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# 5 Social Security and Retirement in Italy

Agar Brugiavini

Italy is now experiencing one of the lowest fertility rates among developed countries, while life expectancy has improved dramatically over the past few years.[1] This aging process is partly counterbalanced by a significant increase in the size and frequency of immigration flows into the country. However, even the most optimistic scenarios suggest that this inflow will not be enough to reverse the demographic pattern shown by the data. In particular, figures 5.1–5.3 show a dramatic increase in the share of older people and in the dependency ratio over past decades.[2] Furthermore, the positive effects of the baby-boom generation were already fading by 1984, and the ratio of old people and very young people to the working-age population stayed roughly constant after that year (fig. 5.3). Demographic projections suggest that, by 2030, each adult individual will support 0.4 elderly individuals and that this rate may

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1. In 1990, estimates were (i) an average of 1.3 children per woman of child-bearing age and (ii) life expectancy at birth of 73.6 years for men and 80.2 years for women (Ministero del Tesoro 1996). The Italian Central Statistical Office (ISTAT) has more recently (1996) estimated (i) an average of 1.18 children per woman and a life expectancy at birth of 75.3 years for men and 81.7 years for women (Ministero del Tesoro 1997).

2. This is the ratio of old people to people of working age. The ratio based on the actual labor force figures (appearing as the denominator) may be misleading as labor force series show a jump in 1977 owing to a change in the Labor Force Survey questionnaire.

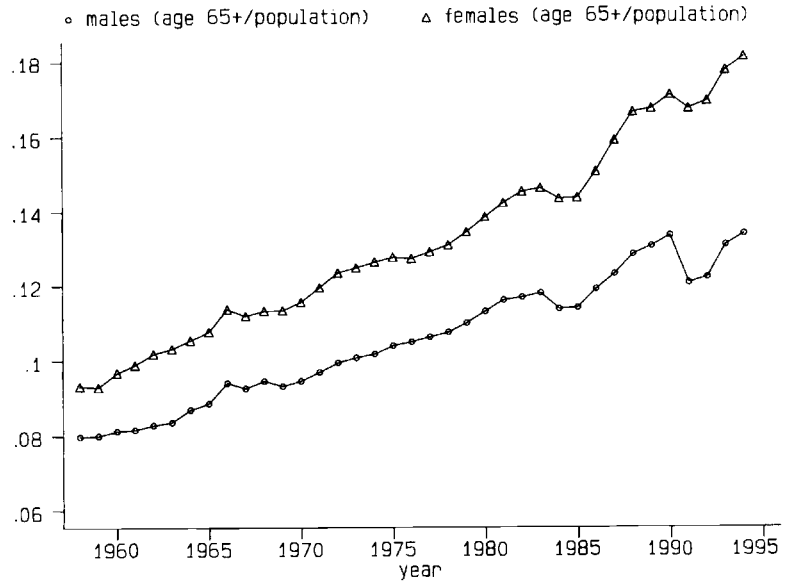


**Fig. 5.1 Share of the population age 65 and over**

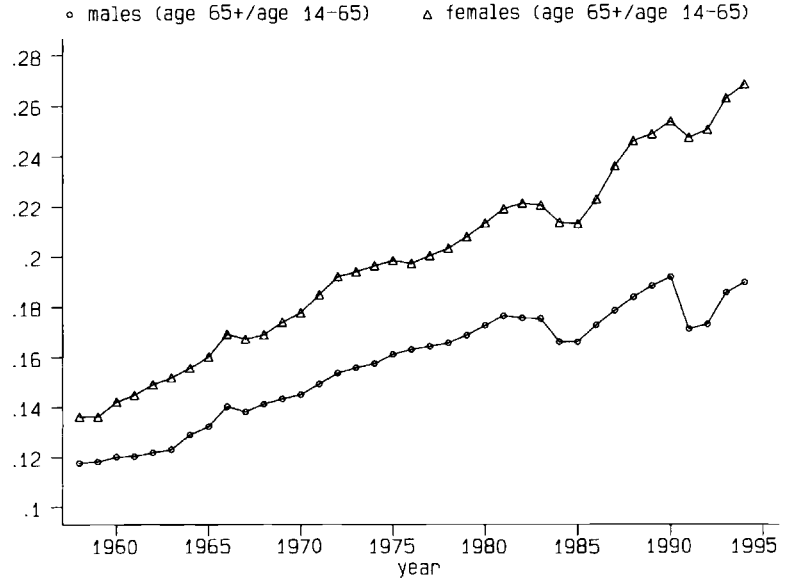


**Fig. 5.2 Dependency ratio—old**

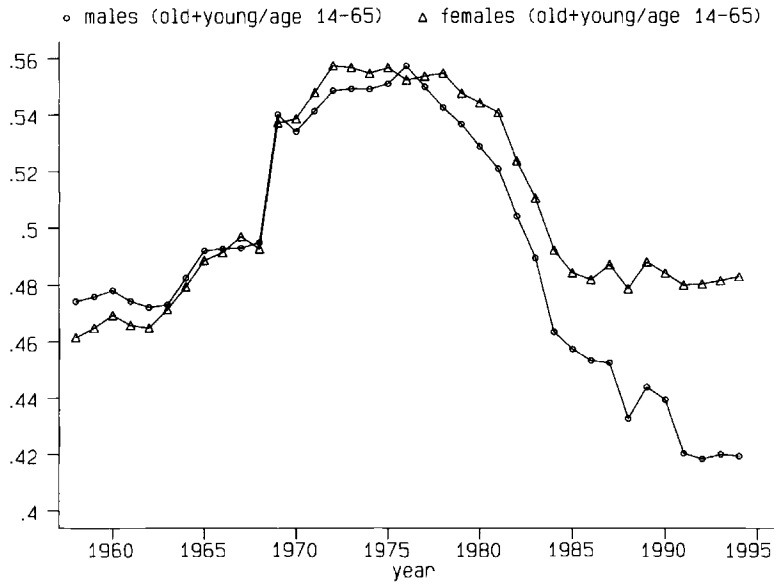


**Fig. 5.3 Dependency ratio—old and young**

increase to 0.56 by 2050 (fig. 5.4) (Livi Bacci 1995a, 1995b; Ministero del Tesoro 1997).

This demographic trend is coupled with a sizable social security program. In 1995, approximately 17 percent of GDP was devoted to old age and other public assistance outlays (Ministero del Tesoro, *Relazione generale sulla situazione economica del paese,* 1996). Estimates of the size of the Social Security Administration liabilities for the payment of future benefit rights in terms of net social security wealth amount to 300 percent of GDP in 1993 (Beltrametti 1996). From the point of view of households, this corresponds to a large share of their assets being in the form of social security wealth: estimates based on micro data suggest that, on average, social security wealth holdings are as large as private wealth holdings.[3] Not surprisingly, these stylized facts have prompted economists to investigate more closely both the financial viability of the social security system and the effects of the incentives provided by the social security program on households' behavior. As a result, two major reforms have been implemented in very recent years aimed at reducing the level of benefits and restricting eligibility criteria for retirees.

One of the key elements both in evaluating future budget outlays and in

3. In 1993, households held, on average, L 349 million in private wealth and L 382 million in pension wealth, corresponding, on average, to nine and ten times, respectively, the after-tax household income of that year (estimates based on my own calculations from Bank of Italy cross-sectional data). Note that U.S.$1.00 was equivalent to L 1,610 in January 1995.

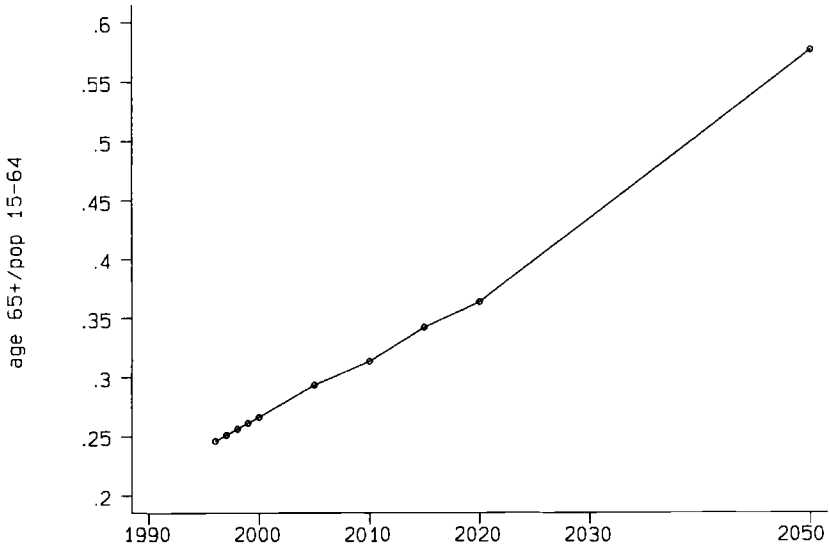


**Fig. 5.4 Projected demographic trends, share of population over 65 over working-age population**

assessing the effect of social security on households' choices is the effect of the retirement decision on the labor market. In fact, understanding the link between social security–related incentives and labor supply can help explain some features of the labor market structure (e.g., the increasing detachment of older people from the labor force). This in turn provides some idea of how the budget will be affected by a given labor market configuration, that is, by the relation between the number of social security taxpayers and benefit recipients. Italy is a very interesting example in this context. First, because virtually all retirement income is provided to individuals by the social security system, pension funds and private annuities play a negligible role. Second, until 1995 replacement rates were very high (roughly 80 percent of last wage), and therefore the retirement decision involved a large fraction of the household's resources. In particular, when considering whether to work an additional year, the individual sets against the earnings of one extra year almost the same amount of income not collected as social security benefits. Third, the existence of an early retirement provision, which attracts no actuarial penalty, greatly distorts choices in favor of early retirement. Finally, different groups in the population belong to different social security funds characterized by different benefit payouts and eligibility criteria. This causes redistribution between individuals, and, given the variety of incentives provided across these groups, it generates different behavioral responses to policy changes (e.g., the recent reforms), which can be exploited for applied economic analysis.

This paper addresses the issues outlined above by first documenting the stylized facts characterizing the labor market both over the recent past and over the life cycle of individuals (sec. 5.1). Section 5.2 describes the structure of the Italian social security program and summarizes the relevant institutional details. Section 5.3 is devoted to a simulation model designed to better understand the incentive effects of social security on current cohorts of retirees. Section 5.4 draws some conclusions.

## 5.1 The Labor Market Behavior of Older Persons in Italy

The Italian labor market has been characterized by a declining attachment to the labor force of older persons, but different patterns are observed for men and for women. After World War II, the Italian social security system became increasingly more generous, particularly with regard to early retirement. There is now a consistent body of evidence that this increased generosity is closely related to a reduction in household savings (Rossi and Visco 1995; Attanasio and Brugiavini 1997). This prompts the question of whether observed changes in labor supply behavior could be explained by the growth of the Italian social security program over those years. An interesting twist in the investigation of this issue in the Italian case is that, owing to the lack of actuarial penalties on early retirement, the workers exhibiting these trends may still be relatively young.

The historical and contemporary facts presented in this section are drawn from a number of different data sources. These are summarized in appendix A.

### 5.1.1 Historical Trends

Figures 5.5 and 5.6 map out the labor force participation rates of men and women of different age groups since 1958. Four age groups are selected: forty to fifty, fifty to sixty, sixty to sixty-five, and over sixty-five.[4]

From these aggregate figures, a marked difference emerges between the labor market behavior of older men in the age groups over sixty. Figure 5.5 indicates that, for these groups, participation starts low (e.g., 60 percent in 1958 for the age group sixty to sixty-four) and declines sharply (to about 30 percent in 1994 for the age group sixty to sixty-four). These figures can be contrasted with the age group fifty to sixty, which is characterized by a greater attachment (90 percent share in 1958) and an almost comparable drop (to about 70 percent) in recent years.

The same distinction can be drawn for female labor force participation (fig. 5.6): for older women, participation declines slightly but steadily, while, for younger women, higher and increasing participation is observed. The decline

4. The choice of age groups is constrained by data availability. However, these age groups are consistent, for men, with the social security configuration that set the normal retirement age at sixty.

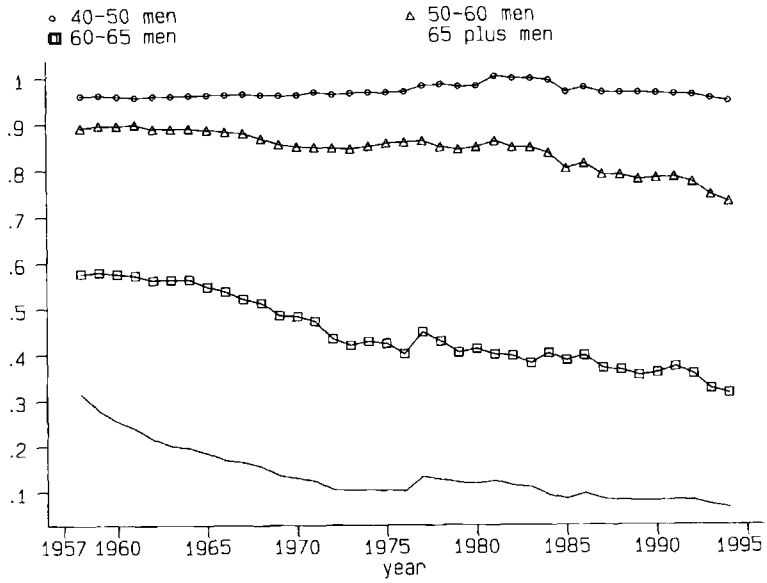


**Fig. 5.5 Historical trends in the labor force participation of older men**

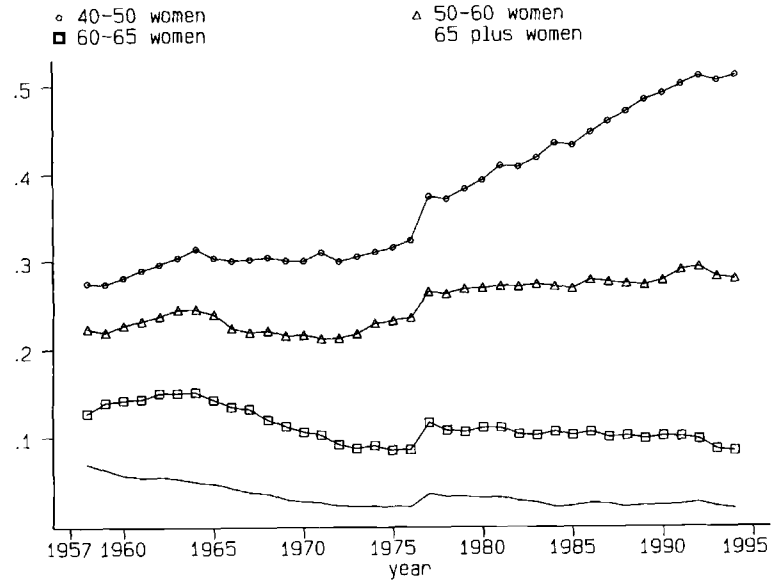


**Fig. 5.6 Historical trends in the labor force participation of older women**

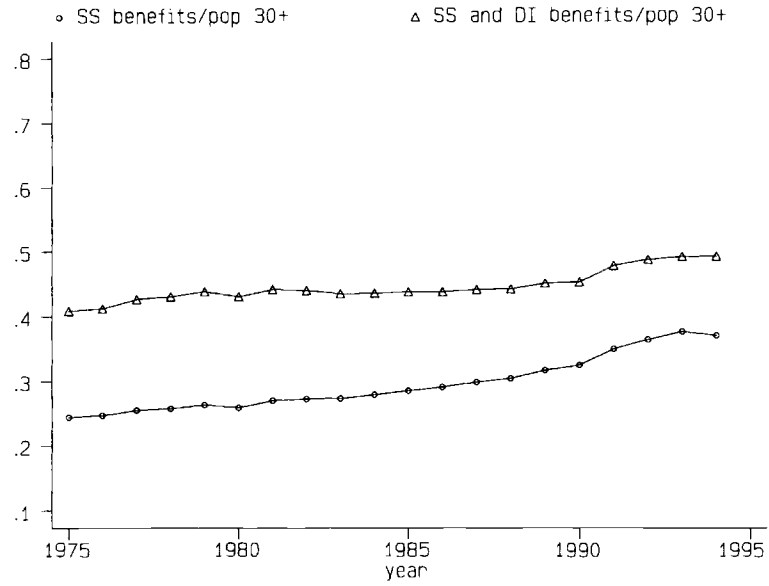


**Fig. 5.7 Social security and disability insurance benefit recipients, age 30 and over**

in the labor force participation rate observed for older women in recent years is less sharp than that for men because of a more marked increase over time in participation in the labor force among younger cohorts.[5]

In order to explore possible correlations between the labor market evidence and the developments in the social security program, a number of graphs are presented that document the increasing generosity of the social security system over time.

A first graph looks at the share of the population over age thirty receiving benefits (fig. 5.7).[6] These are distinguished in two time series: the first series shows the share of old age social security benefits (inclusive of early retirement benefits) and benefits to survivors paid to the population in the age group over

5. There is a noticeable jump of all the series in fig. 5.6 above (and also in fig. 5.5 above, although the jump is less sharp) in the year 1977. This is due to a change in the definition of the labor force occurring in that year, which is described in more detail in app. A.

