, and Germany.

Source: OECD Equity Indicators 2006.

Japan, Mexico, and Portugal, poverty rates for those 65 and older by the relative to median income definition used here all exceed 20 percent—twice the OECD population average—and in the United States the rate is nearly 25 percent. With the exception of Japan, the poverty rate for the elderly in these countries is more than 10 percent higher than for the working age population, indicating that the elderly in these countries are, on average, significantly worse off than the average working age population.[32] Ireland's old age poverty rate of more than one-third indicates that, as of 2000, the Irish universal flat rate pension system had not yet caught up with the country's recently created wealth and that significant expansions of its pension system, aimed at providing a higher basic old age income security, are likely in the near future.[33]

When considering poverty rates among the elderly, it is important to take into consideration the heterogeneity of the 65+ age cohort. As shown in figure 3.3, in all the OECD countries (except Hungary, Spain, and Turkey) for which data are available, poverty rates for the oldest age cohort, those 76 and older, are higher than for the 66- to 75-year-old cohort, and in some countries, the difference is substantial. Similarly, in all four Scandinavian countries the poverty rates for the oldest residents are more than double those of the age group 66–75. Poverty rates rise to nearly 30 percent for Americans 76 or older, and in Ireland, Mexico, and Portugal, they top 35 percent.

The poverty rates for those 76 and older are rather sobering, considering that in all OECD countries (except the Czech Republic, Hungary, Mexico, Poland, Slovakia, and Turkey) life expectancy at birth is more than 76 years (OECD Health Indicators 2006).[34] By this measure it could be argued that nearly 30 percent of all Americans will die in poverty[35]—about three times the share of Germans and French and more than five times the share of Canadians.

Figure 3.3 illustrates a substantial distributional problem, as old age poverty rates—especially for the very old and thus especially for women—

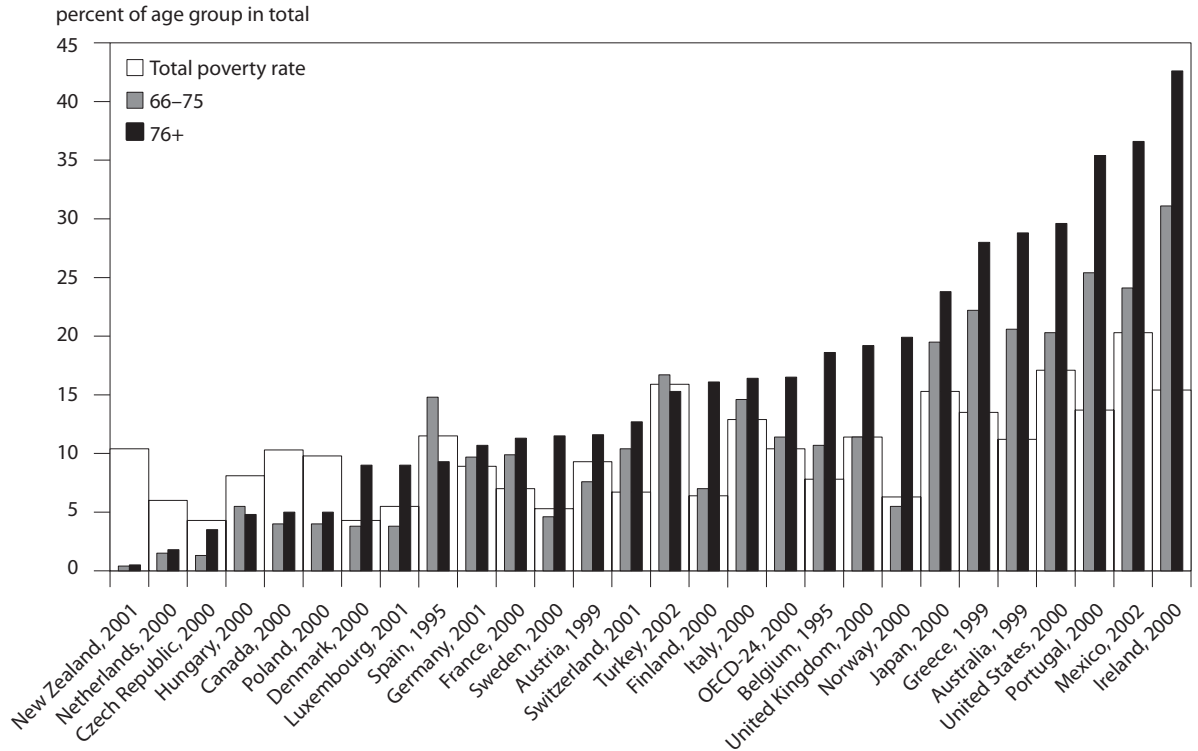
32. Dang and colleagues (2006) surveyed nine OECD countries (Finland, France, Germany, Italy, Luxembourg, Norway, Sweden, the United Kingdom, and the United States) relying on national household microdata and found that only in the United States is the income inequality among the elderly larger than in the population as a whole.

33. OECD (2008) indicates that this has indeed been occurring in Ireland, which since the late 1990s has seen sustained and large increases in mandatory pension levels and accompanying declines in old age poverty rates.

34. In Turkey the average is lower than 70.

35. Strictly, one cannot, however, methodologically draw the conclusion that the combination of a 30 percent poverty rate for those 76 and older and an average life expectancy of 76 or older means that 30 percent will die in poverty. Life expectancy at birth is a projected average lifespan for a population in a given year, not an absolute indicator for the age at which a person will die.

Figure 3.3 Old age poverty rates by elderly subcohorts



Note: Poverty rates are measured as the proportion of individuals with equivalized disposable income less than 50 percent of the income of the entire population. 2000 data for all countries except 1999 for Australia, Austria, and Germany.

Source: Förster and Mira d'Ercole (2005).

are much higher than for the average population[36] in many countries. And, as discussed in chapter 2 and shown in figure 3.3, for many countries, including the United States, the potential for shoring up the financial sustainability of pension systems in the future—predominantly through across-the-board reductions in the real and relative levels of benefits—may be more limited than many believe. These countries will need to pursue other options for achieving the long-term fiscal sustainability of their pension systems.

Finally, these poverty rates indicate that longevity risk—i.e., the risk, from the retirees' perspective, that they have not saved enough for the duration of their old age—poses a significant problem for the oldest retirees in most of the OECD countries (see box 3.3 for more on Americans' retirement savings).

The Income of the Elderly: From What Source(s)?

For analyses of old age poverty it is important to determine the main income source of the elderly. Are they primarily dependent on public pension benefits, do they receive income from assets and capital, or do they rely on earnings from work? For those in the first group, reducing public benefits would be particularly harmful to poverty prevention, whereas this would not be the case should most elderly in fact rely overwhelmingly on capital income or earnings for their income.

Due to large national differences in data collection methodology, the comparative data presented below are subject to a number of caveats.[37] Figures 3.4 and 3.5 distinguish between earnings (income from work[38]), capital income (private/individual pensions, rents, dividends, and interest[39]), and public transfers.[40] For the 23 other OECD countries data are reported using disposable income as the denominator: For 17 of the reporting countries the data are on a gross income basis so total effective tax rates are also reported,[41] and for six countries income shares are net of

36. Figure 3.3 also includes 0- to 17-year-olds in the comparative total population.

37. These are further elaborated in appendix 3A.

38. Includes wages, salaries, and nonfarm and farm self-employment.

39. For the United States, this includes private company/union/non–Social Security general government pensions (i.e., pensions to retired public-sector workers in addition to Social Security), IRAs, Keogh, 401(k) plans, interest, and dividend income.

40. For the United States, this includes Social Security, SSI, family support, and other public assistance.

41. Adema and Ladaique (2005) and OECD (2007b) indicate that there are substantial differences in the tax rates of many OECD countries on different types of income, depending on whether it is from a public or private source. The tax data presented are, therefore, approximate. See appendix 2B for details.

Box 3.3 Americans' (lack of) savings for retirement

Probably the most comprehensive survey coverage of the perceptions of and preparations for retirement in America is the annual Employee Benefit Research Institute (EBRI) Retirement Confidence Survey (RCS), published since 1991.[1] This makes the RCS a natural source of information about the severity of any possible misperceptions that Americans may have concerning their retirement. Its findings generally make sobering reading about retirement preparations among Americans today: The RCS finds widespread misperceptions of basic retirement circumstances.[2]

While over 60 percent of workers expect to receive benefits from an employer-based defined benefit pension plan in retirement, just 40 percent report that they (or their spouse) are enrolled in a defined benefit plan. And with US employers rapidly scaling back such plans, this misperception is likely to grow in the future. Half of Americans (51 percent) do not know the correct age at which they will be fully eligible for Social Security benefits and mistakenly believe that they will be eligible for full benefits sooner than is the case, even though the Social Security Administration has mailed annual individual benefit statements to the entire US population since the late 1990s. Table 3B3.1 summarizes several key findings in the most recent RCS.

Table 3B3.1 shows that from 1994 to 2007 the share of Americans who have tried to estimate their financial needs in retirement has remained relatively stable at around 40 percent, while roughly one-third of Americans have not saved anything toward retirement, and about 40 percent do not do so now. These findings clearly indicate that a very, very large group of Americans is not making any personal financial preparations for retirement. This is highly unlikely to be a well-informed choice.

The RCS report's authors further find several serious misperceptions among Americans who do save toward their retirement. First, most Americans seem to believe that only relatively modest savings will be needed for retirement. Table 3B3.1 shows that almost half think that $500,000 or less will be sufficient. This might be a serious underestimate, at least for most high-income Americans or people with high expenses in retirement, as the share of required savings for retirement is highly dependent on one's standard of living while working (assuming a desire for lifetime income smoothing), and high-income people, therefore, need higher savings to sustain them.

(box continues on next page)

Box 3.3 Americans' (lack of) savings for retirement *(continued)*

Second, there are relatively high fixed costs of continuing to live, especially for people without health care insurance, so low-income workers will need to save more as a multiple of income. VanDerhei (2006) stochastically estimates that high- and low-income groups will need savings multiples of 12 to 13 and 42 to 54 times current income in retirement, respectively.[3] Hence, it is worrying that the RCS finds that 57 percent of Americans expect to need only a savings multiple of 10 or less of their current wages, and only 8 percent believe they will need more than a multiple of 40.

Third, alas, the belief that they need less savings in retirement than seems plausible is not the most pressing misperception facing those Americans with any savings. Rather, it is the fact, as seen in the lower right corner of table 3B3.1, that they fail to reach even their own deflated saving goals. Half of saving Americans close to retirement age (55+) have less than $100,000 in total savings. In the face of such findings, it is cold comfort to discover that 47 percent of American workers somewhat or strongly agree that they (and their spouse) "aren't likely to live long enough to use up all their savings."

Helman, VanDerhei, and Copeland (2007) in their end-remarks diplomatically discuss the risk of "overconfidence" among many Americans concerning their "financial retirement security." However, the RCS findings at least pose the question as to whether—given the level of misperceptions—individual choice and responsibility will continue to be preferred avenues for retirement savings and income security in the future or perhaps more compulsion should be required.

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1. All data in this box are from the 2007 RCS, published by the EBRI in April 2007 (Helman, VanDerhei, and Copeland 2007).

2. Other types of economic research indicate that Americans are better financially prepared for retirement. See, for instance, the augmented stochastic life cycle model in Scholtz, Seshadri, and Khitatrakun (2006).

3. A Monte Carlo estimate for obtaining a 90 percent chance of having adequate retirement income to cover basic living expenses, plus noncovered health care costs. The low end of the value ranges apply for men and the high end values to women. The estimates apply best for older workers, as no assumptions are made for wage growth.

Table 3B3.1 Selected Retirement Confidence Survey findings on retirement preparations among Americans, 1994–2007

Year	Workers who have tried to calculate how much money they need in retirement	Workers who have saved no money for retirement	Workers who are currently saving
1994	31	43	n.a.
1995	32	42	n.a.
1996	29	40	n.a.
1997	33	34	n.a.
1998[a]	42	41	n.a.
1999	48	27	n.a.
2000	53	22	n.a.
2001	44	31	61
2002	38	28	61
2003	43	29	62
2004	42	32	58
2005	42	31	62
2006	42	30	64
2007	43	34	60

Amount of savings American workers think they need for retirement, 2007

Dollar amount	All workers
<250,000	26
250,000–499,999	18
500,000–999,999	20
1 million–1.49 million	7
1.5 million–1.99 million	3
2 million+	8
Don't know	18

Reported total savings and investments among those responding, 2007[b]

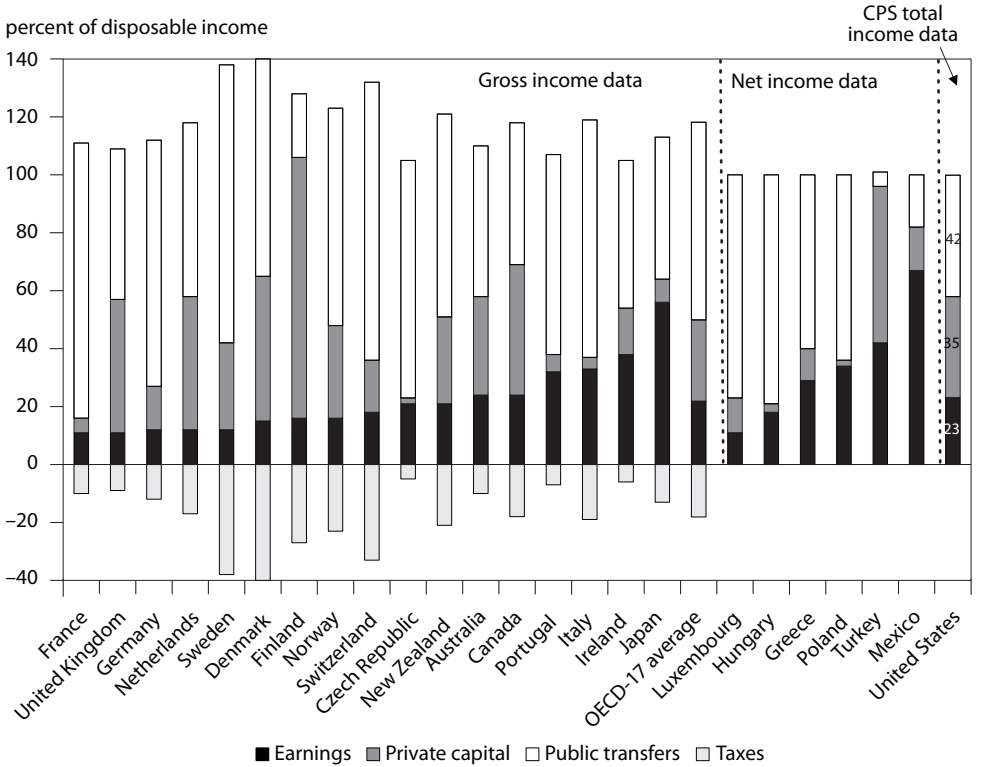
Dollar amount	All workers	Age 55+	Current retirees
<10,000	35	26	32
10,000–24,999	13	5	13
25,000–49,999	10	9	10
50,000–99,999	13	11	12
100,000–149,999	8	11	8
150,000–249,999	7	9	12
250,000–499,999	7	11	5
500,000+	7	17	9

n.a. = not available

a. The phrase "and/or your spouse" was added to the question in 1999, accounting for some of the difference between 1998 and 1999.
b. Does not include the value of primary residence or defined benefit plans.

Source: Helman, VanDerhei, and Copeland (2007).

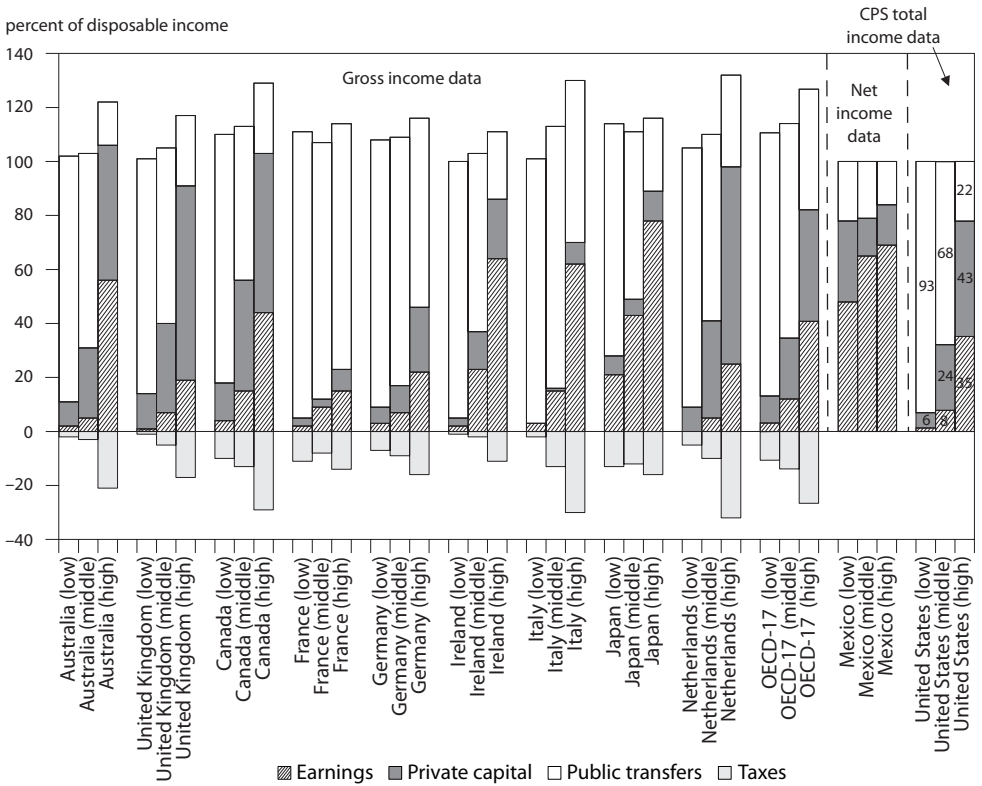
Figure 3.4 Sources of income for the 65+ population, circa 2000



CPS = Current Population Survey

Sources: Förster and Mira d'Ercole (2005); US data are from SSA (2002, table 7.1).

Figure 3.5 Sources of income for 65+ population, by income group, circa 2000



Sources: Förster and Mira d'Ercole (2005); US data are from SSA (2002, table 7.5).

taxation. Unfortunately, comparable data are not available for the United States; however, as the focus here is the relative importance of different sources of income, it is feasible to compare the OECD data with US data from the CPS, which are based on pretax total personal income. US data are on the right in figures 3.4 and 3.5.[42]

These disclaimers notwithstanding, the data indicate large country differences in the sources of income for the elderly.[43] For example, looking at the share of income from earnings, the high shares in Mexico, Turkey, and (less so) Poland reflect the fact that a large number of elderly continue to work (especially in the agricultural sector) past age 65 (see also the very high effective retirement ages in Mexico shown in figure 2.14). The same is likely true in Japan and Ireland. In other continental European countries, Scandinavia, and the United Kingdom, the income share from work is less than 20 percent, and the US share is 23 percent, roughly equal to the OECD-17 average (22 percent). It is, in other words, the case, in terms of the share of income derived from continuing employment, that the US 65+ population do not work more than in other countries; in fact they work pretty much the same as the OECD average. They derive a share of their old age income from work, similar to other English-speaking countries (Australia, Canada, and New Zealand), but far less than in Italy, Ireland, or Japan.

The share of income from capital is somewhat distorted by accounting issues (see appendix 2A for an elaboration on the special case of Finland, for instance). Still, there is a clear pattern in which, for example, Canada, the Netherlands, the Scandinavian countries, the United Kingdom, and the United States have above average shares of income from capital: These are the countries shown in figure 2.2 with substantial total prefunded as-

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42. The US Census Bureau describes its personal income data as follows: "Data on consumer income collected in the CPS by the Census Bureau cover money income received (exclusive of certain money receipts such as capital gains) before payments for personal income taxes, Social Security, union dues, Medicare deductions, etc. Therefore, *money income does not reflect the fact that some families receive part of their income in the form of non-cash benefits, such as food stamps, health benefits, rent-free housing, and goods produced and consumed on the farm* [emphasis added]. In addition, money income does not reflect the fact that noncash benefits are also received by some non-farm residents, which often take the form of the use of business transportation and facilities, full or partial payments by business for retirement programs, medical and educational expenses, etc. Data users should consider these elements when comparing income levels. Moreover, readers should be aware that for many different reasons, there is a tendency in household surveys for respondents to underreport their income. Based on an analysis of independently derived income estimates, the Census Bureau determined that respondents report income earned from wages or salaries much better than other sources of income and that the reported wage and salary income is nearly equal to independent estimates of aggregate income" (see www.census.gov/population).

43. Due to limited data availability, it is not possible to adjust these data from the 65+ cutoff point to the effective retirement ages, so there may be some distortion of data between countries, especially for the earnings share.

sets toward pension provision (TPATPP). In contrast, France, Germany, and the Mediterranean countries have a very limited share of income from private capital, making these countries far more reliant on public pension provision only.[44] Public transfers are the largest individual income item in all OECD countries (except Turkey and Mexico), underlining the crucial reliance of the elderly on government pension promises. Finally, the data in figures 3.4 and 3.5 reveal substantial differences between countries in the level of taxation of pension benefits.

All the data in figure 3.4, however, are national averages across all income classes. As both earnings potential and capital income differ widely among income classes (quintiles) for the 65+ age group, it is useful to attempt to break down income sources by income class. The results of this breakdown are illustrated in figure 3.5, which shows the sources of income for three different groups age 65 and older: the lowest quintile (0 to 20 percent), the three mid-quintiles (20 to 80 percent), and the top quintile (80 to 100 percent).[45]

Several important issues are illuminated in figure 3.5. First, the share of income (from both earnings and capital) rises dramatically in the highest-income quintile, whereas for the lowest-income quintile (with the exception of Mexico and, less so, Japan), income from earnings plays virtually no role after age 65. Evidently, this is not a group for whom employment beyond the statutory retirement age is an immediately appealing opportunity.

This is perhaps not too surprising for the lowest-income quintile, considering that many jobs held by this group are physically stressful and/or repetitive, making it probable that a large share will be physically worn down by age 65.

Second, the fact that the share of income from earnings is extremely modest (again, Mexico and Japan excluded) for the "middle classes" (i.e., the three middle-income quintiles) as well raises the question of just how much even this group is willing—incentivized—to work beyond age 65. In the United States, just 8 percent of this group's income comes from earnings, suggesting that the frequently mentioned notion that "baby-boomers will revolutionize retirement and broadly retire at will later" may indeed be quite revolutionary. It seems more likely that worker earnings past age 65 will continue to be concentrated in the highest-income quintile[46] and thus that a large majority of the population—80 percent—

44. We saw in chapter 2 that in some countries, such as France and Germany, insurance-based assets accounted for a substantial amount of private retirement savings. The income data presented in this section make no distinction between income from private pension fund savings and insurance-based assets.

45. Data for all reporting countries are presented in appendix 3A.

46. This would further be consistent with the findings in Kuhn and Lozano (2005) of a substantial rise in working hours in recent decades among the highest-earning groups in the United States.

will not continue to work much beyond age 65. As a substantial fraction of OECD employment today is in services, it seems implausible that the limited role of old age earnings is rooted in concerns about declining health. It may be that the institutional incentive structures for those 65 and older in OECD countries need to be fundamentally changed—for instance, through higher statutory retirement ages; we elaborate on this subject in chapter 4.

Third, the share of income from capital (including private pensions) is, like earnings, of marginal importance to the lowest-income quintile in all the OECD countries (except Mexico). For this group—irrespective of the large differences in institutional setup and organization between their pension systems—public pension benefits provide essentially all income. This is true even in countries such as the Netherlands, where the main part of the mandatory funded insurance-based scheme falls in this capital category. Any distortion of the findings caused by omitting the drawdown of assets will be very small for this low-income group.[47] Hence for the lowest-income quintile of the elderly, public pensions are the predominant—or only—source of retirement income.

Fourth, looking at the share of income from capital among the middle classes in the OECD, it is somewhat surprising that only in Canada, the Netherlands, and the United Kingdom does this source of income reach one-third of the total (the United States is at just under one-quarter). These findings are especially unexpected, as the level of private pension fund assets in the United States is on par with the Netherlands and substantially above the levels in Canada and the United Kingdom.[48] The explanation for this discrepancy may lie in the fact that US pension fund assets are concentrated more among the highest-income group than is the case in the other three countries. Given that private pensions in this category are mandatory for all in the Netherlands, it is predictable that they would play a larger role in income provision for the middle classes there than in the United States, where voluntary private pensions cover only about 50 percent of wage earners,[49] a figure that is nonetheless higher than the roughly one-third in Canada and the less than half in the United Kingdom (OECD 2005). In earlier periods there was extensive private pension coverage of US middle-class workers in traditional sectors (e.g., steel and auto production), but today this is of less significance for middle-class families in the United States and is essentially nonexistent for the

47. Assets in the form of housing are a potential exception to this.

48. These were in percent of GDP, excluding life insurance assets, in 2001: 102.6 in the Netherlands, 96.2 in the United States, 72.5 in the United Kingdom, and 53.3 in Canada.

49. When measured as a share of the total elderly population, the coverage drops substantially. Wu (2006) lists only 31.5 percent of all those 65 and older as recipients of any non–Social Security pension income. AARP (2008) shows how this dropped to 30.7 percent in 2006.

middle classes in the three major continental European economies and Japan. Thus for France, Germany, and Italy, the public sector is basically the only provider of middle-class retirement income, whereas in Japan earnings contribute more than 40 percent.

This breakdown by income reveals that it is only the top quintile of elderly income earners in the OECD that do not rely heavily on the public sector for pension income. Thus we now see that the national averages of the distribution of income sources for the elderly (figure 3.4) paint an overly flattering "average picture" of the importance of both earnings and capital for pension income. In reality, this importance does not reach beyond the top income quintile.

Based on the data illustrated in figure 3.5, it is clear that public pension reforms in the OECD and certainly in the United States would face serious political obstacles as they may threaten the retirement income of essentially the entire middle class. A high degree of political consensus for change would be necessary to implement major pension reforms, consensus that would be very hard to reach in the absence of an imminent crisis. This explains why Social Security reform is the third rail of American politics. See box 3.4 on who gets what, from where, and when in life.

Intergenerational Transfers

We now shift our focus from traditional intragenerational poverty and income issues to longer-term intergenerational transfers and the related distributional issues.

Generational Accounting

As illustrated above, there is quite a large difference between how many resources pension systems in different countries transfer intragenerationally (i.e., within a given age cohort). Yet in this era of aging populations, with more retirees and fewer workers to come, a more pertinent concern is the level of current and future intergenerational transfers (i.e., between age cohorts of different age, typically from younger to older generations). This concern is at the core of the concept of "generational accounting," originally proposed by Alan Auerbach, Jagadeesh Gokhale, and Laurence Kotlikoff in a series of papers in the early 1990s (Auerbach, Gokhale, and Kotlikoff 1991, 1992, 1994).[50] Generational accounting

50. Generational accounting as originally presented by the authors is completely silent on intragenerational transfers and simply assumes that any burden is distributed evenly across all members of a given age cohort. It further assumes that any future burden is distributed evenly across all future generations.

