7 Social Security and Retirement in the Netherlands

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The programs providing income to the elderly in the Netherlands may be characterized according to a limited number of salient features. First, there is a distinct cutoff at age sixty-five. Broadly speaking, all persons age sixty-five or over are entitled to the same general old age pension (AOW; we refer to this as *social security*). Most other benefits (e.g., disability, unemployment, welfare) expire when someone turns age sixty-five. Second, both over and under age sixty-five, next to the entitlement programs guaranteed by law, relatively many people who stop working are entitled to other benefits, for example, occupational pensions supplementing social security for persons over age sixty-five and early retirement pensions for persons under age sixty-five. Strictly speaking, benefits of the latter type are not part of the social security system. However, these benefits provide powerful incentives to retire next to the benefits provided by social security.

Until recently, studies about the incentives provided by social security to retire in the Netherlands were scarce (see sec. 7.2 below and app. B). In fact, most people no longer work when they reach age sixty-five. This may be ascribed partly to pressure by employers to take early retirement and partly to various other earnings replacement schemes for people under age sixty-five.

Like most other developed countries, the Netherlands is faced with an increasing share of elderly persons in the total population. The share of the population over age sixty-five has grown from 8 percent in 1950 to 13 percent in 1995 and is expected to rise to 21 percent by the year 2050. If nothing else

changes, this will cause a considerable increase in social security expenditures. However, the fact that occupational pensions for persons over age sixty-five are fully funded gives the Netherlands a relative advantage over many other countries. A more immediate concern is the low participation rate for persons under age sixty-five and the costs of the programs providing income to these persons, both public programs, such as disability insurance, and occupational early retirement schemes. In recent years, the government has considerably limited access to and the attractiveness of disability insurance in order to limit the costs of the program. Moreover, many firms have started to negotiate reforms in early retirement programs because the financial burden of these programs is threatening profits.

The paper is organized as follows. In section 7.1, we present statistics about the labor market behavior of older people in the Netherlands, both cross sectionally and over time. In section 7.2, we describe the structure of the entitlement schemes for the elderly in the Netherlands and give a brief description of recent research in the Netherlands on the retirement incentives inherent in the system. Finally, in section 7.3, we present the results of simulating the retirement incentives inherent in the social security system, calculating the implicit tax on continued work for older people at different retirement ages.

7.1   The Labor Market Behavior of Older Persons in the Netherlands

The data used to obtain the figures presented in this section are drawn from a number of different sources. These are summarized in appendix A.

7.1.1   Historical Trends

Figures 7.1 and 7.2 graph the labor force participation rates of older men and women in different age groups since 1960. For older men, there is a decline in
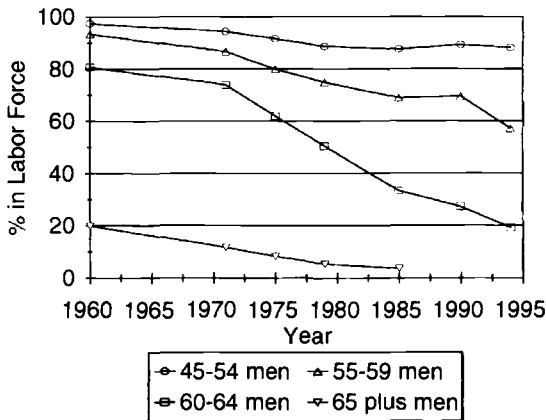

Fig. 7.1   **Historical trends in the labor force participation of older men**
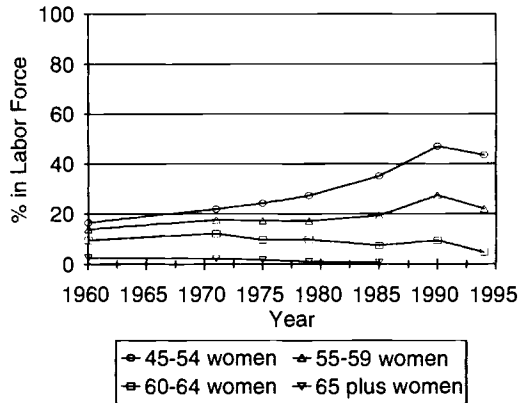
Fig. 7.2   Historical trends in the labor force participation of older women

labor force participation in all age groups. The decline is particularly dramatic for sixty to sixty-four-year-olds. In 1960, about 80 percent of this age group was in the labor force, as opposed to only 20 percent in 1994. For men aged sixty-five or over, labor force participation declined from about 20 percent in 1960 to about 3 percent in 1985. After that year, Statistics Netherlands stopped recording labor force participation for this age group.

For women, there is a notable increase in labor force participation in the age group forty-five to fifty-four (from less than 20 percent in 1960 to more than 40 percent in 1994). There is also a slight increase in the participation rate in the age group fifty-five to fifty-nine. The participation rates in the oldest age groups remained low.

It is clear that the changes in the social security system in the period concerned are not the main factor explaining the declining labor force participation rates since social security provides an income only to persons age sixty-five or older and the largest decline in labor force participation took place among persons younger than age sixty-five. Yet the proliferation of occupational pensions in addition to the basic pension provided by social security made it less and less likely that persons would continue to work after age sixty-five.

In the younger age groups, the relatively generous disability insurance scheme (introduced in 1967) offered an attractive way to retire before age sixty-five. In particular, in the 1970s and 1980s, when the Netherlands faced periods of rapidly increasing unemployment, the disability route to retirement for older employees became a very popular alternative to general layoffs. In 1968, 12 percent of the males between fifty-five and sixty-four years of age received a disability insurance benefit. From 1975 to 1985, this percentage increased from 21 to 37 percent. In 1995, about one-third of the males between the ages of fifty-five and sixty-four received a disability benefit.

In addition, in the face of continued pressure to decrease labor costs, many firms started to offer even more generous early retirement programs. In 1981, about 2 percent of the males between the ages of fifty-five and sixty-four received an early retirement (VUT) benefit; by 1987, this percentage had increased to about 10 percent and by 1995 to about 17 percent.[1]

7.1.2 Labor Market Behavior in 1994

For a more detailed picture of labor force participation in recent years, we use the 1993/1994 Housing Needs Survey (Woningbehoeftenonderzoek, WBO). The WBO is a large, nationally representative survey (fifty-five thousand households) that, among other things, records labor force attachment and income.

The age pattern of labor force participation for men and women in 1994 is depicted in figure 7.3. At age forty-five, almost 95 percent of men and about 55 percent of women participate in the labor force; that is, either they classify their main activity as paid work, or they call themselves unemployed. Among men, participation drops gradually to about 85 percent for fifty-four-year-olds and then starts dropping sharply, to about 55 percent for fifty-nine-year-olds. Between the ages of fifty-nine and sixty, there is a drop of another 20 percent to a level of 35 percent, and, up to age sixty-two, participation drops further to about 20 percent. At age sixty-five, there is a further drop to about 10 percent, and, over age sixty-five, only about 5 percent of the male population is in the labor force.

For women, participation gradually declines from 55 percent at age forty-five to about 22 percent at age fifty-nine. From age fifty-nine to age sixty, participation halves to about 11 percent. Above age sixty-five, hardly any woman considers herself to be part of the labor force.

Figures 7.4 and 7.5 further subdivide males and females into socioeconomic groups. Figure 7.4 shows that up to age fifty-five the group nonworking males consists mainly of the disabled. After age fifty-five, the percentage of the disabled still rises to about 25 percent between the ages of sixty and sixty-five,[2] but the percentage of retirees rises from almost zero at age fifty-four to almost 50 percent beyond age sixty. Beyond age sixty-five, a large majority of men consider themselves to be retired. Figure 7.5 shows that most nonparticipating women younger than age sixty-five are classified as "other." This pertains largely to housewives. The percentage of the disabled rises slightly from age forty-five to age sixty-four but remains clearly lower than the corresponding

1. These figures include only early retirement (VUT) benefits and do not take account of persons who received a regular old age pension before age sixty-five. In a limited number of occupations, the official pension age is younger than sixty-five. Moreover, some pension funds used to offer retirement after forty years of work if this number was reached before age sixty-five.

