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Introduction and Summary

Kevin Milligan and David A. Wise

Through the coordination of work by a team of analysts in twelve countries, the International Social Security Project has used the vast differences in social security programs across the countries as a natural laboratory to study the effects of program provisions on the labor force participation of older persons. The program results have shown that in most countries the provisions of social security programs per se, along with related programs, provide strong incentive to leave the labor force at young ages, and that reducing the inducement to leave the labor force can yield very large improvements in the financial position of government budgets. The work to date has also made clear that disability insurance programs play an especially large role in the departure of older persons from the labor force, as many pass through disability insurance (DI) on their path from employment to retirement. Thus, with this volume we have begun a series of analyses to focus particular attention on the effect of disability programs on retirement and the potentially large effects that changes in these programs could have on the labor force participation of older workers.

This issue is particularly pressing given demographic trends that will increase the cost of social security and health care programs and are likely to increase the need for people in many countries to prolong their working lives. In almost every industrialized country the population is aging rapidly

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The introduction has benefited from comments by the country participants. For acknowledgments, sources of research support, and disclosure of the authors' material financial relationships, if any, please see http://www.nber.org/chapters/c12381.ack.

and individuals are living longer. These demographic trends have placed enormous pressure on the financial viability of the pay-as-you-go social security systems in these countries. The financial pressure has been compounded, until recently, by retirement at younger and younger ages, one of the most dramatic features of labor force change over the past several decades. Because of population aging and longer life expectancies, a larger fraction of the population is receiving social security benefits, compared to the fraction of persons in the labor force and paying for the benefits. It seems likely that the social security systems in many countries will have to be reformed to be financially viable.

We have found in our work to date that in many countries disability programs essentially provide early retirement benefits before the social security eligibility age. Figure I.1 shows the proportion of men collecting disability benefits at age forty-five and at age sixty-four for eight countries. Within each of the two groups of countries, the proportion collecting disability benefits is about the same at age forty-five—2 or 3 percent in the first group and 4 or 5 percent in the second group. Yet in both groups, by age sixty-four there are large differences in the proportion collecting DI benefits (or other programs such as sickness insurance programs, which in some countries are a gateway to DI). It is implausible that the rate of physical disability varies so much among these industrialized countries.[1]

This volume presents analysis of historical trends in our group of countries that is intended to set the stage for further, more formal analysis of disability insurance programs.

This is the fifth phase of the ongoing project and the first in a series of volumes on disability insurance. The first phase of the project described the retirement incentives inherent in plan provisions and documented the strong relationship across countries between social security incentives to retire and the proportion of older persons out of the labor force (Gruber and Wise 1999). The second phase, based on microeconomic analysis of the relationship between a person's decision to retire and the program incentives faced by that person, documented the large effects that changing plan provisions would have on the labor force participation of older workers (Gruber and Wise 2004). The third phase (Gruber and Wise 2007) demonstrated the consequent fiscal implications that extending labor force participation would have on net program costs—reducing government social security benefit payments and increasing government tax revenues. The analyses in the first two phases, as well as the analysis in the third phase, are summarized in the introduction to the third phase.

In the fourth phase (Gruber and Wise 2010) we directed attention to the

1. The data for France are for ages fifty and fifty-nine. The proportion in France rises from 5 percent at age fifty to 18 percent by age fifty-nine. The proportion falls to 3 percent by age sixty-one and to 1 percent by age sixty-six as retirees take up normal retirement benefits.

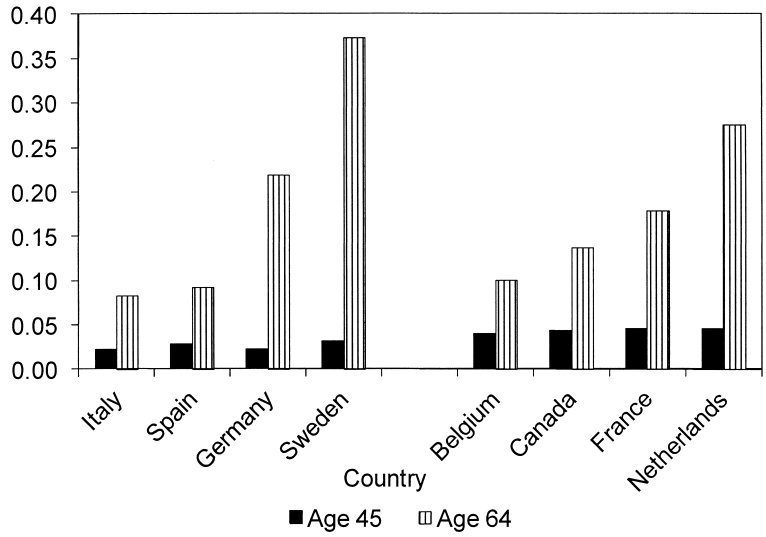

Fig. I.1 Proportion of men collecting disability benefits, by age (forty-five and sixty-four)
Note: France data are for ages fifty and fifty-nine.

oft-claimed proposition that incentives to induce older persons to retire—inherent in the provisions of social security systems—were prompted by youth unemployment. Many have worried that if the incentives to retire were removed, and older persons stayed longer in the labor force, the job opportunities of youth would be reduced. We found no evidence to support this "boxed economy" proposition. In short, we concluded: "the overwhelming weight of the evidence, as well as the evidence from each of the several different methods of estimation, is contrary to the boxed economy proposition. We find no evidence that increasing the employment of older persons will reduce the employment opportunities of youth and no evidence that increasing the employment of older persons will increase the unemployment of youth" (42).

The results of the ongoing project are the product of analyses conducted for each country by analysts in that country. Researchers who have participated in the project are named in the following list. The authors of the country chapters in this volume are listed first; others who have participated in one or more of the first four phases are listed second and shown in italics:

Belgium: Alain Jousten, Mathieu Lefèbvre, Sergio Perelman, *Pierre Pestieau*, *Raphaël Desmet*, *Arnaud Dellis*, and *Jean-Philippe Stijns*
Canada: Michael Baker, Kevin Milligan, and *Jonathan Gruber*
Denmark: Paul Bingley, Nabanita Datta Gupta, and Peder J. Pedersen

France: Luc Behaghel, Didier Blanchet, Thierry Debrand, Muriel Roger, *Melika Ben Salem*, *Antoine Bozio*, *Ronan Mahieu*, *Louis-Paul Pelé*, and *Emmanuelle Walraet*
Germany: Axel Börsch-Supan, Hendrik Juerges, *Reinhold Schnabel*, *Simone Kohnz*, and *Giovanni Mastrobuoni*
Italy: Agar Brugiavini and Franco Peracchi
Japan: Takashi Oshio, Satoshi Shimizutani, *Akiko Sato Oishi*, and *Naohiro Yashiro*
Netherlands: Adriaan Kalwij, Arie Kapteyn, and Klaas de Vos
Spain: Pilar García-Gómez, Sergi Jiménez-Martín, Judit Vall-Castelló, *Michele Boldrin*, and *Franco Peracchi*
Sweden: Lisa Jönsson, Mårten Palme and Ingemar Svensson
United Kingdom: James Banks, Richard Blundell, Antonio Bozio, Carl Emmerson, *Paul Johnson*, *Costas Meghir*, and *Sarah Smith*
United States: Kevin Milligan, *Jonathan Gruber*, *Courtney Coile*, and *Peter Diamond*

An important goal of the project has been to present results that were as comparable as possible across countries. Thus, the chapters for each phase were prepared according to a detailed template that we prepared in consultation with country participants. In this introduction, we summarize the collective results of the country analyses and borrow freely from the country chapters. In large part, however, the results presented in the introduction could only be conveyed by combined analysis of the data from each of the countries. The country chapters themselves present much more detail for each country and, in addition to template analyses performed by each country, often present country-specific analysis relevant to a particular country. These country-specific analyses are especially important in this phase because the available data varied considerably from country to country. In addition, the country chapters typically present results separately for both men and women. In this introduction, however, we usually present results for men only, except in cases where it is important to emphasize different effects of reforms, for example, by gender.

The historical analysis in this volume is intended to set the stage for more formal analysis of disability insurance programs. The key question that future analysis will address is this: *Given health status,* to what extent are the differences in labor force participation (LFP) across countries determined by the provisions of disability insurance programs? This question raises several issues: (a) we need to develop measures of health that are comparable across countries, (b) we need to understand to what extent disability insurance reforms are prompted by health status in a country, and (c) we need to understand whether disability insurance provisions are prompted by the employment circumstances of older people in each country.

To this end, we first consider trends in health status over the past four

or five decades. One of the important challenges we face in cross-country comparison of disability insurance (DI) programs is that commonly used health measures are not comparable across countries. For example, self-assessed health (SAH) status is known to be determined in important part by country-specific response effects. One important measure of health status that is comparable across countries and across time within countries, however, is mortality. Thus we begin in section I.1 by considering changes in mortality over time, and in particular the relationship between mortality and labor force participation. In section I.2 we consider how mortality is related to self-assessed health, perhaps the most widely used single measure of health status within countries. In particular we consider how the change in mortality is related to change in SAH. In section I.3 we consider how mortality is related to other indicators of health status.

With a view to issue (b), in section I.4 we consider how DI reforms are related to changes in health, in particular measured by changes in mortality. Then in section I.5, with a view to both issues (b) and (c), we consider DI reforms as natural experiments—that are not prompted by changes in the health of older persons or changes in the employment circumstances of older persons—and we show that these "exogenous" reforms can have a very large effect on the labor force participation of older workers.[2]

I.1 Mortality and Labor Force Participation

We begin with an examination of mortality and how it relates to labor force participation. We take mortality here as an indicator of health, and the analysis aims to uncover information on how labor force participation at older ages is affected by changes in health. Mortality is chosen as a starting point because mortality data is readily available and well measured in each country. Moreover, without reservation, mortality can be compared both across countries and within countries over time. We realize, of course, that mortality is not the same as morbidity or other measures of health status that may be based on summaries of a large number of health indicators. In section I.2 we consider how mortality is related to SAH, perhaps the most commonly used measure of health. The development of health measures that are comparable across countries will be a major part of our further, more formal analysis of disability insurance programs.

In this section we explore mortality trends in our twelve industrialized countries, with emphasis on mortality and labor force participation. We begin by documenting long-run trends in mortality, using several graphical

2. The results reported here are all based on within-country historical analysis. As the project progresses, more of the analysis will rely on the nexus of more recent and comparable longitudinal studies—Health and Retirement Study (HRS) in the United States, the English Longitudinal Study of Aging (ELSA), the Survey of Health, Aging and Retirement in Europe (SHARE), and the Japan Study of Aging and Retirement (JSTAR).

approaches. We then compare the mortality trends to labor force participation.

Decline in Mortality: We begin with a standard way to show mortality decline. Figure I.2 shows the decline in mortality at age sixty-five over the past six decades in each of the countries. Two features of the data stand out. First, in most of the countries the decline did not begin until about 1970.

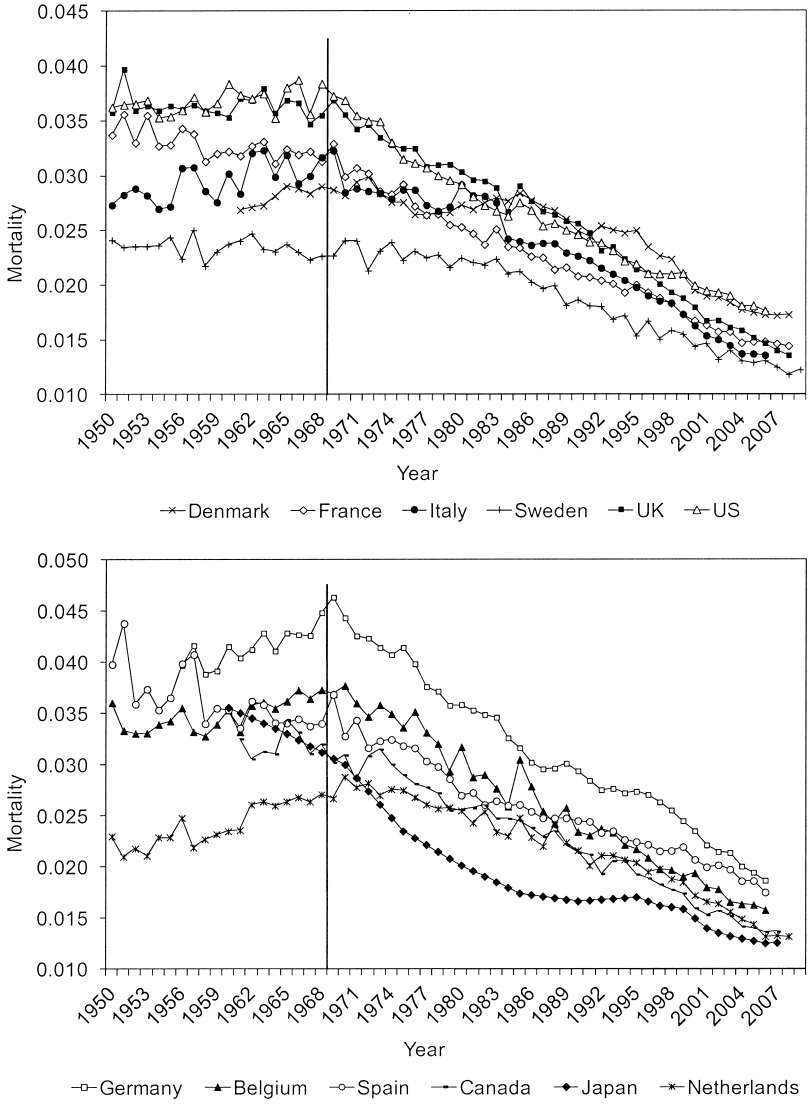

Fig. I.2 Decline in mortality at age sixty-five, by country

Indeed in several countries—Italy, Denmark, Germany, and the Netherlands—mortality increased between 1950 and 1970. Second, thereafter, the decline is generally greater for countries that had the highest mortality rates in 1970. Thus there seems to be some convergence of mortality rates in these countries since 1970. The country chapters show these data for ages fifty-five, sixty, and sixty-five.

