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10 Pensions and Retirement in the United Kingdom

Richard Blundell and Paul Johnson

Unlike those of most other European countries, the United Kingdom's pension system is not well described by an analysis of the social security element. For thirty years or more, around half the workforce has been covered by occupational pensions. Something like half the income of pensioners comes from non–social security sources, and this proportion is growing. Of the workforce in the mid-1990s, three-quarters are "contracted out" of the second-tier State Earnings-Related Pension Scheme (SERPS) into private occupational or personal pensions.[1]

In fact, one can probably divide the population nearing state pension age into two groups—those with and those without significant private provision. For those with private provision, state benefits are likely to be relatively unimportant in understanding retirement behavior; the rules of their pension scheme will be rather more important. For the rest, the state system might be much more relevant, but especially the *effective* availability of benefits, which appears to differ somewhat from what one might understand from a simple reading of the rules governing benefit availability.

Partly as a result of these facts, the United Kingdom also differs from many other countries in one other important respect—its state pension system is solvent. Tax rates necessary to pay for it are not predicted to rise despite the fact

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1. For an overview of the U.K. pension system, see Dilnot, Disney, Johnson, and Whitehouse (1994).

that the number of people over state retirement age is predicted to rise from 10.4 million in the mid-1990s to 11.5 million in 2020 and 14 million in 2050, representing an increase from 15.7 percent of the whole population to over 24 percent.[2]

In this paper, we begin by describing the past and current labor market behavior of individuals around pension age. We also consider the coverage of the various parts of the social security system. We go on to explain the structure of state pensions in the United Kingdom, before computing the incentives for retirement that the structure creates. We end by considering some of the evidence on retirement behavior, especially with regard to the effects of occupational pensions.

10.1 The Labor Market Behavior of Older Persons in the United Kingdom

The labor market behavior of older persons in the United Kingdom has been characterized by a severe fall in the participation of men, with younger cohorts showing distinctly less attachment to the labor market after age fifty-five. The rate of participation among recent cohorts falls sharply below 80 percent after age fifty and declines rapidly thereafter. In contrast, the secular rise in the participation of women has resulted in a small upward trend in participation among women in the age bracket fifty-five to sixty, with participation rates approaching those for men in that age group.

Three micro-data sources are used in the following discussion. One important primary data source is the U.K. Family Expenditure Survey (FES), which is available in consistent annual form for the period 1961–94. This is a continuous sample survey of some seven thousand households collecting information on expenditures, incomes, labor market activity, and demographics. A second source is the U.K. Labour Force Survey, published by the Office of National Statistics and covering some eighty thousand individuals for the period from the 1970s through to the present day. Finally, we make use of a new data source, the Family Resources Survey, a new household-level data set set up by the Department of Social Security that contains detailed income information for a sample of twenty-six thousand households. It is more than three times the size of the FES, which we traditionally use, and is specifically designed to provide good-quality information on income and benefits.

10.1.1 Historical Trends

To show how activity rates by age group have changed over time, we make use of data from the U.K. Labour Force Survey (*Labour Market Trends* [May 1996]). This covers the period from 1971 to 1995 and shows the proportion

2. These figures include the effect of the equalization of state pension age at sixty-five for both men and women, a change that will be phased in between 2010 and 2020.

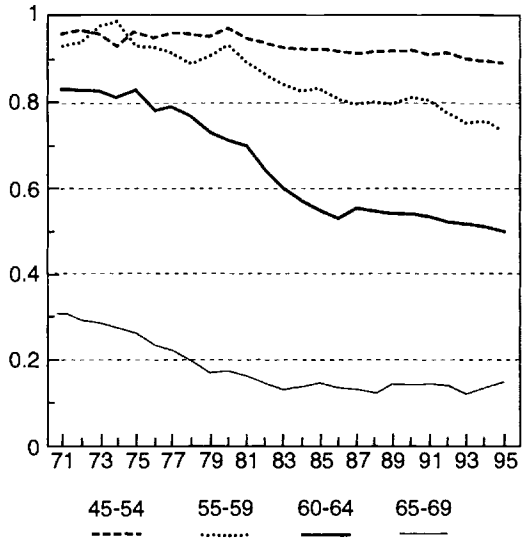

Fig. 10.1 Male activity rates, 1971–95

in each age group counting as economically active—in employment or self-employment or unemployed and actively seeking work (ILO definition). The information that we need is split into four age groups—forty-five to fifty-four, fifty-five to fifty-nine, sixty to sixty-four, and sixty-five to sixty-nine.

In figure 10.1 we present the picture of activity rates for men. Here, the drop in participation rates is clear. Falls are recorded for each of these groups, although much less dramatically for the youngest group, among whom 90 percent were still recorded as being active in 1995, a drop of 5 percentage points since 1971. For the other age groups, falls in activity rates are much more dramatic—from well over 90 to 74 percent for fifty-five- to fifty-nine-year-olds and from 83 to 50 percent for sixty- to sixty-four-year-olds. The changes are not smooth. There are very dramatic falls in activity rates, especially for sixty- to sixty-four-year-olds, in the early 1980s. This seems strong evidence that the structural change in the labor market with the loss of many jobs in traditional industries where there was a predominance of older workers played an important part in the initial reduction in activity rates, although they never recovered with the economic upturn. It is also interesting to note that there have been big activity drops among sixty-five- to sixty-nine-year-olds but that these occurred earlier, in the mid-1970s.

The pattern of changes in activity rates for women over time is very different from that of males, as is evident in figure 10.2. Among the youngest age group, activity rates grew virtually constantly over the period from 62 to 75 percent. Among fifty-five- to fifty-nine-year-olds, activity rates were uneven over the period but generally increasing. Among sixty- to sixty-four-year-olds, the pat-

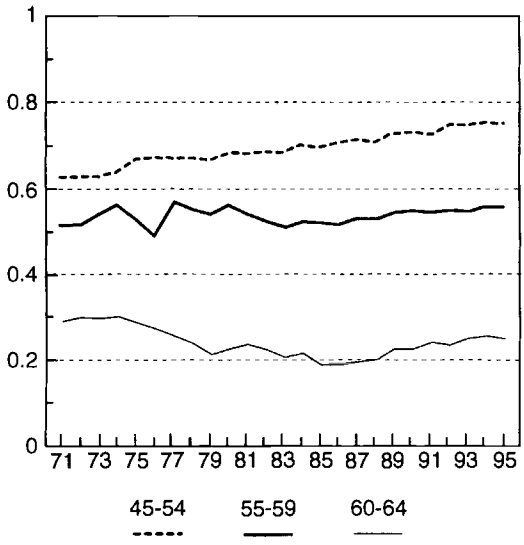

Fig. 10.2 Female activity rates, 1971–95

tern seems to be slightly U shaped, falling in the 1970s and then rising in the early 1990s.

These time-series figures by age group cloud some important date-of-birth cohort effects. We do not have an adequate run of panel data to look at an actual cohort's behavior, but we can use the long run of cross-sectional data that we have to create "pseudocohorts" and thereby see what happens to labor market activity within a particular date-of-birth cohort as the cohort ages.

Figure 10.3 shows labor market activity rates between the ages of fifty-five and sixty-five for three cohorts of men—the first born in 1913, reaching age sixty-five in 1978; the second born in 1921, reaching age sixty-five in 1986; and the third born in 1928, reaching age sixty-five in 1993. The data are drawn from the FES over the period 1968–94. *Activity* is defined as working or seeking work.

The oldest group had higher activity rates at each age, with activity falling from two-thirds to 20 percent between the ages of sixty-four and sixty-five for this group. For a very large portion of this cohort, retirement started at the state pension age. For the middle cohort, the big fall in activity occurred between the ages of sixty-one and sixty-five, while, for the youngest cohort, labor market withdrawal started earlier still.

10.1.2 Benefit Coverage

Coverage of the U.K. state pension system is now virtually universal for people under the state pension age. Anybody in work and earning more than £60.00 per week (about 15 percent of average male earnings) is covered, as is

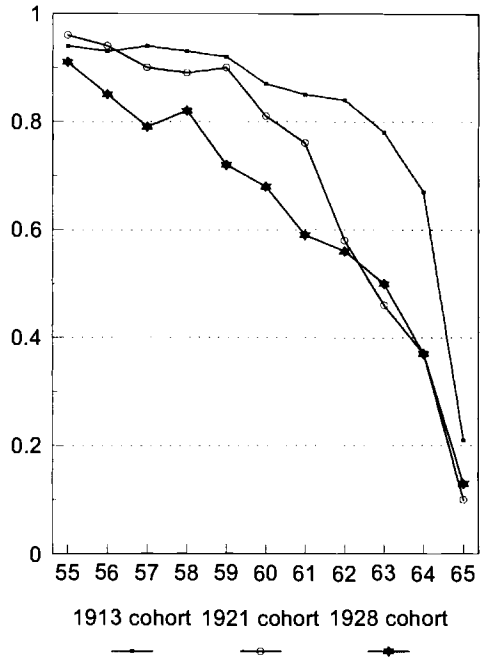

Fig. 10.3 Male activity rates in three cohorts

anybody not working who is unemployed or disabled or who is at home looking after children of school age. (A more detailed exposition of the relevant rules is set out in sec. 10.2 below.) Among men, universal coverage has been a fact virtually since the introduction of the current regime in the late 1940s. For women, the movement toward full coverage is only just reaching completion. This is the result of three separate changes. The first is just the greatly increased levels of economic activity among women. The second is the introduction, in 1978, of Home Responsibilities Protection, which effectively credits contributions for women with dependent children. The third is the phasing out of what is known as the *married women's rate* of national insurance contributions. This latter feature of the system allowed married women to pay much reduced social insurance contributions in return for forgoing rights to the basic pension in their own right. Since 1978, no new entry to this lower-rate national insurance band has been allowed. As a result of this, by 2010 virtually all women reaching the state pension age will have some entitlement to a state pension.