2. These numbers are lower than the numbers quoted above, where it is stated that about one-third of the males between the ages of fifty-five and sixty-four receive disability benefits. The numbers given above stem from registers. Apparently, the WBO underrepresents disability insurance recipients.
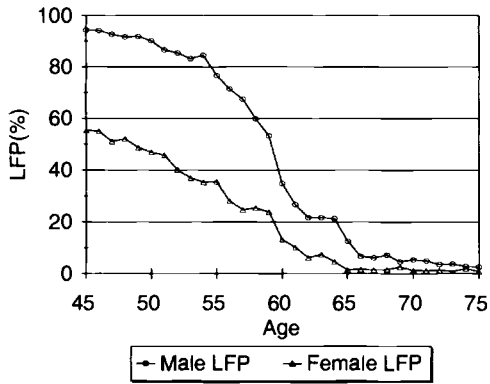
Fig. 7.3   Labor force participation (LFP) rates by age and sex

Fig. 7.4   Distribution of activities of men by age
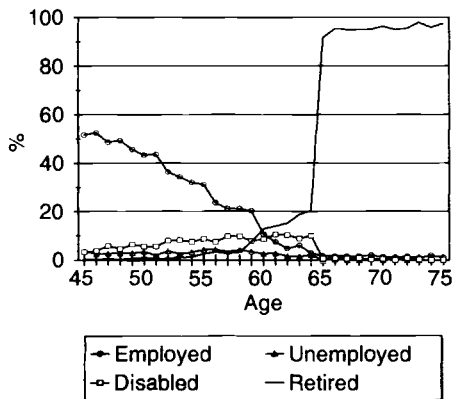
Fig. 7.5   Distribution of activities of women by age
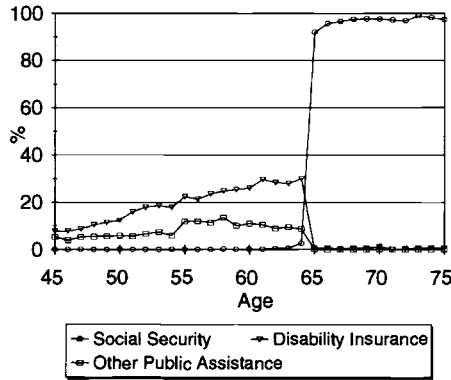
Fig. 7.6   Public income recipiency for men
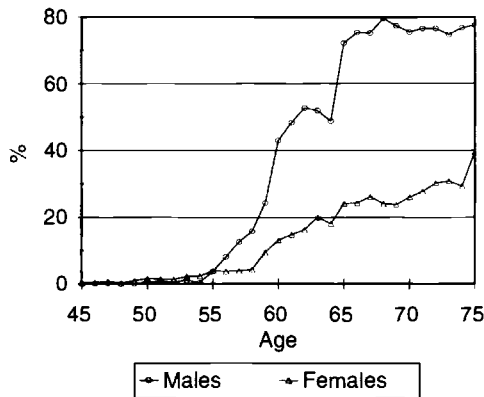
Fig. 7.7   Percentage receiving private pension by age and sex

percentage for men. The same holds for the percentage of retirees up to age sixty-four. After age sixty-five, almost all women call themselves retired.

Figures 7.6 and 7.7 examine the incidence of public assistance and private retirement income for older persons. Figure 6.6 graphs the percentage of men receiving social security, disability insurance, and any other kind of public assistance (excluding child benefits): the most important kinds of benefits are disability benefits, unemployment benefits, social assistance (welfare benefits), and social security. In principle, social security is paid to persons over age sixty-five, the other benefits mainly (in the case of disability insurance and unemployment benefits exclusively) to younger persons.

At age forty-five, about 12 percent of men receive some form of benefit. This percentage rises gradually to about 23 percent at age fifty-four and then shows a steep rise to about 35 percent at age fifty-five. Between the ages of
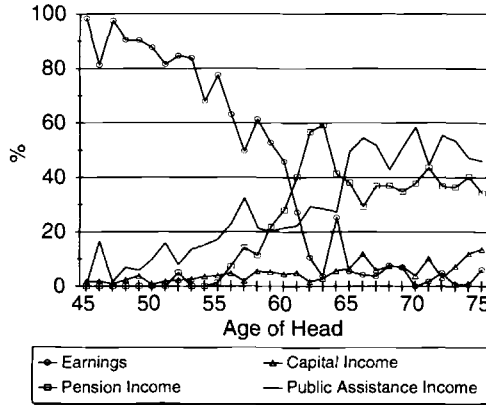
Fig. 7.8   Distribution of family income by source

fifty-five and sixty-four, the percentage of men receiving public assistance shows a small increase to about 40 percent, and then it explodes to about 95 percent at age sixty-five and above.

Figure 7.7 reports the percentages of men and women at each age who are receiving private pension income.[3] For men, this percentage increases from about 5 percent at age fifty-five to about 23 percent at age fifty-nine. Between the ages of fifty-nine and sixty, there is a fairly sharp increase of almost 20 percent to 42 percent. The percentage of males receiving private pensions increases further to about 50 percent at age sixty-two. Between the ages of sixty-four and sixty-five, there is again a sharp increase to almost 75 percent. Over age sixty-five, between 75 and 80 percent of men report that they receive private pensions.

For women, the percentages receiving private pensions after age fifty-five are considerably lower than they are for men. The increase to about 30 percent at age seventy-four is fairly smooth. The increase of about 10 percent between the ages of seventy-four and seventy-five is remarkable. It should be noted that many private pension funds in the Netherlands have an arrangement for widows' pensions. Therefore, the pensions received by women are not all due to their own labor market history.

Figure 7.8 shows the distribution of family income by source for couples, plotted against the age of the family head. Four sources of income are considered: earnings, capital income, private pensions, and public-sector income (mainly social security for persons age sixty-five or over, disability insurance, and other public benefits for younger persons). Below age fifty-three, more than 80 percent of income consists of earnings. Between the ages of fifty-eight and sixty-five, earnings decline from 60 to about 5 percent of income. Capital

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3. This includes early retirement benefits.

income is not a large component in any of the age groups. Private pensions (including early retirement) start to make up a significant portion of total income at about age fifty-six, a portion that rises to more than 50 percent at some ages between sixty and sixty-five, which illustrates the importance of this component in the decision to retire before age sixty-five. After age sixty-five, private pensions make up about 35–40 percent of total income. The share of public benefits increases from about 5 percent for the age groups under fifty to about 25 percent for the age groups between the ages of sixty and sixty-five. Over age sixty-five, public benefits consist mainly of social security and make up about 50 percent of total income on average.

7.2   Key Features of the Social Security System

7.2.1   A History of the Social Security System in the Netherlands

The General Old Age Pension Law (Algemene Ouderdomswet, AOW, i.e., social security) was introduced in 1957. Its purpose was to guarantee a sufficient income to virtually all persons age sixty-five or over. The AOW was preceded by several earlier schemes, such as the so-called Drees Emergency Law (Noodwet Drees, 1949),[4] which provided less broad coverage. Since 1980, the level of social security benefits has been linked to the statutory minimum wage. Couples with a head over age sixty-five were entitled to a social security benefit equal to the after-tax minimum wage, and single persons over age sixty-five were entitled to a social security benefit equal to 70 percent of the (after-tax) minimum wage.

7.2.2   Current Features of the Social Security System

In 1994, the system was changed in such a way that each individual age sixty-five or over is now entitled to 50 percent of the minimum wage, with a supplement of 20 percent for single persons, of 40 percent for single parents with a dependent child under age eighteen, and of up to 50 percent for persons with a partner under age sixty-five (the percentage depends on the income of the partner).

Social security is financed purely on a pay-as-you-go basis by a payroll tax on taxable income of persons under age sixty-five. The associated tax rate is currently (1996) 15.4 percent levied on taxable income up to a maximum (of f 45,325 per year). Social security basically provides equal coverage for all persons over age sixty-five. An exception is those persons who spent part of their working life (age fifteen to sixty-four) abroad. In that case, social security benefits are reduced by 2 percent for every year spent abroad. In 1994, social security benefits amounted to about f 32 billion, or 5 percent of GDP. Cur-

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4. Drees was the minister of social affairs at the time.

rently, about one in every five households in the Netherlands receives social security.

The entitlement to social security does not require retirement from the labor force.

7.2.3   Other Public Programs

A number of arrangements exist that enable persons to stop working before turning age sixty-five. The main ones are disability insurance, unemployment benefits, and various early retirement schemes. Together, these schemes induced the number of persons working in the age bracket sixty to sixty-five to drop dramatically over the last thirty-five years (cf. fig. 7.1 above).

One important benefit program is the Disability Insurance Act (Wet op de Arbeidsongeschiktheidsverzekering, WAO) introduced in 1967. Disability insurance covers all employees (except civil servants, who have their own, very similar, arrangements) against loss of earnings due to long-term sickness and disability. Until 1992, disability insurance guaranteed employees who lost more than 80 percent of their earnings capacity a benefit of 70 percent (80 percent before 1985) of their daily wage (up to a maximum) up to age sixty-five. Currently, disability benefits start at 70 percent of previous earnings (up to a maximum), but they fall to a lower level after a certain period (both the length of this period and the percentage depend on age). However, most employees have taken out additional insurance to cover the risk of the disability insurance benefit falling below 70 percent of their previous earnings.[5]

In the 1980s, disability insurance became a very popular arrangement, one that employers could use to get rid of elderly, less productive employees. Severe legal obstacles existed (and still exist) to laying off employees, and disability benefits were more generous than unemployment benefits.[6] As a result of this, both employers and employees had a preference for the disability route to unemployment. The ensuing rise in the costs of disability insurance induced the government to limit eligibility for disability insurance by tightening entry conditions and reducing benefit levels. Moreover, persons receiving disability benefits are now subject to a more rigorous screening of their loss of earnings capacity.

As mentioned above, unemployment benefits (Werkloosheidswet, WW) are less generous than disability benefits, mainly because they are paid for only a

5. It should be noted that, for single earners who lost more than 80 percent of their earnings capacity, disability benefits are always at least as high as the relevant social assistance (welfare) level (ABW/RWW), which, for a couple, is approximately equal to the after-tax minimum wage. In contrast to the entitlement to social assistance, household wealth is not taken into account.