Equivalent Mortality Ages: There are several ways to present mortality data that highlight more clearly the implications of mortality declines for health. One way is to ask how old you had to be today to have the same mortality as a person of a given age in an earlier year. For example, consider the mortality rate of persons aged sixty-five in the 1960s. Then consider the age at which the same mortality rate occurred in later years. Figure I.3 shows the ages of equivalent mortality in the United Kingdom. Men at age seventy-four in 2007 had about the same mortality rate as men aged sixty-five in the 1960s. The difference is about 9.8 years. That is, by this measure, men aged seventy-four felt about as old as men aged sixty-five four or five decades earlier. Figure I.3 shows the same comparison for the United States and France; the differences are 9.2 and 9.6 years, respectively. Thus, by this measure, there has been a very large improvement in health (a reduction in the mortality rate) over the past several decades. Following, we compare equivalent mortality ages to equivalent self-assessed health ages, which may be closer to healthy equivalent ages.

Table I.1 shows the age in 2005 with the same mortality as sixty-five-year-old men in the early 1960s for each of the countries. Although in each country the equivalent mortality age in 2005 was substantially greater than age sixty-five mortality in the early 1960s, there is also substantial variation in the 2005 equivalent age—from a low of age 69.7 and an increase of 4.7 years in the Netherlands to a high of age seventy-five and an increase of ten years in Japan. Figure I.4 shows the gain in equivalent mortality years (the equivalent mortality age in 2005 minus sixty-five) was strongly related to initial mortality at age sixty-five in the early 1960s. The increase was greater for countries with the highest mortality in the 1960s. Like figure I.2, this figure suggests some convergence of mortality rates in these countries.

Employment by Age: We next present a series of figures to describe the change over time in the relationship between employment and mortality and the relationship between employment and age. We begin with employment by age now, and then turn to employment by mortality and how it has changed over time. Figures I.5 and I.6 show employment by age. The key conclusion is that while the employment rate was similar for most of the countries through age fifty, because of differences in retirement programs, the employment rate varies a great deal by age sixty-five. Figure I.5 shows employment by age in the eleven countries.[3] In nine of the eleven countries,

3. Italy is excluded because data for Italy are available only for men and women combined.

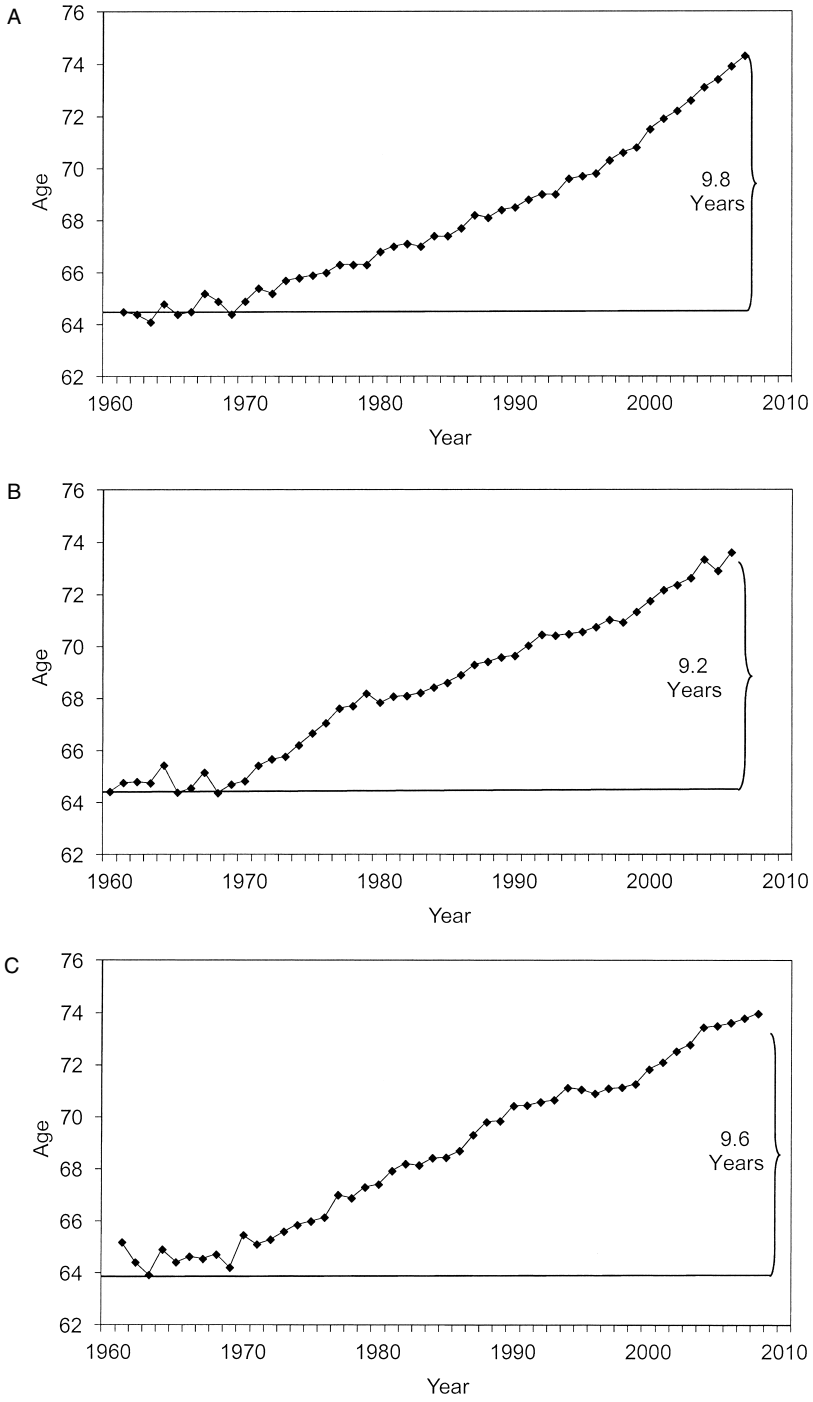

Fig. I.3 How old do you need to be to "feel like" a sixty-five-year-old in the 1960s? *A*, Men in the UK; *B*, Men in the United States; *C*, Men in France

Table I.1 **Gain in equivalent mortality age, early 1960s to 2005, for men aged sixty-five in initial year**

Country	First year	Mortality rate in first year (%)	Equivalent mortality age in 2005	Gain in years
Belgium	1960	3.53	72.8	7.8
Canada	1961	3.26	73.4	8.4
Denmark	1961	2.69	70.0	5.0
France	1960	3.22	73.5	8.5
Germany	1960	4.15	73.2	8.2
Italy	1960	3.06	72.8	7.8
Japan	1960	3.56	75.0	10.0
Netherlands	1960	2.35	69.7	4.7
Spain	1960	3.54	71.9	6.9
Sweden	1960	2.37	71.4	6.4
United Kingdom	1960	3.53	73.4	8.4
United States	1960	3.84	74.1	9.1

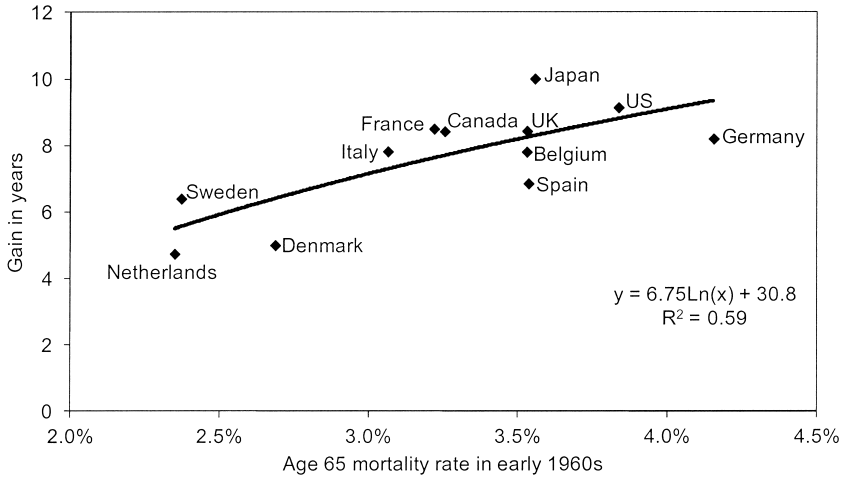

Fig. I.4 **Gain in equivalent mortality age 1960 to 2005 versus age sixty-five mortality rate in 1960 for men**

employment in the forty-five to forty-nine age interval was between 85 and 89 percent, but by age interval sixty to sixty-four the employment rate varied from 18 to 56 percent, and (for seven of the eleven) was between 2.6 to 31 percent in the sixty-five to sixty-nine age interval. Figure I.6 shows employment by year for seven of the twelve countries. In these seven countries the employment rate was between 83 and 90 percent at age fifty, but by age sixty-four the employment rate varied from about 10 to 59 percent.

Mortality by Age: We now turn to employment by mortality and begin by describing mortality by age across the countries. Figure I.7 shows mortality

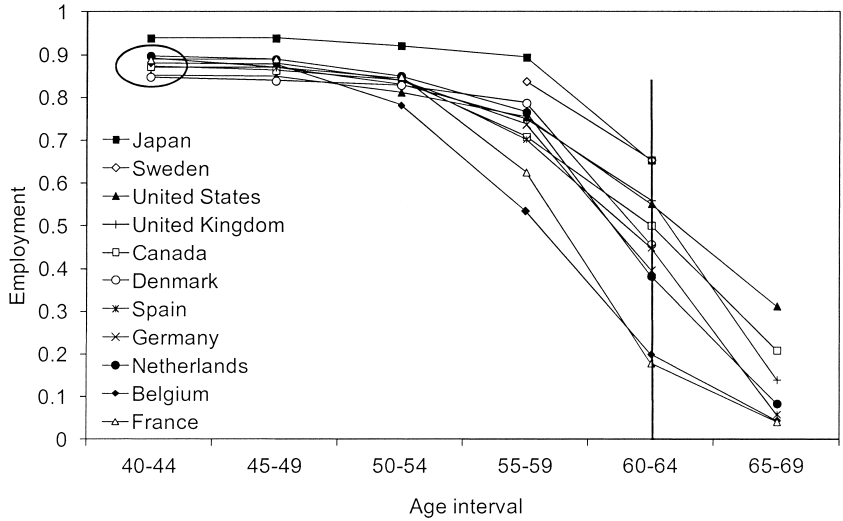

Fig. I.5 Employment by age interval in 2004, in eleven countries, men

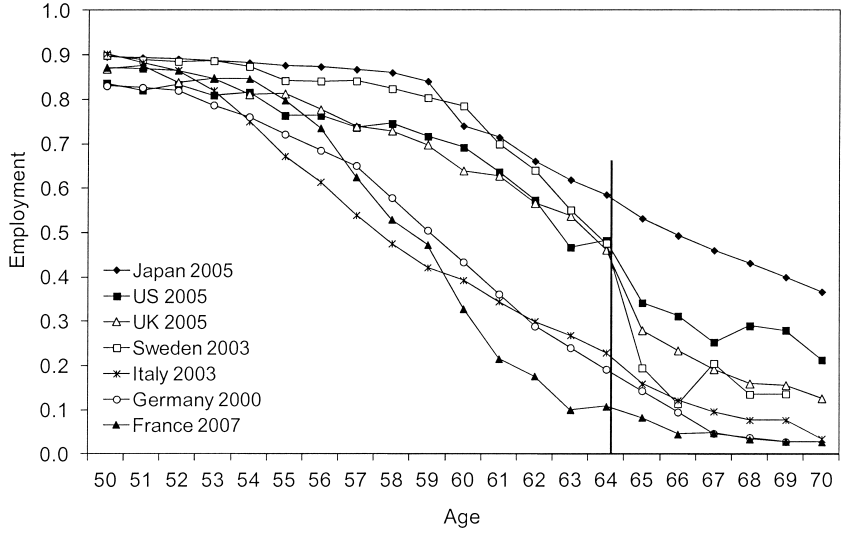

Fig. I.6 Employment by age for seven countries, men

for selected ages in 2005 in the twelve countries. While there are differences across countries, the variation appears small relative to differences in employment by age. Figure I.8 shows mortality by age for each country. The differences across countries are essentially bounded by the lowest mortality rate in Japan and the highest rate in the United States. The country

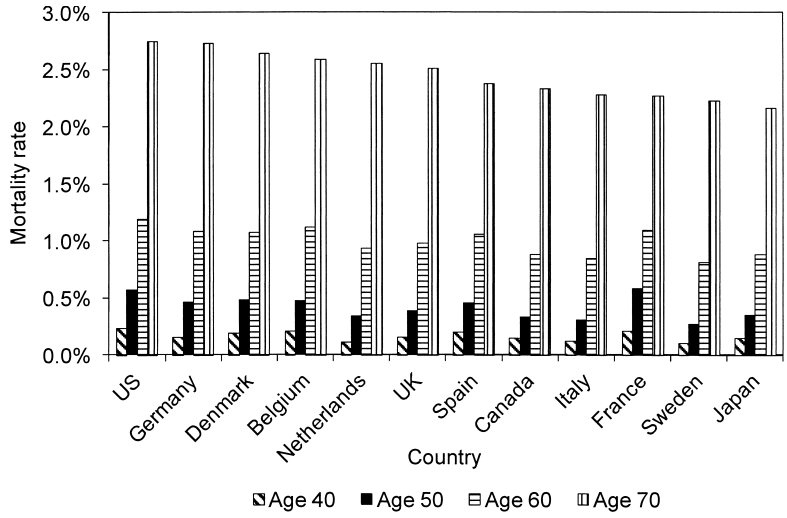

Fig. I.7 Mortality at selected ages in 2005, by country, for men

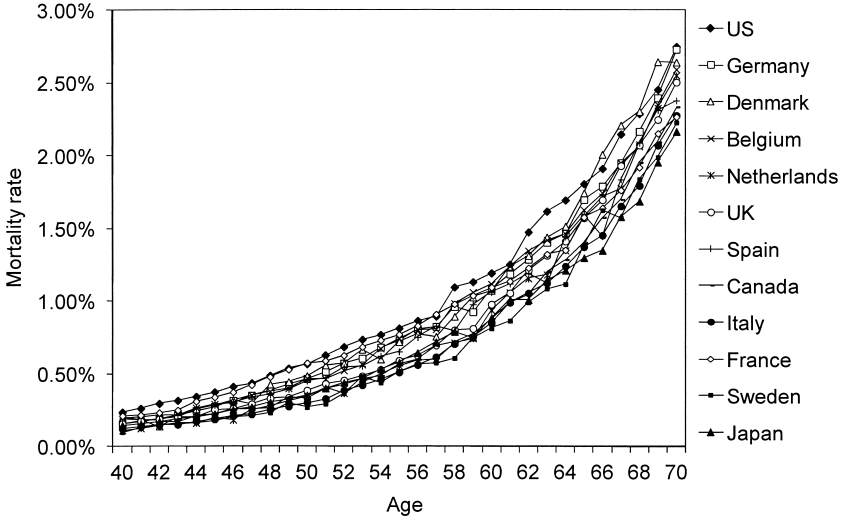

Fig. I.8 Mortality by age by country for men, 2005

trends are ordered by mortality at age seventy, from high to low as indicated in the legend.