6. The choice of this wide age group is determined by the availability of data on disability insurance benefits recipients. In fact, disability insurance benefits are not distinguished by age for every social security fund. It is possible to infer from INPS data (a subset of the social security program, mainly excluding the public sector) that not many disability insurance benefits are paid out before age thirty, hence making this age the natural cutoff point. Alternatively, I could have shown, for the INPS fund alone, the share of disability insurance recipients age fifty over the population age fifty; however, this provides a misleading picture as in some years there was a disproportionate number of disability insurance benefits paid out to those self-employed in agriculture.

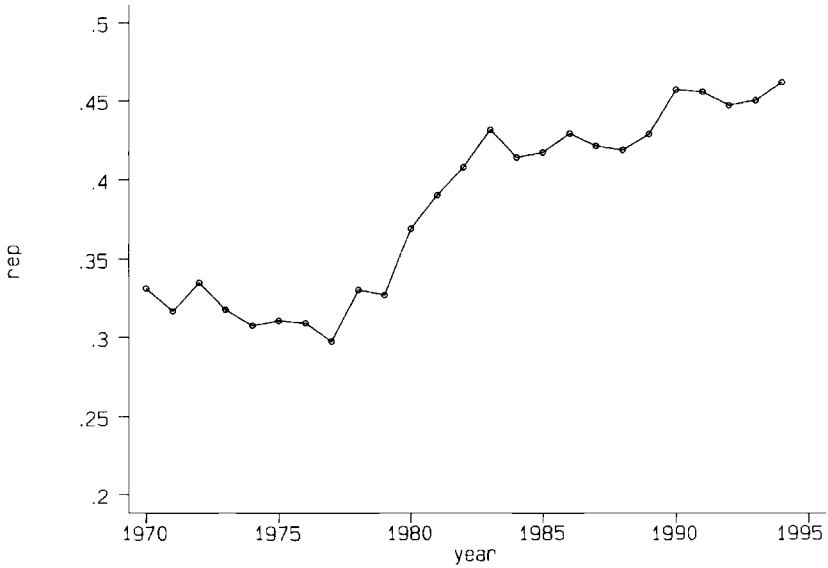


**Fig. 5.8 Social security replacement rate over time, FPLD (private-sector employees)**

thirty; the second series is based on the share of old age social security benefits, survivor benefits, and disability insurance benefits paid to the population of the same age group. It should be pointed out straight away that, in this graph, although the legend reads *benefit recipients,* it is actually the number of benefits that is recorded, as the number of recipients is not generally available. The two figures may differ significantly as each person may receive more than one type of benefit.[7] Both lines increase sharply from 1960 up to the first half of the 1970s, following a more moderate trend thereafter. What is striking is the incidence of disability insurance benefits in this group of the population and how this feature evolves over time. However, the two series tend to converge for most recent years as screening for disability insurance benefits eligibility gets tighter; for example, in 1993, roughly 14 percent of disability insurance benefits were paid out to this age group.[8]

Figure 5.8 shows the change in generosity over time by plotting the aggregate replacement rate (for the private-sector employees fund only). This is

7. For example, some people may claim a survivor benefit and an old age pension. Unfortunately, I could not distinguish between males and females because of lack of data.

8. In sec. 5.2 below, I explain how disability insurance benefits played the role of unemployment/poverty safety net until 1984, when a law was passed by Parliament greatly limiting eligibility and increasing the frequency and quality of screening. To get a general picture, it could be added that, in 1993, disability insurance benefits paid by the INPS administration (i.e., excluding the public sector) covered approximately 7 percent of the resident population.

available for years since 1970, and it is much lower than the "theoretical" replacement rate (roughly 80 percent) because it is obtained as the average benefit level (all types of benefits) over the average of earnings computed on the basis of the payments made to the Social Security Administration. There is a clear pattern of increase over the last few decades, with a huge jump between 1980 and 1985.

### 5.1.2 Labor Market Behavior in 1995

In order to explore more recent facts about the labor market and to analyze patterns of labor force attachment and benefit receipt over the life cycle, it may be useful to turn to micro evidence. I use the Bank of Italy Survey (SHIW), which is a nationally representative survey of Italian households based on questions about consumption, saving, demographic structure, and labor supply asked of each member of the household (see app. A). The responses given by each adult member of the household concern current labor supply behavior as well as some retrospective information on employment. Unfortunately, the whole work history of each worker cannot be reconstructed as there are no questions about spells of unemployment or previous detachments from the labor force. I exploit the data both in its cross-sectional component and in its panel component for the years 1989, 1991, and 1993.[9] For the graphs contained in this section, cross-sectional data are better suited: I decided to work with the three cross sections, rather than just use the 1993 one, as the year 1993 is considered to have been affected by a brief, yet sharp, recession that could provide misleading results. The panel dimension is used to construct the hazard rate out of the labor force, to be discussed in section 5.3 below.

The age pattern of participation for men and women is given in figure 5.9. There is a striking difference between the two curves. They both peter out after age sixty, but, while for men we observe a participation rate close to unity at age forty-five, which runs down to 0.44 by age sixty (normal retirement age under the pre-1992 legislation), women have a participation rate close to 0.5 at age forty-five, which decreases steadily afterward. The most precipitous drop for males seems to occur between age fifty-five and age sixty-two: early retirement seems a natural explanation of this finding.

Figure 5.10 shows how men allocate their time among different activities as they age. There are four categories of activity: employment, unemployment, disability, and retirement. While disability insurance characterizes a nonnegligible fraction of men at all ages, there is a downward trend in the numbers of the employed population that exactly parallels the labor force attachment pro-

9. I also have social security data (INPS archive) in panel form over twenty years; these are also described in app. A. However, this latter data set covers only private-sector employees, and it is an unbalanced panel: in order to provide a general description of the labor market, I therefore opted for the Bank of Italy data. This also allowed me to present some interesting comparisons between private- and public-sector employees pursued further in app. B.

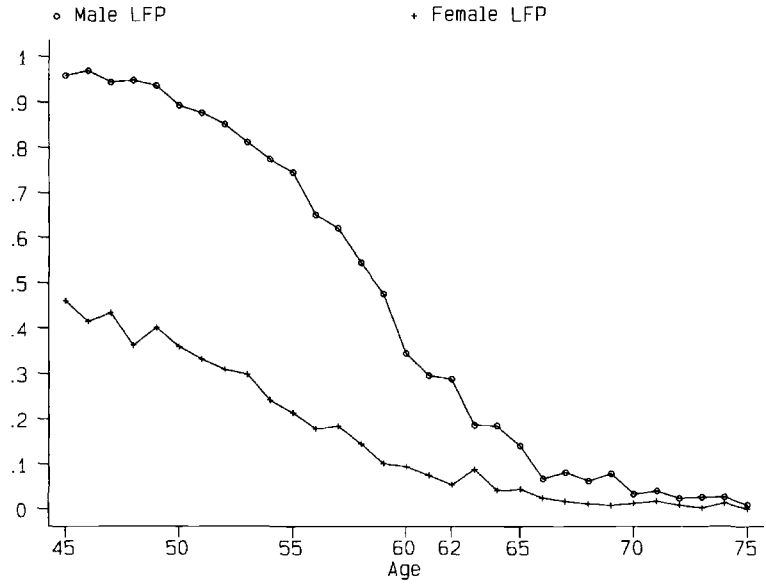


**Fig. 5.9 Participation rates by age and sex**

file.[10] The age pattern of the share of the retired is most striking: retirement absorbs a huge share of men in a relatively short time, starting with approximately 1 percent at age fifty and reaching 70 percent at age sixty-six.[11] Figure 5.11 shows the results of the same split for women: the underlying trends are very different from those observed for men: while the share of employed women starts low and declines steadily over time, the share of retired women grows dramatically over time and reaches a peak at age sixty-five. For example, at age fifty, a negligible fraction has retired, while, at age sixty-five, roughly 50 percent have quit work, mainly reflecting different statutory retirement ages for men and for women. Disability insurance is claimed by a nonnegligible

10. There is a discrepancy between the line representing disability insurance recipients derived from this data source and the one derived from official statistics, shown in fig. 5.7 above. First, it should be noticed that fig. 5.7 refers to the share of the population of over age thirty (both males and females) receiving disability insurance benefits. Furthermore, aggregate data count the number of benefits, not the number of recipients. I have attempted the same calculation using micro data in producing fig. 5.10, however, not every income earner reports her or his second or third pension, and respondents do not always report receiving a disability insurance benefit if they work. Finally, as I explain in app. A, the Bank of Italy data, a very rich data source, tends to oversample wealthy households slightly, probably underestimating the number of disability insurance recipients. In any case, if I cumulate the share of disability insurance benefit recipients from age thirty on, I obtain approximately the same result.

11. For the "retired" curve, I consider only individuals receiving an old age social security benefit or an early retirement social security benefit, excluding all other social security benefits, e.g., the "basic pension" (an income maintenance benefit).

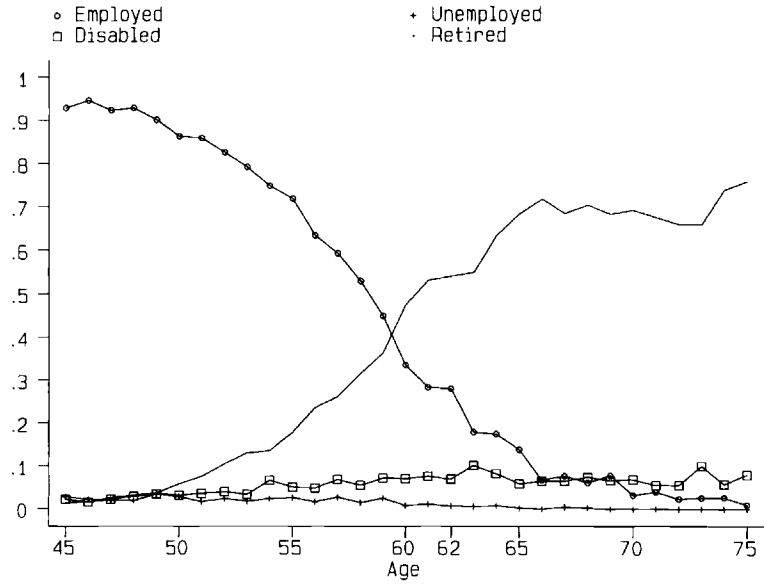


**Fig. 5.10 Distribution of activities of men by age**

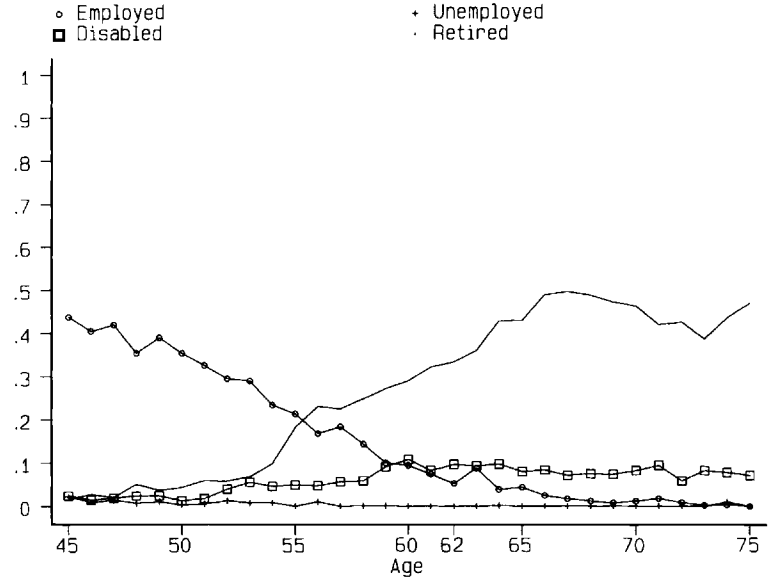


**Fig. 5.11 Distribution of activities of women by age**

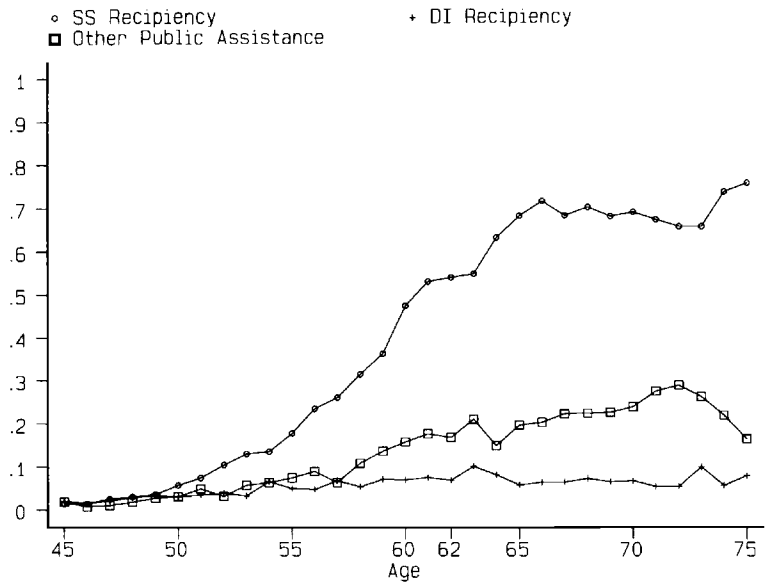


**Fig. 5.12 Public income recipiency for men**

fraction of women, starting at age fifty and continuing until advanced old age. It should be stressed that all graphs are much below the value of 100 percent as many women are not engaged in paid working activities during the life cycle.[12]

### 5.1.3 Income Sources of Older Persons

Figure 5.12 plots social security and disability insurance receipt for men. It shows a marked increase, over the life cycle, of social security benefits and, to a lesser extent, of other public assistance benefits. In figure 5.13, this aspect is further investigated by looking at the percentage of men and women receiving a social security benefit.[13] This share grows rapidly after age fifty-five: between the ages fifty and fifty-nine, the percentage is higher for women (who are more likely to benefit from a survivor pension); after that age interval, there is a stable gender gap. The growing importance of social security over the life cycle is confirmed by figure 5.14, which shows that the share of family income coming from earnings declines rapidly after age fifty-five, that the share of income from capital remains relatively stable, and that there is a corresponding increase in social security benefits and public transfers (see n. 13).

12. Because I am excluding non-work-related social security benefits (as explained in n. 11 above), the share of women receiving some benefits would be much higher (approximately 90 percent) at later ages, when women become more likely to receive a survivor benefit or a basic pension.

13. Any sort of social security benefit, even if it is not the main source of income.

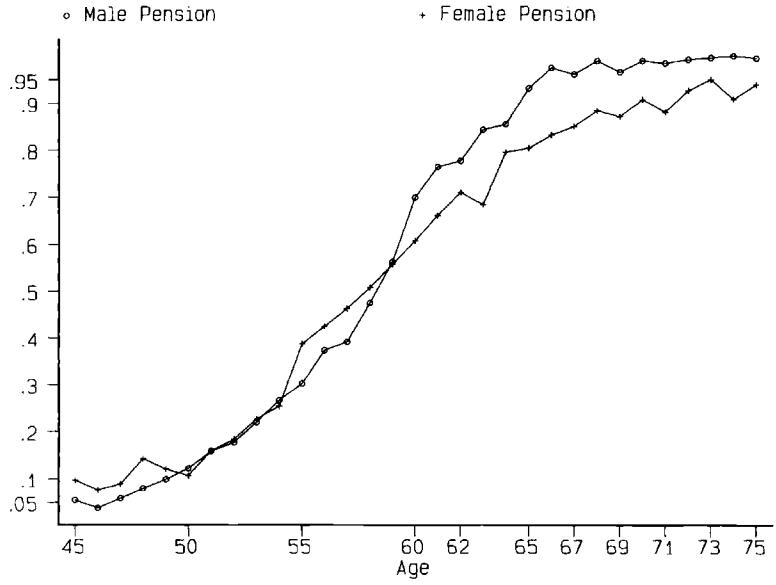


**Fig. 5.13 Share receiving pension**

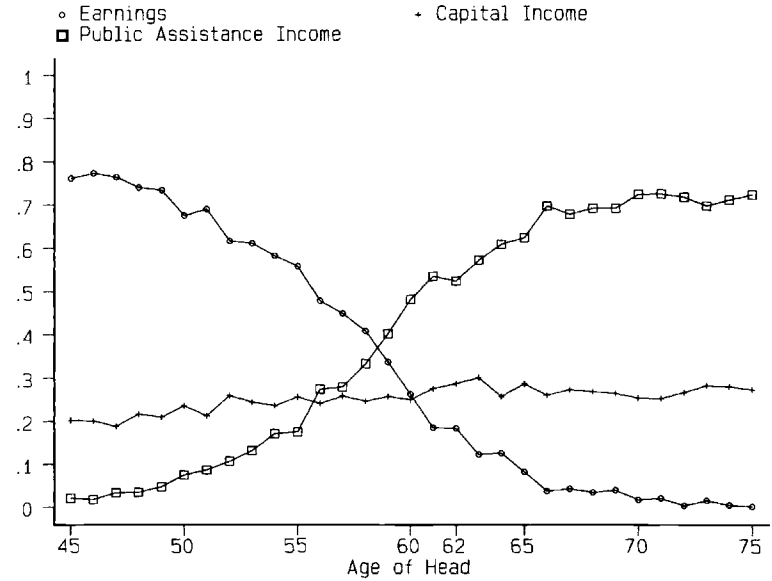


**Fig. 5.14 Distribution of family income by source**

## 5.2 Key Features of the Italian Social Security System

### 5.2.1 History of the Social Security System in Italy

Old age insurance originated in Italy in the public sector in the nineteenth century for employees in the army, while private-sector blue-collar workers had their first (fully funded and nonmandatory) fund set up in 1889 (for a complete and detailed history of the Italian social security system, see Castellino 1976). By 1960, the National Institute for Social Security (Istituto Nazionale per la Previdenza Sociale, or INPS) was collecting mandatory social security payroll taxes from a large share of private-sector employees (under the heading Private-Sector Employees Fund, FPLD) as well as from an increasing number of the self-employed (workers in agriculture and commerce). Hence, INPS, and particularly FPLD, established itself as the main social security fund administration in the country, followed by the public-sector employees' fund.[14] However, many other groups of workers kept (or set up) their own independent funds, each group taking the view that its fund should have its own special conditions. Hence, it was at a very early stage that the social security program took the form of a patchwork of independent schemes, typically characterized by different rules concerning payroll taxes, benefit payout, and eligibility requirements.