6. Disability benefits continued until the individual receiving them reached age sixty-five. Unemployment benefits typically lasted for only two and a half years (but longer for older workers). Furthermore, while an individual was on disability, his pension rights often continued to accumulate as if he were still employed (the arrangements varied by pension fund), whereas the unemployed accumulated very few, if any, pension rights.

limited period (depending on the number of years worked before unemployment). However, most people age sixty or over who become unemployed can expect to receive unemployment benefits equal to 70 percent of their previous earnings up to age sixty-five.[7] Another relevant feature is that, over age 57.5, the unemployed no longer must register with an employment agency and thus de facto can retire from the labor market.

Households with a head younger than age sixty-five without other sources of income (and limited household wealth) are entitled to social assistance (ABW, or Algemene Bijstandswet [General Social Assistance Act], and RWW, or Rijksgroepsregeling Werkloze Werknemers [State Unemployment Act]). The level of the benefits is approximately equal to the level of social security for persons over age sixty-five. Since social security is linked to the minimum wage, this implies that, for employees earning low wages, the replacement rate is about 100 percent. Hence, in particular for those with low wages who are over 57.5 years of age and hence have no obligation to look for a job in order to qualify for benefits, early retirement does not involve a loss of income.

All public benefits for persons younger than age sixty-five are paid only to the extent that a person is not employed.[8]

7.2.4   Private Transfers

Next to social security, a majority of the population over age sixty-five is entitled to a supplementary occupational pension. Meuwissen (1993) estimates that about 80 percent of households with a head aged sixty-five or over received some form of additional pension in 1989. It can safely be assumed that this percentage has only increased since then. Of those households not receiving a pension, more than half draw additional income from other sources, for example, capital income. Typically, occupational pensions supplement social security to 70 percent of final pay for persons who have worked for forty years. After tax, the replacement rate is usually substantially higher.

In general, if an employer offers a pension scheme, then participation in such a scheme is compulsory. More than 99 percent of the pension schemes are of the defined-benefit type,[9] whereas the remainder (0.6 percent) are of the defined-contribution type. More than 72 percent of the pension benefits are defined on the basis of final pay, the remainder being a mixed bag of various combinations of final pay, fixed amounts, and average pay. Combining the effects of social security and private pension schemes leads to the following before-tax replacement rates for those individuals who have contributed for a sufficient number of years: 34 percent receive less than 60 percent, 27 percent between 60 and 69 percent, 20 percent between 70 and 79 percent, and 19

7. As with disability benefits, if necessary, the unemployment benefit is supplemented by welfare benefits to reach the social assistance level; household wealth is not taken into account. Hence, for single earners with low wages, the replacement rate can be almost 100 percent.

8. For those employed part-time, benefits may supplement their earnings.

9. The information in this paragraph stems from PN (1987).

percent at least 80 percent of final pay. One should keep in mind that after-tax replacement rates may be substantially higher.

Most large firms have their own pension fund; smaller firms usually participate in sectorwide pension funds. In the latter case, the contribution rates do not differ between firms, depending on the composition of the labor force.

Private pension arrangements usually require that people leave the job in which they accumulate pension rights at age sixty-five at the latest. There is no earnings test, however, and people may consider looking for secondary jobs once they retire.

Early retirement became increasingly common during the 1980s and was viewed as a means of reducing unemployment. In recent years, the costs of early retirement have increased considerably, and many firms are currently trying to reduce these costs by reducing entitlements or increasing the minimum age at which employees are eligible for early retirement. Typically, early retirement schemes guarantee an employee a benefit equal to 70 or 80 percent of previous earnings up to age sixty-five. In after-tax terms, replacement rates are even higher. Furthermore, while in early retirement, one often continues to accumulate pension rights, although possibly at a lower rate than when working.

Early retirement may be organized via the pension funds, which also provide the occupational pensions, or via the employer itself. Moreover, in contrast to these pensions, early retirement is usually financed on a pay-as-you-go basis. Early retirement usually requires ten years of employment with the same employer before the early retirement date, whereas old age pension rights remain valid if the worker changes jobs. The payment of an early retirement pension usually requires complete withdrawal from the labor market.

Figures 7.9 and 7.10 give the hazard rates of labor force exit for men and women, defined as the number of persons who leave the labor force at the specified age, relative to the size of the labor force a year earlier. These figures
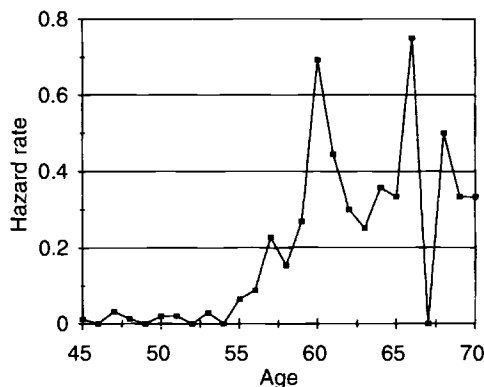
Fig. 7.9   Hazard rate out of the labor force for men—based on panel data
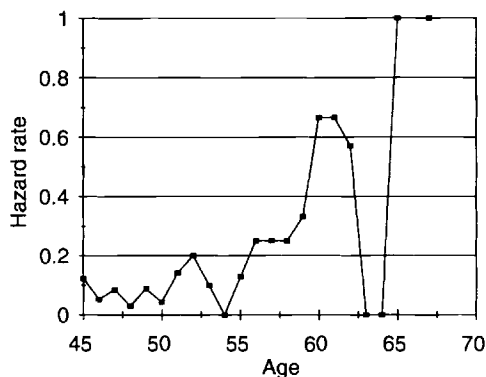
Fig. 7.10   Hazard rate out of the labor force for women—based on panel data

are based on 1992–93 Socio-Economic Panel data. Because of the size of the panel and the low participation rates over age sixty or so, the figures should be considered only illustrative. Nevertheless, for men, the figures suggest that the hazard rates of leaving the labor force surpass 20 percent around age fifty-seven and peak at age sixty, which is consistent with the proliferation of early retirement programs. For women, the figures are based on even smaller numbers of observations. Here, we find that leaving the labor force occurs more frequently at earlier ages but also peaks around age sixty.

It can be concluded that, in the Netherlands, there exists an elaborate system of income replacing transfers that can be expected to act as an incentive to leave the labor force on one's sixty-fifth birthday at the latest. Moreover, it should be noted that, whereas rather strict laws are in force that prevent employers laying off younger employees, reaching the age of sixty-five is a legal reason for discharge, and social insurance protecting against loss of earnings as a result of sickness, disability, or unemployment covers only employees younger than age sixty-five.

7.2.5   The Retirement Effects of Social Security—Empirical Evidence

Until recently, the literature on the retirement effects of social security, disability, or unemployment programs in the Netherlands was quite thin. Papers on this issue were usually descriptive and qualitative in nature. This situation has changed in the 1990s owing to an initiative of the so-called NESTOR program.[10] Under this program, a substantial grant was given to a group of researchers at the University of Leiden (who subsequently called themselves CERRA, the Centre for Economic Research on Retirement and Aging) to set

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10. NESTOR is an acronym (in Dutch) for the Netherlands Program for Research on Aging. It is probably best compared with the National Institute of Aging in the United States, keeping in mind that NESTOR was only a temporary program.

up a panel of elderly households (at the time of the first wave, 1993, the head of the household had to be between forty-three and sixty-three years of age) as well as a research program using these data. A fair amount of the research produced by CERRA has been on retirement.[11]

An overview of the empirical literature on retirement in the Netherlands is given in appendix B. The literature brings out a number of salient, although perhaps not surprising, facts: There exist powerful incentives to retire early, and people usually retire as soon as they are eligible. Both unemployment and disability act as alternatives for early retirement. The choice between the three exit routes (unemployment, disability, and early retirement) is partly driven by the financial attractiveness of the routes. The dramatic fall in labor force participation among the elderly in the Netherlands can probably be explained largely by the introduction of additional incentives to retire over the last three decades.

7.3   Retirement Incentives

In this section, we estimate social security wealth and pension wealth for a number of stylized cases to assess the incentives of social security and private pensions through accrual rate effects. For simplicity of terminology, the term *social security wealth* will include pension wealth, unless explicitly stated otherwise.

7.3.1   Simulation

In the Netherlands, roughly after age sixty, the levels of unemployment and disability benefits (both until age sixty-five) and social security (after age sixty-five) do not depend on the age of retirement. After becoming unemployed or disabled, the worker can expect to keep the same level of benefits up to age sixty-five. After age sixty-five, social security is independent of work history. Hence, if we limit ourselves to these three benefit types, the implicit subsidy on retiring (the change in the worker's future benefits, relative to what he would earn in the coming year) will be equal to the replacement rate (the level of benefits in the coming year relative to his earnings in the coming year) plus the rates of contribution to the programs. The only way in which an employee's future income (after the coming year) may be affected by retiring one year earlier is via his or her private pension. Retiring before age sixty-five may affect the level of private pension to be received after age sixty-five by reducing the number of years counting toward pension benefits.

