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**DEFINED BENEFIT PENSION SCHEMES –
FUNDING FOR ONGOING SECURITY**

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1. Foreword

1.1 In a paper¹ presented to the Institute of Actuaries in February 1992, Thornton and Wilson discussed what they considered to be ‘best estimate’ assumptions. They went on to examine what margins might be necessary in order to ensure that a scheme would remain satisfactorily funded at all times, with particular reference to use of the Projected Unit Method (PUM). Thornton and Wilson argued that this method was most consistent with the funding requirements of an ongoing scheme.

They acknowledged, however, that use of this method could lead to a scheme being technically insolvent from time to time, if the market value of assets was less than the cost of securing the scheme’s wind-up liabilities with an insurance company. Collins² reached the same conclusion in his paper presented to the Staple Inn Actuarial Society in March 1992.

1.2 The main purpose of our paper is to explore, from first principles, the funding requirements of an ongoing scheme. We look at how these can be reconciled with the trustees’ need to be confident that promised benefits will be secure in the event of a wind-up, and the sponsoring company’s aim of not tying up resources unnecessarily.

1.3 The paper is divided into three main parts and two appendices:

Part 1 - Fundamentals

Part 2 - Specific circumstances

Part 3 - Other issues

Appendices and Acknowledgements

PART ONE

FUNDAMENTALS

2. Introduction

2.1 Until a few years ago actuaries enjoyed almost complete freedom when formulating advice to clients on the funding of defined benefit pension schemes. Funding methods with diverse characteristics were in common use and the assumptions adopted were also varied.

2.2 In 1987, Regulations issued under the Finance Act 1986 introduced, for the purpose of restricting the maximum amount of tax relief available, a ceiling on the ratio of assets to accrued liabilities in any non-insured pension scheme. If a scheme was funded to a level in excess of the specified maximum then action had to be agreed with the Inland Revenue to eliminate the “excessive surplus”. Otherwise the tax reliefs available to an approved scheme would be withdrawn in relation to the excess funds.

The basis to be used in valuing assets and liabilities for the surplus test was prescribed in Statutory Regulations, and reflected advice given by the Government Actuary. So far as the liabilities to be valued in respect of active members were concerned, the Projected Accrued Benefits Method (PABM) was chosen. Thus it became necessary for actuaries to have regard to the build-up of assets in relation to a scheme’s accruing liabilities. Actuaries who had, in the past, used prospective methods such as aggregate funding were therefore faced with a new problem to consider.

2.3 In May 1988 Statement of Standard Accounting Practice No. 24 (SSAP24) was published. This document described how pension costs were to be reported in company accounts. It was no longer sufficient simply to show the contributions paid (on which a company’s tax relief is based) as being the pension cost for the period concerned. The cost to be shown in a company’s accounts had to be calculated “on a systematic and rational basis” using “best estimate” assumptions. Thus it might bear little or no relation to the contributions actually paid by the employer.

Arguably, the introduction of SSAP24 should not have influenced actuaries in giving advice on pension scheme funding. The Standard only related to the reporting of pension costs in company accounts and did not seek to affect the way in which a scheme was funded. In practice however, many employers have felt it is advantageous, on the grounds of simplicity if nothing else, for the contributions paid to the scheme to be equal to the pension cost under SSAP24. Actuaries have therefore had to consider questions along the lines of:

- (i) Does my funding method meet the requirements of SSAP24?
- (ii) Are my assumptions for funding purposes within the range of what may be regarded as (prudent) best estimates (see section 12)?
- (iii) If the answer to (ii) is no, then does the pension cost derived using best estimate assumptions represent a rate of contribution which is acceptable from a funding viewpoint?

As regards (i) above, SSAP24 requires the actuary to make allowance for new entrants in his calculations, unless there is good reason to do otherwise. Guidance Note 17 gives further advice on the circumstances in which the different funding methods may be inappropriate. In particular, aggregate funding is generally deemed unacceptable, although the Note indicates that there can be times when this method is permissible.

2.4 The Social Security Act 1990, and Regulations either already issued or still awaited thereunder, have produced further complications for actuaries to address.

