PENSION SCHEMES AND EARLY RETIREMENT

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1. INTRODUCTION

An actuary has two major responsibilities in respect of a fully functional pension scheme:

   (i) To perform (and report on) periodic actuarial investigations; these have the dual purpose of confirming the security of the members' accumulated benefits and of determining, with the agreement of the employers, an appropriate scheme of funding;

   (ii) To provide tables for application to early leaver benefits for the determination of alternative options.

Much has been written on the first of these functions and I expand on this only to a limited extent in §2. This paper addresses itself more to the practical implications of the second of them and, in particular, to the early retirement option.

2. SOME THOUGHTS ON FUNDING METHODS

The ultimate funding objective in relation to a pension scheme is the accumulation of sufficient assets to pay the benefits promised under the provisions of the scheme as they arise.

There are many funding methods available for use in meeting the objective but, until recently, the one most used by U.K. consultants has been said to be the Aggregate Method (2). This section is intended to provide some insight into the practical effects of using this method, particularly in relation to unanticipated withdrawals from service.

The Aggregate Method

This funding method takes the excess of the actuarial value of the aggregate liabilities in respect of both accrued and future service of existing members (including preserved pensioners and retired members) over the actuarial value of existing assets and expresses it as a level contribution rate which, if continued until the last of the current in service members retires, will provide a fund just sufficient to pay the benefits. The only time there is a surplus is if the contribution rate revealed at a valuation is negative.

The theoretical course of contribution rates disclosed at successive valuations is easiest to explain in terms of future contribution rates and contribution rates

applicable to typical profiles of new entrants. The former rate is that which is required to meet all future service liabilities of the current membership over the balance of their working lifetimes (the Standard Contribution Rate for the Attained Age Method). The latter rate is sufficient to meet all liabilities of a typical profile of new entrants over the whole of their working lifetimes (the Standard Contribution Rate for the Entry Age Method). It is assumed that the average age of the current membership is higher than that of the new entrant profile, as is the required contribution rate for them.

Provided that all the valuation assumptions are borne out in practice (and remain unchanged), the rate is likely to start at or somewhat higher than the future contribution rate (past service benefits are often granted at the inception of a scheme) and fall gradually, due to the incidence of new entrants, to approach, but never quite reach, the rate appropriate to the new entrant profile.

It is an inevitable consequence that the contribution rate defined by the Aggregate Method in a mature scheme will fall below that defined by the Attained Age Method; the corollary being that past service will be more than fully-funded. As soon as one starts expressing the funding levels in this way, however, one has started to move away from the Aggregate Method and into the realms of what may be a less justifiable method.

In particular I am referring to the Attained Age Method, where 'past service surplus' tends to be distributed at each valuation and the future contribution rate is maintained in full; it is easy to demonstrate that this method 'funds for surplus'. Such a system, although it produces the comfortable feeling that the pension scheme is generating surpluses on a regular basis, may not be either appropriate for or acceptable to the employers concerned. (This is particularly true as a consequence of the Finance Act 1986, which introduced proposals for the taxation of pension schemes which, using specified actuarial assumptions, are 'in surplus' on past service.)

If a practitioner finds difficulty in countenancing 'over-funded' past service then he should not use the Aggregate Method to achieve his objective. Whatever method he uses, he should be able and willing to explain its possible implications as regards future funding levels (however these may be defined) and future movements in the contribution rate.

In practice the contribution rate defined by the Aggregate Method will be affected by factors such as:

  (i) Favourable (or otherwise) experience;
 (ii) Changes in benefits;
(iii) Changes in valuation assumptions.

These factors could cause the rate to fall below that defined by the Entry Age Method, which could be considered as the theoretical minimum contribution rate. It may be acceptable in these circumstances, if both the trustees and the employers agree, to set a minimum contribution rate equal to the Entry Age rate

and to declare a 'surplus'. In this situation, however, the method would have blended into a variation of the Entry Age Method.

Withdrawals

The net actuarial valuation liability in respect of an individual in service member is the excess of the value of aggregate liabilities in respect of both past and future service over the value of contributions paid at the rate disclosed in the valuation until his retirement (or earlier exit from service).

In an 'immature' scheme being funded using the Aggregate Method, the net liability may be negative for younger members, and will almost certainly be of lower value than the benefits payable on withdrawal. The reverse will be the case for older members.

To the extent that they are anticipated in the valuation basis, however, the contribution rate will not be affected by the incidence of withdrawals. The broad effects of varying levels of withdrawals are indicated in the table.

	Movement in Contribution Rate	
	More withdrawals than anticipated	*Less withdrawals than anticipated*
Withdrawals of:		
Younger members	Upward	Downward
Older members	Downward	Upward

In a scheme funded using the Aggregate Method it is a fallacy to state that withdrawals always have a favourable effect on the scheme's finances.

In practice withdrawals tend to be replaced by new entrants, with a net effect of reducing the contribution rate.

Problems can clearly arise, however, if there is a permanent diminution of the workforce.

Conclusions

In the past, too many practitioners who claimed to use the Aggregate Method tended to mislead themselves and their clients by referring in their valuation reports, without thinking too deeply, to surpluses and to withdrawal profits. These are rare phenomena in valuations made using the Aggregate Method, although they may well exist if other funding methods are being used.