In this section, we compute social security and pension wealth, accrual rates, and implicit tax/subsidy rates for persons aged fifty-five in January 1985, depending on when they stop working (between 1985 and 2000, i.e., between their fifty-fifth and seventieth birthdays). As in Diamond and Gruber (chap. 11

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11. A description of the research program can be found in CERRA (1996).

in this volume), accrual rates are defined as the change in the worker's social security and pension wealth relative to the social security and pension wealth obtaining if he retires one year earlier, and tax/subsidy rates are defined as the change in the social security and pension wealth relative to what he would earn over the coming year. Social security and pension wealth (the sum of which will be denoted by SSW) is calculated as the actuarially discounted sum of future benefits minus the discounted sum of future contributions to the programs involved when still at work. In our computations, we distinguish four baseline cases: (*a*) persons who receive an early retirement pension when they stop working at age sixty[12] or later and who will receive a private pension in addition to social security once they turn age sixty-five; (*b*) persons who receive a disability benefit when they stop working before age sixty-five and who will receive a private pension in addition to social security once they turn age sixty-five; (*c*) persons who will receive only social security when they turn age sixty-five; and (*d*) persons who receive a disability benefit when they stop working before age sixty-five and who will receive only social security when they turn age sixty-five.

As can be inferred from the data given in section 7.1 above, cases *a* and *b* are the most common ones. A large majority of employees are entitled to private pensions in addition to social security when they turn age sixty-five. Moreover, most firms have early retirement programs, and all employees have disability insurance. Early retirement usually requires ten years of continuous service with the same employer, which would mean that most elderly employees qualify. Access to the disability route is supposed to be limited to persons unable to work, which has been relatively easy to prove until fairly recently. Cases *c* and *d* are valid only for the (very small) groups of employees who, on retirement, are entitled to public benefits only.

For all entitlements, we assume zero growth in real terms after 1995.[13] For survival probabilities, we use the sex/age-specific survival tables of Statistics Netherlands (1992). We assume independence between the mortality rates of the worker and his spouse. We use a real discount rate of 3 percent. To compute net benefit and pension levels, we subtract payroll and income taxes. For the years after 1995, we use the tax schedule for 1995, keeping tax rates and brackets fixed in real terms.

To produce our baseline numbers, we consider a typical male who was born in January 1930 and thus turned age fifty-five in January 1985. We assume that his annual before-tax earnings in 1985 equal f 48,152, which is equal to the median earnings for males working more than thirty-two hours per week in the age group fifty to fifty-nine, as based on the Socio-Economic Panel (SEP) of

12. It should be noted that the early retirement age varies by employer or sector. In the calculations, we assume that early retirement is possible as of age sixty.

13. For disability, social security, and unemployment benefits, this is more or less in line with current government policy. Some private pension funds guarantee that pensions will grow with the increase in real wages, however.

1985. We assume that the worker's wife is three years younger than he is and that she has no earnings herself.

We assume that, between 1985 and 1995, the wage has moved with the index for the statutory minimum wage.

7.3.2   Base-Case Results

We consider a worker who may or may not be working another year between his fifty-fifth and seventieth birthdays. The results are shown in table 7.1, and the resulting tax/subsidy rates are graphed in figure 7.11. In general, working another year can affect social security wealth in different ways:

1. The worker younger than age sixty-five who chooses to work another year must pay payroll taxes toward social security, unemployment insurance, disability insurance, and, possibly, private pensions. This lowers net social security wealth.

2. The worker younger than age sixty-five may forgo a year of benefits (disability insurance, early retirement if over age sixty), which lowers net social security wealth.

3. At age fifty-nine, the worker would be entitled to early retirement only if he worked another year. This would considerably increase net social security wealth.

4. Working another year (up to age sixty-five) would imply accumulating another year of occupational pension rights, which increases net social security wealth.

5. Working another year after age sixty-five could imply forgoing a year of occupational pensions and receiving a lower amount of net social security benefits than without earnings. This would decrease net social security wealth.

The four baseline cases can be summarized as follows:

a) Persons who are entitled to an early retirement pension at age sixty would typically lose the right to an early retirement pension and stop accumulating pension rights when they stop working before that age. In the calculations, we assume that they go on accumulating pension rights until their sixty-fifth birthday if they take early retirement. Because, typically, entry in an occupational pension scheme is impossible before age twenty-five, we assume that individuals have started accumulating pension rights at age twenty-five.

As early retirement is assumed to be possible only as of age sixty, no replacement rate is reported in the table until the age at the last year of work is fifty-nine. Typically, early retirement pensions pay 80 percent of previous earnings; the after-tax replacement rate is about 90 percent. After age sixty-five, the occupational pensions supplement social security to 70 percent of final pay, which likewise results in an after-tax replacement rate of about 90 percent as a result of the fact that persons aged sixty-five or over no longer pay contributions to social security or other payroll taxes.

From age fifty-five to age fifty-eight, every additional year of work results in a decrease in social security wealth by about 7 percent. By working an

Table 7.1   **Incentive Calculations for the Base Case**

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
			SS + ER + PP		
54	. . .	266,958	. . .	. . .	. . .
55	. . .	247,365	−19,593	−.073	.687
56	. . .	229,033	−18,332	−.074	.650
57	. . .	212,121	−16,912	−.074	.612
58	. . .	196,668	−15,453	−.073	.578
59	.910	296,367	99,699	.507	−3.777
60	.906	258,463	−37,903	−.128	1.410
61	.900	222,715	−35,748	−.138	1.384
62	.902	188,559	−34,157	−.153	1.339
63	.892	157,316	−31,242	−.166	1.280
64	.909	128,554	−28,762	−.183	1.222
65	.909	120,371	−8,183	−.064	.357
66	.909	112,631	−7,740	−.064	.347
67	.909	105,331	−7,300	−.065	.337
68	.909	98,468	−6,863	−.065	.327
69	.909	92,038	−6.430	−.065	.315
			SS + DI + PP		
54	.791	459,325	. . .	. . .	. . .
55	.789	417,164	−42,161	−.092	1.478
56	.787	376,878	−40,285	−.097	1.428
57	.788	338,751	−38,128	−.101	1.379
58	.782	303,010	−35,741	−.106	1.338
59	.761	269,520	−33,490	−.111	1.269
60	.761	237,690	−31,830	−.118	1.184
61	.759	207,718	−29,972	−.126	1.160
62	.762	179,121	−28,598	−.138	1.121
63	.758	152,290	−26,831	−.150	1.099
64	.909	128,554	−23,735	−.156	1.009
			SS Only		
54	. . .	197,610	. . .	. . .	. . .
55	. . .	183,590	−14,019	−.071	.475
56	. . .	170,062	−13,528	−.074	.464
57	. . .	157,316	−12,746	−.075	.447
58	. . .	145,269	−12,047	−.077	.436
59	. . .	134,189	−11,080	−.076	.407
60	. . .	122,498	−11,691	−.087	.421
61	. . .	111,459	−11,039	−.090	.415
62	. . .	100,220	−11,240	−.101	.431
63	. . .	89,981	−10,239	−.102	.410
64	.610	80,823	−9,158	−.102	.380
65	.610	78,045	−2,778	−.034	.118
66	.610	75,414	−2,632	−.034	.115

Table 7.1   (continued)

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
67	.610	72,927	−2,487	−.033	.112
68	.610	70,584	−2,343	−.032	.109
69	.610	68,383	−2,200	−.031	.105
			SS + DI		
54	.764	389,976	. . .	. . .	. . .
55	.763	353,389	−36,587	−.094	1.239
56	.763	317,908	−35,481	−.100	1.217
57	.763	283,946	−33,962	−.107	1.191
58	.759	251,611	−32,334	−.114	1.171
59	.761	220,903	−30,708	−.122	1.129
60	.739	190,069	−30,834	−.140	1.111
61	.743	160,918	−29,150	−.153	1.096
62	.744	132,173	−28,745	−.179	1.103
63	.740	105,447	−26,726	−.202	1.069
64	.610	80,823	−24,624	−.234	1.022

Note: SS = social security; ER = early retirement; PP = private pension; SSW = social security wealth; DI = disability insurance.

additional year, an individual accumulates an additional year of pension rights, which increases the pension to be received after age sixty-five. However, the net present value of this is much lower than the contributions paid by the individual and his employer for social security, pensions, disability insurance, and unemployment insurance. In fact, there is an implicit tax of around 60 percent of net earnings on working an additional year.[14]

When an individual works until his sixtieth birthday, he is assumed to be entitled to early retirement. As a result of this, his social security wealth increases by more than 50 percent, and there is an implicit subsidy on his net earnings of more than 375 percent if on his fifty-ninth birthday he decides to work another year.

From age sixty on, by working another year, workers not only pay another year of contributions toward social security, pensions, etc. but also forgo a year of early retirement benefits. Their pension rights (as of age sixty-five) are not affected. As a result, working another year is implicitly taxed at a rate of around 130 percent of net earnings.