While a pay-as-you-go (PAYGO) financing method had been gradually introduced since the 1950s, it was only in 1969 that the financial distress of the funded schemes caused by the events of World War II and the desire to set up a modern welfare state finally led to a definite move toward a PAYGO system for the major funds. Almost simultaneously, three further important changes were introduced for the private-sector employees' fund: (1) benefit computation became of a "final salary" type (average of the last five years of employment, as explained below) in place of the previous career average measure; (2) a means-tested income maintenance scheme was introduced for each individual over age sixty-five not covered by old age insurance (the so-called *pensione sociale*); (3) social security benefits became automatically linked to a price-growth index. Finally, the early retirement option was introduced for private-sector employees: this would allow a retiree to claim old age benefits conditional on having "completed" thirty-five years of social security tax payments, but with no constraint on age. It should be added that the early retirement option had been available to government employees since 1956: throughout the 1960s and 1970s, it was made even more generous for this group as men could claim the early retirement benefit having made only twenty years' social security tax payments while married women needed to contribute to the public-sector employees fund for as few as fifteen years. The public sector also re-

14. I am not describing the self-employed INPS fund, although this had an interesting evolution and is becoming increasingly important.

ceived preferential treatment in another relevant respect: benefit computation was based on a "pure final salary" in place of an average of the last five years' earnings. More recently (1976), social security benefits for private-sector employees were automatically linked to real-wage growth as well as price growth.

These facts show that, after World War II, acts of Parliament enacted piecemeal changes that went almost invariably in the direction of increasing generosity, with no concern about the long-term effects of these amendments. The Italian experience seems even more peculiar considering that, for forty years, this trend continued uninterrupted and then two major reforms were passed by Parliament within a period of three years, both aimed at improving the social security budget—the first in 1992 (referred to as the Amato reform), the second in 1995 (known as the Dini reform).

### 5.2.2 Current Features of the Social Security System

In this section I describe in detail the legislation governing the social security system in 1992. In fact, the evidence presented in section 5.1 concerns the features of the social security system before the reforms. I therefore provide only a brief overview of the system after the reforms.

The Italian social security system relies on three "pillars": (i) mandatory old age insurance, also providing insurance to survivors and disability benefits; (ii) pension funds; and (iii) private annuities. The first covers the majority of the working population (almost all private-sector employees) and is financed by a PAYGO method,[15] while the remaining forms of insurance provide additional coverage outside (or, in a few cases, as substitutes for) the public program. Pension funds are generally fully funded and nonmandatory (unless they substitute for the public program, as happens for employees in some banks and financial institutions).

In this study, I consider the social security system to be a mandatory public insurance program collecting payroll taxes from both employers and employees to provide old age benefits, survivor benefits, and disability insurance to its members.[16] I disregard pension funds and private annuities as they play a negligible role. The social security program is based on a number of institutions administering public pensions. A vast majority of the population is insured with the INPS. This is itself responsible for a number of separate and independent funds, the most important of which is the FPLD. Although a description of the INPS-FPLD gives a fairly good idea of the system as a whole, it should be borne in mind that a wide variety of cases actually exist. Table 5.1

15. That is, an unfunded method of financing.

16. The Italian social security system has played a major role in providing a safety net for low-income households both explicitly (through special provisions that are part of the INPS administration, e.g., income maintenance provisions for the needy and very old) and implicitly (through disability benefits). Although these income maintenance provisions are not included in this study, they have certainly contributed to the inflation of the INPS budget and are relevant in explaining the aggregate data.

Table 5.1 **Number of Pensions and Number of Workers for Some Major Social Security Funds, 1993**

| | Pensions (thousand) | Workers (thousand) | Ratio |
|---|---|---|---|
| INPS, total | 14,814 | 16,345 | .91 |
| Private-sector employees, FPLD | 10,141 | 11,250 | .90 |
| Self-employed | 3,634 | 4,347 | .84 |
| Agriculture | 2,038 | 893 | 2.28 |
| Arts and crafts | 816 | 1,798 | .45 |
| Commerce | 780 | 1,655 | .47 |
| Other INPS | 314 | 748 | .42 |
| Public-sector employees | 2,171 | 3,776 | .57 |
| Others | 284 | 969 | .29 |

summarizes some of the main indicators for the private-sector employees' fund (INPS-FPLD), the public-sector employees' fund,[17] and the INPS-managed fund for the self-employed.

Table 5.1 shows clearly that INPS provides insurance to a large fraction of the working population; public-sector employees account for only 15 percent of total INPS workers and 20 percent of the INPS-FPLD group.

*Payroll Social Security Taxes*

The inflow of resources into the system comes from employers' and employees' contributions: when outlays exceed revenue, the deficit is financed by the central government, which has come under increasing pressure to pay for pensions. For example, it is estimated that the theoretical equilibrium payroll tax (i.e., the payroll tax that would balance the budget) was, in 1991, between 35 and 44 percent, according to whether full imputation is made for income maintenance benefits. This is much higher than the actual payroll tax (26.4 percent in 1991): the difference is an estimate of the tax levied on the entire population of income tax payers in order to finance pensions (INPS, *Le pensioni domani,* 1993).

The payroll tax is unevenly shared between employer and employee. In 1983, for INPS-FPLD, the total payroll tax was 24.51 percent of gross earnings, of which 7.15 percent fell on the employee. In 1995, this grew to 27.17 percent, of which 8.34 percent was paid by the worker. In contrast, social security taxes for public-sector employees and the self-employed have been lower, although gradually converging to the private-sector ones.[18] A further 7.41 per-

17. I am referring to the public-sector employees fund as one entity, but there are two major groups: Central Government Employees and Istituto Nazionale Previdenza e Assistenza Dipendenti Amministrazioni Pubbliche (other civil servants [e.g., local government employees], teachers in primary education, etc.); this latter group was formerly known as the Treasury Fund.

18. There is no split between what is paid for old age benefits and for the other benefits. It should be noted that, for public-sector employees, various rules apply. In particular, for government employees, no explicit social security tax is paid by the employer.

cent should be added in the private sector for a "severance-pay fund," referred to as TFR. This is retained by the employer and builds up in a fund, directly managed by the employer, that provides a lump-sum benefit at the time of retirement. I discuss this provision in more detail below; however, it should be noted that an additional 0.8 percent tax is related to the TFR provision in a complex fashion. This additional 0.8 percent social security tax is paid by the employer on a monthly basis, but it does not accrue to the severance pay fund (a fraction of this tax goes to the National Health Service and a fraction to the social security fund). At the end of the year, the employer takes from his employees' TFR fund a rebate equivalent to the additional tax he paid, which is therefore effectively paid by the employees.

The tax base is not capped: this is a point long debated in the literature, as social security benefits are capped. There is a limit to earnings under which the social security tax due stays constant: in 1995, social security tax had to be paid on at least L 720,000 of yearly earnings (which is approximately 3 percent of mean individual earnings of that year and is below the value of the bottom 5 percent of the distribution of earnings). This limit is known as the *minimum amount subject to social security tax.*

*Eligibility*

Eligibility requirements are met when a man reaches age sixty (a woman fifty-five) and has contributed for at least fifteen years.[19] However, the early retirement option often makes the age requirement irrelevant as a worker in the private sector can claim early retirement benefits at any age if thirty-five years' tax payments have been completed. For a male public-sector employee, twenty years' tax payments are required (fifteen years for a married woman). (However, it should be added that, in the pre-1995 legislation, the normal retirement age for the public sector is sixty-five for both men and women [for full details, see table 5.2].) In general, a year of work is completed if fifty-two weeks of social security tax payments have been recorded by the Social Security Administration. However, since 1984, only yearly earnings above a threshold (e.g., L 13 million in 1995, approximately 37 percent of mean earnings) count as full: lower earnings lead to a proportional reduction in the recorded number of weeks.[20] This limit is known as the *minimum eligibility level.* A relevant aspect in discussing incentives to labor supply provided by the social security program is the retirement earnings test. In fact, in Italy, workers can

19. Retirement is not mandatory, but individuals who intend to work beyond the normal retirement age are not protected by law and could be fired. However, before the 1992 reform, a worker could postpone retirement (up to age sixty-five in the private sector) if this would allow him to complete forty years' tax payments. The 1992 reform encouraged workers to postpone retirement (until age sixty-five) even if forty years' contributions had been completed by providing a slightly higher return in the benefit computation formula. Claiming and receiving a pension are often separate events. The delays in paying different types of benefits vary: in most cases, benefits are received one month later than the date of the claim (the latter usually coincides with the worker's birthday).

20. Allowance is made for special cases: e.g., maternity leave.

Table 5.2 **Eligibility Criteria for Retirement and Early Retirement**

| | Private Sector | | Public Sector | | Self-Employed | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| Pre-1992 regime: | | | | | | |
| Old age benefit (age) | 60 | 55 | 65 | 65 | 65 | 60 |
| Early retirement (years of tax payments) | 35 | 35 | 20 | 15 | 35 | 35 |
| Post-1992 regime: | | | | | | |
| Old age benefit (age) | 65 | 60 | 65 | 65 | 65 | 60 |
| Early retirement (years of tax payments) | 35 | 35 | 35 | 35 | 35 | 35 |
| Post-1995 regime: | | | | | | |
| Old age benefit (age) | 57–65 | 57–65 | 57–65 | 57–65 | 57–65 | 57–65 |

draw a pension and earn income at the same time. However, there are earnings cutoffs that make this choice less attractive. The earnings cutoffs have changed over time and have been heavily affected by the reforms. I focus attention solely on the rules applying to private-sector employees prior to 1992: Old age social security benefits could be claimed while receiving earnings. In this case, benefits could be claimed only within the amount given by the minimum benefit plus half the difference between the actual benefit and the minimum benefit. Early retirement benefits could not be claimed along with earnings.

From this brief description of the eligibility criteria, there emerges a picture of a social security system that is actuarially unfair and enacts, willingly or unwillingly, redistribution of resources across the population. In particular, there is an incentive to early retirement as no actuarial penalty applies to early retirees. For example, a private-sector employee who started work at age sixteen could retire at age fifty-one, while the same worker could retire at age thirty-six in the public sector. This might explain why detachment from the labor force increases significantly over time in the age group fifty to sixty as well (see fig. 5.5 above).

*Benefit Computation*

For a private-sector employee (INPS-FPLD), benefits are computed by first averaging the last five years' earnings (prior to the retirement age): this gives the level of "pensionable earnings." Actual earnings of each year are taken before tax and converted to real amounts by means of a consumer price index.[21] Pensionable earnings are converted to social security benefits by applying a 2 percent factor (referred to as the *rate of return*) for each year of social security

21. This is an index provided by the Central Statistical Office (ISTAT) in which weights applied to prices are taken from a large sample of the Italian population on the basis of a sampling frame of blue- and white-collar employees (Indice dei Prezzi al Consumo per le Famiglie di Operai e Impiegati).

tax payment up to a maximum of forty years. Hence, a worker can get at most 80 percent of his pensionable earnings. If retirement is postponed, additional years of work beyond a total of forty do not count for benefit computation; however, they are included in pensionable earnings as they replace earnings of earlier years. The system is highly progressive both because of earnings caps and because of old age minimum benefit levels. Earnings entering the benefit computation are capped. Between 1969 and 1988, pensionable earnings would be set against a given limit, and the amount in excess of that limit would not contribute to the benefit formula. For example, in 1985, pensionable earnings in excess of L 32 million (1.6 times the average earnings for that year) would not be included in benefit calculations. After 1988, the constraint was less stringent, as a lower "rate of return" was applied to pensionable earnings in excess of a given limit. In 1995, a 2 percent rate applied to the first L 57 million (again, 1.6 times the average earnings) and a 1.5 percent rate to pensionable earnings in excess of that figure but below L 76 million (2.2 times the mean earnings), and the returns fell to 1.25 percent for pensionable earnings between L 76 and L 95 million (2.7 times the mean earnings). Finally, the top earnings bracket attracted a 1 percent return.

The system is much more generous to low-income workers by providing a *minimum benefit,* that is, a "floor" benefit level.

It is worth recalling that public-sector employees have their benefit level based on final salary rather than average earnings over the last five years. For all funds, benefits increase at regular intervals with nominal wages, that is, consumer price growth plus real earnings growth. The former is measured by the consumer price index but is implemented in a slightly staggered fashion (e.g., if the social security benefit amounts to more than three times the "minimum benefit," indexing is based on 75 percent of the price change). Wage growth is measured by changes in real wages in both the private and the public sectors.[22]

*Minimum Benefit*

The minimum benefit is a relevant concept in the Italian social security system both because the number of retirees involved is nonnegligible and because the minimum benefit is often used as a benchmark against which to set incomes for other provisions. In practice, if the benefit formula gives a retiree a benefit level below a given threshold, the benefit itself is set in line with that threshold. Up to 1983, this provision could be applied to more than one pension for the same retiree, while it now affects only one pension for each retiree, leaving the other benefits at their computed level. This income transfer to low-income retirees is conditional on means testing: up to 1992, this test involved only the

22. Indexation to nominal wage started, for INPS-FPLD, in 1975: the legislation has changed several times in the last few decades, tending to extend this feature to more groups of the working population. The timing of indexation has also changed several times: during the 1970s, it was done quarterly.

claimant's income and excluded the income of the spouse. Hence, for example, in 1985, the means test had a cutoff at twice the minimum level (roughly L 4.7 million that year, which was 17 percent of mean household income). More recently, a similar limit applies to singles, but for married couples what matters is the sum of the incomes of both spouses, which must be below four times the minimum level (in 1995, approximately L 8 million, which was 18 percent of mean household income).

*Taxation*

While social security taxes are not subject to income taxes (as these are paid after the social security tax), social security benefits are taxed at current tax rates.

*Survivor Benefits*

While survivor benefits to widows were part of the insurance contract at a very early stage, it was only in 1977 that several household members were entitled to claim such benefits, eligibility extending from widows and children younger than age eighteen to include widowers and children older than age eighteen in full-time education. More recently, beneficiaries include (i) the surviving spouse, (ii) children younger than age twenty-one if in secondary school and younger than age twenty-six if attending college working toward a degree or of any age if disabled, and (iii), conditional on none of the above being alive, dependent parents or single dependent sisters and brothers. In order to claim the survivor benefit, the worker should have had a full five years' tax payments. Survivor benefits can also originate from the disability insurance benefit of the worker (described below). The actual benefit is a percentage of the old age benefit that the deceased worker would receive at that age—60 percent for the lone surviving spouse, 20 percent to each child if one of the spouses is alive, and 40 percent to each child if orphaned, up to a total amount not exceeding the initial old age benefit of the worker. Parents, brothers, and sisters receive, if eligible, 15 percent of the old age benefit each, up to grand total of 100 percent of the old age benefit itself. The Italian social security system does not envisage a dependent wife benefit: the only advantages to married couples are to those drawing minimum-level pensions (described above).

*Other Social Security Programs*

In recent years, the social security program has been under scrutiny, the financial distress within the system leading to calls for a reduction in both benefit levels and eligibility. This also focused the attention of policy makers on a global social security reform in order to achieve a much-needed realignment of the treatment of different groups of workers. This process started with two important changes brought about in 1984 and in 1989, the former relating to disability insurance provision and the latter trying to regulate those benefits aimed at the redistribution of income. One of the key elements in the debate

that took place at the time was the insistence on clearly distinguishing between benefits relating to an income maintenance program (implementing redistributive policies, which would therefore be financed by the entire population) and old age insurance benefits (which were more properly financed by the working population).

A typical income maintenance provision, in which the role of the central government predominated over that of the Social Security Administration, was the means-tested *basic pension* (*pensione sociale*) granted to individuals over age sixty-five (even if they had made no social security tax payments). To be eligible, a single person cannot have an income above the level of the basic pension itself (the basic pension in 1995 was L 4.6 million, 13 percent of mean earnings), while a couple cannot have an income above L 19 million in 1995 (54 percent of mean earnings). The benefit is granted with no penalty in the absence of other incomes, and it is awarded only partially if some resources are available within the income cutoff. Another interesting example is the unemployment benefit, paid in the form of an early retirement benefit (*prepensionamento*), granted to workers of firms in specific industries going through a recession. This benefit can be claimed by the worker five years earlier than the normal retirement age and could be regarded as a form of "involuntary" early retirement. However, not only does this apply only to a limited number of occupational sectors in the economy, but it is also becoming less frequent.

