The personal pensions stampede

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May 1992

THE PERSONAL PENSIONS STAMPEDE

STAMPEDE

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PREFACE

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CHAPTER 1
INTRODUCTION:
THE PERSONAL PENSIONS STAMPEDE[1]

From April 1988, individuals were offered a new pensions option by the
Government: the possibility of 'contracting out' of the State
Earnings-Related Pension Scheme (SERPS) into an Approved Personal
Pension. In a personal pension scheme, an individual accumulates his
or her pension contributions in a fund, the proceeds of which are used
to buy an annuity from an insurance company on retirement. Two main
objectives appear to lie behind this reform:

- **To see the emerging costs of SERPS curtailed.** Projections of the
  costs of SERPS into the next century had alarmed the Government.[2]
  Encouraging people to contract out of SERPS was complementary
  to other provisions in the 1986 Social Security Act intended to
  downgrade the value of future SERPS entitlements.[3]
- **To broaden private pension coverage.** Since the early 1970s,
  occupational pension scheme coverage had remained static at
  around 50 per cent of the working population (Office of Population
  Censuses and Surveys, 1989). Certain groups in the work-force, such
  as part-timers, employees of small firms, and workers in certain
  private sector industries and services, still had very low rates of
  coverage.[4] Overall, the state would continue to play the dominant
  role in providing income on retirement for many people. The
  Government was keen to reduce that role.

Personal pensions were seen as a good way of achieving these
objectives. They gave workers who were not covered by occupational
pension schemes the tax reliefs given to members of existing 'defined

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[1] A similar phenomenon in the United States — the rise in numbers belonging to defined
contribution schemes — was so labelled by Gustman and Steinmeier (1989).
[2] See Government Actuary (1985) and Hemming and Kay (1982).
[3] For details, see Creedy and Disney (1988).
[4] On the characteristics of occupational pension scheme members, see Disney and Whitehouse
(1990).

benefit' schemes.[5] Unlike most occupational pension schemes, changing job would not affect the value of personal pensions: they were fully portable. They were more flexible than many defined benefit schemes, as the pension could be drawn at any age between 50 and 75.[6] The major risk for individuals was variability in pension fund performance: a sustained period of negative or low real rates of return would lead to low pensions, whereas pensions for members of 'standard' occupational schemes and those who remained in SERPS were to some extent immunised by their entitlement being linked to earnings. But sellers of personal pension policies could point to the high real rates of return in the capital market in the previous decade, and to the insurance provided by the possibility of a personal pension optant re-contracting into SERPS at a later date if conditions seemed appropriate.

To encourage take-up of personal pensions, the Government offered to transfer a proportion of the opting individual's National Insurance contribution into their personal pension fund in return for the individual forgoing any entitlement to SERPS on reaching pensionable age for the period during which this arrangement was in force.

The proportion of the National Insurance contribution to be transferred was composed of two parts: (i) the existing contracting-out rebate available to members of occupational pension schemes, currently standing at 5.8 per cent of earnings between the National Insurance lower and upper earnings limits (LEL and UEL); this is made up of 3.8 per cent applicable to employer's National Insurance and 2 per cent to employee's; (ii) for an individual who had not already been contracted out in their current employment, an extra 2 percentage point 'incentive' reduction of their NI contribution rate between the LEL and the UEL for the period until April 1993.[7] Indeed for anyone

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[5] These included tax relief on contributions up to an age-related maximum, tax-free accrual of the pension fund, and commuting part of the annuity value of the fund to a tax-free lump sum: see Dilnot and Disney (1989). Personal pension schemes, and indeed money purchase schemes generally, are known as 'defined contribution' schemes, as the pension is wholly determined by the return on contributions paid into the fund. In 'defined benefit' schemes such as SERPS and existing occupational contracted-out pension schemes, pension entitlements are related to some measure of earnings (and, of course, years of employment).

[6] This applies only to personal pensions bought with contributions *additional* to the contracted-out rebate. The minimum age is reduced for certain occupations: for example, cricketers and trapeze artistes may draw their pension as early as 40. It is not necessary to retire to draw this part of the pension.

[7] The incentive was also available to individuals in newly contracted-out occupational pension schemes.

contracting out before April 1989, this 'incentive' was paid for the previous two tax years as a lump sum into the scheme.

Finally the rebate would be grossed up to take account of the income tax relief on an individual's pension contributions. This is applicable solely to the employee's share of the contribution (2 per cent of the 5.8 per cent) and not the incentive, giving a 'net' rate of contribution to the personal pension fund of 8.46 per cent of eligible earnings.[8] Of course the individual could supplement this amount by contributions from earnings up to the prescribed age-related maximum, and these contributions, too, would obtain tax relief.

FIGURE 1.1

Personal Pension Take-Up Rates by Age
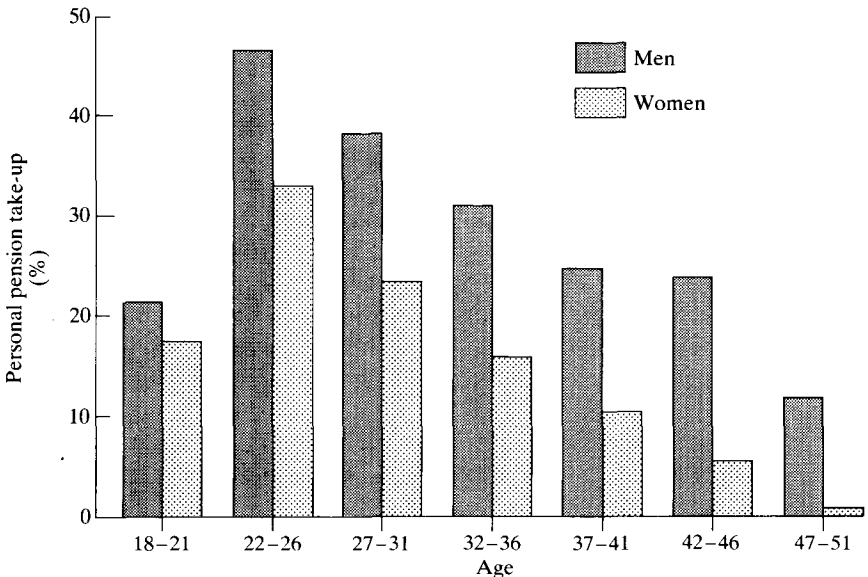
Source: Number of optants taken from National Audit Office (1991), table, p.19. Number of employees in each age range based on authors' calculations using 1989 Family Expenditure Survey data.

The introduction of personal pensions has proved extremely popular, abetted by a sustained advertising campaign by providers, which

[8] This rebate is applied only to earnings between the National Insurance LEL and UEL, and so varies as a proportion of total earnings. The percentage of earnings which constitutes the rebate is maximised when earnings are equal to the UEL.

included banks and building societies as well as specialist pension firms and financial institutions. By 1990, 4 million individuals had opted to take up personal pensions. A National Audit Office report (1991) presented some characteristics of personal pension optants from a 1 per cent sample of all optants taken by the Department of Social Security. Of the 4 million optants, 2.7 million were male and 1.3 million female. One half of optants were aged under 30. Taking the NAO figures of absolute number of optants by age and using Family Expenditure Survey data to calculate numbers employed in each age-group gives the striking take-up rates illustrated in Figure 1.1.

The take-up rate among men aged 22–26 approaches 50 per cent, while for those aged 47–51 it is little over 10 per cent. For women, the proportions are lower. As we shall see, this high take-up amongst younger workers is not surprising if these individuals engaged in a rational economic calculus of future returns in various forms of pension scheme. Nevertheless, the take-up rate contradicts the traditional assertion that younger workers exhibit myopia as to their retirement income some 30 to 40 years in the future, and of course inertia was expected to lead many individuals to remain in SERPS whether it was optimal to do so or not. The suspicion has therefore remained in some quarters that many individuals had been lured into taking up personal pensions by the 'hard sell' of providers, which focused in particular on the cumulated 2 per cent 'incentive' payment into the personal pension fund, and which played down the transactions costs associated with the management of the contributions and the conversion of the fund to an annuity value.

If the Government nevertheless felt that congratulations were warranted by the success of personal pensions in achieving the objective of broadening private pension coverage, it soon received a rude retort in the form of a highly critical report from the National Audit Office. Government policy was criticised on two main counts:

- **The failure to predict the extent of take-up of personal pensions.** The DSS had used the working assumption that half a million people would opt for a personal pension, although a contingency plan made in 1986 allowed for up to one-and-three-quarter million optants. With take-up exceeding expectations by a factor of eight, the Government Actuary (1990) has now suggested that it is reasonable to assume take-up of between four and five million at least until 1992–93, when the 2 per cent 'incentive' ends.

• **The cost to the National Insurance Fund.** Actuarial calculations commissioned by the NAO indicate a reduction in National Insurance contributions revenue totalling £9.3 billion for the six years 1988–93. This consists of a £6.9 billion cost attributable to the contracted-out rebate and £2.4 billion arising from the 2 per cent 'incentive'. The estimated long-term saving from lower SERPS payments is valued at £3.4 billion (bearing in mind that optants can revert to SERPS at a later date) although the NAO report provides no details as to how this figure is calculated. This gives the 'headline' result that the introduction of personal pensions implied a net 'cost' of £5.9 billion. It was no surprise that the *Financial Times* headlined its editorial on personal pensions after the NAO report 'The pensions débâcle' (4 January 1991) and *The Guardian* headlined 'Pensions plans blunder cost taxpayer £6bn' (5 December 1990).

To put this cost into perspective, it is worth bearing in mind that the Government's forecast for National Insurance revenues over the six-year period 1988–93 stands at a little over £220 billion. The *gross* cost of personal pension rebates (excluding future savings on SERPS) therefore represents a little over 4 per cent of total receipts for the period or, in more popular terminology, the cost of cutting the basic rate of income tax by around three-quarters of a penny.[9]

What options are open to the Government? The answer must of course depend on its objectives. Government policy appears to have been predicated on maximising the numbers who would choose to take up personal pensions; the NAO report implicitly assumes the rather different objective that the Government should minimise the budgetary cost to the National Insurance Fund. More consistent objectives might be to minimise the cost of the National Insurance rebate for a given target level of contracted-out individuals or to maximise the number opting to contract out for a given budget constraint (i.e. level of National Insurance Fund receipts). Since the contracting-out rebate was designed for quite a different purpose,[10] and its current and

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[9] Forecast National Insurance revenues taken from HM Treasury (1991), Table 2A.4; cost of cutting the basic rate of income tax from 'Tax revenue ready reckoner' Appendix to the Chancellor's *Autumn Statement*, various years.