Box 3.4 Who gets what, from where, and when in life?

Individual benefits accruing from social spending, whether public or private, are usually closely associated with age. Income assessments using cross-sectional analyses combining household microdata and tax-benefit simulations have shown that social benefit expenditures, net of taxes, remain very low until the age of retirement.[1] The explanation for this bias in favor of retirees is clear: Public spending is typically intentionally redistributive across the life cycle, especially targeting this older group, and retirees, in the case of an insurance-based pension system, receive their previously paid-in contributions in retirement, usually in their 60s. By and large, in terms of expenditures, "social protection" means "old age protection."

It is instructive to compare the scope of this intentional life cycle redistribution across different countries and income groups. This is done in figure 3B4.1, based on data from Dang and colleagues (2006). (The discussion in this box also draws extensively on their insights.) The three components of the figure show, for selected OECD countries, the age distribution of total social spending net of taxation, excluding health care but including public and private pension benefits, sickness and invalid benefits, unemployment benefits, housing benefits, social assistance, and in-work benefits as a percentage of average spending for the total population (figure 3B4.1a) and for the bottom (figure 3B4.1b) and top (figure 3B4.1c) quintiles. A reading above 100 percent indicates that the values of benefits paid to individuals in a given age group exceed those of the population as a whole, or in other words that redistribution favors this group. It is important to note that this figure illustrates only the relative internal redistribution of each country's social expenditure and cannot be used to compare levels of gross social spending between countries, on which continental European countries spend far more as a share of GDP than does the United States.

Figure 3B4.1a shows that US social spending is significantly higher for older age groups than in other OECD countries, reflecting the fact that Social Security is the largest nationally comprehensive social protection program in America.[2] In contrast, social spending for working age populations in other OECD countries, with more comprehensive unemployment benefit systems, is more evenly distributed than in the United States. In figure 3B4.1b, this is particularly evident for the lowest-income quintile, where US social spending is far more redistributive toward older age groups than elsewhere in the OECD. Figure 3B4.1c shows, however, that this is not the case among the top income quintiles, as social spending on the highest-earning elderly in France is on par with that in the United States. It is further noteworthy that the earlier statutory and effective retirement ages in

Box 3.4 Who gets what, from where, and when in life? *(continued)*

France and Italy are reflected in a spike in social spending for those over 50, earlier than in other countries.

In the United States, the top income quintile receives a higher relative share of social spending in old age than the bottom income quintile: 440 percent of the average from age 65+ versus 310 percent. This in all likelihood reflects the contributory insurance aspects of Social Security. As a comparison, more universal, redistributive social spending, as in the United Kingdom or the Scandinavian countries, results in the top-income elderly receiving only 170 and 280 percent, respectively, of average social spending.

The broad-based social spending measure in figures 3B4.1a to 3B4.1c illustrates the emphasis on old age social protection in the United States when measured against beneficiaries in other age groups. High-income Americans over age 65 benefit relatively more from redistribution of social spending not only than elderly cohorts in most other OECD countries but also Americans in the bottom income quintile. These findings suggest that any cuts in US social expenditure would be most equitably targeted toward this group.

1. See, for instance, Gottshalk and Smeeding (2000) and Förster and Mira d'Ercole (2005).
2. Social Security is run by the federal government (through the Social Security Administration), whereas other US social assistance programs (e.g., Medicare/Medicaid and Unemployment Insurance) are national in scope but administered locally by state governments (with federal grants for funding).

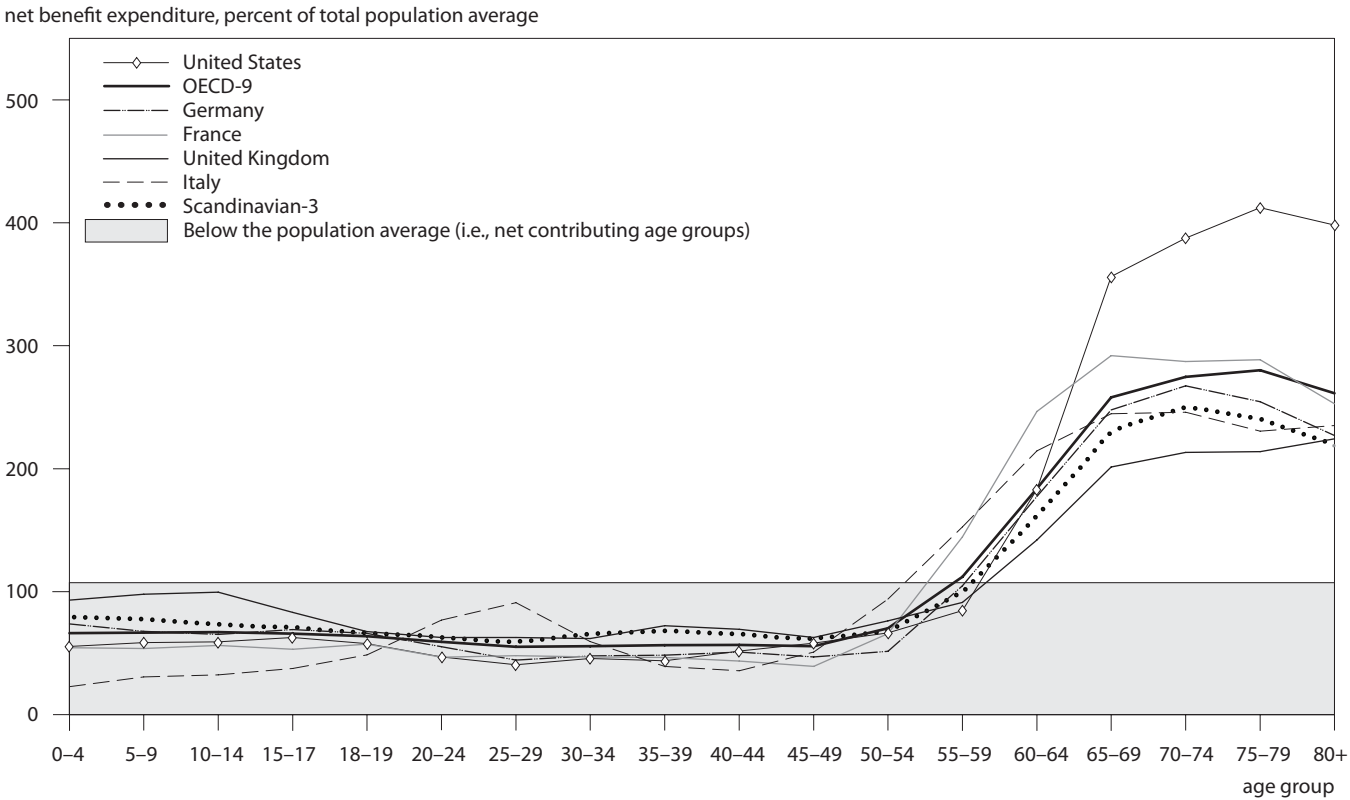
provides an approach to overcome the deficiencies of the traditional definition of government deficit by illuminating the intergenerational transfers in unfunded pay-as-you-go pension promises.[51]

Funded pension systems and promises do not generally entail any generational transfer worth mentioning,[52] an evident financial advantage

51. Other policy areas, such as revenue-neutral changes to the tax system and government-induced adjustments to the market valuations of real and financial assets, may also involve intergenerational transfers not captured by the traditional deficit measures. For an elaboration, see Auerbach, Gokhale, and Kotlikoff (1994).

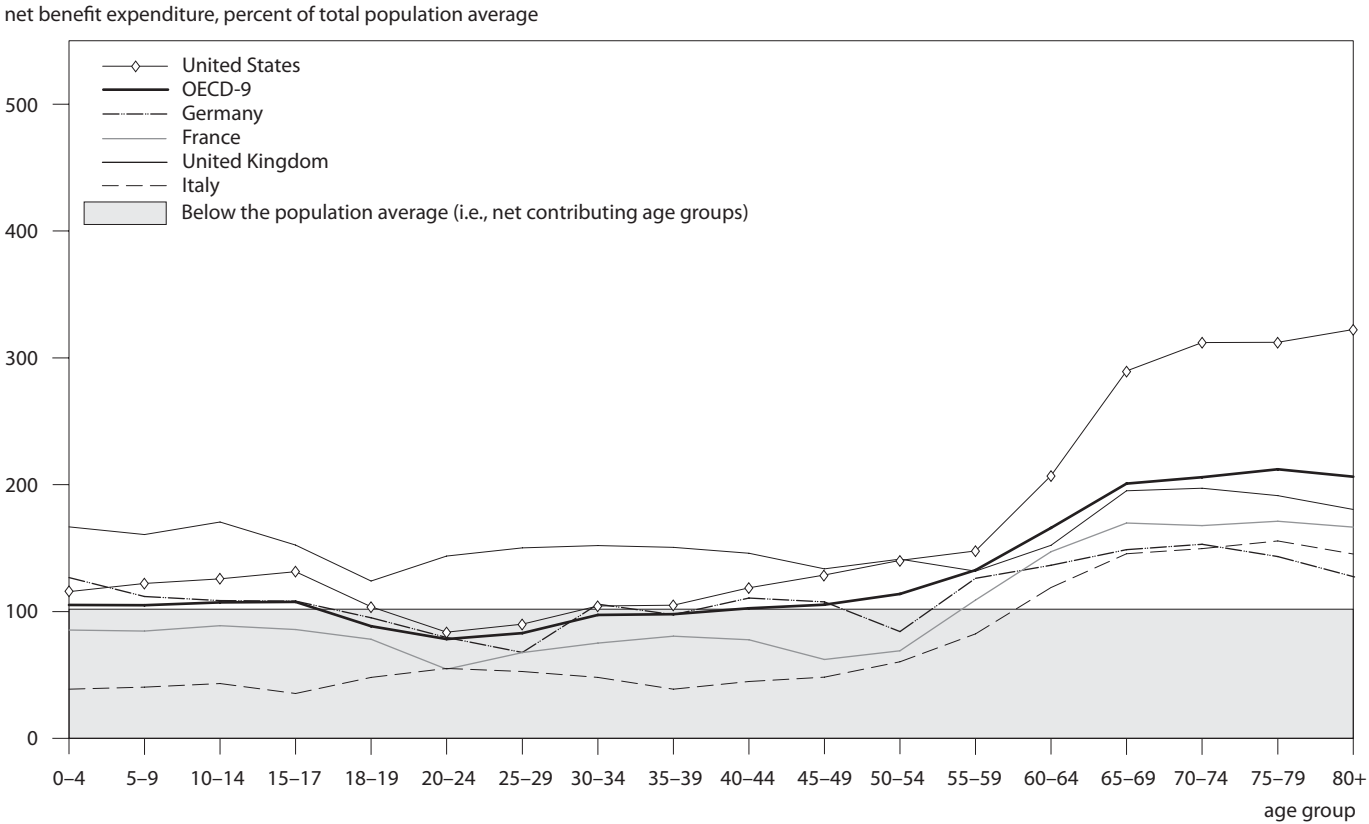
52. Issues concerning differences in tax treatment of contributions to funded pension systems muddy this picture a little, as ultimately any tax breaks for such contributions will have to be paid by someone! Frequently, however, tax advantages for contributions are paid by the same generation upon retrieval, yielding a very limited net gain. See chapter 7 for an elaboration of this issue.

Figure 3B4.1a Net public benefit expenditures, total population, by age group, late 1990s



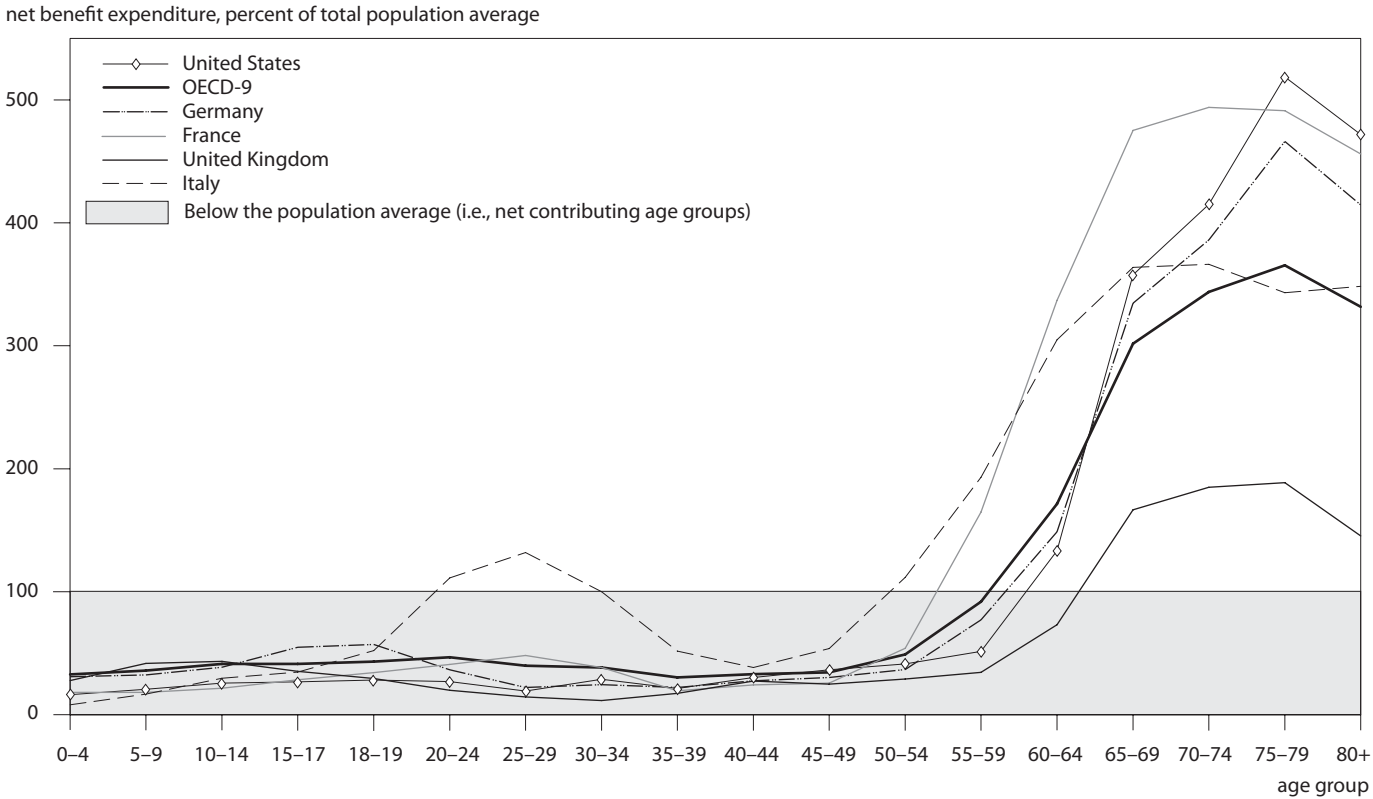
Source: Dang et al. (2006).

Figure 3B4.1b Net public benefit expenditures, bottom income quintile, by age group, late 1990s



Source: Dang et al. (2006).

Figure 3B4.1c Net public benefit expenditures, top income quintile, by age group, late 1990s



Source: Dang et al. (2006).

of such systems. Instead, generational accounts estimate the value of what the average member of each age cohort can expect (on a net basis) to receive from/pay to the government (including state and local levels) over their remaining lifetime, as well as what future generations will receive/pay. It thus becomes possible to compare what newborns today will receive from/pay to the government with the benefits/payments of future newborns. Estimating the net future burden of government for both living and future generations is done through the "government's intertemporal budget constraint," which posits that the government's spending on goods and services cannot surpass the sum of three items: (1) current government net wealth, (2) the present value of net payments of current generations, and (3) the present value of net payments of future generations. In other words, the government must eventually pay for its spending through either the resources it already commands (#1) or those it plans to extract from current (#2) or future generations (#3).[53]

Like any exercise in long-term government financial projections, generational accounting is sensitive to assumptions concerning government expenditure growth, discount rates, economic growth rates, and demographic developments. However, one particularly crucial issue is the treatment of government education expenditures: Are they treated as consumption or as a transfer to a particular age cohort (like Social Security benefits, for example)?[54] The answer matters because it affects the treatment of PAYGO pension system first generations.

As a matter of simple mathematical reasoning, generations that retire soon after the foundation of a PAYGO pension system—say, Americans retiring in the first decades after Social Security was set up in 1935 (see box 3.1)—receive a large transfer simply due to fortuitous timing, as they are entitled to benefits until death after paying in only a few years (rather

53. This extremely superficial walk-through of the central assumptions of generational accounting hardly does justice to its methodology. See Auerbach, Gokhale, and Kotlikoff (1991, 1992, 1994) for in-depth methodological descriptions.

54. In their original description of generational accounting, Auerbach, Gokhale, and Kotlikoff (1991) treated only OASDI, Hospital Insurance, Welfare, Unemployment Insurance, and food stamps as transfers or receipts from the government and thus almost invariably had Americans remaining net contributors to the government until approximately the age of retirement at 60–65. In later estimations (e.g., Kotlikoff and Raffelhüschen 1999), several versions of generational accounts treated education expenditures as either consumption or a transfer. The European Commission (1999), which estimated generational accounts for 12 EU members in 1995, included educational expenditures as a transfer and reached estimates showing that net transfers to Europeans peak at around age 25, when they have enjoyed the full benefits of government education expenditures and not yet, on average, begun to pay full taxes. Thereafter their net transfers for their remaining lifetime declines, with tax payments exceeding benefits received until approximately age 60, after which pension benefits cause the net balance to rise again toward (but not reaching) zero at the end of their lives.

than their entire working life). This is also the origin of the "legacy debt" described by Peter Diamond and Peter Orszag (2005).[55] An illustrative, if extreme, example is the case of Ida May Fuller, the first American to receive a monthly Social Security check, in January 1940. Ms. Fuller worked for three years under the Social Security program and paid total accumulated taxes during that time of $24.75. She went on to live until the age of 100, and during her last 35 years received a total of $22,888.92 in Social Security benefits, yielding her a lifetime return from her three-year participation in Social Security of nearly thousand-fold![56]

On the other hand, as pointed out by Antoine Bommier and colleagues (2004), the same American generations that thus received a large windfall from participation in the upward transfers (i.e., from young to old) of Social Security (and later Medicare) incurred substantial lifetime losses by not being able to reap the benefits of public education (a downward transfer from old to young), which only really took off in America in the 20th century, even as later in their lives these same generations (who had grown up without public education) helped finance it through their general tax payments.[57] Given the relatively simultaneous expansion of both public education and old age pensions in many OECD countries during the first half of the 20th century, this is not a uniquely US situation.

Generational accounting, therefore, is open to criticism on a number of accounts (Haveman 1994, Diamond 1996, Buiter 1997), and its specific assumptions are crucial. Yet it has prompted numerous countries (26 in 2000, according to Gokhale et al. 2000) to use the methodology to estimate the burden of future generations relative to those alive today. Briefly summarized, comparative studies indicate that the vast majority of OECD countries run sizable generational imbalances, with future generations facing either significantly higher taxes or lower government benefits. For instance, Kotlikoff and Bernd Raffelhüschen (1999) present results from 22 developed countries (of which 19 are also members of the OECD) and find that only three do not exhibit generational imbalances.[58] Undoubtedly, these research efforts have helped to raise public and political awareness of these otherwise largely hidden transfers between generations.

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55. Diamond and Orszag (2005) estimate this legacy debt at $11.5 trillion. Leimer (1994) estimates that all Americans born between 1876 and 1937 will receive more than $8.1 trillion more from Social Security than they paid in. See also CBO (2006).

56. See SSA, Historical Background and Development of Social Security, at www.ssa.gov/history for more details.

57. Becker and Murphy (1988) hypothesize that, introduced separately, neither public education nor Social Security may be Pareto-improving reforms but that they may be if deliberated together.

58. Auerbach, Kotlikoff, and Leibfritz (1999) find a similar overwhelming share of imbalances for a smaller (overlapping) sample of countries. See also European Commission (1999).

Time Spent in Retirement—A Transfer of Leisure to Current Generations?

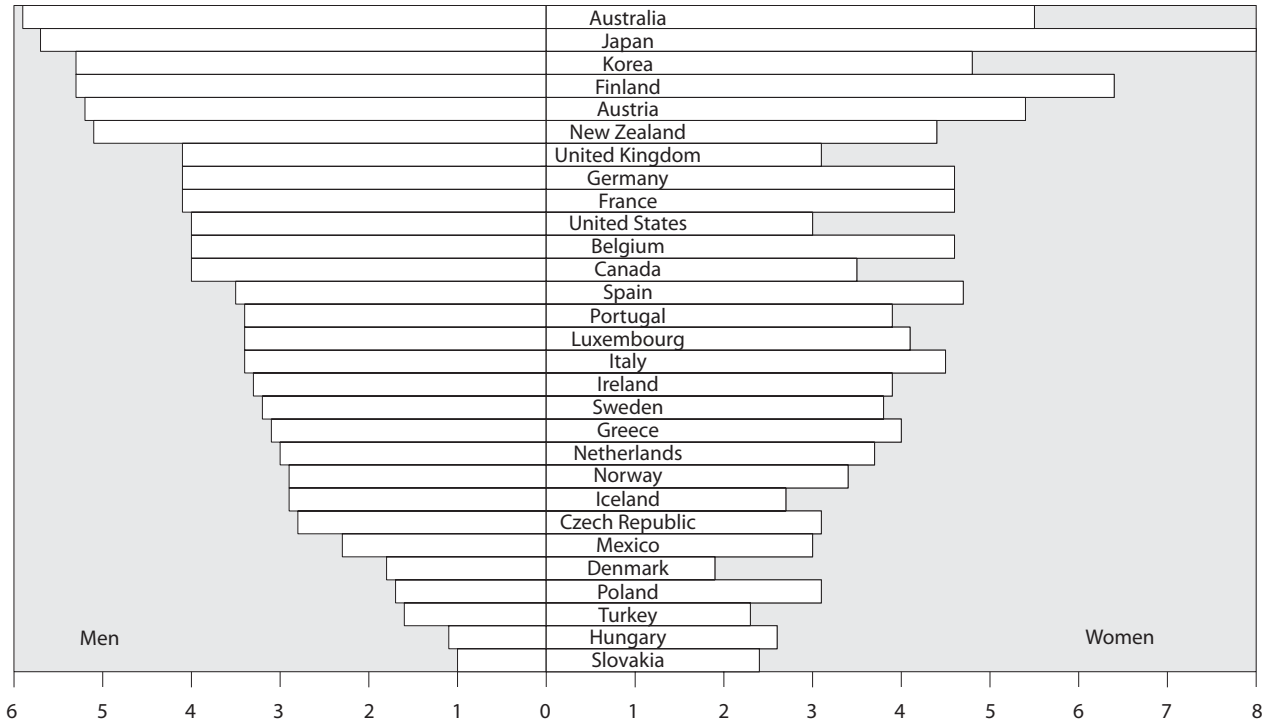
A comprehensive measure of intergenerational transfers like the generational accounts above depends on the assumptions built into the model used to make the estimations. Other, more straightforward measures can illustrate the differences among generations in the transfers they can expect to enjoy during their lifetimes. One such is time spent in retirement. Economic theory assumes that rational actors will choose preferred levels of work and leisure and thus attach a value to leisure. Traditional labor economics shows that the labor supply curve may be backward bending as the lure of higher wages encouraging more hours of work is offset by the fact that higher wages mean higher incomes with which to buy more leisure time.[59] Furthermore, rising life expectancies grant workers more total time. How might rational workers respond to the additional years of life and how should governments and societies respond in terms of retirement pension policies? Should pension programs be designed to allow workers to retire at the same age regardless of their life expectancy? Or should workers be expected to work more years?[60] Bluntly put, which groups get to enjoy the benefits of rising life expectancies?

To address this question we start with changes in life expectancy across the OECD countries. Life expectancy at birth has lengthened dramatically in the last generation (1970 to 2004), rising 8.1 years for men and 5.7 years for women in the United States. For the OECD as a whole, the increase is slightly larger (the straight average of 30 members), at 8.3 and 7.9 years of additional life, respectively. Life expectancy at birth is not the measure most relevant to pension analysis, however, because quite a bit of the increase has been the result of reduced infant mortality and lower death rates for young people. Life expectancy at age 65 is the more relevant measure for pension considerations. The rise in this category has been smaller, only 4 and 3 years, respectively, for men and women in the United States, while the OECD, on average, saw a corresponding lengthening of 3.5 and 4 years over the period. As with other data in this book, the range of variation across the OECD is quite wide. As shown in figure 3.6, for example, from 1970 to 2004 the expected life of a Japanese woman at age 65 rose by 8 years, about 2.5 times more than the increase for an

59. Different economic choices among countries are frequently explained by differences in the "preference for leisure." The most notorious explanation is that today's Europeans work so much less than Americans because they put a higher emphasis on leisure than do Americans. See Blanchard (2004) for this explanation of differences in labor input between Europe and the United States.

60. In chapter 4 we discuss in detail the economic incentives that the elderly face when deciding their age of retirement.

Figure 3.6 Increase in life expectancy at age 65, 1970–2004 (years)



Note: Data from 1970, 2004, or nearest available year.

Source: OECD Health Indicators, 2006.

American woman and over four times more than for a Danish woman. During the same period, an Australian man around retirement age experienced an expected increase of 6 years of life, one-half more than that of American men and six times that of a Slovak man.

Even the smaller numerical increases in life expectancies for the 65-year-olds translate into hefty rates of change. The six extra years of life for Australian men, for instance, equal a 50 percent increase over the period, or almost double the rate of change for American men. Thus in terms of future pension liabilities, the rate of increases in life expectancies is the best indicator of the rate of increases in pension-related liabilities.

Because of differences in the effective age of retirement illustrated in figure 2.13, however, the spread across countries of years in retirement is much greater than the spread of life expectancy. This is illustrated in figure 3.7, which shows for 2004 a rough estimation of the years from the age when a person, on average, leaves the labor market to expected death.[61]

Differences are sizable—Belgian women can expect to live almost 27 years in retirement, about a decade longer than Korean women. French men, meanwhile, can look forward to just over 21 years in retirement, four years longer than American men, nearly seven years more than Japanese men, and more than a decade longer than Korean men.