*Disability Insurance*

The most striking feature in this debate is the role of disability insurance, which is still part of the social security program. There are at present two possible disability insurance benefits: (i) the "disability insurance pension," provided under the legislation that applied up to 1984, and (ii) the "disability insurance provision" (*assegno di invalidità*), which can be claimed under the post-1984 legislation. The former was granted to workers who proved that they were physically unable to carry out their job (with their earnings ability reduced by two-thirds) and who had completed five years' tax payments. *Earnings ability* was, however, a rather loose concept, involving the doctor's judgment of the general welfare level of the claimant, not just his or her health quality. Disability insurance pensions were computed by following the general rules of eligibility and of benefit calculation and by computing pensionable earnings as the average of actual earnings prior to the date of the claim. After 1984, the existing disability insurance pensions were not terminated or modified, except in cases in which the beneficiary had an income exceeding three times the minimum benefit. Starting in 1984, the disability insurance provision was the new form of disability insurance benefit; it was granted under the same eligibility requirements as before, with the important difference that *loss of earnings ability* was defined much more strictly. Furthermore, the disability insurance provision was temporary, and a new claim was required for renewal

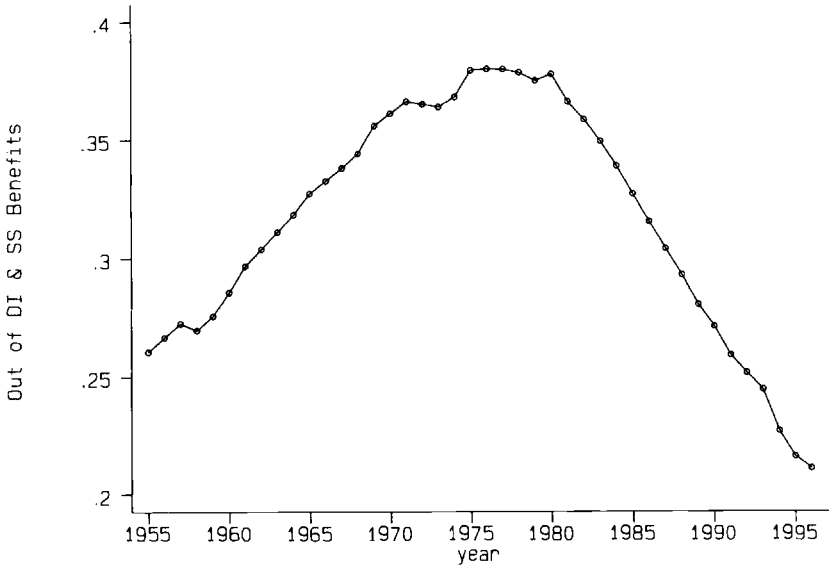


**Fig. 5.15 Share of disability insurance benefit receipts, FPLD (private-sector employees)**

every three years, which entailed new medical examinations. Screening of the health status of disability insurance recipients is now carried out randomly. The disability insurance provision is to be brought in line with the minimum benefit whenever the calculated benefit is below that level.

This brief description of the disability insurance benefit and its evolution over time highlights the strong incentive provided to claim disability insurance in order to achieve early retirement in those cases where the early retirement option was not available. However, the 1984 law had a major effect in reversing this trend: figure 5.15 shows that the share of disability insurance benefits over total benefits peaked in the years 1975–80 and declined sharply thereafter. In figure 5.16 the same pattern emerges from the ratio of disability insurance benefits to insured workers: by relating disability insurance benefits to the working population (insured with INPS-FPLD), it is possible to appreciate how the steepest decline came in 1987, when the new disability insurance legislation of 1984 had its full effect.[23] More interestingly, disability insurance benefits over total benefits dropped dramatically for the age group fifty to fifty-nine, the age group immediately preceding normal retirement age (fig. 5.17).

23. This ratio can be computed only since 1975. Therefore, in fig. 5.16, I have also shown again the ratio of DI benefits over total benefits for this subperiod (provided in fig. 5.15 for a longer spell) in order to draw a comparison.

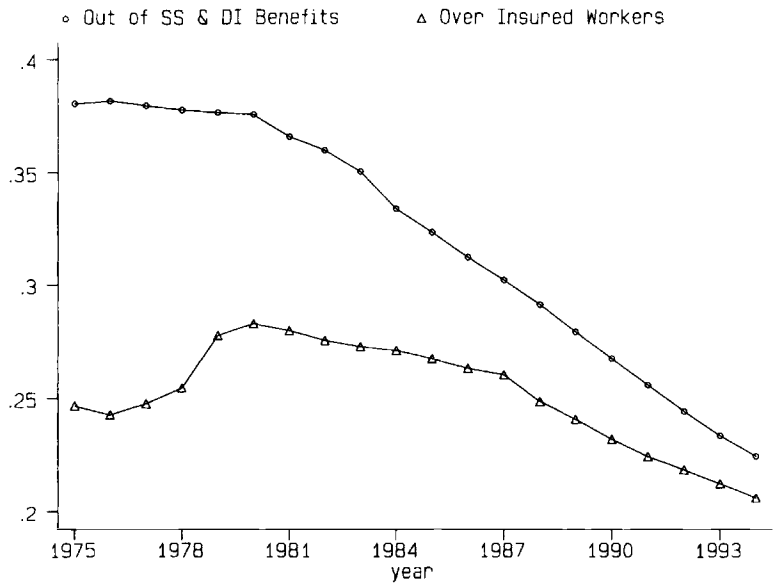


**Fig. 5.16 Share of disability insurance benefit receipts, FPLD (private-sector employees)**

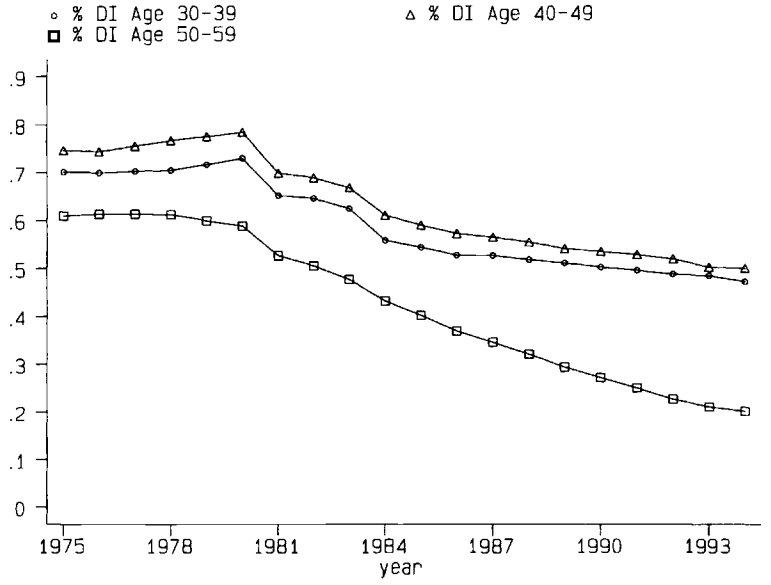


**Fig. 5.17 Share of disability insurance benefit receipts as a fraction of total social security and disability insurance benefits, FPLD (private-sector employees)**

*The Severance Pay Fund, TFR*

This provision applies to both private- and public-sector employees. In the private sector, a nonnegligible fraction of annual earnings (7.41 percent) is earmarked by employers for an end-of-job one-time payment. This money does not contribute to any pension fund but is directly managed by the firm, which uses it as internal funds. This appears as another key feature of the system in analyzing the incentives of social security with regard to retirement: the prospect of cashing in a lump sum at retirement (which would otherwise earn a low rate of interest) may induce a worker to leave the labor force earlier than the normal retirement age.

The TFR was originally set up in the private sector and was regarded by workers as a form of unemployment benefit; firms encouraged the growth of this fund in order both to reduce workers' mobility and to create an extra source of internal financing (Di Vezza 1990). The legislation concerning the lump-sum benefit computation differs from sector to sector and, prior to 1982, from occupation to occupation within the private sector. In particular, prior to 1982, the lump sum would, for the vast majority of private-sector employees, correspond to a share of 8.33 percent (i.e., one-twelfth) of the final wage adjusted according to the number of years in employment with the same firm. Hence, the fund would effectively grow at the wage-growth rate for each year up to 1982, and each year the employer would retain 8.33 percent of the gross wage of his employees. After 1982, for all employees in the private sector, the fund built up each year was capitalized at a rate given by the sum of two components: a fixed 1.5 percent plus 75 percent of the growth in prices recorded in the month of December of the previous year. In periods of high inflation, this growth rate would be below the price-growth rate and much below nominal wage growth. For this reason, it is often argued that workers would be better off if they could invest that money with a financial institution. While 7.41 percent of gross earnings is retained by the employer for the TFR fund in the manner described above, a further 0.8 percent of the worker's gross earnings is paid by the employer to the INPS administration, which does not contribute to the employee's TFR.[24] The employer collects a full rebate on this additional payroll tax by reducing the TFR of his employees for an equivalent amount at the end of the year. Hence, this additional tax is effectively paid by the employee with no corresponding TFR benefit.

While the TFR payroll tax is not subject to any income tax, the worker pays separate income tax on the TFR lump-sum benefit at reduced tax rates.[25]

24. I have already described under the heading *Social Security Tax* how this additional payroll tax mainly goes to the National Health Service to provide health insurance for retirees.

25. Income tax is paid on the TFR only above a given minimum level. This tax-exempt level changes over time.

*Old Age Insurance through Private Schemes*

Saving through pension funds is available for only a limited number of individuals in specific occupational sectors and is almost invariably a voluntary additional supplement to the basic pension. More recently, the need to alleviate part of the burden of pension provision that falls on social security has shifted attention to a system in which, in addition to the public pension scheme, there should exist a non-own-managed pension fund and possibly a private old age insurance contract. The recent reforms intend to channel the enforced "low-return" savings of the TFR into pension funds for newly hired employees, provided that the firm/industry and the fund itself abide by a number of requirements. It is still being debated whether this change will increase or decrease workers' welfare, the debate hinging on a number of factors (including the behavior of firms in setting wages).

### 5.2.3 The Recent Reforms

Some of the issues raised in the description given above of the social security system have been tackled by the recent reforms. The first reform (known as the Amato reform) was passed by Parliament in 1992. Once phased in, it reduced pension outlays and ironed out major differences between various sectors and occupations. However, this left the rules governing the early retirement provision almost untouched and, according to many, did not produce the much-needed savings in the social security budget. Hence, the second reform (known as the Dini reform) of 1995 totally changed some of the basic rules for granting benefits to future retirees and attempted to harmonize the actuarial rates of return for early and late retirees. For the purpose of this study, I focus on the 1995 reform, passing over the 1992 reform and the transitional phase between the two reforms. This choice is motivated by my intention of highlighting the features of long-term equilibria. However, as shown in appendix B, the Amato reform had a major effect on retirement behavior as it was the first signal of a coherent redesigning of the social security system. In table 5.3, some of the key features of the three regimes are summarized.

The post-1995 reform adopts a "contribution-based" method of benefit calculation. It should be stressed that this applies only to benefit computation, while financing is still on a PAYGO basis. The social security benefit is the annuity equivalent to the present value (at retirement) of past payroll taxes, updated by means of a five-year moving average of the nominal GDP growth rate. The relevant tax rate is 33 percent, and an age-related actuarial adjustment factor is applied to the resulting figure.[26] As for the early retirement provision, the 1992 reform ironed out differences between programs (contributions had to be paid for at least thirty-five years, irrespective of type of occupation, sector, etc.), with no adjustment of retirement benefits, while the 1995 reform

26. Hence, the benefit is (33%) × (adjustment factor) × (present value of social security taxes).

**Table 5.3** **Some Key Features of the Pre-1992 Regime, the Post-1992 Regime, and the Post-1995 Regime (having completed the transition)**

| | Pre-1992 | Post-1992 | Post-1995 |
|---|---|---|---|
| Normal retirement age | 60 (men), 55 (women) | 65 (men), 60 (women) | 57–65 (men), 57–65 (women) |
| Transitional period | | 2032 | 2035 |
| Pensionable earnings | Average of final five years' real earnings (converted to real values through price index) | Career average earnings (converted to real values through price index + 1%) | Not applicable |
| Pension benefit | 2% (pensionable earnings) × ($t$), where $t$ is the number of years in the system (at most 40 years) | 2% (pensionable earnings) × ($t$), where $t$ is the number of years in the system (at most 40 years) | Annuity based on stock of Social Security payroll tax; past taxes converted to real values through nominal GDP growth rate |
| Indexation of pension | Cost of living plus real earnings growth | Cost of living | Cost of living |
| Pension to survivor | 60% to spouse, 20% to each child, 40% to each child (if no spouse) | Same | Same, but 70% to lone child + means test |
| Years of contributions for eligibility | 15 | 20 | 5 |
| Early retirement provision | Any age if 35 years' social security taxes | Any age if 35 years' social security taxes | Flexible within the window |

introduced a *window* of pensionable ages with actuarially based adjustment of pensions. These vary between age fifty-seven and age sixty-five with "actuarial adjustment factors" between 4.720 and 6.136 percent, respectively. Contribution requirements changed from the initial fifteen years to just five years after 1995. Payroll taxes jumped to 32.7 percent of gross earnings (to be split between the employer and the employee): the increase (from approximately 27 percent in 1995) was partly artificial as it was simply the result of relabeling under one social security tax rate several contribution items. The other provisions were basically unchanged, although, following the new eligibility requirements and benefit formula, the rules governing "minimum benefits" became tighter. The basic pension (*pensione sociale*) was replaced by a basic provision (*assegno sociale*), which was to be financed by the central government and was granted under stricter means testing.

Table 5.3 summarizes some of the key features of three regimes: the regime prevailing before the Amato reform (denoted as the pre-1992 regime), the one prevailing at the steady state after the Amato reform (the post-1992 regime), and the one prevailing after the Dini reform (the post-1995 regime). However, both reforms are characterized by a rather long transitional period affecting all the cohorts of post-1992 retirees: the provisions for the transitional periods involve a pro rata method of establishing eligibility and benefit computation criteria. This method allows the legislation of the old regime to apply to the share of years in employment under that regime, while the remaining share is regulated by the new rules. This meant that, in practice, during the transitional phase a retiree could have his eligibility and his social security benefits computed according to three different systems of legislation.[27]

### 5.2.4 The Hazard Rate out of the Labor Force

From the brief description of the social security system in place before 1993, it is clear that there were many loopholes that allowed workers to retire earlier than the normal retirement age. The early retirement option, which attracted no actuarial penalty, was the leading candidate in explaining some of the facts observed at the aggregate level. Other social security provisions have played a major role: for example, disability insurance benefits may have contributed to the increasing detachment of young workers from the labor force, owing to the poor screening methods implemented prior to 1984. However, a more detailed description of the dynamic nature of the retirement choice could be gained by looking at hazard rates. These are constructed by using the panel dimension of the Bank of Italy data over three years of interviews, 1989, 1991, and 1993.

27. For example, for someone retiring at age sixty-two in 1995, benefits in the transitional period were based on two regimes as follows. A weighted average of final salaries was computed by distinguishing two components: for a portion the average of the last five years' real earnings and for a portion the last six years' real earnings (plus a further six months). This average was the pensionable earnings measure. To this, a return of 2 percent per year (up to a maximum of forty years) was applied, provided that pensionable earnings were below a given limit; a reduced rate applied to earnings above the limit.

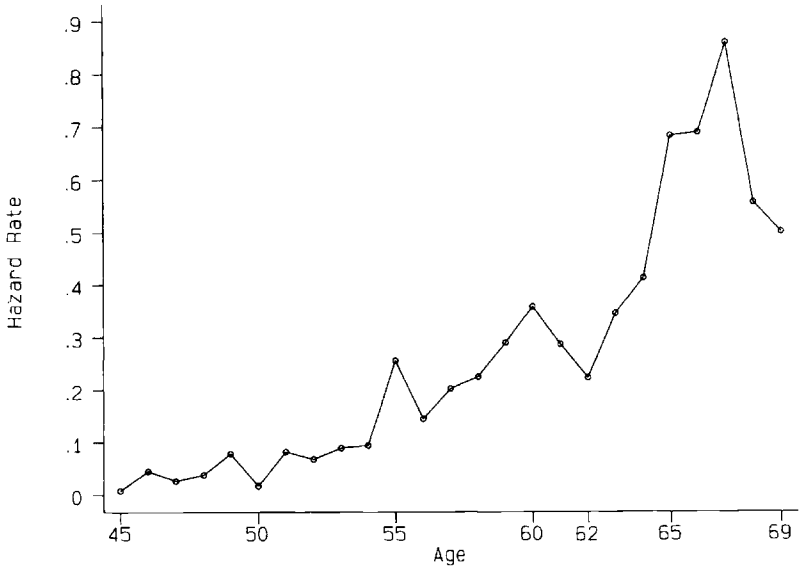


**Fig. 5.18 Hazard rate out of labor force for men**

Although the panel component is a small random sample (about three thousand households, roughly eight thousand earner units per year), it is useful in controlling for compositional effects (for a description of the data, see app. A).

The hazard rate out of the labor force for men is depicted in figure 5.18. There are several interesting spikes in this diagram: at ages sixty, fifty-five, and sixty-six. The first peak is easily explained by recalling that the normal retirement age prevailing before 1992 in the private sector was sixty for men. The spike occurring at age fifty-five is, however, of almost comparable size: this corresponds to recipients of either early retirement provisions or disability insurance benefits. The huge spike at age sixty-six is partly due to a small denominator and partly due to the fact that private-sector employees represent only a fraction of the labor force.[28] From figure 5.19, it is possible to gauge the different labor force attachment of women: the early spike at age fifty-three to fifty-five corresponds to the normal retirement age in the private sector. By age sixty-five, virtually all women in the sample are out of the labor force. However, a nonnegligible fraction gradually exits the labor force by age fifty-five.