In sum, there has been virtually 100 percent coverage of male workers over the past thirty years. Coverage for women has been less but is now almost 100 percent. No published statistics are available that allow this trend to be graphed over time.

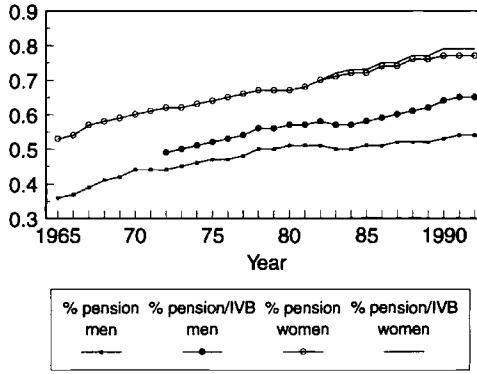

Fig. 10.4 Pension and invalidity benefit (IVB) receipt among over fifty-fives

Finally, in this historical section, we show how the proportions of men and women aged fifty-five and over receiving retirement pensions or invalidity pensions have changed over time. These trends are illustrated in figure 10.4, from which a number of interesting facts emerge. First, a rather higher proportion of women than men receive a pension. This fact—at first sight surprising—arises from the lower pension age for women, the higher proportion of women over age fifty-five who are also over age sixty, and the receipt by married women and widows of pensions entitlement to which was gained through their husband's contributions. Second, there has been a rise over time in the proportion of men and women with retirement pensions. Third, for men, there has been a very substantial increase in the proportion receiving invalidity pensions from a mere 1 or 2 percent in the early 1970s to 10 percent by the early 1990s. There has been no such increase for women, although there are signs of this changing by the start of the 1990s.

10.1.3 Labor Market Behavior in 1994–95

Participation rates by age and sex are presented in figure 10.5. The vast majority (80 percent or so) of men in their late forties are (full-time) workers. This proportion drops to around 40 percent by age sixty. For women, the pattern is similar, but it should be emphasized that one sees much lower full-time working and higher levels of part-time work. Work participation among women tails off quite rapidly for the fifty-year-old women, falling from about 60 percent in the late forties to 40 percent in the mid-fifties, 30 percent in the late fifties, and 20 percent at age sixty.

Figure 10.6 provides somewhat more detail than this using data from the Family Resources Survey. It considers four subsets of men: those employed working full-time (including the self-employed), those unemployed and seeking work, the disabled, and the retired. We ignore part-timers, who never make up more than 3 percent of any male age group.

The vast majority (80 percent or so) of men in their late forties are full-time

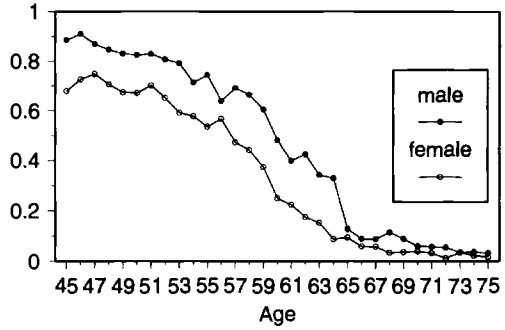

Fig. 10.5 Participation rates by age and sex (fraction in labor force)

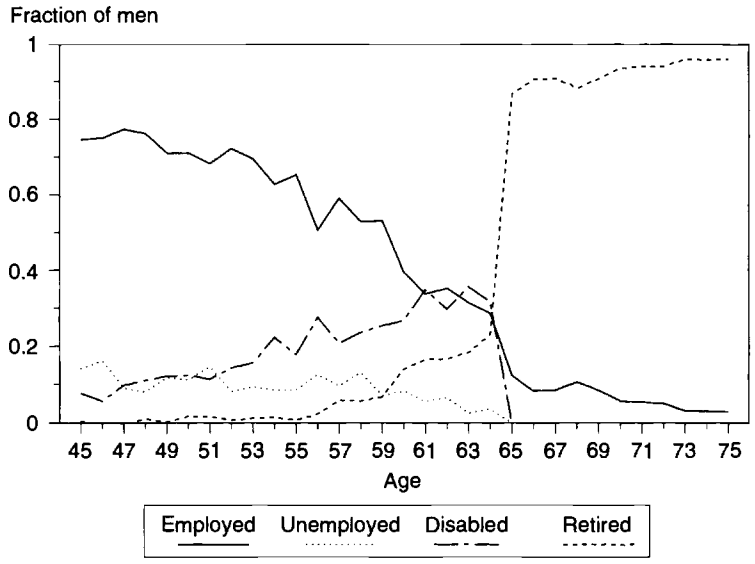

Fig. 10.6 Economic activity of men by age

workers; 7–10 percent consider themselves unemployed, and a further 7 percent are unoccupied, sick, or retired. The proportion in full-time work falls steadily, reaching 75 percent of those in their early fifties, dropping to 60 percent of those in their late fifties, and dropping sharply again to 40 percent of sixty-year-olds. This drops again to 30 percent by age sixty-four and then to under 10 percent at age sixty-six. By age sixty-one, the majority of men consider themselves unoccupied, retired, or long-term sick. Ninety percent are in this position at age sixty-six. Among those over seventy, fewer than 5 percent of those in our sample are in full-time work.

Figure 10.7 shows the corresponding distribution of activities for women.

Fig. 10.7 Economic activity of women by age

Participation in work tails off quite rapidly in the fifties, falling from about 60 percent in the late forties to 40 percent in the mid-fifties, 30 percent in the late fifties, and 20 percent at age sixty. The proportion unoccupied or retired at age fifty-nine is 59 percent, rising to 72, 75, and 80 percent at ages sixty, sixty-one, and sixty-two, respectively. Given that the state pension becomes available at age sixty, the increase in inactivity at that age is not surprising.

The state pension age is five years younger for women than for men, but a higher proportion of women work past the state pension age. There are a number of possible reasons for this. One is that there is some tendency for husbands and wives to retire at the same time, with the result that wives might not retire until their husband reaches age sixty-five. A second is that some occupational pension schemes have normal leaving ages for both men and women of sixty-two or sixty-three. Finally, because many women reach age sixty without entitlement to a full basic pension, they might work more years in order to defer receipt and thereby raise their eventual entitlement.

For comparison, figures 10.8 and 10.9 present the hazard rates out of the labor force for men and women, respectively. The relatively small sample sizes in the Family Resources Survey, which has been used to construct these figures, lead to exaggerated variation. Nevertheless, the growing rate of exit for men beginning in their early fifties is clear, as is the strong peak at the official retirement age of sixty-five. Although there is a clear rise in the hazard, there