Employment by Mortality: We want to understand how employment varies across countries, given health. Again, we use mortality as our measure of health, sticking with a measure that is comparable across countries. We then compare the employment rate across countries for given levels of mortality.

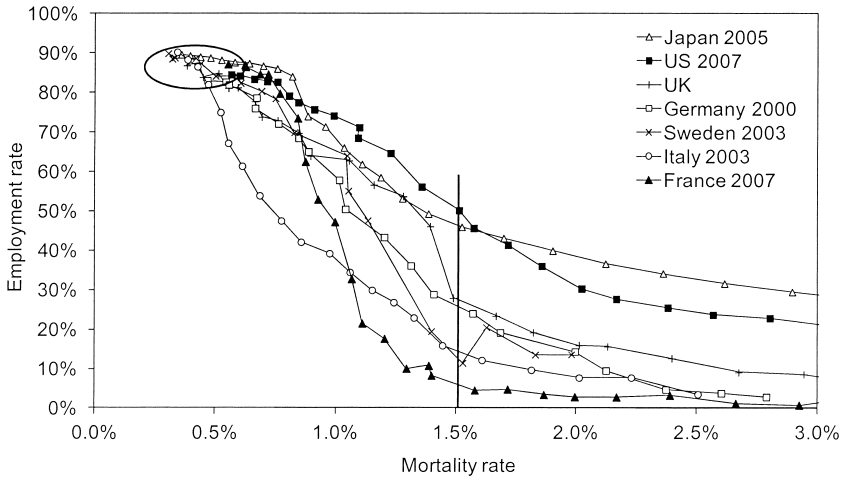

Fig. I.9 Employment versus mortality, selected countries, by one-year intervals

Figure I.9 shows employment by mortality for seven countries by single-year age intervals. At the ages at which the mortality rates in these countries were about 0.5 percent in each of the countries, the employment rates are very similar in the countries, ranging from about 0.82 to 0.90. But as the mortality rate increases, the divergence across the countries increases. For example, at the age at which the mortality rate in each of the countries was 1.5 percent, the employment rates varied from about 7 percent in France to about 50 percent in the United States. Like the increasing divergence in employment rates by age, the divergence as persons age and mortality increases reflects the large variation in the provisions of retirement pathways.

Figure I.10 shows mortality rates for ten countries (excluding Sweden and Italy, which are included in figure I.9) by five-year age intervals. The general features of the figure are the same as those of figure I.9. The cross-country employment rates diverge as mortality increases. This pattern is especially apparent for the seven countries with similar employment rates—ranging from 0.85 to 0.89—when the mortality rate is around 0.2 percent. When the mortality rate was about 1.1 percent in each country, the employment rate ranged from 0.17 to 0.58.

To understand the cross-country comparisons in figures I.9 and I.10, it helps to consider in more detail the relationship between employment and mortality. Figure I.11 shows the relationship between age and employment in 1977 and 2007. As highlighted, the employment rate at ages sixty-two and sixty-three changed little over this thirty-year period. But at these ages the mortality rates declined substantially between 1977 and 2007—about 1 percent at each age. Figure I.12 presents a different view of the data, showing the employment rate by mortality in 1977 and 2007. Consider first the

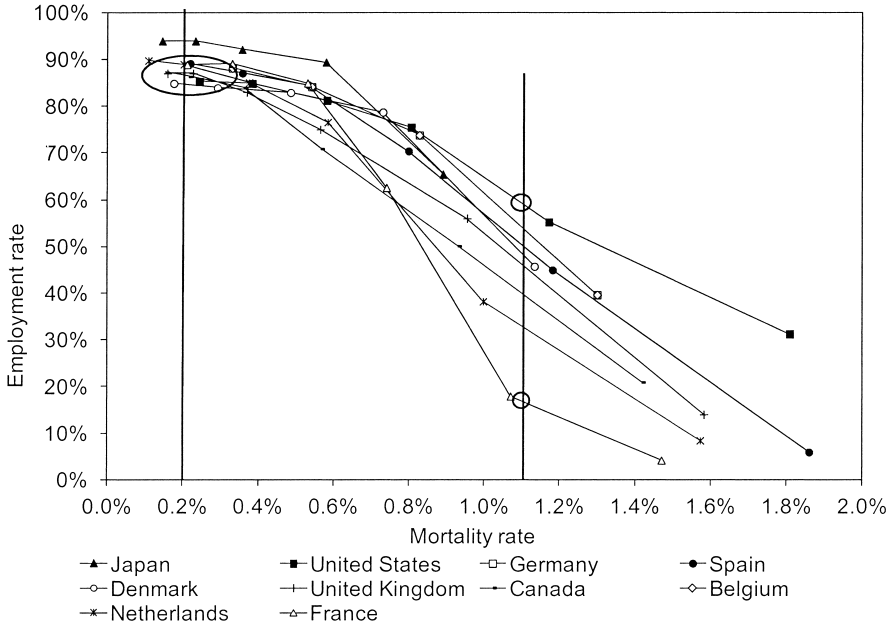

Fig. I.10 Employment versus mortality in 2004 by five-year intervals

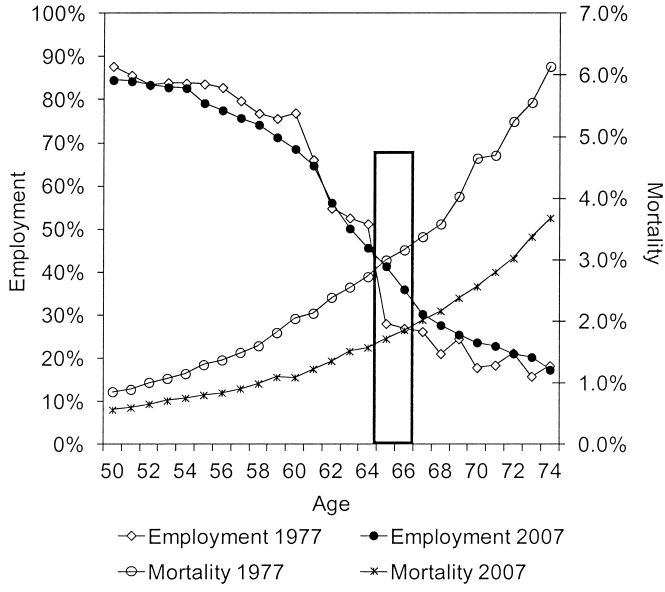

Fig. I.11 Employment and mortality by age, men in the United States, 1977 and 2007

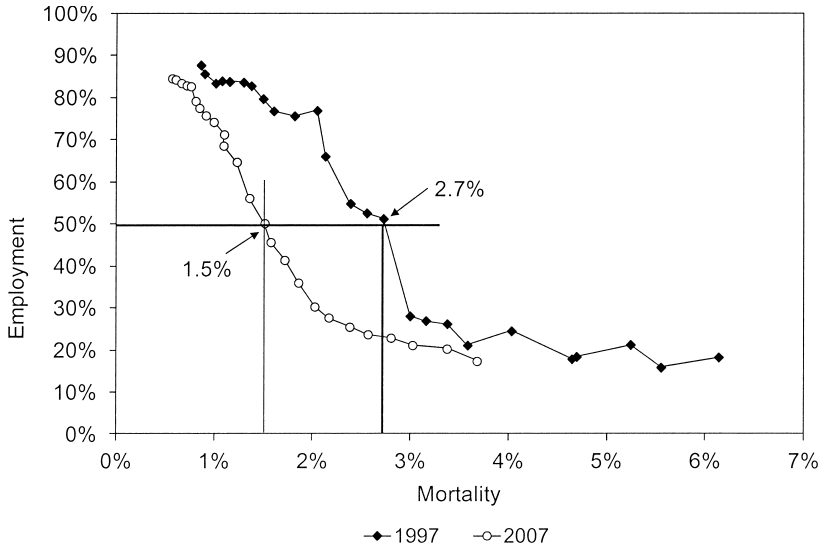

Fig. I.12 Employment by mortality, men in the United States, 1977 and 2007

age at which 50 percent of men were employed. In 2007, the mortality rate when 50 percent of men were employed was 2.7 percent; thirty years later in 2007, the mortality rate was only 1.5 percent, a decline of 1.2 percent. That is, for the employment rate to be 50 percent in 2007, men had to be much healthier (by the mortality measure) than they were in 1977. Looking at the data another way, at the age at which the mortality rate was 1.5 percent, in 1977 about 80 percent of men were employed but only 50 percent in 2007.

Figures I.13 and I.14 show comparable figures for France. Figure I.13 shows that for France, the employment rate at ages sixty-two and sixty-three declined by almost 30 percent. In addition, the mortality rate at these ages declined by about 1 percent as well, about the same as in the United States. Figure I.14 shows that in France at the age at which 30 percent of men were employed the mortality rate was 2.7 percent in 1977 but only 1.1 percent in 2007, a decline of 1.6 percent. That is, for the employment rate to be 30 percent in 2007, men had to be much healthier (by the mortality measure) than they were in 1977. Further, looking at the data another way, at the age at which the mortality rate was 1.1 percent, 90 percent of men were employed in 1977 but only 30 percent in 2007.

Figures I.15 and I.16 show comparable figures for the United Kingdom. Figure I.15 shows that for the United Kingdom, the employment rate at ages sixty-two and sixty-three declined by about 20 percent. In addition, the mortality rate at these ages declined by about 1 percent as well, about the same as in the United States and France. Figure I.16 shows that in the

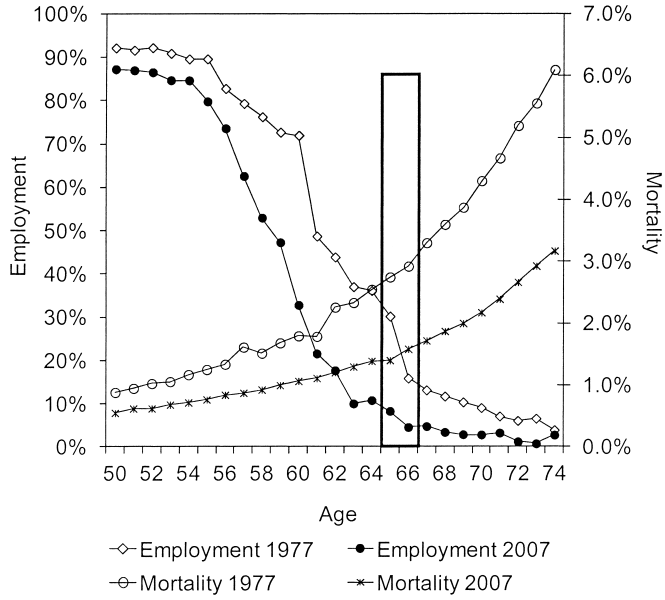

Fig. I.13 Employment and mortality by age, men in France, 1977 and 2007

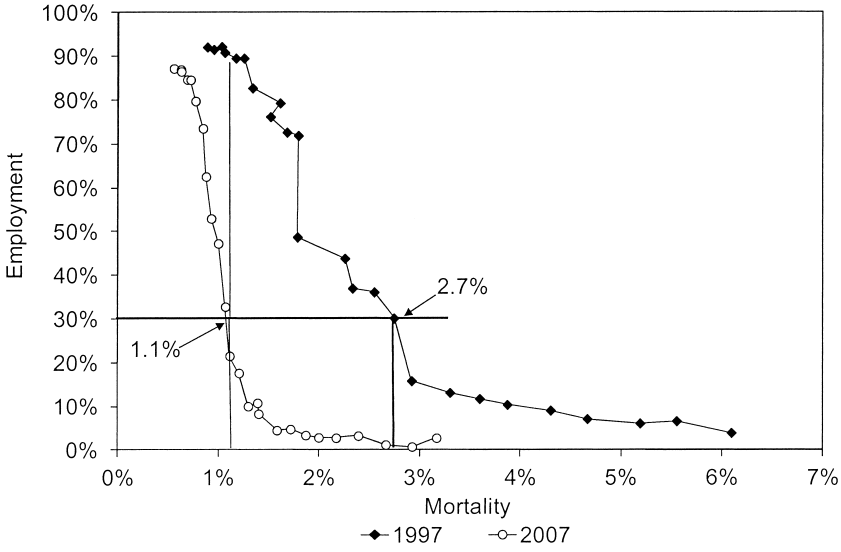

Fig. I.14 Employment by mortality, men in France, 1997 and 2007

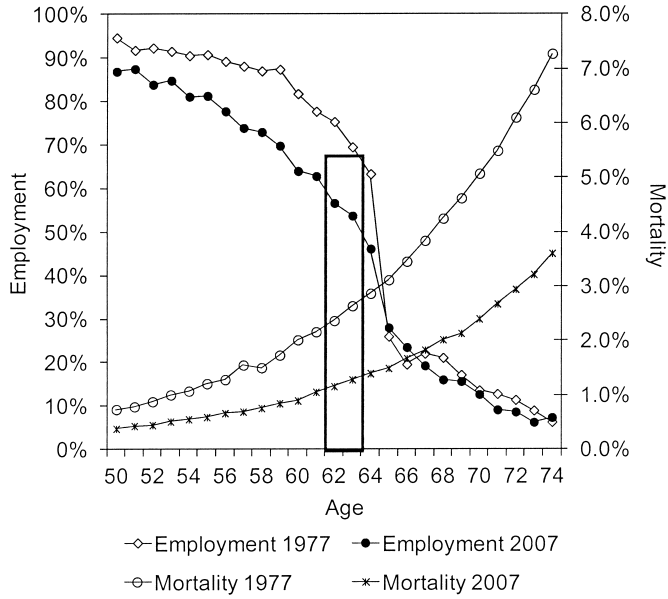

Fig. I.15 Employment and mortality by age, men in the United Kingdom, 1977 and 2007