[10] The option of contracting out was devised to stop individuals from having to make contributions to both the state and a private additional earnings-related pension. Contracting out was allowed if schemes agreed to provide a Guaranteed Minimum Pension (GMP). The rebate was set to compensate occupational pension schemes for the cost of providing the GMP — see Hemming and Kay (1981b).

prospective rate fixed by quite different criteria, there is no particular reason why this rebate is the appropriate 'subsidy' to offer to personal pension optants. We discuss this further below. Furthermore, since the 'returns' on opting to take up a personal pension differ quite significantly among individuals, as will also be shown shortly, some attempt at price discrimination in the setting of the subsidy might have been optimal. Indeed, this option was discussed when personal pensions were first considered.

There is also the question of how present costs and future benefits (i.e. the savings on SERPS) should be valued. For example, should we discount back future costs and savings? It is apparent that the National Insurance Fund is incurring substantial costs now in return for a saving on SERPS payments in the future, which, discounted back at any reasonable discount rate, is rather small. Furthermore, having subsidised individuals to opt out of SERPS, the present value of the cost of continuing the subsidy, and thereby encouraging individuals to remain contracted out of SERPS, may be less than the benefit expenditure which would be incurred if individuals opted back into SERPS when the 2 per cent 'incentive' is ended or the contracted-out rebate falls over time as projected by the Government Actuary (1990). In this case the second-best solution of maintaining the distorting subsidy may be less costly than its abandonment. These are difficult issues and again require the analysis of choice between pension schemes on the basis of individual characteristics such as age and earnings.

The object of this report is to look at individual choice between personal pensions and SERPS on a disaggregated basis. In Chapter 2 we outline briefly the way entitlements to SERPS and personal pensions are calculated, and describe a model used to calculate individual lifetime earnings histories based on a nine-year pool of Family Expenditure Survey data. This model is applied to calculate the pension from successive years in SERPS and in a personal pension scheme in Chapter 3. For each individual we can then calculate the optimal pension strategy: whether to contract out of SERPS, and whether and at what age to revert to SERPS. We illustrate the sensitivity of the choices to changes in parameters such as the real rate of return and transactions costs, and to the structure of incentives and rebates. Chapter 4 then provides a description of the aggregate results. Chapter 5 considers the Government's policy options, concentrating on the contracted-out rebate — what role it should perform and what level and structure of rebate are appropriate. Chapter 6 concludes.

CHAPTER 2
TECHNICAL ASSUMPTIONS IN MODELLING PENSIONS STRATEGY

Opting for a personal pension in place of SERPS need not involve any *current* cost to an individual: the minimum they must invest is merely the rebate of National Insurance contributions offered for contracting out.[1] They will pay National Insurance in the usual way, but the rebate and the associated tax relief will be transferred to the firm operating their pension plan. Choosing whether to take a personal pension then depends critically on an assessment of the benefits offered by SERPS compared with the likely return from a personal pension plan.

In the analysis, we compare alternative uses of the contracted-out rebate: between a personal pension and remaining in SERPS. We do not assess the optimal level of contribution into a personal pension plan, nor the relative tax advantages of alternative assets.[2] We are only investigating features which are common to both the SERPS and personal pension regimes.

Given this basis, we use microeconomic analysis to calculate lifetime earnings profiles for a large sample of individual men. It is then possible to calculate pensions obtained from remaining in SERPS or investing the contracted-out rebate in a personal pension. The optimal pension strategy for each individual may then be examined in some detail.

2.1 Modelling Lifetime Earnings Profiles

The model of life-cycle earnings underlying the pension simulation is based on a sample of over 30,000 male employees drawn from a nine-year pool of Family Expenditure Survey data for the years 1978–86. The model is described in detail in Disney and Whitehouse (1991a). Briefly, five components among the factors affecting individual earnings over time can be isolated:

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[1] The tax privileges associated with saving through pensions are still available to an individual contracted into SERPS in the form of Free Standing Additional Voluntary Contributions (FSAVCs) — see Dilnot and Disney (1989). Thus, the decision to contract out of SERPS should not be affected by decisions about 'topping up' the pension beyond the statutory minimum.
[2] On which, see Dilnot and Disney (1989), Hills (1984), Knox (1990) and Capital Taxes Group (1990).

(i)   activity patterns, determined by unemployment, childbirth, retirement, health etc.;
(ii)   occupation and industrial affiliation;
(iii)   aggregate economy-wide growth in real wages;
(iv)   occupation- and industry-specific static variations in earnings with age; and
(v)   movements over time in occupational and industrial differentials.

By a mixture of regression analysis, historical evidence and extrapolation, individual age–earnings profiles were constructed, adjusted for productivity growth and occupational and industrial affiliation. The data also provide evidence as to year of entry to the labour market and a range of background characteristics. Thus, our simulations take account, at a disaggregated level, of factors (ii) to (v) above. The major drawback is the lack of 'event history' information, including evidence as to job mobility and spells out of the labour market. Since the latter are crucial for women, we focus only on men. The assumption of no job turnover may be regarded as generating anticipated lifetime earnings profiles when no job mobility is expected.

To illustrate our model, we shall shortly consider a hypothetical case typical of individuals in the sample. First it is useful to discuss briefly some parameters of the pension system and how they affect pension values.

2.2 Calculating the Value of SERPS Entitlements

The relationship between earnings in a particular year and the SERPS entitlement accrued in that year is a complex one.[3] First, no SERPS entitlement is earned in a year when earnings are below the National Insurance lower earnings limit (LEL) for that year. Second, any earnings above the upper earnings limit (UEL), which do not therefore attract employee's contributions, are also ignored. Earnings below the UEL are revalued to the year of reaching state pensionable age using an index of economy-wide average earnings. The value of the LEL in the year prior to reaching state pensionable age is then deducted from the annual earnings figure. The rationale for the deduction of the LEL is that the limit is set approximately equal to the value of the basic state pension which they will receive. The surplus is then multiplied by an accrual rate factor (see Table 2.1) to arrive at the additional SERPS pension.

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[3] See Disney and Whitehouse (1991b) for a full discussion.

TABLE 2.1

SERPS Accrual Rate by Year of Retirement

Year of retirement	Age in 1990	Accrual rate (%)
1995–96	60	$25/20 = 1.25$
2000–01	55	$25/21 = 1.19$
2005–06	50	$22.5/26 = 0.87$
2010–11	45	$20/31 = 0.65$
2015–16	40	$20/36 = 0.56$
2020–21	35	$20/41 = 0.49$
2025–26	30	$20/46 = 0.43$
2027–28 onwards	28 or under	$20/49 = 0.41$

Note: These rates apply for SERPS entitlements accrued after 1988–89 only. The accrual rates shown are for men; after 2022–23 the rate remains at 20/44 for women due to their shorter working lives, although after 1998–99 the female accrual rate may be higher for individual women due to the provisions for home responsibility protection.
Source: Government Actuary, 1990.

For individuals retiring before 1998–99 this accrual factor is one-eightieth, or 25/20 per cent. The earnings of younger people are subject to a lower rate of accrual, and so a lower pension, as a result of two reforms in the 1986 Social Security Act. First, the switch from the 20 best years rule to an average lifetime earnings formula meant a full working life had to be spent in SERPS to accrue a full entitlement rather than the 20 years originally envisaged. As this reform is phased in from 1998–99 onwards, the denominator in Table 2.1 rises. Second, the Act also introduced a phased reduction in the target earnings replacement rate from 25 to 20 per cent — the decline in the numerator in Table 2.1.

2.3 Calculating the Value of Personal Pensions

The value of a personal pension is more difficult to predict since it depends on the accumulated value of contributions and uncertain future investment returns. We consider a personal pension accruing from the minimum contribution, namely the National Insurance contracted-out rebate and the additional 2 per cent incentive payable until 1993, both applicable only to earnings between the National Insurance LEL and UEL. The current level of the rebate, set by the Government in consultation with the Government Actuary's Department, is 5.8 per cent, though this will fall over time. The rebate was initially set at a higher level to reflect the accelerated accrual of

Guaranteed Minimum Pensions in occupational schemes (see Hemming and Kay (1981b)) associated with the introduction of SERPS. As the accrual of GMPs slows, the cost of providing them, and so the value of the rebate, will fall. Table 2.2 shows the Government Actuary's forecast of the future level of the rebate.

TABLE 2.2

Forecast Contracted-Out Rebate

	Contracted-out rebate (%)
1990–91	5.8+2.0
1993–94	4.8
1998–99	4.3
2003–04	3.9
2008–09	3.6
2013–14	3.5
2018–19	3.4

Source: Government Actuary, 1990.

FIGURE 2.1

The Contracted-Out Rebate as a Percentage of Earnings, 1990–91
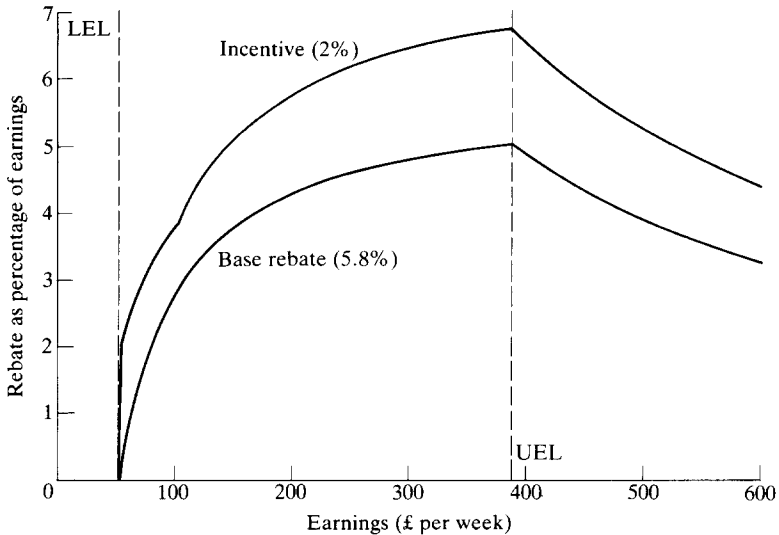
Source: Authors' calculations.

Note that although the rebate is set as a constant proportion of earnings between the LEL and the UEL, an individual investing his or her contracted-out rebate will not invest a constant proportion of his or her *total* earnings. At the LEL the base contracted-out rebate is zero although the regulations do not allow the 2 per cent incentive part of the rebate to fall below a value of £1 per week. This rule will affect anyone with less than £50 per week of earnings above the LEL. The contracted-out rebate reaches its maximum as a proportion of earnings at the UEL. The relationship between the rebate as a proportion of earnings and the level of earnings is therefore the inverted 'U shape' illustrated in Figure 2.1. Our comparison of the returns from investing the contracted-out rebate (not a constant proportion of earnings) parallels the way in which SERPS is accrued.