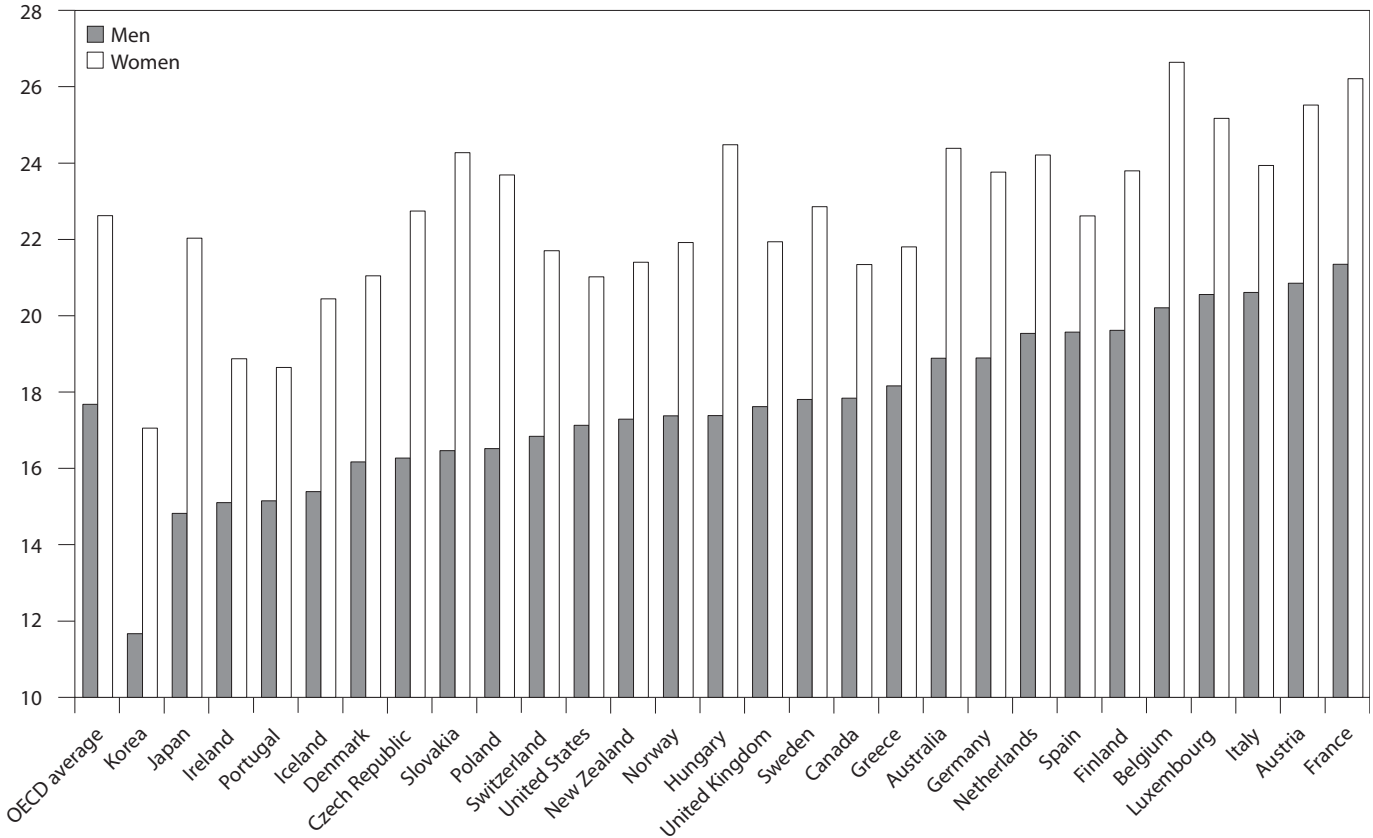
Not only are these differences in time spent in retirement considerable between the sexes (women typically both retire earlier and live longer) and between countries (Austrians, Belgians, and the French spend more time in retirement than do Americans or almost anyone else, while the Japanese, Irish, and Portuguese spend noticeably less), they also give rise to politically important additional distributional challenges both between generations and between different groups in society.

Even as life expectancy has been rising, the effective age of retirement in nearly all OECD countries has declined. In the United States, for instance, the effective retirement age for men has declined by three to four years, from over 68 around 1970 (figure 3.8) to about 64 today. And the decline in effective retirement ages over the same period in continental Europe was generally larger than in the United States. The absolute decline has been less pronounced for women who, in earlier decades, tended to leave the labor market significantly earlier than men; they still do, but the gap is smaller.

Figure 3.9 combines the data in figure 3.7 with similar estimates for 1970 to show the increase—from both rising life expectancy and declining

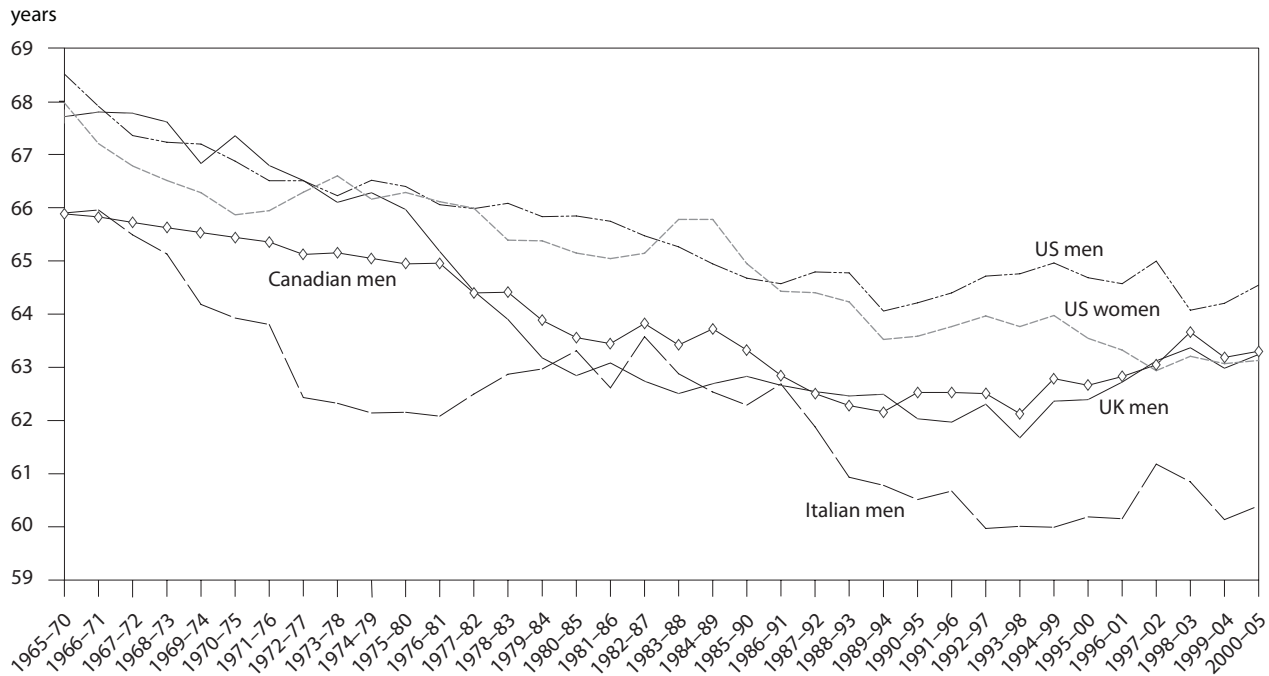
61. The OECD source notes the following concerning these data: "These estimates of the average number of years that workers can expect to spend in retirement are likely to be underestimates. They are based on "period" estimates of life expectancy, which do not take into account future declines in mortality rates but only contemporaneous mortality rates by age and gender. Cohort estimates of life expectancy are consistently higher when these declines are taken into account" (OECD 2006, chapter 2, footnote 3).

Figure 3.7 Estimated years spent in retirement, 2004



Source: OECD (2006).

Figure 3.8 Average effective retirement age, selected OECD countries, 1965–2005



Notes: The average effective age of retirement is calculated as a weighted average of (net) withdrawals from the labor market at different ages over a 5-year period for workers initially aged 40 and over. In order to abstract from compositional effects in the age structure of the population, labor force withdrawals are estimated based on changes in labor force participation rates rather than labor force levels. These changes are calculated for each (synthetic) cohort divided into 5-year age groups. The estimates for US women are less reliable as they have been derived from interpolations of census data rather than from annual labor force surveys.

Source: OECD estimates, available at www.oecd.org.

Figure 3.9 Increase in expected years in retirement, 1970–2004

Source: OECD (2006).

age of retirement—between 1970 and 2004 in the average amount of time spent in retirement across countries. Substantial changes took place in most countries, especially for women.[62]

The rise in life expectancy is, of course, a benefit to society, but the fact that French men who retired in 2004 can look forward to more than a decade of additional time in retirement than their countrymen in 1970 indicates a very large increase in the number of years of life spent outside the labor market for the currently retiring generation, relative to earlier ones. And women in six countries have an additional decade or more in retirement. In some countries (e.g., Canada, Denmark, Greece, and the United States), the additional expected years of leisure for today's retirees are not as large—about 4 to 6 years for both sexes. Only Korea has seen a relatively marginal increase in the number of years spent in retirement. Overall, the increase in life expectancy in the OECD countries has been passed on in the form of longer retirements. This is evident in figure 3.10, which breaks down the total increase in years in retirement from 1970 to 2004 for men based on the rise in life expectancy and the decline in effective retirement age.[63]

Figure 3.10 shows that the composition of the increase in years spent in retirement varies substantially among OECD countries. On average, the split is close to 50-50 between the rise in life expectancy and decline in effective retirement age. In countries like France, Hungary, Poland, and Spain, the decline in effective retirement age makes up the bulk of the total rise, whereas increases in life expectancy dominate in Australia, Canada, Japan, and the United States. Only Korea—with the smallest increase in years spent in retirement over the period—has in recent decades seen healthy financially sustainable development, as an increase in the effective retirement age after 1970 (illustrated by the *negative decrease* in figure 3.10) acted as a partial offset to the large increase in life expectancy. Many other OECD countries are now trying to emulate this Korean experience.

The fiscal impact of this increase in years of retirement adds impetus to OECD country efforts to raise retirement ages. It is important to

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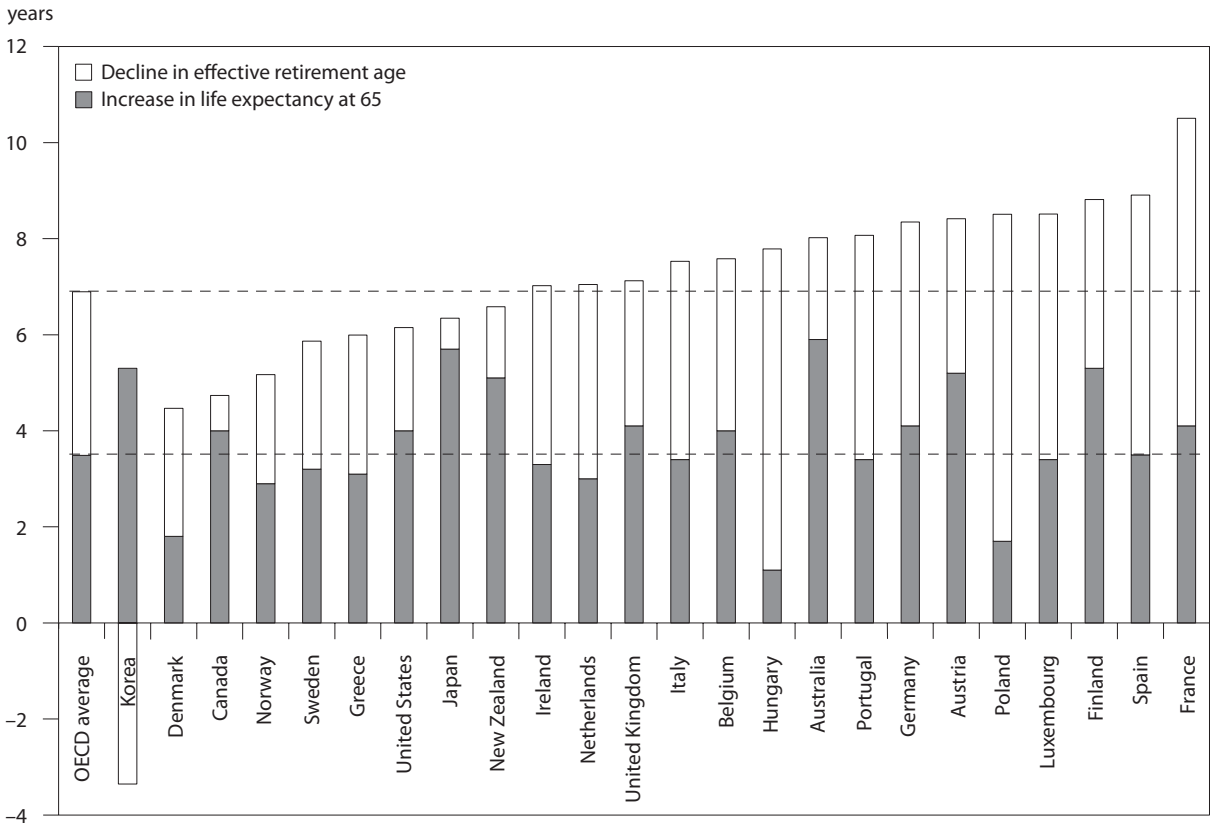
62. If estimates of the decline in "work performed" from one generation to the next were carried out on the basis of total lifetime hours worked, rather than simply by effective age of retirement, currently retiring generations in many countries would invariably be shown to be in an even more advantageous relative position. This is because of the decline in average annual work hours from 1970 to 2004, as well as the later entry into the workforce due to more time spent in education, of more recent retirees. As such, the relative generational transfer of leisure time to currently retiring generations presented here, which concerns itself with only the part related to the retirement decision, is an underestimate of the total magnitude of the transfer.

63. Figure 3.10 is an approximation, as it subtracts a country's rise in life expectancy at age 65 from the total increase in years spent in retirement from the age of withdrawal from the labor market. As this age is typically lower than 65, the increases in life expectancies illustrated in 3.10 are likely biased downward.

Figure 3.10 Components of increase in years in retirement for men, 1970–2004



Sources: OECD (2006); OECD Health Database, 2007.

distinguish between (1) *prefixed gradual rises* in the age at which an individual is entitled to a full (or reduced early) pension, such as those initiated in the US Social Security system by President Ronald Reagan in 1983, which will see this eligibility age rise in the United States from 65 in 2000 to 67 in 2027,[64] and (2) *explicit life expectancy links to retirement ages*. While the former obviously cuts the amount of time in retirement future retirees can expect, these predetermined rises in retirement ages rarely account for sudden unexpected increases in life expectancies and are usually capped at politically determined levels of minimum voter pain. They may, therefore, not provide any long-term guarantees of fiscal sustainability. Thus even as the retirement age in US Social Security is scheduled to rise a total of two years from 2000 to 2027, average life expectancy at 65 for Americans rose more than two years over the past 27 years (although the rise is unevenly distributed between men and women).[65]

Many OECD countries have in recent years scheduled rises in their earliest and full eligibility ages of the former prefixed gradual rises type. As such, they have implemented this aspect of the 1983 Social Security reform, too. However, these types of reforms have a relatively limited ambition, as they lack the direct link to life expectancies; they merely attempt to reverse the practice of current generations that retire prematurely (as early as their mid-50s) by raising retirement ages. Many reforms as a result will not provide much more than a first step toward a long-term fiscally sustainable pension system, and many countries may need to further increase their retirement ages in the future. Table 3.1 provides a nonexhaustive listing of such recent reforms in OECD countries.

It is clear from table 3.1 that the phasing in of later retirement ages is for political reasons generally set far in the future. This mirrors the 17-year US preannouncement of rises in the full Social Security eligibility age in 1983. Given their later decision to raise retirement ages, it is evident from table 3.1 that only a few countries have, similar to the United States in 2000, actually started to raise the retirement age already. But the large size of baby-boomer generations entering retirement in many countries means the timing of retirement age increases matters materially for the sustainability impact of these reforms. If, through excessively long phase-in

64. The Social Security phase-in works such that those born in 1937 or earlier may retire at the age of 65. This rises by two months per earlier year of birth between birth years 1938 and 1943, so that for those born in 1942, the age of retirement with a full Social Security pension is 65 years and 10 months. For birth years 1943–54, the age of retirement with a full pension is fixed at 66, before rising again by two months per birth year, so that people born in 1960 or later will face a retirement age of 67 (i.e., be able to retire with a full pension only in 2027). See Social Security Administration's website, www.ssa.gov/retirechartred.

65. The most recent data for the period 1976–2003 show a rise from 13.8 to 16.8 for men and from 18.1 to 19.8 for women. See OECD Health Division, October 2006 Update, www.ecosante.org.

Table 3.1 Recent phased-in raises of the retirement age in selected OECD countries

Country	Reform type	Affected group	Period of phase-in
Australia	Full eligibility age: From 60 to 65	Women	1995–2014
	Earliest age: From 55 to 60 (for mandatory occupational pensions)	All	2015–25
Austria	Full eligibility age: From 60 to 65	Women	2023–33
	Earliest age: From 60 to 62	Men	2000–05
	Earliest age: From 55 to 62	Women	2000–27
Belgium	Full eligibility age: From 60 to 65	Women in private sector	1997–2009
Czech Republic	Full eligibility age: From 60 to 63	Men	1996–2012
	Full eligibility age: From 53–57 to 59–63	Women	1996–2012
Denmark	Earliest age: From 60 to 62	All	2019–22
	Full eligibility age: From 65 to 67	All	2024–27
Germany	Earliest age: Reduced from 63 to 62	Men	By 2010
	Earliest age: From 60 to 62	Women	2011–16
	Full eligibility age: From 65–67	All	2012–29
Italy	Full eligibility age: From 58 to 60	All	2008–11
Japan	Full eligibility age: From 60 to 65 for flat rate pension	Men	2001–13
	Full eligibility age: From 60 to 65 for flat rate pension	Women	2006–18
	Full eligibility age: From 60 to 65 for earnings-related pension	Men	2013–25
	Full eligibility age: From 60 to 65 for earnings-related pension	Women	2018–30
Korea	Full eligibility age: From 60 to 65	All	2013–33
	Earliest age: From 55 to 60	All	2013–33
Switzerland	Full eligibility age: From 62 to 64	Women	2000–05
United Kingdom	Full eligibility age: From 60 to 65	Women	2010–20
	Earliest age: From 60 to 65 (pension credit)	Men	2010–20
	Full eligibility age for state pension: From 65 to 68	All	2024–46
United States	Full eligibility age: From 65 to 67	All	2000–27

Note: In countries with insurance-based systems, it is possible to de facto raise the official retirement age for full pension eligibility by simply raising the number of years in which individuals need to have been contributing to the system. Such changes do not concern retirement ages explicitly and are thus excluded from this table. An example would be the rise in the number of contribution years for French public servants to (the private sector level of) 40 years, up from 37.5, for full pension eligibility in 2003.

Sources: OECD (2006); BBC News, http://news.bbc.co.uk; IPE News, www.ipe.com.

periods, decision makers let the large generations retire at an early age, at least part of the fiscal impact of the reform will be lost, as large generations will "slip through" into retirement.[66] Thus the fact that US increases in the full pension eligibility age will have been fully phased in relatively early is a fiscal advantage for the country.

Delays in phasing in increases in retirement ages have had spectacular intergenerational distributional effects. If OECD policymakers had made the decision as early as 1970 to link life expectancies and retirement ages, the effects would already have been dramatic. Life expectancies and retirement ages can be linked in several ways (see below). If, for instance, there had been a decision to freeze the 1970 ratio of "time in retirement" to "time not in retirement," a measure that correlates rises in life expectancy and in retirement age, then the average retirement age in the OECD would have had to rise substantially from the lower 60s to age 70 by 2004, as illustrated in figure 3.11.[67]

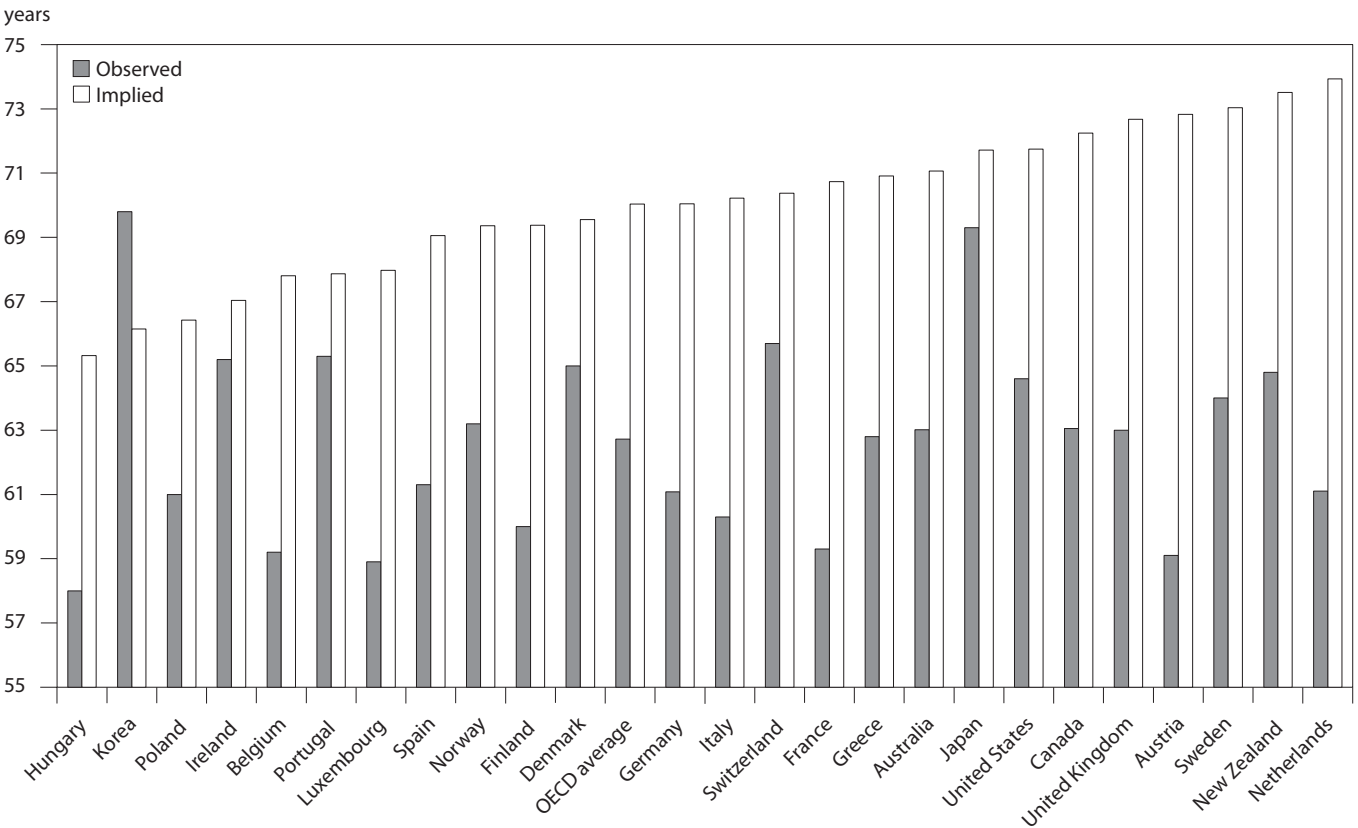
The political feasibility of having maintained such a stable ratio since 1970 is probably quite low. Certainly no American administration would have contemplated overseeing the gradual rise of US retirement ages to almost 72 years of age for men and 69 for women today, and French presidents would probably have had a challenging time persuading their countrymen that they would have to work more than a decade longer in 2004 than was actually the case! On the other hand, we do feel that the implications of figure 3.11—namely, that earlier generations spent a much smaller proportion of their lives in retirement than today—ought to feature more prominently among the public arguments in favor of raising retirement ages in many OECD countries.

This discussion is part of our assessment of fairness, because we are looking at how societies allocate the benefits of additional years of life among generations. In the OECD, the benefit has been given in full to current retirees, who are relying on current workers to pay the cost of additional years of pension benefits. This has occurred with little if any thought of fiscal sustainability because it has been the politically attractive option. However, this trend is starting to change. Edward Whitehouse (2007) notes that a growing number of OECD countries (13 out of 30) have begun to directly and indirectly link mandatory pensions to life expectancy, over

66. See box 3.5 for a blatant example of this type of "reform timing" in Denmark.

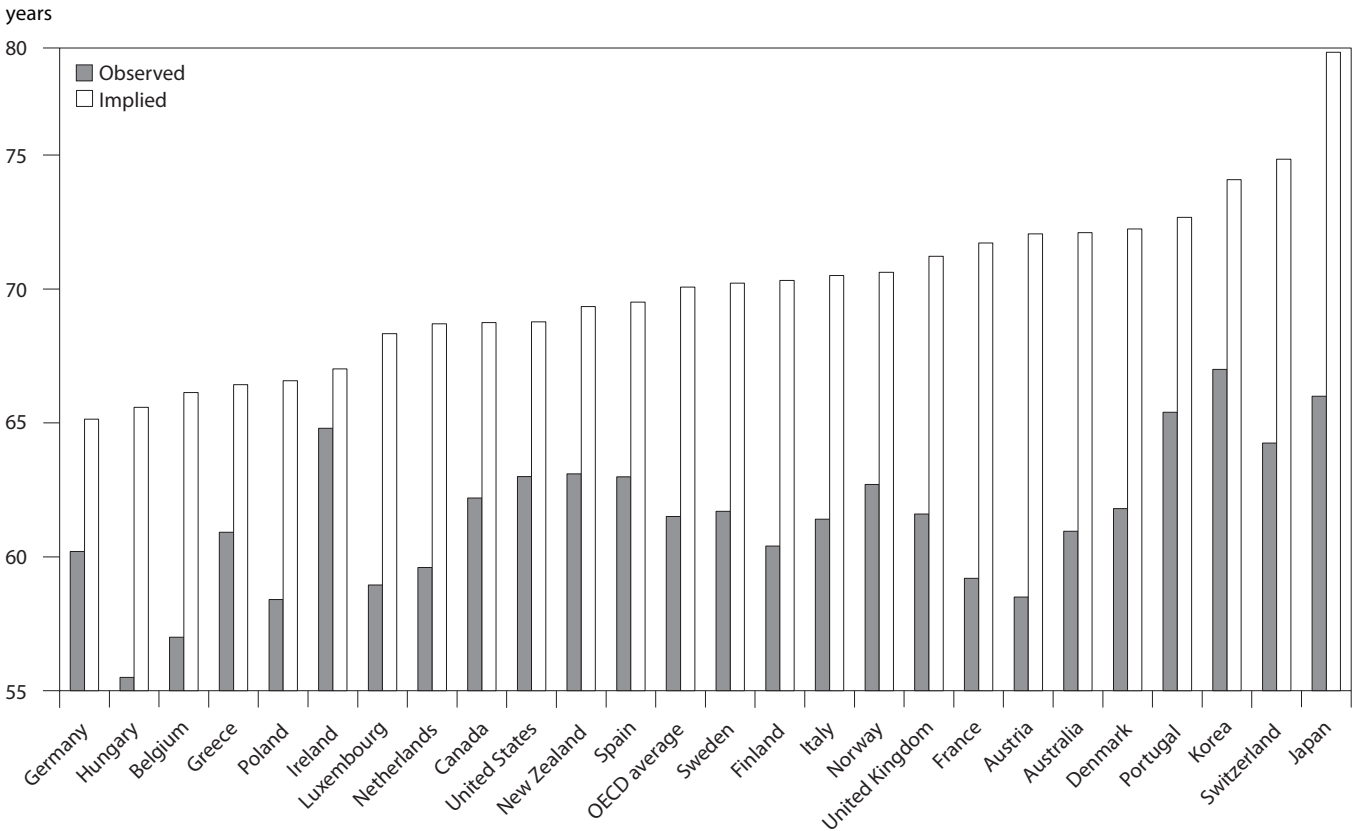
67. Figure 3.11 is created by first taking the ratio of expected years in retirement in 1970 (from figure 3.10) over the full life expectancy for people who reached age 65 in 1970. The full life expectancy at 65 is used as the denominator, as full life expectancies at the effective age of retirement in 1970 are not available. However, as the effective retirement ages in 1970 were close to age 65, this data inaccuracy is unlikely to affect the results substantially. Second, the full life expectancy for people who reached age 65 in 2004 is multiplied by (1 – the ratio from the first step) to yield the effective retirement age in 2004 had the ratio of time in retirement been the same as in 1970.