The calculations for the cases in which the persons retire on their sixty-sixth

14. It should be noted that one of the factors determining the accrual rates and the implicit tax rates is the contribution to be made to the occupational pension fund. These contributions vary considerably across pension funds. In the calculations, we have used the contributions valid for one of the largest private pension funds in the Netherlands (PGGM), operating mainly in the health sector.
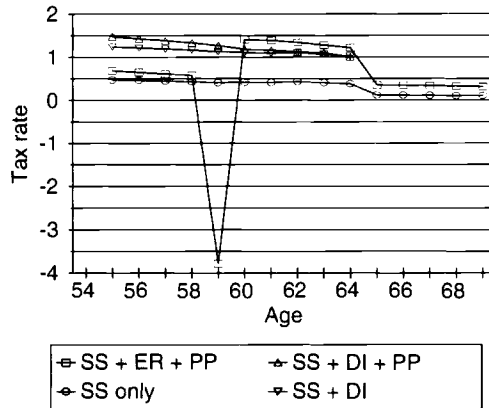
Fig. 7.11   Tax/subsidy rates—base cases
Note: SS = social security; ER = early retirement; PP = private pension; DI = disability insurance.

birthday or later are tentative, at best, because retirement at age sixty-five is virtually automatic if those involved have not retired earlier. In the calculations, we assume that an individual who works after age sixty-five is paid the same net earnings as before his sixty-fifth birthday and, in addition, receives social security. Moreover, it is assumed that he stops accumulating pension rights and is not entitled to (occupational) pensions as long as he keeps working.

Forgoing the occupational pension for a year results in a decrease of social security wealth by about 6.5 percent per year. This amounts to an implicit tax rate of about 33 percent on net earnings.

All in all, the figures suggest that there is a huge incentive to stop working at the early retirement age, especially if one looks at social security and pension wealth, the accrual rate, and the implicit tax rate. For most couples in the Netherlands, the replacement rate would be the most obvious decisive factor. Replacement rates of more than 90 percent make it likely that only very few persons would decide to work an extra year, for instance, if they derive high nonmonetary rewards from work.[15]

b) We assume that those who receive a disability benefit when they stop working before age sixty-five and an occupational pension in addition to social security after age sixty-five would stop accumulating pension rights once they receive disability benefits.

If these persons would receive disability benefits, they receive 70 percent of their previous earnings, or almost 80 percent after tax. By working an additional year, the worker would forgo a year of disability insurance benefits and pay an additional year of contributions. On the plus side, he would accumulate

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15. It should also be noted that the loss of fringe benefits such as a company car might be taken into account in the decision whether to retire early.

additional pension rights. The net result is a decrease in social security wealth. This decrease in social security wealth drops from about f 42,000 in 1986 to f 24,000 in 1994, which amounts to an accrual rate increasing from −9 to −16 percent or an implicit tax rate on net earnings decreasing from almost 150 percent in 1985 to 101 percent in 1994.

The results for retiring between one's sixty-sixth and seventieth birthdays are equal to the results of base case *a*.

In this case, the figures suggest an incentive to retire into disability as soon as possible. The accrual rates and tax rates could be even higher if one keeps accumulating pension rights during disability (free of charge), as is the case in some pension schemes.

Again it should be mentioned that probably the most important incentive to retire is the replacement rate. Although the replacement rate in terms of gross earnings was reduced from 80 to 70 percent in January 1985, this does not appear to have affected the attractiveness of the scheme very much. The introduction of sharper criteria for disability in recent years appears to have been somewhat more successful in reducing the inflow.

c) We assume that those who receive only social security after age sixty-five would not receive any benefit until reaching age sixty-five if they retire voluntarily before that age.

Because they would not receive any benefit, the replacement rate is, in fact, zero. If they continue working, the payment of contributions for social security, disability insurance, and unemployment insurance causes social security wealth to decrease by 7–10 percent per year from 1985 to 1994, which implies an implicit tax rate of more than 47 percent of net earnings in 1985, which gradually decreases to 38 percent in 1994. In view of the replacement rate in this case, these numbers are probably not very relevant in practice.

If these individuals retire after age sixty-five, we assume that they would receive the same net earnings as before age sixty-six and, in addition, social security. The replacement rate of social security alone is about 61 percent. In this case, if they continue to work, they pay a higher income tax rate on their social security benefit than without earnings, which reduces social security wealth by about 3 percent per year (an implicit tax on earnings of about 11 percent).

Again, looking at social security wealth only, the incentive would seem to be to retire as soon as possible. However, without any earnings replacing benefits, the option of retiring would not be feasible for most persons.

d) For those who receive a disability benefit when they stop working before age sixty-five and receive social security after age sixty-five, there are two main differences from case *b* above. First, when working, they would not pay pension contributions toward the occupational pension scheme. Second, they would not receive an occupational pension after age sixty-five.

If these persons were to retire between their sixty-sixth and seventieth birthdays, the results would be equal to base case *c*.

Table 7.2   Incentive Calculations for the Single Worker

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
		SS + ER + PP			
54	...	159,640	...	...	...
55	...	140,245	−19,395	−.121	.709
56	...	122,103	−18,141	−.129	.670
57	...	105,379	−16,724	−.137	.631
58	...	90,114	−15,265	−.145	.595
59	.905	186,501	96,387	1.070	−3.780
60	.918	149,038	−37,463	−.201	1.457
61	.909	113,675	−35,363	−.237	1.455
62	.908	79,981	−33,694	−.296	1.418
63	.898	49,195	−30,786	−.385	1.357
64	.920	20,866	−28,329	−.576	1.295
65	.920	9,409	−11,457	−.549	.535
66	.920	−1,424	−10,833	−1.151	.521
67	.920	−11,640	−10,216	...	.506
68	.920	−21,241	−9,602	...	.490
69	.920	−30,235	−8,993	...	.472
		SS + DI + PP			
54	.790	342,352	...	...	...
55	.788	301,321	−41,032	−.120	1.499
56	.787	262,126	−39,195	−.130	1.447
57	.789	225,044	−37,081	−.141	1.398
58	.784	190,286	−34,759	−.154	1.355
59	.750	157,612	−32,673	−.172	1.281
60	.763	126,428	−31,184	−.198	1.213
61	.758	97,060	−29,368	−.232	1.208
62	.758	69,134	−27,926	−.288	1.175
63	.754	43,911	−25,223	−.365	1.112
64	.920	20,866	−23,045	−.525	1.053
		SS Only			
54	...	94,825	...	...	...
55	...	80,806	−14,019	−.148	.494
56	...	67,278	−13,528	−.167	.483
57	...	54,532	−12,746	−.189	.465
58	...	42,485	−12,047	−.221	.454
59	...	31,405	−11,080	−.261	.421
60	...	19,080	−12,324	−.392	.464
61	...	7,430	−11,650	−.611	.466
62	...	−4,538	−11,969	−1.611	.493
63	...	−15,514	−10,976	...	.474
64	.462	−25,358	−9,844	...	.441
65	.462	−28,807	−3,449	...	.158
66	.462	−32,068	−3,261	...	.154

Table 7.2   (continued)

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
67	.462	−35,143	−3,075	. . .	.149
68	.462	−38,033	−2,890	. . .	.144
69	.462	−40,740	−2,707	. . .	.139
			SS + DI		
54	.762	277,538	. . .	. . .	. . .
55	.762	241,882	−35,656	−.128	1.256
56	.762	207,301	−34,581	−.143	1.234
57	.762	174,197	−33,103	−.160	1.209
58	.759	142,656	−31,541	−.181	1.189
59	.725	112,570	−30,086	−.211	1.144
60	.742	82,177	−30,394	−.270	1.143
61	.742	53,412	−28,765	−.350	1.151
62	.742	25,103	−28,309	−.530	1.166
63	.738	−1,168	−26,270	−1.047	1.134
64	.462	−25,358	−24,191	. . .	1.083

Note: SS = social security; ER = early retirement; PP = private pension; SSW = social security wealth; DI = disability insurance.

Because these persons do not pay pension contributions, both the replacement rates and the implicit tax rates are slightly lower than in case *b* above. However, solely from the viewpoint of accrual rates and implicit tax rates, there is still a distinct incentive to retire as soon as possible.

7.3.3   Other Cases

Table 7.2 gives the analogous results for a single worker. The main differences between table 7.2 and table 7.1 above are the considerably lower amounts of social security wealth accumulated by a single worker. In most cases, the implicit tax rates are much the same as for a couple, while the accrual rates are higher because the denominator (social security wealth) is lower.

Similar to the case for couples, the single worker who could take early retirement would find it attractive to take it at the earliest possible age if he could afford an income loss of about 10 percent. The disability benefit option also appears to be very attractive.