In order to obtain a sharper description of the relation between institutional features and actual behavior, I have computed hazards for the two subsamples private- and public-sector employees. The limited sample size did not allow me to distinguish between males and females. There is a clear distinction between the behavior of the two groups. In figure 5.20, the hazard for

28. It should be recalled that, although retirement is not mandatory, there is virtually no possibility of working beyond age sixty-five.

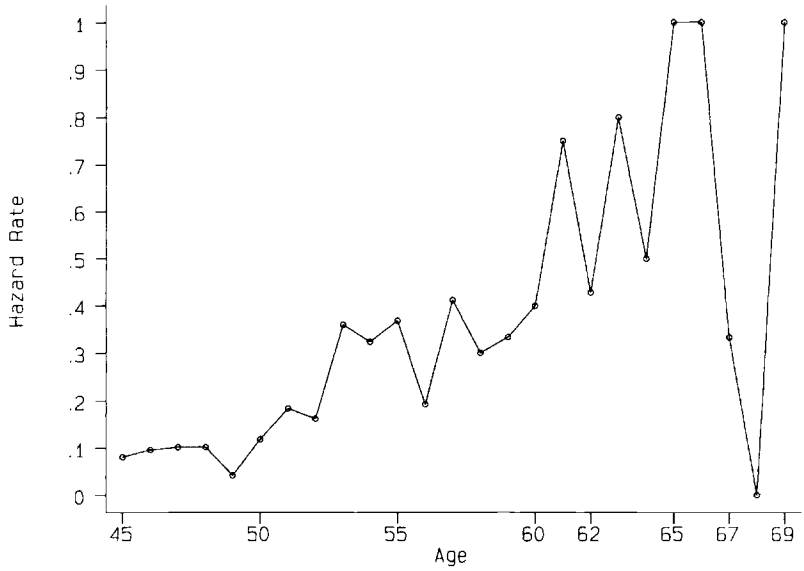


**Fig. 5.19 Hazard rate out of labor force for women**

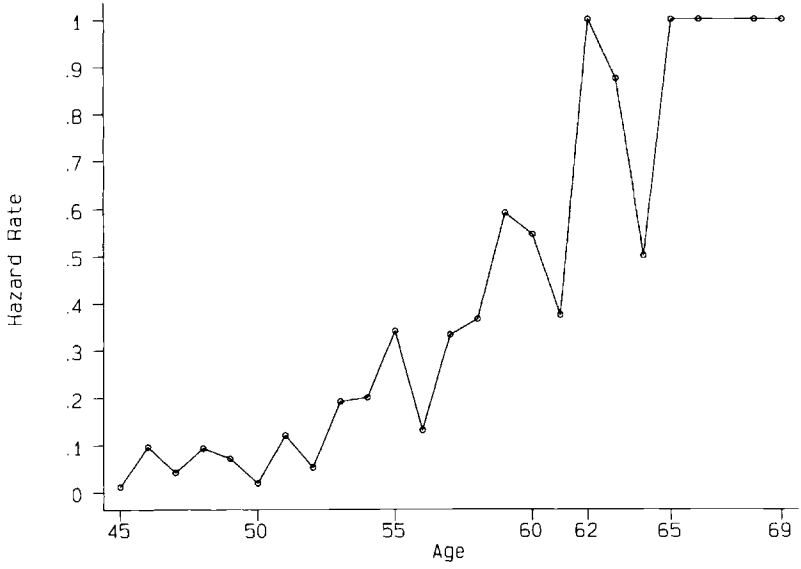


**Fig. 5.20 Hazard rate out of labor force, private-sector employees**

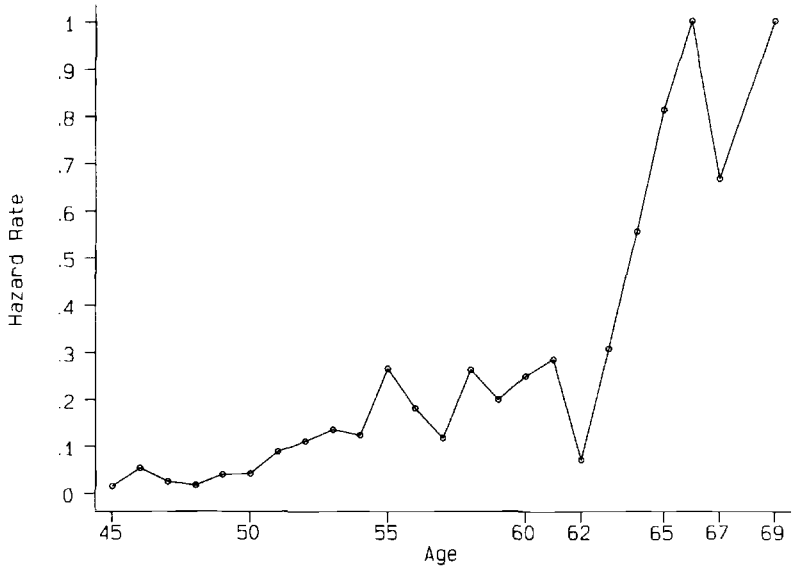


**Fig. 5.21 Hazard rate out of labor force, public-sector employees**

private-sector employees shows that there is a progressive detachment from the labor force at three crucial ages: fifty-five (presumably early retirement), sixty (normal retirement age), and sixty-three. Public-sector employees (fig. 5.21) also show an early peak at age fifty-five; however, many seem to carry on working until the normal retirement age (sixty-five).

These findings are confirmed by the frequency distribution of actual retirement ages presented in figures 5.22–5.24. The pictures are based on actual retirement ages of retirees who answer a retrospective question on which was the year of their retirement. I use four cross sections of the Bank of Italy Survey (see app. A) for the years 1989, 1991, 1993, and 1995 and compute the frequency distribution of the various retirement ages relative to the total number of retirees. These figures show that institutional features greatly affected retirement decisions: two peaks occur for men, at ages sixty and sixty-five, while for women there are three peaks, at ages fifty-five, sixty, and sixty-five.

## 5.3 Retirement Incentives

### 5.3.1 Simulation Model

The simulation model that I use to assess the incentives of social security on retirement computes net social security wealth for a married individual who was born in January 1930 and turned sixty-five in January 1995. The simulation is carried out for a "base case" and for a number of alternative cases in

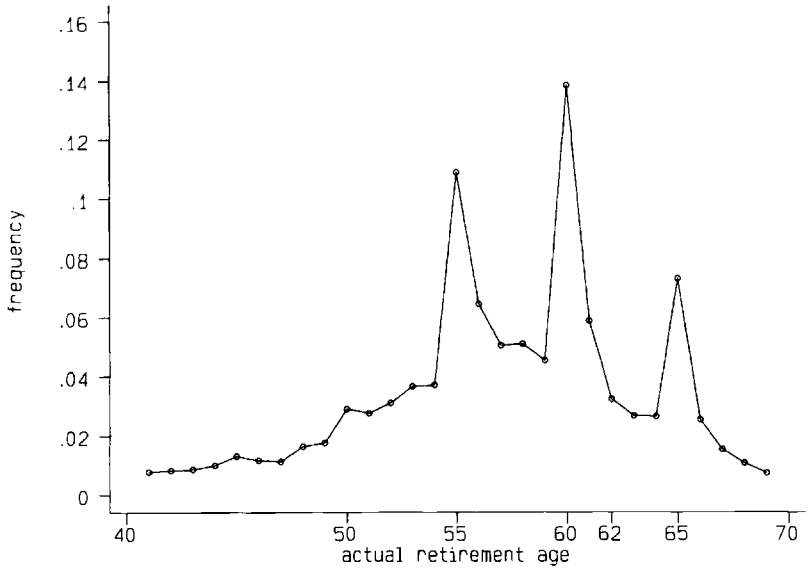


**Fig. 5.22 Retirement age, all**

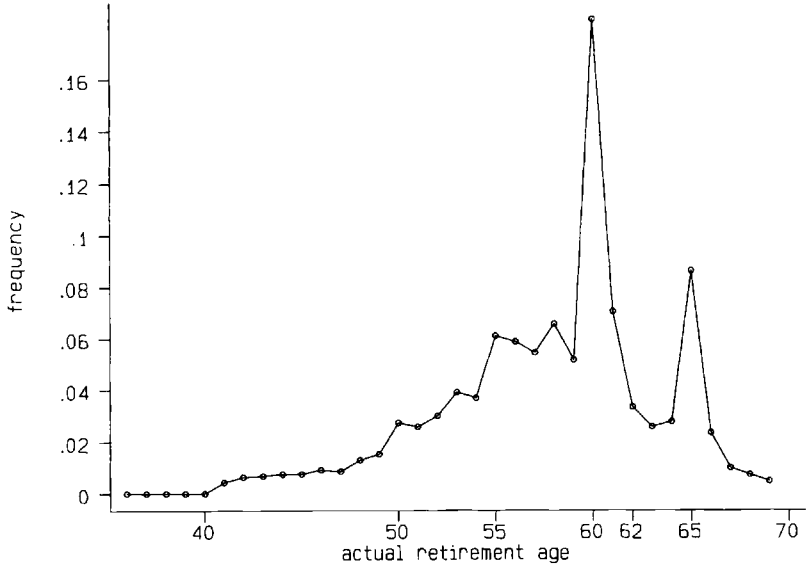


**Fig. 5.23 Retirement age for men**

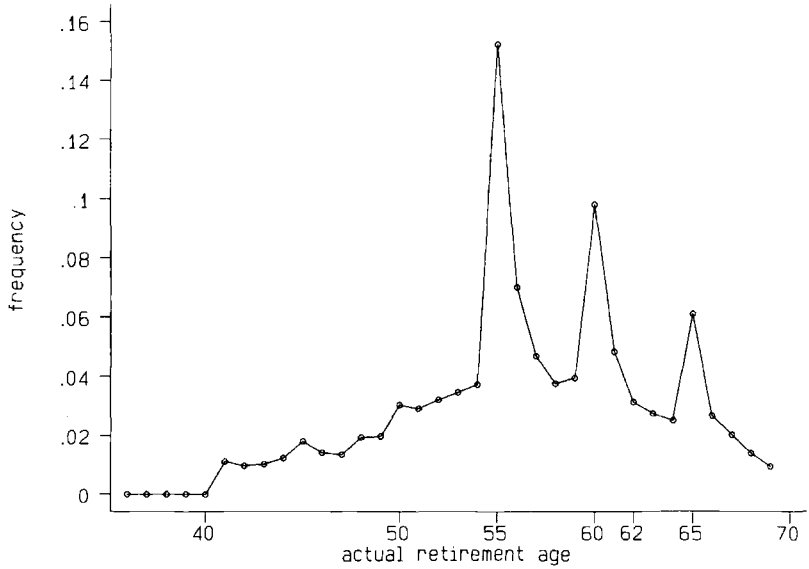


**Fig. 5.24 Retirement age for women**

which the sensitivity of the results to the parameter configuration is assessed. Retirement is analyzed between the ages of fifty-five and sixty-nine, and it is assumed that the median worker claims benefits under the pre-1992 legislation.[29] In fact, two major reforms of the Italian social security system took place within this period, one in 1992 and one in 1995, both characterized by a long transitional period, as described in section 5.2 above. On the one hand, the pre-1992 legislation seems the relevant regime on which to base the model in order to explain the features of the time-series data on labor force attachment; on the other hand, from 1993 on, individuals have experienced a gradual move toward a different system, one that is not described in the simulation. However, since the transitional phase, starting in 1993, has been characterized by a pro rata method of benefit computation, which only marginally affected individuals on the verge of retirement, the use of the pre-1992 legislation seems appropriate.[30]

The simulation computes retirement old age benefits, benefits to survivor (wife) if the worker has died, and net pension wealth for a married employee in the private sector (i.e., insured with INPS-FPLD). It should be stressed that,

29. An alternative case is presented in which the post-1995 legislation (i.e., after the most recent reform of the Italian social security system) is analyzed at the steady state.

30. The pro rata method corresponds to a benefit computation where the pre-1992 legislation applies to the fraction of years for which the worker has been contributing under the old regime and the post-1992 legislation applies to the remaining fraction. Hence, for our cohort, the effect of the new legislation is felt only for at most sixth-fortieths of the computational period. The 1995 reform also entails a similar pro rata method starting in 1996 for the transitional period: this would be even less relevant to the results of the base-case simulation.

as shown in section 5.2 above, the private-sector employees' fund, INPS-FPLD, is representative of the insured population in terms of both size and its historical relevance; however, the other funds (particularly the government employees' and INPS self-employed funds) are of nonnegligible size and of growing importance. I neglect disability insurance benefits since the worker becomes eligible to claim benefits in 1985, when the new screening rules were in place and disability insurance benefits could no longer be a substitute for early retirement, as was the case prior to 1984. I take into account the "severance pay fund" provision (TFR).

The basic assumption is that this individual worked continuously in a full-time job during his active life. In almost all cases, the worker is assumed to enter the labor force at age twenty, but, in one case, an incomplete earnings history is modeled.

It should be noted immediately that Italy has experienced wild variations in wage-growth and price-growth rates over the past decades: it seemed reasonable to assume a constant earnings growth rate, constant inflation rate, and tax brackets fixed in real terms throughout the simulation. I present only one case at the end of this section where I have adopted the actual earnings profile and actual tax brackets as a counterfactual. All these assumptions will be described in more detail below.

The simulation involves a number of steps:

*Computation of the Benefit Level at the Chosen Retirement Age*

This step requires computing a sort of "final salary" formula, which is obtained by averaging the last five years' gross earnings (inflation indexed)—this average is referred to as *pensionable earnings.* The retiree will receive in his first year of retirement 2 percent on pensionable earnings, for each year of contributions, up to a maximum of forty years' contributions. Cappings apply to the computation of pensionable earnings, and benefit levels that do not reach a given minimum threshold are brought up to that level (for details, see sec. 5.2 above and app. A). Net benefits are obtained by subtracting the income tax applying in the given year.

*Computation of Expected Social Security Wealth*

Net social security wealth is the present discounted value of future benefits up to age one hundred. This is the weighted sum of projected benefits, with weights given by male survival probability, and the individual discount rate. The pre-1992 legislation applies a "double indexation" of benefits that grow with both inflation and real wages.[31] I compute a stream of future benefits in nominal terms. This allows me to set the nominal benefits against the actual

31. As explained in sec. 5.2 above, inflation is measured by the consumer price index, while real wage growth should be measured by increases in contractual minimum wages. In all the simulations, I have adopted a 1.5 percent real wage growth and a 3.5 percent price growth. In the counterfactual, where actual earnings are used, I have adopted real earnings growth in the industrial sector up to 1995 and earnings growth equal to GDP growth afterward.

level of the minimum benefit in each year when considering the incentives for a low-earnings individual. In fact, although everything else grows with the economy, I use actual parameters as far as the social security features are concerned. In particular, the historical levels for capping of earnings, for the minimum benefit levels, and for the social security tax rate are adopted. This also makes it easier to compute after–income tax benefits on the basis of the nominal benefit. In fact, income taxes apply to pension income as well as to earnings.[32] Hence, all figures are then discounted back to age fifty-five at a nominal rate based on a 3 percent real discount rate plus a 3.5 percent inflation rate. The mortality prospect is given by the Italian sex/age-specific life tables ("Tavole di mortalita' per sesso e per eta', anno 1985," in ISTAT, *Annuario statistico italiano,* 1988). The life table is kept unchanged over the years; that is, the perspective is taken of a fifty-five-year-old forward-looking worker who plans for his retirement at each future age up to age sixty-nine. To compute net social security wealth, I take out, along with income taxes, the social security payroll tax that the individual would pay during any continued work. Hence, if the worker evaluates the possibility of postponing retirement for one year, his social security wealth is net of the present value (at age fifty-five) of the social security payroll tax that he and his employer would pay in that year.[33] Because income tax rates and social security tax rates (plus the severance pay fund tax rates) affect earnings and social security wealth calculation in a complex fashion, I provide below a sketch of the steps taken in the simulation to include these different tax rates.

*Pension Wealth to the Surviving Wife*

The Italian social security system provides a pension to survivors (in this simulation, the surviving wife), although no benefit is provided to the dependent wife.[34] Hence, a joint likelihood of the death of the worker and the survival of the wife is computed for each year beyond the chosen retirement age. In the base case, the worker's wife is three years younger and has never worked.

*Severance Pay Fund Benefit (TFR)*

This involves computing the lump-sum benefit at the age of retirement corresponding to the 7.41 percent of gross earnings earmarked by the employer for this fund. While the lump-sum benefit is added to social security wealth, the

32. It should be noted that the Italian tax system is progressive, highly nonlinear, and subject to marked changes over the years: hence, in general it would be inappropriate simply to extrapolate income taxes and rebates from one year to the next. In practice, since I am assuming constant growth rates and a tax system that grows with the economy in all relevant simulations, the after–income tax benefits could be computed starting from real benefits as well.

33. Social security taxes in Italy are particularly high (see sec. 5.2 above) and have also changed over the years.

34. As explained in the previous section, special allowance is made for a dependent wife only in those cases where the pension is topped up to a minimum level and the retiree is allowed to receive earnings at a higher level than in a "single-household" case. In this exercise, I have ignored the fact that a pension to survivors exists both during the worker's active life and during retirement. The present simulation accounts only for the wife of the retiree claiming benefits.