The Government makes a number of stipulations about converting the accumulated fund of contributions and investment returns derived from the contracted-out rebate into a pension. This is known as the 'protected rights' component of the pension; an annuity bought with extra contributions is a good deal more flexible.

First, the protected rights part must be used to purchase an annuity on reaching state pensionable age (currently 60 for a woman and 65 for a man), whilst any extra pension can be drawn earlier or later.

Second, the annuity bought must offer 'limited price indexation', that is it must guarantee an annual increase equal to inflation, up to a maximum rise of 3 per cent. Alternatively, an annuity giving a 3 per cent increase even if inflation is lower is permissible. The Government, through its commitment to pay individuals the difference between their notional SERPS entitlement and the Guaranteed Minimum Pension, effectively indexes the GMP component of the pension in payment for inflation beyond 3 per cent. However, it would only be by accident that the value of a personal pension resulting from investing the contracted-out rebate and the GMP would coincide. If a personal pension had a greater *initial* value than the GMP, then the part of the pension above the GMP would only be *limited* price indexed. The whole pension would have a declining value in real terms over the period it was being drawn if inflation exceeded 3 per cent. Conversely, a personal pension below the GMP would be over-indexed. This under- or over-indexation implies that a personal pension with the same initial value as a (fully indexed) SERPS entitlement does not provide a stream of benefits of the same value.

A third stipulation on converting the protected rights to an annuity

is that life offices must offer a table of annuity rates that do not vary with the sex or marital status of the pensioner, though they may vary the rate with the age at which the fund is converted.

Finally, the personal pension, like SERPS, must offer a half pension to a surviving spouse.

Computing the annuity rates available to personal pension holders is difficult, and evidence from the annuity market is scant since the vast majority of protected rights pensions will not become payable for over 20 years. The annuity value depends on the duration that the pension is paid (both to an individual and to their surviving spouse), on the level of inflation and on the interest rate. The English Life Tables (Office of Population Censuses and Surveys, 1987) suggest that a man who reaches age 65 lives on average to 78, and that a woman aged 60 lives to 81. Life insurers must offer annuities for the protected rights component that vary solely with the age at which the annuity starts. Since the only people converting their fund to a pension at 60 are women and those at 65 are men, insurers should be able to offer an annuity rate at 60 based on female mortality and one at 65 based on male mortality. The annuity rates shown in Table 2.3 are calculated on this assumption. If the rules require a unisex mortality assumption and insurers are unable to take account of greater female longevity (and so retirement duration), then the male annuity rates in the table would be slightly lower and the female rates somewhat higher.

TABLE 2.3

Annuity Rates Under Alternative Rate of Return Assumptions

Per cent

Real rate of return	Male annuity rate	Female annuity rate
3.5	8.3	6.8
3.0	8.0	6.5
2.5	7.7	6.2
2.0	7.4	5.9
1.5	7.1	5.6

Note: Assumes male life expectancy of 78 at 65, female of 81 at 60, rate of return between 1.5 and 3.5 per cent, full indexation and inflation of 5 per cent. In the male case, there is a one-half pension payment to a surviving spouse who is two years younger.
Source: Authors' calculations.

Table 2.3 does not take account of limited price indexation of the non-GMP component of the pension and the figures have been calculated assuming full price indexation. If inflation is greater than 3 per cent, then the annuity rates under limited price indexation would be higher than those shown in the table: for example for a male and a 3.5 per cent real return they would be 8.8 per cent with prices rising at 4 per cent, and 9.4 per cent with inflation of 5 per cent. However, as we have stated previously, these understate the 'true' value of the stream of pension benefits, since any pension above the GMP will be under-indexed. When inflation exceeds 3 per cent, the true annuity rate (taking account of the potential losses from under-indexation) will lie between the fully indexed rate and the limited price indexed rate.

The annuity rates on these assumptions are shown in Table 2.3 at various levels of the real rate of return (above prices). In Chapter 3 we investigate the sensitivity of the results both to the rate of return and to the annuity rate. Note that, for example, the 6.8 per cent female annuity rate implies that a woman retiring at age 60 with a £10,000 accumulated fund could convert this into an annual pension with an initial value of £680, subsequently increasing to take account of inflation.

Individuals contracted out will receive the difference between their GMP and their notional SERPS entitlement, that is the value of the pension they would have earned had they been contracted in. The GMP formula is similar to that for SERPS, though the GMP will usually be less than the notional SERPS benefit. We include the receipt of the residual additional pension in calculating the total pension accruing from contracting out.

CHAPTER 3
THE NEW PENSION CHOICE:
INDIVIDUAL EXAMPLES AND SENSITIVITY ANALYSIS

Use of Family Expenditure Survey (FES) micro-data allows us to consider the hypothetical earnings profiles of individuals disaggregated by industry, occupation, schooling, residence, hours, current earnings and occupational pension scheme status. We use two hypothetical case-studies to illustrate the model. We assume both men were born in 1960, and so were aged 30 in 1990. The first example lives in the North, left school at 16, and works 44 hours per week as a skilled manual worker in the mechanical engineering industry. He is not a member of an occupational pension scheme. Our second hypothetical case is working 42 hours per week as a manager in the construction industry in the South-East.

FIGURE 3.1
Forecast Lifetime Earnings Profiles
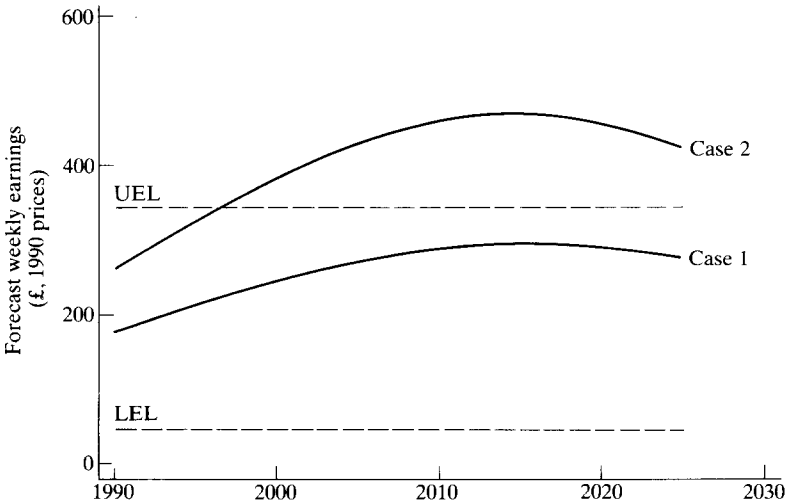
Note: Shows the age–earnings profiles predicted for the example cases with characteristics as described in the text, calculated using the method described in Disney and Whitehouse (1991a). The LEL and the UEL of the National Insurance system (assuming a continuation of the current price indexation procedures) are shown for comparison.

Figure 3.1 shows the age–earnings profiles in 1990 prices predicted on the basis of these characteristics, using the method described in Disney and Whitehouse (1991a), for these two hypothetical individuals. The earnings limits of the National Insurance system are shown for comparison. The model predicts that our first case earned just under £180 per week in 1990, our second case just over £260. Note how their relative pay is projected to vary over the lifetime, with the earnings gap widening in their 40s and 50s and subsequently narrowing.

We have the information we have described for these two example cases for the whole FES sample of over 30,000 employees. These cases are not atypical of the individuals in the data set.

3.1 An Example

We now consider the build-up of pension entitlements over the remainder of our first case's lifetime. We have modelled his earnings for each year from 1990 to 2025 — the year he reaches state pensionable age. Over this period, his earnings are predicted to average £230 per week in 1990 prices. With assumptions about the National Insurance earnings limits, the contracted-out rebate, the SERPS accrual rate, the annuity rate and the level of investment returns, his total pension entitlement can be calculated under the two types of scheme. Some of these are current practice (see note to Figure 3.2). On our 'baseline' assumptions, his SERPS entitlement earned in the period 1990 to 2025 is predicted to be £48.86 per week (in 1990 prices); a personal pension is forecast to buy an annuity worth £57.28 per week. If he contracted out, he would also receive the difference between the SERPS pension and the GMP, which in this case is £3.38 per week. The total weekly pension resulting from contracting out is therefore £60.66, one-quarter more than SERPS. Given that there need be no *current* cost to opting for a personal pension (it is financed by the transfer of the contracted-out rebate), the predicted benefits suggest that our example individual would be better off taking out a personal pension.

However, this analysis ignores the fact that it is possible to return to the state scheme after contracting out. Our individual should not, then, be considering the total lifetime pension, but rather the increment to total pension arising from spending a period in one type of scheme. Figure 3.2a breaks down the total SERPS and personal pension into a series of annual components representing *the increment to total pension that would be earned from spending each additional year in either scheme*. The

FIGURE 3.2

Forecast Increment in Pension Value from Personal Pension and SERPS

3.2a **First Example**   3.2b **Second Example**
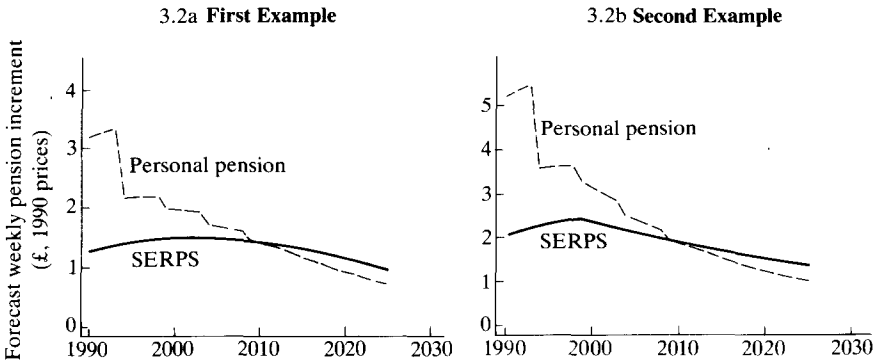
Note: Shows the value of the weekly pension entitlement earned if a given year is spent in that scheme. Assumes 2 per cent per annum economy-wide earnings growth, real rate of return of 3.5 per cent, indexed annuity rate of 8.3 per cent, no transactions costs, indexation of the LEL and UEL to price inflation, and that the contracted-out rebate follows the path forecast by the Government Actuary (1990), see Table 2.2.

Source: Authors' calculations based on example case. Life-cycle earnings derived from analysis of 1978–86 Family Expenditure Survey data.

total pensions described above (£48.86 for SERPS and £60.66 for a personal pension) are obtained by *summing these increments over time* for each scheme.