The next two tables, tables 7.3 and 7.4, concern workers who are at the ninetieth and tenth percentiles of the earnings distribution, respectively (see also fig. 7.12). As is the case for the median, we take the ninetieth and tenth percentiles of the 1985 income distribution of full-time male workers between the ages of fifty and fifty-nine and assume that the time pattern of wages follows that of the statutory minimum wage.

| Table 7.3 | | Incentive Calculations for the 90th Percentile | | | |

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
			SS + ER + PP		
54	. . .	448,203	. . .	. . .	. . .
55	. . .	414,605	−33,599	−.075	.678
56	. . .	383,316	−31,288	−.075	.637
57	. . .	354,915	−28,401	−.074	.586
58	. . .	329,104	−25,811	−.073	.531
59	.924	512,294	183,189	.557	−4.031
60	.925	448,763	−63,530	−.124	1.394
61	.917	389,145	−59,618	−.133	1.366
62	.916	333,770	−55,375	−.142	1.305
63	.907	282,947	−50,824	−.152	1.249
64	.921	236,198	−46,748	−.165	1.196
65	.921	213,761	−22,438	−.095	.586
66	.921	192,537	−21,223	−.099	.571
67	.921	172,517	−20,020	−.104	.555
68	.921	153,694	−18,823	−.109	.537
69	.921	136,056	−17,637	−.115	.519
			SS + DI + PP		
54	.566	697,921	. . .	. . .	. . .
55	.566	636,243	−61,678	−.088	1.244
56	582	577,533	−58,710	−.092	1.195
57	.563	521,598	−55,935	−.097	1.154
58	.594	469,394	−52,204	−.100	1.073
59	.595	421,043	−48,351	−.103	1.064
60	.596	378,667	−42,376	−.101	.930
61	.598	338,622	−40,044	−.106	.917
62	.605	301,317	−37,305	−.110	.879
63	.605	267,455	−33,863	−.112	.832
64	.921	236,198	−31,256	−.117	.800
			SS Only		
54	. . .	197,610	. . .	. . .	. . .
55	. . .	174,209	−23,401	−.118	.446
56	. . .	151,300	−22,909	−.132	.442
57	. . .	129,860	−21,439	−.142	.420
58	. . .	109,485	−20,375	−.157	.399
59	. . .	90,816	−18,670	−.171	.393
60	. . .	74,362	−16,454	−.181	.349
61	. . .	59,183	−15,179	−.204	.336
62	. . .	44,271	−14,912	−.252	.342
63	. . .	30,191	−14,079	−.318	.336
64	.365	17,632	−12,560	−.416	.313
65	.365	12,684	−4,948	−.281	.126
66	.365	8,008	−4,676	−.369	.122

Table 7.3   (continued)

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
67	.365	3.601	−4.406	−.550	.119
68	.365	−.537	−4.139	−1.149	.115
69	.365	−4.410	−3.873	. . .	.111
			SS − DI		
54	.535	447.327	. . .	. . .	. . .
55	.536	395.847	−51.480	−.115	.980
56	.553	345.516	−50.331	−.127	.971
57	.537	296.543	−48.973	−.142	.960
58	.567	249.775	−46.768	−.158	.917
59	.595	205.460	−44.315	−.177	.932
60	.575	163.616	−41.844	−.204	.887
61	.581	124.488	−39.128	−.239	.865
62	.589	86.614	−37.874	−.304	.868
63	.589	50.693	−35.921	−.415	.858
64	.365	17.632	−33.061	−.652	.823

Note: SS = Social Security; ER = early retirement; PP = private pension; SSW = social security wealth; DI = disability insurance.

The replacement rates, accrual rates, and tax/subsidy rates for workers at the ninetieth percentile (table 7.3) who are entitled to early retirement are much the same as those for workers with a median wage. The main difference concerns the unlikely case of retiring after age sixty-five. Since, for high-income workers, occupational pensions make up a larger share of total income after age sixty-five, these workers would forgo a larger amount by continuing to work after age sixty-five. It should be remembered that the basic social security benefit is paid regardless of whether the worker has retired and that occupational pensions are paid only if the worker has left his job.

When ninetieth percentile workers receive disability insurance benefits, their replacement rate is considerably lower than that for the median worker as a result of the ceiling in the public disability insurance system. The rates of accrual and the implicit tax rates are also lower than those for the median worker. However, only the lower replacement rate suggests that, for these workers, retiring via the disability route is less attractive than for workers with lower wages.[16]

Ninetieth percentile workers who are not entitled to occupational pensions

16. It should be noted that, in a number of pension arrangements, the disability benefit for workers with wages above the public insurance ceiling is supplemented to 70 percent of previous earnings by the pension fund. For these workers, the replacement rate would be fairly close to that of the median worker.

| Table 7.4			Incentive Calculations for the 10th Percentile		
Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
			SS + ER + PP		
54	. . .	199,961	. . .	. . .	. . .
55	. . .	186,692	−13,269	−.066	.617
56	. . .	174,143	−12,549	−.067	.591
57	. . .	162,460	−11,683	−.067	.562
58	. . .	151,665	−10,795	−.066	.540
59	.878	213,951	62,286	.411	−3.157
60	.876	189,332	−24,619	−.115	1.284
61	.871	166,123	−23,209	−.123	1.261
62	.872	143,921	−22,202	−.134	1.209
63	.864	123,585	−20,335	−.141	1.151
64	.871	104,841	−18,744	−.152	1.100
65	.871	104,023	−819	−.008	.049
66	.871	103,249	−774	−.007	.048
67	.871	102,520	−729	−.007	.046
68	.871	101,836	−684	−.007	.045
69	.871	101,196	−640	−.006	.043
			SS + DI + PP		
54	.871	357,535	. . .	. . .	. . .
55	.869	325,515	−32,020	−.090	1.488
56	.866	294,784	−30,731	−.094	1.447
57	.867	265,573	−29,210	−.099	1.406
58	.854	238,085	−27,488	−.104	1.374
59	.866	212,255	−25,830	−.108	1.309
60	.867	188,023	−24,232	−.114	1.264
61	.861	165,145	−22,878	−.122	1.243
62	.863	143,282	−21,863	−.132	1.191
63	.856	123,282	−20,000	−.140	1.132
64	.871	104,841	−18,441	−.150	1.083
			SS Only		
54	. . .	197,610	. . .	. . .	. . .
55	. . .	189,610	−8,000	−.040	.366
56	. . .	181,812	−7,798	−.041	.362
57	. . .	174,439	−7,373	−.041	.350
58	. . .	167,410	−7,030	−.040	.345
59	. . .	160,898	−6,512	−.039	.325
60	. . .	154,346	−6,552	−.041	.336
61	. . .	148,153	−6,193	−.040	.330
62	. . .	141,899	−6,254	−.042	.336
63	. . .	136,276	−5,624	−.040	.314
64	.851	131,268	−5,008	−.037	.290
65	.851	130,598	−670	−.005	.040
66	.851	129,966	−632	−.005	.039

Table 7.4   (continued)

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
67	.851	129,373	−594	−.005	.037
68	.851	128,817	−556	−.004	.036
69	.851	128,298	−519	−.004	.035
			SS + DI		
54	.858	355,184	. . .	. . .	. . .
55	.856	328,432	−26,752	−.075	1.224
56	.854	302,453	−25,980	−.079	1.206
57	.852	277,553	−24,900	−.082	1.183
58	.839	253,830	−23,723	−.085	1.166
59	.866	231,335	−22,495	−.089	1.121
60	.851	209,265	−22,070	−.095	1.132
61	.850	188,413	−20,852	−.100	1.112
62	.852	167,919	−20,494	−.109	1.102
63	.846	148,850	−19,069	−.114	1.066
64	.851	131,268	−17,582	−.118	1.020

Note: SS = social security; ER = early retirement; PP = private pension; SSW = social security wealth; DI = disability insurance.

after their sixty-fifth birthday or to any benefit before age sixty-five have lower social security wealth than median workers if they retire after age fifty-five as a result of the higher contributions to social security, disability insurance, and unemployment insurance made during the years they are still working. The accrual rates—the decrease in social security wealth as a result of working an additional year—are also higher than for median workers, in particular when they choose to continue working beyond age sixty. In that case, the amounts of payroll taxes paid toward social security, unemployment insurance, and disability insurance reduce social security wealth—the denominator in the accrual rate calculations—to such an extent that the accrual rates increase considerably, although the absolute amounts of the decrease remain limited. On the other hand, the implicit tax rates on net earnings are somewhat lower than for median workers because the contributions to social security, disability insurance, and unemployment insurance are subject to a ceiling. After age sixty-five, the replacement rate of social security only is about 36.5 percent for workers at the ninetieth percentile.