2.4.1 First, in August 1990 it became impossible for scheme trustees to make any refund of “excessive surplus” (see 2.2, and subject to the Trust documents permitting) unless all scheme pensions earned to date are entitled to Limited Price Indexation (“LPI”), once in course of payment. (For contracted-out schemes, this requirement was restricted to pensions in excess of GMP.) LPI means increases each year at the lesser of 5% and the rate of inflation.

2.4.2 Secondly, since July 1992, if a scheme winds up in deficit then the shortfall is a debt on the employer. For an ongoing company with a scheme which has insufficient assets to cover its discontinuance liabilities it remains to be seen how, if at all, an auditor will reflect this potential liability in the company’s accounts.

2.4.3 Thirdly, from an appointed date yet to be announced by the Government, all non-GMP pensions earned in respect of subsequent service will be entitled to LPI once in payment.

2.4.4 Last, but by no means least in the context of this paper, a new condition will be introduced regarding the use of surplus in schemes which do not already give LPI on all non-GMP pensions in payment. If the actuarial valuation of a scheme (on or after an effective date still to be announced) reveals a surplus then, to the extent that the surplus permits, it will have to be used to provide LPI escalation on pensions already earned - including pensions in payment and preserved pensions - before being available for use in any other way.

The definition of surplus for this purpose has yet to be decided and the Department of Social Security has asked the actuarial profession to consider this matter. We welcome this invitation and our contribution to the debate is given in section 11 of the paper. At this stage however, two points are worth noting:

- (i) The surplus test will have to be based on a comparison of existing assets and accrued liabilities. Only the assumptions to be used and the definition of accrued liabilities have yet to be decided.
- (ii) Employers with schemes which do not award LPI on all non-GMP pensions may be anxious to ensure, so far as possible, that such surpluses never arise. Trustees and members may disapprove of such an attitude, but actuaries involved in advising employers may find themselves being asked to recommend a low rate of contribution, perhaps at a “minimum” level. This could be one which is designed to provide ongoing security for no more than a scheme’s wind-up liabilities. We have heard this approach described as ‘deficit funding’, a description which we consider very misleading - see Appendix A.2.

2.5 The purpose of this introduction has been to summarise the factors which we think have caused use of the more traditional funding methods to become much less common in recent years, and to indicate further factors which may now be affecting the advice given by actuaries working in pensions. In the main body of this paper we go on to consider how these various influences might be reconciled in a consistent way.

3. Funding Methods

3.1 The 1984 report “Terminology of Pension Funding Methods”³ (TPFM) lists and describes five main funding methods. Further variations or newly developed methods are also used in practice. With such a diversity of methods it is important that the actuary advises the client of the objectives of the method adopted, its characteristics and the consequences of using it. Each method builds up funds at a different rate.

3.2 Whilst no attempt is made by TPFM to categorize methods, essentially they can be split into two groups.

Those in the first category can be described as “Prospective Methods”. They take account of the total service (both past and future) of the existing membership. This category includes the Entry Age, the Attained Age and the Aggregate Methods.

The second category can broadly be defined as “Accrued Benefit (or Target) Methods” and includes the Current Unit and the Projected Unit Methods (PUM). These may be regarded as methods which identify a target level of funding required at a date in the future (though in the case of the PUM, for example, it is not always presented in this way). A contribution rate is then calculated with the aim of trying to ensure the target is attained. Methods in this category are often used along with an averaging period in order to ensure that a stable contribution rate can be achieved.

3.3 As outlined in section 2, there has been a clear move towards Accrued Benefit Methods in recent years. The use by the Government Actuary of the PABM as a valuation method for the purpose discussed in section 2.2 can be seen as an example of this trend (though one could take the view that he had little alternative, given the Government’s objective).

So what is it that makes a good funding method?

3.4 Actuarial students are taught the need for Stability, Security, Liquidity and Durability within any acceptable method of funding⁴. However, the relative importance of these and other issues affecting the rate at which funds are put aside to meet future liabilities varies from case to case. In particular, the employer and the trustees may well have different views.

3.5 It is generally accepted that an employer will look for Stability. Fluctuating cash flows are considered unacceptable, though given the fairly short-term view of most employers the importance of Stability may be open to question. Indeed, our own view is that it is more important for the employer to appreciate how contributions are likely to fluctuate in the future. However, when deciding whether benefits can be afforded it is vital to consider the long-term cost as indicated by the average long-term contribution rate.