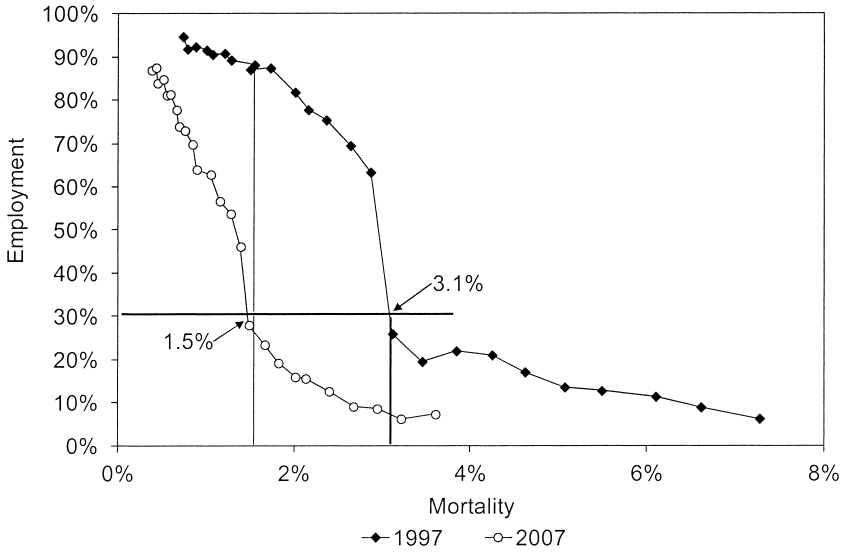

Fig. I.16 Employment by mortality, men in the United Kingdom, 1977 and 2007

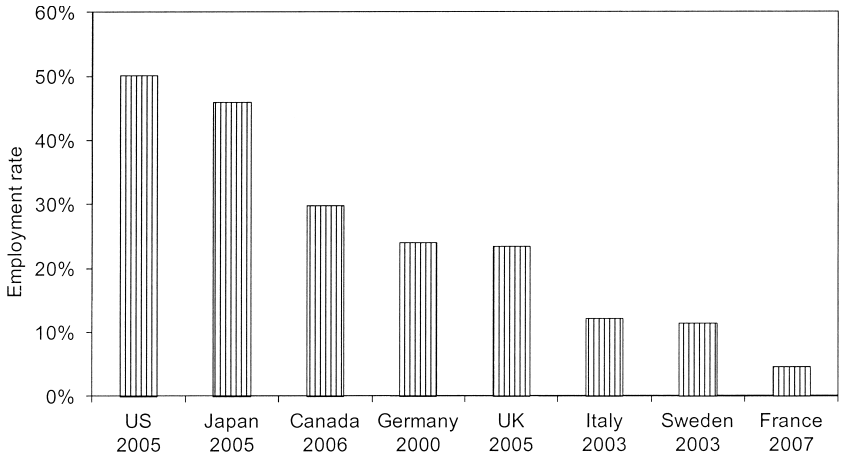

Fig. I.17 Proportion of men employed when the mortality rate is 1.5 percent, selected countries, various years

United Kingdom at the age at which 30 percent of men were employed the mortality rate was about 3.1 percent in 1977 but only about 1.5 percent in 2007, a decline of 1.6 percent. That is, for the employment rate to be 30 percent in 2007, men had to be much healthier (by the mortality measure) than they were in 1977. Further, looking at the data another way, at the age at which the mortality rate was 1.5 percent, almost 90 percent of men were employed in 1977 but only about 30 percent in 2007.

The data necessary to make figures like these for all countries are not now included in the data files for each country. We can, however, show variation across countries like that shown in the left-hand vertical bars in figures I.12, I.14, and I.16. Figure I.17 shows the employment rate in years in the 2000s for men in eight countries when the mortality rate was 1.5 percent. The rate varies from 4.5 percent in France to 50 percent in the United States. The data in this figure are comparable to the data shown in figures I.9 and I.10, but those figures also show the employment rates when the mortality rate was much lower and the employment rate was similar across countries. This figure shows a very large dispersion of employment rates across countries at the 1.5 percent mortality rate.

I.2 Mortality versus Self-Assessed Health

The previous figures highlight the changing relationship between mortality and employment. As emphasized earlier, mortality lends itself to these comparisons because mortality is comparable across time and across time within countries. Other potential measures of health status are not comparable across countries and may not be comparable across time within

countries. Nonetheless, we would like to explore the relationship between mortality and another commonly used summary measure of health status. Perhaps the most commonly used measure is self-assessed health status (SAH). We compare these two measures in several ways. We first compare SAH and future mortality in the United States. Second, we compare mortality equivalent ages over time with SAH equivalent ages over time. We illustrate this idea with data for two countries, the United States and Sweden. Third, we consider within countries the time trend relationship between mortality and SAH. Finally, we combine the latter comparisons to estimate the cross-country relationship between the change in mortality over time with the comparable change in SAH over the same time period.

SAH and Future Mortality in the United States: Table I.2 shows that in the United States Health and Retirement Study (HRS) SAH in 1992 is strongly predictive of subsequent mortality. The table shows the proportion of men and women that are deceased by 1996, 2002, and 2008. For example, for men in excellent health only 11.4 percent are deceased by 2008 compared to 57.9 percent for men in poor health.

Mortality Equivalent Ages versus SAH Equivalent Ages—United States: Figure I.18 compares these two measures for the United States. First, the figure shows mortality by age in 1977 and in 2007. The figure shows that a person aged seventy-seven in 2007 had about the same mortality rate as a person aged sixty in 1977, a difference of about seven years. Second, the figure shows the proportion of people who reported they were in fair or poor health, by age, in the 1970s and in the 2000s. Comparing these two trends, men who were sixty-nine in the 2000s had about the same SAH as men who

Table I.2 **Percentage of HRS respondents aged fifty-one to sixty-one in 1992 who are deceased by the beginning of each wave, by SAH in 1992, United States**

	Self-reported health in 1992				
Year	Excellent (%)	Very good (%)	Good (%)	Fair (%)	Poor (%)
		Men			
1996	1.0	1.5	2.1	4.3	10.8
2002	5.8	7.2	13.3	22.1	36.9
2008	11.4	15.6	25.8	36.5	57.9
Percent in category	24.5	29.6	27.8	11.5	6.6
		Women			
1996	0.4	0.8	0.8	2.1	4.2
2002	2.6	5.4	7.1	15.2	24.4
2008	6.4	10.3	15.2	28.8	36.8
Percent in category	23.1	30.7	25.7	13.6	6.9

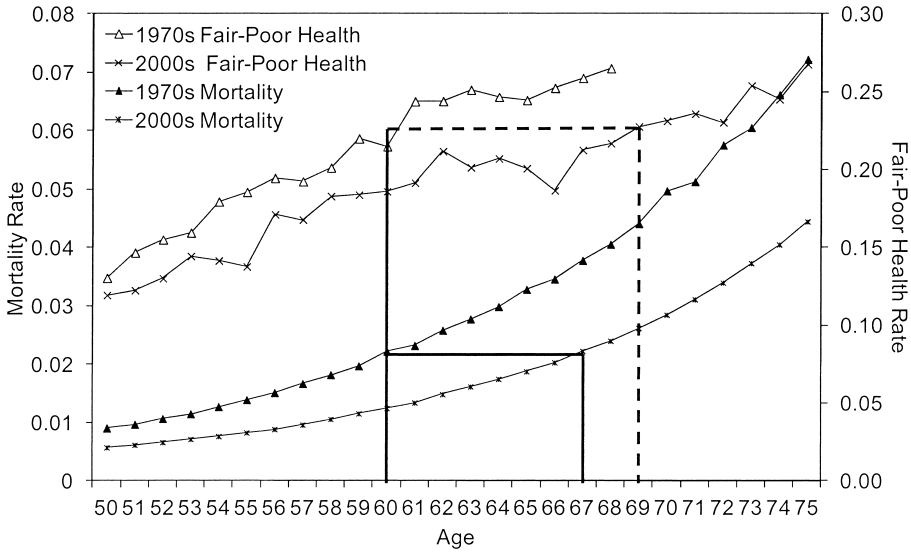

Fig. I.18 Mortality and self-assessed health 1970s and 2000s, United States

were over nine years younger, aged sixty, in the 1970s. Thus, in this example, there was a greater difference in age equivalent SAH than in age equivalent mortality (about nine versus seven years).

Mortality Equivalent Ages versus SAH Equivalent Ages—Sweden: Figure I.19 compares these two, mortality and SAH, for Sweden. Mortality and SAH, for Sweden are only available for age-groups forty-five to fifty-four, fifty-five to fifty-nine, and sixty to sixty-four. The data used in the chapter for Sweden are for 1976 and 2005. For each of these years the average for the age intervals is plotted in figure I.19 at the midpoint of the intervals. These values are shown by the three markers for SAH and mortality for each of the two years. Then the markers are fitted—the mortality markers with a power functional form and the SAH markers with a linear functional form. First, based on these rough approximations, the figure shows that a person aged sixty-three in 2005 had about the same mortality rate as a person aged fifty-five in 1976, a difference of about eight years. Second, the figure shows the proportion of people who reported they were in poor health, by age, in 1976 and in 2005. Comparing these two trends, men who were about sixty-four in 2005 had about the same SAH as men who were about nine years younger, aged fifty-five, in 1976. Thus, in this example, there is also a greater difference in age equivalent SAH than in age equivalent mortality (about nine versus eight years).

Thus, in both the United States and Sweden, there appears to be a sub-

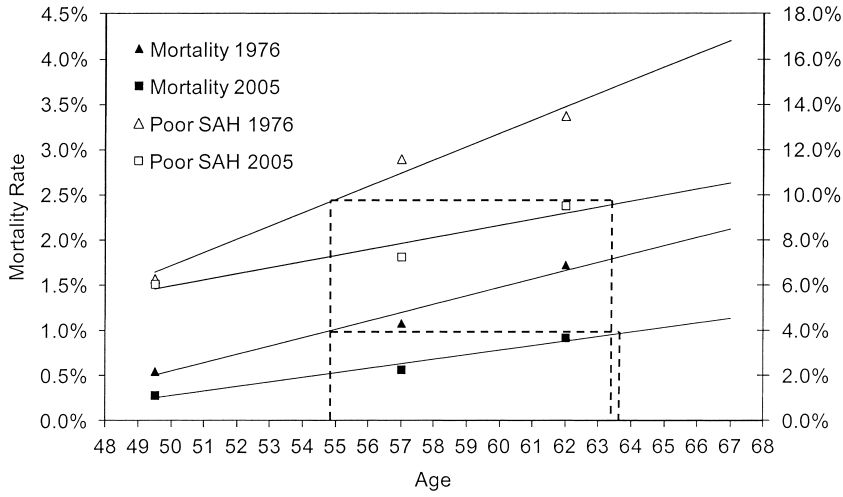

Fig. I.19 Mortality and self-assessed health 1976 and 2005, Sweden

stantial correspondence between age equivalent mortality and age equivalent SAH.

Within-Country Trends in Mortality versus SAH: The within-country trends in several countries are shown in figure I.20 for the United States, Sweden, the Netherlands, Canada, and the United Kingdom, respectively. For each of these countries, with the exception of the United Kingdom, there seems to be a close correspondence between the trend in mortality and the trend in SAH. The SAH measure in the United Kingdom, however, differs from the measure used in the other countries—the United Kingdom uses "bad health" versus "fair or poor health" in the other countries.

It is important to note that, with the exception of the United Kingdom, even though there seems to be a systematic relationship between mortality and SAH within countries, it can be seen from the levels of the SAH values that the proportion of persons saying they are in fair or poor health varies greatly across countries.