Ninetieth percentile workers who are entitled to disability insurance before age sixty-five and to social security only after age sixty-five also face lower replacement rates than median workers. Similar to the previous case, their accrual rates increase considerably when they continue to work, while the tax rates are somewhat lower than for median workers.
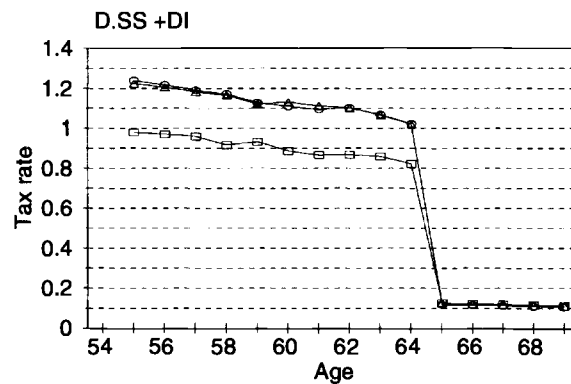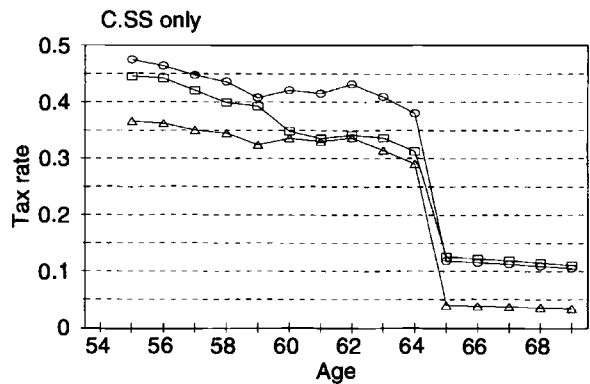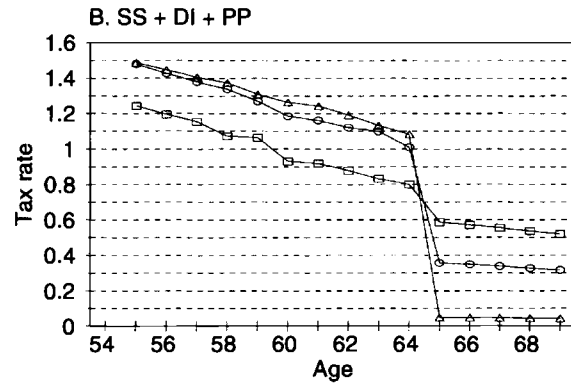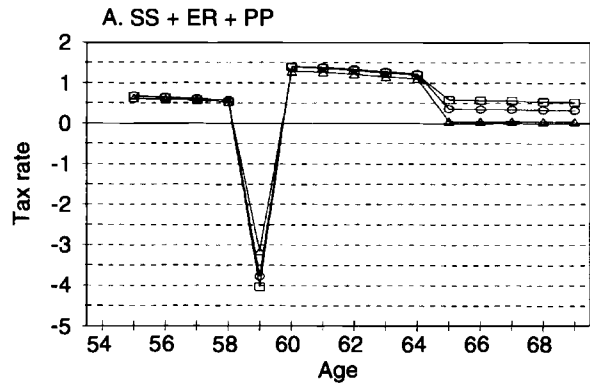
Fig. 7.12 Tax/subsidy rates across earnings profiles: *a,* social security + early retirement + private pension; *b,* social security + disability insurance + private pension; *c,* social security only; *d,* social security and disability insurance

Workers who are at the tenth percentile of the earnings distribution face slightly lower replacement rates than median workers if they are entitled to early retirement. This is because the increase in net income as a result of the fact that pension contributions and payroll taxes no longer have to be paid is lower at this level of income. The rates of accrual and the implicit tax rates are slightly lower than at the median.

In the case where these workers with low wages would receive disability insurance, their benefits would be equal to the social minimum. As a result of this, the replacement rates for persons retiring before age sixty-five are higher than those for the median worker. The accrual rates and the implicit tax rates are much the same as those for median workers.

For low-wage workers who, on reaching age sixty-five, are entitled only to social security, social security wealth is higher than for workers at the median. This is a result of the lower contributions to social security (and disability and unemployment insurance) made before retiring, which are not followed by lower benefits after age sixty-five.

The replacement rate for the worker entitled to social security only is only marginally lower than that for the worker who is also entitled to private pensions after age sixty-five (.851 as compared to .871), which shows that private pensions make up only a very small part of total income after retirement for low-wage workers.

Table 7.5 presents the results for persons with an incomplete earnings history. Social security benefits and disability benefits are not affected by the earnings history. With respect to occupational pensions, we assume that the persons have accumulated only thirty years of pension rights when working until age sixty-five instead of the maximum of forty. Apart from a reduction in social security wealth, this hardly appears to affect the results. In fact, in monetary terms, the accruals are exactly the same in most cases because the amounts paid for contributions are the same and the amounts forgone in pension receipts are also the same, the increase in before-tax pensions as a result of accumulating one more pension year leading to a constant increase in net pensions at the relevant range of pensions. The amounts of accrual differ only if the threshold for the statutory health insurance for the elderly is crossed.

As a result of having accumulated pension rights over thirty instead of forty years, the replacement rate of the pensions received after age sixty-five is reduced by about 7 percent, from .91 to .84. It should be noted that, in this case, the decrease for single workers would be higher (from .92 to .79), mainly because the occupational pension makes up a larger share of the income for a single retiree than for a couple.

Since, by working after age sixty-five, individuals forgo a lower amount of occupational pension, the amounts of accrual after age sixty-five are lower than those shown in table 7.1 above, as are the implicit tax rates.

Summarizing the results of these calculations, it can be seen that the Dutch system of social security, disability insurance, early retirement, and occupa-

Table 7.5   **Incentive Calculations for an Incomplete Earnings History**

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
		SS + ER + PP			
54	. . .	243,842	. . .	. . .	. . .
55	. . .	224,249	−19,593	−.080	.687
56	. . .	205,917	−18,332	−.082	.650
57	. . .	189,005	−16,912	−.082	.612
58	. . .	173,551	−15,453	−.082	.578
59	.910	274,123	100,572	.579	−3.810
60	.906	236,220	−37,903	−.138	1.410
61	.900	200,472	−35,748	−.151	1.384
62	.902	166,315	−34,157	−.170	1.339
63	.892	135,073	−31,242	−.188	1.280
64	.838	106,311	−28,762	−.213	1.222
65	.838	99,460	−6,851	−.064	.298
66	.838	92,976	−6,484	−.065	.291
67	.838	86,856	−6,120	−.066	.283
68	.838	81,099	−5,757	−.066	.274
69	.838	75,701	−5,398	−.067	.265
		SS + DI + PP			
54	.791	436,209	. . .	. . .	. . .
55	.789	394,047	−42,161	−.097	1.478
56	.787	353,762	−40,285	−.102	1.428
57	.788	315,634	−38,128	−.108	1.379
58	.782	279,894	−35,741	−.113	1.338
59	.761	246,404	−33,490	−.120	1.269
60	.761	214,574	−31,830	−.129	1.184
61	.759	184,602	−29,972	−.140	1.160
62	.762	156,005	−28,598	−.155	1.121
63	.758	130,069	−25,936	−.166	1.062
64	.838	106,311	−23,758	−.183	1.010
		SS Only (not affected)			
54	. . .	197,610	. . .	. . .	. . .
55	. . .	183,590	−14,019	−.071	.475
56	. . .	170,062	−13,528	−.074	.464
57	. . .	157,316	−12,746	−.075	.447
58	. . .	145,269	−12,047	−.077	.436
59	. . .	134,189	−11,080	−.076	.407
60	. . .	122,498	−11,691	−.087	.421
61	. . .	111,459	−11,039	−.090	.415
62	. . .	100,220	−11,240	−.101	.431
63	. . .	89,981	−10,239	−.102	.410
64	.610	80,823	−9,158	−.102	.380
65	.610	78,045	−2,778	−.034	.118

Table 7.5   (continued)

Age at Last Year of Work	Replacement Rate	SSW	Accrual	Accrual Rate	Tax/ Subsidy
66	.610	75,414	−2,632	−.034	.115
67	.610	72,927	−2,487	−.033	.112
68	.610	70,584	−2,343	−.032	.109
69	.610	68,383	−2,200	−.031	.105
		SS + DI (not affected)			
54	.764	389,976	. . .	. . .	. . .
55	.763	353,389	−36,587	−.094	1.239
56	.763	317,908	−35,481	−.100	1.217
57	.763	283,946	−33,962	−.107	1.191
58	.759	251,611	−32,334	−.114	1.171
59	.761	220,903	−30,708	−.122	1.129
60	.739	190,069	−30,834	−.140	1.111
61	.743	160,918	−29,150	−.153	1.096
62	.744	132,173	−28,745	−.179	1.103
63	.740	105,447	−26,726	−.202	1.069
64	.610	80,823	−24,624	−.234	1.022

Note: SS = social security; ER = early retirement; PP = private pension; SSW = social security wealth; DI = disability insurance.

tional pensions results in great incentives to retire as early as possible, except in the case where the worker would be entitled to early retirement, in which case it would be attractive to wait until the early retirement age. These findings are fairly robust to changes in assumptions about earnings. Further calculations show that the results are also unaffected by changes in assumptions about discount rates, mortality, and wife's age. The fact that very few persons in the Netherlands work until their sixty-fifth birthday can be seen to be entirely consistent with these findings.

Nevertheless, some remarks are in order. First, it should be mentioned that the implicit tax rates take into account contributions to social security, disability insurance, unemployment insurance, and occupational pensions, which a worker in the Netherlands would hardly be able to estimate. In particular, pension and social insurance contributions made by the employer are often not mentioned on wage slips. Furthermore, payroll taxes are collected jointly with income taxes, and only a very well-informed worker would be able to identify them separately. In the end, what really seems to matter for the individual considering retirement is the replacement rate.