Figure 3.11a Observed and implied effective retirement ages for men, 2004



Sources: OECD (2006); authors' calculations.

Figure 3.11b Observed and implied effective retirement ages for women, 2004



Sources: OECD (2006); authors' calculations.

and above the prefixed increases listed in table 3.1. He describes four ways to link life expectancies to mandatory pensions (Whitehouse 2007):

- *Defined Contribution (DC) Plans.* Countries can introduce mandatory DC systems as a substitute for earlier defined benefit (DB) pensions. As DC benefits are directly related to the available capital at the time of retirement, the link between life expectancy in retirement and benefits is clear. Seven OECD countries have in recent years introduced this type of life expectancy link to their mandatory pension system.[68]
- *Notional DC Plans.* Three OECD countries (Italy, Poland, and Sweden) have introduced these types of systems, which link payouts to life expectancy in the same way as funded DC plans, even though there is no actual funding created by worker contributions (see chapter 6).
- *Links to Benefit Levels.* Finland, Germany, and Portugal have introduced automatic adjustment mechanisms, predominantly driven by changes in life expectancies, to the benefit levels of their mandatory pension systems (see also the discussion below).
- *Direct Eligibility Age Qualifications.* The systems in Denmark (see box 3.5) and France (box 3.6) feature the most intuitive link between life expectancy and retirement ages. Denmark will explicitly raise the earliest and full pension eligibility ages in accordance with life expectancies, once prefixed increases are fully phased in by 2027. Functionally similar, France will link to life expectancy the number of quarters of contributions required to be eligible for a full pension. As in Denmark, this linking will occur once prefixed increases in the number of quarters of contributions (up to 164 quarters, or 41 years) have been implemented in 2012. After 2012, required contributions for a full pension will rise in such a way that the ratio of expected time in retirement and required period of contributions for full pension eligibility (i.e., working life) will remain constant at approximately 0.5.[69] The long-term target in France will be that recipients of a full pension must have worked roughly twice as long as they are projected to live in retirement.[70] In other words, one might superficially say that the long-term target for the French mandatory pension system is an individual old age support ratio of 2.

68. Whitehouse (2007) identifies Australia, Denmark, Hungary, Mexico, Norway, Poland, Slovakia, and Sweden. We return to this subject in chapter 5.

69. The projected life expectancy at age 61 for France in 2012 is 21.8 years, equaling 53 percent of the required 41-year contribution period for a full pension (Whitehouse 2007, 34).

70. See also Jeger and Lelievre (2005).

Box 3.5 The 2006 Danish pension reform and the future retirement age

In June 2006, an overwhelming majority (80+ percent) in the Danish parliament passed a series of reforms to the Danish pension system to raise the average retirement age and keep people in the labor market longer.[1]

Until this reform, Denmark had a dual public pension system: an early retirement system, allowing people to retire at age 60,[2] and a universal tax–financed old age pension system with a statutory retirement age of 65.[3] The reform maintains the dual system but raises the ages both for access to early retirement (by six months each year from 2019–22 to 62 years of age) and for universal old age pension (by six months per year from 2024–27 to 67 years of age). These prefixed scheduled rises are similar to other such reforms (shown in table 3.1) that reverse unsustainably low retirement ages (including a reduction in Denmark as recently as 2004 from 67 to 65 years of age in the universal old age pension).

Nonetheless, the 2006 reform created a loophole that undermines the attempt to restore generational fairness. More than a quarter of the entire Danish population will be able to retire during the 65–window in place from 2004–24.[4] This policy change illustrates how the political process of pension reform necessitates providing special advantages for powerful voting constituencies—in Denmark nearly all of the large baby-boomer generation will be able to retire at age 65, rather than at 67, like preceding and subsequent generations.

However, the more interesting aspect of this reform is the explicit link to life expectancies it provides in the period after these predetermined and scheduled rises in retirement ages in the mid-2020s. The law explicitly states the aim to ensure that the period in early/universal retirement remains at approximately 19.5 years measured at age 60, irrespective of further rises in life expectancies. As such, this reform is based on a target number of years in retirement that distributes all benefits of future rises in life expectancy to contributing society at large and grants none to future retirees. Moreover, the gap between the time of the earliest retirement (62 by 2022) and the normal retirement age (67 by 2027) is foreseen to remain five years, such that the availability of early retirement is also directly linked to life expectancies.[5]

The reform includes efforts to ensure that the public receives ample notice of any changes in the retirement eligibility age to allow individuals to plan accordingly. Any increase in the retirement age must be published 10 years in advance, which means that the formulae for determining such increases will contain some uncertainty from having to use 10-year projections of life expectancy at 60. The

(box continues on next page)

Box 3.5 The 2006 Danish pension reform and the future retirement age *(continued)*

target number of 19.5 years is the historical average of years in retirement (from early and universal retirement) since the introduction of early retirement in Denmark in 1979 until 1995, when life expectancy from age 60 began rising. A distributionally important issue is that the reform formula uses a simple average of the life expectancies for both men and women at 60. But expected lifetimes at age 60 are significantly higher for women than for men in Denmark (23 years to 19.7 years, respectively, in the most recent data, 2004–05[6]), implying a longer period in retirement for women than men.

Surprisingly perhaps, the 2006 reform was approved at a time of no immediate economic crisis in Denmark. At the same time, the reform (excluding the baby-boomer loophole) is austere in the long term, as it allocates all future increases in life expectancies after the mid-2020s to society as a whole rather than to retirees, while simultaneously linking early retirement options to life expectancy. The 2006 reform thus implies a gradually declining ratio of expected-time-in-retirement to time-not-in-retirement after the mid-2020s and makes no allowance for the potential desire of future wealthier generations to consume more leisure. The rise in age for early retirement also may affect people with physically demanding jobs and generate political discontent in the future.

It seems likely that the generally extensive nonretirement-related welfare state in Denmark facilitated this austere outcome. Nonetheless, the large political majority behind it in 2006 notwithstanding, any pension reform is only as strong as present-day political will and leadership.

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1. The information in this box is from the final agreement of June 2006 (Danish Ministry of Finance 2006).
2. A number of additional conditions must be fulfilled in order to get early retirement. The three most important are: (1) residency in an EEC country; (2) early retirement contributions for 25 of the preceding 30 years; and (3) full participation in the labor force up until retirement (i.e., seeking employment in case of unemployment). Several of these conditions were implemented in a 1998 reform.
3. Denmark further has a very extensive quasi-voluntary occupational pension system, covering about 85 percent of workers.
4. This group consists of those aged 45–65 in 2004, which amounted to 27 percent of the entire population (National Danish Statistical Authority Population Database, available at www.dst.dk).
5. This follows the emphasis of Barr (2006), who suggests that the principal problem of pension systems is the time of the earliest available retirement option. See also chapter 4.
6. Data are from the National Danish Statistical Authority, www.dst.dk.

Box 3.6 Public and private pensions in France: Toward egalité

Recent developments in public and private pensions in France elegantly exemplify many of the issues described in this section. When the French universal pension scheme (now known as the Régime général d'assurance vieillesse des travailleurs salaries, RGAVTS) was set up in 1945, many French working either directly in the public sector or in (then) state-owned industries and utility monopolies had no financial interest in participating, as they were already covered by more generous separate public schemes and succeeded for decades in maintaining their separate and privileged status. Thus there existed a pension system duality between the RGAVTS and the (occasionally far) more generous "special schemes" (the 19 *régimes spéciaux*[1]) from the beginning of public pensions for the broader French population. In effect, the "universal system" was intended for the private sector only.

In 1993 the government of Prime Minister Edouard Balladur implemented a set of remarkably far-reaching reforms of private-sector pensions.[2] For the RGATVS basic pension, the necessary period of contributions for a full pension was raised from 150 to 160 quarters (37.5 to 40 years, scheduled to rise to 41 by 2012), the period of reference wage for pension estimation was gradually raised from 10 to 25 best years by 2008, and all upward valorization of the 25 annual salaries and all pensions were to be indexed to the consumer price index rather than wages. When fully phased in, these reforms will, by some estimates, reduce gross replacement rates by 22–43 percent, depending on particular career paths—some private-sector retirees will see their total pension cut almost in half (Benallah, Concialdi, and Math 2003).

Thus France showed that the reform of pensions *is* possible. Indeed, very deep and far-reaching pension reforms were carried out in the early 1990s—at least for some.

By so dramatically reducing the value of private pensions in France, the "Balladur reform" not only did much to maintain the financial sustainability of the private pension system; it also exacerbated the distributional unfairness relative to the unreformed public pension system. These increasingly large differences in generosity levels between the French private and public systems opened a political reform strategy for the public pension system. Interest grew in restoring fairness by subjecting the approximately 25 percent of the workforce covered by public-sector schemes to the reforms implemented for the far larger private workforce.

The French public bestows high levels of legitimacy on their pension systems as an embodiment of their social rights. When the government of Prime Minister

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Box 3.6 Public and private pensions in France: Toward egalité *(continued)*

Alain Juppé tried in 1995 to extend the major parts of the "Balladur reform" to public-sector pension plans, it had to withdraw the proposals after large-scale street demonstrations. It was only by 2003 that the government of Jean-Pierre Raffarin managed, after facing down massive demonstrations, to implement more limited reforms of French public pensions. For example, as for private-sector pensions, the number of years of contributions for a full public pension increases from 37.5 to 40 (by 2008, rising to 41 in 2012), and pensions are indexed to the consumer price index rather than to wages.[3]

However, the 2003 reform excluded most of the smaller "special schemes" in the French public sector. Although it included the main civil servant pension schemes, the reform did not apply to public-sector workers in the state utility monopolies and quasi-monopolies—SNCF (state railways), RATP (greater Paris public transportation network), EDF (former state power monopoly), GDF (former state natural gas monopoly), and la Poste (state postal monopoly)—or to special schemes for the Bank of France, seamen, and miners. These groups represent roughly half a million French workers, not counting dependents.[4]

Two factors account for the exclusion of these groups from the 2003 reforms: First, all of the (former) state monopolies are heavily unionized,[5] and second, they command significant disruptive force, as striking SNCF, RATP, EDF, and postal workers can largely cripple French public infrastructure—and have, as in 1995, 2003, 2007, and 2008.

Hence it was only in late 2007 that the newly elected President Nicolas Sarkozy acted to extend the 2003 public pension reform to the *régimes spéciaux*, ending the most blatant inequalities in pension coverage between French workers in the private and most of the public sectors and a small subset of public-sector employees. The stated intentions of the reform were fairness and "bringing the special schemes in line with the standard public scheme."[6]

Thus the politics of fairness and *égalité* overcame decades of entrenched opposition to the reform of generous public pensions even in France[7]—a lesson that should not be lost on either US policymakers at the state and local levels or public employees.

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1. The *régimes spéciaux* is a series of—as the name implies—special pension schemes in place only for workers at (previously) state-owned companies and public utility monopolies in France. See below.

Box 3.6 Public and private pensions in France: Toward egalité *(continued)*

2. At the time, these comprised the RGAVTS (basic pension), the ARRCO (compulsory supplemental occupational pensions for all private-sector wage earners), the AGIRC (compulsorysupplemental occupational pensions for managerial and professional workers), and IRCANTEC (similar to the ARRCO for employees in the public sector without civil servant status). See ADECRI (2005) for details.

3. Some elements in the 2003 reform concerned both private- and public-sector employees, but the latter were by far the most affected. However, substantial distributional inequalities persisted between public and private workers. Although the 2003 reform lengthened the calculation period for public-sector pensions from a reference rate of the last six career months to the last three career years, this remains relative to the 25 best years for the private sector. Similarly, the contribution levels for public-sector employees at 7.85 percent of wages are substantially lower than for private-sector employees, whose combined pension contributions (RGAVTS plus compulsory supplemental pension contributions) typically start at 9.5 percent of wages. See EIRO (2003b, 2003c) for a complete overview of the 2003 reform.

4. The number in the late 1990s—523,191—is cited in Rothenbacher (2004) based on data from Charpin (1999).

5. The CGT (Confédération générale du travail), generally considered the most militant among France's five national unions, is the majority union in most of the former national utility monopolies. See EIRO (2003d).

6. See Sarkozy's speech to the Senate, "Nicolas Sarkozy announces plans for a new social contract," September 18, 2007, available at www.premier-ministre.gouv.fr.

7. The details of the 2007–08 extension of the 2003 reforms are not yet clear. The government accepted extensive transitional agreements for affected workers, so the total financial savings from this final piece of reform for the French government are unclear and may not be particularly significant.

Whitehouse (2007) explains that the precise distribution of the gains from increases in life expectancies (or, from the perspective of financial costs, life expectancy risk) differs materially depending on the specifications of the four life expectancy linkages. One important general aspect to note here is the shift from a pure DB (like Social Security) to a pure DC system transfers all gains from increased life expectancies to society as a whole and none to retirees, irrespective of when in life mortally declines; in contrast, direct age eligibility qualifications, which use changes in life expectancies for ages at or close to retirement as a reference age, do not. This is because an individual's retirement decision cannot be undone, and laws are not—in liberal democracies at least—enacted retroactively, so any increases in life expectancies that occur at ages above the reference age

after an individual has retired will accrue completely to the retiree.[71] Hence any direct age eligibility qualifications will inherently entail some distribution of increases in life expectancies between workers and retirees.

US Social Security has no link to life expectancies and instead relies only on prefixed gradual rises to be fully implemented by 2027. After that, American retirees will reap all benefits from any increase in US life expectancies (and the US government will correspondingly carry the financial risk). With Social Security needing long-term financial reform, we believe this is a mistake and that US lawmakers as part of this reform process ought to legislate an explicit life expectancy link to both the earliest age of eligibility (currently 62) and the age of full eligibility for Social Security, for implementation by 2027.[72] As we believe system-changing reforms of Social Security are unwarranted, and that lowering benefit levels for all recipients will be untenable, we suggest that this link be instituted via a direct eligibility age link, similar to the approaches in Denmark and France.

The question is how to implement such a direct age link. We saw in box 3.5 that Denmark after the mid-2020s will target a fixed number of years in retirement and raise retirement eligibility ages with rises in life expectancy at age 60. Assuming simplistically (and likely erroneously for most people concerned) that additional years of employment bestow no benefit to the individual, this will transfer all post-2020 benefits from increases in life expectancy below age 60 to society and none to retirees.[73] We believe this type of direct life expectancy link will be not only unsuitable for the highly heterogeneous US workforce but also very politically challenging to implement.

Instead, we propose to link life expectancy and Social Security eligibility ages in a way that would keep constant the relationship between years spent in retirement and the rest of an individual's lifetime—that is, to adopt a ratio of expected time in retirement (ETR) to time not in retirement (TNR). Another possibility would be the ETR to working life ratio, to be implemented in France after 2012. This ratio links extra time in retirement to extra time spent working and thus is more rigorous than the ETR-TNR ratio. We believe that our suggested ratio is superior, as it does

71. The lower this reference age, the larger the share of life expectancy increases that will be transferred to retirees.

72. Whitehouse (2007, 39) notes that given the relatively limited scope of Social Security, such a life expectancy link will have less of a fiscal impact in the United States than similar measures in other OECD countries.

73. Given that the reference age of changes in retirement ages in Denmark will be 60 (i.e., below the country's current retirement ages of 62 and 67), the link will be further uncertain, as changes in life expectancies at 60 may differ from changes in life expectancies at 62 or 67. If, hypothetically, mortality risk declines occurred only between ages 60 and 67, then life expectancy at age 60 would not change, Danish retirement ages would not be raised, and retirees would still enjoy longer retirements.

not penalize individuals for late entry into the workforce (e.g., due to long periods in tertiary education). In contrast, the proposed French ratio—if combined with increasing educational attainment—will have a double impact on raising eligibility ages for a full pension. We believe this could be an unfortunate disincentive to engage in especially the longest tertiary education courses.

For the sake of argument, assume that it is reasonable to spend 18 percent of expected lifetime in retirement (the midpoint between the ratio in the OECD countries for 1970 and the ratio for 2004 is 18.7 percent[74]) and that the reference age for changes in life expectancies is 65.[75] A life expectancy of 80 for people who reach age 65 implies a retirement age of 65.6 years. Were life expectancy for people who reach the age of 65 to rise to 90, this would raise the retirement age to 73.8 years. In both cases, retiring generations who reach the age of 65 would look forward to spending 18 percent of their expected lifetime in retirement. Moreover, the benefit of the ten years of expected lifespan from 80 to 90 would be distributed with 1.8 years of additional leisure to the retirees and 8.2 years of additional labor force participation to contribute to paying for that extra retirement.

A fair pension system in terms of the distribution of retirees' leisure years among generations would target a fixed share of expected lifetime in retirement, so that each generation—irrespective of life expectancy at the reference age—might enjoy the same amount of lifetime in retirement.[76] Adopting a target ETR-TNR ratio also has the political advantage that it "gives something to everyone," as both retirees and younger generations benefit from a rise in life expectancy at any age.[77] Any future such pension reform would thus be "leisure-fair" rather than laissez-faire.

However, such a constant ETR-TNR ratio may overlook important welfare economic implications. The labor supply curve bends backward as income rises and people choose to consume more leisure. If we assume that real wages rise over time, this is also true across long intergenerational time spans, such that one might expect future and thus wealthier generations to "consume" more leisure in retirement than a constant ratio would imply. This would indicate that the ETR-TNR ratio should gradually decline over time as richer generations choose a longer retirement. At the same time, a constant ETR-TNR ratio would, given the power of

74. Choosing such a historical average for a target ETR-TNR ratio stretching over several generations has the distributional fairness advantage and therefore likely political appeal of smoothing out any large intergenerational differences.

75. Age 65 remains the most common age of eligibility for a full pension in OECD countries.

76. See Andersen (2005) for a theoretical discussion of a similar proposal.

77. As mentioned above, increases in life expectancies above the reference age after retirement invariably benefit the retiree.

compound interest rates, imply a constant lowering of the implicit rate of return on pension contributions.

But such welfare theoretical considerations do not take into consideration the starting point of any potential reform. Present-day retirees in the OECD enjoy vastly longer periods in retirement than did their parents so, even before considering the need to maintain a fiscally sustainable retirement system (of the PAYGO variety), there is a case for "adjusting the pendulum" by increasing normal retirement ages. Indeed, from figures 3.10 and 3.11 it is clear that in many OECD countries, retirement ages will for a period have to rise faster than life expectancies. A target ETR-TNR ratio should be adopted only after a period of scheduled rises in retirement age in excess of the rises in life expectancy in order to "make up" for the disproportional allocation of additional years of life expectancy to retirees in recent decades.

Average National Retirement Ages and Differing Life Expectancies—A Distributional Issue in National Pension Systems?

Life expectancies differ substantially across different groups, giving rise to vastly different retirement lengths and thus directly affecting each group's pension generosity, as people may have contributed the same amount to a national PAYGO or DB system. Does this imply that retirement age should be varied across different groups? On theoretical grounds, at least, Baily (1987) found, based on an intertemporal utility model, that policymakers should not attempt such stratification, as it would violate the principle of consumption smoothing.

The single most important and immediately observable subnational determinant of life expectancy is gender—women live significantly longer than men, irrespective of estimated life expectancies. In the OECD, women's life expectancy at birth in 2004 was 81½ years, which is almost 6 years longer than men. At age 65, OECD women in 2004 with 19½ years remaining still had an almost 3½ year advantage over men.[78] Figure 2.13 in the previous chapter showed that 10 OECD countries (Australia, Austria, Belgium, the Czech Republic, Hungary, Italy, Poland, Switzerland,

78. See OECD Health Database, 2007. Although life expectancies for both men and women in the OECD continue to rise, they do so at very different rates depending on the age at which they are measured. For instance, life expectancy for American men at birth has risen by more than eight years from 1960 to 2004, whereas at age 65, it has risen by only about four years. The 2003 Technical Panel to the Social Security Board of Trustees discusses the two tales of declining US mortality rates in the 20th century, with very rapid declines at young ages in the first half and rapid declines at older ages from 1950 on. See TPAM (2003).

Turkey, and the United Kingdom) already have different legal retirement ages for men and women. However, in all 10 the statutory retirement age for women is two to five years lower than for men. So, ironically, the existing stratification of retirement ages by gender makes these countries' pension systems even more skewed in favor of women than life expectancies alone would imply. This is certainly a holdover from an earlier era, when in overwhelmingly single-earner households women's retirement ages from the labor force were of mostly symbolic importance and mattered little in fiscal terms as women retired earlier to care for their typically older spouse. The ongoing reform efforts we saw in table 3.1 (e.g., in Australia, Austria, Belgium, the Czech Republic, Italy, Switzerland, and the United Kingdom) to eliminate such differences and align the official retirement ages of men and women (by raising that of women closer, if not equal, to the level of men) should therefore be welcomed.

Erasing distributional differences in retirement ages seems an intuitively fair policy reform. However, using differences in life expectancies to regulate new distributional differences is fraught with danger.

Estimates of life expectancies and derived approximations of distributional fairness based on them are invariably ex ante in nature and therefore rely (merely) on the best estimates of the future available at a particular time.[79] As government transfers and pension systems provide the majority of income for most retirees, exceptionally high validity requirements would have to be attached to any such estimates that might be used—in the name of distributional fairness—to discriminate in favor of a single group in terms of retirement age. Indeed, in the United Kingdom the government considered uncertainties concerning life expectancies so great that it rejected the original proposals from Lord Turner's Pension Commission suggesting an explicit life expectancy link for all retirees. Instead, with the stated desire to provide ample notice to UK retirees about changes in retirement ages, the government implemented a fixed schedule, pushing the retirement age to 68 by 2044.[80]

Who Wants to Live Forever? The Disputed Future of Life Expectancies

How long we will live is a question that most people ponder at some stage in life. Some Americans may find it comforting to look at the World Health Organization's annual World Health Report (WHO 2006) and discover that US life expectancy at birth in 2004 was 75 for men and 80 for women. However, like most single number answers to complex questions, this one conveys what Gigerenzer (2002) has called the "illusion of

79. See Queisser and Whitehouse (2006) for a discussion of this issue in relation to actuarial concepts.

80. See Whitehouse (2007) and UK Department of Works and Pensions (2006).

certainty," as estimating average life expectancies is both complex and highly assumption driven.

Life expectancy estimates are based on age-specific death rates for a given population (e.g., all residents of a country). An age-specific death rate of 5 percent at age 75 indicates that 5 percent of everyone in that population alive on their 75th birthday will die before the 76th. When age-specific death rates are known for all of a given population cohort (usually everyone born in a given calendar year), it is possible to compile an accurate cohort life table (also known as a generational life table) and calculate life expectancies at all ages.

Constructing a cohort life table requires continuous data collection over a very long time, as actuaries need to wait for everyone in the cohort to die before the data input is complete. Invariably, therefore, the tables are ex post and out of date as they reflect the circumstances of a group of people in the past whose historical conditions of life are unlikely to be the same for future generations.

To be both economically feasible and relevant, it is useful to estimate (rather than calculate) a different type of life table, the period (or current) life table. Instead of relying on long-term historical data to map the life spans of an actual age cohort, a period life table estimates how a hypothetical cohort would fare if its members throughout their lives suffered the mortality conditions experienced by all ages during a specific period. Data collection thus switches from the longitudinal (covering the entire lifetime of people born in year x) to the cross-sectional (covering all age groups alive in a given year), producing a snapshot of prevailing mortality conditions in period x.

For illustrative purposes, a recent period life table for the entire US population is presented in abbreviated form in table 3.2.[81] The calculations in the table are based on a snapshot of data, signaling the broad circumstances of life in the United States in 2003. No allowances have

81. Data for $q(_x)$ are derived from final numbers of deaths in the United States during 2003 and represent the only direct data input to the life table. $l(_x)$ is the number of people from the hypothetical cohort (originally set at 100,000 live births) who survive to the beginning of each age interval: 99,116 get to celebrate their 10th birthday, while 2,363 become centenarians. $d(_x)$ is the number of deaths in each age interval from the original 100,000. For instance, 687 will die during their first year, or 1,240 when they are 65. $L(_x)$ shows the number of person-years lived by the hypothetical cohort in each age interval from x to $x + 1$. Hence 99,290 represents the number of years the 99,313 who celebrated their 1st birthday live before their 2nd birthday. $T(_x)$ represents the total number of years that will be lived after the beginning of age interval x to $x + 1$ by the hypothetical cohort. Hereby, 6,756,754 equals the total number of years to be lived after their 10th birthday by the 99,116 who celebrated it. Finally, $e(_x)$ represents the average number of years to be lived by those still surviving in the hypothetical cohort, based on the estimated age-specific values of $q(_x)$. It is derived by dividing $T(_x)$ by $l(_x)$, so that, for instance, the average remaining life expectancy for the hypothetical cohort between their 65th and 66th birthday would be 1,524,128 ÷ 82,668, or 18.4 years.

Table 3.2 US total population life table, 2003

x − age	$q(_x)$ − probability of dying between ages x and $x+1$	$l(_x)$ − number surviving to age x	$d(_x)$ − number dying between ages x and $x+1$	$L(_x)$ − person-year (years lived between ages x to $x+1$)	$T(_x)$ − total number of person-years lived over age x	$e(_x)$ − expectation of life at age x
0–1	0.00687	100,000	687	99,394	7,748,865	77.5
1–2	0.00047	99,313	46	99,290	7,649,471	77.0
10–11	0.00017	99,116	16	99,108	6,756,754	68.2
65–66	0.01501	82,668	1,240	82,048	1,524,128	18.4
100+	1.00000	2,363	2,363	6,044	6,044	2.6

Source: Abbreviated version of table in CDC (2006).

been made for changes in these circumstances in the future; thus the assumption is that the newborns in table 3.2 will in 50 years face the same medical technology, prevalence of smoking, cancer risks, murder rates, vehicle safety levels, obesity rates, and anything else that will affect their probability of death as those aged 50 in this table. This assumption of a status quo is, of course, highly questionable, and it lies at the heart of all notions of uncertainty concerning life expectancies.[82] What should we assume about age-specific death rates in the future? Maybe a new electronic toddler alarm will be created, so that infant mortality drops (i.e., the 687 deaths before the 1st birthday in table 3.2 decline), or maybe a cure for lung cancer is discovered, dramatically reducing death rates among the elderly (i.e., the 1,240 deaths at age 65 in table 3.2 drops)?