Cross-Country Comparison between the Percent Change in Mortality and the Percent Change in SAH: Figure I.21 summarizes the relationship across nine countries for which both series are available over some time period. It compares the percent change in "fair-poor" health with the percent change in mortality. For each country the time period spans the year of the first SAH observation to the year of the last SAH observation. For example, the period for the Netherlands is 1983 to 2008. The percent change in SAH is the percent difference between the 1983 value and the 2008 value. The percent change in mortality is over the same time period. For the nine countries that report the proportion in fair or poor health (or one minus the proportion in better health) there is a close relationship between the change in

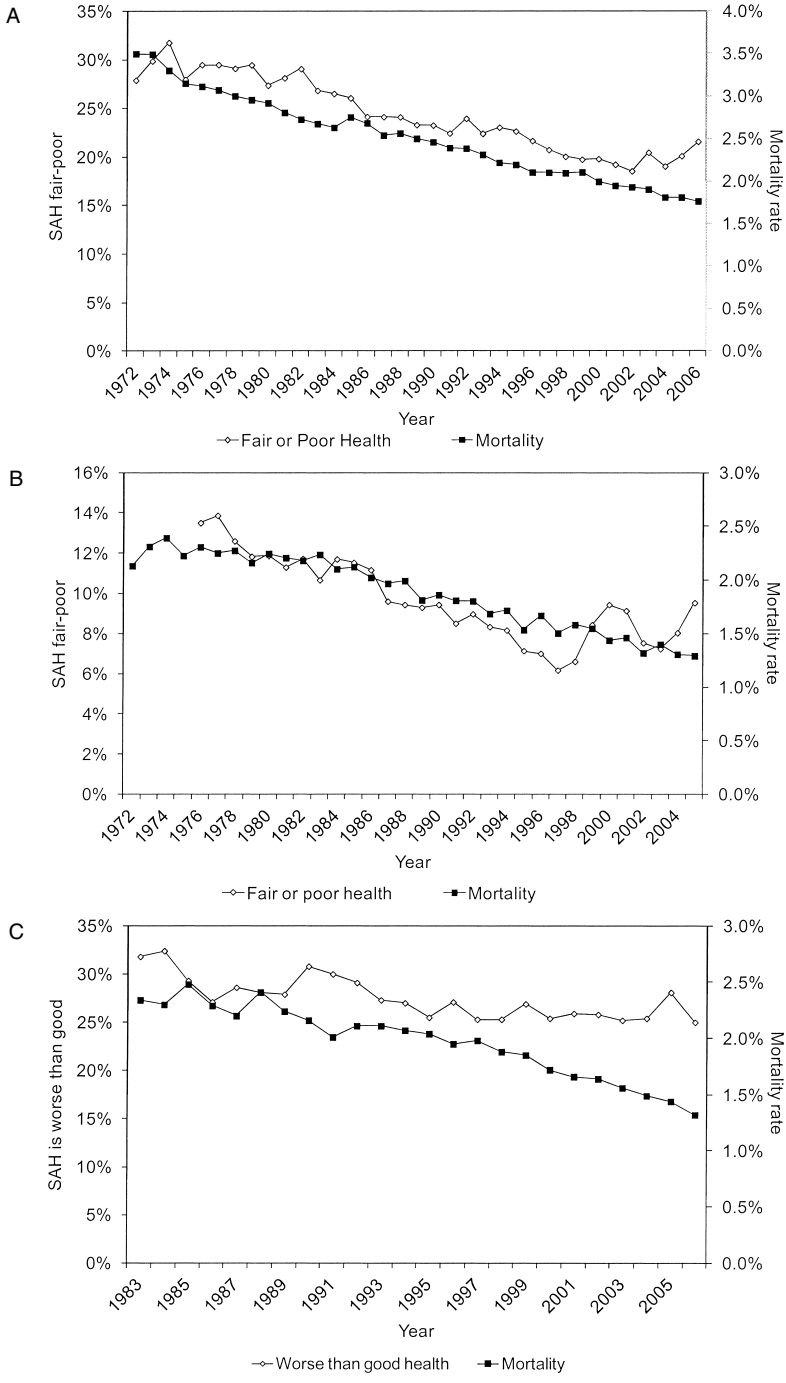

Fig. I.20 Mortality versus "fair-poor" self-assessed health: *A*, Men in the United States; *B*, Men in Sweden; *C*, Men in the Netherlands; *D*, Men in Canada; *E*, Men in the United Kingdom

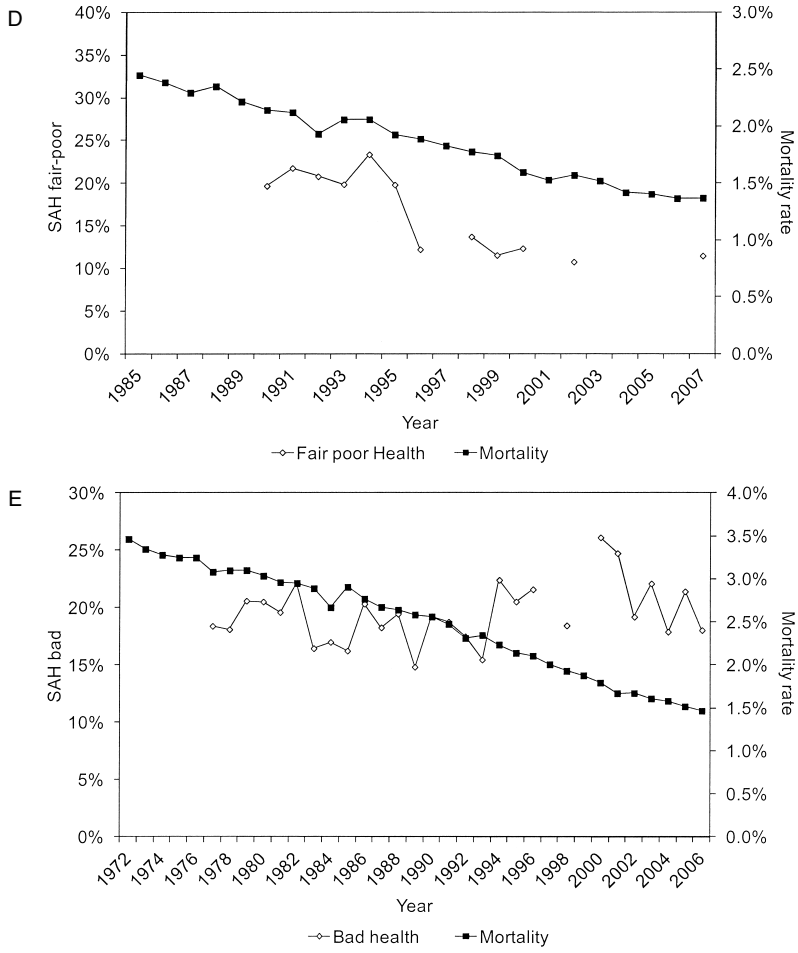

Fig. I.20 (cont.)

mortality and the change in SAH. The SAH is not available for Italy. The data points for France and the United Kingdom use different measures of health—the United Kingdom reports the percent in bad health and France reports the average of a ten-point scale of health status. This suggests a fairly tight *within-country* relationship between improvements in mortality and improvements in self-assessed health, providing a link between our earlier mortality analysis and one commonly used health measure. We emphasize again, however, that perusal of the previous figures reveals that the level of SAH varies greatly from country to country, consistent with substantial country-specific SAH response effects.

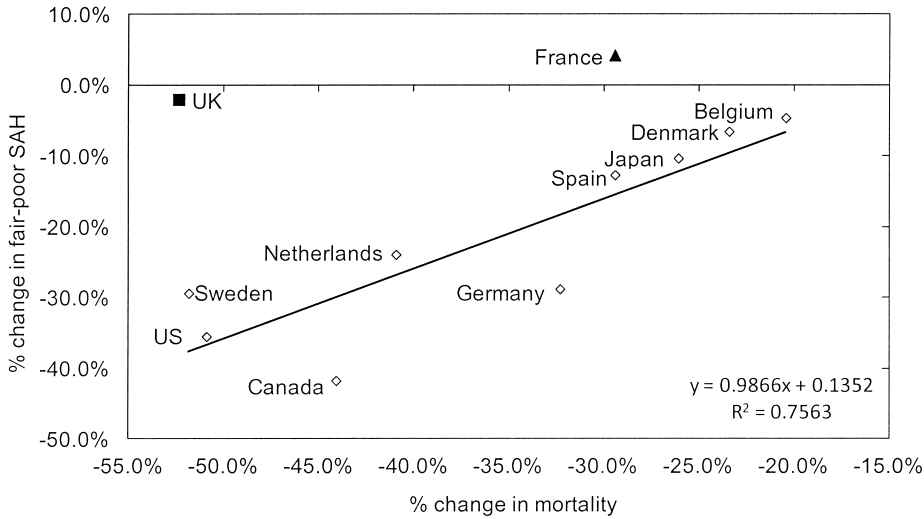

Fig. I.21 Percent change in "fair-poor" health versus percent change in mortality, men aged sixty to sixty-four

I.3 Mortality versus Other Health Measures

The evidence presented in section I.2 suggests that on balance there is a substantial relationship between within-country trends in SAH and trends in mortality. Here we consider how mortality is related to other health measures. While most countries have some data on SAH, the data on other health measures varies a great deal from country to country and the evidence on the relationship of the various measures to mortality is mixed.

To illustrate the various data series and their relationship to mortality we show examples from several countries—Denmark, Italy, Spain, Sweden, and Japan. Figure I.22 shows mortality rates for cancer, heart, brain, and respiratory causes in Denmark. Among these objective measures of health, only heart disease shows a strong and consistent decline. Figure I.23 shows mortality rates by cause for cancer, circulatory diseases, heart, cirrhosis, and respiratory causes in Italy, with especially large declines in the first three.

Figure I.24 shows the trend in the incidence of major illnesses—cholesterol, high blood pressure, allergies, diabetes, heart problems, and respiratory problems—in Spain. The data show an increase in high blood pressure and cholesterol and little change in the others between 1987 and 2006. Figure I.25 shows trends in circulatory disease, back pain, and long-term disease in Sweden, with an increase in circulatory disease and little change in the others. Figure I.26 shows trends for feel not good or sick, Activities of Daily Life, and SAH, with a downward trend in each of them.

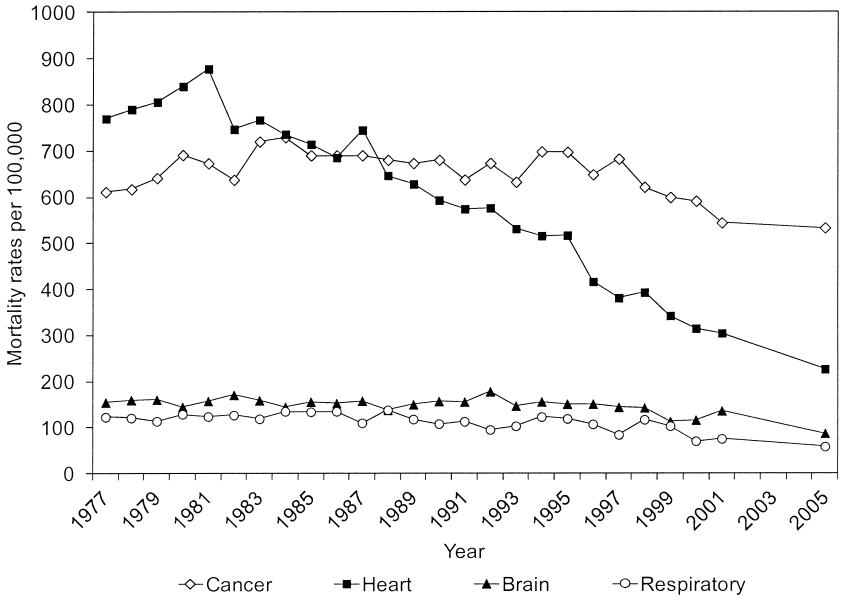

Fig. I.22 Mortality rates for selected causes for men aged sixty to sixty-four in Denmark