It has not yet become clear what the effect of the 'surplus' proposals in the Finance Act 1986 will have on the more reactionary practitioners except, perhaps, to encourage them to use the Attained Age Method more openly. The legislation appears to be slanted in favour of the 'accruals' concept of the Projected Unit Method, which is a much more volatile funding method than the Aggregate Method.

A practitioner should be fully aware of the financial implications of any funding method which is adopted for a pension scheme. He should also explain it to his client and be willing to change it for another method if it transpires that it is inappropriate to the client's circumstances.

3. SOME EARLY RETIREMENT THEORY

Original theories regarding early retirements were that profits (or losses) to the pension scheme as a result of early pensions being taken would be minimized. The methods by which this should be done are adequately described in Lee (1). These methods can be separated into two categories, summarized as follows:

Type A   The benefit is defined at and payable from the date of leaving service; it is normally intended to be equivalent in value to the actuarial valuation reserve the day before leaving (allowing for future increments in earnings and, if appropriate, future contributions).

Type B   The benefit is an option available as an alternative to a preserved benefit due from the scheme's normal retirement date (a 'deferred pension'); the aim is to provide a benefit equivalent in value to the member's deferred pension after the date of leaving.

There may still be profits or losses in *Type A* cases as a result of benefits being either more than or less than fully-funded. In practice, even in schemes which are financed using the Aggregate Method or the Entry Age Method, it is usually found to be convenient to use past service reserves to calculate *Type A* pensions. This is because there can be difficulty in choosing appropriate future contribution rates, particularly in schemes where the costs of improved benefits for selected groups of members are being met by temporary (or permanent) additions to the overall contribution rate. The result of this practice is that pensions calculated using *Type A* methods are often not quite financially neutral and that the contribution rate may be affected by the incidence of early retirement. (Any movement in the rate is unlikely to be of significance, however, when compared with movements resulting from increments or from other decrements.)

Profits in *Type B* cases arise indirectly as a result of the release of reserves inherent in the replacement at the date of leaving of an 'active valuation reserve' (with a provision for future earnings increments and, if appropriate, future contributions) with a 'deferred pension reserve'.

4. SOME PRACTICAL CONSIDERATIONS

Complicated individual calculations based on the theory are usually avoided, in practice, by expressing the immediate pension as an age specific fraction of the deferred pension. The derivation and use of appropriate age specific fractions ('early retirement factors') is central to this paper.

Before suitable early retirement factors can be derived for a Company's pension scheme, it is necessary to determine answers to the following questions:

(i) What do the Scheme Rules say?

(ii) What is the Company's present and potential policy regarding the encouragement of early retirement?

(iii) What pension increases are guaranteed to what part of a pension, either in payment or in deferment?

(iv) What present or potential practice is there for non-guaranteed discretionary increases to any part of a pension, either in payment or in deferment?

(v) What is the present method and basis of actuarial valuation of the scheme and, if appropriate, to what extent is the scheme 'funded' using this method and basis?

Clearly, the answers to a number of these questions depend on qualitative judgement rather than precise knowledge. Where precise knowledge is available, however, it is unwise to dispense with it merely on the justification that the variability inherent in the 'qualitative' items swamps the inaccuracies of such action.

5. SOME HISTORY

The Dark Ages

Until the end of the 1960s interest rates and inflation were, in today's terms, low. For example, the average investment return for a typical pension scheme during the 20 years to 31 December 1969 on 'book values' (market values were regarded with much suspicion during that period and profits on sales of investments were considered as 'windfall' income) was below 6% per annum and the average rate of inflation was below 4% per annum. During the same period actuarial valuations were made using rates of investment return which rose slowly from about 3% per annum to as high as 5% per annum. The practice of granting increases to pensions either in payment or in deferment was embryonic in those years and much appears to have depended on the largesse of the Actuary at successive valuations. In addition, unemployment levels were low throughout and there was little need to encourage members to take early retirement.

Early retirement pensions were generally calculated strictly in accordance with the *Type B* method. The factors used tended to reflect the valuation assumptions and were designed so that there was little financial effect on the scheme resulting from the early retirement option being taken. As valuation rates of interest rose, therefore, the early retirement factors gradually got lower. There was, of course, still a profit accruing to the scheme at the date of leaving service.

When investment returns continued to rise in the 1970s there was a resistance to changes which could cause further reductions in early retirement pensions. The reactionary pressures often prevailed and this was the first step towards early retirement factors becoming part of the scheme's benefit structure rather than part of a financially neutral option available to deferred pensioners.

This small step was justified on three counts:

(i) The reserve required to fund the 'higher' pension was usually less, at the date of leaving, than the full valuation reserve the day before.

(ii) It was likely, if inflation remained high, that increases would eventually be

given to pensions in payment or in deferment and that this would cause the early retirement factors to become appropriate again.

(iii) The cost, if any, would be met out of implicit margins in the valuation basis.

Inflation did remain high and began to devalue fixed money benefits rather rapidly. Before too long it became commonplace for more increases to be given on a more regular basis to pensions in payment and sometimes even to those in deferment. At first these all tended to be on a discretionary basis and funded either by special contributions or from surpluses arising as a result of implicit margins in the valuation bases.