Our second case earns a higher increment in both schemes since his earnings are higher. Figure 3.1 shows that his earnings cross the UEL of the National Insurance system in 1997. This caps entitlements to SERPS and the value of the contracted-out rebate for personal pensions, and affects the shape of curves in Figure 3.2. It is particularly apparent in the concavity of the SERPS curve. Despite the differences in earnings levels and profiles, the qualitative result remains the same: the optimal pension strategy is to take out a personal pension, and then re-contract into SERPS in 2009. The invariance of the re-contracting-in year to factors other than year of birth is considered further in Chapter 4, where we present our results for the whole sample. First, we look at some further issues using our first example.

What does Figure 3.2 tell us? First, it shows that increments to personal pension entitlement are greater early on in the working life, despite the fact that earnings are generally greater in later years. This weighting arises from the effect of compound interest — contributions from earlier years accrue a much larger total return. The time profile of the

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projected fall in the contracted-out rebate (see Table 2.2) is also responsible for the downward slope of the personal pension increment curve. In addition, this lies behind the discontinuities in the curve. The revaluation of individual earnings in line with economy-wide average earnings in the SERPS scheme also gives greater weight to earlier years than, for example, revaluation in line with prices (Disney and Whitehouse, 1991b). The annual increment to a SERPS pension therefore has a much flatter profile than real earnings over the lifetime.

Figure 3.2 also shows that an optimal pension strategy involves switching between the two schemes. The year 2009 marks the cross-over of the two lines. Our first example individual would be better off contracting back into SERPS in 2009, when he is aged 49, than remaining in a personal pension scheme. Following this optimal strategy, his pension earned would be £63.47, 30 per cent more than remaining in SERPS and around 5 per cent more than opting for a personal pension for the whole period 1990 to 2025. Note, however, that while a mixed personal pension / SERPS strategy is optimal, the discrepancy in values between reverting to SERPS and remaining in a personal pension until state pensionable age is rather small, and any additional switching costs involved in changing scheme would erode this differential still further.

3.2 Transactions Costs

The above analysis ignores transactions costs. Some commentators have suggested that these may substantially reduce the attractiveness of a personal pension. We assume transactions costs consisting of a flat-rate annual charge of £26, and a further 4 per cent of the accumulated lump sum levied when an annuity is purchased. These charges exceed the standard scale set by the Life Assurance and Unit Trust Regulatory Organisation (LAUTRO) which must be used by pension providers when illustrating benefits, though they are in the middle of the range found by Walford (1991) in a survey of pension firms. Together, these may represent between a fifth and a third of the contributions to the scheme, depending on the level of earnings and the age at which the contributions were made. Figure 3.3 compares the results of the model for our first example 30-year-old with and without these transactions costs.

Including transactions costs does not significantly affect the *qualitative* result that the optimal pension strategy involves switching between the

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FIGURE 3.3

**Forecast Increment in Pension Value from Personal Pension and SERPS
Including the Effect of Transactions Costs**
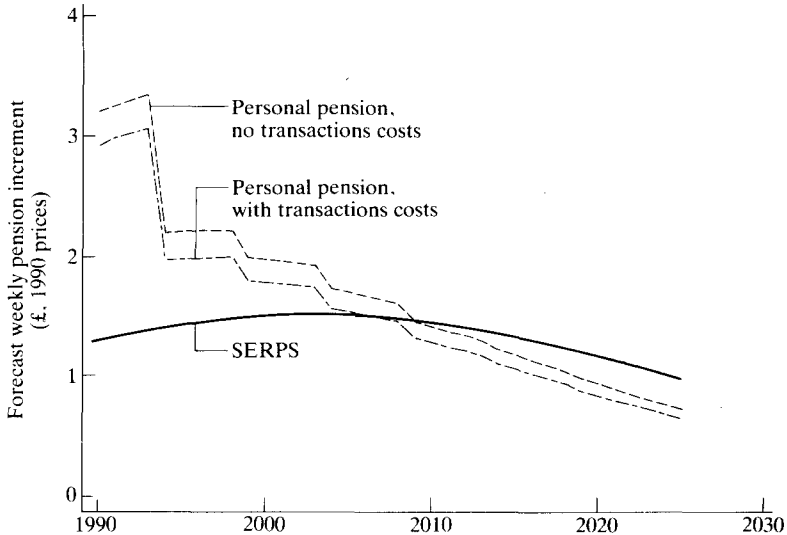
Note: Assumptions as in note to Figure 3.2; transactions costs as described in the text.
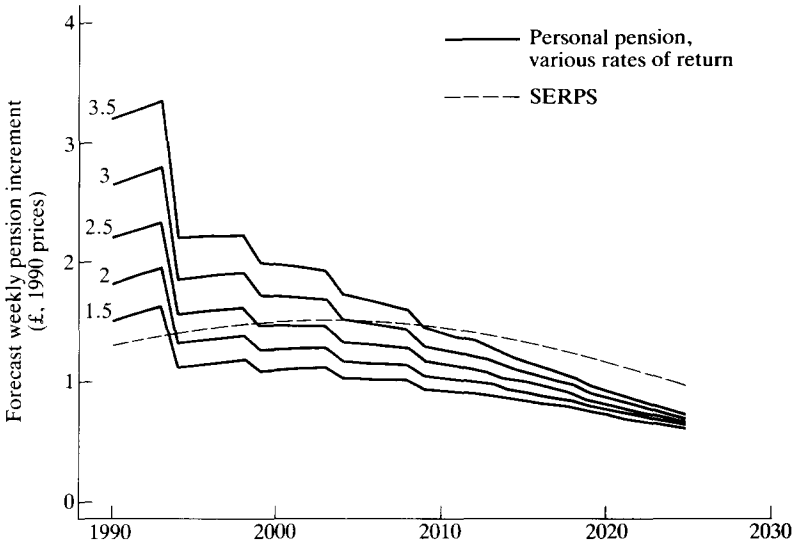*Source:* Authors' calculations.

two schemes. Indeed, it makes it more likely, given that the differential between the personal-pension-only strategy and the mixed strategy is larger. However, the cross-over age shifts back to 47. The value of a personal pension (including the residual SERPS payment) from contracting out for the whole period is reduced to £54.73, a cut of £5.93 or nearly 10 per cent of the total pension value. The total pension (both from SERPS and the personal scheme) under the optimal strategy of switching between the two pension plans is reduced to £59.47.

3.3 Sensitivity Analysis: The Rate of Return

One of the central assumptions in modelling personal pension entitlements is the real rate of return earned on contributions. Figure 3.4 looks at the effect on the pensions choice of our example individual of varying the assumed rate between 1.5 and 3.5 per cent. The impact of rates of return outside this range should be clear.

Shifting to a lower rate of return rotates the personal pension curve

FIGURE 3.4
Forecast Increment in Pension Value from Personal Pension and SERPS
**Varying the Assumed Rate of Return**

Note: The personal pension calculation includes transactions costs as described in the text.
Source: Authors' calculations on example case.

downwards and anticlockwise: the impact of a lower rate in reducing returns is greater in earlier years due to the compound interest effect, though there is still a drop in pension from a lower rate of return in later years due to the effect on the annuity rate. The impact on optimal pension strategy is substantial. However, the effect for this particular individual is not so much on whether to opt for a personal pension — this is still optimal with a real rate of return below 2 per cent — as on when it would be best to re-contract into the SERPS scheme. At a 3 per cent return the cross-over age moves back to 44. At rates of return between 1.5 and 2.5 per cent the incentive to take out a personal pension becomes very small, and the cross-over year is now 1994 (at age 34), when the incentive rebate ends and the basic rebate is forecast to fall to 4.8 per cent. With the returns critically dependent on unknown future returns, calculating the optimal point to re-contract into SERPS is highly sensitive to the assumptions made.

What bounds can we suggest for the real rate of return? Many would argue that the real return must be positive. For example, the Social

FIGURE 3.5
**Annual Average of the Cumulated Real Rate of Return on a 20-Year Investment in UK
Equities and Short-Term Fixed Interest Deposits**
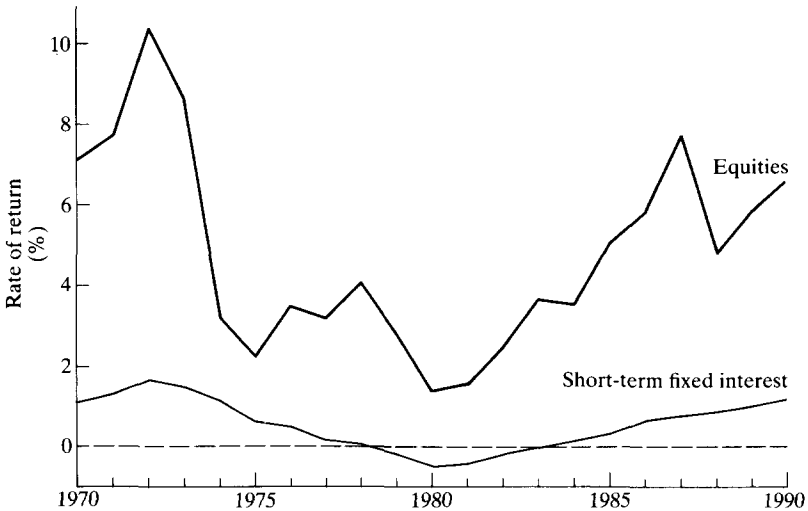
Note: Equities calculation based on Financial Times Actuaries All Share Index. Accumulated
money return including changes in capital values and gross dividend income. Short-term
interest rate successively from bank rate, minimum lending rate and bank base rates. Deflated
by retail prices index.
Source: Watson and Sons, 1990.

Security Pensions Act of 1975 precludes the Government Actuary from
using a negative return in his or her projections. However, Hemming
and Kay (1981a) suggest that there is no economic argument why the
return on physical (and so financial) investment should not be negative
— even in the face of negative returns, savings and investment will still
take place. With little guidance from a theoretical point of view, perhaps
recent experience is the only guide available. We consider the returns
on two illustrative types of asset for the period 1970 to 1990: equities
and short-term fixed interest deposits, deflated by the retail prices
index. The real return on ordinary shares averaged 7.8 per cent over
the 21-year period, that on short-term deposits 1.3 per cent. The former
exhibited much more variability in the return (a range of –50 to +40
per cent) than the latter (–12 to +9 per cent). However, pensions are a
long-term investment. Figure 3.5, therefore, presents for each of the
years 1970–90 the annual average of the cumulated return on a 20-year
investment using data for 1950–90.

Over the long term, as one would expect, the variability in returns is reduced substantially. For equities the range is now between 1 and 10 per cent, for real interest rates between −0.5 and +1.7 per cent. Though there is little evidence on the asset distribution of personal pension fund investments, occupational pension schemes have tended in the 1980s to maintain a portfolio with a 70/30 ratio between equities and cash or fixed interest deposits.[1] With this asset distribution, the mean 20-year moving average of the real rate of return is around the 3.5 per cent we take as our baseline assumption.