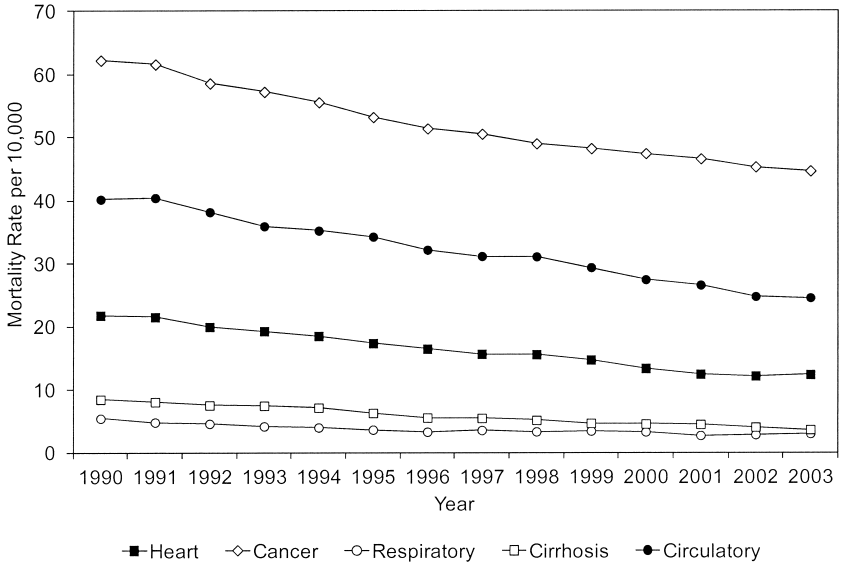

Fig. I.23 Causes of death of men aged fifty-five to sixty-four in Italy

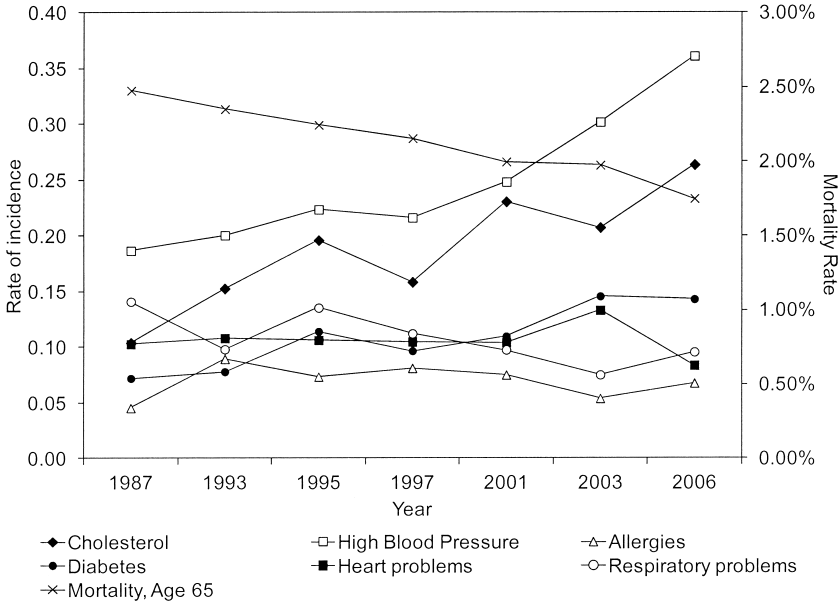

Fig. I.24 Incidence of major illnesses for men aged sixty to sixty-four in Spain

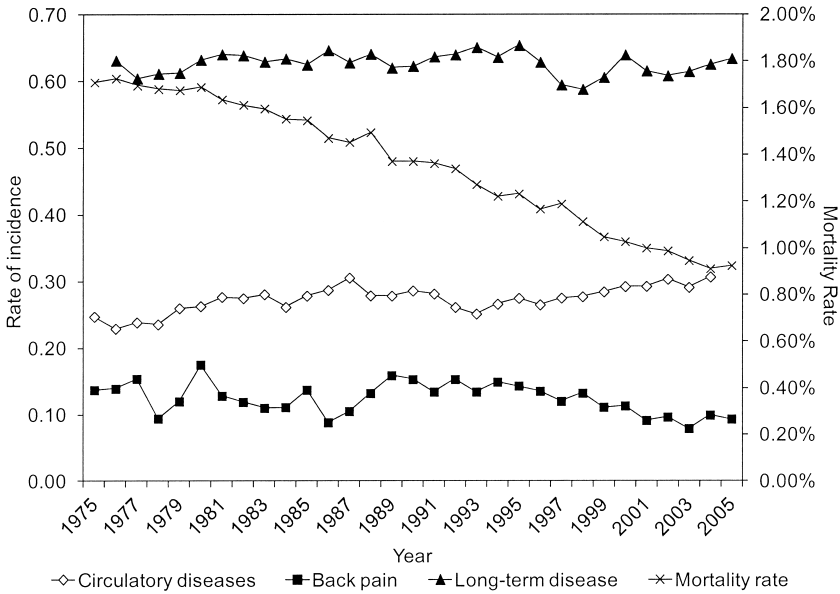

Fig. I.25 Incidence of major diseases in Sweden for men aged sixty to sixty-four

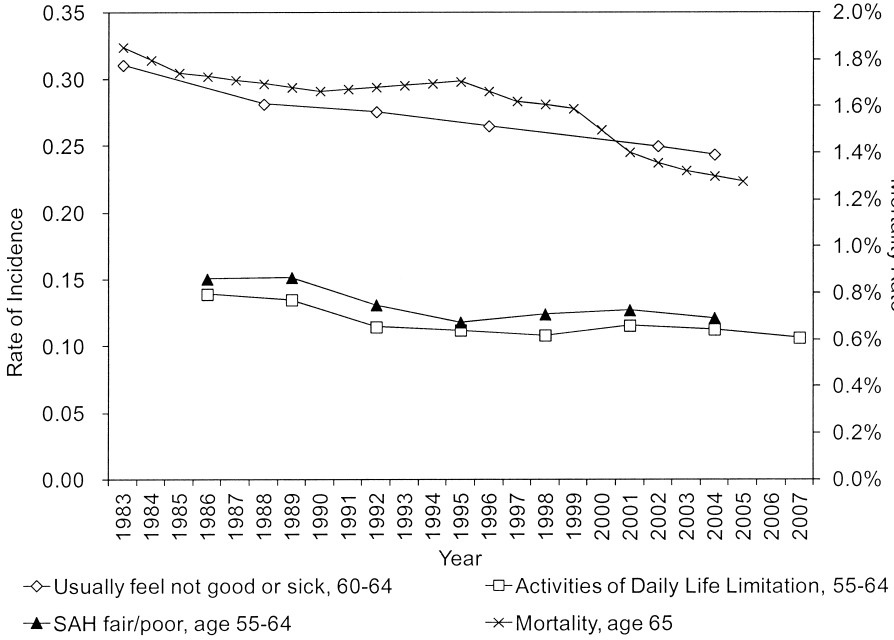

Fig. I.26 Health indicators, Japanese men

I.4 Mortality versus DI Participation

In this section we emphasize the general absence of a relationship between DI participation and health, as indicated by trends in mortality. The evidence suggests that DI provisions, which determine participation rates, are essentially a train on their own track. That is, DI provisions seem not to be endogenous with respect to health as indicated by mortality.

To summarize the evidence across countries, figure I.27 shows the percent change in DI participation against the percent change in mortality between 1980 and 2005. There appears to be little relationship. Although there was a wide variation across countries in the percent reduction in mortality over this period (from about –30 percent to –50 percent), the change in DI participation shows little relationship to the reduction in mortality.

To provide more detail on the trends within countries, figures I.28, I.29, I.30, I.31, and I.32 show the trends in mortality and DI participation in five countries—the United Kingdom, Canada, Italy, Sweden, and the United States, respectively. It appears that the trend in DI participation in these countries is unrelated to the trend in mortality. Given that SAH trends in the same direction as mortality in most countries for which we have data, as shown in section I.2, it appears that there is also little relationship between SAH and DI participation.

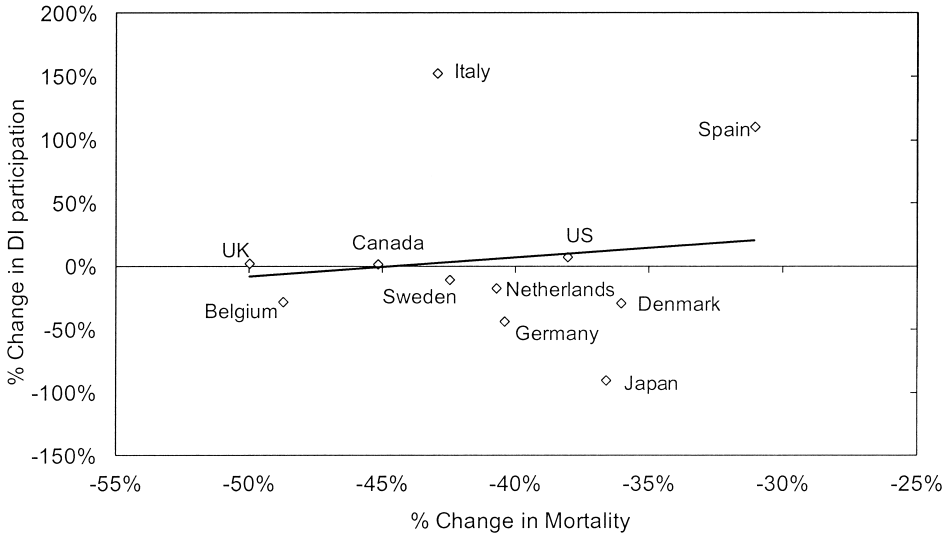

Fig. I.27 Percent change in DI participation versus percent change in mortality, early 1980 to 2005, men

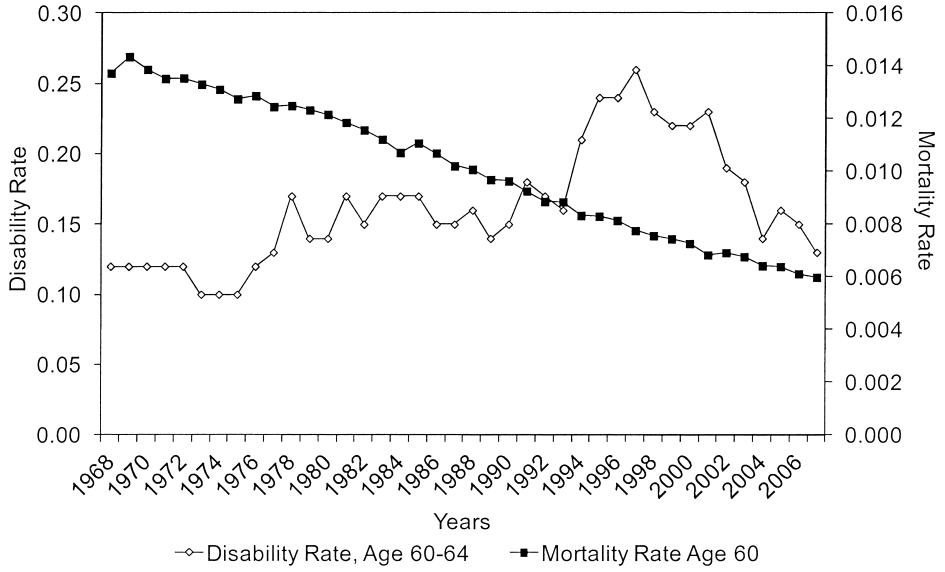

Fig. I.28 Trends in mortality and DI participation in the United Kingdom

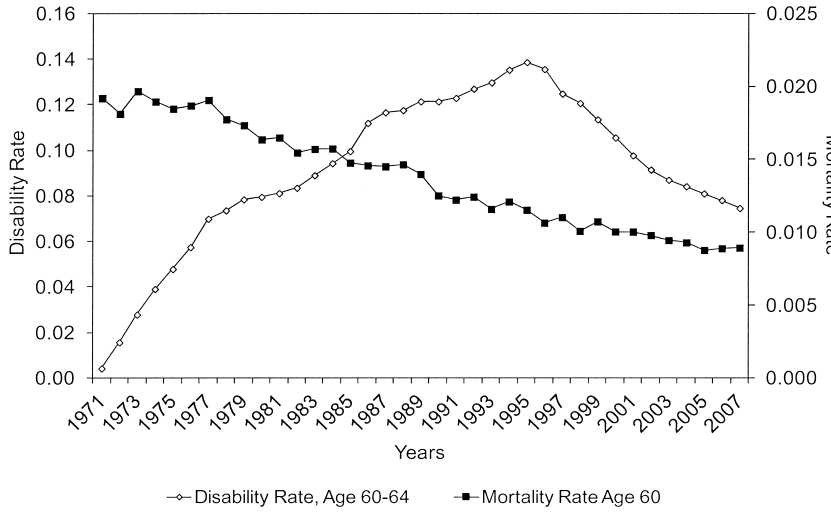

Fig. I.29 Trends in mortality and DI participation in Canada

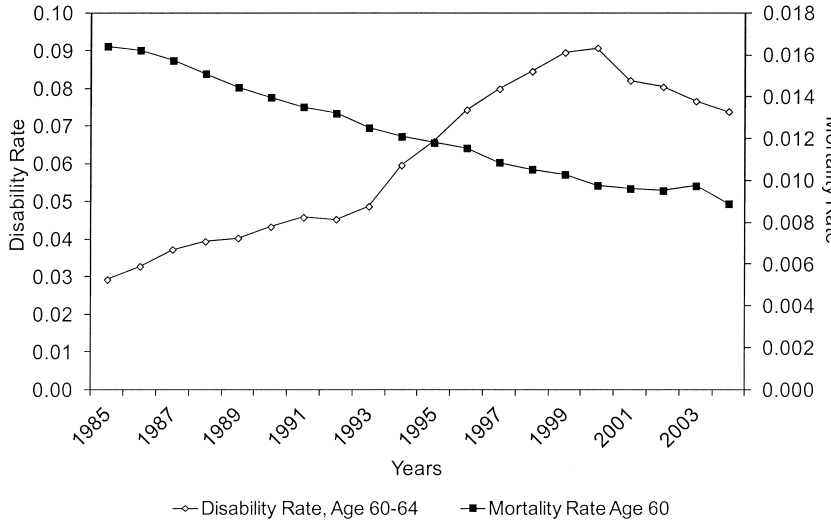

Fig. I.30 Trends in mortality and DI participation in Italy

I.5 "Natural Experiments": DI Reform and DI Participation

In future analysis, we will consider the relationship between DI provisions and labor force participation. In particular we will ask: Given health status, to what extent are differences across countries in the *relationship* between health status and LFP determined by the provisions of disability insurance programs? There are two key issues that are important in determining how