Guaranteed rates of increase and explicit allowances in the valuation bases are now more common, however, although there still tend to be implicit margins available to generate surplus and to finance additional discretionary increases.

The result of such increases coming into existence has been that 'out-of-date' early retirement factors often became almost appropriate. In order to maintain the *Type B* equivalence, however, it should have been necessary to value deferred pensions using a method and basis which was consistent with the basis underlying the early retirement factors. This has rarely been done in practice and there has, therefore, been an 'early retirement strain' when a deferred pensioner has exercised the option to take his pension early. This strain has tended to be ignored in the past as being an offset against 'withdrawal surplus'. As turnover reduces and more deferred pensioners take their pensions early, these early retirement strains could become more significant and might, in time, come to be comparable with, or even exceed, the withdrawal surpluses.

Early retirement strains will exist for as long as deferred pension reserves are calculated on one basis and early retirement factors on another.

The reactionary pressures stemmed as much as anything from employers who did not wish to discourage early retirement during periods when manning levels were being 'rationalized'. In fact, practitioners were often asked (and still are) whether existing scales of early retirement factors could be improved. The answer has usually been in the affirmative provided that the resulting pensions appear to fall between the strict actuarial equivalences of the *Type A* and *Type B* early retirement pensions.

In practice, backs of envelopes figured largely around the calculations of what could be permitted. Comfort was taken in the apparent fact that the additional reserves required to 'pay for' these improved factors were less than those originally released when the deferred pensions were set up. It is difficult to see what parts of the envelopes were used to assess the effect on pension schemes when there was a delay (during which any withdrawal surplus was capitalized as a part of an actuarial valuation) between the date of withdrawal and the date the early pension commenced. In retrospect it could have been said that it is the employers who have the ultimate responsibility to meet the cost of the benefits so they are entitled to have a say in the choice of their own scale of early retirement factors.

There is no justification, however, for a practitioner to have failed to give the employers some idea of the cost implications of their requirement.

In addition, if the early retirement factors are to be part of the benefit structure, then some provision for this ought to be included in the valuation basis, whether that be implicit or explicit. The provision should cover not only the early retirement of active members but also the early retirement of both present and future deferred pensioners.

When considering liabilities in respect of present and future deferred pensioners, it is an invalid excuse to say, for example, that these consist only a small fraction of the valuation liability so it is not worth being too precise in their calculation. If proper account was taken of the early retirement option it may be found that the fraction is not as small as it first appeared. In relative terms this may still be insignificant but insignificance does not excuse fallacious methods.

Renaissance

Tables of early retirement factors (and of factors applicable to other options for a deferred pensioner) have traditionally been financially neutral, so that the value of the valuation basis of the benefit before the option is taken is the same as the value after the option is taken. The tables used to be reviewed following each successive actuarial investigation and revised, if necessary, in order to maintain this neutrality.

There was a clearly perceptible change in philosophy during the 1970s as a result of actuaries and other advisors (and hence employers and trustees) remarking that tables calculated using higher rates of interest appeared to give less favourable options than those derived from existing tables.

The consequent movement away from financially neutral options has, in general, been less than fully reflected in the methods used for valuing preserved pensions during the course of an actuarial investigation. The traditional system of valuing just the defined preserved benefits has often been retained and strains arising when more valuable options are taken have been allowed to emerge at successive investigations. This system is financially unsound and could cause problems as the number of preserved pensioners increases.

In the light of the revised philosophy and the deficiences of some existing systems, it would be logical that the actuarial valuation of preserved pensions, both for people who have already left service and for future withdrawals, should be made using the following principles:

(i) The tables should be reviewed, before the valuation, to ensure that they are still appropriate;

(ii) The most expensive (in terms of the valuation basis) options, using these tables, should be determined; in practice these are likely to be either retirement at the earliest opportunity or the immediate payment of a transfer value (see also *Current Affairs* later in this section);

(iii) The options determined in (ii) should be valued for all preserved pensioners, both present and future.

The effect of using this procedure in practice would be a more gradual release of reserves following withdrawals from service and the elimination of strains which might otherwise have arisen following alternative options being taken by preserved pensioners.

The same procedure should be adopted (including (i)) if the cost of changing the form of early leaver benefits is to be determined (e.g. the cost of introducing an element of escalation for preserved pensions prior to retirement).

Preservation

The practical effects of the preservation requirements as embodied in the Social Security Act 1973 were threefold:

(i) The number of deferred pensioners increased rapidly.
(ii) The method of calculating deferred pensions was formalized.
(iii) A 'value for money' condition was introduced for application in schemes which have no guaranteed increases on pensions in deferment.

The only one of these which deserves comment in this discussion is the last, although it is effectively the first which made the discussion necessary. The comment is simply that the early retirement factors to be applied to a value for money pension should really be on the same actuarial basis as the factors used to calculate that pension (or, perhaps, vice versa). It can easily be demonstrated that the value of a pension calculated using a 'generous' early retirement factor on a value for money deferred pension calculated on a 'realistic' basis could greatly exceed the member's contributions with interest.

