

general gives inflation-proof pensions, and the private sector which does not. However, many private sector pensioners have received significant *ad hoc* and fixed increases in pensions. There is therefore pressure for more conformity of pensions arrangements. The abandoning of index-linked pensions in the public sector would be a retrograde step; the alternative would be for the private sector to guarantee its pensioners greater protection against inflation.

There are two major obstacles to the private sector providing index-linked pensions; firstly can industry guarantee to pay open-ended nominal liabilities over which it has no control, and secondly will the costs be too high? The government could help overcome the first problem either by issuing index-linked bonds or offering to accept the liability for pension increases for a pre-arranged sum. The costs of introducing index-linked pensions are very high; it could increase the cost of pensions by 70%, although there are some off-setting factors. It is therefore worth considering whether pensioners should not receive a lower pension which would then be index-linked. Then they will be able to retain their standard of living as they get older, albeit a lower one.

In some cases the practical difficulties and possible adverse repercussions elsewhere in the economy outweigh the benefit to be derived from the introduction of indexation. However, there are definite advantages to be gained from indexing private sector occupational pensions. The present debate should therefore concentrate on ways to improve private sector benefits rather than envious criticism of those who have the security of a pension which will not be eroded by inflation.

### ***ACTUARIAL MANAGEMENT OF A UNIT-LINKED OFFICE***

by

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*(Synopsis of a paper presented to the Society on 6 January 1981)*

The terms upon which the office transacts business should be judged within the overall constraint of the office's long- and short-term corporate objectives. The two most common objectives are a specific rate of return on capital employed and a specific increase

in the net worth of the office. If it is the former, the rate at which the stream of future surplus equates to the initial strain is a net rate. The rate of discount at which the net worth is computed would also be a 'net' rate, although care must be taken to adjust the surplus on the pension contracts for tax at the appropriate rate.

The categorization of contracts into categories A to D by Grant & Kingsnorth (J.I.A. 93, 387) is no longer relevant. Category B contracts are largely obsolete and investment performance guarantees are of limited interest.

The current range of contracts can be categorized as follows:

- Type 1: Office invests  $x\%$  of the first  $n$  premiums and  $y\%$  of the balance. All income is reinvested but an annual charge retained. Surrender Value is the value of the units possibly with a sterling penalty.
- Type 2: A constant percentage of each premium is invested. The first  $n$  premiums are invested in units ('capital units') that attract a higher management charge than those to which premiums are allocated subsequently. Income is reinvested. Surrender Value is the value of capital units multiplied by  $\bar{A}_{x+t:\overline{n-t}|}$  plus value of other units, possibly with a sterling penalty.
- Type 3: A limiting case of Type 1, with  $x = y$ .
- Type 4: A modification of one of the previous types. The risk premium cost of the life cover from time to time is met by cancelling sufficient units.
- Type 5: This is a single premium whole life policy, the office investing typically 95% of the premium. An annual charge is deducted from the fund.

The return available under a contract depends crucially upon the office's tax position, lapse experience, the volume of business obtained, expense inflation. By suitable design it is possible to minimize the effect of lapses and inflation, but tax and business volumes remain as problems.

The primary objective of valuation is to ensure solvency and any surplus so revealed is distributable. However, there may be occasions where a more stringent basis may be used in order to either delay or smooth out the emergence of surplus. The extent to which separate contingency reserves need to be held depends upon the precise design of the contracts.

It is important to have a thorough understanding of the nature of

operational expenses incurred by the office. Expenses should be split into direct new business, direct renewal, selling and overheads. An expense analysis ought to be carried out to measure these and subsequently actual expenses must be monitored against forecast.

There are four principal sales outlets: direct sales, broker, professional intermediary and mass marketing. With direct salesmen the overall acquisition cost is generally higher and one has the problem of selection and training. However, within reason the office has control over their activities. The broker acquisition costs are generally lower but the office has no control over them and often the contract needs to be quite competitive. Mass marketing is still in its infancy in this country.

### ***COMPUTER TECHNIQUES FOR DEVELOPING PREMIUM RATES***

by

N. STEPHENS

*(Synopsis of a paper presented to the Society on 17 February 1981)*

The paper shows the basic methods used to produce premium rates on a computer. It is aimed primarily at students but would also be of interest to those in the actuarial profession who have previously used only commutation functions to evaluate premium rates.

The paper is in two parts—the first showing how, by returning to first principles and summing all values, commutation functions are no longer required. The second part gives the basic steps required to produce a cash flow program which may be used to check premium rates, profitability and bonus levels of new or existing policies. Whilst commutation functions may still have a place in actuarial calculations it is not possible to employ them where, for instance, interest rates are assumed to vary with elapsed term or where withdrawal rates also are included as a decrement. The paper shows how these sorts of assumptions can be simply included in a computer model, although it is pointed out that the results obtained should be carefully compared with rates produced assuming level interest rates and no withdrawals.

Numerous simple flow diagrams are used to demonstrate the