Second, the options open to workers depend on individual circumstances. Early retirement is currently a fairly general provision in most firms, but retirement via the disability route has been made more difficult in recent years.

7.4   Concluding remarks

In the Netherlands, the system of provisions for elderly people who (have to) stop working can be characterized by two main dimensions. First, there is a division by age, between people age sixty-five and older and those under age sixty-five. Second, both public and private schemes are important. For people under age sixty-five, publicly provided disability and unemployment benefits exist next to early retirement schemes provided by the employer. For most people over age sixty-five, private pensions supplement social security.

The labor force participation of the elderly, especially of males, has dropped considerably over the last thirty-five years. Between the ages of sixty and sixty-five, only about 20 percent of males are in the labor force; over age sixty-five, participation is considered to be too low to be of interest.

Combining public and private schemes, employees who stop working can mostly expect high replacement rates. The effect on future benefits of retiring now instead of working one more year is rather low. The resulting implicit tax rates of working one more year are very high. This in itself may provide a strong incentive to retire early. Yet, without further research, it would be hard to say which part of the drop in participation among older workers is due to those incentives and which part is involuntary, that is, due to real disability and involuntary unemployment. Empirical research available today suggests that the incentives described here provide the main explanation for the sharp drop in labor force participation among the elderly part of the labor force.

Appendix A
Data Sources

All data used come from Statistics Netherlands.

Historical Data

Data are from the census (1960, 1971) and Labor Force Surveys (1975, 1979, 1985, 1990, 1994). Figures are not adjusted for changes in definitions. Figures for labor force participation of persons aged sixty-five or over are not available after 1985.

Contemporaneous Data

For the detailed figures on labor force participation, we use the 1993/1994 Housing Needs Survey (Woningbehoeftenonderzoek, WBO). The WBO is a large, nationally representative survey (fifty-five thousand households) that records, among other things, labor force attachment and income.

The figures on hazard rates (fig. 7.9 and 7.10 above) are based on the 1992

and 1993 waves of the Socio-Economic Panel (SEP). The income composition figures (fig. 7.8 above) are based on the latest Socio-Economic Panel data (1993) and pertain to the year 1992. The SEP is a nationally representative household panel consisting of about five thousand households. The figures pertain to before-tax incomes. It should be noted that the subdivision into age groups causes the numbers of observations on which the figures are based to be rather small.

Appendix B
The Effect of Social Security on Retirement— Recent Evidence

As noted by Woittiez, Lindeboom, and Theeuwes (1994, 5), until recently there was "a paucity of empirical research" in the Netherlands on factors determining retirement. Contributions that they mention are Delsen (1989), who gives an overview of early retirement schemes in Europe; Bolhuis, Ottens, and Steenbeek-Vervoort (1987), who discuss the problem of the financial sustainability of early retirement schemes introduced in the early 1980s; and Henkens and Siegers (1990), who provide one of the first quantitative analyses of retirement decisions of males in the Netherlands. The most prominent study in this "earlier literature" is undoubtedly Aarts and de Jong (1992). Their monograph reports on a project covering more than a decade of research into the determinants of disability. Next to obvious health factors, financial considerations are found to play an important role. Indeed, this study was the first to document by means of quantitative analysis the fact that the disability scheme was both a financially attractive route into early retirement for the employee and a convenient way to lay off elderly employees.

In view of the tightening of the eligibility rules for disability, the reduction of disability benefit levels, and the simultaneous introduction of various generous early retirement schemes, one would expect a substitution of channels into retirement as a result of this. Woittiez, Lindeboom, and Theeuwes (1994) study precisely this point. By means of both multinomial logit and conditional logit models, they model the probability of finding elderly individuals (defined as being between forty-eight and sixty-two years of age) in one of four states: working, disabled, unemployed, or early retired. They find a significant role for financial incentives; that is, a state becomes more likely if the associated income level is higher. Simulations with their models show, for instance, that a 10 percent reduction of benefits in the nonworking states raises the percentage of individuals found working by a few percentage points. The authors also find evidence for stigma effects (cf. Moffit 1983) in their conditional logit model, indicating that the state of unemployment is valued below the state of

disability and that both are valued below early retirement. This finding is partly supported by Woittiez and Theeuwes (1998), who use self-reported measures of life satisfaction as well as several measures of mental and physical health to find that, other things being equal, people who work are generally better off than those who do not, with early retirees running a close second. The disabled are the least satisfied with their life, whereas the unemployed are above the disabled and below the early retired. The key difference between the unemployed and the early retired lies in the involuntary nature of the former state. Indeed, the authors find that it is precisely this involuntary nature that explains most of the dissatisfaction of the unemployed.

In principle, early retirement can also have a involuntary nature as an employer may pressure an employee who is eligible for early retirement to leave the firm. Thio (1995) lumps together all exit routes considered so far (disability, early retirement, and unemployment) for a sample of household heads between the ages of fifty-three and sixty-three. Everyone not working in his sample has indicated whether the separation from the last job was involuntary (dismissal, forced by the firm, afraid of being laid off) or voluntary (had "worked long enough," etc.). He then uses a competing risks model to explain these different routes into retirement. He does find some evidence for involuntary early retirement, although this is not significant. Nevertheless, early retirement remains the favorite exit route out of employment. In Kerkhofs, Theeuwes, and Woittiez (1996), transitions out of a job are analyzed by means of a duration model. They also establish a substitution pattern in the choice of exit routes. When the early retirement route is available, it dominates the other exit routes.

As both eligibility rules and replacement rates for early retirement differ across firms (or sectors), one may suspect that employees and employers match to their mutual benefit. Workers with a preference for early retirement may match with firms that offer relatively low wages and the possibility of retiring early. Firms (or sectors) that need healthy young workers may decide to offer generous early retirement schemes. Thio and Woittiez (1996) investigate this issue by estimating a hedonic price relation in which the wage offered to an individual employee is related to characteristics determining worker productivity and early retirement benefits. The early retirement benefits are constructed on the basis of a wage-growth equation and specific information on the early retirement rules for the firm. These are converted into a ratio of the expected present value of early retirement to the expected present value of wages. It is found that there is a trade-off between wages and early retirement benefits, but not one for one; that is, the better early retirement benefits are not fully reflected in lower wages. This finding seems to be consistent with the behavior of employers in the Netherlands, who are increasingly anxious to change the early retirement rules as these turn out to be much more expensive than originally anticipated.

Clearly, for this type of study, the availability of data for both employees and employers is essential. Another study taking advantage of this is Theeuwes and Lindeboom (1995). These authors match firm and employee data to analyze the effect of exit routes on the number of elderly employees leaving the firm. They provide evidence that there is some, but not full, substitution between channels into retirement. This gives room for policy measures to reduce retirement. On the basis of employee data only, they find that eligibility requirements, rather than benefit levels, determine the moment of retirement. Heyma and Thio (1994) take up the issue of explaining differences in labor force participation among elderly workers between the United States and the Netherlands, exploiting the Health and Retirement Survey (HRS) and the CERRA samples. They first estimate standard probit participation equations as well as nonparametric variants. Next, they consider simple transition models. Qualitatively, the models are not very different across the two countries; parameter estimates generally have the same sign, with one major exception: (imputed) log wage has a positive effect on the probability of participation in the Netherlands and a negative effect in the United States. It is a bit hard to interpret this difference as no replacement ratios are given. The interesting part of Heyma and Thio's analysis is where they use U.S. estimates to predict participation in the Netherlands and vice versa. This shows that, if the Dutch had the American coefficients, labor force participation would even be higher than it is in the United States, whereas, if the Americans had the Dutch coefficients, labor force participation in the United States would be even lower than it is in the Netherlands. This suggests that the explanation for the observed differences between the United States and the Netherlands is not a matter of different characteristics of individuals but rather a matter of a different institutional environment. The two main features of this institutional environment are financial incentives and eligibility rules, both of which are not, or not fully, taken into account in the comparison in Heyma and Thio (1994).[17]

Heyma (1996) addresses both these elements in a dynamic programming model of retirement decisions. He takes into account the three exit routes mentioned earlier and allows for the possibility of layoffs. Except for working, all states (disability, unemployment, and retirement) are assumed to be absorbing states. He builds financial incentives and eligibility rules into his model. Having estimated the model, he simulates such policy changes as later eligibility for early retirement, raising the mandatory retirement age by two years, and lower early retirement benefits. The effects found are substantial. For example, if the early retirement benefits are set equal to disability benefits, the labor force participation of sixty-two-year-olds easily doubles. Heyma, Lindeboom, and Kerkhofs (1997) extend this model by using data on individual behavior,

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17. The inclusion of log wages captures some financial incentive aspect, but, since no replacement ratios are used, it is not clear what to make of it.

survival rates, and private pensions and firm data. The effects are similar to those found in Heyma (1996). Emphasizing the institutional characteristics, they are able to explain many of the dynamics in retirement behavior.

The research reviewed here provides ample evidence for the dominant role of financial incentives and eligibility rules in the explanation of the low labor force participation rate among the elderly in the Netherlands. However, no study has yet fully quantified the part of the decrease in labor force participation among the elderly that can be ascribed to the changes in incentives and eligibility rules that have occurred over the last three decades.

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