An implication of using the same factor both on the 'Rules' pension and on the value for money pension is that each anticipates the same increases (if any) in deferment. Thus, if this is the case, any increases granted to deferred pensions should be applied equally to both the Rules pensions and the value for money pensions.

Social Security Pensions Act 1975

The events described above were not modified in any way for a pension scheme of an employer who opted to contract-in to the earnings-related part of the State pension scheme from 6 April 1978.

If a scheme became contracted-out, however, it became obliged, in broad terms, to provide a Guaranteed Minimum Pension (GMP) in respect of each of its active members. The GMP is different from other pensions payable under the scheme for the following reasons:

(i) It has to be provided in full at State pensionable age (or earlier in the case of a widow's GMP).
(ii) It is highly unlikely that a scheme will give increases on the GMP before it comes into payment in excess of those it is obliged to give.
(iii) It is unusual for a scheme to give increases on a GMP after it has come into payment because it is inflation-proofed by the State.

Much attention has been given, and rightly so, to the effect of this legislation on early leavers who had to take deferred pensions. There is a nagging suspicion, however, that insufficient attention was paid to the early retirement option. It is true that consideration may have encompassed some or all of the following questions:

(i) What should the existing early retirement factors be applied to?
(ii) Should the whole early pension qualify for 'normal' increases before State pensionable age?
(iii) Should the early retirement option be permitted if the resulting pension appears to be potentially lower than the GMP?
(iv) Should the level of commutation be limited to ensure the resulting pension is at least as large as the GMP?
(v) What should happen if the pension turns out to be lower than the GMP?
(vi) Should an option exist for variable levels of pension to cope with the GMP?

Too little consideration may have been given, however, as to whether the existing early retirement factors were appropriate or what the financial effect on the scheme may be of using these factors.

Current Affairs

There are two recent items of legislation on pension scheme matters which are of particular relevance to this paper.

The first item (under the Health & Social Security Act 1984) was to abolish franking for people leaving service on or after 1 January 1985 by redefining deferred pensions as:

$$\text{Rules pension} - \text{GMP at exit} + \text{GMP revalued}$$

The second item (under the Social Security Act 1985) was to apply guaranteed increases for people leaving service on or after 1 January 1986 of up to 5% per annum to a proportion of the pension in excess of the GMP during the period of deferment. The proportion qualifying for increases is generally:

$$\frac{N}{NS} \times (\text{Rules pension} - \text{GMP at exit})$$

where NS is the period of service to which the Rules pension relates and N is the period of service after 1 January 1985.

There are further requirements under the Social Security Act 1985 that alternative benefits (in particular early retirement pensions and transfer values) should be at least equal in value to the preserved benefits, including future increases, that they replace. There is no objection to them having a greater value. (The precise requirements are set out in the 1985 and 1986 amendments to Memorandum No 77 (4) and Memorandum No 78 (5).)

Although the legislation applies only to people who leave service after it comes

into force, a number of employers are likely to underwrite the cost of applying it retrospectively. In particular, there will be a faction which seeks administrative convenience by applying the increases to the whole of the pension in excess of the GMP. Such action would, incidentally, eliminate the requirement for a value for money provision to exist in the scheme rules.

An immediate effect of the legislation is that, in a contracted-out scheme, a preserved benefit will consist of up to three distinct parts before it comes into payments and at least two thereafter.

Before retirement:
(i) A part representing the GMP, which increases between the date of exit and State pensionable age in line with the selected method of revaluation (Section 21 Orders, fixed rate ($8\frac{1}{2}$%) or limited (maximum of 5%)).
(ii) A part which must be increased between the date of exit and normal retirement date by 5% each year (or by reference to the increase in the Retail Price Index during the same period, if lower).
(iii) The balance, to which there will be no obligation to give increases prior to retirement.

After retirement:
(i) The GMP, which is inflation-proofed by the State and upon which it is unusual for a pension scheme to grant any additional increases.
(ii) The balance, to which there will be no obligation to give increases.

There has been much investigation going on in other places (and, therefore, not in this paper) into the financial effect on pension schemes of this change in the structure of deferred pensions. The 'knock-on' effect on the early retirement option is not covered in detail in the legislation nor does it appear to receive the investigation it deserves in those other places.

In my opinion it is vital, before the legislation takes full effect, firstly to take a view on how an early retirement pension should be calculated and secondly, to estimate the financial consequences to the scheme and the employers of adopting a specified method and scale of factors. It is unforgiveable for a practitioner to allow systems to evolve without expert advice being given on both the shape and the cost of such systems.

The Shape of Things to Come

There are proposals in the Social Security Act 1986 which include the diminution of benefits arising from the earnings-related part of the State pension scheme. This proposal has little relevance to this paper because, as I see it, preserved pensions will still be potentially divided into the parts described above for a very long period into the future.

Another proposal is to encourage new money purchase 'personal pension schemes'. By definition, the benefits payable on early retirement would be purchased by the accumulated fund at retirement and early retirement factors

would be quite inappropriate. (It is, of course, possible to package benefits by the use of 'terminal bonuses' so that it looks as though traditional early retirement provisions exist, but any such package would merely be a device and is outside the scope of this paper.)

6. SOME ALGEBRA

Having noted the existence of a problem, it is now worth straying back into some more theory. This is deliberately kept at a very simple level.