As we have already discussed, the accountancy profession is also committed to showing an essentially stable pension cost from year to year in companies’ accounts. The timescale considered by accountants is, however, generally shorter than actuaries would consider appropriate for funding purposes.

3.6 Liquidity is also important to the employer. He may view the fund as a form of insurance, safeguarding the company’s profits against adverse (albeit often foreseen) fluctuations in expenditure. For example, in the case of a small employer the strain on cash flow if a number of senior people retired around the same time could otherwise be significant. The pension fund can help cushion the sponsoring company from these effects.

3.7 This brings us to Security which, in our view, is the most important of the basic requirements. It is the need for Security which leads to a pension fund being set up as a legally separate trust in the first place. However, as Lee⁴ puts it:

“... the mere existence of a trust fund separate from the assets of the employer obviously does not in itself guarantee pension rights. The size of the fund in relation to its liabilities is crucial.”

Any funding method must ensure there is enough money available for the trustees to pay the promised benefits. This includes benefits on leaving, death or retirement, and the benefits to which members are entitled should the scheme be wound up.

It is true that additional assets provide further Security in that the fund has a cushion against adverse investment returns. We would argue that if such a contingency reserve is felt necessary then it should be identified separately and should be in addition to the considerations of the funding method.

However, it is a fallacy to suggest that the mere existence of assets in excess of the value of the benefits accrued provides additional Security. On discontinuance it is common for assets over and above those necessary to provide the benefits promised to be available for use as the trustees or the employer (or sometimes both) feel is appropriate. Without a guarantee that the additional assets will be used to provide further benefits the extra security for members in having additional assets in the fund may be more apparent than real.

3.8 Of the three funding requirements considered so far, trustees and members will be most concerned with Security. Stability is of little consequence to members except insofar as it affects the viability of the sponsoring company. Liquidity will not be important to the members. They are unlikely to concern themselves with where the money is coming from, so long as their benefits are secure. Where the problem of Liquidity is extreme and the continued payment of benefits is in doubt then the problem becomes one of Security. The duty of the trustees is to look after the interests of all members. To carry out this duty they must be sure there are sufficient assets in the fund to ensure the Security of the benefits promised.

3.9 We now turn to Durability, which is generally included in the list of desirable qualities of funding methods. Lee⁴ suggests that a funding method should be judged by whether the contribution rate will remain stable if the scheme is closed to new entrants. The justification given for this is that only in this way can a bulk transfer take place without putting undue strain on the purchaser. We disagree however, and believe that Durability of this type is not a necessary feature of a funding method. On the sale and acquisition of a company it is a matter for the purchaser to decide how he will fund pension promises. This is a matter which we consider further in section 8.

3.10 In addition to these fundamental tenets of actuarial theory, we believe excessive assets should not be unnecessarily tied up in the pension fund. The scheme will have been set up to provide certain benefits for members and assets put into the fund are not generally available to the sponsoring employer's business. If a funding method results in assets which are more than sufficient being allocated to the fund, it is unlikely to be the best use of the money. Moreover, as we explained in section 2.4.4, a surplus may be the last thing the employer wants if this will result in him paying for benefit improvements (i.e. pension increases) which he did not want to provide.

We will refer to this principle as "Sufficiency".

3.11 Thus we believe that the four tenets of funding are:

Stability
Liquidity
Security
Sufficiency

Before the actuary uses any method, we feel he should consider the importance of these factors in the circumstances being addressed. In the vast majority of cases the method used will have to satisfy all of these tenets. We will now go on to discuss the most appropriate way of meeting these requirements when funding a final salary pension scheme.

4. Accrued Benefit Methods

4.1 The first three tenets suggested in 3.11 could equally be met by the majority of methods currently in use, but we believe prospective methods generally fail to address the matter of “Sufficiency”. In order that excessive resources are not allocated to the pension fund, the actuary must take account of future as well as existing members. Except in rare cases the scheme will be an ongoing entity and can be expected to continue in the future. (The case of a scheme closed to new entrants is considered in 9.2.) If the effect of new entrants is ignored, the actuary is implicitly assuming that the average age of the membership will increase. If new entrants do join there will therefore be a tendency to overfund. Thus in an ongoing scheme prospective methods are likely to generate surpluses.