3.4 Sensitivity Analysis: The Annuity Rate

Chapter 2 showed the sensitivity of the annuity rate to the rate of inflation given the rules for limited price indexation. If inflation exceeds the 3 per cent limit, then the Government will pay for uprating the GMP component of the pension. If the real rate of return remains the same, then the nominal rate of return is increased. In these circumstances, the rate of increase of the annuity fund during retirement is increased relative to the rate of change in pension payable. The result is a higher initial annuity value.

Figure 3.6 illustrates the impact of a range of annuity rates on either side of our 8.3 per cent baseline assumption. The effect is broadly similar to varying the rate of return assumption. An annuity rate of 10 per cent would be consistent with limited price indexation and inflation of around 6 per cent. Note, though, the proviso we attached in Chapter 2: following the optimal pension strategy would result in a pension above the level of the GMP, and so would mean that more than one-quarter of the pension would be uprated at less than inflation.

3.5 Women and Personal Pensions

Our results have focused on a set of cases of male employees. The analysis for women is more complex. Women tend to have complicated employment histories, with periods of non-participation, part-time employment and a greater degree of occupational mobility. It is therefore necessary to model labour force participation as well as

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[1] Occupational funds currently hold around one-third of their portfolio in other forms such as overseas assets, property and index-linked securities: see Combined Actuarial Performance Services Ltd (1990).

FIGURE 3.6
Effect of Varying Annuity Rate Assumption
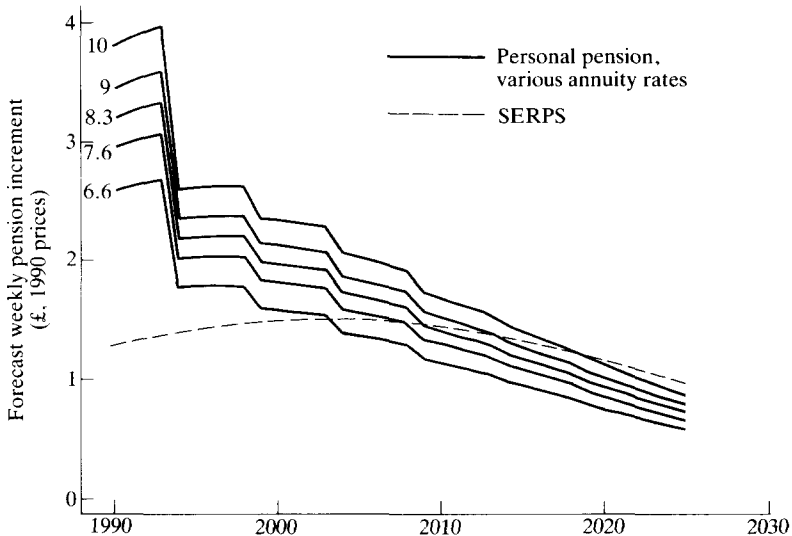
Note: Assumptions as in note to Figure 3.2, except that annuity rates are varied as shown.

earnings over the lifetime. Indeed, given recent trends in activity rates, earnings may well be easier to forecast than participation. Nevertheless, we can illustrate the likely outcomes with one or two stylised examples.
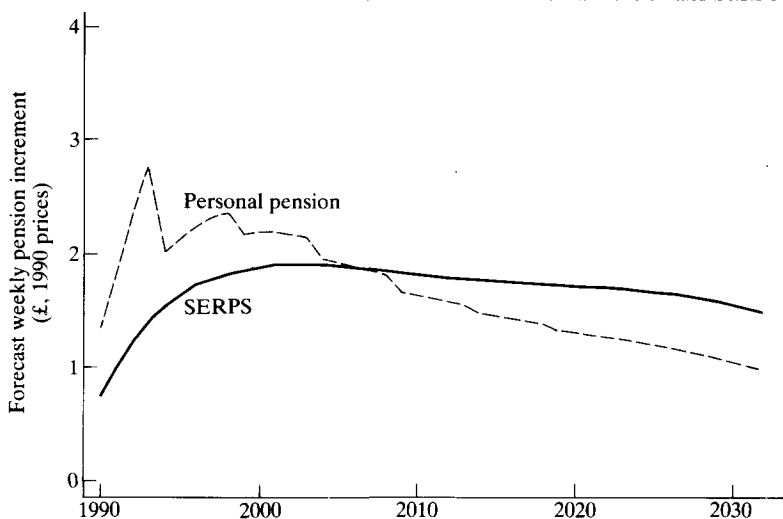
We use the cross-section age structure of pay derived from an analysis of Family Expenditure Survey data, coupled with an assumption of 2 per cent per annum economy-wide real earnings growth to derive an estimate of the lifetime pay profile for a woman born in 1972, and so aged 18 in 1990. Shortly, we will use these results to look at the build-up of entitlements in the two pension schemes along the lines of Figures 3.2 and 3.3.

It should be noted that SERPS is considerably more generous to women than men. Women receive their state pension earlier, but no account is taken of this in calculating their pension entitlements, whereas with a personal pension, the annuity will take account of this aspect of the greater duration of retirement. Women's greater longevity also extends the length of their retirement. To the extent that life offices may set annuity rates for the protected rights pension at age 60 based on female mortality and at age 65 based on male mortality, they will be able to take account of this second reason for longer retirement. If they

do not, then the male and female annuity rates will be slightly closer. However, even taking account only of earlier retirement, the annuity rate offered by the private sector is less generous for women than the (implicit) annuity rate from SERPS.

The consequence of the greater generosity of SERPS is that the 'cut-off' age at which women should no longer consider a personal pension is lower, and that the optimal age of re-contracting in is younger. We illustrate this again using an example.

FIGURE 3.7

Forecast Increment in Pension Value from Personal Pension and SERPS

Note: Earnings profiles derived from cross-section median full-time female earnings by age taken from 1989 Family Expenditure Survey data coupled with an assumption of 2 per cent per annum economy-wide earnings growth. Uses the baseline assumptions, transactions costs and pension calculation methods as discussed in the notes to Figures 3.2 and 3.3. Annuity rate of 6.8 per cent is assumed.

Figure 3.7 shows the pension increment curves for a personal pension and SERPS in the way that Figure 3.2 illustrated the pension choice of an example man. This hypothetical woman, assumed to be born in 1972 and so aged 18 in 1990, would be better off contracting out of SERPS. However, on the baseline assumptions, she would improve her pension by re-contracting into SERPS in 2007, when she is aged 35.

Note that the home responsibility protection rules in the pension

system mean that women out of paid employment caring for children or sick relatives are credited with a SERPS entitlement for this period. Given that the Government pays people the difference between the notional SERPS entitlement and the GMP, even women who have contracted out during periods in work will receive a SERPS entitlement for any periods of home responsibility. Although Figure 3.7 shows a set of continuous curves, it does reflect the pension choice both of a woman with a full career and of a woman with periods of home responsibility.

3.6 Personal Pensions and SERPS in 'Steady State'

FIGURE 3.8

Annual Increment to SERPS and Personal Pension with Steady-State Assumptions
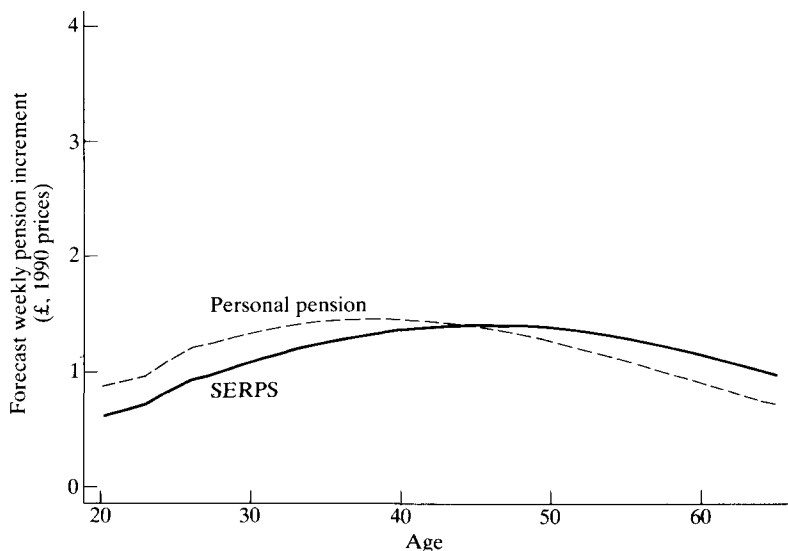
Note: Assumes 3.5 per cent real return. SERPS accrual rate set at male steady-state value of 20/49. Contracted-out rebate assumed 3.4 per cent; rate of return 3.5 per cent; earnings growth rate 2 per cent.

Many commentators have argued that pensions policy should be considered in the long-run, 'steady-state' context.[2] We have stated

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[2] See, for example, Hemming and Kay (1982) and Creedy, Disney and Whitehouse (1992).

previously that one reason for the relationship between age and the marginal annual increment to personal pension is the time path of the contracted-out rebate. This time path is an artefact of the introduction of SERPS (and GMPs) with an accelerated build-up of entitlements, since the contracted-out rebate is designed to reflect the average SERPS (and GMP) accrual rate of the population as a whole. What happens to pension incentives in 'steady state', when the working population all accrue SERPS entitlements at the same long-run rate?

Figure 3.8 shows the marginal pension increments in the two schemes with the SERPS accrual rate at its steady-state level (20/49 or 0.41 per cent) and the contracted-out rebate at the long-run level predicted by the Government Actuary (3.4 per cent). It remains the case that personal pensions dominate early on in the working life, but SERPS provides a larger increment in later years. Optimal switching between the two schemes is now wholly driven by the compound interest effect. Earlier earnings in a personal pension generate a return of 3.5 per cent on our baseline assumptions. In SERPS, these earnings are revalued at a rate of only 2 per cent. Although the 'cross-over' between SERPS and a personal pension still exists, it is apparent that the disparity in returns is considerably reduced. Indeed strategies of remaining in SERPS or remaining in a personal pension throughout the lifetime generate roughly the same income: £53.77 (SERPS) compared to £55.06 per week (personal pension). However, as mentioned, a small gain in pension can be obtained by switching from a personal pension to SERPS at age 44. This optimal strategy generates a total pension from the two sources of £58.56 per week.

This 'steady-state' case highlights the fact that it is both the accelerated accrual at present contained within SERPS, and the underlying age structure of incremental returns, which generate the disparity in pension accruals over the lifetime.

CHAPTER 4
THE NEW PENSION CHOICE: AGGREGATE RESULTS

It is now possible to summarise the aggregate results of our analysis of optimal pension strategy for the whole sample of over 30,000 men. We consider first optimal contracting-out behaviour, before turning to the issue of contracting back into SERPS, and investigating the sensitivity of the results to assumptions about real rates of return. Note that the results are based on the annuity rate assumptions in Table 2.3 and the assumption of a part fixed, part variable transactions cost described in Chapter 3.