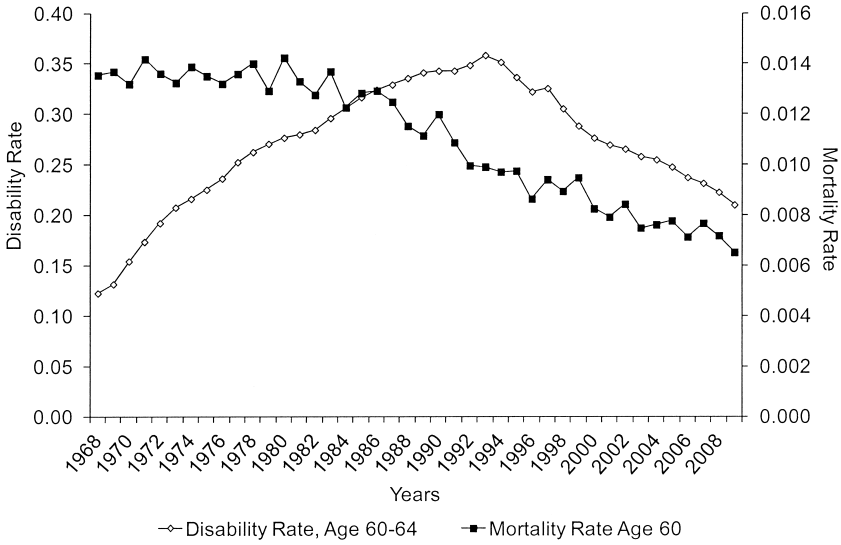

Fig. I.31 Trends in mortality and DI participation in Sweden

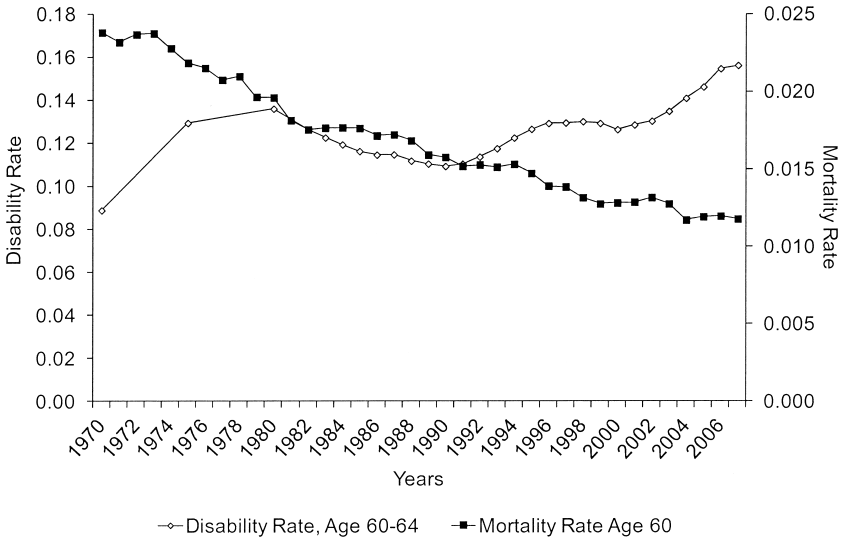

Fig. I.32 Trends in mortality and DI participation in the United States

the results of this analysis can be interpreted. One is whether the relationship between labor force participation and DI provisions can be interpreted to represent the causal effect of the provisions on LFP. If, for example, DI reforms were adopted in part in response to low LFP of older workers, this reverse causality (endogeneity) would imply that to some extent the DI pro-

visions were adopted in response to low LFP rather than low LFP being the result of DI provisions. The second issue relates to DI provisions and health status. Given health status, we will want to estimate the effect of DI provisions on the likelihood that a person is employed. But, if DI provisions in a country were to some extent adopted in response to lower health status, we would overestimate the effect of DI provisions on LFP, given health status. Earlier, we have shown substantial evidence that DI reforms in a country do not seem to follow changes in health status in the country.

Here we present several "natural experiments" showing the effect on LFP of reforms that were not prompted by changes in the health of older people or by changes in the LFP of older people. For example, the DI reform in Belgium was prompted by a court ruling. We also emphasize reforms in which the effect was on one gender but not the other or on persons of a given age and not other ages, but in which the reforms were not intended to target these groups. We consider reforms in Canada, Germany, Belgium, Sweden, France, and Denmark.

Canada: Several changes occurred to the Canada Pension Plan Disability Insurance program starting in the mid-1980s, all in line with a trend toward making eligibility and benefits more generous. These reforms included an increase in the benefit level, a relaxation of the number of years one must have worked in order to qualify, and an enhancement of retroactivity in claiming benefits. An important reform in 1989 emphasized socioeconomic factors such as the unemployment rate and job skills in the determination of eligibility for those aged fifty-five to sixty-four. On top of this, efforts to publicize the availability of benefits were made.

The trend toward increasing generosity of benefits and eligibility came to an end in 1995, following concerns about the now-high levels of participation and the associated cost. The provision for socioeconomic considerations was removed, existing claimants were systematically reexamined, and a new emphasis on self-sufficiency and returning to work was instituted. This reform had a very substantial effect on the DI participation rate. The change for men aged sixty to sixty-four is shown in figure I.33. The rate was reduced from about 14 percent in 1985 to less than 8 percent by 2007, a reduction of about 40 percent.

Germany: The 1984 reform in Germany (effective in 1985) restricted disability pension eligibility and affected women in particular. To be eligible for disability benefits, workers had to have a minimum of three contribution years in the last five years. In effect, this ruled out claims for many women who did not work on a regular basis. Figure I.34 shows the number of new DI claimants by year. The reform had a dramatic effect on the number of women retiring on a DI pension. The number was reduced from 173,000 in 1984 to 67,000 in 1986 (a reduction of over 60 percent), with further reduction to about 60,000 in the next few years. The effect on men was much smaller, from about 163,000 in 1984 to 129,000 in 1986.

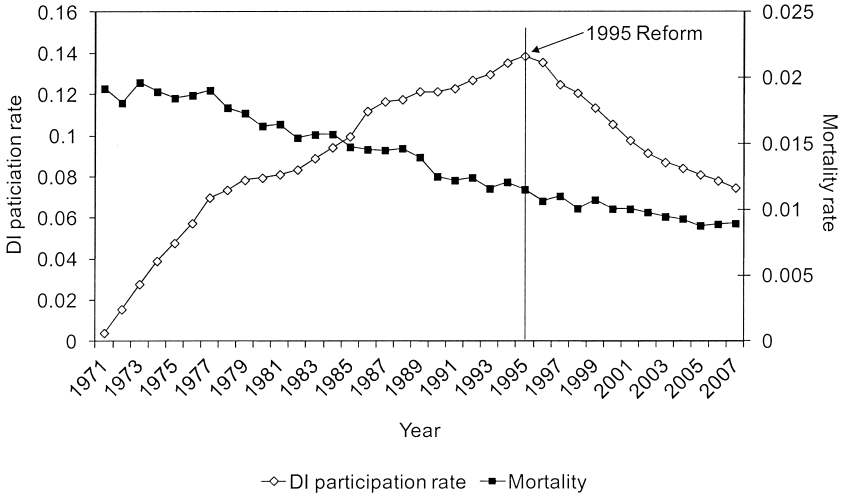

Fig. I.33 Canada: Effect of 1995 reform on the DI participation of men aged sixty to sixty-four

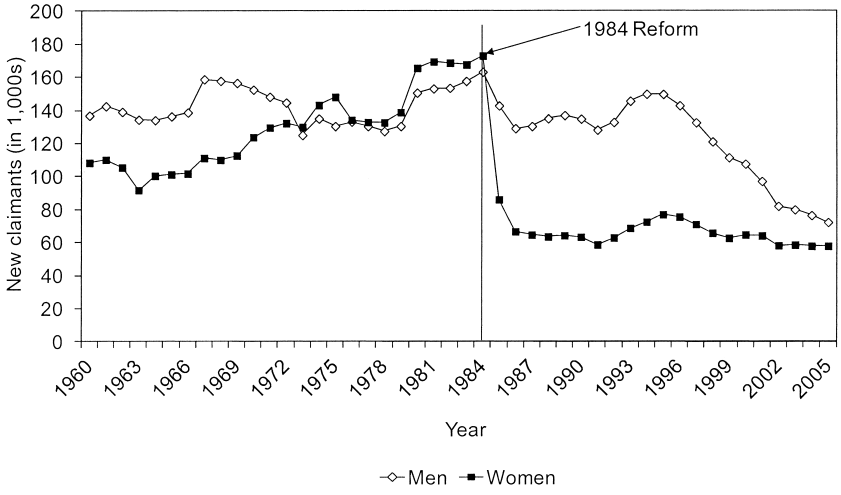

Fig. I.34 Germany: Effect of 1984 reform on the number of new claimants

The differential effect of the 1984 reform on men and women can also be seen by comparing the pathways to retirement for men and women. Figure I.35 shows pathways to retirement between 1960 and 2005 for women and men, respectively. The figure shows the large effect of the 1984 reform on the proportion of women retiring by way of DI and the relatively small effect on the DI retirement path for men. These figures show differential effects of other reforms on men and women. For example, the 1972 reforms

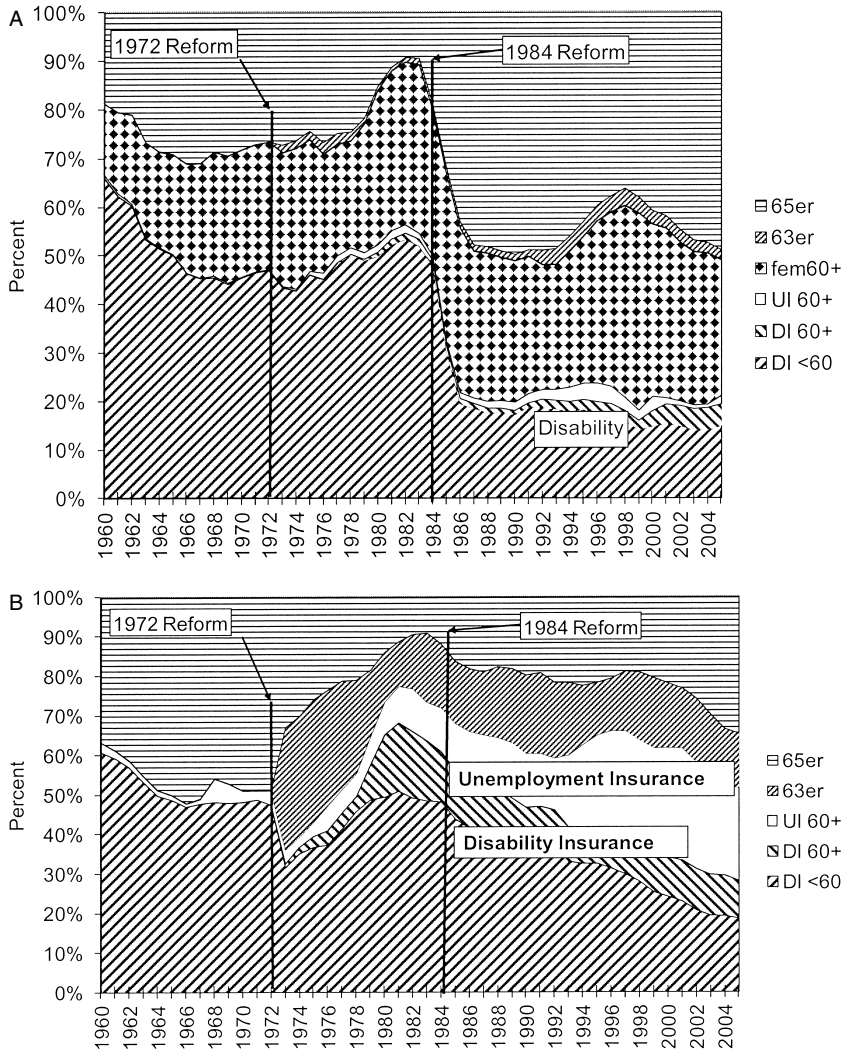

Fig. I.35 Pathways to retirement in Germany: *A*, For women; *B*, For men

had a much greater effect on men than on women. In general, in addition to differential effects of reform, the pathways to retirement have been quite different for men and women.

Belgium: In 1997 the Belgian government was forced by a European Court of Justice ruling to harmonize the normal retirement age and the full career requirements for men and women. This decision resulted in a large increase in the DI participation of women aged sixty to sixty-four. The decision was to align the female full career definition to the definition for men. Since

1997, the normal retirement age for women has been raised gradually from sixty to sixty-one in 1997, to sixty-two in 2000, sixty-three in 2003, sixty-four in 2006, and to sixty-five in 2009. These increases were accompanied by corresponding increases in full career requirements for women. Prior to 1997, with a retirement age of sixty, women over sixty were not eligible for DI benefits. Figure I.36 shows the steep increase in DI participation thereafter. The increase can be explained by the increase in the retirement age and the resulting increase in the LFP of women aged sixty to sixty-four. This example also highlights the importance of considering disability insurance programs as a substitute for standard retirement programs.

Sweden: Until the 1990s, there was a trend in Sweden toward more liberal eligibility rules. That trend was reversed with a series of reforms in the 1990s. First, eligibility for DI for labor market reasons was abolished in 1991. Then, in 1991 and 1992, access to sickness absence was restricted through legislative initiatives. Next, a focus on rehabilitation was introduced for employers and local governments. Finally, in 1997, special eligibility rules for older workers were abolished.

The impact of these changes can be seen in figure I.37, which shows the reduction in DI participation following these reforms for men and women, respectively. Overall there is a marked decrease in DI participation over the next several years following the reforms. For persons aged sixty to sixty-four, for example, the decline between 1992 and 1998 was 74 percent for men and 66 percent for women.