We will therefore concentrate on Accrued Benefit Methods. Such methods have regard to the level of the fund which is necessary at any point in time if Sufficiency is to be measured.

4.2 In our view, consideration of various projection periods is fundamental to judging the suitability of an Accrued Benefit Method. Although TPFM³ defines such methods in terms of one-year periods, a period of 10 or 20 years has commonly been used in practice with the sole intention of providing a stable contribution rate over that period. More recently the impact of SSAP24 has often led to the use of the average remaining working lifetime of active members as the projection period. But what of fluctuations within the period? This is one of the main criticisms often levelled at Accrued Benefit Methods and it must be addressed.

It is our belief that Accrued Benefit Methods can only be used successfully if the consequences of various projection periods are considered. Only by investigating the contribution rate over various periods can the actuary be satisfied that the rate recommended is appropriate. Ideally the recommended rate should balance the requirement of stability with those of security and sufficiency. We feel it is imperative that the actuary should examine the effects on contribution rates of projecting over long (up to 40 years) and short (down to one year) periods.

4.3 With this background, it is useful to consider how Accrued Benefit Methods meet each of the criteria we have laid down.

Stability

We have already seen that the desirability of stability depends upon whom the actuary is advising. In particular, the employer and the trustees may well have different views on the projection period considered appropriate. Having said this, Accrued Benefit Methods will frequently provide a stable contribution rate over several different projection periods. By making full allowance for withdrawals in the projections and for the replacement of those who leave service, for whatever reason, the rate produced by an Accrued Benefit Method should be relatively stable from valuation to valuation. Only marked deviations from the expected experience, changes in future service benefits or the actuary’s economic assumptions, or assumptions which lead to significant changes in the scheme’s demography should cause the rate to fluctuate.

Liquidity

Accrued Benefit Methods can make full allowance for any expected fluctuations in cash flow during the projection periods. Indeed it is this requirement which illustrates the need for the actuary to examine contribution rates over various periods. If a heavy demand for cash is anticipated in one particular year then the contribution rate may well increase in that year. Should this happen towards the start of a long projection period it may be lost in the averaging effect. By studying the year on year rates the actuary can identify this and plan the funding accordingly.

Security

Assuming that the level at which the method is targeted is at least sufficient then Security is assured. Only adverse experience, not foreseen at the valuation, can result in benefits being exposed. Irrespective of the method used, the actuary must monitor the progress of the fund regularly to ensure that adverse experience has not put the security of benefits in doubt. Indeed, by concentrating on the level of the fund, Accrued Benefit Methods help ensure that Security is provided.

Sufficiency

By definition an Accrued Benefit Method aims at a specific target. It would therefore be strange if the method did not meet the test of having enough but not too many assets in the fund. If it fails this test then the target is wrong!

4.3.1 Durability

We have already explained why we do not believe that Durability is a necessary requirement of a funding method. Accrued Benefit Methods can be as “durable” as any other method however. If the purchaser’s scheme is aiming at the same general target as the vendor’s scheme then the method has Durability. If the two schemes have different targets then it becomes a matter for negotiation as to the amount of assets to be transferred. We explore this issue more fully in Section 8.

4.4 Accrued Benefit Methods concentrate on the level of the fund. As such the resulting contribution rate may be regarded as a by-product. Clearly these methods will meet the most important requirements of Security, Sufficiency and, with careful study of projections, Liquidity. Given a reasonably stable membership and so forth then Stability will also be achieved. Like the contribution rate this will be a by-product of using an Accrued Benefit Method, but stability is always possible by paying more than is strictly needed.

4.5 Thus the ideal funding method may be regarded as one which produces a stable contribution rate whilst maintaining liquidity and ensuring that there are always sufficient assets available to meet the promises made. To make best use of the assets available to the sponsoring company, excess assets should not be tied up in the fund. We believe that, in the vast majority of cases, it is Accrued Benefit Methods which best meet these criteria and allow the sponsoring company and the actuary to address the matters outlined in sections 2 and 3. If this is accepted then the next stage is to consider the available choice of such methods.

5. The Choice of Method

5.1 Given that Accrued Benefit Methods best meet modern funding requirements, then the actuary has a number of such methods from which to choose. When different projection periods are also considered the permutations are endless. So what is the most suitable method and how should the actuary go about choosing the appropriate projection period?