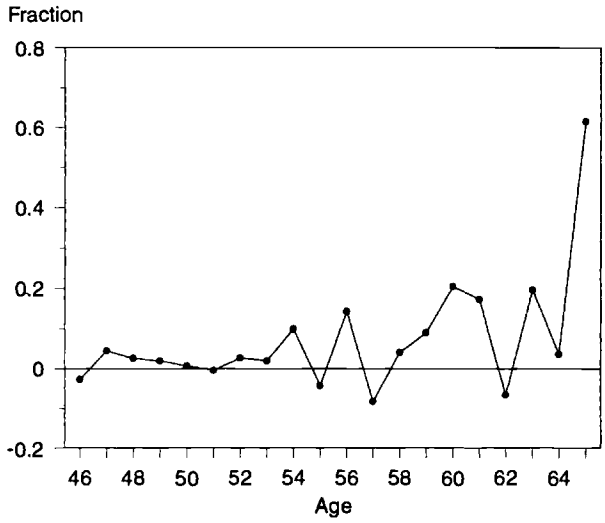

Fig. 10.8 Hazard rate out of the labor force for men

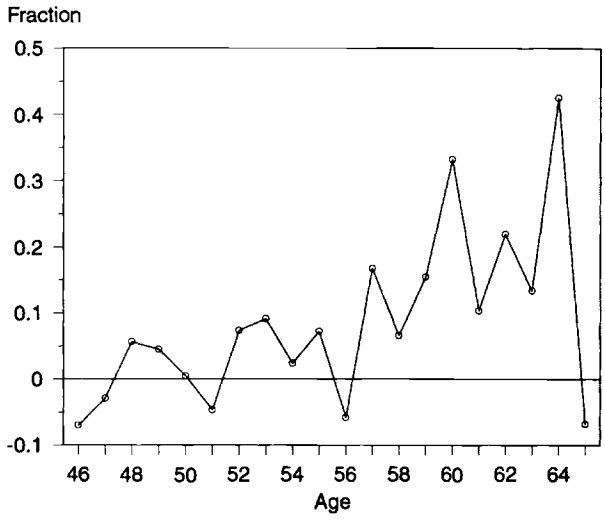

Fig. 10.9 Hazard rate out of the labor force for women

is no evidence of a peak at age fifty-five due mainly to the very different early retirement schemes available across occupations. There is, however, a peak at age sixty corresponding to the retirement age in many public-sector occupations and to the rules of the social security system, which stop entitlement to welfare benefits being dependent on work availability from age sixty. This is something we discuss further below. For women, the picture has similar overall

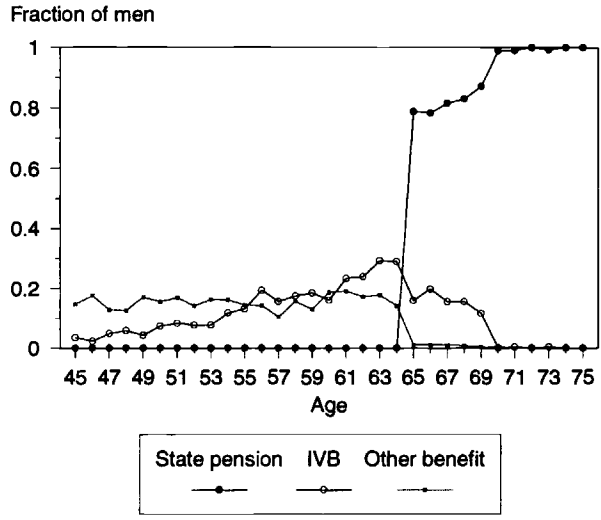

Fig. 10.10 Public income receipt for men (IVB = invalidity benefit)

shape but displays a swift increase in the hazard up to the retirement age of sixty.

10.1.4 Income Sources of Older Persons

Overall rates of public income receipt for men by age group are shown in figure 10.10. More detail is provided in table 10.1. These figures are based on data from the Family Resources Survey. The table shows the proportion of men in age bands from forty-five up receiving particular types of state benefits[3] (excluding private pensions). The columns sum too more than one hundred because it is possible to be in receipt of more than one benefit at a time. The proportion receiving some benefit (we exclude the child benefit) rises gradually with age. Over 40 percent of sixty- to sixty-four-year-olds receive some benefit: one-quarter receive the invalidity benefit, 13 percent the minimum means-tested income support, and 10 percent other sorts of sickness benefits. The fact that we do not see virtually 100 percent of sixty-five- to sixty-nine-year-olds receiving a retirement pension is simply because 17 percent are receiving the invalidity benefit. Between the ages of sixty-five and seventy, it is possible to choose which to receive if the invalidity benefit was being received prior to age sixty-five. Because the invalidity benefit was nontaxable until 1995, there was an incentive to continue receiving it.

Above age seventy-five, more than one man in ten receives means-tested

3. The housing benefit is not included. *Other* includes such categories as war pensions, special payments, and a host of small-scale benefits.

Table 10.1 **State Benefit Receipt among Males (percentages by age band)**

	45–49	50–54	55–59	60–64	65–69	70–74	75+
None	80	75	70	57	1	0	0
Pension	0	0	0	0	81	99	99
Invalidity benefit	4	8	17	25	17	0	0
Income support	9	8	8	13	5	5	11
Other sick	5	7	7	10	7	3	1
Other	10	9	9	9	8	13	16

Source: Family Resources Survey, 1994–95.

Table 10.2 **Number of Male Invalidity Benefit Recipients by Age (numbers given in thousands)**

Men	1979–80	1984–85	1989–90	1993–94
45–49	39	53	64	105
50–54	56	75	108	134
55–59	108	128	171	224
60–64	171	239	266	322
65+	47	72	177	235
All ages	506	673	917	1,217

income support (the rate of receipt among women is more than double that). This reflects the fact that income support rates are actually higher than basic pension rates, especially for older pensioners. Administrative statistics reveal that, in addition to these benefits, a further 11 percent of those over age seventy receive the housing benefit—designed to help low-income individuals afford rented accommodation.

Within the state welfare system itself, the most dramatic changes with respect to numbers receiving benefits have been in the number of individuals, particularly pre–pension age, receiving benefits initially designed for the long-term sick and disabled. The invalidity benefit is the most important of these. It is a contributory benefit payable to long-term sick individuals who can show that they are incapable of working owing to illness or disability and have been unable to work for at least twenty-eight weeks. Until recently, claimants have only been required to provide a certificate from their own doctor stating that they are incapable of working as a result of sickness. Since 1995 and the replacement of the invalidity benefit by the incapacity benefit, the rules for entitlement have been tightened with the express intention of halting the increase in numbers of recipients shown in table 10.2.

This growth in the numbers appears to be related directly to growth in unemployment rates (see Disney and Webb 1991). Until the early 1990s, the benefit provided income levels significantly in excess of such other social security benefits as the unemployment benefit and income support because earnings-

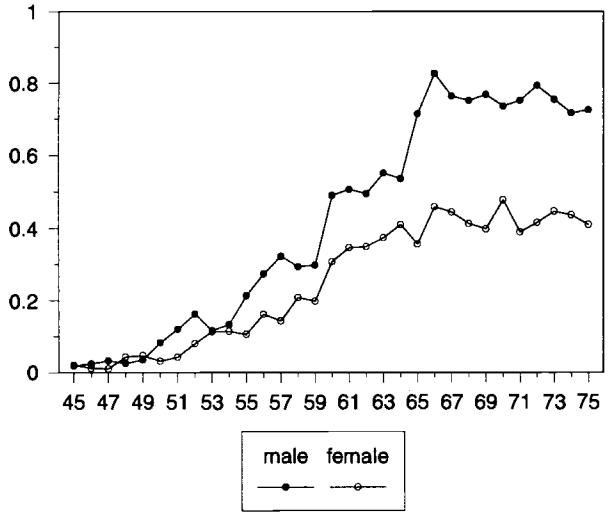

Fig. 10.11 Private pension receipt by sex

Table 10.3 Percentage of Birth Cohorts Recording Occupational Pension Receipt, by Birth Cohort, Gender, and Marital Status (men aged 65–69, women aged 60–64)

Cohort	Male Pensioners	Married Female Pensioners	Single Female Pensioners
1900–4	48	2	19
1905–9	50	2	23
1910–14	58	5	28
1915–19	64	10	31
1920–24	65	15	41
1925–29	68	23	48
1930–33	...	24	45

Source: Johnson and Stears (1995), based on the 1961–93 FESs.

related pensions were payable in the same way as for SERPS for those over the state pension age. Given that about a quarter of all men aged between sixty and sixty-four received the invalidity benefit in 1994, there can be little doubt that the invalidity benefit has been used as an early retirement vehicle.

In figure 10.11, we provide a description of the proportion of men and women at each age who are receiving a private pension. As in the United States, this rises fairly rapidly after age fifty-five, with a large gap opening up between men and women after age sixty-five. Table 10.3 gives a similar picture of the proportion of various cohorts who were receiving occupational pensions in the first five years after the state pension age. An increase in pension coverage for each successive cohort is evident, rising from around half to two-thirds

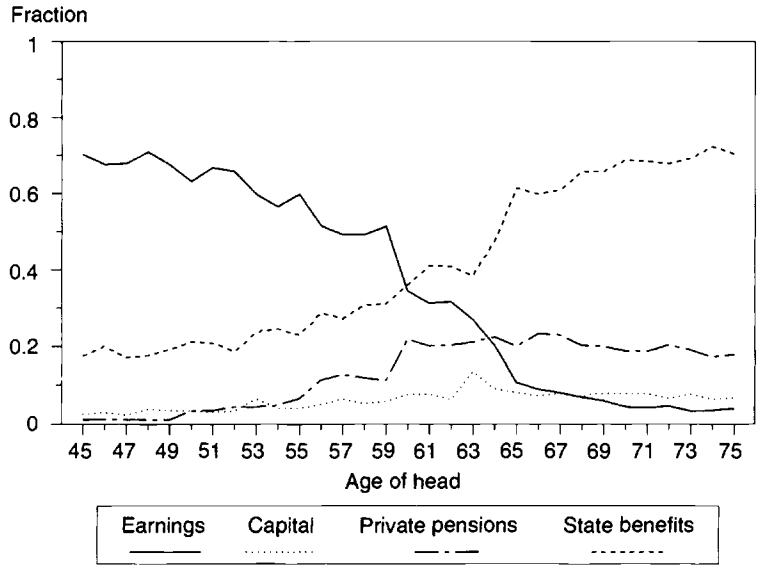

Fig. 10.12 Composition of family income by age of head of household

of men, roughly doubling to just under a half of single women, and rising from very few to about a quarter of married women. Average receipt has also risen. Among recipients, mean real occupational pension levels have doubled to nearly £90.00 per week for men and £60.00 for women. This important development in private, largely occupationally based pensions in the United Kingdom is documented in further detail below.