We have a deferred pension payable from State pensionable age and consisting of:

> G, The GMP at exit;
> A, The part which receives increases at a guaranteed rate;
> B, The balance upon which no increases are granted.

After retirement, assumed to take place at the date of exit, the whole of the pension in excess of the GMP escalates (possibly at 0% per annum) and there are no increases given to the GMP once it comes into payment.

If we work on a pure interest basis and ignore the effects of any ancillary benefits, the value of the deferred pension at age x for a man is:

$$A \, v_j^{65-x} \, a_{65}^k + B \, v_i^{65-x} \, a_{65}^k + G \, v_l^{65-x} \, a_{65}^i$$

where i, rate of interest,
  $i-j$, rate of escalation on A before retirement,
  $i-k$, rate of increases on pensions in payment,
  $i-l$, rate of revaluation of GMP in deferment,
  a_x^k, annuity payable from age x allowing for $(i-k)\%$ pension increases.

The value of the immediate pension, P, at age x is:

$$P \, a_x^k - G \, v_l^{65-x} \, (a_{65}^k - a_{65}^i)$$

The expressions simplify, if actuarial equivalence is required, to:

$$P = \frac{A \, v_j^{65-x} \, a_{65}^k}{a_x^k} + \frac{B \, v_i^{65-x} \, a_{65}^k}{a_x^k} + \frac{G \, v_l^{65-x} \, a_{65}^k}{a_x^k} \qquad (1)$$

i.e. $A \times Factor \ 1 \ + \ B \times Factor \ 2 \ + \ G \times Factor \ 3$

Thus, actuarial equivalence on a *Type B* basis can be maintained if different early retirement factors are applied to each component of the deferred pension. Although justifiable in theory, such a complicated system has not proved popular in the past.

The pension, P, would exceed the GMP at State pensionable age provided that:

$$P(1 + i - k)^{65-x} > G(1 + i - l)^{65-x}$$

If as an example we use the following interest rates and the corresponding annuity values:

$$i = 9\% \qquad a^k_{65} = 12\cdot65$$
$$i-j = i-k = 5\% \qquad a^k_{60} = 14\cdot35$$
$$i-l = 8\tfrac{1}{2}\% \qquad a^k_{55} = 15\cdot95$$
$$a^k_{50} = 17\cdot50$$

we obtain the following values for the three factors:

Age	Factor 1	Factor 2	Factor 3
65	1·000	1·000	1·000
60	·725	·573	·860
55	·536	·335	·755
50	·401	·198	·671

Factor 1 is typical of an 'out of date' early retirement factor. Factor 2 might be considered 'realistic' and has understandably been opposed by pension scheme members (and by employers) in the past.

The expression for P in (1) can easily be simplified further to:

$$P = (A^* + B + G^*) \; \frac{v_i^{65-x} \, a^k_{65}}{a^k_x}$$

i.e. $(A^* + B + G^*) \times$ *Factor 2*

where $A^* = A(1 + i - j)^{65-x}$ i.e. the escalating part of deferred pension at 65;

       $G^* = G(1 + i - l)^{65-x}$ i.e. the revalued GMP at 65.

It is very dangerous to go along this route of trying to maintain actuarial equivalence by using a single early retirement factor. This is because the discount factors required are calculated using the high rate of interest 'i' and appear to be penal. There would be unremitting pressure to improve these factors and, as long as they are to be applied to deferred pensions which already include revaluation/ escalation to Normal Retirement Date, this pressure must not be permitted to prevail. A study of the specimen factors shown in the table above will indicate why this is.

If we sought to obtain actuarial equivalence on a *Type A* basis and, for convenience, took the rate of salary escalation to be equal to the rate of revaluation of GMPs in deferment, the early retirement pension would be:

$$P = (A + B + G) \; \frac{v_i^{65-x} \, a^k_{65}}{a^k_x}$$

i.e. $(A + B + G) \times$ *Factor 3*

7. SOME LEGISLATION

There is, at the present time, remarkably little legislation relating to the calculation of an early retirement pension. The Practice Notes (3) (as amended by Memorandum No. 80 (6)) define the maximum permissible early retirement pension, in broad terms, to be equal to the maximum permissible deferred pension. This maximum is calculated by reference to service completed, potential service and earnings near the time of leaving service. The earnings can be increased in line with a suitable index between the time they are paid and the operative date. The deferred pension is thus defined in terms of its present amount and implicitly excludes any increases, whether guaranteed or otherwise, which may accrue between the operative date and the normal retirement date.

Logic suggests, therefore, that an early retirement pension should not exceed the underlying deferred pension including increases that have accrued at the date of retirement but excluding any prospective increases.

The Social Security Pensions Act 1975 only overrules this to the extent that a pension payable from a contracted-out scheme must not be less, at State pensionable age, than the GMP. There is no comment about the level of pension which can be paid before that time but the implication is still that it should not exceed the accrued deferred pension, excluding any future revaluations of the GMP.

This Act did, however, introduce the idea (Memorandum No. 77 (4)) that early retirement factors should not exceed 6% for each year by which payment is advanced unless they are certified by an Actuary. This was yet another step towards such factors becoming a part of the benefit structure rather than a part of a financially neutral option.