5.2 Within any projection period, it will usually be appropriate for the actuary to allow for the following (special cases are considered in section 9):

- general pay increases, plus merit/promotional pay increases;
- new entrants;
- withdrawals;
- normal, early and ill-health retirements; and
- deaths.

Bearing in mind the employer's desire for Stability, the actuary should take care to ensure his assumptions regarding these elements are consistent. Assumptions which individually look entirely reasonable can produce surprising forecasts for the membership structure some years hence.

5.3 We therefore advocate considering the effects of the assumptions used on the scheme's demography at various dates in the future. Decrement and new entrant assumptions can be applied to the current membership and the resulting population analysed at various points in the future, say every 5 years. These analyses may then be agreed as reasonable with the employer. If the projected membership does not match his expectations then either the assumptions should be changed until this is no longer the case, or his expectations are shown to be unreasonable. In this way a fuller understanding of the likely future for the scheme is obtained and the employer and actuary can have greater confidence in the funding recommendations.

5.4 When we are training to be actuaries, we are all taught the importance of treating the economic assumptions as a package. The foregoing analysis shows the importance of considering the demographic assumptions as a package as well. In particular it ensures that the assumptions are consistent with the scheme continuing in its current form since, except in rare cases, assumptions which lead to a stable structure and age distribution are most likely to be appropriate.

An example is given in Appendix 1.

5.5 In sections 3.7 and 3.8 we explained why we believe Security is of paramount importance, and why we prefer an Accrued Benefit Method which starts with this fundamental requirement. Such a method should aim to ensure that the assets in the fund are always sufficient to meet the promises that have been made: that is, to ensure there is enough money available to provide members with their promised entitlements whatever the contingency. This is all the members ask and all that the trustees require.

5.6 As with all methods, the one we advocate begins with the current membership. We check that there are sufficient assets available to meet the promises that have been made to these members at the valuation date. On that date the only promise that might have had to be honoured is to pay the benefit promised if the Trust wound up. Thus we begin by checking whether the scheme is solvent.

5.7 This is only the start however, because we know the Trust did not wind up. In the year after the valuation the trustees will have to pay some pensions which have been promised to members who have already retired or who will retire in that year. Other members will die or leave and they will also have promises which must be kept.

As explained earlier, the actuary should make allowance for those who leave to be replaced, unless there is good reason to do otherwise. (For example, the management of the company may have plans for contraction or expansion which should be taken into account.) Thus new entrants will join the scheme and salaries will (probably) increase. The membership in one year's time is forecast and the actuary can again value the promises made to these members. As before, the only promise of real value is that, if the trust wound up at the end of the year, certain benefits would be due. So again we are concerned with the solvency, at the end of the first year.

From the above we have established the starting fund, the cash flow requirements for the year and the assets required to meet the promises at the end of the year. From here it is a simple arithmetical exercise to calculate the contributions required.

5.8 This exercise may be repeated for each of the next, say, 40 years as members leave, die or retire and are replaced by new entrants. Contribution rates can then be calculated for rolling 5, 10 and 20 year periods. A funding rate can be chosen which does not lead to either too small or too large a fund being built up.

5.9 This analysis of the individual rates over the next 40 years, with exits being replaced by new entrants, differentiates this method from "Discontinuance Funding". It is a fundamental assumption that the scheme will continue in existence. The method aims to ensure that at every point in time during its continuing existence, sufficient assets are available to meet the promises made. Thus the fundamental tenet of funding is met, namely that of Security.

5.10 By careful analysis of the results of using different projections any instability can be identified. If rates fluctuate significantly it may not be possible to stabilize the contribution rate, at least in the short term. In such circumstances, the actuary, the sponsoring company and the trustees need to agree a rate which meets the company's need for stability and the trustees' need for security. The projections will also indicate the expected level of the fund and the value put on the liabilities at each point in time. Thus the actuary and sponsoring company can ensure that there is enough, but not too much money available; the requirement of Sufficiency is met.

6. The Target

6.1 We have explained our contention that Accrued Benefit Methods best meet the modern requirements of a funding method. In addition we have explained in general terms the importance of the target being related to the benefits promised in the Trust Deed if the scheme were to be wound up. But what value should be put on these benefits?