Finally, in figure 10.12, we present a picture of the distribution of family income by source. Earnings remain the main source of family income until around age sixty, when the importance of public and private pension sources begins to play a dominant role.

10.2 Key Features of the U.K. Pension and Social Security System

As we have made clear, it is hard to consider the U.K. state pension system in isolation from the private sector. For one thing, among recently retired pensioners, private pensions make up close to half of total income in retirement—with the mean occupational pension payment (among those receiving some payment) approaching £90.00 per week, which compares with a basic state pension of £61.15 per week. This is just about 16 percent of male average earnings. More important for understanding the structure of the system, one needs to take account of the relation between SERPS and the private sector for the majority (over three-quarters) of workers at any time are "contracted out" of SERPS into private schemes.

Traditionally, the state in the United Kingdom has offered just a basic pension at close to "subsistence" levels. First introduced in 1906, and reformed into something approaching its current form following the last war, the basic pension provides a flat-rate benefit, unrelated to earnings levels, which was £61.15 per week for a single person in 1996. Although unrelated to earnings levels, it is nonetheless a "contributory" benefit, at least in principle. Entitlement to a full benefit depends on contributions being made (or credits received) for 90 percent of a working life. This requires forty-four years of contributions or credits for men and thirty-nine years for women (rising to forty-four when pension ages are equalized at sixty-five in 2020).

These contributory conditions are nowhere near as onerous as they appear. Any time spent unemployed or sick/disabled gains credits—which count in just the same way as contributions—and time spent looking after children has, since 1978, reduced the effective number of years of contributions required through a system called Home Responsibilities Protection (HRP). Virtually all men aged sixty-five and over receive a full basic pension on the basis of their own contributions. The coverage of women currently over sixty is less comprehensive. Fewer than 60 percent receive a full pension, and the majority of them do so only on the basis of contributions made by their deceased husband. However, married women without rights of their own are entitled to a dependent's addition to their husband's pension, worth £36.60 per week in 1996.

Low rates of entitlement among married women reflect long periods spent out of the labor market by older cohorts, along with an option that married women used to be able to exercise whereby their national insurance contributions were reduced in return for a loss of pension rights. Later generations have benefited from the introduction of Home Responsibilities Protection (in 1978); they have also seen higher levels of female labor market participation. The consequence is that, by the early years of the next century, the vast majority of women as well as of men will retire with entitlement to a full basic pension (see Johnson and Stears 1996).

Perhaps the most important feature of the basic pension is its low level. It represents just 16 percent of average male earnings. With indexation in line with the retail price index, its level *relative to* earnings is falling—it was 20 percent of the male average in the late 1970s. With continued price indexation, we can expect it to fall to just 7 or 8 percent of the male average by 2030.

Currently, entitlement to the basic pension depends only on contributory record and age—there is no retirement test. It is possible, however, to defer pension receipt by up to five years to "state retirement age" (sixty-five for women, seventy for men). Deferral results in an increase in pension entitlement of 7.5 percent per year. This is more valuable to women than to men because of their higher life expectancy. Possibly as a result of this, 17 percent of female pensioners and 11 percent of males receive increments to their basic pensions as a result of deferral. There is no provision for the payment of retirement pensions before age sixty-five (men) or sixty (women).

Deferral is becoming less widespread following the abolition, in 1989, of the "earnings rule," which effectively meant that those (women aged sixty to sixty-four and men sixty-five to sixty-nine) earning more than £75.00 per week (in 1989) had their pension entitlement reduced. The reduction was fifty pence for every £1.00 between £75.00 and £79.00 of earnings and £1.00 for every £1.00 thereafter. Virtually all those affected deferred their pension receipt rather than taking a reduced amount. The fact that nearly a quarter of men and a third of women over age eighty, with pension entitlements in their own right, have pension increments as a result of deferral indicates that this was a relatively important provision when many younger pensioners worked, as they did in the 1960s and 1970s.

One might have expected the complete abolition of this rule to lead to significantly changed behavior among those in the relevant age ranges. However, as Whitehouse (1990) points out, there was limited evidence that the rule was having much effect during the 1980s. We present new evidence here based on earnings distributions in the FES in 1987–88 and in 1991–92. It should be stressed that we have only very small samples of men in work in these age groups—just seventy-two individuals in the two years 1987 and 1988 and sixty-six individuals in 1991 and 1992.

The graphs are presented with earnings shown in nominal terms. The maximum on each graph is set such that it is effectively scaled up by nominal earnings growth—of 40 percent over the period. In other words, £165 in 1991–92 becomes £115 in 1987–88 when deflated by nominal earnings growth. For ease of presentation, the graphs exclude those individuals earning over these maxima. This excludes 20 percent of the working individuals in 1987–88 but a third of those in 1991–92.

Even with this small sample, there is clear evidence (shown in fig. 10.13) of bunching at the earnings-rule level of £75.00 per week in 1987–88. The majority of those in work were, however, earning well below this level and, as we noted, about a fifth were earning well in excess of it. There is no such obvious peak in figure 10.14. The increased proportion earning over £170 might also be evidence of people being freed from the effects of the earnings rule. However, such conclusions should be treated with considerable caution, given the sample sizes in the data.

The basic pension remains by far the most important element in social security spending on the elderly. There are also, however, important income-related benefits. Of the 10 million pensioners in the United Kingdom, 1.5 million are dependent on the minimum means-tested benefit income support, which is available at higher levels than the state pension. In addition, a similar number receive means-tested help with their housing costs. This means that the minimum social security income for a single sixty-five-year-old is not the £61.15 available from the basic pension but the £67.05 available from income support *plus* the housing benefit to cover any rent.

The contributory benefit system was originally designed as a purely flat-rate

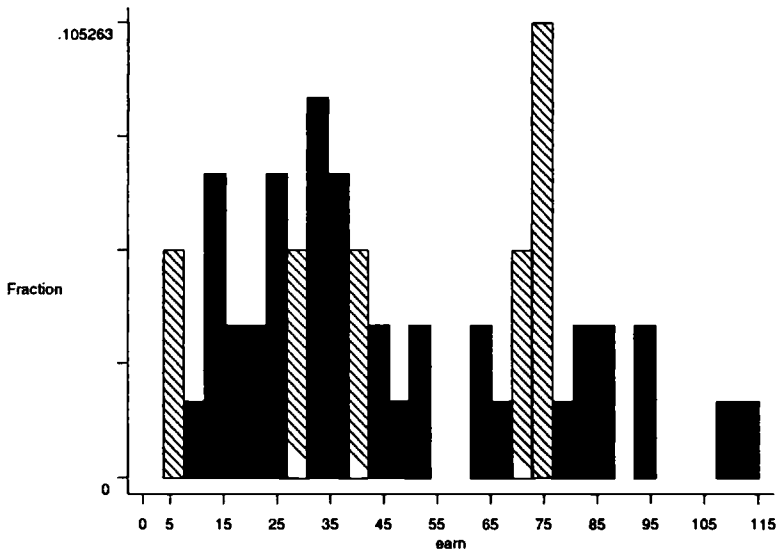

Fig. 10.13 Weekly earnings of men aged 65–69 in 1987 and 1988 FES

arrangement intended to provide only a bare minimum income level. Until the early 1960s, contributions were also paid at a flat rate. As they became partially income related, an earnings-related "graduated pension" was introduced. No further accruals were earned after 1975. Never generous, this pension is now a virtual irrelevance as its design purposely failed to allow for indexation. Although 7.5 million pensioners receive it, average receipt is just £2.00 per week. It can be safely ignored.

The same is not true of its successor, SERPS—the State Earnings Related Pension Scheme. SERPS was introduced only in 1978, with the intention that it would start paying out full benefits twenty years hence. Between 1978 and 1999, there would be a very gradual building up of maximum SERPS benefits as each successive cohort of retirees would have built up one more year of benefit entitlement.