The Health & Social Security Act 1984 and the Social Security Act 1985 hardly changed this state of affairs, except to the extent that the accrued deferred pension could be defined in a different way (including increases which have already accrued) and that any early retirement pension must not be less than the actuarial equivalent of the deferred benefit (including prospective increases) that it replaces. This last requirement is liable to cause confusion amongst less technically minded (non-actuarial) persons who could interpret it as meaning their out-of-date 'actuarial' early retirement factors should be applied to the fully revalued deferred benefits. The potential problems arising in such cases are referred to in the preceding section.

8. WHAT SOME SCHEMES DO

A Bad System

One system which evolved following the advent of contracting-out under the Social Security Pensions Act 1975, and which has been condoned by many practitioners, is the application of existing early retirement factors to a deferred pension including the GMP revalued to normal retirement date. The justifications for this have been:

(i) The amount of the revalued GMP is known and should therefore be taken into account explicitly in the calculations.

(ii) The resulting pension tended to compare favourably with the GMP due from State pensionable age.

There is no actuarial justification for this system, however, and the fact that the existing early retirement factors contained an implicit provision for increases to deferred pensions both before and after normal retirement date, which are not appropriate in the case of a revalued GMP, has been conveniently disregarded. The deficiencies of this system are clear.

A common feature of this system in practice is that retirement may be prevented if the immediate pension payable is not at least equal to the GMP at State pensionable age even where there is a regular practice of granting discretionary pension increases.

One result of applying this system is that the early retirement pension often exceeds the accrued deferred pension. It is clear in such a case not only that the early retirement pension may exceed the maximum permitted under Inland Revenue regulations, but also that the reserve required to pay this pension is likely to exceed the past service reserve held the day before leaving; it may even exceed the valuation reserves calculated using the Aggregate Method or the Entry Age Method.

The costs incurred in the use of this system are relatively small at the present time because GMPs are only a fraction of their ultimate size. If the system were allowed to continue it would logically have to be extended to cover the 'guaranteed' increases on the deferred pension in excess of the GMP as well as the 'guaranteed' revaluation on the GMP. The costs could become horrendous.

Practitioners who encounter this system should take the opportunity offered by the requirements of the Social Security Act 1985 to review it and to advocate a more justifiable system.

A Good System

Many employers consider early retirement factors to be part of the benefit structure and take a relaxed view of the cost implications of possible increases to pensions at State pensionable age. One system which has evolved in these circumstances is:

(i) A single scale of early retirement factors is applied to the accrued deferred pension at retirement (including past, but not future, increases).

(ii) Early retirement is always permitted, even where the pension is potentially lower than the GMP at State pensionable age.

(iii) Commutation is restricted so that the minimum residual pension is not less than the GMP at retirement; no commutation is permitted if the pension is already less than the GMP at retirement.

(iv) The pension in excess of the GMP in payment (and the GMP only becomes payable after State pensionable age) qualifies for all increases, whether guaranteed or discretionary.

(v) The pension (or a part of the pension) is increased if necessary at State pensionable age to be at least equal to the GMP.

(vi) One scheme I know uses this system but also applies a minimum to the early retirement pension equal to the immediate pension which could be bought in the scheme by the alternative transfer value.

Surprisingly enough, this system can be less expensive than that outlined in the example of a bad system described above.

Some of the employers who have agreed to the use of this system have undertaken the added discipline of paying the costs arising from any expected increases due at State pensionable age as and when retirement occurs.

An Alternative System

A number of employers have been worried about the potential cost of procedures such as those described in the example of a good system and have adopted systems along the following lines:

(a) The accrued deferred pension at retirement is divided into two parts:

    (i) the GMP payable from State pensionable age;

    (ii) the balance of the pension.

(b) The balance of pension can be taken immediately in any one or more of the following ways:

    (i) a whole life pension calculated by applying the early retirement factors to part or all of the balance of pension;

    (ii) a temporary pension payable until State pensionable age which does not exceed the sum of the revalued GMP and the basic State pension;

    (iii) a lump sum, subject to Inland Revenue restrictions.

(c) Very careful consideration has to be given as to how 'five year guarantees' and other ancillary benefits should be calculated and applied.

9. SOME CALCULATIONS

An Infinity of Options

At the risk of detracting attention from the salient points of the discussion, I have included a section on calculations. Such calculations, by their very nature, are likely to get out of control and to take over a paper. This is because of the vast range of possibilities which are available, covering:

    (i) Different valuation bases and methods.

    (ii) Different benefit structures.

    (iii) Different pension increase provisions.

    (iv) Different levels of funding.

    (v) Different scales of early retirement factors.

    (vi) Contracted-in or out.

(vii) Different ages at leaving service.

(viii) Different ages at taking the early retirement option.

The very existence of such an infinity is a deterrent, particularly as explanation and comment could be required on each option.

The Chosen Path

I have tried to focus on just a few calculations which might demonstrate some of the problems referred to earlier in the paper. In order to do this I have had to define a specimen valuation method and basis. The one I have chosen is merely to demonstrate effects. The basis and methods applicable to any specified scheme could equally well have been used but the results would be likely, in broad terms, to be the same.