TFR tax from additional work reduces net social security wealth. I have made two simplifying assumptions throughout all the simulations in order to compute the TFR:

1. The relevant rules for benefit computation are those in place after 1982 (see sec. 5.2 above). This implies that the same rate is used to capitalize the TFR fund each year (1.5 percent plus 75 percent of the inflation rate), hence underestimating the value of the fund accumulated up to 1982. In fact, up to 1982, the fund would basically grow at the nominal growth rate of the worker's wage.[35]

2. I do not apply income tax to the TFR benefit: this omission overestimates the actual benefit. Since the average income tax rate on the TFR benefit is, for a median worker, approximately between 10 and 15 percent, this should be almost equivalent to the underestimation discussed above. Hence, the two biases should roughly cancel each other out.[36]

### 5.3.2 Methodological Issues

The results of the simulation are the net of tax replacement rate, the accrual rate, and the tax/subsidy rate from additional work. The *net of tax replacement rate* is the rate at which the net social security benefit replaces the worker's (after-tax) earnings should he continue to work in that year. The other two measures of the incentives provided by the social security program require the computation of net social security wealth. This is the present value of future pension benefits (after income tax) net of the present value of any additional contribution from continued work. Hence, the *accrual rate* can be computed as the relative change in net social security wealth from the previous year. Finally, the *implicit tax/subsidy* is the absolute change in net social security wealth over the potential earnings from working an additional year. The implicit tax/subsidy should be interpreted as an implicit tax, via social security entitlements, on an additional year of work. The numerator is the opposite of the numerator used in the accrual rate, and it measures the change in social security wealth looking at one additional year of work. Hence, a positive number indicates a disincentive to (a tax on) work through social security wealth that the worker forgoes.

Both the net replacement rate and the implicit tax/subsidy require a measure of earnings from additional work: since the income tax system and the social security tax system interact in a complex way, it is best to provide some notation at this stage.

*Replacement Rate*

Both the social security benefit and the earnings of the additional year of work are subject to income taxes. In accordance with the Italian tax system,

35. However, as I explained in sec. 5.2 above, these rules would vary across different occupational groups within the private sector.

36. The underestimation is generated by the difference in the compounded rates based on $r_1 = 1.5\% + (0.75) \times (3.5\%)$ in each year, as opposed to $r_2 = [(1.015) \times (1.035) - 1]$ in each year.

the relevant measure of earnings is obtained by subtracting first social security taxes and then income taxes as social security contributions are not subject to income tax. A further complication arises when considering the TFR tax.[37] This is a fraction of gross earnings retained by the employer that is not recorded in the available gross earnings data (neither is the employer social security tax). Hence, under the assumption that the employer social security tax payment and the TFR tax are reflected in a lower wage, a grossing-up procedure is required in order to obtain the theoretical gross earnings figure.

Let us assume that the tax system can be described by one tax rate $\tau_I$ (in fact, there are several tax rates, tax exemptions, and tax rebates). Let $\tau_W$ be the worker social security tax rate, $\tau_E$ the employer social security tax rate, and $\tau_{\text{TFR}}$ be the TFR tax rate, while $Y$ represents earnings before income tax and employee social security tax but after the TFR tax and after social security taxes have been paid by the employer.[38] Hence, $Y$ represents earnings as recorded by the available survey data.

The replacement rate is based on after–income tax and after–social security tax earnings, on the one hand, and after–income tax social security benefits, on the other hand. Hence, obviously, the lump-sum TFR benefit (a stock value) should not appear in the numerator of the replacement rate. As for net earnings, these are given by[39]

$$YN = (1 - \tau_W - \tau_I)Y.$$

*Implicit Tax/Subsidy*

In measuring earnings, which appear in the denominator of the implicit tax/subsidy, I add back to after–income tax earnings both the employee and the employer contributions. In fact, these have already been taken out of net social security wealth. In other words, earnings (*YTS*), which appear in the denominator of the implicit tax/subsidy, are obtained by grossing up as follows:

$$YTS = YN + \tau_W Y + \tau_E Y + \tau_{\text{TFR}} Y.$$

### 5.3.3 Assumptions for the "Base Case"

In the "base-case" simulation, the worker is characterized by a "synthetic earnings history." This is obtained by projecting backward and forward the 1994 median earnings of a particular year-of-birth cohort of workers. Median earnings are computed on a panel of workers (private-sector employees) in

37. Strictly speaking, this is not a tax as the employer retains part of the gross wage from his employees, which is not paid to any social security fund. However, I call it the *TFR tax* for simplicity.

38. Notice that, throughout the exercise, I am ignoring an additional 0.8 percent social security tax paid by the employee as this has no corresponding benefit (see sec. 5.2 above).

39. Although I am showing a computation carried out in one step, the actual computation in the simulation requires two separate steps, taking out first the social security tax, then income taxes, which are highly nonlinear.

continuous employment, drawn from the private-sector social security workers archive. The data available go from 1974 to 1994.[40] Although it would seem appropriate to focus on the cohort that was born in 1930, I have defined a cohort within a ten-year age band (from 1927 to 1936): this is in order to allow for both a reasonable sample size within each cell and comparability with other data sets.[41]

Because wages for all cohorts, and particularly for the cohort in which I am interested, show marked changes over the sample period (due mainly to price changes), and since income taxes greatly affect net earnings in a nonlinear fashion over the years, the simulation results based on historical earning profiles and historical tax rates proved hard to interpret. It seemed appropriate to turn to an economy where wages and taxes grow at constant rates. Hence, I used the 1994 median earnings figure and the 1994 tax system as a starting point. To project earnings both forward and backward, I used the assumptions on inflation, wages, and GDP growth adopted by the Italian government in making its forecasts on future social security government expenditure.[42] The choice of a cohort of full-time employees in continuous employment provides a misleading estimate of median earnings of that cohort: part-time work and, more important, incomplete earnings histories are quite common in the Italian labor market. However, this characterization of the base case is then compared with an alternative case where an incomplete earnings history is modeled explicitly. Finally, I adopt the historical values for social security tax rates, while the TFR retention rate is assumed to be constant throughout, for the reasons given above.

### 5.3.4 Base-Case Results

Table 5.4 shows the base-case results. Each row represents the age of the worker in the last year that he works. Hence, the first row presents results for a married man who has worked during the year 1984 and retired on his fifty-fifth birthday (1 January 1985). The first column is the net replacement rate described above. The row for age fifty-five represents the first year of eligibility. The next three columns show the evolution of net social security wealth over time. Finally, marginal retirement incentives are captured by the rates presented in the last two columns. It is worth recalling at this stage the aspects of

40. The series is projected backward to 1950 by making use of earnings growth rates drawn from Rossi, Sorgato, and Toniolo (1993).

41. In particular with the Bank of Italy cross-sectional survey. For details, see app. A.

42. In particular, I have used a 1.5 percent annual rate for both real earnings growth and real GDP growth and a 3.5 percent rate for annual inflation. Since these growth rates had been chosen for future projections, in order to obtain steady earnings I also used the same rates in retrospective extrapolation—even if this resulted in gross underestimation of true growth figures. Government actuaries have actually run future projections on the effects of the social security reform by making use of a number of different scenarios. The motivation for the choice of parameters in this exercise is twofold: on the one hand, adopting the same real growth rate for both GDP and earnings gives a simple benchmark; on the other hand, there is evidence that, in the last twenty years, there has not been a marked difference, on average, between the two rates (see also Rostagno 1996).

**Table 5.4** **Base-Case Incentive Calculations**

| Last Year of Work | Replacement Rate | Social Security Wealth | Accrual | Accrual Rate | Tax/ Subsidy |
|---|---|---|---|---|---|
| 54 | . . . | 285,353 | 0 | 0 | 0 |
| 55 | .726 | 280,477 | −4,876 | −.017 | .245 |
| 56 | .744 | 274,486 | −5,990 | −.021 | .308 |
| 57 | .761 | 268,066 | −6,420 | −.023 | .338 |
| 58 | .780 | 261,160 | −6,907 | −.026 | .372 |
| 59 | .798 | 253,918 | −7,242 | −.028 | .401 |
| 60 | .799 | 241,677 | −12,241 | −.048 | .697 |
| 61 | .804 | 229,536 | −12,141 | −.050 | .711 |
| 62 | .805 | 217,643 | −11,893 | −.052 | .718 |
| 63 | .805 | 205,963 | −11,680 | −.054 | .729 |
| 64 | .809 | 194,396 | −11,568 | −.056 | .746 |
| 65 | .809 | 183,099 | −11,296 | −.058 | .756 |
| 66 | .809 | 172,011 | −11,088 | −.061 | .772 |
| 67 | .809 | 161,167 | −10,844 | −.063 | .787 |
| 68 | .809 | 150,577 | −10,590 | −.066 | .803 |
| 69 | .809 | 140,269 | −10,308 | −.068 | .818 |

the social security system that determine the figures in table 5.4, in particular, the tax implicit in postponing retirement by one year:

*a*) The pre-1992 regime allowed a private-sector employee to benefit from early retirement, with no age requirement, provided thirty-five years' contributions had been completed. Hence, although the normal retirement age for a man in the private sector was sixty, the base-case individual could actually claim retirement as early as his fifty-fifth birthday. It should also be noted that, although retirement is not mandatory, in practice very few can retire after age sixty-five (on this point, see sec. 5.2 above).

*b*) For each additional year of work, the worker must pay social security taxes: in Italy, these have grown in discrete jumps. Hence, net social security wealth is affected in a nonlinear fashion over time.

*c*) The additional year of earnings enters the benefit computation formula both because pensionable earnings are an average taken over the last five years' earnings and because, up to age sixty, any such additional year increases the fraction of years of contributions accounted for in the computation itself.[43] After age sixty, the fraction of pensionable earnings that is converted into a pension stays constant at 80 percent. The effect on social security wealth of adding one year to the benefit computation then depends on real earnings growth and inflation; in fact, past earnings are converted to current figures by means of price indexation.

43. Having completed forty years' contributions to the system, the retiree receives a first benefit of 80 percent of pensionable earnings (i.e., a fraction of 2 percent for each year of contribution).

*d*) For an additional year of work, there are fewer years over which benefits are claimed, lowering social security wealth. On the other hand, the TFR fund accumulates for one more year; but the rate of return on this fund is below nominal earnings growth and has no actuarial adjustment.

*e*) Finally, for each future year, there is a chance that the worker will die, lowering his social security wealth.

The first result to notice in table 5.4 is that the replacement ratios are very high at all ages. This is an important feature of the Italian system to be kept in mind in order to explain all subsequent results. Although the benefit computation formula suggests that the social security benefit should replace at most 80 percent of pensionable earnings, the actual figures show replacement ratios that range from 0.735 to 0.803. This is both because pensionable earnings differ from earnings coming from an additional year of work and because the tax system affects both the numerator and the denominator in a progressive fashion. The variation over time of the replacement ratio is totally explained by the social security tax figures: the same rate computed before social security tax earnings would give simply two levels, one before age sixty and one after age sixty.

Table 5.4 shows that a typical worker starts with a net pension wealth (inclusive of the TFR benefit) of L 285 million, reaching L 183 million at age sixty-five (going from approximately fifteen times to seven times his respective median earnings). There is a steady decline in social security wealth over the life cycle; however, a careful inspection of accrual rates reveals a significant fall between age fifty-nine and age sixty. This means that there is no incentive to delay retirement, particularly at the normal retirement age (because in that year the individual completes forty years' tax payments and reaches "full contribution history").

The final column shows the tax/subsidy rate. This is a very high number: the tax on working one additional year is roughly between 25 and 82 percent of after–income tax earnings of that year. The main reason for such a remarkable result is the large replacement ratio implied by the pre-1992 social security system. Similarly to the accrual rate, the implicit tax shows a jump at age sixty, and it then grows steadily for later ages (a graph is provided in fig. 5.25).

Finally, it should be noted that, while the severance pay fund provision (TFR) affects the level of social security wealth, it does not have significant effects on the marginal changes in social security wealth or on the shape of the implicit tax/subsidy profile.[44] Further simulations (not shown here) imply that the implicit tax is higher in the presence of the TFR provision than in its absence, providing one more reason to retire early. This is because the return on this fund is lower than earnings growth.

44. For the median worker of the base case, the TFR benefit at retirement is roughly 23 percent of total net social security wealth.

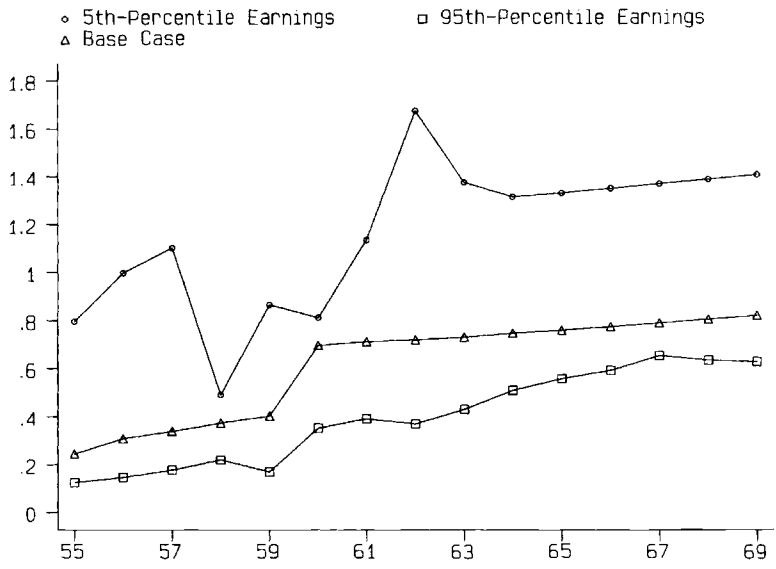


**Fig. 5.25 Tax/subsidy rate across earnings profiles after social security tax, constant earnings/tax growth**

### 5.3.5 Other Cases

In this section, some sensitivity analysis is carried out by allowing for both permutations in the age-earnings profile and variations in the parameters.

Table 5.5 looks at a *single man* who considers retirement at different future ages, starting at age fifty-five. The results for the replacement rate differ only slightly from the base-case scenario. In fact, under the assumption that the wife never worked, old age pension benefits for a couple are based on the man's earnings profile. However, the income tax system differs in the two cases, entailing a tax rebate for couples that could affect both social security benefits and earnings. The replacement rate is lower than for a married man (apart from the first figure at age fifty-five), hence suggesting that the income tax rebate weighs more on the earnings of an additional year of work than on social security benefits. Social security wealth is at a lower level than for a married man because there is no pension to the surviving spouse. Results for the accrual rate are simply a rescaled version of the finding obtained for a married man at a slightly lower level (hence becoming more negative). The implicit tax is lower throughout for a single man (apart from the first figure) than for the married man, again because of the income tax system. A slight divergence between the implicit tax paths for a couple and for a single worker occurs toward the end of the working life, owing to the effect of the wife's survival probability becoming important in the net social security wealth calculation. This similarity across

**Table 5.5** **Incentive Calculations—Single Worker**

| Last Year of Work | Replacement Rate | Social Security Wealth | Accrual | Accrual Rate | Tax/ Subsidy |
|---|---|---|---|---|---|
| 54 | . . . | 236,380 | 0 | 0 | 0 |
| 55 | .735 | 230,997 | −5,383 | −.023 | .282 |
| 56 | .736 | 225,293 | −5,704 | −.025 | .301 |
| 57 | .754 | 219,247 | −6,045 | −.027 | .326 |
| 58 | .773 | 212,808 | −6,439 | −.029 | .356 |
| 59 | .791 | 206,140 | −6,668 | −.031 | .378 |
| 60 | .793 | 195,449 | −10,691 | −.052 | .623 |
| 61 | .797 | 184,917 | −10,532 | −.054 | .632 |
| 62 | .799 | 174,681 | −10,237 | −.055 | .633 |
| 63 | .799 | 164,705 | −9,975 | −.057 | .638 |
| 64 | .803 | 154,893 | −9,812 | −.060 | .648 |
| 65 | .803 | 145,393 | −9,500 | −.061 | .651 |
| 66 | .803 | 136,142 | −9,251 | −.064 | .660 |
| 67 | .803 | 127,152 | −8,991 | −.066 | .668 |
| 68 | .803 | 118,427 | −8,725 | −.069 | .677 |
| 69 | .803 | 109,978 | −8,449 | −.071 | .687 |

the two cases is explained by (*a*) the lack of additional benefits for the dependent wife and (*b*) the fact that benefits to the surviving spouse are provided with no age limit (only means testing).

Table 5.6 describes the results for a worker with an *incomplete earnings history.* Unlike the base case, he starts working at age twenty-four (in 1954); hence, when considering retirement on his fifty-fifth birthday, he would have completed only thirty-one of forty years of his social security tax history and would reach full eligibility only at age sixty-four (working at age sixty-three). This variation on the base case has interesting implications for the incentive results. First, the replacement rate is lower than in the base case up to age sixty-four, after which it coincides. The tax/subsidy path is shifted to the right at a much lower level for ages below sixty-five. This is because, at that point, full eligibility is reached in both cases; hence, up to that age, there is a higher incentive to work for someone who entered the labor force later. After age sixty-five, the two paths do not overlap exactly because of the TFR provision, which stays constantly lower for the case of an incomplete earnings history.

Further variations to the base case are obtained by changing the age-earnings profile and the institutional setup. The results are summarized in table 5.7, where findings across different simulations are shown for significant ages only.