It was originally designed, broadly speaking, to provide a pension equal to one-quarter of earnings during the best twenty years of earnings, with full inheritance by surviving spouses. The earnings on which the pension is calculated are bounded by the lower earnings limit (approximately equal to the basic pension) and the upper earnings limit (£455 per week, or just 20 percent above male average earnings, in 1996). Along with the basic pension, these earnings limits move up each year in line with prices. The result is that an increasing proportion of contributors has earnings above the upper earnings limit, which is itself not far in excess of male average earnings. Current contribution rates are 10 percent for employees and 10.2 percent for employers. The upper earnings limit caps contributions from employees but not from employers.

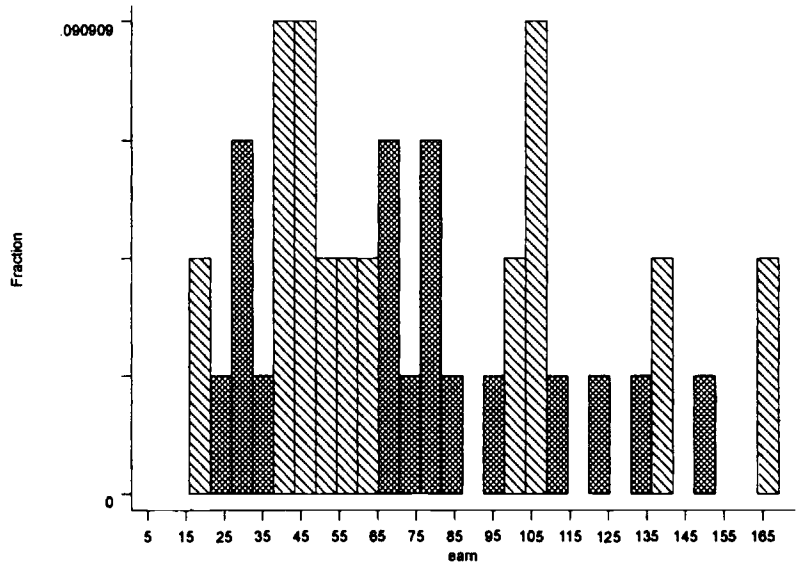

Fig. 10.14 Weekly earnings of men aged 65–69 in 1991 and 1992 FES

At present, SERPS entitlements are calculated as follows. Earnings above the national insurance upper earnings limit are ignored. Earnings in each financial year since 1978 are revalued to the year in which the individual reaches pensionable age by an index of economywide average earnings. From this figure, the national insurance lower earnings limit in the year prior to retirement is deducted. The total revalued earnings net of the lower earnings limit are then multiplied by an accrual factor to arrive at the additional pension entitlement. The accrual rate is determined by the year in which pension age is reached. It is currently 25/20 (1.25 percent or 1/80th). It is this accrual rate that determines the relation between level of SERPS entitlements and earnings levels. The current one-eightieth accrual rate is what allowed the scheme when introduced to provide a pension of a quarter of earnings over twenty years. In other words, the calculation would be number of years entitled divided by eighty and multiplied by the total level of revalued average earnings.

From 1999 on, the SERPS accrual factor will gradually fall, reaching 20/49 (0.41 percent or 1/244th) by 2027–28. So, for people retiring after 2027–28, SERPS will be 49/244 (= 20 percent) of average revalued earnings over their entire working life if they work for each of the available forty-nine years between sixteen and sixty-five. Shorter working lives will reduce the numerator accordingly and thereby reduce the proportion of revalued earnings, which will form the SERPS payment.

This fall in accrual rate was introduced in the Social Security Act of 1986 following concerns about the generosity of SERPS and the aging population

resulting in unsustainable levels of expenditure in the future. The main effect of the changes will be to move from a benefit formula producing a pension worth 25 percent of best twenty years earnings to one producing 20 percent of lifetime average revalued earnings and a reduction in survivor benefits from 100 percent of the SERPS payment to 50 percent of it.

As with the basic pension, there is no provision for the early receipt of SERPS, but receipt can be deferred on the same basis as can the basic pension. Deferral, however, is rare.

The result of the introduction of SERPS, especially for the generation retiring in the years around 2000, will be significantly to increase the social security income, and thus the total income, *of those without a private pension.* The retirement income of those in occupational pension schemes will have been largely unaffected by its introduction, however, because, from its inception, such schemes have been able to *contract out* of SERPS. People in schemes that guarantee a certain level of benefit can give up rights to SERPS and pay lower national insurance contributions as a result. Since 1988, not only have traditional final salary occupational pensions been able to contract out in this way, but so also have group money purchase and personal pension schemes. So now about three-quarters of eligible workers (i.e., those earning over the lower earnings level) are not covered directly by SERPS. Half are in occupational schemes, and another quarter are in personal pensions. The coverage of personal pensions is particularly high among young men, for whom the advantages of joining, given a rebate that is not age related and a SERPS system that is becoming less generous, are considerable. Occupational pension coverage is less clearly associated with a particular age group, although those who are covered tend to work for large employers and to be relatively well off.

These facts must be borne in mind when considering the effect of social security on retirement. There can be no question that, for many people, it is the size of, and policies followed by, their particular occupational schemes that matter. In the future, personal pensions will become much more important (very few have reached maturity) in this context.

10.3 Retirement Incentives

In this section, we look at the retirement incentives within the U.K. social security system by considering sample workers with specific sets of characteristics that are relevant to the calculation of state benefit income entitlement in retirement. The analysis reveals a number of interesting features of the U.K. retirement benefit system. In particular, it demonstrates the role of benefits available before the state pension age and the rather wide range of incentives created for different individuals depending on their earnings, age, and marital status.

In our simulations, we consider the incentives facing a man born in 1930 and so reaching the state retirement age of sixty-five in 1995.

In order for us to make the calculations, the first thing that matters is a work and earnings history. We actually need this only from 1978. We do not need to look beyond that because state pension entitlement became dependent on earnings only after that date.[4] For our base case, we take the median earnings of a male worker up to age fifty and then project these forward by average earnings growth over the following twenty years.

This results in a smooth increase in real earnings over time. But it does fail to take account of the falls in real earnings that one does observe in a cohort once the early to mid-fifties are reached. To some extent, this fall is a result of selection. Those with occupational pensions and higher earnings are more likely to retire early. This means that the lower earnings recorded for older individuals are probably closer to the ones actually faced by those people most dependent on the state system. We also considered an individual facing the actual median earnings of his cohort through to age sixty-five. The results were very similar, except that the lower earnings resulted in higher replacement rates. The results are set out in the appendix.

With this information, we can calculate the amount of SERPS plus the basic pension to which the individual would be entitled in the first and subsequent years of retirement. Given life tables (supplied by the government actuary's department) and an assumed discount rate, we can then calculate an expected net present discounted value of social security wealth. This is done, in the base case, for a married man. Under current rules, he would be entitled to a dependent's addition to the basic pension if (as we assume) his wife had no rights of her own. If she outlived him, his wife—who, we assume, is three years his junior—would inherit the full amount of his benefits (including SERPS benefits and excluding the dependent's addition). We take account of this by using mortality data on women as well and looking at the joint probabilities of one or both of them living to any age (up to one hundred).

The rules for SERPS that we use are those pertaining to people reaching pension age in 1995. That means that they receive one-eightieth of revalued earnings for every year of work from 1978. The spouse is assumed to have rights to the full SERPS pension on the death of her husband. The effects of changes in policy reducing the value of SERPS for individuals retiring after the year 1999 are not considered.

So our base case individual, results for whom are shown in table 10.4, is a married man, with cohort median earnings up to age fifty and with earnings then rising with the national average. For the moment, we assume that he would receive no early retirement benefit were he to retire before age sixty-five, as is implied, in theory, by the structure of the benefit system. We later consider the effects of relaxing this assumption by looking at the case of an individual who becomes entitled to the incapacity benefit at age sixty. We have

4. As we have already noted, the previous "graduated pension" scheme resulted in benefits so small as not to be worthy of consideration.

Table 10.4 **Base-Case Incentive Simulations**

Last Year of Work	Replacement Rate	SSW (£)	Accrual (£)	Accrual Rate	Tax/ Subsidy
54	...	66,464	...	...	...
55	...	66,232	−233	−.004	.02
56	...	66,154	−78	−.001	.01
57	...	65,830	−323	−.005	.03
58	...	65,499	−331	−.005	.03
59	...	65,179	−320	−.005	.03
60	...	64,878	−300	−.005	.03
61	...	64,708	−171	−.003	.02
62	...	64,526	−182	−.003	.02
63	...	64,309	−216	−.003	.02
64	...	64,108	−201	−.003	.02
65	.464	64,011	−97	−.001	.01
66	.491	63,818	−193	−.003	.02
67	.519	63,489	−329	−.005	.03
68	.549	63,004	−485	−.008	.05
69	.581	62,345	−659	−.011	.07

already seen that a very high proportion of individuals receive this benefit before age sixty-five.