The method selected is such that it is convenient to assume that the past service reserve is fully-funded (exactly) the day before the member leaves service. Different levels of funding could have been considered but would have led to unnecessary complications.

The selected basis can be summarized as:

Rate of investment return	9% per annum
Earnings progression	8% per annum
Revaluation under Section 21	8% per annum
Decrements before retirement	None
Pensioner mortality	Approximately $a(55)$ ultimate

Normal retirement age is assumed to coincide with State pensionable age and both the Earnings progression and the revaluations under Section 21 are assumed to cease one year earlier. Suitable provision is included for widows' pensions on death after retirement.

Only male members will be considered with specific ages at leaving of 35, 50 and 60. Early retirement will be at ages 50 or 60.

Intermediate stages of the calculations are omitted.

Building Bricks

BASIC ANNUITY FACTORS

		No escalation	5% escalation
Retirement at 65:	*Whole Life from 65*	8·75	12·65
Retirement at 60:	*Temporary from 60 to 65*	4·00	4·50
	Deferred from 65	5·40	9·85
	Whole Life from 60	9·40	14·35
Retirement at 50:	*Temporary from 50 to 65*	8·40	11·10
	Deferred from 65	2·20	6·40
	Whole Life from 50	10·60	17·50

PAST SERVICE RESERVE FACTORS

Age	35	50	60
No escalation after retirement	6·15	7·05	7·75
5% escalation after retirement	8·90	10·20	11·20

DEFERRED PENSION RESERVE FACTORS

Age	35	50	60
No escalation	·65	2·40	5·70
No escalation to 65, 5% thereafter	·95	3·50	8·20
5% escalation to 65, none thereafter	2·85	5·00	7·25
5% escalation throughout	4·10	7·20	10·50

ANNUITY VALUATION FACTORS

Age	50	60
No escalation	10·60	9·40
No escalation to 65, 5% thereafter	11·60	11·80
5% escalation to 65, none thereafter	15·50	11·30
5% escalation throughout	17·50	14·35

Example 1

Scheme X is contracted-in with no escalation promised either before or after retirement.

(a) We first consider a man who is retiring from service at 60 having accrued a deferred pension of £1,000 p.a.

   (i) If he is given his full accrued pension immediately, which is worth £9,400, there will be a strain on the scheme's finances of £1,650 at retirement.

  (ii) The *Type A* pension is £824 p.a., which is worth £7,750.

 (iii) The *Type B* pension £606 p.a., which is worth £5,700.

 (iv) The historic early retirement factors have an implicit allowance for 5% p.a. increases before and after retirement. The resulting early retirement pension is £725 p.a. (see *Factor 1* in §6), which is worth £6,815. These factors are assumed to be still in use.

(b) Now we consider a man who was 35 when he left with a deferred pension of £1,000 p.a. and who is retiring at 50.

   (i) There was a release of reserves at leaving of £5,500 (6150 − 650).

  (ii) The *Type B* pension at 50 will be £226 p.a., which is worth £2,400.

 (iii) The early retirement pension payable is £400 p.a. (see *Factor 1* in §6), which is worth £4,240, so there will be a strain on the scheme's finances of £1,840 at retirement.

 (iv) If the deferred pension had been defined as £400 p.a. from 50 the release of reserves at leaving would have been £4,986 (6150 − 1164) and there would have been no strain at retirement.

  (v) If the man had paid £2,000 of contributions his value for money deferred pension would have been £3,077 p.a. from 65. If the early

retirement factor is applied, the pension at 50 would be £1,231 p.a., requiring a reserve at leaving of £3,582 (which should be compared with his contributions, £2,000, at the same date).

(c) We now consider a man who is retiring at 50, but the scheme's provisions have been amended so that, in this example, half his deferred pension of £1,000 p.a. will receive automatic increases of 5% p.a. both before and after retirement; the other half will get no increases.

 (i) The *Type A* pension is £624 p.a., of which £291 p.a. receives 5% p.a. escalation. This is worth £8,625.

 (ii) The *Type B* pension is £319 p.a., of which £200 p.a. receives 5% p.a. escalation. This is worth £4,800.

 (iii) The normal early retirement pension, based on the accrued deferred pension, would be £400 p.a., of which £200 p.a. receives 5% p.a. escalation. This is worth £5,620.

 (iv) The anticipated deferred pension at 65 is £1,539 p.a., of which £1,039 p.a. will receive 5% p.a. escalation. If the early retirement factor is applied to this pension, the pension at 50 would be £616 p.a., of which £416 p.a. would recieve 5% p.a. escalation. This is worth £9,400. There would thus be a strain of £775 on the scheme's finances at retirement. This compares with the expected release of reserves of £3,825 (8625 − 4800) if the man had deferred his pension to 65.

Example 2

Scheme *Y* is contracted-out. No escalation is promised either before or after retirement. The early retirement scale is '3% simple discount' (i.e., the factor is 70% if retirement is 10 years early).

Let us consider the man who left service at 35 with an accrued pension of £1,000 p.a. of which £250 p.a. is the GMP. The GMP will have accumulated to £850 p.a. at 50 and £2,663 p.a. at 65. He wishes to retire at 50.

 (i) There was a release of reserves at leaving of £3,932 (6150 − 2218).