Medical and demographic experts are split on the question of how to refine such estimates for future changes in lifestyle or medical technology. One school of thought (the historical optimists) espouses the view that future decreases in mortality rates (increases in life expectancies), evolving from a complex interaction of behavioral and social factors and the continuing emergence of new medical technologies, will continue at the constant pace seen in the last more than 150 years.[83] This would entail a continued rise in life expectancies at birth of up to 2½ years per decade for the foreseeable future. The other school of thought (the worried empiricists) reject the continued projection of historical trends and instead focus on current trends that they contend will slow or even reverse life expectancy increases in many

82. It further determines the magnitude of longevity risk, a topic we analyze in chapter 7.

83. See Watson Wyatt (2005), Vaupel and Kistowski (2005), Vaupel and Jeune (1995), Oeppen and Vaupel (2002), Kannisto (1994), Kannisto et al. (1994), Riley (2001), Jeune (1995), and Wilmoth (1995) for representatives of this line of thinking.

developed countries.[84] This school of thought worries about the impact of rapidly rising obesity levels,[85] diabetes, infectious diseases, and antibiotic-resistant pathogens on the mortality rates of older people, in particular.

The debate is ongoing. For instance, the 2003 Technical Panel advising the US Social Security Advisory Board[86] recommended that the SSA change its assumptions guiding the predicted declines in US mortality rates and thus by extension in US life expectancies. In its intermediate scenario, the panel recommended raising the average life expectancy at birth for Americans in 2078 from the current Social Security Trustee estimate of 82.9 to 84.4 years of age,[87] in either case a significant increase over the latest life expectancy of 77.5 years (table 3.2).[88] And even the recommendations of the technical panel came with significant uncertainties. Cheng and colleagues (2004) estimated that the standard 95 percent confidence interval for the panel's predictions for life expectancy at age 65 for men in 2078 would equal ranges of 17.2–24.8 years and 19.4–28.1 years for women. Indeed, most long-term projections of life expectancies now come in the form of probabilistic fan charts, sketching a range of possible scenarios and outcomes.[89] Antolín (2007), after a review of different approaches to predicting changes in mortality rates,[90] attempts to quantify the degree of uncertainty by suggesting a Monte Carlo–based stochastic approach for attaching probabilities to different mortality outcomes.

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84. See Watson Wyatt (2005), Olshansky et al. (2005), Olshansky, Carnes, and Désesquelles (2001), and McNeill (1976) for representatives of this school.

85. Olshansky et al. (2005) estimate that current obesity levels in the United States have lowered life expectancy by up to a full year for some groups of Americans. Reynolds et al. (2005) find a significantly higher risk of disability among the obese.

86. One member of the technical panel, J. R. Wilmoth, is a recognized member of the school of historical optimists.

87. The panel recommended several additional technical changes to how the Social Security Trustees estimate future changes in mortality rates. See TPAM (2003) and Cheng et al. (2004). However, as with the Panel's recommendations on fertility, the recommended changes in mortality assumptions have a quite limited impact on the long-term financial situation of Social Security. The Office of the Chief Actuary estimates that implementing the advisory panel's mortality recommendations of an increase in life expectancies raises the unfunded 75-year obligation by "only" $500 billion and brings forward the exhaustion year for the trust fund by just one year (to 2041).

88. The 2003 Panel's recommendation represented a decrease from the previous 1999 advisory panel, which had recommended an end-of-projection period life expectancy at birth of 85.2 years.

89. Such charts are increasingly common in many types of even short-term predictions. See, for instance, the Bank of England's inflation and GDP projection charts, available at www.bankofengland.co.uk.

90. Antolín (2007) surveys process-based biomedical forecasts, causal econometric forecasting, and historically based extrapolative forecasts.

Inevitably, predictions of life expectancies fall into the category of inherent uncertainties that, unlike risks, according to Knight (1921), cannot be directly quantified. This reality should discourage rules that discriminate against individual groups based on such estimates.

Other Possible Stratifications of Retirement Ages

Gender is the most obvious of factors that cause differences in life expectancies among population subgroups. But socioeconomic variables such as education, family income, marital status, homeownership, employment/labor force participation, geographic address, and race are also consistently correlated in the medical literature with large differentials in life expectancies in the OECD and many other countries. However, there is no scholarly consensus about the extent of the impact of any individual socioeconomic factor because of the complex impact on health of many of these variables, correlations between them as explanatory variables (for instance, education and income are almost invariably highly correlated), concerns about the direction of causality,[91] and issues of data validity.[92] Nonetheless, the evidence is clear: A substantial international literature points to a large positive impact of education/socioeconomic status/income on mortality risk for all age groups, irrespective of whether free universal government-provided health care is available (as in Europe) or not.[93] Thus those who are highly educated and/or have

91. The classic chicken-and-egg issue: Does limited time in school cause poor health and increased mortality or might some people already be ill and, therefore, drop out of school? Some studies, like Lleras-Muney (2005), suggest that lack of schooling causes increased mortality later in life. See also the *New York Times*, "A Surprising Secret to a Long Life: Stay in School," January 3, 2007. Similar issues haunt the relationship between increased mortality and unemployment or sudden drops in income.

92. Lynch et al. (2005) show the significant difference the choice of time period and the choice between US Census inequality data and IRS tax revenue–based inequality data makes for the magnitude of the impact of inequality. Further, it is a frequently mentioned worry concerning especially older death certificates, where race was identified overwhelmingly based on the visual impression of the body by a certifying physician, funeral director, or the family, which may differ from the corresponding race identification in US Census data, containing socioeconomic input.

93. See, for instance, von dem Knesebeck, Verde, and Dragano (2006) for evidence from 22 European countries; De Vogli et al. (2005) for Italy and 21 other countries; Huisman et al. (2004) for 11 OECD countries; Mackenbach, Huisman, and Kunst (2003) for six European countries; Brønnum-Hansen (2006) and Brønnum-Hansen et al. (2004) for Denmark; Bopp et al. (2003) for Switzerland; McLeod et al. (2003) for Canada; Davey Smith et al. (1998) for the United Kingdom, and Sundquist and Johansson (1997) for Sweden. A number of other studies report that in the former Communist countries in Europe, a very large gap in mortality rates has opened between different socioeconomic groups since the fall of the Berlin Wall in 1989. See Shkolnikov et al. (2006); Kalediene and Petrauskiene (2004); and Leinsalu, Vågerö, and Kunst (2003).

a high income and/or are married and/or are employed generally live (in some places much) longer than their countrymen less fortunate in these regards.[94]

America occupies a special place in the literature on the effect of socioeconomic factors on health. First, US income and health care access differentials are larger than in all other OECD countries. Second, for obvious historical reasons, US society is uniquely race conscious and has produced a very large scholarly literature on the impact of race on mortality rates. In this area, America represents arguably not only the best but also the worst in the world. Murray and colleagues (2006) found that in 2001 life expectancy at birth for Asian women in America was 86.7 years, more than two years longer than the highest national average (Japan) in the world that year. The same was found for Asian men in America, who with a life expectancy of more than 81 had three years more than the world's next highest male life expectancy (78.2 in Iceland). However, for urban black American men, life expectancy was 15.4 years lower than for Asian men, roughly equal to that of men in Albania, Egypt, and Peru (WHO 2002). Such differences in life expectancies have significant independent distributional policy consequences. For example, Woolf and colleagues (2004) find that all the improvements in medical technology in America between 1991 and 2000 saved only one-fifth of the lives lost to the excess mortality rates among African-Americans over the same period. In other words, bringing African-American mortality rates down to the US average would have saved five times more lives than all technological medical improvements achieved during the 1990s.

Other socioeconomic variables are intertwined with the impact of race on mortality rates. Both education and race may affect the mortality rate, but the outcome is blurred when, as Hillary Waldron (2002) points out, for the most recent cohorts, a higher share of white males drops out of high school than black males, even as a larger share of white men goes to college.[95] Richard Rogers and colleagues (1996) estimate that blacks have a higher mortality rate than whites from diabetes, homicide, and in-

94. A specialized strand of the medical literature considers whether rising income inequality has an independent adverse impact on mortality rates. Proponents of the "social capital thesis" argue that rising income inequality reduces the level of social capital (as defined by, for instance, Putnam 1993 and 2000) via "psychosocial interpretation effects" of increasing levels of frustration over relative deprivation and the adverse health effects of social conflict. See, for instance, Kaplan et al. (1996) and Lynch et al. (2000). Other authors (e.g., Pearce and Davey Smith 2003) contest this theory, arguing for the primacy of absolute (rather than relative) levels of deprivation and of macroeconomically and politically determined underinvestment in human, physical, and health infrastructure.

95. One possible explanation is that in terms of mortality, it is irrelevant whether one drops out of or completes high school; rather, only higher levels of education confer beneficial impacts on earnings and the ability to learn and implement healthy behavior.

fectious diseases (HIV/AIDS) but a lower mortality rate from accidents, respiratory diseases, and suicide. Some studies emphasize the effect of early-life deprivation for many blacks (see, for instance, Warner and Hayward 2006), while others conclude that, when controlling for socioeconomic variables, the effect of race on US mortality rates disappears entirely, especially at higher ages.[96]

The socioeconomic stratification of mortality rates in America seems to be widening, with educational attainment or income becoming more important in recent years. Gopal Singh and Mohammad Siahpush (2006) find that life expectancy disparities between two groups of Americans differentiated by socioeconomic deprivation rose from 2.8 years in the early 1980s to 4.5 years in the late 1990s.[97] This widening in life expectancies by socioeconomic status cuts across racial barriers, as several studies show that high-income blacks have experienced the same declines in mortality as other high-income groups, while low-income blacks have not (Barnett, Armstrong, and Casper 1999).

In summary, while socioeconomic variables and (in America) race play substantial roles in determining mortality rates and life expectancies, the complexity of their impact and uncertainties in projected life expectancy estimates ought to, as with gender, caution against using these parameters in pension legislation to implement different retirement ages for different socioeconomic groups. The inherent measurement uncertainties are very daunting. Even if it were judged desirable to pay higher monthly Social Security pensions to, say, African-Americans than to Caucasian Americans, the practical problems of implementing such a measure would be horrendous, and any regulations to this effect would likely be declared unconstitutional.

There may, however, be a case for providing different pensions for workers based on the types of job they perform. Several countries already have such programs in place that would seem to mirror such intent. Italy's legislation offers retirement up to five years earlier than the standard retirement age to Italians with "arduous work" (*lavoro usurante*), defined as "a particularly intensive and continuous mental or physical effort, caused by factors that cannot be prevented by taking appropriate measures."[98] Similarly, France's provisions for people with "long working lives" allow citizens to retire with a full pension as early as age 56. However, the eligibility criteria are strict: Participants must have paid social insurance contributions for 42 years—from the age of 14 to retire at 56! Thus this option is essentially open only to people with low educational

96. See, for instance, Rogers (1992), Menchik (1993), and Sorlie, Backland, and Keller (1995).

97. See also McDonough et al. (1997), Schalick et al. (2000), Crimmins and Saito (2001), and Lin et al. (2003).

98. As defined in Legislative Decree No. 374/1993, available at www.eurofound.eu.int.

skills.[99] French civil servants in "active services" also have access to full pensions as early as 50 (police officers) and 55 (nurses). Similar options for a relatively low retirement age are available for many US firemen and police officers, based on municipal or state pension rules.

Such rules create more problems than they solve. Who decides what is a hard job? Where do the funds come from to support the early retirement? From the employers that generate the hard jobs? From the workers employed in them? From general tax revenue? There is a general consensus that many workers who do physically demanding jobs do not receive particularly high wages and are also forced to retire early because they cannot perform these jobs beyond age 55 or so. This is part of a broader issue of the widening of the wage and income distribution in the United States, and it is not clear that public pension policy is necessarily the place to tackle it.

One of the big differences between the labor market in the United States and that in many countries in Europe is that Americans are required to work in order to receive income, except for short-term assistance such as Unemployment Insurance. This suggests that workers may be expected to take different jobs rather than early retirement if they can no longer perform the tasks they have been performing. So while it is unreasonable to expect aging workers to continue to carry heavy furniture or move heavy boxes, there may be many other tasks they can perform.

A Closer Look at the Distributional Effects of Public Pensions

A particular distributional pension issue is whether public-sector pensions are more generous than those available to the general population and, if so, what impact this may have on government finances and other issues. We believe this issue is particularly pertinent in the United States, as several state and local government employee pension schemes will soon face significant economic stress, a challenge that seems bound to raise some distributional concerns between US private-sector workers and state and local employees. In this section we analyze (1) OECD data on the differences in retirement ages and benefit generosity between public-sector pension schemes and those universally available and (2) the age profile of the sector's workers. We also begin the discussion of government pension accounting issues.

99. Participants must have paid contributions for 41 years to retire at age 58 and 40 years to retire at age 59 and also have had at least five quarters of contributions before the end of the calendar year in which their 16th birthday fell. Certain other criteria also apply. See EIRO (2003a).

Public Pension Schemes—Generosity Levels and Consequences

Powerful organizations can over time be expected to "look after their own," and governments, being among the oldest and certainly most powerful organizations around, are no exception. So it is little surprise that civil servants and other public-sector employees—soldiers, police officials, teachers, state-owned enterprise employees, and others—were frequently covered by government pensions well before the public at large. In the United States, the federal government in 1789 accepted the responsibility of providing pensions for disabled war veterans from the Revolutionary War; in 1857 New York City started a pension fund for the city's police; and in Chicago and New Jersey, teachers acquired coverage during the 1890s.[100] Older countries in Europe started even earlier: Austrian state civil servants became eligible for public pensions as early as 1750, central government officials in France in 1790 (evidently the revolution there looked after its own, too—at least initially) and all French civil servants in 1853 (Benallah, Concialdi, and Math 2003), British civil servants in 1810 were granted a noncontributory pension by parliament,[101] and the first German *beamte* in Bavaria become eligible in 1805. Rothenbacher (2004) cites the average year of introduction of civil servants' public pensions in 18 surveyed countries as approximately 1850, 60 to 70 years before the introduction of public pensions for other workers, employees, and/or the general public.[102]

Of course, there were many good reasons for granting public pensions to civil servants. One imperative was to ensure the loyalty of the country's armed forces—it is easier to make soldiers stay and fight if they know it earns them a future pension. It was also considered important to (try to) guarantee the financial independence of public servants and to make careers in the public services appealing through pension provision.[103] Using future pension benefits as a substitute for cash in hand today pushes the financial costs of attracting and maintaining a competent civil service well into the future—a tax burden that future politicians will have to deal with.

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100. See the Social Security Administration website for an in-depth time line of social insurance in the United States until the 20th century (www.ssa.gov/history). See also Hewitt Associates (2005).

101. Raphael (1964), cited in Palacios and Whitehouse (2006).

102. According to Rothenbacher (2004), only in Ireland did civil servants and the general public get access to public pensions simultaneously in 1909. However, this is due to the fact that Ireland, at the time a British colony, did not have a separate indigenous administrative class of civil servants, and hence all Irish residents, irrespective of occupational sector, participated in the first British universal pensions from 1909.

103. This argument is, of course, even more important concerning public legislators, government ministers, and judges. Typically, these small groups have pension schemes far more generous than any other group, or, in the case of judges, lifetime appointments.

The fact that public-sector workers are among the groups most likely to vote may amplify the moral hazard risk for political leaders.[104]

When for largely electoral political reasons mandatory public pension systems were expanded in the 20th century to cover the general population, governments often did not include public-sector employees (who were typically already covered). As Robert Palacios and Edward Whitehouse (2006) describe, this "dualism of public pension systems" frequently emerged and persisted due to the powerful ability of civil servants to protect their pecuniary interests through their own special systems, which were and remain, on average, significantly more generous than those to which the general public has access (see below).

According to survey data collected by Palacios and Whitehouse (2006), 14 OECD countries in 2004 had civil service pension schemes completely or partially integrated with the national scheme but with separate "top-up" benefits. This is similar to the current system for US federal government employees, who, if hired since 1984, have been covered by Social Security but in addition have had a top-up benefit in the form of the defined contribution Federal Thrift Savings Plan.[105] Nine countries (seven in the euro zone as well as Korea and Turkey) have kept their civil service schemes completely separate from the general national schemes; it is only in Finland and the Netherlands that civil servants may be on separate programs but enjoy the same benefits as all other resident participants.[106]

Such differences matter in terms of pension distribution. Public employment is nontrivial in all OECD countries: In the United States it accounted in 2005 for 16.3 percent of total CPS employment, or almost 22 million (excluding the armed forces), and more than 15 percent in all major OECD countries in 2001.[107] In their survey of civil servant pension schemes, Palacios and Whitehouse (2006) found that statutory retirement ages in half of the countries for which data are available are significantly

104. The same moral hazard issue also affects corporate pension decision makers; see chapter 7.

105. The Federal Thrift Savings Plan is in many ways similar to a regular private tax-deferred 401(k) plan. It also covers the US armed forces. Apart from employee contributions, it consists of a 1 percent automatic agency contribution as well as matching contributions of 100 percent of up to 3 percent of salary and 50 percent of the next 2 percent (FRTIB 2005). Federal employees hired before 1983 have access to additional vested pension rights under the previous federal government–defined benefit scheme. The other 11 fully integrated countries are Canada, Denmark, Iceland, Ireland, Italy, Japan, Norway, New Zealand, Spain, Sweden, and Switzerland, while the United Kingdom and Australia have partially integrated systems (Palacios and Whitehouse 2006, appendix table 1).

106. Both Finland and the Netherlands rely extensively on privately (the Netherlands) or quasi-governmentally (Finland) managed mandatory occupational pension funds.

107. Data from the BLS CPS (www.bls.gov/cps) and OECD (2002).

below those for general national pension schemes—typically by five years but in Mexico until recently a staggering full decade (55 instead of 65).[108] They also found that maximum replacement rates for full-career civil servants are substantially higher than for similar workers in the general national schemes. Their findings are summarized in table 3.3.

These significantly more generous civil service pension schemes[109] constitute an additional problem for government finances, as they are almost exclusively funded on a PAYGO basis, and less than one in four had accumulated any type of prefunding (Palacios and Whitehouse 2006). We also note that even when there are public employee contributions, as in the case of the US Federal Employee Thrift Pension System, these are accompanied by matching employer contributions and thus represent an additional budgetary pension outlay for governments.

One way to further illustrate this difference in pension levels among private and public employees in America is to study the SSA's sources of income data for people over 65 (SSA 2006a). These are broken down by government employees (including federal and military pension recipients) and private employees[110] as well as by size of the employment-based pension income (i.e., excluding Social Security benefits; figure 3.12).

As can been seen in the distributions of employment-based pension income for government and private employees, the former clearly have a relatively more generous employment-based pension income. In fact the government-sector median employment-based pension income is, at $15,600, fully 130 percent higher than the corresponding private-sector median at just $6,720. And—perhaps surprisingly, given the attention bestowed on the pension income of US corporate executives—far higher shares of retired public-sector workers in America have annual employment-based pension income above $15,000 as well as in the highest ($50,000+) category than is the case for private-sector workers.

Perhaps more worrisome, public sectors across the OECD are faced with a worse demographic outlook than the rest of the economy. Due to the rapid expansion of the government sector in many countries around the time of the baby-boomer generation's entry into the workforce and traditionally long public-sector career paths, a very large share of public workers

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108. This mismatch in Mexico has been partly reversed by an increase in the public-sector retirement age to 60, following reforms enacted by the Calderón government in 2007.

109. Civil service schemes are far more likely than general national schemes to be indexed to earnings rather than prices.

110. "Government sector" here refers to recipients of federal, state, local, and military employment-based pensions. "Private sector" refers to recipients of any (i.e., DB, DC, hybrid, or other) private employer-based pensions and annuities (SSA 2006a, chapter 5). See also appendix 3A and SSA (2002) for additional information on the underlying data and the precise definition of "included units," of which there are 3.8 million in the government sector and 8.4 million in the private sector.

Table 3.3 Civil service and general national pension schemes, retirement ages and replacements rates

	Normal statutory retirement age		Maximum replacement rate	
Country	Civil service scheme	General national scheme	Civil service scheme	General national scheme
Australia	55–60	65 (5–10 years higher)	66–88	52
Austria	60	60 (f)/65 (m) (five years higher for men)	80	80
Belgium	60	65 (five years higher)	75	60
Canada[a]	65	65 (same)	90	56
Czech Republic	n.a.	65	n.a.	n.a.
Denmark	65	65 (same)	n.a.	n.a.
Finland	63–65	65 (up to two years higher)	60	60
France	60	60 (same low age)	75	71
Germany	65	65 (same)	75	46
Greece	60	65 (five years higher)	69	n.a.
Hungary	n.a.	60 (f)/62 (m)	n.a.	n.a.
Iceland	65	67 (two years higher)	76	73
Ireland	n.a.	66	n.a.	n.a.
Italy	n.a.	60 (f)/65 (m)	80	66
Japan[a]	65	60 (five years lower!)	n.a.	n.a.
Korea	n.a.	60	n.a.	n.a.
Luxembourg	n.a.	60	83	71
Mexico[a,b]	55	65 (10 years higher)	n.a.	n.a.
Netherlands	65	65 (same)	n.a.	n.a.
Norway	67	67 (same)	66	53
Portugal[a]	60	65 (five years higher)	80	n.a.
Spain[a]	60	65 (five years higher)	95	88
Sweden	65	65 (same)	73	76
Switzerland	62	64 (f)/65 (m) (3/2 years higher for f/m)	65	58
Turkey	n.a.	58 (f)/60 (m)	n.a.	n.a.
United Kingdom	60	65 (five years higher)	67	37
United States	n.a.	65+	n.a.	n.a.

n.a. = not applicable

a. Years of service: 15 in Mexico, 25 in Canada and Japan, 30 in Spain, and 36 in Portugal.

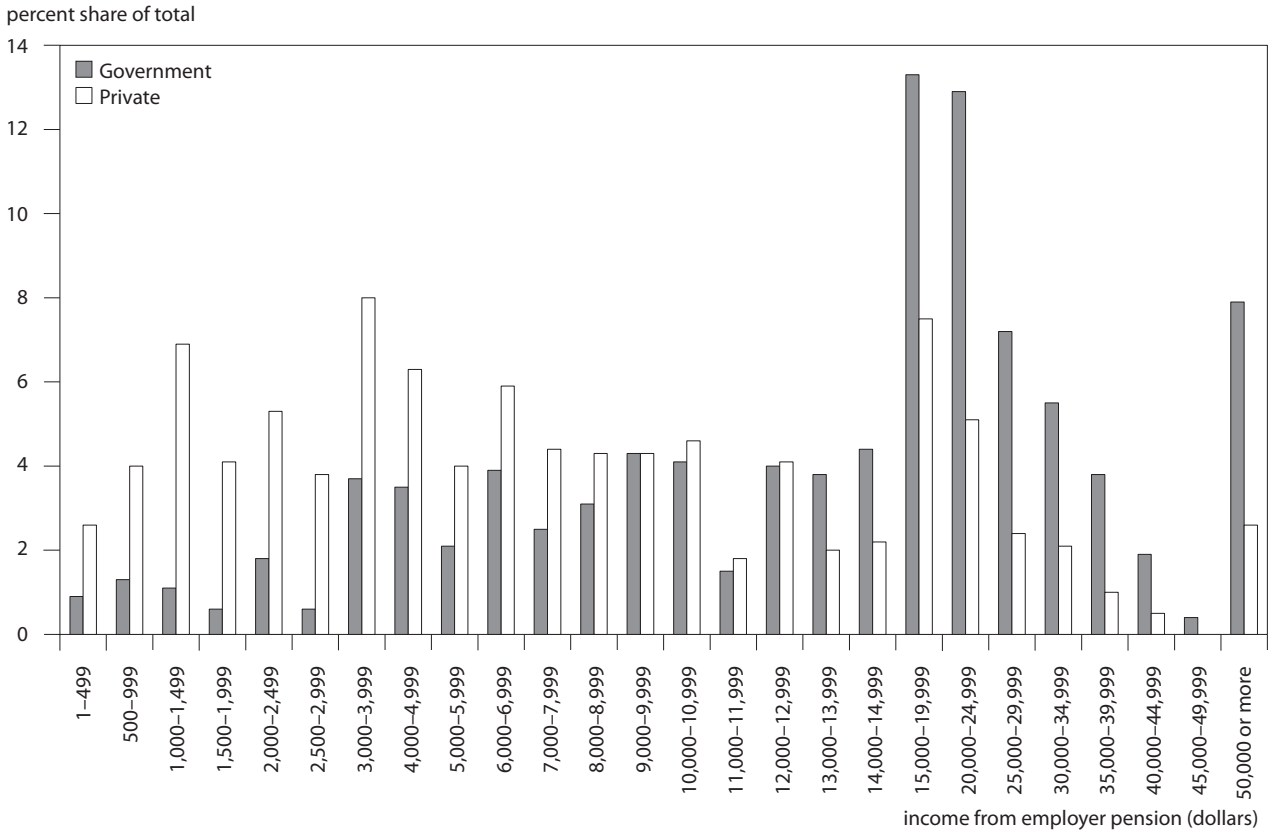
b. 2007 reforms by the Calderon government will gradually lower the Mexican difference to five years by raising the public retirement age to 60.

Note: Female (f)/male (m), where difference in retirement age exists.

Source: Palacios and Whitehouse (2006).

today are from these generations and are fast approaching retirement age. Indeed, detailed studies by the US Office of Personnel Management and the Government Accountability Office (GAO) suggest that up to one-third of all US federal government employees will be eligible for retirement by 2012, including at such high-profile agencies as the US Treasury,

Figure 3.12 US annual employment-based pension income distribution in 2004, by sector



Source: SSA (2006a).

Department of Defense, Department of State, and—not without irony—the Social Security Administration (GAO 2008).

The situation is similar in many OECD countries, as up to one-third of all government employees were, in 2007, less than 10 years from a retirement at the relatively high (for public servants, according to table 3.3) age of 65.[111] In all countries except Australia, Japan, Korea, Portugal, and Turkey,[112] this share is substantially larger than for the economies as a whole, clearly indicating that expenditure on civil service pensions can be expected to rise rapidly in the near future (figure 3.13; see below for data on US state and local governments).

Yet, viewed in strictly financial terms, the facts that public pensions are more generous than the national average and that public-sector employee pension expenditure will correspondingly soon make up a larger share of total public expenditure, hardly constitute an overwhelming problem in OECD countries, as these generally have reasonably well-functioning public sectors and a broad tax base to support them. Certainly, no OECD countries have permitted the exceptionally generous and macroeconomically distorting public-sector pension benefits (i.e., government liabilities) of several developing countries (such as Brazil and India).[113] Rather, the core concerns are those of labor market distortions, public-sector human resources management, and the politics of pension fairness.