France: Two policy changes in France in the late 1990s and early 2000s demonstrate the importance of reforms in determining sickness benefit par-

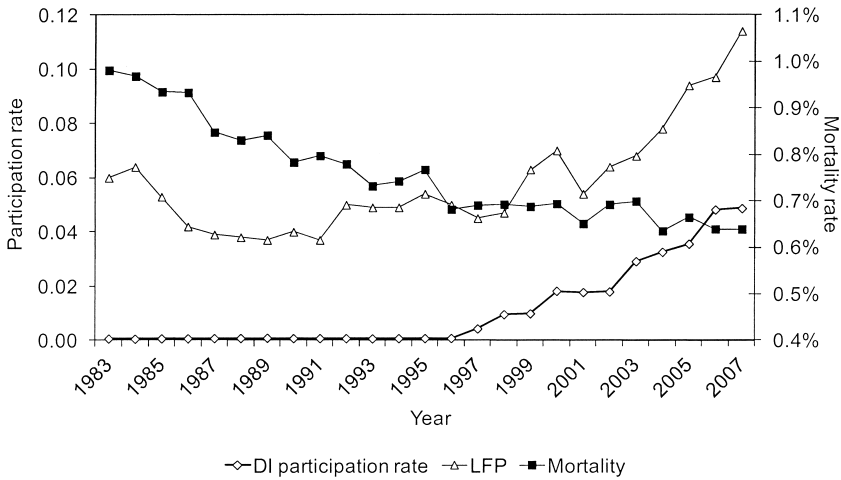

Fig. I.36 Belgium: The effect of the 1997 reform on the DI participation of women aged sixty to sixty-four

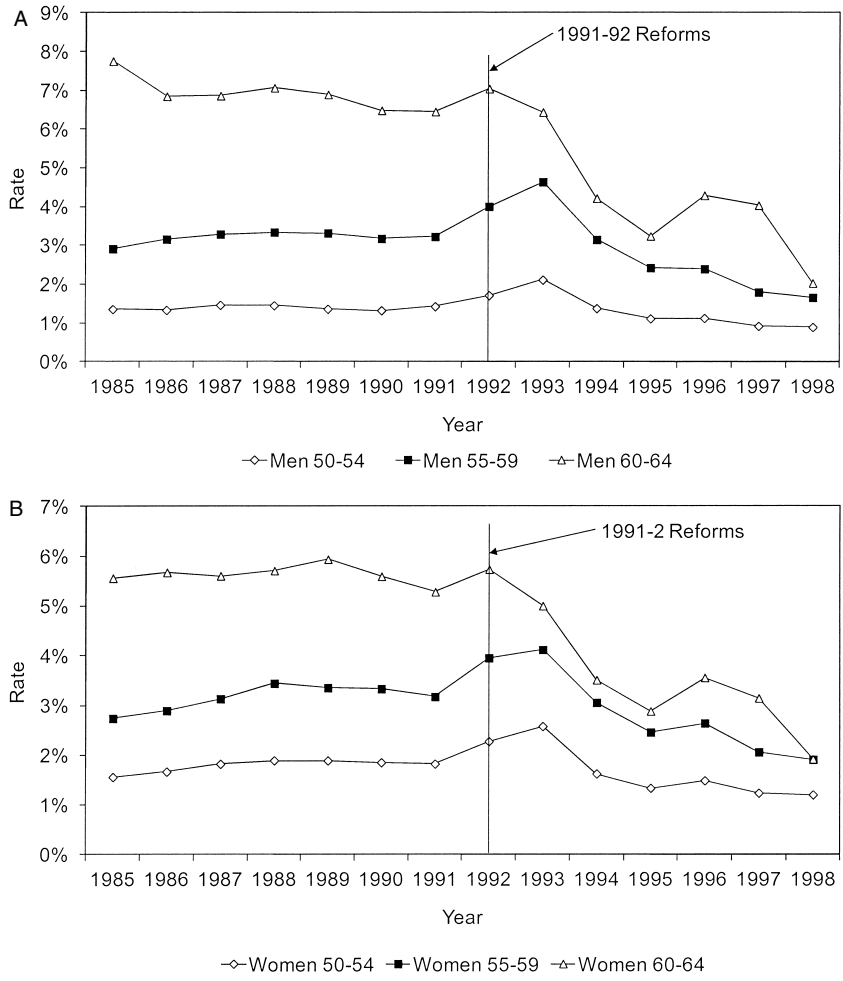

Fig. I.37 Sweden: Effect of the 1991 to 1992 reforms on the DI participation by age group: *A*, By men; *B*, By women

ticipation. First, some early retirement schemes were being phased out. For example, the number of recipients on an early retirement scheme, at ages fifty-five to fifty-nine, dropped from 230,000 in 1997 to 130,000 in 2005. Unemployment (without search requirement after age fifty-six or fifty-seven) largely acted as a substitute—the number of recipients of unemployment benefits increased from 270,000 to 400,000 over the same period. Older workers may also have sought benefits through long-term sickness leaves.

In addition, stricter controls, but without legislated reform, affected sickness benefits in 2004 to 2005. There was an increase in the intensity of reviews for sickness benefit claims following concern over the rapid rise

in uptake. In principle, if sickness benefits were being used as a route to retirement by older workers, the stricter sickness benefit regime would have a heavier impact on older workers than on younger workers, who obtain sickness benefits in case of health problems.

Figure I.38, for men and women respectively, supports this explanation. The figure shows the evolution of sickness benefits per capita (in 1998 euros) for five age groups—that is, the total amount of sickness benefits received by a given age-group over its size in the full population, in order to correct for

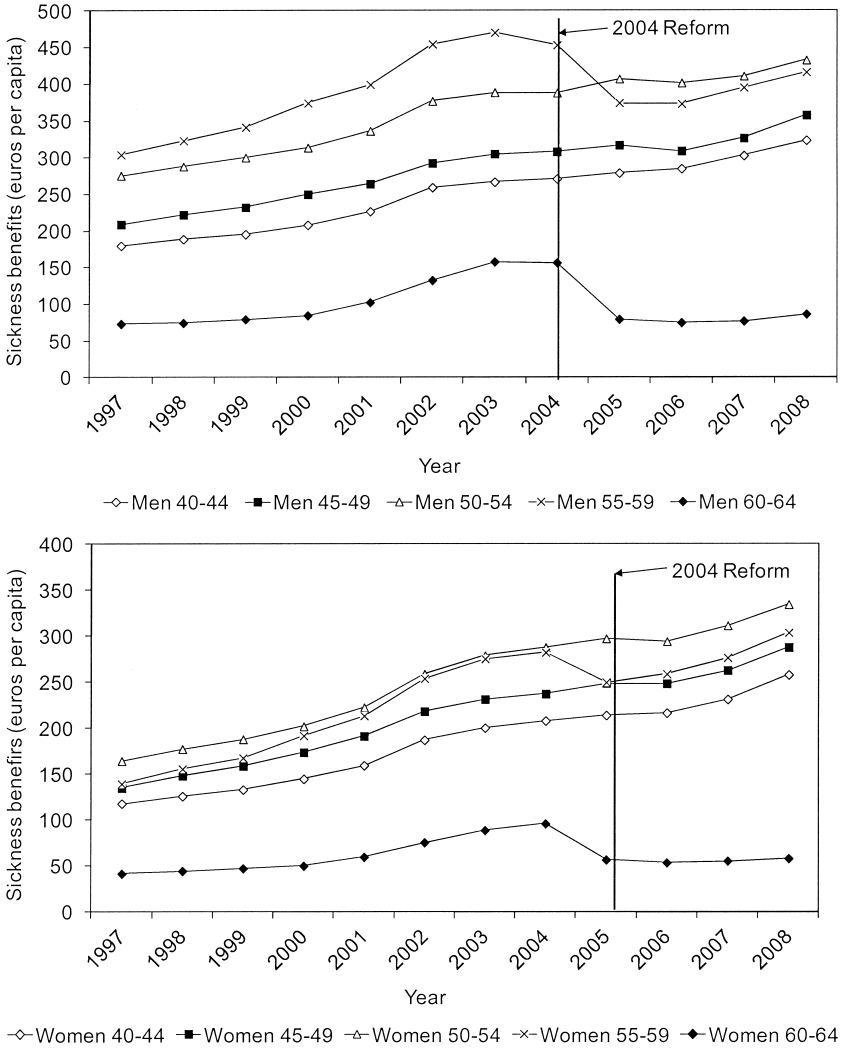

Fig. I.38 France: Effect of 2004 stricter sickness controls: *A*, Men; *B*, Women

demographic shifts. Consider panel A, for men. All age-groups display an upward trend over the 1997 to 2008 period, with years 2000 to 2003 standing out above that trend. However, the magnitude of the 2000 to 2003 bump is much larger for older workers in the age-groups fifty-five to fifty-nine and sixty to sixty-four. In particular, the decrease in benefits that occurs in the overall population after 2003 seems to be fully driven by the older age groups while the other groups only display a slowdown in growth after 2004 to 2005. The patterns for men and women are quite similar although the bump is somewhat less apparent for women. Thus these figures show not only the effect of DI (sickness) reforms on DI participation, but also highlight the substitution effects between retirement programs.

Denmark: The 1984 reforms of a number of programs in Denmark had a large effect on the number of women on DI, but almost no effect on men. The primary disability program, called the Social Disability Program (SDP), was revamped with three tiers. The lowest of these took social criteria into consideration, meaning that the age and employment prospects of the applicant were taken into account in determining DI eligibility. These reforms led to a large and sudden shift of women from other programs and into the SDP disability insurance program. In short, with the introduction of the 1984 reforms some women became ineligible for DI, but a much larger number became newly eligible, especially women aged sixty and older.

Figure I.39 shows the jump in the participation rate of women aged sixty to sixty-four between 1973 and 1995. The participation rate increased from about 18 percent in 1983 to almost 35 percent in 1985.

Figure I.40 shows essentially the same information with respect to DI participation, but in the form of a large shift in pathways to retirement. In 1983 about 34 percent of women entered retirement by way of disability insurance. In 1985 this percent jumped to about 69 percent.[4] The figure also highlights the substantial changes in the pathways to retirement over the past forty years.

The Danish example highlights both the importance of substitution between programs for older workers and the nonhealth reasons for some of the shifts in disability insurance uptake.

The Netherlands: Since the mid-1980s there have been a series of DI reforms aimed at reducing the number of DI recipients. The analysis for the Netherlands makes an important point: the success of these reforms depended in part on the (relative) attractiveness of alternative routes to retirement such as early retirement and unemployment insurance options. These programs also became less generous. Taking this into account, an

4. The other programs are: an Unemployment Program, the PEW, the sixty-five to sixty-six Old-Age Pension (OAP), the Widows Pension and the Early Old-Age Pension (EOAP), the Transitional Benefit Program (TBP) for long-term unemployed, and the Flex Job (FJ) program.

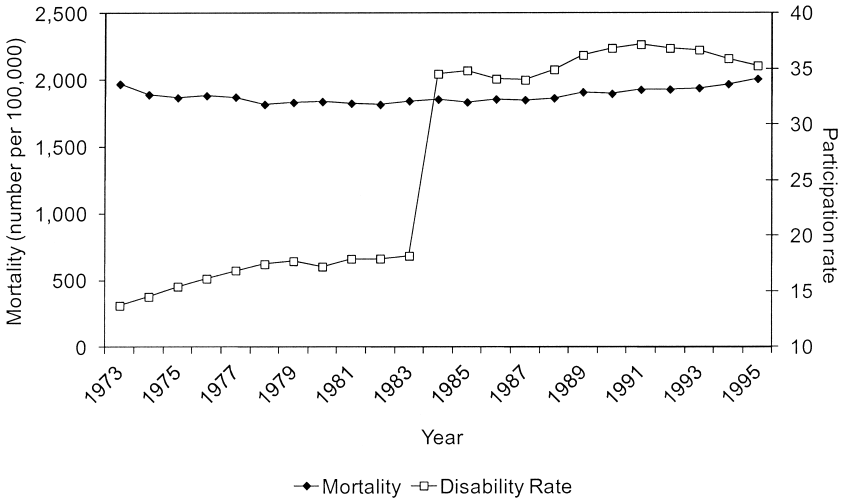

Fig. I.39 Denmark: Effect of the 1984 reform on DI participation of women aged sixty to sixty-four

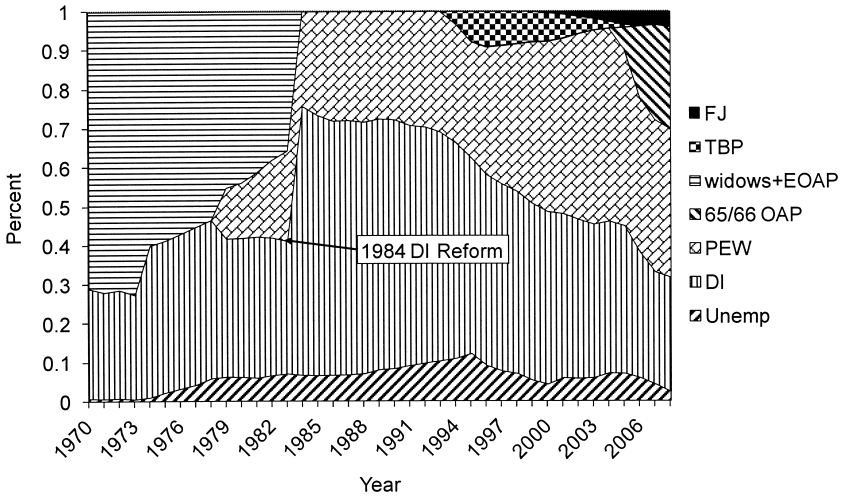

Fig. I.40 Denmark: Pathways to retirement for women aged fifty-five to sixty-four

empirical evaluation of several reforms in DI, early retirement, and unemployment programs shows that, on balance, the reforms were associated with reductions in the inflow into DI and early retirement programs and an increase in inflow into unemployment insurance programs. Such interaction among programs is important for other countries as well.

I.6 Summary and Conclusion

The historical analysis in this volume is intended to set the stage for and inform more formal analysis of disability insurance programs. The key question that future analysis will address is this: *Given health status,* to what extent are the differences in LFP across countries determined by the provisions of disability insurance programs? To answer this question we need to develop measures of health status that are comparable across countries, we need to understand to what extent DI insurance reforms are prompted by health status in a country, and we need to understand whether DI provisions are prompted by the employment circumstances of older people in each country. Thus we have undertaken this historical analysis to help inform our future analysis.

We began by considering changes in mortality over time and in particular the relationship between mortality and labor force participation. In this context we think of mortality as one measure of health status that is comparable across countries and comparable over time within countries. We gave particular attention to the relationship between mortality and labor force participation. We find that even though LFP rates are quite similar at low mortality rates, they diverge substantially with increasing mortality rates. The divergence is very similar to the increasing divergence in LFP across countries at older ages.

Having in mind how mortality may be related to other measures of health, we then consider the relationship between the trends in mortality and self-assessed health within a country. In general, we find a rather strong relationship between the two trends, although with very different reported levels of self-assessed health across countries.

We then consider how mortality is related to other indicators of health status. Here the available data varies greatly from country to country and the relationship of the different measures to mortality trends also varies from country to country. This is even true of objective measures such as heart disease or respiratory disease.

Then we consider how trends in DI participation are related to changes in health, in particular measured by the change in mortality. We find little relationship over time within a country. In this respect we conclude that DI insurance reforms are largely a train on their own track and not endogenously determined with respect to health.

Finally we consider natural experiments in which the disability insurance reforms were not prompted by changes in health status or by changes in the employment circumstances of older workers. We find that these exogenous reforms can have a very large effect on the labor force participation of older workers.

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