4.1 Contracting Out of SERPS

The results for contracting out showed very little variation in optimal behaviour with any factor including earnings, other than cohort. Table 4.1 therefore presents the age in 1990 *below* (and including) which it would be optimal to contract out at various rates of return.

TABLE 4.1

Cohort and Age at which Optimal to Contract Out in 1990 by Real Rate of Return

Real rate of return (%)	Cohort	Age in 1990
3.5	1941	49
3	1942	48
2.5	1944	46
2	1948	42
1.5	1955	35

Note: Shows maximum age (oldest cohort) at which contracting out would improve the value of the pension: all those younger should contract out, all those older remain in SERPS.
Source: Authors' simulations based on Family Expenditure Survey data, 1978–86.

On our baseline assumptions, any man aged under 50 would improve the eventual value of his pension by contracting out of SERPS into a personal pension.[1] In total, around 80 per cent of male employees in

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[1] Note that this analysis ignores occupational pension schemes. In general, the returns from occupational pensions will dominate those from both SERPS and personal pensions, though they may require some current contribution from employees in addition to the contracted-out rebate.

1990 would be better off with a personal pension than in SERPS. Shifting to a lower rate of return reduces the attractiveness of a personal pension and so reduces this cut-off age. At 2.5 per cent this is 46; at 1.5 per cent only those 35 or under should contract out.

4.2 Re-Contracting Into SERPS

TABLE 4.2

Dominant Re-Contracting-In Ages for Males by Cohort and Age in 1990

Cohort	Age in 1990	Cross-over year	Cross-over age	Percentage of age-group
1941	49	1994	53	92
1942	48	1994	52	100
1943	47	1994	51	100
1944	46	1994	50	100
1945	45	1994	49	100
1946	44	1994	48	100
1947	43	1994	47	100
1948	42	1994	46	100
1949	41	1994	45	100
1950	40	1997	47	61[a]
1951	39	1999	48	83
1952	38	1999	47	98
1953	37	1999	46	99
1954	36	2000	46	72[b]
1955	35	2003	48	71[c]
1956	34	2004	48	93
1957	33	2004	47	99
1958	32	2004	46	99
1959	31	2006	47	74[d]
1960	30	2009	49	83[e]
1961	29	2009	48	93
1962	28	2009	47	97
1963	27	2009	46	95
1964	26	2009	45	96
1965	25	2010	45	60[f]

[a] Also 20% 1996 and 10% 1994.
[b] Also 28% 1999.
[c] Also 15% 2002 and 6% 2001.
[d] Also 14% 2005 and 12% 2004.
[e] Also 8% 2007 and 4% 2006.
[f] Also 35% 2009.

Note: Shows the cross-over age for each age-group at which the majority would find it optimal to re-contract into SERPS assuming a real return of 3.5 per cent and earnings growth of 2 per cent. Transactions costs included as described previously.

Source: Authors' simulations based on Family Expenditure Survey data, 1978–86.

Table 4.2 considers when it is optimal to contract back into SERPS for each cohort on our baseline assumptions, assuming that the Government Actuary's prediction of the future contracted-out rebate is correct. Generally, the cross-over (or re-contracting-in) age was found to be relatively invariant with factors other than cohort. For the majority, over 90 per cent of each age-group are forecast to be better off contracting back in the same year, though in some cases there is variability within the cohort by factors such as earnings (see notes to Table 4.2). The pattern observed in Table 4.2 arises from the discontinuities in the incremental value of a personal pension resulting from the time path of the contracted-out rebate. Many of the cases detailed in the table are forecast to return to SERPS in a year that the contracted-out rebate is reviewed. Figure 4.1 shows the distribution of optimal re-contracting-in year for all those in our sample forecast to contract out, confirming that the majority of re-contracting in occurs in years when the rebate is reviewed. Clearly, greater variation in optimal re-contracting-in ages would be observed were the forecast time path of the rebate to exhibit less extreme discontinuities.

FIGURE 4.1

Distribution of Re-Contracting-In Years
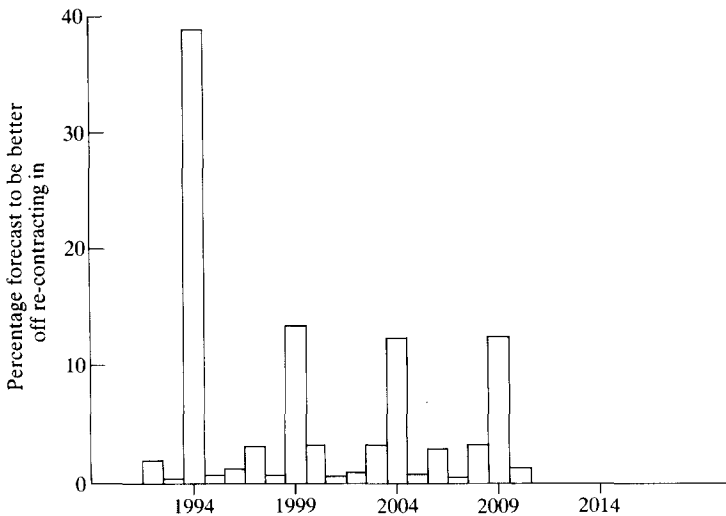
Note: Summarises data from Table 4.2.

Source: Authors' simulations based on Family Expenditure Survey data, 1978–86. The years marked (1994, 1999 etc.) are the years when the contracted-out rebate will be reviewed.

We stated previously that everyone under the age of 50 would be better off contracting out. All of those over 40 taking out a personal pension will find it optimal to contract back into SERPS in 1994, when the contracted-out rebate is reviewed (and forecast to fall) and the additional incentive rebate projected to be withdrawn. Younger individuals are likely to be better off contracting back into SERPS in later years, though it is apparent that over time the cross-over age falls slightly.

Although 'multiple switching' between the schemes is a theoretical possibility given the discontinuities in the personal pension schedule, we can find no clear-cut examples among our 30,000 cases where this would be optimal, even abstracting from switching costs between schemes.

We have illustrated already that the rate of return has a significant impact on the cut-off age when it is optimal to contract out of SERPS in 1990. Table 4.3 looks at the sensitivity of the cross-over age at which it is optimal to contract in to varying the rate of return assumption. The table gives the distribution of the change in cross-over year shifting from our baseline 3.5 per cent real return assumption to a lower rate, based on a sample consisting of each individual who is forecast to contract out in the first place.

TABLE 4.3

Effect on Re-Contracting-In Age of Changing Real Rate of Return Assumption

Percentage of cases

Change in cross-over age	Rate of return			
	3%	2.5%	2%	1.5%
0	36	32	15	1
1–4 years	28	6	7	.
5 years	35	15	20	.
6–9 years	.	13	11	9
10 years	.	28	18	33
>10 years	.	5	29	56
Sample size	20,350	18,691	14,832	7,946

Notes: Columns may not sum to 100 due to rounding.

Shows difference in cross-over year between assuming rates of return 1.5–3 per cent and the baseline assumption of 3.5 per cent.

Sample in each case is the number forecast to be better off contracting out at the relevant rate of return; excludes those forecast never to be better off contracted out (see above for details of effect on whether to contract out at all). This accounts for the decline in sample size as the return assumption is reduced.

Sample includes data for individuals born in 1965 or before.

Calculation includes transactions costs as described in the text.

Source: Authors' simulations based on Family Expenditure Survey data, 1978–86.

As Table 4.1 would suggest, the sample forecast to be better off contracted out is smaller as the return is reduced. At a 3 per cent return, over a third of those contracting out should not alter their re-contracting-in decision compared with the baseline case. Over a third should reduce their time in a personal pension by five years, a little under a third by between one and four years. The cross-over year is reduced further as the return falls. At 1.5 per cent, almost the whole of the (much reduced) group who do contract out would be better off contracting in sooner than on our baseline assumptions.

CHAPTER 5
WHAT IS THE APPROPRIATE CONTRACTED-OUT REBATE?

The major criticism of the introduction of personal pensions levelled by the National Audit Office was the cost to the National Insurance Fund of the contracted-out rebate. This poses two policy questions: what is the appropriate *level* of the rebate and to what extent is the rebate *structure* appropriate?

The appropriate rebate will of course depend on what role we want the rebate to perform. Its original function was to compensate occupational pension schemes for the cost of providing the GMP.[1] Since 1988 it has had a similar though new function: compensating individuals for forgoing their SERPS entitlement. To these, the Government has added a third objective: encouraging people to contract out of SERPS into individual or group money purchase schemes.

It should be borne in mind that these objectives need not be consistent. They may well point to different rebate levels and structures: we already have a rebate that is different for those contracting out for the first time from that for those in established occupational schemes (due to the 2 per cent incentive).

Taking account of the criticisms of the National Audit Office, it is also necessary to consider the impact of the choice of rebate level and structure on the finances of the National Insurance Fund. Assessing the revenue impact is a complicated task: the rebate will not only affect revenues through its direct influence on the payments for contracting out, but also through its incentive effect on contracting-out behaviour.

We consider the level and the structure of the rebate in turn, concentrating on its compensatory role.

5.1 Personal Pensions and the Neutral Level of the Contracted-Out Rebate: An Illustration

What might be considered 'fair' compensation for the individual contracting out of SERPS into a personal pension? A reasonable

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[1] Since occupational pension schemes also differ in their 'cost' of providing a GMP, given the age and sex structure of their membership, an implicit aim when setting the terms for contracting out, analogous to the third objective in the text, was to encourage occupational schemes to contract out their members (Hemming and Kay, 1981b).

definition would be when the rebate is sufficient (but no more than sufficient) to fund a personal pension of the same level as the SERPS entitlement forgone. Hereafter, we term this the 'neutral' rebate to avoid the pejorative connotations of 'fair', noting that for each individual the value of this 'neutral' rebate will be different, depending on their personal earnings profile and their age when they are considering the contracting-out decision.

Tables 5.1 and 5.2 and Figure 5.1 present the results of an analysis of the neutral contracted-out rebate using a sample of over 7,000 male and female employees drawn from the 1989 Family Expenditure Survey. The analysis proceeded as follows. First, a sample was selected of those individuals with earnings above the National Insurance LEL, and so eligible for the rebate. Second, the marginal increments to SERPS pension and the GMP for 1989 were calculated under a range of aggregate earnings growth assumptions.[2] Third, the investment in a personal pension required to match the GMP was derived for a range of assumptions about the real rate of return.[3] Note that, given the Government's commitment to pay the difference between the notional SERPS entitlement and the GMP, the pensions will be of equal value. The level of the contracted-out rebate that would give this pension contribution was then calculated for each individual. The result is a set of individual-specific contracted-out rebates which would exactly compensate each employee for forgoing their SERPS entitlement in 1989.