As mentioned above, pensions usually and rationally make up an important share of the total lifetime compensation package used to lure human capital to the public sector.[114] However, a detrimental issue arises when public-sector pension promises hinder job mobility between the public and private sectors and if, in attempting to hold on to prized employees, governments penalize people who do not spend their entire career in public service. There are two commonly used forms of such penalties. First, employers impose long vesting periods (periods of service required to receive any public-sector pension) that strongly incentivize employees to continue working in the public sector for up to 15 years in

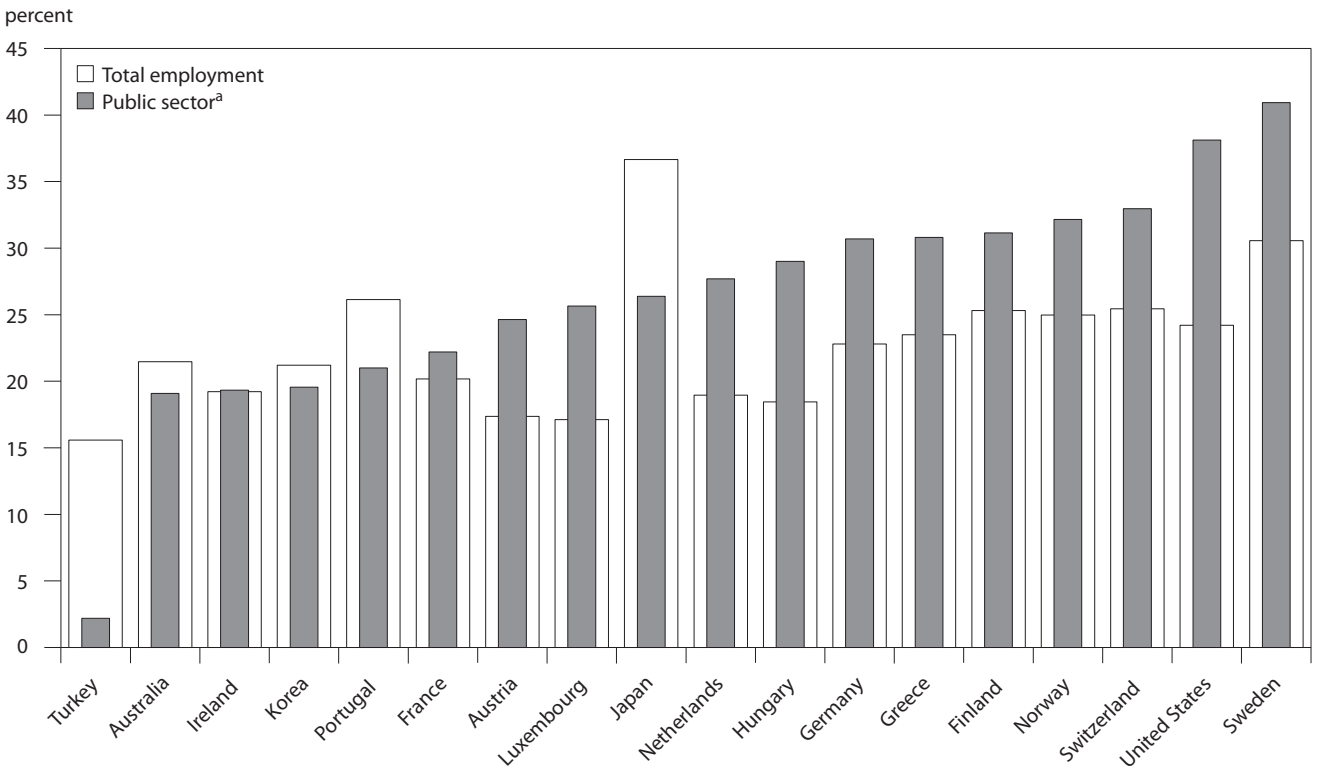
111. Americans born in 1943–54 can retire at 66 with a full Social Security pension. These comparative data are from 2001. CPS data for the United States only showed that in 2005 29 percent of all government workers were aged 45–54, 17 percent aged 55–65, and 3 percent 65+. The corresponding figures for total nonfarm employment were 22, 12, and 3 percent, respectively.

112. In these four countries, the likely reason for their relatively youthful workforce is not (Turkey partly excepted) that they have a great number of very young employees but rather that many more of the older (55 or 60+) public-sector employees have already retired, thus lowering the relative share of older employees.

113. See Palacios and Whitehouse (2006), OECD (2005), and 2006 IMF Article IV consultations with both Brazil and India.

114. See Schiavo-Campo, de Tommaso, and Mukherjee (2003) for examples of other, less important, nonwage benefits used for this purpose.

Figure 3.13 Share of employed 50+, selected OECD countries, 2001 or most recent



a. Total public sector, except Australia, Austria, and Switzerland (federal administration) and Ireland, Greece, and Sweden (central government).

Sources: OECD (2002); OECD Labor Force Statistics; Eurostat.

some OECD countries[115] if they want to accrue any pension benefits from their employment. Second, early departees from public-sector pension schemes may receive a much lower value of their accrued pension than what it would have been worth had they remained in the public sector for their entire career. A similar situation faces many private-sector workers who leave a job with an occupational DB pension plan for other employment. We further discuss pension portability in chapter 7.

Public pension schemes, typically more generous than the average national schemes, may further amount to significant obstacles for the privatization of former state-owned enterprises (SOEs) or other parts of the public sector (see chapter 7 for an example from France). Potential private-sector buyers usually are not willing to take over the running of such entities in competitive markets if they are saddled with pension liabilities owed to past and present retirees significantly in excess of the national average. And public-sector/SOE employees will, of course, oppose privatization if it entails substantial reductions in their pensions. In most ways, this is not dissimilar to the likely unwillingness of a potential buyer to take over General Motors, for example, including GM's pension (and health care) liabilities, and the equally likely opposition of the workforce to any such sale excluding them. However, given the probable improvements in productivity and other beneficial spillover effects from privatization of government assets (such as the introduction of competition in former government monopoly service areas), the blocking of privatizations due to conflicts over pensions for (soon to be formerly) public servants frequently means forgoing even very large efficiency gains for an economy.

US Government Pension Accounting—Time to Empty the Augean Stables?

By far the most potent distributional issues concerning public-sector pensions are transparency and fairness. All pension accounting, even on the best of days, can be a rather murky business of opaque rules, complicated formulae, and far-reaching assumptions. In addition to these factors, public pension accounting has been largely (although rapidly becoming less so) outside the watchful eye of financial markets, and so until recently the true extent of government pension liabilities has had very little real-life impact. At least at the federal government level, this is partly due to the reluctance of sovereign governments to acknowledge that their pension liabilities may constitute tangible, legally binding promises;

115. Palacios and Whitehouse (2006) list Austria, France, Portugal, and Spain for this requirement.

otherwise, it would likely become more legally and legislatively difficult to reform these systems. The 2006 proposal by the US Federal Accounting Standards Advisory Board (FASAB)[116] to change a crucial assumption concerning government Social Security pension liabilities elegantly illustrates this issue.

The federal government recognizes a liability for its pension promises to both public servants and the population at large only when the pension benefit is due and payable (i.e., at the time of cash payment). This is essentially in keeping with the follow-the-money principle of cash-flow accounting, according to which promises of future pension benefit payments are conveniently not counted on the government balance sheet so that legally and politically they remain, in effect, just promises. Instead, the FASAB in October 2006 suggested that the US federal government starts incurring expenses (and liabilities thus emerge) "when participants substantially meet eligibility requirements during their working lives." For Social Security,[117] this change to accrual accounting principles would mean that liabilities related to pension promises would be put on the government books after 10 years (40 quarters) or the equivalent period of covered employment. By changing the accounting assumptions, the net costs of providing Social Security benefits for everyone with more than 10 years of contributions (and therefore substantially eligible) would suddenly be put on the government record today, rather than only when these Americans actually retire.[118] Given the large number of people in this category—including the overwhelming majority of baby-boomers—this would lead to an immediate and sizable deterioration in the long-term financial position of the SSA and, by extension, the US federal government budget, relative to how both are presented today.

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116. The Treasury, Office of Management and Budget (OMB), and Comptroller General established the FASAB in October 1990, which is responsible for promulgating accounting standards for the US government. These standards are Generally Accepted Accounting Principles (GAAP) for the federal government. For details on this proposal, see the FASAB press release from October 23, 2006, "FASAB Issues Preliminary Views Regarding Accounting for Social Insurance," and the exposure draft at www.fasab.gov. See also public comments on the FASAB preliminary views in FASAB Memorandum on Social Insurance, July 12, 2007, at www.fasab.gov.

117. As well as railway retirement programs.

118. In detail, the FASAB would require that these "new" liabilities—(1) the present value of future benefits from work in covered employment; (2) interest on the liability; (3) prior service costs; and (4) actuarial gains—be included as a net cost in the Statement of Social Insurance (SOSI). The SOSI presents the actuarial present value for the 75-year projection period of the Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI) future income and cost expected to arise from the legally specified formulae for current and future program participants. The SOSI in its present form is in the SSA annual financial statements. For the 2006 data, see www.ssa.gov/finance/2006/Financial_Statements.pdf.

Yet the inclusion in government budget publications of long-term cost estimates for Social Security–based accrual accounting is not tantamount to turning these future pension promises into inviolable guarantees. Rather, as expressed by former Federal Reserve Chairman Alan Greenspan in 2003 testimony before the Senate Committee on Banking, Housing, and Urban Affairs, "accrual-based accounts would lay out more clearly the true costs and benefits of changes to various taxes and outlay programs and facilitate the development of a broad budget strategy."[119] For instance, under current accounting rules, reform proposals involving an increase in government debt (a recognized liability) and offsetting decreases in future (unrecognized) pension liabilities would erroneously show up as simply a deterioration in the government fiscal position. Accrual-based accounts might thus increase awareness of the broader spending priorities of the federal budget. It seems plausible that putting the accrual accounting–based costs of future pension promises on the books would help minimize the risk of ill-informed Social Security reform decisions.

Similarly, the use of cash-flow accounting in the early years of Social Security assisted in masking the buildup up of sizable legacy debt in the form of underfinanced benefit payments to early Social Security recipients. Peter Diamond and Peter Orszag (2005) estimate this debt at $11.5 trillion, and its ongoing amortization is the principal reason for the long-term financial problems of Social Security.

At the same time the financial situation of the Social Security system and the OASDI Trust Funds is, in fact, very transparent and regularly made public—in excruciating detail and with all long-term assumptions laid bare—in the annual reports of the OASDI Trustees.[120] As such, contrary to the situation in many US private and certainly other US public (see below) pension schemes, the financial outlook for Social Security is very well illuminated and understood. Unfortunately, current government accounting rules, by not stipulating required remedial action, have facilitated that this knowledge be consistently ignored by policymakers.

However, even the most translucent accounting rules will not compel or constrain sovereign democratically elected decision makers: Only voters can do that. The most that can be expected to emerge from rewriting the government accounting rules is improved clarity about the current state of affairs and about viable reform options. Even much-needed improvement in the transparency of the accounting rules cannot substitute for the political will to own up to the future liabilities of current pension promises.

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119. Federal Reserve Board's semiannual monetary policy report to the Congress, US Senate, February 11, 2003. Diamond and Orszag (2004) present a similar view of support for the informative effects of accrual accounting.

120. Available at SSA's website, www.ssa.gov/OACT.

State and Local Government Accounting and Retirement Finances

Among US state and local governments,[121] it is clear that transparency, brought to bear where there was previously little or none (such as in the area of accounting for state and local government employee pension liabilities), can have a substantial independent effect.

Unlike in most other countries, US public-sector employee pension liabilities are not solely the responsibility of the central (federal) government. Instead, given that almost one-quarter and two-thirds of all public-sector employees work at the state and local levels, respectively,[122] these two levels of government hold the vast majority of public-sector pension liabilities.

As mentioned above, US federal government employees hired after 1984 have been on the regular Social Security system plus the defined contribution Federal Thrift Savings Plan. However, when looking at the 80 percent of US public employees that work in state and local government, it becomes clear that a similar move toward DC plans and Social Security participation among this group has failed to materialize. A relatively stable 80 percent of state and local government employees remain on DB plans, according to the most recent data available from the Bureau of Labor Statistics.[123] As can be seen in figure 3.14, this is four times the share of private industry workers. This difference in DB coverage ratios is also evident in the employer costs of benefit provision. According to BLS data, in 2007 state and local governments spent, on average, over six times as much on DB compensation as did private-sector employers—$2.59 (and rising) per hour versus just $0.42 per hour.

At the same time, though, state and local governments spend less on DC pension compensation than do private-sector employers.[124] This is illustrated in figure 3.15, which also shows that while private-sector

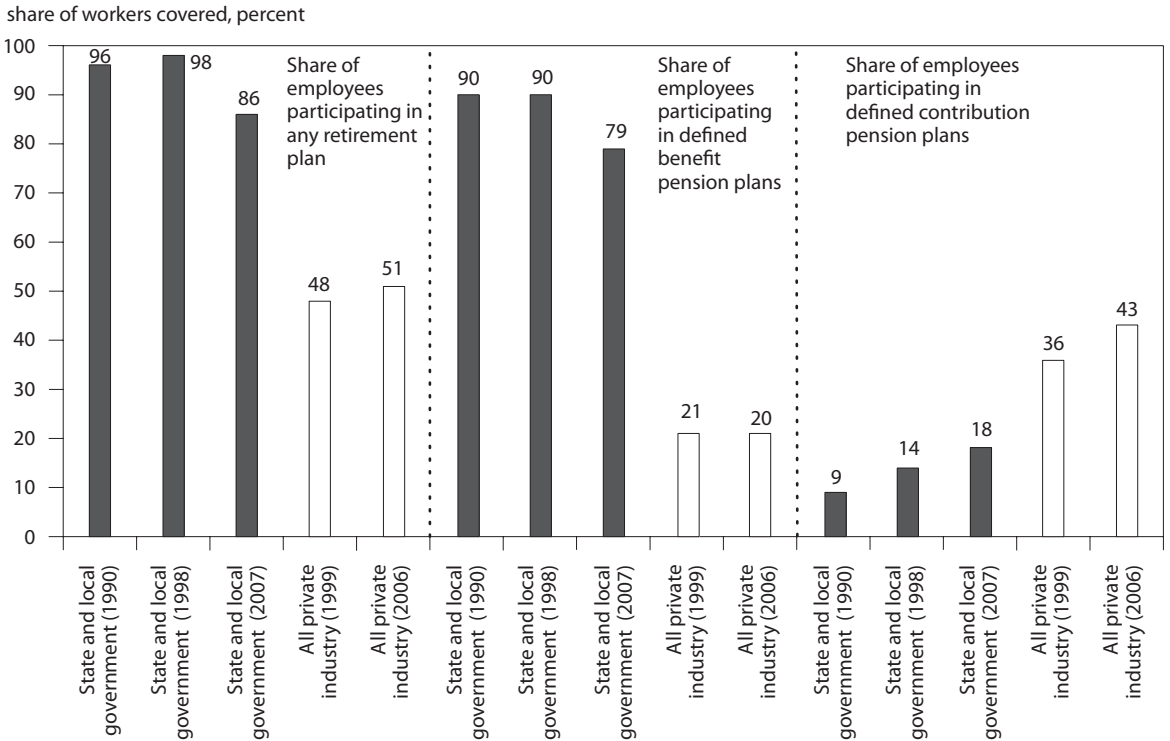
121. The situation is not unique to the United States but is also present in other countries with powerful local governments. See, for instance, Japanese Ministry of Internal Affairs and Communications, White Paper on Local Public Finance (2005) for recent efforts in Japan to gather balance sheets reflecting the frequently dire financial situation for prefectures and municipalities. See also Robaschik and Yoshino (2001, 2004) for a discussion of Japanese local government finances and attempts to improve transparency.

122. In 2005, US state governments employed just over 5 million Americans, and local governments had more than 14 million on their payrolls. In contrast, the federal government (excluding the armed forces) accounted for only 2.7 million. Data from the BLS Current Employment Survey (CES) at www.bls.gov/ces/home.htm

123. See BLS National Compensation Survey (NCS) at www.bls.gov/ncs/ebs.

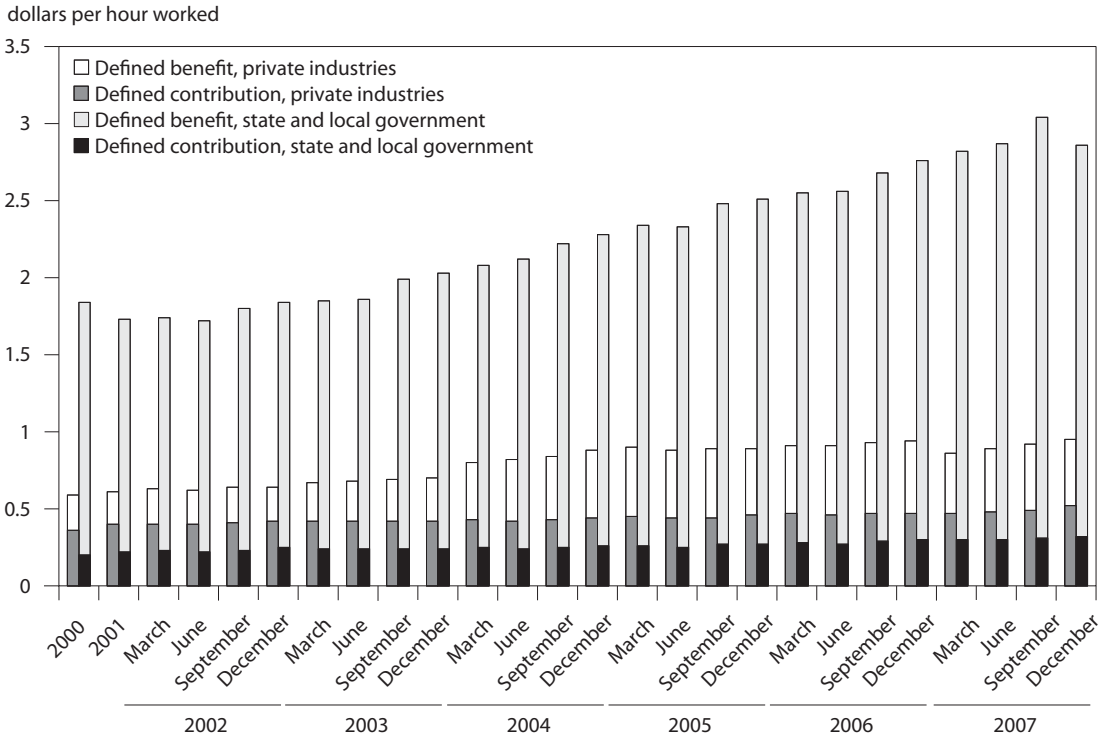
124. McDonnell and EBRI (2005) found that part of the reason for the disparate cost of benefits between public- and private-sector employees is the fact that many public-sector workers are concentrated in relatively better-educated and thus higher-income brackets and have longer careers under single plans than private-sector workers.

Figure 3.14 Pension coverage for US state and local government and private industry employees, most recent year available



Source: Bureau of Labor Statistics, National Compensation Survey.

Figure 3.15 US employer cost of benefits per hour worked, all employees in sector



Note: SIC-based data until 2003; NAICS-based data 2004 onwards.

Source: BLS ECEC Survey, www.bls.gov/ncs.

employer expenditure in 2007 on pension benefit provision was split roughly half and half between DB and DC plans (54 percent DC and 46 percent DB), fully 90 percent of state and local government expenditure went toward DB pensions. On average, therefore, US state and local government workers carry far less financial risk into retirement than do their private-sector compatriots.

Surveys from NASRA (2007), the Wisconsin Legislative Council (2007), and Bovbjerg (2008) found that in 2006 approximately a quarter of all state and local government workers did not participate in Social Security, rising to almost half among public school teachers.[125] However, that same year, non–Social Security–eligible state and local workers were, on average, covered by retirement plans with median contribution rates substantially (44 percent) above those of their Social Security–eligible peers.[126] For about three-quarters of state and local workers, DB pension plans are thus only one component of their total pension eligibility, which might also include a DC plan with employer contributions, not dissimilar to the Federal Thrift Savings Plan.

It is reasonable to state, therefore, that the overwhelming majority of US state and local employees have significantly more generous pension coverage than do employees in either the federal government or the private sector. And this can be by quite some margin (appendix table 3B.1 describes the details of the DB pension plans that cover about 80 percent of state and local workers). Consider state employees in New Mexico: In addition to Social Security, they receive a DB plan offering a guaranteed pension of 3 percent of the highest three consecutive years of salary per year of service, available after 25 years. So a New Mexico state employee who retires at the earliest age for Social Security coverage could retire at age 62—even if he or she was a "wayward youngster" and started working at the late age of 37—after working for 25 years, with reduced Social Security and a guaranteed DB pension worth 75 percent of the average of the three highest consecutive income years of work.[127] Not a bad deal, most Americans would likely agree! Indeed, as table 3B.1 shows, on average the DB component alone for state and local employees is typically worth over half of their highest income years' salary. Considering that three-quarters of US state and local employees also have access to either Social Security and/or DC pension plans, this compares them very favor-

125. NASRA (2007) shows that most state and local workers in Alaska, Colorado, Louisiana, Maine, Massachusetts, Ohio, and Nevada did not participate in Social Security.

126. Median employer and employee contribution rates were 8.5 and 5 percent, respectively, for Social Security–eligible state and local workers and 11.5 and 8 percent, respectively, for non–Social Security–eligible state and local workers (NASRA 2007, figure M).

127. New Mexico DB pension accrues at 3 percent per service year but is capped at 80 percent of the average of the three highest earnings years. See appendix table 3B.1 for selected details of 85 state and local pension plans for all 50 states.

ably indeed with "spoiled" French civil servants. French *fonctionnaires* have "only" their government DB pension, worth approximately three-quarters of their highest years of salary, to fall back on if they retire at age 62 after 34 years of service.[128]

The flip side of generous pension benefits to state and local employees is invariably large and rapidly rising pension contributions and liabilities for those governments. Indeed, as shown in figure 3.16, the level of annual contributions by state and local governments to their pension funds has risen by more than 80 percent from 2000 to $63 billion in 2007. At the same time, total payments from the same pension funds have risen by 90 percent to $153 billion in 2007.[129]

Given the highly adverse demographic outlook for the government sector in general, as highlighted above, it seems certain that both these trends will rise steeply in the years ahead as baby-boomers retire. This is a major worry for some state and local governments, given that NASRA (2007) shows that actuarial funding levels of state and local pension funds have continued to decline every year, albeit at a declining rate from 101 percent of actuarial liabilities in FY2001 to 86 percent in FY2006, despite a strong performance by financial markets after 2002.[130]

NASRA (2007) further shows that the combined underfunding of 127 surveyed state and local pension funds was approximately $385 billion in 2006.[131] However, some industry specialists have calculated that such approximate levels of underfunding may be a serious underestimate, derived by using more generous accounting assumptions than are available to private pension plans. Had state pension plans in 2004 used the same accounting assumptions demanded by private-sector DB plans, estimates indicate that their total funding deficit would have more than doubled, from about $300 billion to almost $700 billion.[132]

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128. French civil servants accrue 2 percent of their three highest years of income for every year of service and get a 3 percent bonus for each year worked after age 60. Thus for 34 years of service at age 62, they are eligible for a DB pension worth 74 percent of the highest three years of income. See EIRO (2003a, 2004).

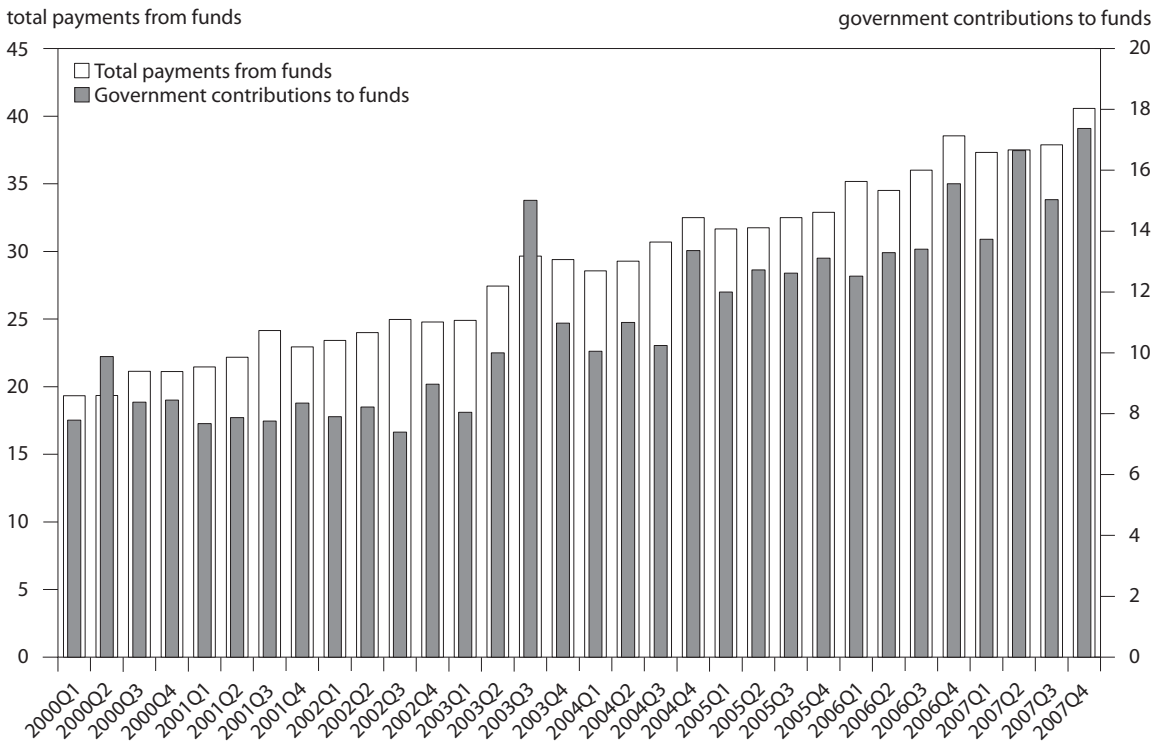
129. Total income for public pension funds over the 2000–07 period was made up roughly of two-thirds investment income, just over 20 percent government contributions, and the remainder employee contributions.

130. See also Wilshire Consulting (2006, 2007) and Standard and Poor's (2006a).

131. NASRA (2007) surveys about 85 percent of all employees covered by state and local government pension funds. Taking these numbers as an average, this suggests that the total underfunding in US state and local pension funds might be as high as $450 billion. The NASRA (2007) survey is more comprehensive than the more detailed data presented in appendix table 3B.1.

132. See estimates from Barclays Global Investors, described in *Business Week*, "Sinkhole," June 13, 2005. For an elaboration on how elastic accounting assumptions may inflate or deflate pension liabilities, see chapter 7.