In table 10.4, five measures are presented. The first is simply the replacement rate. This is a measure of pension income in the first year of retirement divided by available *net* earnings in that year. So, if the individual concerned could earn £10,000 (after tax) at age sixty-five and could receive £5,000 in pension benefits, he would have a replacement rate of 50 percent. For years before it is possible to draw a state pension, the replacement rate is not defined.

The second is a measure of *social security wealth* (SSW). At all points, this is wealth considered from the point of view of a fifty-five-year-old, so it is discounted to age fifty-five. It is calculated by adding together pension entitlement from each year of assumed retirement to age one hundred, conditioned on the probability of living to that age. Since the probability of living to such an old age is small, the contribution of discounted wealth at these ages is negligible. Survivor benefits are also included in this calculation conditioned on probability of death of the husband and survival of the wife.

Social security wealth is itself a net concept, in this case net of projected national insurance contributions. If someone retires at sixty-five, he receives benefits from that year on but will have paid national insurance contributions in each year up to then. We measure net social security wealth as the difference between the discounted sum of projected benefits and the discounted sum of projected national insurance contributions (including employer contributions).

The third measure is social security wealth *accrual.* This, very straightforwardly, is the difference between social security wealth in the year before re-

tirement and social security wealth in the year of retirement. It is just a measure of how social security wealth changes. A positive number means that an extra year of work will increase social security wealth, a negative number that an earlier retirement date would maximize it. Accrual *rate* is just the *proportionate* change in social security wealth between the same two years.

The final numbers presented are tax/subsidy rates, which are the absolute accrual amount divided by the earnings available in that year. So, if your social security wealth were to rise by £1,000 over the year and your earnings were £10,000, you would have a 10 percent subsidy on your earnings to work that extra year. Positive numbers, arising from negative social security wealth accruals, effectively indicate a tax on the projected earnings. Positive is tax, negative subsidy.

Taking our base case first, table 10.4 shows the results for a married man born in 1930, with a wife three years younger and entitled to no pension in her own right, and with the base-case smoothed-earnings profile described earlier.

The pattern of results is quite striking. In each year up to age sixty-five, the accrual of social security wealth is slightly negative. Net social security wealth conditional on retiring at age sixty-five is about £2,000 less than that conditional on retiring at age fifty-five. This difference is small. It reflects two features of the U.K. system and of our calculations. Until age sixty-five, this individual will be paying 10 percent of his earnings in nation insurance contributions each year, and his employer will be paying an additional 10 percent. So the cost to working an extra year is substantial. The benefit of working an extra year, in terms of social security wealth, comes through extra SERPS being accrued. Basic pension entitlement, which makes up the greater part of the total state pension, is unaffected by extra years of work. The loss in net income to higher national insurance contributions is significant for each extra years of work but adds on only once. The extra amount of SERPS earned is small for each year but payable for many years, especially given the existence of a younger wife. These values come close to canceling each other out, but the negative effect of extra national insurance contributions is just the greater.

The accrual *rate* is small—social security wealth falls at less than 1 percent per year. The effective tax on employment averages out at about 2 percent of salary each year.

This pattern is constant up to the state pension age. Further pension deferral increases the available pension, both basic and SERPS, by 7.4 percent. This increase would be inherited by the widow of our sample man in the (likely) event that he were to die first. But, of course, a full year's pension is sacrificed. By the time the man reaches his late sixties, the cost of not claiming the pension is beginning to become more substantial, although still not great.

In this example, and in what follows, we see no great change in accrual rates at age sixty-five that would be likely to explain the very great observed retirement hazards at this age. This would seem to be evidence of the impor-

Table 10.5 **Incentive Calculations—Single Worker**

Last Year of Work	Replacement Rate	SSW (£)	Accrual (£)	Accrual Rate	Tax/ Subsidy
54	...	33,951	...	...	...
55	...	32,875	−1.077	−.03	.10
56	...	31,944	−930	−.03	.09
57	...	30,794	−1,150	−.04	.10
58	...	29,626	−1,169	−.04	.10
59	...	28,465	−1,161	−.04	.10
60	...	27,339	−1,126	−.04	.10
61	...	26,330	−1,008	−.04	.09
62	...	25,333	−997	−.04	.09
63	...	24,328	−1,005	−.04	.09
64	...	23,356	−971	−.04	.09
65	.358	22,478	−879	−.04	.09
66	.379	20,491	−1,986	−.10	.20
67	.401	18,404	−2,087	−.11	.21
68	.424	16,220	−2,185	−.13	.22
69	.449	13,942	−2,278	−.16	.23

tance of social norms, of employer-determined retirement dates, and of the fact that all employment protection comes to an end once people pass their sixty-fifth birthdays.

It is also worth noting here that the assumption that the spouse has no rights of her own is important. If she had full rights of her own, then she would not be able to inherit her husband's full rights in the event of his death.

In table 10.5, where we consider the case of a single man, the importance of marital status for these calculations is demonstrated quite clearly. Pension wealth at any age is only around half that for the married man. This reflects both the higher pension rights of the married man and the higher survival expectations of his (younger) spouse, who is in a position to inherit the whole of his pension. In addition, accruals from extra work are substantially more negative at all ages; each extra year of work costs just as much in national insurance contributions, but the return is lower because there is no spouse to inherit SERPS. Before age sixty-five, these negative accruals effectively impose an extra tax rate of about 10 percent on earnings in each extra year of work.

Accruals and tax rates become much more negative after age sixty-five as the deferment rules are not generous enough to compensate the single man for the loss of each year's pension. Again, the fact that deferral rates are the same for men and for women, married and single, places single men at a significant disadvantage.

The other comparison between the single and the married man that is worthy of note is that between replacement rates. Replacement rate at age sixty-five for the married man is 46 percent, for the single man 36 percent. This is the

Table 10.6 **Incentive Calculations—Ninetieth Percentile Earnings**

Last Year of Work	Replacement Rate	SSW (£)	Accrual (£)	Accrual Rate	Tax/ Subsidy
54	...	75,942	...	...	...
55	...	75,543	−489	−.01	.03
56	...	75,107	−345	−.00	.02
57	...	74,468	−639	−.01	.03
58	...	73,736	−732	−.01	.04
59	...	72,930	−806	−.01	.04
60	...	72,133	−798	−.01	.04
61	...	71,511	−622	−.01	.03
62	...	70,955	−556	−.01	.03
63	...	70,330	−624	−.01	.03
64	...	69,748	−583	−.01	.03
65	.333	69,300	−447	−.01	.03
66	.353	68,503	−797	−.01	.05
67	.373	67,557	−946	−.01	.06
68	.394	66,442	−1,116	−.02	.07
69	.417	65,134	−1,308	−.02	.08

Table 10.7 **Incentive Calculations—Tenth Percentile Earnings**

Last Year of Work	Replacement Rate	SSW (£)	Accrual (£)	Accrual Rate	Tax/ Subsidy
54	...	61,046	...	...	...
55	...	61,143	98	.00	−.01
56	...	61,394	250	.00	−.03
57	...	61,427	33	.00	−.00
58	...	61,450	23	.00	−.00
59	...	61,469	19	.00	−.00
60	...	61,482	13	.00	−.00
61	...	61,309	−173	−.00	.02
62	...	61,353	44	.00	−.01
63	...	61,363	10	.00	−.00
64	...	61,369	5	.00	−.00
65	.631	61,204	−165	−.00	.02
66	.668	61,318	114	.00	−.02
67	.706	61,310	−8	−.00	.00
68	.747	61,163	−147	−.00	.02
69	.791	60,862	−301	−.00	.05

effect of the dependent's addition to the basic pension, which is available to the married man.

As tables 10.6 and 10.7 show, the incentive effects for high and low earners are remarkably similar to those for middle earners. Tax/subsidy rates for extra years of work are very similar. Levels of social security wealth are also much

Table 10.8 **Incentive Calculations, Counting Incapacity Benefit at Age 60 as an Early Retirement Benefit**

Last Year of Work	Replacement Rate	SSW (£)	Accrual (£)	Accrual Rate	Tax/ Subsidy
54	...	90,346	...	...	...
55	...	98,878	532	.006	−.05
56	...	91,566	688	.007	−.06
57	...	91,994	428	.005	−.04
58	...	92,424	431	.005	−.04
59	...	92,869	444	.005	−.04
60	.521	93,319	450	.005	−.04
61	.484	84,814	−8,505	−.100	.75
62	.456	76,555	−8,258	−.108	.73
63	.441	68,529	−8,026	−.117	.72
64	.425	60,761	−7,767	−.128	.71
65	.412	53,256	−7,505	−.141	.71
66	.436	52,978	−278	−.005	.03
67	.461	52,584	−393	−.007	.04
68	.488	52,061	−524	−.010	.05
69	.517	51,389	−672	−.013	.07

alike, largely as a result of the mainly flat-rate nature of the U.K. benefit system. Replacement rates, however, are very different, being very much higher for the low earner.