The first permutation is made in the earnings profile, by including both ends of the distribution of earnings. In the Italian social security system, there is both capping on pensionable earnings and topping up of low benefit levels; hence, interesting cases may be explored when earnings reach the roof or the floor of social security benefits. Experimenting with the data revealed that the two interesting cases lie in the top 95 percent and the bottom 5 percent of

**Table 5.6** **Incentive Calculations—Incomplete Earnings History**

| Last Year of Work | Replacement Rate | Social Security Wealth | Accrual | Accrual Rate | Tax/ Subsidy |
|---|---|---|---|---|---|
| 54 | . . . | 249,356 | 0 | 0 | 0 |
| 55 | .638 | 245,988 | −3,368 | −.014 | .169 |
| 56 | .656 | 241,570 | −4,418 | −.018 | .227 |
| 57 | .674 | 236,698 | −4,871 | −.020 | .257 |
| 58 | .692 | 231,316 | −5,382 | −.023 | .290 |
| 59 | .710 | 225,575 | −5,741 | −.025 | .318 |
| 60 | .729 | 219,396 | −6,179 | −.027 | .352 |
| 61 | .751 | 212,772 | −6,624 | −.030 | .388 |
| 62 | .770 | 205,864 | −6,908 | −.032 | .417 |
| 63 | .788 | 198,653 | −7,210 | −.035 | .450 |
| 64 | .809 | 191,057 | −7,596 | −.038 | .490 |
| 65 | .809 | 179,911 | −11,147 | −.058 | .746 |
| 66 | .809 | 168,972 | −10,939 | −.061 | .762 |
| 67 | .809 | 158,276 | −10,696 | −.063 | .776 |
| 68 | .809 | 147,834 | −10,442 | −.066 | .792 |
| 69 | .809 | 137,674 | −10,161 | −.069 | .807 |

**Table 5.7** **Incentive Calculations—Summary of Other Cases, Last Year of Work Is Age 61**

| Case | Replacement Rate | Social Security Wealth | Accrual | Accrual Rate | Tax/ Subsidy |
|---|---|---|---|---|---|
| Base case | .804 | 229,536 | −12,141 | −.050 | .711 |
| Single worker | .797 | 184,917 | −10,532 | −.054 | .632 |
| Incomplete history | .751 | 212,772 | −6,624 | −.030 | .388 |
| 5th percentile | 1.357 | 87,029 | −4,382 | −.048 | 1.135 |
| 95th percentile | .580 | 408,138 | −15,660 | −.037 | .390 |
| Post-1995 regime | .547 | 148,423 | −1,073 | −.007 | .063 |
| Actual earnings | .840 | 165,975 | −9,613 | −.055 | .648 |

the distribution of earnings.[45] These two points of the distribution were obtained, for the year 1994, from the same panel data set used in constructing median earnings. In both cases, I then applied the same earnings growth rate (backward and forward) used for the median earnings profile. For the earnings capping level and the "minimum benefit," I take actual figures; however, for the years after 1995, figures are calculated on the basis of economic growth.

These permutations show some inherent redistributional features of the Italian social security system, and they explain how these provide incentives for

45. While the tenth and ninetieth percentiles were almost untouched by the roof and floor of the social security system, the fifth and ninety-fifth percentiles almost invariably hit these barriers: while these may be extreme cases, they are useful in describing how these upper and minimum levels operate.

intertemporal decisions by individuals. Obviously, replacement rates are on average much higher for the *fifth percentile* and much lower for the ninety-fifth percentile than in the base case: an example for age sixty-one can be found in the first column of table 5.7. Accrual rates and the tax/benefit of continued work look very different in the base case than they do for the low-earnings and high-earnings individual. Some interesting insights can be gained from the comparison. In fact, while capping on pensionable earnings applies to pensionable earnings, topping up of benefits applies directly to the benefit level. The tax/subsidy pattern for the bottom 5 percent of the distribution shows large fluctuations (fig. 5.25 above). This is because the minimum benefit grows roughly in line with actual historical earnings. The implicit tax levels are very high (reaching a peak of 180 percent of potential earnings at age sixty-two). In fact, there is a large transfer component from the system to the individual that the individual forgoes if he postpones retirement. Opposite results are obtained for the top *ninety-fifth percentile.* The replacement rate is lower than for the base case, and the implicit tax pattern is constantly lower than the base case. This is explained by a high level of potential earnings (in the denominator) that is not fully reflected in the benefit computation (in the numerator). Moreover, the ninety-fifth percentile tax pattern is not as smooth as the age-tax profile obtained for the base case, again because actual earnings capping changes over time in discrete jumps.

A further set of results is based on the *post-1995 legislation.* The assumption is made that the 1995 reform of the Italian social security system has been completely phased in—and this naturally means that one should be extremely careful in interpreting the findings. In fact, as explained in section 5.2 above, the transitional period of the 1995 reform is a very long one (ending in 2035), while, in my simulation, the legislation is considered when implemented for a worker retiring between the years 1985 and 2000.

At this stage, it is useful to give a brief recap of a few crucial features of the post-1995 (steady-state) legislation, as they differ radically from those of the base-case scenario:

*a*) The post-1995 reform adopts an average-earnings-based method of benefit calculation. First, the present value (at retirement) of past payroll taxes is determined. This is obtained by taking a 33 percent share of past earnings for each year in which the worker and the employer paid payroll taxes and weighing each past wage by means of a five-year moving average of the nominal GDP growth rate. This stock measure is then converted into an annuity by applying an age-related actuarial adjustment factor, given below.

*b*) The 1995 reform enacts a window of pensionable ages with an actuarially based adjustment of pensions: the ages are between fifty-seven and sixty-five, with factors ranging between 4.72 and 6.136 percent, respectively. Before age fifty-seven, I have used a constant factor 4.72 percent and, after age sixty-five, a constant factor 6.136 percent.

*c*) Future benefits then grow with prices only.

*d*) Finally, the TFR provision abides by the same rules as in the old regime.

**Table 5.8** **Incentive Calculations—Post-1995 Regime**

| Last Year of Work | Replacement Rate | Social Security Wealth | Accrual | Accrual Rate | Tax/ Subsidy |
|---|---|---|---|---|---|
| 54 | ... | 159,881 | 0 | 0 | 0 |
| 55 | ... | 156,914 | −2,968 | −.019 | .149 |
| 56 | ... | 153,398 | −3,516 | −.022 | .181 |
| 57 | .463 | 152,557 | −842 | −.005 | .044 |
| 58 | .482 | 151,386 | −1,170 | −.008 | .063 |
| 59 | .502 | 150,151 | −1,235 | −.008 | .068 |
| 60 | .523 | 149,496 | −655 | −.004 | .037 |
| 61 | .547 | 148,423 | −1,073 | −.007 | .063 |
| 62 | .570 | 146,543 | −1,881 | −.013 | .114 |
| 63 | .593 | 144,000 | −2,543 | −.017 | .159 |
| 64 | .622 | 140,868 | −3,132 | −.022 | .202 |
| 65 | .628 | 134,420 | −6,448 | −.046 | .432 |
| 66 | .634 | 127,868 | −6,553 | −.049 | .456 |
| 67 | .640 | 121,318 | −6,549 | −.051 | .475 |
| 68 | .646 | 114,879 | −6,439 | −.053 | .488 |
| 69 | .652 | 108,342 | −6,537 | −.057 | .519 |

It is obvious that the crucial features of this benefit calculation method are (1) the difference between the (smoothed) GDP growth rate and the earnings growth experienced by each individual and (2) the actuarial adjustment factor. Individuals cannot withdraw from the labor force before their fifty-seventh birthday or after their sixty-fifth birthday; however, as with the base case, I have carried out the simulation from age fifty-four (last year of work) to age sixty-nine.

From table 5.8, there immediately emerges a striking contrast with the pre-1992 regime with regard to the replacement rate figures (now ranging between 0.463 and 0.652) and the net social security wealth figure (roughly L 160 million at age fifty-four, i.e., ten times the median earnings). This is because workers only gradually build up an increasing stock of social security taxes. Accrual rates are negative throughout; however, they do not follow the pattern observed for the base case. Perhaps the most interesting comparison with the base case is that concerning the implicit tax (fig. 5.26). While the implicit tax is much lower than in the base case, the new regime does not particularly encourage work beyond age fifty-seven (the age of eligibility). Between age sixty-four and age sixty-five, the implicit tax jumps because there is no further increase in the adjustment factor. After age sixty-five, the implicit tax grows almost in line with that in the base case: this is because, in both cases, all the relevant parameters remain constant. However, while in the pre-1992 regime benefits grow with earnings (with no fund buildup), in the new regime benefits grow with prices, but the stock of social security taxes builds up. The behavior of the implicit tax between the ages of fifty-seven and sixty-five is not as smooth as one would expect, given the emphasis placed by the reform on producing

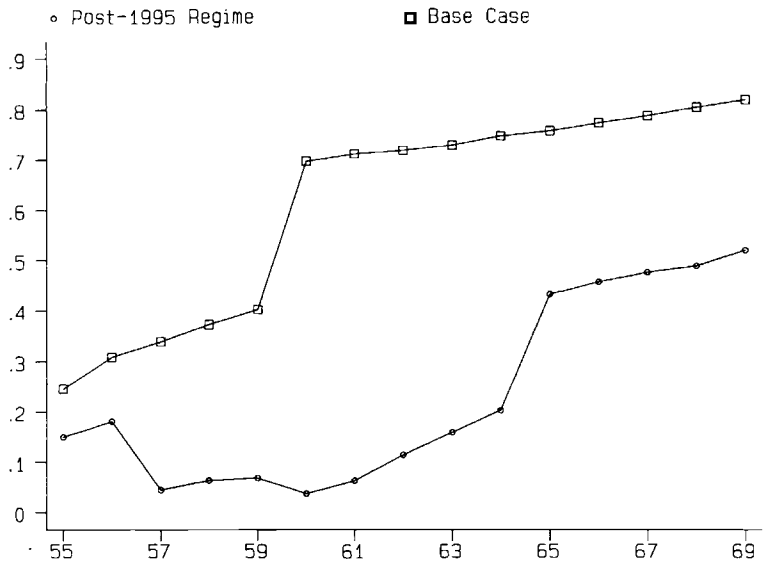


**Fig. 5.26 Tax/subsidy rate across regimes after social security tax, constant earnings/tax growth**

an "actuarially fair system," and given that the simulation is based on constant growth rates. This may be explained by the calibration of the actuarial adjustment factor, which is based on a slightly different life table from the one used in this study, and by the use of a different discount factor. In fact, the actuarial adjustment of the benefits that, under the new regime, apply at the different retirement ages was calibrated by government actuaries in order to achieve actuarial fairness across retirement ages for an individual who is sixty-two in 1996 and by assuming a real discount rate of 1.5 percent.[46]

Finally, it is interesting to compare the base case with a counterfactual case where the *actual earnings profile* and actual income taxes have been used to produce a "realistic case."

Earnings are computed by taking medians from the given year-of-birth cohort of employees by calendar year. To follow this cohort back through time (i.e., before 1977), I used the growth rate of gross earnings, at current prices, for employees in the industrial sector. The age-earnings profile of the "typical actual worker" does not show an appreciable decline until the last available years: the stable growth in earnings for this group is explained both by the fact that we are following a true cohort of full-time male employees through time and by the fact that my definition of this cohort covers a wide age band. This

46. This calibration procedure is designed so that an individual aged sixty-two in 1996 is indifferent between the prereform and the postreform regimes.

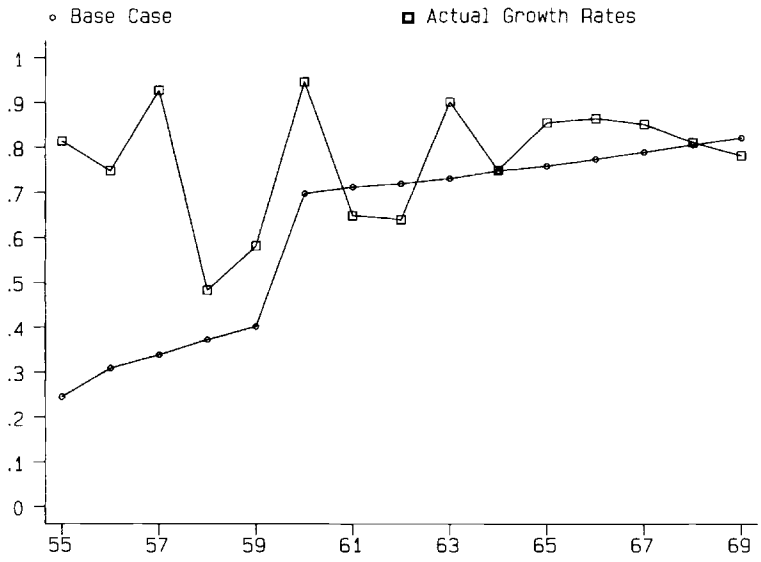


**Fig. 5.27 Tax/subsidy rate across growth rates after social security tax, actual earnings/tax growth**

implies that part-time work should be excluded from the sample by definition and that sample numerosity becomes a problem only for the last few years, when many members of the cohort have retired. Hence, it is only from age sixty (1990) that I have replaced actual earnings with their projection, obtained by letting earnings increase at the same growth rate as nominal wages in the industrial sector. For this case, I provide information at age sixty-one (in table 5.7 above) and the implicit tax profile (fig. 5.27). It is clear that the results for the "actual earnings" profile are totally dominated by changes in earnings growth rates and income taxes. The highest disincentive to supply labor for an extra year is for those aged fifty-seven, sixty, and sixty-three; after age sixty-seven, there is a steady decline in the implicit tax. While the peak at age sixty can again be explained by, among other things, full eligibility, the spike at age fifty-seven is partly due to a decline in the earnings growth rate, immediately followed by a sharp increase (the former affects the numerator, while the latter affects the denominator). This is also reflected in a relatively low replacement rate for age fifty-seven. This early spike is a particularly interesting feature of the system as it happens to coincide almost exactly with a peak in the male hazard rate out of the labor force.

## 5.4 Conclusions

The Italian social security system is characterized by strong incentives to early retirement. These have certainly had an effect on individual intertemporal

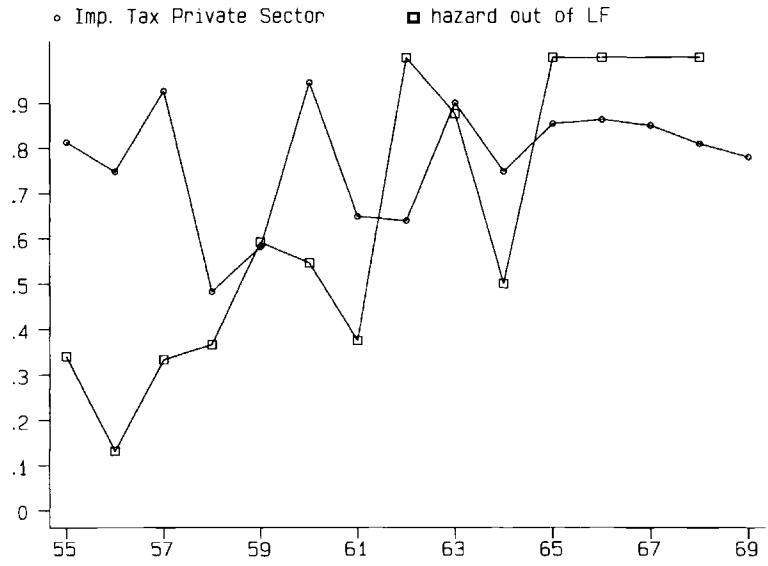


**Fig. 5.28 Tax/subsidy rate against hazard, private-sector employees, actual earnings/tax growth**

decisions, particularly those concerning labor supply. Both time-series data and micro data provide support for the view that there is a causal relation between the increased generosity of the social security system and its eligibility criteria and the timing of retirement. Moreover, the simulation exercise carried out in this study shows that these incentives differ across groups of the population according to such characteristics as individual earnings profiles and work experience. The tax on additional work implied by forgone social security wealth is almost invariably large, and it usually peaks at the ages when the empirical evidence shows the highest detachment rates from the labor force. For example, the male hazard shown in figure 5.18 above and the distribution of actual retirement ages (fig. 5.23 above) suggest that there are three typical ages for leaving the labor force: a first peak is observed at age fifty-five, then a significant peak at age sixty (corresponding to the normal retirement age in the private sector), while the third exit from the labor force occurs around age sixty-five. This is in line with the incentives provided by the social security system as measured by the implicit tax/subsidy. In fact, the tax/subsidy profile (table 5.4 above) suggests that the system encourages workers to leave the labor force at all ages, and certainly to retire no later than age sixty. The existence of these incentives in the social security program is even more evident in the tax/subsidy profile computed under "realistic assumptions" with regard to the earnings profile and the income tax system (fig. 5.28). This exercise points out not only that the social security benefit formula is actuarially unfair but also that it is totally dominated by the behavior of wages and prices immediately

before the year chosen to retire. As a result, the median worker of this exercise would find it very costly to postpone retirement after age fifty-seven. This suggests that a simple cost/benefit analysis might have induced many to take advantage of early retirement, which in Italy has been widely available with no actuarial penalty. The social security reforms of 1992 and 1995, aimed at reducing benefit outlays, have affected workers' behavior in many respects. There is a direct effect on savings, related to the substantial reduction in household pension wealth due to reduced benefit levels and restricted eligibility criteria. While the effects on labor supply decisions are harder to gauge, the econometric evidence presented in appendix B suggests that the 1992 reform was regarded by many as a breaking point, after which the social security system could no longer be as generous as it had been in the past. Hence, many reacted to the reform by moving up their expected retirement age (particularly young people in the private sector).