Figure 3.16 Quarterly US government contributions to and total payments from state and local pension funds, 2000–07 (billions of dollars)



Source: US Census Bureau, Finances of Selected State and Local Government Employee Retirement Systems, table 2, http://ftp2.census.gov/govs/qpr/table2.txt.

These large numbers notwithstanding, it is, on the other hand, erroneous to allege that a general state or local government pension crisis exists—or may even be in the works—in the United States. When compared to fully sovereign borrowers, even the total of state-level debt and unfunded pension liabilities is nowhere near many countries' central government debt. Only in Connecticut, Hawaii, Mississippi, Rhode Island, and West Virginia does this share climb to the low teens compared with state-level GDP.[133] The low level of US state debt is partly due to the frequently difficult political process of authorizing borrowing in state capital, where frequently direct voter approval and at least legislative approval are required. This is unlike debt at the federal level, where legislative approval is only periodically required for raising the federal government debt ceilings.[134]

US subgovernmental pension funding levels vary tremendously, too—several states have financially healthy pension systems, while others are in various degrees of financial trouble. Appendix table 3B.1 shows that public pension funds in Delaware, Florida, North Carolina, and Oregon were actually overfunded as of 2006, and funds in Georgia, Nebraska, and New York were close to fully funded. On the other hand, about a dozen of the 85 plans shown had funding ratios of less than two-thirds of liabilities, and the West Virginia Teachers Retirement System had a worrisome 19.1 percent of projected liabilities. Given the demographic trends illustrated above, it thus seems certain that there will be serious financial problems in some state and local pension funds even in the short term.

However, given that pension liabilities are very long term in nature, that there are several trillions of dollars of prefunded assets in pension funds available to draw upon, and that benefits pay out relatively slowly—does any of this really matter? It may start to very soon, due to an unfolding change in the accounting rules for state and local governments.

Since June 1997, the Government Accounting Standards Board (GASB)[135] has required that state and local governments measure and

133. 2004 data from Standard and Poor's (2006a).

134. Snell (2004) surveys indicate that 16 states require direct voter approval, and five state constitutions forbid the incurring of general obligation debt.

135. The Government Accounting Standards Board (GASB; www.gasb.org) was organized in 1984 to establish standards of financial accounting and reporting for state and local government entities. Although GASB has no authority to enforce any of its standards, rating agencies in case of bond issuances do consider whether state and local government reporting adheres to the GASB standards (GAO 2007).

disclose annual DB pension costs on an accrual accounting basis.[136] However, the pension promises to retiring state and local workers—for which over $2.9 trillion in assets were available at the end of fiscal year 2005–06[137]—do not constitute the entirety of retirement promises to this group. There is another category, blandly known as other postemployment benefits (OPEBs). This essentially residual category consists of nonpension benefits—primarily health care and life insurance—promised to state and public retirees. Until now, OPEB expenses have been included in governments' general expenditures and merely laid out in a footnote to the audited accounts, while being expensed on a cash-flow pay-as-you-go basis. However, in its Statement No. 45 issued in mid-2004, the GASB required pension plan sponsors to start accounting for their OPEB expenses, based on the accrual accounting that also governs the reporting of pension liabilities.[138] Yet very few governmental entities have set aside any assets to fund these obligations. Unlike pension promises, which as stated above have approximately $2.9 trillion in the bank already and are only about 15 percent *underfunded*, OPEB promises are almost wholly *unfunded*. This unfunded status constitutes a potentially serious issue for many state and local governments, due to the requirement in Statement 45 for governments to start to prefund these costs of OPEBs.[139] The Statement requires governments to report an annual OPEB cost, consisting of "the normal accrual accounting OPEB costs for the year" plus a "component for amortization of the total unfunded actuarial accrued liabilities over a period not exceeding 30 years," the total of which equals the annual required contribution (ARC). Hereby state and local governments, if they have made very generous OPEB promises to their employees and, as is most

136. See GASB Statement No. 27 (available at www.gasb.org), which was issued in November 1994 and came into force in June 1997. State and local governments that participate in DC pension schemes are also required to estimate their net liabilities on an accrual accounting basis. However, a relatively wide range of accounting assumptions were made available to public plan sponsors, leading some members of GASB in 1994 to criticize the new rules as failing to meet the test of responsibility, as they allowed "an extraordinary number of accounting options," evidently making it possible for some plan sponsors to artificially prop up finances. See the *New York Times*, "Public Pension Plans Face Billions in Shortages," August 8, 2006.

137. Data from US Census Bureau, Table 1: National Summary of State and Local Government Employee-Retirement System Finances Fiscal 2005–06, available at www.census.gov/govs/retire.

138. GASB took the position that OPEBs, like pension benefits, are part of public employees' total compensation and so should be included in the costs of providing these services. See Standard and Poor's (2005).

139. The statement becomes effective gradually, beginning after December 15, 2006, for phase 1 governments (those with total annual revenues of $100 million or more); after December 15, 2007, for phase 2 governments (those with total annual revenues of $10 million or more but less than $100 million); and after December 15, 2008, for phase 3 governments (those with total annual revenues of less than $10 million).

common, until now made no prefunding arrangements, may suddenly be faced with substantial additional liabilities to finance arising from promises to retiring public-sector employees.

The extra bill to taxpayers may in some places be substantial. Standard and Poor's (2005, 2006b, 2007) estimates that the extent of OPEB promises varies among government entities far more than other pension plans and may in some cases constitute up to 50 percent of the total pension liability.[140] Standard and Poor's (2007) most recent partial estimate, covering 40 of the 50 state governments, is $394 billion—about as much as the total underfunding of state and local government pension funds. However, actuarial OPEB liabilities are likely to be even more volatile and to increase more rapidly than actuarial pension liabilities, as estimating them requires taking into account future health care cost inflation. State and local government finances are thus affected by the same crushing effects of health care costs as are the federal Medicare and Medicaid programs (but unlike the federal government, the state and local governments are now obliged to put these costs on their books).[141]

The effects of these multiple developments—an aging workforce, continued generous pension provisions, a history of underfunding retirement promises, and new accounting rules for state and local governments' health care obligations—are not yet clear. There are several possible scenarios. While a broad state and local level government pension crisis is unlikely, several, if not numerous, pension entities at these levels of government will face substantial financial challenges in the years immediately ahead.

This will soon matter politically. State and local government pension plans, unlike their private-sector counterparts, are not covered by the Employee Retirement Income Security Act of 1974 (ERISA) or the insurance operation run by the Pension Benefit Guaranty Corporation (PBGC).[142] Hence there is no federal guarantee for these pension promises. States will have to pay for them themselves.

On the other hand, and likely as a direct result, the GAO (2007, 19) reports that 31 states have a total of 93 constitutional provisions—the strongest form of legal protection a state can provide—protecting public-

140. Some state and local governments have offered their employees very generous health care coverage for dependents, whereas others have made no such commitments.

141. As a result, other industry estimates of state-level OPEB obligations are significantly higher than Standard and Poor's (2007). Credit Suisse analysts Zion and Varshney (2007) indicate that unfunded health care liabilities may be as high as $1.5 trillion, while Aon Consulting in late 2006 estimated the total state and local government retiree health care bill at approximately $1.1 trillion (*New York Times*, "Paying Health Care From Pensions Proves Costly," December 19, 2006). Edwards and Gokhale (2006) estimate that OPEBs relating to health care could be $1.4 trillion.

142. Public pension funds must still, however, comply with IRS requirements for tax-exempt treatment (GAO 2007).

sector pension provisions. The overwhelming majority of state and local pensions, negotiated by unions in collective bargaining, have this additional protection. Pension promises are thus very hard to renege on for state and local governments.

However, given that these future promises are, on average, substantially more generous than those available to employees in the private sector, and that they will ultimately have to be paid by all taxpayers, continuing to honor them in the face of rapidly rising costs seems likely to cause future political fissures. This is especially so as most state and local governments maintain balanced budget requirements[143] that generally restrict the financing of (general fund) activities and PAYGO pension payments through more debt.[144] Instead of simple debt financing, state and local governments will have to rely to a larger extent on either direct tax increases or cuts in other expenditure items to finance rising pension expenditures. With the limited political appetite in America in recent years for the former and the largest other expenditure item being education,[145] it is easy to identify the contours of upcoming state and local clashes of interest in what will be close to a zero-sum game between the traditional low tax/limited government constituency, families with children, and public-sector retirees. Simply relying on one-off budget fudges in the form of sales of earmarked "pension bonds"[146] or public assets or raising

143. Snell (2004) carried out a survey for the National Conference of State Legislators, showing that all states except Vermont had such rules in place of constitutional or statutory rules, or those derived by judicial decision from constitutional provisions about state indebtedness. As states typically follow fund accounting (in which all revenues and expenditures are designated a particular fund), they must distinguish in their state balanced-budget requirements between the general fund and other funds (typically for such items as highways or general transportation). Balanced-budget requirements for states usually concern the general funds, which account for the vast majority of state spending.

144. The federal government debt held by the public rose from $3.5 trillion to $5.1 trillion, or more than 45 percent, from 2002 to March 2007, according to the June 2007 Treasury Bulletin (www.fms.treas.gov/bulletin); the total outstanding federal debt reached $8.9 trillion in March 2007. Furthermore, the assets of the Social Security Trust Fund are entirely made up of Treasury bills, and as such are a government IOU to benefit recipients.

145. In FY2003–04, state and local governments spent $655 billion, or 34 percent of all direct general expenditure, on education, with three-quarters at the local level (US Census Bureau, State and Local Government Finances, www.census.gov).

146. Several states, such as New Jersey, have tried to issue pension obligation bonds (POBs), where the proceeds of the bond sale go not to funding the general state government but to the state pension fund(s). Essentially, POBs are a bet that the market return of pension fund investments will surpass the interest paid on the bond. Standard and Poor's estimates that in 1995–2005 state and local governments raised approximately $30 billion through POB issuance. However, given volatile market returns since 2000, POBs have not always paid off for the issuing entity. See *Business Week* Special Report—Public Pensions, "Online Extra: How the Garden State Dug a Hole," June 13, 2005. POBs, and the related practice of "reverse compounding," are highly relevant for private-sector pensions, too, and are discussed in detail in chapter 7.

fees for other public services seems highly unlikely to financially suffice, even if such options were (improbably) politically passable.

State and local governments may instead choose, in the face of overwhelming financial challenges, to renege on the pension promises to retirees. Choosing such approach would represent a novel development in the area of public pensions in America, as, for instance, not even the default of New York City in the late 1970s resulted in changes to any of the city's promised public worker pensions. Yet there are signs that it is beginning to happen. Several states have in recent years opted to cut public worker pensions rather than take any of the unpalatable options mentioned above,[147] although strong legal protections (in either state laws or union contracts) for public pensions seem destined to lead states that choose this option into costly litigation.

Whatever option state and local governments choose, massive pension-related inequalities cannot politically persist. Given the generosity of state and local public-sector pensions relative to those for private-sector workers and the increasing exposure of the true costs to governments of these promises (thanks to the new GASB accounting rules), the public sector may elect to follow the example of the private sector, where increased accounting transparency and rising financial stress led to a dramatic scaling back of pension promises (see chapter 7). Such a trend seems plausible given the political difficulty, once the distributional unfairness becomes known to the wider voting public, of having to defend public-sector pension promises that are much more generous than those available to the average public. If there is a large-scale reduction in public-sector pension benefits, a decline among state and local workers (especially in the most financially strained state and local governments) seems possible, if not likely. This is another lesson from the decade-long pension-related conflicts in France, which ended in 2007–08 only with the curtailment of generous "special pensions" for some public employees (see box 3.6).

Concluding Remarks

This chapter has focused on the distributional aspects and concerns of pension provision. We have shown how the fundamental organizing principles—universal means-tested or contributory insurance—of pension systems largely shape distributional outcomes and also play a big role in the outlook for countries' pension sustainability. US Social Security is relatively modest (especially at high incomes), falling approximately in the middle in terms of progressivity in the OECD, and is considerably less

147. *New York Times*, "Once Safe, Public Pensions Are Now Facing Cuts," November 6, 2006, lists Oregon, Rhode Island, Milwaukee County, and the city of Houston as such examples.

redistributive than mandatory pension programs in other English-speaking countries. We therefore conclude that there is political room to make Social Security a more progressive contributory insurance system.

We find that poverty is more prevalent among old people in the OECD than among working age populations, particularly among the very old (those 75 and older), who are overwhelmingly women. In fact, the United States is among the OECD countries with the highest levels of old age poverty. Looking at the sources of income for people over age 65, we find both for the United States and most OECD countries that only in the top income quintile do public transfers not make up the overwhelming majority of income (for the top income quintile, earnings account for a substantial share of income). As a result, we conclude that pension reforms aimed at improving the solvency of Social Security are not tenable if they include across-the-board cuts in benefits. Instead, we propose that benefit cuts be targeted only to the highest-income quintile in the United States.

Currently, retiring generations across the OECD can look forward to substantially larger shares of their lifetime spent in retirement, relative to both earlier generations and—if anything like current benefit levels are maintained—future generations as well. OECD countries are, therefore, increasingly taking measures to link retirement to life expectancies. While the United States has legislated a prefixed gradual increase in the full Social Security eligibility age from 65 to 67, it is not among the countries to have legislated a direct link to life expectancies. We believe that is a mistake and propose that after 2027, both the early and full age of Social Security eligibility be linked directly to Americans' life expectancy. We believe this is best done in a manner that maintains the fraction of Americans' lifetime spent in retirement to total lifetime fixed at historical levels. As we describe elsewhere, this gradual increase in the normal retirement age should be accompanied by measures to encourage saving for workers wishing to retire early and to ensure that disabled workers are not pushed into poverty.

However, predictions of life expectancies are uncertain and contested. Direct links to life expectancies must therefore tread a fine line between the necessary "early warning" to allow the public to plan accordingly for changes and the risk of increasing uncertainty by premature announcements. While disparities in life expectancies for different population subgroups are rapidly increasing in the United States, we conclude that the uncertainties of life expectancy estimation are too great to permit differentiation of retirement ages in mandatory pension systems.

Public employee pensions across the OECD and in the United States are significantly more generous than average mandatory pensions available to the general public. In the United States, given recent cuts to private-sector pension benefits, political resistance to tax increases, and the scale of retirement-related funding problems among some state and local governments, it seems likely that any long-term financial problems in

state and local government pension plans will be addressed largely through cuts in pension benefits. This is particularly likely as public pension accounting is undergoing the same transition to accrual accounting as previously experienced in the private sector, where a scaling back of pension promises quickly followed. Recent hotly contested reductions in the generosity of public-sector pensions in France also point to the fact that in periods of intense fiscal stress, it is politically untenable to maintain significantly more generous retirement programs for public-sector workers relative to other workers.

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Appendix 3A
Data and Definitions

Poverty Thresholds

The poverty thresholds (using the definition of 50 percent of median disposable income) of selected OECD countries are shown in table 3A.1. The thresholds include national currencies, in US dollars, as a share of the US threshold (in only three countries is it higher) and as a share of take-home pay of the average production worker.

Old Age Income Data

All income data presented in this chapter are from Förster and Mira d'Ercole (2005) and based on answers to OECD country questionnaires. The only exception is the data for the United States, which are from the Social Security Administration (SSA 2002). We discuss the data from Förster and Mira d'Ercole (2005) first.

This section relies extensively on appendix 1 in Förster and Mira d'Ercole (2005). The authors attempted to maximize country coverage by drawing on different data sources, primarily household surveys but also, for Belgium, Denmark, and Sweden, a combination of survey and administrative data.

However, the surveys in different countries use different methodologies, so the precise definition of a household may vary. For example, do adult children living with their parents constitute a separate household? The more the definition reduces the size of the household, the more likely it is to relatively depress income and thus increase poverty. As mentioned in the chapter, 17 OECD countries report data on a gross basis (before direct taxation and, where applicable, payroll taxation), whereas Austria, the Czech Republic, Greece, Hungary, Mexico, Poland, Spain, and Turkey report on a net tax basis. Due, however, to differences in the way gross taxes are estimated—relying on taxpayer-respondent answers, administrative data, or microsimulations—direct and literal cross-country comparisons should be approached with caution.

Income components are split into three categories. "Earnings" covers wages, salaries, and self-employment income. "Capital, private" includes rents, dividends, and interest paid in cash (but Denmark, Germany, and Turkey also include imputed rents of homeowners). "Public transfers" cover cash transfers paid by the government to households and individuals but exclude in-kind transfers such as subsidized rents, an exception that may distort results.

The classification of "private pensions" is surrounded by large differences, particularly concerning their income category classification. In the

Table 3A.1 Values of poverty thresholds for single adults used to measure relative poverty at half of median disposable income

Country	Latest year	50 percent of nominal equivalized disposable household income		Share of US poverty threshold (percent)	Poverty threshold for a single adult relative to take-home pay of an average production worker (percent)
		National currency	US dollars		
Australia	1999	10,617	6,852	57	36
Austria	1999	104,972	8,127	68	47
Canada	2000	13,019	8,764	73	49
Czech Republic	2000	63,025	1,631	14	46
Denmark	2000	83,391	10,301	86	53
Finland	2000	49,733	7,722	64	49
France	2000	48,284	6,796	57	48
Germany	2001	14,998	7,079	59	40
Greece	1999	1,359,057	4,437	37	49
Hungary	2000	361,892	1,282	11	63
Ireland	2000	6,668	7,816	65	48
Italy	2000	11,601,000	5,531	46	41
Japan	2000	1,380,000	12,801	107	38
Luxembourg	2001	552,877	12,269	102	60
Mexico	2002	13,050	1,351	11	23
Netherlands	2000	20,325	8,515	71	51
New Zealand	2001	10,208	4,289	36	33
Norway	2000	99,701	11,313	94	52
Poland	2000	5,740	1,322	11	37
Portugal	2000	718,005	3,306	28	57
Sweden	2000	78,833	8,594	72	52
Switzerland	2001	22,384	13,252	111	45
Turkey	2002	1,468,727	970	8	21
United Kingdom	2000	5,981	9,065	76	43
United States	2000	11,977	11,977	100	52

Notes: Data refer to annual disposable income. Values, as reported in country questionnaires, for the most recent year are expressed in prices of the base year. For the purpose of this table, these values have been adjusted in line with changes in the consumer price index. "Equivalized" disposable income is household disposable income divided by household size at the power 0.5. National currency data are converted at annual Federal Reserve average market rates (GSA releases) and the original euro conversion rates. Currency data for the Czech Republic, Hungary, Poland, and Turkey are from the Pacific Exchange Rate Service.

Source: Förster and Mira d'Ercole (2005).

data presented in this chapter, they are all classified as "capital, private" with the exception of Austria, the Czech Republic, Hungary, Italy, and Mexico, where they are included as part of "public transfers." However, in Hungary, Italy, and Mexico, the scope of private pensions is negligible, making this an issue of minor importance for these countries.

Finally, the extraordinarily large share of elderly income in Finland from "capital, private" is due to the classification of the entire mandatory Finnish insurance-based pension system in this category. As such, the "public transfer" category includes only non-directly-pension-related transfers from the government.

The income distribution data for all reporting countries in Förster and Mira d'Ercole (2005) are reported in table 3A.2.

The source of the US data presented in this chapter is the SSA's biannual report on "Income of the Population 55 or Older" for 2000, which in turn draws on the US Census Bureau's data from the Current Population Survey (CPS). The SSA made several adjustments to the CPS data for the purposes of their biannual publication. The main difference lies in the SSA's unit of analysis, which is based on age and not a construct of families and unrelated individuals, as used by the Census Bureau. In the data presented in this chapter, the age cutoff is 65, and "aged units" are married couples living together, at least one of whom is 65 or older, and nonmarried persons 65 or older (married persons not living with a spouse are counted as nonmarried). Unlike the Census Bureau, the SSA does not classify a younger relative living with an older relative as a member of a "nonaged family." As this distinction increases the size of households, it has the broad impact of reducing poverty measures. The 2000 SSA report (www.ssa.gov/policy) comments as follows on the direct quantitative comparison of the two measures: "Census data show that the number of households with a householder aged 65 or older in 2000 was 21,828,000. In comparison, SSA data show 25,230,000 such households. The SSA count generally includes the Census Bureau's aged households plus some aged units living in nonaged households or living with other aged units in the same household. The number of aged households was 87 percent of the number of aged units."

The income measure used is total money income, which is the sum of all income received by the aged unit before any deductions such as those for taxes, union dues, or Medicare premiums. As such, although the US data are listed under "net tax income," they are pretax. However, as we saw in chapter 2, figure 2.5, the direct taxation on pension benefits is limited at 5 percent. Other sources of retirement income for the vast majority of Americans can equally be assumed to be lightly taxed, with the exception of earnings income in high tax brackets. However, the differences in income shares when accounting for taxes can be assumed to have an immaterial impact on the conclusions derived from these data.

Table 3A.2 65+ income distribution, by source and income group, circa 2000 (percent)

Country	Earnings	Private capital	Public transfers	Taxes
Australia				
Low	2	9	91	−2
Middle	5	26	72	−3
High	56	50	16	−21
United Kingdom				
Low	1	13	87	−1
Middle	7	33	65	−5
High	19	72	26	−17
Canada				
Low	4	14	92	−10
Middle	15	41	57	−13
High	44	59	26	−29
Czech Republic				
Low	0	0	99	0
Middle	4	1	99	−1
High	60	4	49	−13
Denmark				
Low	1	10	120	−31
Middle	6	36	92	−33
High	35	87	33	−55
Finland				
Low	1	59	49	−9
Middle	6	93	24	−23
High	35	96	9	−40
France				
Low	2	3	106	−11
Middle	9	3	95	−8
High	15	8	91	−14
Germany				
Low	3	6	99	−7
Middle	7	10	92	−9
High	22	24	70	−16
Ireland				
Low	2	3	95	−1
Middle	23	14	66	−2
High	64	22	25	−11
Italy				
Low	3	0	98	−2
Middle	15	1	97	−13
High	62	8	60	−30

Table 3A.2 65+ income distribution, by source and income group, circa 2000 (percent) *(continued)*

Country	Earnings	Private capital	Public transfers	Taxes
Japan				
Low	21	7	86	−13
Middle	43	6	62	−12
High	78	11	27	−16
Netherlands				
Low	0	9	96	−5
Middle	5	36	69	−10
High	25	73	34	−32
New Zealand				
Low	0	4	116	−20
Middle	10	18	89	−18
High	40	53	33	−25
Norway				
Low	1	12	95	−8
Middle	7	27	86	−20
High	38	48	48	−33
Portugal				
Low	3	2	95	0
Middle	28	5	72	−4
High	40	9	63	−12
Sweden				
Low	1	11	107	−18
Middle	4	22	109	−35
High	28	50	72	−50
Switzerland				
Low	8	9	126	−43
Middle	11	11	105	−27
High	32	29	77	−38
OECD-17 average				
Low	19	25	73	−16
Middle	12	23	79	−14
High	41	41	45	−27
Greece				
Low	9	6	85	n.a.
Middle	22	7	71	n.a.
High	39	16	44	n.a.
Hungary				
Low	3	1	96	n.a.
Middle	8	3	89	n.a.
High	41	5	54	n.a.

(table continues next page)

Table 3A.2 65+ income distribution, by source and income group, circa 2000 (percent) *(continued)*

Country	Earnings	Private capital	Public transfers	Taxes
Luxembourg				
Low	0	1	98	n.a.
Middle	8	6	86	n.a.
High	19	25	56	n.a.
Mexico				
Low	48	30	22	n.a.
Middle	65	14	21	n.a.
High	69	15	17	n.a.
Poland				
Low	6	2	92	n.a.
Middle	17	3	80	n.a.
High	61	1	38	n.a.
Turkey				
Low	56	33	11	n.a.
Middle	49	45	7	n.a.
High	35	62	3	n.a.

n.a. = not applicable

Note: Low = lowest income quintile; Middle = 2nd to 4th income quintile; High = highest income quintile.

Source: Förster and Mira d'Ercole (2005).

"Total money income" includes wages and salaries, self-employment income (including losses), Social Security, Supplemental Security Income, public assistance, interest, dividends, rent, royalties, estates or trusts, veterans' payments, unemployment compensation, workers' compensation, private and government retirement and disability pensions, alimony, and child support. Importantly, however, capital gains (or losses) and lump-sum or one-time payments such as life insurance settlements are excluded. Furthermore, the measure does not reflect in-kind transfers such as food stamps, health benefits, subsidized housing, payments in kind, or fringe benefits from one's employment (SSA 2002).

Several authors have attempted to estimate potential biases in the CPS measurement of both poverty and income sources. These estimates do not address the question of consumption versus income discussed in the text but concern themselves merely with any methodological biases in the income-based approach. Marc Roemer (2000) compares CPS data with an adjusted national income and product account (NIPA)–based estimate of old age income and estimates that the CPS in 1996 captured 96 percent of earnings, 70.9 percent of capital income, 88.3 percent of public transfers, and 76.6 percent of private and non–Social Security–related

public pensions. In total, the CPS captured 92.6 percent of the NIPA-based old age income. Roemer attributes this underestimate (of capital income, in particular) to respondent difficulties and possible unwillingness to answer the CPS survey questions about assets and capital income. Lynn Fisher (2005) focuses on CPS respondents' underreporting of asset ownership, which presumably occurred as financial asset ownership rates rose during the 1990s. She finds that, in aggregate, "the evidence suggests that the CPS underestimates whether or not a source of [asset-based] income was received, but estimates higher amounts for those receiving it" (Fisher 2005, 6).

Laurence Kotlikoff and colleagues (2006) use a different data source and report comparable data for some of the income sourcing reported in this chapter. Using the 2004 Federal Reserve Survey of Consumer Finance, they estimate that in the event of a reduction of 100 percent of Social Security benefits, one-third of the 65+ singles would experience a 90+ percent reduction in living standards, while the corresponding percentage for married couples is 41 percent. There is no immediate way to verify that these people who rely overwhelmingly on Social Security for their old age income are in the low-income bracket, but the results suggest that there is a large group of low-income people with few if any other sources of old age income in the United States. The results from Kotlikoff and colleagues (2006) thus seem to at least partly support this chapter's central conclusions about old age income sources.

SSA (2002) also reports a number of relevant supporting data for the broad conclusions of this chapter. According to the report's table 6.A.1, 78 percent of those 65 and older report having no earnings income, split between 65 percent for 65- to 74-year-olds and 91 percent for those over 75. In addition, 52 percent of those over 65 have no asset income of any kind, with virtually no difference between that group and the oldest (75+). The report found that 71 percent of Americans age 65 or older have no income from private pensions or annuities, clearly illustrating the limited coverage of such voluntary pensions in the United States.

In its table 6.A.2, SSA (2002) presents data by income quintile. With regards to income from private pensions or annuities, the share reporting no income is 94, 83, 65, 54, and 60 percent, respectively, for the five income quintiles (in rising order). Concerning earnings, 96, 94, 85, 71, and 46 percent, respectively, report no income. Asset-based income is zero for 80, 66, 51, 39, and 27 percent, respectively. Thus public pension benefits provide the overwhelming share of old age income for most Americans other than those in the top quintile.