Table 5.1 shows that the median neutral contracted-out rebate for 1989 would be 4.4 per cent, using our baseline assumptions of 3.5 per cent real return and 2 per cent real earnings growth. Setting the rebate at this average level would ensure that 50 per cent of the population were more than fairly compensated and 50 per cent less than fairly compensated for the loss of their SERPS pension. Assuming that individuals behave 'rationally', therefore, 50 per cent is the proportion who would choose a personal pension rather than remain in SERPS. Table 5.1 also demonstrates the extent to which the rebate varies. The upper quartile of the distribution of neutral rebates is shown to be 6.6

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[2] Economy-wide earnings growth affects the value of the SERPS entitlement through its impact on the earnings revaluation factor.

[3] Annuity rate assumptions are again as those given in Table 2.3, transactions costs as described in Chapter 3.

per cent. At this level, 75 per cent would be more than fairly compensated, 25 per cent less than fairly.

TABLE 5.1

**Quantiles of Neutral
Contracted-Out Rebate**

Quantile	Neutral rebate (%)
1st decile	2.9
Lower quartile	3.5
Median	4.4
Upper quartile	6.6
Top decile	12.3

Note: Individual-specific rebates are calculated by deriving the rebate that would equalise the returns to contracting out into a personal pension and staying in SERPS. The table presents the quantiles of the distribution of resulting neutral rebates calculated at baseline assumptions of 3.5 per cent real return and 2 per cent earnings growth. Includes transactions costs as described in Chapter 3.
Source: Authors' calculations using 1989 Family Expenditure Survey data.

FIGURE 5.1
Cumulative Frequency Distribution of Neutral Contracted-Out Rebate

Percentage of eligible population
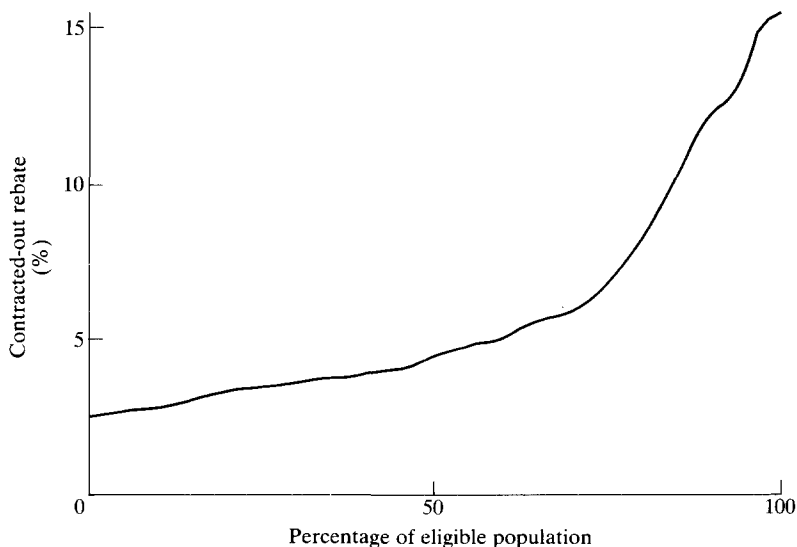
Note: Shows the results of the analysis in Table 5.1 as a cumulative frequency distribution.
Source: Authors' calculations using 1989 Family Expenditure Survey data.

Figure 5.1 presents the results of the analysis as a cumulative frequency distribution. It shows the proportion of the population that would be fairly compensated at every level of the rebate. The neutral rebate varies between 2 and over 15 per cent. At the current level of 5.8 per cent, on our baseline assumptions over 70 per cent of the population would gain from taking out a personal pension instead of remaining in SERPS. Including the incentive, giving a 7.8 per cent rebate, this rises to over 80 per cent.

Before considering the reasons for the substantial variability in the neutral rebate, we look at the sensitivity of this analysis to our assumptions about earnings growth and the rate of return.

TABLE 5.2

**Median Neutral Contracted-Out Rebates
by Earnings Growth and Real Rate of Return Assumptions**

Per cent

Earnings growth	Rate of return				
	1.5%	2%	2.5%	3%	3.5%
1%	6.7	5.7	4.7	4.0	3.4
1.5%	7.8	6.4	5.4	4.5	3.9
2%	9.4	7.4	6.1	5.3	4.4
2.5%	11.1	9.0	7.1	5.9	5.0
3%	12.9	10.5	8.6	6.8	5.7

Note: Includes transactions costs as described in Chapter 3.
Source: Authors' calculations using 1989 Family Expenditure Survey data.

Table 5.2 shows the median rebate for the population at various levels of earnings growth and rates of return. The rebate falls as the rate of return increases — a personal pension plan requires less contribution now to provide the same pension later if it can earn more from investment returns. The rebate increases as earnings growth rises — the SERPS pension will be bigger with faster earnings growth, as earnings in earlier years are revalued in line with average earnings before calculating the SERPS entitlement.

The neutral level of the rebate, then, depends significantly on assumptions about future earnings growth and rates of return. The range of assumptions considered in Table 5.2 lie within the bounds both of possibility and of recent experience. Even within the relatively narrow range of assumptions covered, the minimum and maximum costs of funding a personal pension equivalent to a SERPS pension shown in

the table vary in a ratio of 4:1.

The level of the neutral rebate depends principally on the difference between earnings growth and the rate of return. The current rebate (5.8 per cent) would be fair compensation (at the median) for a difference between the rate of return and earnings growth of around 0.5 per cent, though this figure was explicitly set above the neutral level. Our baseline assumptions point to a much lower rebate of 4.4 per cent which suggests that the personal pensions option may have been 'underpriced' by the Government.[4]

Setting the level of the rebate to give fair compensation for forgoing a SERPS entitlement is therefore a difficult choice, given the extent of uncertainty and the sensitivity of the results to small changes in assumptions.

5.2 Personal Pensions and the Structure of the Contracted-Out Rebate by Age and Sex

Having discussed the level, we now turn to the appropriate age and sex structure of the contracted-out rebate, taking account of its compensatory role.

Table 5.1 showed that the level of the neutral rebate for different individuals varied over a fairly large range. What is responsible for this variation?

The neutral rebate differs significantly between men and women. There are two main reasons. First, women have a lower annuity rate due to their greater longevity. At the baseline assumptions, a woman retiring at 60 could expect an annuity rate of 6.8 per cent compared with an 8.3 per cent rate for a man retiring at 65. The accumulated pension fund must therefore be bigger if women are to buy an indexed pension equivalent to their SERPS entitlement. Second, women retiring after 2022–23 have a faster SERPS accrual rate than men due to their shorter working lives, a result of the state pensionable age being lower for women. For women, then, personal pensions are less attractive than SERPS which is more generous to them compared with men, as suggested previously. Overall, gender differences result in a median

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[4] Indeed, the Government Actuary (1987) proposed a rebate for the current period of 5.4 per cent, not 5.8 per cent, which was explicitly above the neutral level to give occupational schemes with a preponderance of older members an incentive to contract out. The actual rebate was set higher to give a further cushion to these schemes and to compensate for additional obligations under the Social Security Act 1986. Its consequence is, of course, to give an even greater 'subsidy' to the intra-marginal personal pension optant.

FIGURE 5.2
Median Neutral Contracted-Out Rebate by Age and Real Rate of Return
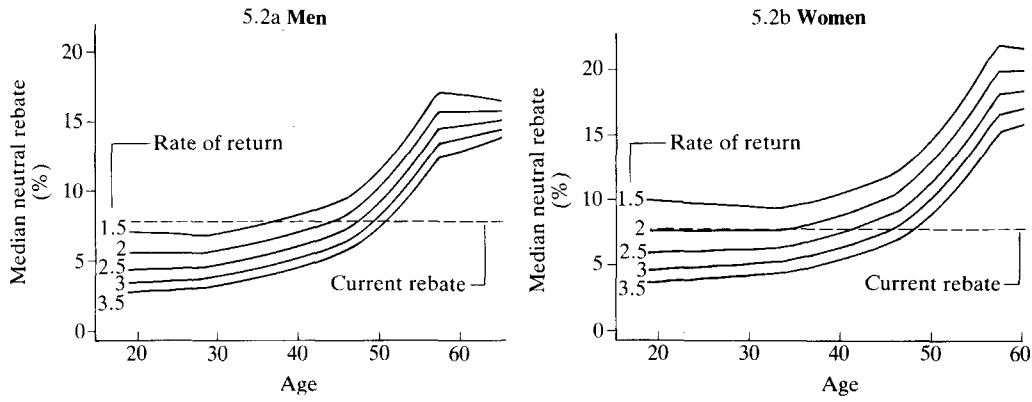
Source: Authors' calculations using 1989 Family Expenditure Survey data.

neutral rebate of 4.8 per cent for women on our baseline assumptions, compared with 4.1 per cent for men and 4.4 per cent for the population considered as a whole.

A second source of variation in the neutral rebate is age. A personal pension is more valuable to younger workers because of the compound interest effect. The young also face a lower accrual rate for SERPS (see Table 2.1). For these two reasons, the neutral contracted-out rebate should rise with age. Figure 5.2 shows the neutral rebate in the sense defined previously by sex and age and at various rates of return. It also shows the current rebate (including the incentive) for comparison. Again, we are examining pension increments in 1989 for a sample of around 7,000 employees earning above the lower earnings limit drawn from the Family Expenditure Survey. As suggested earlier, the overall neutral rebate for women is higher than that of men.

The shape of the curves is of interest. Starting at the *right-hand* side (with older workers), there is a relatively flat segment of the curve, a result of the fact that those retiring before 2000–01 face the same SERPS accrual rate (25/20 per cent). Moving left, the curve declines steeply as the SERPS accrual rate falls (see Table 2.1). For those retiring after 2010–11, the fall in the SERPS accrual rate is less steep since the reduction in the target replacement rate from 25 to 20 per cent has by then been achieved. At the youngest ages, the curve is again flat. After 2027–28 for men and 2022–23 for women, SERPS reaches 'maturity' and the accrual rate stabilises at a low level.

Figure 5.2 echoes the results of Chapter 4 that men up to their late 40s (and women up to their early 40s) should contract out at our baseline assumptions: the neutral rebate lies below the current rebate offered, so they are more than neutrally compensated for giving up their SERPS entitlement. As the rate of return falls, the neutral rebate rises and the age at which SERPS looks a better bet for 1989 falls. At a 1.5 per cent real return (below the assumed earnings growth rate of 2 per cent), the median rebate rises above the current rebate paid for all women.