In table 10.8, we consider the most important divergence from the base case, one that may better describe the incentives facing most individuals who would be dependent on the state for their pension income. Thus far, we have taken the rules of the U.K. social security system literally and modeled incentives as though there is no early retirement option. However, the reality is that virtually anybody dependent just on the state provision would be able to leave work earlier and receive state benefits. This is made explicit to some extent in the social security system in that, from age sixty on, there is no "availability for work test" that must be satisfied before income support will be paid out. Furthermore, as we saw in the previous section, a very large fraction of men in their early sixties receives the incapacity benefit (previously the invalidity benefit).

With this in mind, we have performed the same calculations as above, but on the assumption that benefits become available at age sixty. In particular, we have assumed that the incapacity benefit becomes available, although it is similar enough in level to income support that the results are almost identical if one chooses to model income support instead.

The effects of introducing this possibility are dramatic, indeed. Once age sixty is reached, each extra year of work means forgoing a full year's benefits with only a small future increase in SERPS as compensation. The pattern until age sixty is familiar. After age sixty, the effects of an extra year of work are to

reduce social security wealth by about £8,000 per year. This is equivalent to a tax rate of more than 70 percent on the year's earnings and means a fall in social security wealth of around 10 percent or more for each year of work.

Until now, it has been hard to understand why the benefit system might create significant incentives to leave work early. Introducing this extra element of realism makes it much easier to see its potential role. The penalty for working past age sixty can be great, indeed. To the extent that individuals are able to claim invalidity pensions before age sixty, these arguments could, for some people, extend back even further. It is also worth saying that, until the beginning of the 1990s, SERPS additions were payable with respect to invalidity pensions as well as with respect to retirement pensions. So, for the period up to then, incentives to retire before age sixty-five would have been greater still.

For low earners, the effects of being eligible for benefits at age sixty are even more spectacular. The tax rate on an extra year's work reaches 91 percent at age sixty-one for a married man at the tenth percentile of earnings. For high earners, the effects are somewhat less dramatic, with the effective tax rate reaching a maximum of 60 percent. The potential incentives for low to middle earners to leave the labor market are very considerable indeed.

These observations raise interesting issues about the structure of the U.K. benefit system and appear to fit rather well with the observed behavior of many older men. Especially for the low paid, there are significant incentives to retire early. But it is harder to implicate the social security system alone in the *change* in activity rates since the 1970s for there have been no major changes that could have had such an effect. Put together with the fall in demand for lower-skilled workers, however, the relative generosity of social security for older groups, especially through apparently easy access to the invalidity benefit, can explain the observed fall in participation rates among older, less skilled workers.

10.4 Occupational Pensions

As we have stressed throughout, for a large part of the population, social security pensions play only a secondary role in providing retirement income and presumably also in the retirement decision. In the private sector, the standard occupational pension offers a pension equal to one-sixtieth of the final salary for each year of membership in the scheme. This was true of nearly two-thirds of private-sector schemes in 1990. So, after forty years of service, one could expect a pension of two-thirds of final earnings. Of course, very few people actually stay in schemes that long.

There are a variety of postretirement indexation provisions. Only about 20 percent of members of private schemes were guaranteed postretirement benefits to match inflation, a third could expect inflation matching subject to a maximum of 5 percent, and a further quarter were promised inflation indexation up to 3 or 4 percent. This variety of indexation promises is further complicated

Table 10.9 **Proportion of Scheme Members Covered by Particular Early Retirement Rules (1990)**

	Early Retirement at Request of Employer (%)	Voluntary Early Retirement (%)
No provision	2	9
Accrued pension actuarially reduced	11	58
Accrued pension reduced favorably	15	14
Accrued pension with no reduction	20	8
Accrued pension plus extra payment	24	. . .
Other	28	11

Source: National Association of Pension Funds.

by the fact that many schemes operate with a degree of discretion in the actual awards made.

In the public sector, a number of schemes provide a pension of one-eightieth of the final salary for every year of service but are payable from age sixty and guarantee full inflation indexation.

This range of schemes makes a "typical" pension promise hard to value. The job is made infinitely harder by the range of early retirement provisions. Here, *early* means prior to the scheme's "normal pension age." This normal pension age has traditionally been sixty-five or sixty—largely sixty for women and sixty-five for men. European equal treatment legislation has resulted in equalization between men and women, often at the lower age. Voluntary early retirement usually offers less generous terms than early retirement at the employer's request. Early retirement for health reasons is often extraordinarily generous: "Many schemes calculate the pension on the basis of the member's earnings at the time of retirement, but as if employment had continued until normal retirement age. This produces a substantially greater benefit than an ordinary early retirement" (Pension Law Review Committee 1993, 2.2.39). Employers have made use of these generous provisions to ease older individuals out of work (Pension Law Review Committee 1993, 4.15.10). Given that the rules defining exactly what counts as ill health grounds for early retirement are often unclear, there is also scope for employees to make use of them.

In cases other than ill health, the complex situation is summarized in table 10.9. Where retirement is at the request of the employer, at least 44 percent receive their fully accrued pension with no actuarial reduction, or better. Given that this is often offered as part of a voluntary redundancy package, the fact that this is designated "at the request of the employer" should not be taken to indicate that the employee has no scope for decision making in the face of such incentives. Even where the retirement decision is purely voluntary, at least a fifth of employees face better than actuarially fair reductions in benefits.

When early retirement is available, it is often available on generous terms that clearly result in losing pension wealth by working longer. The only group

for whom this is unlikely to be true are those who might expect substantial pay increases in the years approaching normal retirement age. Otherwise, there is clear potential for redistribution of resources in occupational schemes toward earlier retirees as well as toward those whose earnings do increase sharply right at the end of their careers.

10.4.1 Occupational Schemes and Retirement Behavior

Given the detail we have shown on the effects of state pensions on incentives and the fact that occupational schemes clearly provide different incentives, there is clear value in considering the actual retirement behavior of each group.

The differing nature of the rules governing occupational pension schemes and those governing state pensions clearly induces different incentives to retire before the standard retirement age. On becoming eligible, the most obvious effect of occupational pension schemes operates through a wealth effect. Individuals eligible for early retirement are less likely to work when their pension income is higher. However, occupational pensions may also give an incentive to work longer since continued employment increases eventual pension entitlement when pensions are typically linked to final earnings.

These differential incentives should show themselves in observed transition rates out of employment for those nearing retirement. To analyze this, we consider results from the 1988–1989 U.K. Retirement Survey.[5] This data source covers some twenty-five hundred households in the age range fifty-five to sixty-nine. It gives detailed employment and pension life histories. It is a retrospective work history data set unique in the United Kingdom, recording all job spells for each individual in the household and carrying health information based on a detailed description of medical symptoms.

Figure 10.15 shows *retirement probabilities* for men at each age between forty and sixty-five, separately for those with and without an occupational pension. (These are *not* retirement hazards.) *Retirement* is defined as leaving work and never reentering before age sixty-five. It is clear that the probability of retirement before age fifty-five is greater for those without an occupational pension. From age fifty-five, those with a pension are more likely to retire at each age. This pattern in part reflects the composition of the two groups—those without an occupational pension tend to be less skilled and more likely to be forced out of the labor market very early. Those with occupational pensions start to be able to take attractive levels of pensions from age fifty-five. The spike at age sixty is much more apparent for those with occupational pensions, reflecting the substantial proportion for whom this is the scheme's normal retirement age.

The equivalent picture for women is shown in figure 10.16. Here, the biggest

5. For more information on this data, see Bone et al. (1992) and Disney, Grundy, and Johnson (1997). Examples of use of the panel element of these data include Tanner (1998), Disney, Johnson, and Stears, and Johnson, Stears, and Webb (1998).