Appendix 3B

Table 3B.1 Comparative details of 85 major public employee retirement funds in 2006

	State	Fund name	Employee coverage[a]	Active employees	Beneficiaries and annuitants	Fund "support ratio"	Participants covered by Social Security	Normal retirement (age/years)	Early retirement (age/years)	Reduction for early retirement
1	Alabama	Alabama Employees Retirement System	S, L	82,830	33,266	2.49	Yes	60/10; any/25	None	
2		Alabama Teachers Retirement System	T	135,126	64,362	2.10	Yes	60/10; any/25	None	
3	Alaska	Alaska Public Employees Retirement System	S, L	34,660	21,852	1.59	No	60/5; any/30	55/5	6% a year
4		Alaska Teachers Retirement System	T	9,835	9,349	1.05	No	60/8; any/20	55/8	Table
5	Arizona	Arizona State Retirement System	S, L, T	217,893	78,392	2.78	Yes	65; 62/10; R80	50/5	Table
6	Arkansas	Arkansas Public Employees Retirement System	S, L	43,453	22,234	1.95	Yes	65/5; any/28	55/5; any/25	6% a year
7		Arkansas Teachers Retirement System	T	85,916	30,014	2.86	Yes	60/5; any/28	Any/25	Lesser of 5% for each year less than 28 yrs. of service or 5% for each year prior to age 60
8	California	California Public Employees Retirement System	S, L	809,690	443,341	1.83	Yes	55/5	50/5	Multiplier varies
9		California State Teachers Retirement System	T	453,365	207,846	2.18	No	60/5	55/5; 50/30	3% to 6% a year
10	Colorado	Colorado Public Employees Retirement Association	S, L, T	180,360	69,416	2.60	No	65/5; 50/30; 55/R80	50/25; 55/20; 60/5	6%; 3%; 4%
11	Connecticut	Connecticut State Employees Retirement System	S	50,605	36,964	1.37	Yes	62/10; 60/25	55/10	3% a year
12		Connecticut Teachers Retirement Board	T	51,015	26,695	1.91	No	60/20; any/35	Any/25; 55/20; 60/10	3% a year
13	Delaware	Delaware Public Employees Retirement System	S, T	34,313	19,108	1.80	Yes	62/5; 60/15; any/30	55/15; any/25	2.4% a year
14	Florida	Florida Retirement System	S, L, T	643,379	252,060	2.55	Yes	62/6; any/30	Any/6	5% a year
15	Georgia	Georgia Employees Retirement System	S	72,716	31,355	2.32	Yes	60/10; any/30	Any/25	7% a year; max. 35%
16		Georgia Teachers Retirement System	T	209,349	70,239	2.98	Yes	60/10; any/25	Any/25	7% a year
17	Hawaii	Hawaii Employees Retirement System	S, L, T	64,069	34,304	1.87	Yes	62/5; 55/30	55/20	6% a year
18	Idaho	Idaho Public Employee Retirement System	S, L, T	64,762	26,438	2.45	Yes	65/5; R90	55/5	3% a yr. for 1st 5 yrs.; 5.75% a yr. thereafter
19	Illinois	Illinois State Employees Retirement System	S	68,075	54,868	1.24	Yes	60/8; R85	55/25	6% a year
20		Illinois Teachers Retirement System	T	159,272	85,103	1.87	No	62/5; 60/10; 55/35	55/20	6% a year
21		Illinois Municipal Retirement Fund	L	174,008	84,704	2.05	Yes	60/8; 55/35	55/8	3% a year
22	Indiana	Indiana Public Employees Retirement Fund	S, L	153,664	62,248	2.47	Yes	65/10; 60/15; 55/R85	50/15	Table
23		Indiana State Teachers Retirement Fund	T	73,350	39,849	1.84	Yes	65/10; 60/15; 55/R85	50/15	5% a year
24	Iowa	Iowa Public Employees Retirement System	S, L, T	163,091	82,204	1.98	Yes	65; 62/20; R88	55/4	3% a year

Employee contribution	Employer contribution	Vesting period (years)	Final average salary period[b]	Formula multiplier	Limitation	Annual postretirement COLAs	Investment return assumption (percent)	Wage inflation assumption (percent)	Real rate of return assumption (percent)	Fund funding ratio (percent)
5%	7.78%	10	3 H/10	2.01%	None	Ad hoc only	8	4.50	3.50	89.6
5%	9.36%	10	3 H/10	2.01%	None	Ad hoc only	8	4.50	3.50	84.0
6.75%	16.77%	5	5 HC	2% (1st 10 yrs.); 2.25% (2nd 10); 2.5% (added yrs.)	None	75% of CPI if 65, 9% cap; 50% of CPI if 60 or retired 5 yrs. - 6% cap	8.25	3.50	4.75	65.7
8.65%	13.76%	8	3 H	2% (1st 20 yrs.); 2.5% (added yrs.)	None	75% of CPI if age 65, 9% cap; 50% of CPI if 60 or retired 8 yrs.	8.25	3.50	4.75	60.9
9.10%	9.10%	Immediate	3 HC	2.1% (1st 20 yrs.); 2.15% (next 5 yrs.); 2.2% (next 5 yrs.); 2.3% over 30	None	Excess earnings - 4% cap	8	4.50	3.50	83.7
5%	12.54%	5	3 H	2%	None	3%	8	4	4	83.0
6%	13.26%	5	3 H	2.15%	None	3%	8	4	4	80.3
6%	10.36%	5	1 H	2% at 55; 2.5% at 63 or older	65 yrs. max.	2%	7.75	3	4.75	87.3
8%	8.25%	5	1 H	2% at 60; 2.4% at 63	100% FAS	2%	8	3.25	4.75	86.0
8%	10.15%	5	3 H	2.50%	100% FAS	3.50%	8.50	3.50	5	73.3
2%		5	3 H (cap)	1.33% + 0.5% over $43,400; 1.625% yrs. over 35	None	60% of CPI up to 6%, 2.5% minimum	8.50	5	3.50	53.2
6%	3.01%	10	3 H	2%	75% FAS	Excess earnings: 1.5% or 6% cap	8.50	4	4.50	68.4
3% above $6,000	6.10%	5	3 H	1.85%	None	Ad hoc only	8	3.75	4.25	101.7
Non-contributory	6.72%	6	5 H	1.6% to 1.68% (age & yrs. of service)	100% FAS	3%	7.75	4	3.75	105.6
1.25%	10.41%	10	2 HC	0.0	90% high yr.	CPI - 1.5% semi-annual cap	7.50	3.50	4	94.5
5%	9.24%	10	2 HC (cap)	2%	40 yrs. max.	CPI - 1.5% semi-annual cap	7.50	3.75	3.75	98.0
6%	13.75%	5	3 H	2%	None	2.50%	8	4	4	65.0
6.23%	10.39%	5	3 1/2 HC	2%	100% FAS	CPI - 1% minimum to 6% max. (conditional)	7.25	4.50	3.25	95.2
4%	$210.5 million	8	4 HC/10	1.67%	75% FAS	3%	8.50	3	5.50	52.2
9.40%	7.64%	5	4 HC/10 (cap)	2.20%	75% FAS	3%	8.50	3.50	5	62.0
4.50%	10.04%	8	4 HC/10 (cap)	1.67% (1st 15 yrs.); 2% (added yrs.)	75% FAS	3%	7.50	4	3.50	100.1
3%	4.70%	10	5 H	1.1% + money purchase annuity	None	Ad hoc only	7.25	N.D.	N.D.	96.8
3%	19.25%	10	5 H	1.1% + money purchase annuity	None	Ad hoc only	7.50	4.50	3	43.4
3.70%	5.75%	4	3 H	2% (1st 30 yrs.); 1% (next 5 yrs.)	65% FAS	Excess earnings - 3% cap	7.50	4	3.50	88.4

(table continues next page)

Table 3B.1 Comparative details of 85 major public employee retirement funds in 2006 *(continued)*

	State	Fund name	Employee coverage[a]	Active employees	Beneficiaries and annuitants	Fund "support ratio"	Participants covered by Social Security	Normal retirement (age/years)	Early retirement (age/years)	Reduction for early retirement
25	Kansas	Kansas Public Employees Retirement System	S, L, T	149,073	63,348	2.35	Yes	65; 62/10; R85	55/10	2.4%/7.20% a year
26	Kentucky	Kentucky Retirement Systems	S, L	145,384	73,000	1.99	Yes	65/4; any/27	55/5; any/25	5%/4% a year
27		Kentucky Teachers Retirement System	T	73,740	38,497	1.92	No	60/5; any/27	55/5	5% a year
28	Louisiana	Louisiana State Employees Retirement System	S	57,811	40,624	1.42	No	60/10; 55/25; any/30	50/10; any/20	Table
29		Louisiana Teachers Retirement System	T	81,347	61,554	1.32	No	60/5; 55/25; any/30	Any/20	Multiplier varies
30	Maine	Maine State Retirement System	S, L, T	52,282	32,918	1.59	No	60/5	Any/25	2.25% a year
31	Maryland	Maryland State Retirement and Pension System	S, L, T	191,273	103,831	1.84	Yes	60/5; any/30	Any/25	6% a year; max. 30%
32	Massachusetts	Massachusetts State Employees' Retirement System	S	83,178	50,593	1.64	No	55/10; any/20	None	
33		Massachusetts Teachers Retirement Board	T	88,788	44,452	2.00	No	55/10; any/20	None	
34	Michigan	Michigan State Employees Retirement System	S	32,575	45,980	0.71	Yes	60/10; 55/30	55/15	6% a year
35		Municipal Employees' Retirement System of Michigan	L	37,826	21,505	1.76	Yes	Varies by plan	Varies by plan	Varies by plan
36		Michigan Public School Employees Retirement System	T	305,445	157,163	1.94	Yes	60/5; any/30	55/15	6% a year
37	Minnesota	Minnesota State Retirement System	S	48,000	24,204	1.98	Yes	Soc. Sec. normal*	55/3	Table
38		Minnesota Public Employees Retirement Association	L	158,366	66,102	2.40	Yes	Soc. Sec. normal*	55/3	Table
39		Minnesota Teachers Retirement Association	T	79,164	44,683	1.77	Yes	Soc. Sec. normal*	55/3	Table
40	Mississippi	Mississippi Public Employees Retirement System	S, L, T	158,893	69,729	2.28	Yes	60/4; any/25	None	
41	Missouri	Missouri State Employees Retirement System	S	54,493	27,052	2.01	Yes	65/5; 65/4 Active; 60/15	57/5	6% a year
42		Missouri Local Government Employees Retirement System	L	29,940	11,787	2.54	Yes	60/5; R80 option	55/5	6% a year
43		Missouri Public Schools Retirement System	T	75,539	38,110	1.98	No	60/5; R80; any/30	55/5; any/25	Table
44	Montana	Montana Public Employees Retirement Board	S, L	27,962	15,654	1.79	Yes	65/any; 60/5; any/30	50/5; any/25	Table
45		Montana Teachers Retirement System	T	18,099	11,019	1.64	Yes	60/5; any/25	50/5	6%; 3.6% a year
46	Nebraska	Nebraska Public Employees Retirement Systems	S, L	62,245	14,604	4.26	Yes	55		Money purchase
47		Nebraska Schools Public Pensions	T	36,042	13,052	2.76	Yes	65; 55/R85	60/5; any/35; 55/R85	3% a year
48	Nevada	Nevada Public Employees Retirement System	S, L, T	98,187	33,262	2.95	No	65/5; 60/10; any/30	Any/5	4% a year
49	New Hampshire	New Hampshire Retirement System	S, L, T	51,738	19,711	2.62	Yes	60/any	50/10; R70/20	1.5%; 3%; 4%; 6.67% a year
50	New Jersey	New Jersey Public Employees Retirement System	S, L	310,392	121,166	2.56	Yes	60/any	Any/25	3% a year
51		New Jersey Teachers, Police and Firemen	T	151,873	65,445	2.32	Yes	60/any	Any/25	3% a year
52	New Mexico	New Mexico Public Employees Retirement Association	S, L	51,699	22,699	2.28	Yes	65/5 to 60/20; any/25	None	

Employee contribution	Employer contribution	Vesting period (years)	Final average salary period[b]	Formula multiplier	Limitation	Annual postretirement COLAs	Investment return assumption (percent)	Wage inflation assumption (percent)	Real rate of return assumption (percent)	Fund funding ratio (percent)
4%	5.27%	10	3 H	1.75%	None	Ad hoc only	8	4	4	68.8
5%	5.89%	5	5 H	1.97%	None	CPI	7.75	4	3.75	61.3
9.86%	13.11%	5	3 H	2.50%	100% FAS	1.50%	7.50	4	3.50	73.1
7.69%	19.10%	10	3 HC	3.33%	100% FAS	Excess earnings; CPI - 3% cap	8.25	N.D.	N.D.	63.9
8%	15.90%	5	3 HC+(cap)	2.50%	100% FAS	CPI - 3% cap	8.25	3.20	5.05	67.5
7.65%	15.09%	5	3 H	2%	None	CPI - 4% cap	7.75	4.75	3	77.1
2%	9.18%	5	3 HC	1.80%	100% FAS	CPI - 3% cap	7.75	4	3.75	93.8
8.30%	2.90%	10	3 HC	0.5% to 2.5% (age-related)	80% FAS	CPI - on 1st $12,000-conditional, 3% cap	8.25	N.D.	N.D.	81.5
11%	15.40%	10	3 HC	0.1% to 2.5% (age-related) + 2% for each yr. over 24	80% FAS	CPI - on 1st $12,000-conditional, 3% cap	8.25	N.D.	N.D.	67.2
Non-contributory	13.60%	10	3 HC	1.50%	None	3% ($300 annual cap)	8	3.50	4.50	79.8
Varies by plan	Varies by plan	6, 8, or 10	5/3 HC	1.3% to 2.5% (employer option)	80% FAS for multipliers over 2.25%	3 plans - depending on employer agreement	8	4.50	3.50	76.0
3 to 4.3%	7.60%	10	3 HC	1.50%	None	3%	8	3.50	4.50	79.3
4%	4%	3	5 HC	1.70%	None	CPI - 2.5% cap plus investment surplus	8.50	N.D.	N.D.	96.2
5.50%	6%	3	5 HC	1.70%	None	CPI - 2.5% cap plus investment surplus	8.50	6	2.50	74.7
5%	9.05%	3	5 HC	1.70%	None	CPI - 2.5% cap plus investment surplus	8.50	5	3.50	92.1
7.25%	10.75%	4	4 HC (cap)	2% (1st 25 yrs.); 2.5% (added yrs.)	100% FAS	3%	8	4	4	72.0
Non-contributory	12.59%	5	3 HC	1.7% (and .8% to age 62 if R80 met)	None	80% CPI: 5% cap	8.50	3.50	5	85.3
0% to 4%	Varies by plan	5	5/3 HC	1% to 2% (employer option)	None	CPI - 4% cap	7.50	4	3.50	95.0
5.50%	5.50%	5	3 HC	2.5%; 2.55% with 31 or more yrs. service	100% FAS	CPI - 80% of original benefits lifetime cap	8	N.D.	N.D.	82.6
6.90%	6.90%	5	3 HC	1.785%; 2% with at least 25 yrs. of service	None	3%	8	4.25	3.75	88.0
0.072	7.58%	5	3 HC	1.67%	None	1.50%	7.75	4.50	3.25	76.1
4.80%	156% of EE rate	3		Money purchase	None	Money purchase	7.60	3.50	4.10	104.0
7.98%	101% of EE rate + .7%	5	3 HC	2%	None	CPI - 2.5% cap	8	3.50	4.50	93.4
10.50%	10.50%	5	3 HC	2.67%	75% FAS	2% to 5% (varies) with number of years retired	8	3.50	4.50	74.9
6.30%	6.70%	10	3 H (cap)	1.67% to 65; 1.515% after 65	None	Ad hoc	9	3.50	5.50	68.0
5%	$7.97 million	10	3 H	1.82%	None	60% of CPI	8.25	4	4.25	89.9
5%	$93.83 million	10	3 H	1.82%	None	60% of CPI	8.25	4	4.25	81.5
7.42%	16.59%	5	3 HC	3%	80% FAS	3%	8	4.50	3.50	92.1

(table continues next page)

Table 3B.1 Comparative details of 85 major public employee retirement funds in 2006 *(continued)*

	State	Fund name	Employee coverage[a]	Active employees	Beneficiaries and annuitants	Fund "support ratio"	Participants covered by Social Security	Normal retirement (age/years)	Early retirement (age/years)	Reduction for early retirement
53	New Mexico (*continued*)	New Mexico Educational Retirement Board	T	63,362	26,100	2.43	Yes	65/5; any/25; 60/R75	R75	2.4%/7.2% a year
54	New York	New York State and Local Retirement Systems	S, L	561,951	306,531	1.83	Yes	62/5; 55/30	55/5	6%/3% a year
55		New York State Teachers Retirement System	T	260,041	129,587	2.01	Yes	62/5; 55/30	55/5	6%/3% a year
56	North Carolina	North Carolina Teachers and State Employees	S, T	375,516	134,719	2.79	Yes	65/5; 60/25; any/30	60/5; 50/20	3% a year
57		North Carolina Local Government Employees Retirement System	L	141,255	38,488	3.67	Yes	65/5; 60/25; any/30	60/5; 50/20	3% a year
58	North Dakota	North Dakota Public Employees Retirement System	S, L	18,102	6,187	2.93	Yes	65/any; R85	55/3	6% a year
59		North Dakota Teachers Fund for Retirement	T	9,585	5,893	1.63	Yes	65/3; R85	55/3	6% a year
60	Ohio	Ohio Public Employees Retirement System	S, L	381,464	156,747	2.43	No	60/5; any/30	55/25	3% a year
61		Ohio State Teachers Retirement System	T	175,065	119,184	1.47	No	65; any/30	60/5; 55/25	3% a year
62	Oklahoma	Oklahoma Public Employees Retirement System	S, L	45,472	24,372	1.87	Yes	62/6; R90	55/10	Table
63		Oklahoma Teachers Retirement System	T	87,194	41,782	2.09	Yes	62/5; R90	55/5	Table
64	Oregon	Oregon Employees Retirement System	S, L, T	187,704	101,519	1.85	Yes	65/any; 58/30	55	Actuarial reduction
65	Pennsylvania	Pennsylvania State Employees Retirement System	S	110,972	102,060	1.09	Yes	60/3; any/35	Any/5	Table
66		Pennsylvania Public School Employees Retirement System	T	255,000	157,000	1.62	Yes	62; 60/30; any/35	55/25	3% a year
67	Rhode Island	Rhode Island Employees Retirement System	S, T	32,000	19,000	1.68	Yes	60/10; any/28	None	
68	South Carolina	South Carolina Retirement Systems	S, L, T	181,022	94,667	1.91	Yes	65/any; any/28	60; 55/25	Table
69	South Dakota	South Dakota Retirement System	S, L, T	36,074	18,076	2.00	Yes	65/3; 55/R85	55/3	Table
70	Tennessee	Tennessee Consolidated Retirement System	S, L, T	204,735	89,772	2.28	Yes	60/5; any/30	55/10; any/25	4.8% a year
71	Texas	Texas Employees Retirement System	S	132,411	67,596	1.96	Yes	60/5; R80	None	
72		Teacher Retirement System of Texas	T	874,369	257,144	3.40	No	65/5; R80	55/5; any/30	Table
73		Texas Municipal Retirement System	L	95,583	32,175	2.97	Yes	60/5; any/20 or 25 option		Money purchase
74	Utah	Utah Retirement Systems	S, L, T	99,589	38,509	2.59	Yes	65/4; any/30	Any/25; 60/20; 62/10	3% a year; 7% for each year before age 60
75	Vermont	Vermont State Employees Retirement System	S	8,288	4,173	1.99	Yes	62/any; any/30	55/5	6% a year
76		Vermont Teachers Retirement System	T	10,696	4,789	2.23	Yes	62/any; any/30	55/5	6% a year
77	Virginia	Virginia Retirement System	S, L, T	332,916	124,639	2.67	Yes	65/5; 50/30	50/10; 55/5	6%; 4.8% a year
78	Washington	Washington Public Employees Retirement System	S, L	222,854	80,402	2.77	Yes	65/5	55/20	Table

Employee contribution	Employer contribution	Vesting period (years)	Final average salary period[b]	Formula multiplier	Limitation	Annual postretirement COLAs	Investment return assumption (percent)	Wage inflation assumption (percent)	Real rate of return assumption (percent)	Fund funding ratio (percent)
7.83%	10.90%	5	5 HC	2.35%	None	50% of CPI - 4% cap	8	3	5	70.4
3%	8%	5	3 HC (cap)	1.67% (under 20 yrs.); 2% (over 20 yrs.); 3.5% (over 30 yrs.)	None	If age 62 + retired 5 yrs.: 50% of CPI, max. 3% on 1st $18,000	8	3	5	N.D.
3%	7.97%	5	3 HC (cap)	Same as New York's ERS	None	If age 62 + retired 5 yrs.: 50% of CPI, max. 3% on 1st $18,000	8	3	5	98.8
6%	2.66%	5	4 HC	1.82%	None	Ad hoc	7.25	N.D.	N.D.	106.5
6%	4.80%	5	4 HC	1.85%	None	Ad hoc	7.25	N.D.	N.D.	99.4
4%	4.12%	3	3 H/10	2%	None	Ad hoc	8	3.50	4.50	88.8
7.75%	7.75%	3	3 H	2%	None	Ad hoc	8	3	5	75.4
9%	13.70%	5	3 H	2.2% (1st 30 yrs.); 2.5% (added yrs.)	100% FAS	3% cap	6.50	4	2.50	93.0
9%	13.70%	5	3 H	2.2% (1st 30 yrs.); 2.5% (added yrs.)	100% FAS	3% cap	8	3.50	4.50	75.0
3% to 3.5%	11.50%	8	3 H/10	2%	None	Ad hoc	7.50	2.50	5	74.1
7%	13.43%	5	5 HC	2%	None	Ad hoc	8	3	5	49.3
6%	8.04%	5	3 H	1.5% + money purchase annuity	None	CPI - 2% cap	8	3.75	4.25	104.2
6.25%	3.52%	5	3 H	2.50%	100% high yr.	Ad hoc	8.50	3	5.50	92.7
7.16%	4%	5	3 H	2.50%	None	Ad hoc	8.50	3.25	5	83.6
8.75% (9.5% teachers)	14.84%	10	3 HC	1.7% (1st 10 yrs.); 1.9% (2nd 10 yrs.); 3% (21–34 yrs.); 2% (35+)	80% FAS	3%	8.25	3	5.25	59.6
6.25%	7.55%	5	3 HC	1.82%	None	CPI - 4% cap	7.25	3	4.25	71.6
6%	6%	3	3 HC/10	1.625% (service before 7/1/02); 1.55% service after 7/1/02	None	3.10%	7.75	N.D.	N.D.	96.7
Non-contributory	7.30%	5	5 HC	1.5% + .25% FAS over SSIL	94.5% FAS	CPI - 3% cap	7.50	N.D.	N.D.	99.8
6%	6.45%	5	3 H	2.30%	100% FAS	Ad hoc	8	4	4	95.2
6%	6.40%	5	3 H	2.30%	None	Ad hoc	8	3	5	87.3
3, 5, 6, or 7%	3% to 14%	5		Money purchase options	None	Up to 70% of CPI (employer option)	7	N.D.	N.D.	82.1
Non-contributory	11.59% to 14.52%	4	3 H	2%	None	CPI - 4% cap	8	4.75	3.25	93.2
3.35%	6.26%	5	3 HC	1.67%	50% FAS	50% of CPI - 5% cap	8	N.D.	N.D.	99.3
3.40%	5.09%	5	3 HC	1.67%	50% FAS	50% of CPI - 5% cap	8.25	N.D.	N.D.	84.6
5%	6.62%	5	3 HC	1.70%	100% FAS	CPI - 5% cap	7.50	3	5	81.3
6%	2.25%	5	5 HC	2%	None	CPI - 3% cap	8	4.50	3.50	N.D.

(table continues next page)

Table 3B.1 Comparative details of 85 major public employee retirement funds in 2006 *(continued)*

	State	Fund name	Employee coverage[a]	Active employees	Beneficiaries and annuitants	Fund "support ratio"	Participants covered by Social Security	Normal retirement (age/years)	Early retirement (age/years)	Reduction for early retirement
79	Washington (*continued*)	Washington Teachers Retirement System	T	67,270	37,321	1.80	Yes	65/5	55/20	Table
80	West Virginia	West Virginia Public Employees Retirement System	S, L	36,000	18,900	1.90	Yes	60/5; 55/R80	55/10	6% a year
81		West Virginia Teachers Retirement System	T	22,500	24,600	0.91	Yes	60/5; 55/30; any/35	Any/30	Actuarial reduction
82	Wyoming	Wyoming Retirement System	S, L, T	39,619	18,788	2.11	Yes	60/any; R85	50/4; any/25	5% a year
83	Milwaukee	Milwaukee City Retirement System	L	12,015	10,787	1.11	Yes	60/any; 55/30	55/15	Table
84		Milwaukee County Retirement System	L	5,056	7,275	0.69	Yes	60/any; 55/30	55/15	5% a year
85	Wisconsin	Wisconsin Retirement System	S, L, T	260,302	129,289	2.01	Yes	65/any; 57/30	55	Varies by amount of service
	Total/average			12,092,132	5,646,026	2.14				

a. Coverage: S = state; L = local; T = teachers

b. H = highest; HC = highest consecutive

* and N.D. = not determined

COLA = cost of living allowance

CPI = consumer price index

FAS = financial accounting standard

SSIL = Social Security integration level

= State does not participate in Social Security.

Source: Wisconsin Legislative Council (2007).

Employee contribution	Employer contribution	Vesting period (years)	Final average salary period[b]	Formula multiplier	Limitation	Annual postretirement COLAs	Investment return assumption (percent)	Wage inflation assumption (percent)	Real rate of return assumption (percent)	Fund funding ratio (percent)
5% to 15%	2.92%	5	5 HC	1% + money purchase	None	CPI - 3% cap	8	4.50	3.50	N.D.
4.50%	10.50%	5	3 HC/10	2%	None	Ad hoc	7.50	3.50	4	73.2
6%	15%	5	5 H/15	2%	None	Ad hoc	8	3.50	4.50	19.1
5.57%	5.68%	4	3 HC	2.125% (1st 15 yrs.); 2.25% (added yrs.)	None	CPI - 3% cap	8	4	3	95.1
5.50%	0	4	3 H	2%	70% FAS	2% after 5 yrs. retired	8.50	3	5.50	122.9
Non-contributory	$46,929,347	5	3 HC	2%	80% FAS	2%	8	3.50	3	76.2
5%	4.50%	Immediate	3 H	1.60%	70% FAS	Investment earnings; reductions possible	7.80	4.10	3.70	99.6
							7.9	3.8	4.2	82.0