# Appendix A
# *Data Sources*

### Historical Data

Labor Force Participation by Age and Sex

This is based on ISTAT's *Annuario del lavoro e dell'emigrazione* (1958–80) and *Supplemento al bollettino mensile di statistica* (1975–85). For subsequent years, the series on labor force participation can be derived from ISTAT's *Rilevazione nazionale delle forze di lavoro* (1986–94). The jump in the series in 1976, also discussed in Casavola and Sestito (1994), was produced by a change in the definition of both *unemployment* and *employment*. After that year, these two terms covered people actively seeking work even if not previously employed and people who did not regard themselves as employed but who worked during the survey week.

Share of Workers

This is based on ISTAT's *Annuario del lavoro e dell'emigrazione* (various issues), *Rilevazione nazionale delle forze di lavoro* (various issues), *Supplemento al bollettino mensile di statistica* (1975–85), and *Collana di informazione* (1986–95); and Ministero del Tesoro, *Relazione generale sulla situazione economica del paese* (several issues). Survival probabilities are drawn from "Tavole di mortalità," in ISTAT's *Annuario statistico italiano* (1989, 1995).

Benefit Receipt and Insured Population

The figures based on historical data for benefit receipt are drawn from ISTAT's *Statistiche dei trattamenti pensionistici* (1985–94) and *Supplemento al bollettino mensile di statistica* (1975–84); and INPS, *Notizie statistiche*

(1977–80). However, more details can be found in CENSIS/CER, *Rapporto sulla situazione sociale del paese.* The Treasury has published some special reports on projections for future pension outlays: Ministero del Tesoro, *Tendenze demografiche e spesa pensionistica* (1996), and *Sanità, scuola e pensioni* (1997).

### Contemporaneous Data

All figures tabulated by the author are drawn from the Bank of Italy Survey, 1989–93 (see below).

### Studying Retirement in Italy

There are two main sources available at a micro level:

Bank of Italy Cross-sectional Data

The Bank of Italy provides cross-sectional data at regular intervals. This is a nationwide survey that collects detailed information on Italian households concerning their saving/consumption decisions, earnings of each member of the family, and demographic variables. I have used several cross sections of the survey: the waves available since 1984 (i.e., 1984, 1985, 1986, 1987, 1989, 1991, and 1993) plus the waves that are part of the Bank of Italy Historical Archive (annually from 1977 to 1983). The two sets of samples differ in many respects: the former (i.e., more recent waves) has a larger number of observations (around eight thousand, as opposed to four thousand or fewer for previous years), there is less detailed information on working status (e.g., the age at which the individual started working is missing), and, most important, age is recorded in ten- and fifteen-year bands that are kept fixed over the years. In this study, I have used only the 1989, 1991, and 1993 surveys; however, I have carried out comparisons with the other available source (see the next subsection). To this end, I constructed year-of-birth cohorts for both sources, which I kept fixed throughout the study.

I assigned individuals to different year-of-birth cohorts on the basis of their age and the year of the survey. For all the observations where age was recorded in intervals (surveys for the years 1977–83), I randomly assigned individuals to year-of-birth cohorts by assuming a uniform distribution within the age interval. Each age band may contain up to three cohorts.

In order to cope with the scarcity of observations resulting for some cells, and given the restriction imposed by the recording of age before 1984, I defined cohorts over year-of-birth bands as follows: cohort 1, before 1911; cohort 2, between 1912 and 1926; cohort 3, between 1927 and 1936; cohort 4, between 1937 and 1946; cohort 5, between 1947 and 1956; cohort 6, between 1957 and 1959; cohort 7, between 1960 and 1963; and cohort 8, after 1963. Besides questions regarding the characteristics of those already retired, there are some retrospective questions posed to both retirees and workers (e.g., age

at which they started work). However, a full work history cannot be constructed. There are also questions about expected retirement age and, in just one survey, expected social security benefit.

The INPS Database

I use an unbalanced panel running for twenty years (1974–94), drawn from the INPS Archive 01/M, that records information about workers on the basis of a form sent yearly to the INPS by employers. The information available concerns age, sex, occupation, wage, and changes of job characteristics, but no information on education or household structure is available. I constructed cohort gross earnings profiles for the simulation on the basis of this sample according to age bands. The relevant age band for the median worker is year of birth between 1927 and 1936.

# Appendix B
## *The Effects of Social Security on Retirement: Survey of the Literature and Econometric Estimates*

Here, I first give a brief review of the literature on incentives within the social security program affecting individuals' behavior. I then move on to some new empirical evidence that tries to measure behavioral responses to changes in social security provisions directly.

### Existing Literature

While a great deal of research has been carried out both on the effects of the reforms and on the relation between saving behavior and social security wealth, very little attention has been devoted to the effects of social security security arrangements on labor supply. There are a few notable exceptions: in particular, Geroldi (1993), Peracchi and Rossi (1995), and Padoa Schioppa Kostoris (1996). The work carried out by Peracchi and Rossi tries to assess the overall effect of the 1995 reform, stressing, among other aspects, how there are some distinct patterns in the time-series data clearly generated by the increasing generosity of the social security system. In particular, the authors note that labor force participation in Italy is lower than in other countries, particularly for the age group fifty-five to fifty-nine (immediately prior to the normal retirement age). The authors also point out that the existence of the early retirement option is a very likely explanation of the fact that the average employment rate for the age group fifty to fifty-seven falls with each year of age. The results presented in sections 5.1 and 5.3 above confirm these facts. A more direct question is raised by the work of Padoa Schioppa Kostoris (1996), who

evaluates the potential financial gains from the 1995 reform under different scenarios by simulating potential quits from the labor force. Another relevant approach to assessing the importance of the labor supply incentives of social security is to turn attention away from the "median worker" to other cases. A very detailed study by Rostagno (1996) shows that incomplete earnings histories may play a crucial role in evaluating the effects of the reforms and that these cases may be much more common than previously thought. This might help explain some features of the hazard rates out of the labor force shown in section 5.2 above because, while many retire well before the normal retirement age, there is still action in the data after age sixty caused by people who want to reach full contribution.

An important test of the effects of changes in the institutional setting is the analysis of the behavioral responses of individuals and households. Following Feldstein's seminal paper (1974), a very stimulating empirical literature on the effects of the social security system on the saving patterns of Italian households has developed. After early papers that estimated a very low degree of substitutability between pension wealth and private wealth (Brugiavini 1987; and Jappelli 1995) on households' micro data, a number of contributions have challenged that finding. Rossi and Visco (1994, 1995) argue that much of the decline in the Italian saving rate in the 1970s was due to the increased generosity of the social security system over those years, and time-series estimates suggest that about one-third of Italian accumulated capital stock may have been lost because of this exceptional growth. More recently, Attanasio and Brugiavini (1997) have adopted a "natural experiment" approach in using micro data to evaluate the differential effect of the 1992 reform on the saving behavior of households. In particular, the authors distinguish between groups of the population that are likely to be affected in different ways by the reform and then look at the mean variation (between the postreform and the prereform value) in savings across these groups. It emerges that, between 1991 and 1993, the groups that were most affected by the reform in terms of benefit cuts or stricter eligibility rules also tended to save more.

### Redistributional Effects of the Social Security System and Econometric Estimates of Changes in Expected Retirement Age

One distinct feature of the Italian social security system is the difference existing in the arrangements of the different funds. I have already discussed how the public-sector, as opposed to private-sector, employees' fund was privileged in many respects by the pre-1992 legislation, particularly because of the early retirement option (more generous for the public sector) and because of the benefit computation formula (of a pure final salary type in the public sector). Castellino (1994) estimates that a large stock of resources was redistributed across generations and across funds because of these different features. One way to look at how these differences affect labor supply decisions is to

contrast the hazard rate of public- and private-sector employees, as I have done in figures 5.20 and 5.21 above. In the private sector, three relevant peaks were pointed out: age fifty-six (early retirement), age sixty (normal retirement), and age sixty-four (possibly incomplete earnings history). In the public sector, there is also evidence of early retirement between the ages of fifty-five and sixty-one, but then virtually every worker has retired by age sixty-five (the normal retirement age).

Turning to the econometric evidence, I present some estimates of changes in expected retirement ages drawn from the Bank of Italy panel of household-level data. The methodology adopted is a "difference-in-difference" estimator and draws heavily on the work of Attanasio and Brugiavini (1997) described above. In particular, the basic identifying assumption is that the 1992 reform is the only relevant change (as far as differential labor supply decisions are concerned), and I therefore exploit the reform to measure behavioral responses before and after the event. The first difference is the time difference, the second that between groups. Groups in the population are assumed to be exogenously determined, and, given the availability of panel data, I can control for individuals' characteristics throughout (Venti and Wise 1995). Hence, membership in a group can be interpreted as an instrument (control). I allocate individuals to groups according to the characteristics observed at the beginning of the sample (year 1989) and discard those who later cross groups, particularly if they change employment status and type of occupation. A careful selection of the sample is crucial to this methodology because of the identification issues described above. In the end I was left with approximately fifteen hundred men and seven hundred women.

Given that the panel is partly rotating—that is, some households are replaced after two years—there are at least two data points for each individual, which allowed me to compute differences in the expected retirement age. I selected six groups, three according to occupation (employee in the private sector, employee in the public sector, and other occupations) and two according to experience (less than fifteen years' social security tax payments in 1993 and more than fifteen years' tax payments in 1993). This is because the 1992 reform relies on a pro rata method (described earlier) that leaves the rules to be adopted for the latter group almost unchanged while it greatly affects the eligibility criteria and benefit calculation for the former group. However, in constructing the variable *experience,* I had to rely on information regarding the age at which work started, which may be a noisy measure. A slightly different selection criteria based on year-of-birth cohorts provided almost identical results in the estimates. It is worth recalling at this stage that the Amato reform of 1992 has gradually postponed the normal retirement age but has not tackled the early retirement option, apart from restricting eligibility requirements in the public sector.[47]

47. The normal retirement age gradually moves from sixty to sixty-five for men. The early retirement option is available, but public-sector employees need thirty-five years of contributions

**Table 5B.1** **Mean Expected Retirement Age: Panel Data, 1989–95**

| Group | 1989 | 1991 | 1993 | 1995 |
|---|---|---|---|---|
| Males, young (1959–74) | 59.19 | 60.06 | 59.89 | 61.14 |
| Males, old (1922–58) | 60.24 | 60.68 | 59.94 | 60.07 |
| Females, young (1959–74) | 56.58 | 57.23 | 56.74 | 58.40 |
| Females, old (1922–58) | 57.30 | 57.93 | 57.90 | 59.17 |

**Table 5B.2** **Yearly Changes in Expected Male Retirement Age: Panel Data, 1989–95 (baseline regression, groups defined by age)**[a]

| | Δ Years | S.E. |
|---|---|---|
| Occupation: | | |
| Private-sector employee: | | |
| Generation 1 | .957 | .359 |
| Generation 2 | .197 | .194 |
| Public-sector employee: | | |
| Generation 1 | .644 | .673 |
| Generation 2 | .756 | .297 |
| Others: | | |
| Generation 1 | −.050 | .586 |
| Generation 2 | .494 | .268 |
| | *F* | Prob > *F* |
| Hypothesis 1 | .17 | .680 |
| Hypothesis 2 | 2.49 | .115 |

*Note:* Generation = 1 if years of tax payments in 1993 < 15 and 2 if years of tax payments in 1993 ≥ 15. Hypothesis tests: hypothesis 1: private-sector employees of generation 1 = public-sector employees of generation 1; hypothesis 2: private-sector employees of generation 2 = public-sector employees of generation 2.

[a]Number of observations = 1,896.

Table 5B.1 presents mean expected retirement age for some groups of the population. While the figures are suggestive of a reduction occurring between 1991 and 1993, it is hard to place any statistical significance on this finding.

Tables 5B.2 and 5B.3 show the econometric estimates. In table 5B.2, the regression is carried out for males, the dependent variable is the change (in years) in expected retirement age, and the explanatory variables are group dummies that take the value one if the individual belongs to that group and zero otherwise. In this case, OLS estimates automatically deliver an efficient estimator of mean changes in the dependent variable. In fact, variations in sample numerosity across groups suggest that it is possible to improve on simple arithmetic means.

to become eligible in place of the previous twenty years (fifteen for married women). In the public sector, normal retirement age has been sixty-five throughout.

**Table 5B.3** **Yearly Changes in Expected Male Retirement Age: Panel Data, 1989–95 (groups defined by age)**[a]

| | Δ Years | S.E. |
|---|---|---|
| Occupation: | | |
| Private-sector employee: | | |
| Generation 1 | 1.387 | .453 |
| Generation 2 | .254 | .253 |
| Public-sector employee: | | |
| Generation 1 | .792 | .831 |
| Generation 2 | 1.129 | .371 |
| Others: | | |
| Generation 1 | −.483 | .774 |
| Generation 2 | .762 | .305 |
| Private-sector employee in 1993: | | |
| Generation 1 | −2.570 | .910 |
| Generation 2 | −.567 | .469 |
| Public-sector employee in 1993: | | |
| Generation 1 | .480 | 1.671 |
| Generation 2 | −.854 | .749 |
| Others in 1993: | | |
| Generation 1 | .963 | 1.444 |
| Generation 2 | −1.295 | .777 |
| Private-sector employee in 1995: | | |
| Generation 1 | .753 | .887 |
| Generation 2 | .442 | .527 |
| Public-sector employee in 1995: | | |
| Generation 1 | −1.792 | 1.805 |
| Generation 2 | −1.434 | .845 |
| Others in 1995: | | |
| Generation 1 | 1.283 | 1.466 |
| Generation 2 | −.217 | .866 |
| | *F* | Prob > *F* |
| Hypothesis 1 | .36 | .530 |
| Hypothesis 2 | 3.79 | .050 |
| Hypothesis 3 | 2.57 | .109 |
| Hypothesis 4 | .11 | .745 |
| Hypothesis 5 | 1.63 | .200 |
| Hypothesis 6 | 3.54 | .061 |

*Note:* Generation = 1 if years of tax payments in 1993 < 15 and 2 if years of tax payments in 1993 ≥ 15. Hypothesis tests: hypothesis 1: private-sector employees of generation 1 = public-sector employees of generation 1; hypothesis 2: private-sector employees of generation 2 = public-sector employees of generation 2; hypothesis 3: private-sector employees in 1993 of generation 1 = public-sector employees in 1993 of generation 1; hypothesis 4: private-sector employees in 1993 of generation 2 = public-sector employees in 1993 of generation 2; hypothesis 5: private-sector employees in 1995 of generation 1 = public-sector employees in 1995 of generation 1; hypothesis 6: private-sector employees in 1995 of generation 2 = public-sector employees in 1995 of generation 2.

[a]Number of observations = 1,896.

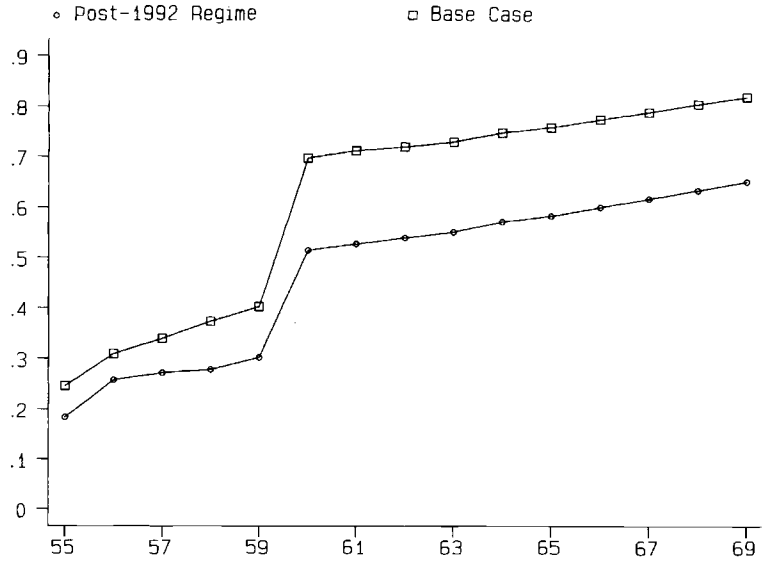


**Fig. 5B.1 Tax/subsidy rate across regimes after social security tax, constant earnings/tax growth**

The results of table 5B.2 give the baseline specification. Expected retirement age seems to have increased between 1989 and 1995, particularly for young individuals working in the private sector. However, the results of table 5B.3 suggest that the reforms have had an effect on expected retirement age: in 1993, young individuals working both in the private sector and in the public sector tended to reduce their expected retirement age. This is in line with the common belief that, while postponing normal retirement age (in the private sector), the 1992 reform has mainly affected younger workers. In particular, young workers in the private sector tended to reduce their retirement age by approximately 2.5 years, and there is evidence of a significant difference in the behavior of private- and public-sector employees.

## Interpretation of Results

It is hard to provide a clear-cut interpretation of the results outlined above, particularly because the event *retirement* may be quite far in the future for many workers in the sample and the expected retirement age could be a noisy variable. The 1992 reform did not remove the early retirement option; hence, it would still be possible, in both the private and the public sectors, to reduce retirement age even though the reform did postpone the statutory retirement age. Young workers have been greatly affected by the 1992 reform as their social security wealth has been reduced by a considerable amount. The implicit tax profile, corresponding to the 1992 reform (see fig. 5B.1), shows that the

implicit tax on work is still positive and high over the life cycle, hence providing an incentive to retire early. What seems to emerge (also from table 5B.1 above) is that, before the reform, many thought of their retirement age as the normal retirement age and that the reform has focused the attention of workers on this issue. The 1992 reform also made it clear that the system could no longer be as generous as it has been in the past and that, given the incentive system discussed in this paper, on average workers want to get out of the program as soon as they can.

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