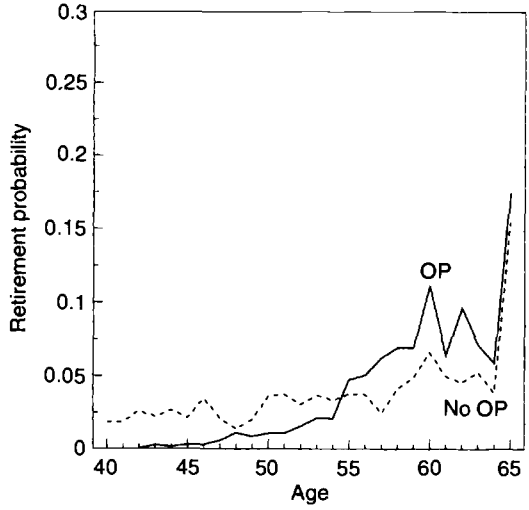

Fig. 10.15 Retirement probabilities for men (OP = occupational pension)

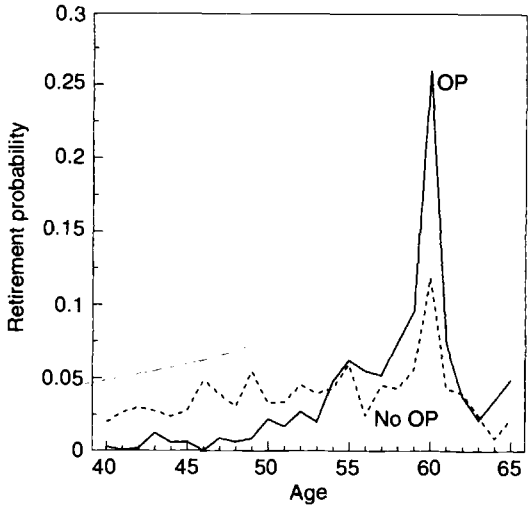

Fig. 10.16 Retirement probabilities for women (OP = occupational pension)

difference is in the size of the spikes at age sixty. Those with occupational pensions are more than twice as likely as those without to retire at age sixty. At first sight, this appears surprising given that those without occupational pensions are dependent just on the basic pension, for which the normal pension age is exactly sixty. But many will not have full entitlement in any case; within occupational pensions, the most common normal retirement age for women is

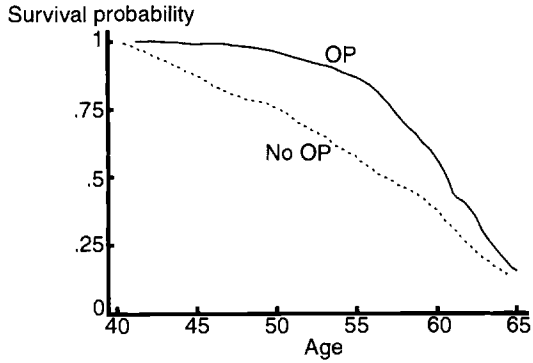

Fig. 10.17 Survival functions for men (OP = occupational pension)

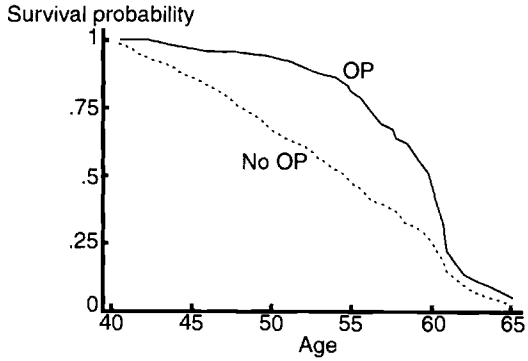

Fig. 10.18 Survival functions for women (OP = occupational pension)

sixty, and general attachment to the labor market is likely to be much lower for those without an occupational pension. The gains from working until age sixty for those with occupational pensions are much greater than for those without.

Disney, Meghir, and Whitehouse (1994) demonstrate similar effects using retirement hazards from the same data. They, too, find that the structure of pension benefits shifts the retirement probabilities, deterring individuals from retiring just prior to the earliest potential receipt of benefits. Once an individual is eligible for benefits, the hazard rate and probability of labor market exit are significantly increased.

Survival functions for men are plotted in figure 10.17 and for women in figure 10.18. The figures show the probability of survival in the labor force at each age from forty to sixty-five according to occupational pension status. They demonstrate very clearly for both men and women that those with occupational pensions are much more likely to remain in the labor market at least until age sixty than are those without. From age sixty, the survival probabilities converge for both men and women.

The labor market experience of the two groups is shown to be profoundly different. The lower retirement hazards at earlier ages among the occupational pension sample, resulting from both a lower exit rate and a lower probability of never subsequently working, mean that a large gap opens up between the two pension groups. After age fifty-five, the gap begins to close. These survival functions confirm the importance of the incentives provided by occupational pension schemes: the survival probability is considerably higher just before retirement benefits may become due (either "full" or early retirement), and thereafter the survival probability falls much more rapidly than that of those not covered by pension schemes. For those without occupational pensions, retirement behavior is considerably more heterogeneous. Retirement ages cover a larger age range and have a broader distribution. These differences in this survival to retirement functions are consistent with what we would expect given the incentive structure built in occupational pensions.

10.5 Conclusions

There have been significant changes in labor market behavior among older individuals in the United Kingdom since the 1970s. Participation and activity rates, especially among men over age fifty-five, have fallen dramatically. While it is hard to see any *changes* to the social security system that might have caused this, the social security system does provide significant incentives to retire early if, as is often the case, benefits can be received before age sixty-five. For those who can get invalidity benefits—and these individuals account for more than 40 percent of nonworking sixty- to sixty-four-year-olds—the system comes close to working as providing early retirement benefits with no actuarial reduction. The same is true for individuals who are entitled to income support in this age group. One in eight men receives this benefit. The relative generosity of these benefits and the incentives that they create, combined with the reduced demand for unskilled labor, must play a part in explaining the observed fall in labor market participation.

Among those with occupational pensions, significant increases in pension wealth could have had an important effect on increased early retirement, as could the relatively generous treatment of early retirement by many occupational schemes. We have shown that the retirement behavior of occupational pensioners differs significantly from that of those without occupational pensions in ways that are consistent with the former taking advantage of generous early retirement benefits.

Appendix
Evidence of the Effect of State Pensions on Retirement

Although there is a large international literature that has addressed the issue of estimating models of retirement behavior,[6] there is little evidence for the United Kingdom. Here, we draw on the recent study by Meghir and Whitehouse (1997) using the U.K. Retirement Survey data described above to examine the effect of various features of the pension system as well as earnings and demographic and health variables on the transition into retirement. The only previous econometric study for the United Kingdom was that by Zabalza, Pissarides, and Barton (1980), which used an earlier retirement survey but presented a purely static model of labor market participation at retirement in relation to the "earnings rule" discussed in section 10.2 above.

It is difficult to argue that retirement in the United Kingdom can be modeled as a well-defined labor market state distinct from other spells out of work. On the one hand, men within the state pension scheme can draw a pension only after age sixty-five; even this can be deferred at any point in time at a (more or less) actuarially fair rate. However, as we have seen, in addition to own savings, the state social security system, including the invalidity benefit, provides an important source of income for those out of work before that age. Those with occupational pensions are not prohibited from working even after drawing a pension early so long as they change employers. Thus, the obvious approach to modeling the age at which individuals leave the labor market is to study the transitions in and out of work up to age sixty-five, beyond which only very few men work. This is the approach followed in Meghir and Whitehouse (1997) and Disney, Meghir, and Whitehouse (1994). It was also followed recently by Blau (1994) for the United States.

In their reduced-form equations, Disney and Whitehouse show that, among other variables, health and the aggregate unemployment rate both have a strong and negative effect on the exit rate and that education increases the exit rate. The occupational variables included relate to the ones observed in the previous job. Professional/managerial workers have lower exit rates back to work and clerical workers higher vis-à-vis manual workers; nevertheless, these differences seem completely insignificant. When unobserved heterogeneity is taken into account, the effects of health and the unemployment rate increase. The exit rate elasticity with respect to aggregate unemployment for a manual worker at the start of the spell with mean education and age fifty-four is -1.16.

These results imply that age, health, and labor market conditions are important determinants of early retirement, as defined above. They affect the exit rate from jobs and change the rate of return to work in opposite directions. Thus, older men and men in poor health are likely to retire earlier, and the

6. Including Berkovec and Stern (1988), Stock and Wise (1990), and Rust (1989) on the United States and Borsch-Supan (1993) on Europe.

incidence of early retirement becomes more prevalent in periods of high unemployment. It is possible that both these effects are operating through the wage. But it is very likely that the aggregate unemployment rate and health both operate through the job arrival rate. Further, health is also likely to change the tastes toward work.

"Structural" transition equations, including earnings and benefits out of work, were also estimated. Social security benefits were shown to have a negative effect on the rate of return back to work, while earnings have a negative effect in the transition out of work and a positive effect on the rate of return back to work. The most significant effect was that of earnings on the job exit rate. Again, health and age have important effects.[7]

These results do indicate that incentive effects may play an important role in determining the age of retirement. The overall effect of benefits on the probability of retirement at a particular age (i.e., job exit at that age and nonreturn to work thereafter) can be calculated from a combination of the two estimated transition models. On the basis of the results, which control for unobserved heterogeneity, the elasticity with respect to benefits is about -0.36. In terms of these results, the job exit rate elasticity with respect to earnings (-0.54) is the strongest indication that economic incentives may affect the retirement age even for individuals without an occupational pension, indicating that lower-paid individuals do drop out of the labor market first.

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7. Health could partly capture the effect of eligibility for the invalidity benefit (for a discussion of the importance of the invalidity benefit, see sec. 10.2 above) since the reduced-form benefit equations do not include health; the FES, from which the benefits are imputed, does not contain health information.

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