 (ii) The early retirement pension, based on the accrued deferred pension, (£1,600 p.a.), would be £880 p.a. at 50 and would be increased to £2,663 at 65. There would be a strain of £5,060 at retirement, of which £3,923 is in respect of the increase at 65.

 (iii) The early retirement pension, based on the expected deferred pension, (£3,413 p.a.), would be £1,877 p.a. at 50 and would be increased to £2,663 p.a. at 65. There would be a strain of £13,434 at retirement, of which £1,729 is in respect of the increase at 65. If the deferred benefit had been expressed as payable from 50, the release of reserves at leaving would have been £213 (6150 − 5937).

 (iv) If the pension was split into the GMP and the excess, an immediate pension of £413 p.a. would be payable from 50 and would be increased to £3,076 p.a. at 65. Alternatively a temporary pension to 65 of £521 p.a.

could be paid and replaced by the GMP at 65. The strain here, attributable only to the generous early retirement factors, is £2,578 at retirement.

Example 3

Scheme *Z* is the same as Scheme *Y* except that its provisions have been improved so that, in this example, half of the deferred pension in excess of the GMP gets 5% p.a. guaranteed increases.

We will look at a man who leaves at 50 with an accrued pension of £1,200 p.a., of which £400 p.a. is the GMP. The expected pension at 65 will be £2,485 p.a. of which £1,253 p.a. is the GMP and £832 p.a. will qualify for the 5% p.a. increases.

(i) The full past service reserve was £9,720, the deferred pension reserve is £6,847 and the cost of providing just the GMP from 65 is £3,007.

(ii) The early retirement pension, based on the accrued deferred pension, would be £660 p.a. at 50, including £220 p.a. qualifying for increases. The pension would have accrued to £897 p.a. at 65.

If the total pension is increased to £1,253 p.a. at 65 and none of it qualifies for further increases, the value of the benefit package at retirement would be £8,895.

If only the GMP portion is increased to £1,253 p.a. at 65, the total pension will be increased to £1,930 p.a., of which £457 p.a. will qualify for further escalation and the total benefit package at retirement would be worth £10,787.

(iii) The early retirement pension, based on the expected deferred pension, would be £1,367 p.a. at 50, of which £457 p.a. will qualify for escalation. The pension would have accrued to £1,860 p.a. at 65.

If this pension is left unchanged at age 65 and only £607 p.a., being the excess over the GMP (subject, perhaps, to a maximum of the accrued escalating pension, £950 p.a.), qualifies for escalation, the value of the benefit package at retirement would be £17,342.

If the GMP portion is increased at age 65 to £1,253 p.a., the total pension will be increased to £2,424 p.a. and the total benefit package at retirement would be worth £18,884.

(iv) If the pension is split into the GMP and the excess and the early retirement factor is applied to the accrued excess, an immediate pension of £440 p.a. would be payable until 65, by which time it would have increased to £677 p.a. and the GMP would become payable in addition. £220 p.a. of the initial pension would qualify for increases for ever.

Alternatively, a temporary pension of £625 p.a. (including £347 p.a. which escalates) could be paid until 65, at which time it would have accrued to £999 p.a. and would be replaced by the GMP. The value of this benefit package is £9,189 at retirement.

10. SOME FINAL THOUGHTS

When I started this paper I also intended to discuss ancillary benefits and situations where Normal Retirement Age is other than State pensionable age. It soon grew too long, however, and I decided that any such discussions being included would cloud the main issues.

Consequently I leave you with just a few thoughts:

(i) Early retirement pensions are slowly becoming defined benefits rather than cost-free options based on actuarial equivalence. I believe it to be important that no cost is involved when an option to take such a defined early retirement benefit is made. To this end the option should be allowed for explicitly in the valuation method for both active members and deferred pensioners.

　(a) Thus, if a full accrued pension can be paid immediately in certain circumstances, then there should be an explicit provision for this in the valuation and funding basis for active members by the use of a retirement decrement. A simple and practical alternative which is sometimes used is to assume that all members retire one or two years early. A second alternative is, of course, for the employers to have the added discipline imposed on them, perhaps in times when they are considering redundancies (and perhaps when they can least afford it), of paying for such enhanced benefits as and when they arise.

　(b) Also, if the accrued pension is to be reduced for early payment then the practitioner should try to ensure that the reduced pension is not more valuable than the reserve held the day before leaving. Subsequently he should ensure that deferred pension reserves are calculated assuming the members retire at the earliest opportunity (provided that this is the most expensive option to the scheme, which it usually is).

(ii) Any system used for reducing an accrued pension for early payment should be simple, sensible and justifiable. I believe that the examples of a good system and of an alternative system outlined in §8 meet this requirement.

(iii) Practicners, Trustees and Employers should all be aware of the cost implications of any agreed system.

11. SOME FINAL WORDS

I hope that this paper has not been rendered too incomprehensible by the jargon included in it, that it has lived up to my intentions that it should be educational and that it should provide guidelines for revised systems in cases where existing ones are not entirely appropriate. The views expressed and the mistakes made are my own. Nevertheless, I am grateful to those who have

assisted in checking formulae and arithmetic and to Janet Jenkins for her word-processing skills.

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