The substantial variation in the neutral median rebate by age has led to suggestions that a contracting-out structure with different levels of rebate by age would be optimal. This would allow the Government to engage in price discrimination — offering sufficiently large rebates to older workers to encourage them to contract out whilst reducing the intra-marginal subsidy to younger workers, which is far larger than that needed to compensate them neutrally for forgoing some SERPS entitlement. The absolute level of the rebate would be determined by

the proportion of the population the Government wished to contract out, along the lines of Figure 5.2. In fact, age- and sex-related rebates were considered by the DSS in consultation with the Government Actuary. They were rejected on four main grounds:

- that they would make personal pensions less attractive to younger people;
- that they were difficult for individuals to understand;
- that they would be complex for the DSS and the pensions industry to administer;
- that it would be difficult to justify introducing an age- and sex-related rebate regime for personal pensions without extending the treatment to occupational schemes, providing administrative difficulties to scheme managers.

None of these arguments are particularly convincing. If the role of the contracted-out rebate is to offer neutral compensation for forgoing a SERPS entitlement then Figure 5.2 gives an overwhelming case for age and sex variation in the rebate structure. As such, the first argument given by the Government seems somewhat odd: the large intra-marginal subsidy given to younger workers (ensuring that future SERPS savings will be lower than the current revenues forgone at any reasonable discount rate) is precisely the reason for considering price discrimination through age-related rebates. The rebate does not offer neutral compensation; there is no particular reason to favour younger workers over older. We reiterate that while the case for an age-related rebate *structure* seems convincing, the average level of the rebate must be related to the target proportion of the eligible work-force it is intended should contract out. Furthermore, if the Government was concerned that personal pensions would not get off the ground (a groundless fear, as it happened), the logical policy would be to have an extra incentive to new optants — which is exactly what there was. Adding a substantial bonus for certain age-groups via the single contracted-out rebate merely duplicates the incentive and raises the cost to the National Insurance Fund.

The second argument is that individuals would find age and sex relation difficult to understand. However, it is the case that there are other examples of age relation in the pensions system that do not cause problems: the maximum tax-relieved pension contribution, for example, varies with age. The third point — that varying rebates would be difficult to administer — is equally difficult to assess.

5.3 Occupational Pensions and the Contracted-Out Rebate[5]

The fourth argument against relating the rebate to age was concerned with the implications for occupational schemes. Administrative difficulties may be greater in the occupational sector than for personal pension managers. However, if these difficulties were to prove insurmountable it should not preclude introducing age- and sex-related rebates for the personal pensions sector; we do not agree that it is difficult to justify different rebate regimes for occupational and personal schemes.

The neutral rebate has been considered from a personal pensions perspective, although the results for an analysis of occupational schemes would be similar. We have analysed the contributions and investment returns required to fund a personal pension equal to SERPS. Since a SERPS entitlement is approximately equal to the GMP provided by an occupational scheme, the contributions and returns required to fund a GMP will be approximately equal to those required to fund a SERPS pension. Thus the evidence discussed above is also applicable to the level of the neutral contracted-out rebate from an occupational pension scheme perspective.

However, this does not imply that the same rebate should be given to occupational schemes as to personal pensions. It may well be the case that the rates of return differ between the two types of scheme. As we have seen, the rate of return is a critical factor in the choice of rebate level. Managers of personal pension plans may be more risk-averse on their clients' behalf than occupational pension fund managers, and earn lower returns as a result of a more conservative investment policy. In particular, publicity literature often stresses that they may avoid investing in risky assets close to retirement to prevent the vagaries of financial markets having a substantial impact on the value of the pension. Occupational schemes, with the exception of closed schemes, are continuing and do not have such a fixed time horizon. Thus, whilst the neutral rebate from the position of an occupational scheme will display a similar distribution with respect to earnings growth and the real return, this does not imply that the appropriate level of the rebate will be the same between the two types of scheme.

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[5] Note that the arguments presented in this section refer to salary-related occupational schemes. It would be necessary to treat contracted-out money purchase schemes in the same way as personal pensions.

The Government has already accepted the principle of different rebate levels — the 2 per cent incentive is open only to personal and newly contracted-out occupational schemes. There seems no reason to reject different rebate structures. Occupational pension schemes are devised to pool risks. Since they combine a range of individuals of either sex and different ages, the distribution of neutral contracted-out rebates by scheme as opposed to by individual will have much less variation. Occupational schemes with a preponderance of female or older members may already judge that it is not favourable for them to contract out; schemes with male, younger members are receiving a similar type of intra-marginal subsidy to that given to younger personal pension optants. Though they may be similar in type, the two problems are of an entirely different magnitude. Hence, there is little difficulty in justifying age-related rebates for personal pensions and not extending this structure to occupational pension schemes.

CHAPTER 6
CONCLUSIONS

This report has shed light on the popularity of personal pensions since 1988. Using a microeconomic simulation of individual lifetime earnings for men, annual pension increments in both SERPS and a personal pension scheme were calculated for each individual in the data set. The analysis illustrated the sensitivity of these pension entitlements to transactions costs and to differential real rates of return by reference to a hypothetical case and for the sample as a whole. The question of the optimal timing of re-entry from a personal pension into SERPS was also examined for this individual case, and in the aggregate.

Given our 'baseline' assumptions, we find that most men up to their mid-40s would have obtained a significant increment in their lifetime pension by choosing to opt for a personal pension where they were not already covered by an occupational pension scheme. The evidence as to high take-up rates among young men presented by the National Audit Office is not therefore particularly surprising and it can be argued that, even allowing for inertia in pension planning, a forecast of 0.5 million optants was extraordinarily low. Interestingly too, differences in income for any particular age-group have little effect on optimal choice notwithstanding some of the complex non-linearities of pension accrual to income in SERPS; in fact it is age that is the crucial determinant.

Further analysis suggests that the optimal strategy is very sensitive to the rate of return which it is assumed that the personal pension would earn, but that even under fairly conservative assumptions, younger optants would have obtained substantial intra-marginal rents from taking advantage of the level of the contracted-out rebate offered, as well as the 2 per cent 'incentive'. The main impact of a lower rate of return is to bring forward the optimal date at which it is advantageous to re-contract back into SERPS, which we put at between 45 and 53 for all male optants on the baseline assumptions. This is somewhat older than some commentators have suggested.

For women, for whom we have not done detailed life-cycle micro-simulations, the evidence is less clear. SERPS is considerably more advantageous to women than men, because of the discrepancy in the full risk-rating of the public and private annuity, given that women still retire earlier and live longer. Consequently, although it is

advantageous for many women to contract out into a personal pension, the cut-off age is considerably younger than for men under the baseline assumptions, and the advantage is quickly eroded when simulating a lower rate of return. At the risk of generalising from some stylised simulations, it seems likely that for many female optants, the optimal re-contracting-in age will be much earlier than for men: when the next significant fall in the contracting-out rebate is projected, or even when the 2 per cent incentive expires in 1993. Other rather general studies of this issue have tended to assume that this disparity in optimal re-contracting-in ages between men and women is not so large, but our results, although tentative, cast doubt on this general conclusion.

Finally, our empirical analysis considered whether the same 'cross-over' between a personal pension and SERPS would be optimal in steady state, when the impact of the accelerated accrual underlying the system was removed. The evidence suggested that a switching strategy between a personal pension and SERPS remained optimal, although the disparity in returns was less clear-cut. The right to re-contract into SERPS could be seen as a form of insurance for older workers, especially if the return to personal pensions is seen to be more 'risky'. It is not clear that a steady-state situation where additional pensions are provided by the private sector from earnings in the first half of the working life and by the state for earnings in the second half is either administratively or socially optimal.

The Government therefore faces the likelihood of continued popularity of personal pensions, especially as long as the 2 per cent incentive is in force, though women, especially, would find it optimal to re-contract into SERPS in the near future. The fact that the optimum for re-contracting in for men is closer to age 50 suggests that pension inertia or the non-pecuniary costs of switching may actually cause a significant number to remain with their personal pension until retirement. We therefore considered the optimal strategy for a government wanting to keep demand for personal pensions buoyant but, at the same time, wanting to minimise the public exchequer costs, especially to the National Insurance Fund.

It is apparent from our discussion in Section 5.2 that the contracted-out rebate is an extremely blunt instrument as it stands for pursuing a rational strategy towards personal pensions. A general strategy might have taken the following form:

(i)   Choosing an additional 'incentive' rebate to 'kick-start' personal pensions. The 2 per cent offered may have been pitched at about the right level, depending on the impression that the Government had as to the need to stimulate the 'take-off' of personal pensions.

(ii) A target level of personal pension optants. Our analysis of Family Expenditure Survey data for 1989 described in Chapter 5 showed that it is not too difficult to calculate the proportion of the eligible population which would contract out for any given value of the contracted-out rebate using micro-data. Thus, our estimate suggests that at the Government Actuary's 5.4 per cent figure, up to around 70 per cent of the population would find it optimal to take up a personal pension (the actual current figure of 5.8 per cent is somewhat higher to cushion other changes to occupational pension scheme obligations arising from the Social Security Act 1986). To put it another way: if we assume that roughly 5 million male SERPS members had been expected to generate, say, 0.5 million optants, the contracted-out rebate offered to personal pension optants should have been considerably lower.

(iii) Having chosen the 'cut-off' point in terms of the proportion of optants, it is therefore straightforward to choose the contracted-out rebate for personal pensions. However, this value, in our view, should no longer be the *average*, or constant, rebate, but the *marginal*, or highest, rebate offered. At this level, all but the marginal optant would obtain intra-marginal gains. We have shown that it is primarily age (and to a lesser extent, gender) which determines the advantage of a personal pension over SERPS — a result of the compound interest effect and the deceleration in the SERPS accrual rate. It is therefore straightforward to recoup some of the intra-marginal returns to private pensions by price discrimination: in this case by linking the contracted-out rebate offered to personal pension optants to age. Although it is difficult and indeed probably undesirable to price-discriminate exactly (although not impossible to do if one abstracts from differential mortality, as we have shown by the microeconomic simulation in this report), such a broad 'risk-rating' of the incentive would substantially reduce the excess costs to the National Insurance Fund while retaining whatever target of opting out intended by the Government.

It has been suggested elsewhere that the Government might reconsider the arrangement by which individuals who have taken out a personal pension can re-contract into SERPS. The balance of the argument would suggest that this is an ill-conceived reaction to the problem of 'excessive' intra-marginal rents to personal pensions optants, which would itself induce arbitrary and heterogeneous reductions in expected total pension entitlements. We believe that the price-discrimination approach advocated here is a more attractive and equitable option to deal with this issue.

Simply offering a universal and highly attractive rebate (as has been the policy so far) or concentrating on the public costs while ignoring the intended target number of optants of the policy (as appears to have been the thrust of much of the discussion since the NAO report) is, in our view, a sub-optimal response to an interesting but complex issue.

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