In the case of a wind-up (as opposed to a closing of the scheme to new entrants or a take-over), a scheme will have to continue on a paid-up basis (if the Pension Schemes Office agrees) or the benefits will have to be bought out with an insurance company. In practice, a scheme which is run on a paid-up basis is likely to be wound up subsequently while some assets and beneficiaries remain. On discontinuance, the only way to ensure the promised benefits are exactly met is to purchase them in the non-profit deferred annuity market. Thus the fund available at any point in time should be sufficient to secure the promised benefits with a reputable insurance company (as well as meeting the expenses of winding-up). Indeed, Collins² states that “the only true measure of whether a scheme is insolvent or not is when the value placed on the liabilities equates to the premium required by an insurance company to secure those liabilities ...”

6.2 In theory the cost of the benefits could be found by building a model of the non-profit deferred annuity market into the funding basis. However, research in our own office has suggested that a more practical expedient is to select a rate of interest which, along with the other valuation assumptions, acts as a proxy for the pricing policy of insurance companies.

6.3 So far we have referred broadly to the benefits promised to members in the case of a wind-up, but what are these benefits? In virtually all the discussion we have seen of the method we are advocating it has been assumed that the benefits promised on discontinuance are those available to early leavers, but this need not be the case. There are good reasons why an employer might wish to provide better benefits to those who suffer the consequences of a wind-up. As discussed in section 3.7 however, the mere existence of additional assets within the Trust does not guarantee additional security. Only by formally documenting the members’ rights to these extra benefits can the employer be confident that assets put aside for that purpose will be used as intended. The method we suggest specifically allows for this and, along with appropriately drafted rules, ensures the employer’s wishes will be followed.

We have a number of clients who fund on the basis of building up assets in excess of those sufficient to provide leaving service benefits. They ensure security for the members by documenting the additional benefits these assets are to provide. If such a scheme were to be wound up the assets would be used, as far as possible, to secure these additional benefits.

6.4 It is sometimes claimed that, as the Projected Unit Method builds up assets sufficient at any time to meet the members’ expectations of later receiving benefits based on final earnings, it will therefore lead to a higher level of funding than with discontinuance benefits as the target. However, given that the calculation of the actuarial liability using the PUM typically allows for future withdrawals, this is not necessarily true, even if leaving service and wind-up benefits are the same. Where an employer wishes to provide discontinuance benefits based on projected final earnings, our proposed method will almost certainly result in a required fund which exceeds that built up under the PUM. Put another way, the PUM would probably fail to build up sufficient assets for the promise on discontinuance to be honoured.

6.5 We therefore conclude that the employer’s intentions in all eventualities should be made clear in the Trust Deed. If the employer wishes to build up sufficient assets to provide benefits based on projected earnings in the event of a wind-up then the Trust Deed should ensure that the assets would be used for this purpose. Otherwise additional assets would be surplus to requirements and the use to which they were put could well be a matter of dispute. Equally, if the employer has made such a commitment then the actuary has a duty to ensure that the assets in the fund are always expected to be sufficient to meet this target.

7. Meeting the Target

7.1 Once the target has been agreed, the actuary must consider how the assets are going to accumulate over the projection period. Account will need to be taken of the future return on the scheme's investments in the ongoing situation. This return may differ from that appropriate in modelling the pricing policy of insurance companies.

7.2 Like Thornton and Wilson¹ we advocate an approach which uses one rate of interest to value the accrued liabilities and a different rate during the projection period. It is only by coincidence that future investment returns (the "valuation rate") would be equal to the rate used to price accrued liabilities (the "settlement rate"). Indeed, there are sound theoretical reasons for expecting the settlement rate to be below the valuation rate (see section 7.5).

7.3 In order to maximise the chance of being on target in the future the actuary must make his or her best estimate of investment returns. However Collins² has asked:

"If insurance companies harden their bases on the basis of lower interest rates should this force scheme actuaries to strengthen their basis to prevent schemes becoming insolvent?"

If the settlement and valuation rates are the same then by strengthening the valuation basis an actuary will only increase the likelihood that excess assets are built up. The only way to take account of a hardening of insurance company bases without causing these difficulties is to separate the valuation rate and the settlement rate and to strengthen the latter. If the actuary expects the fund to earn a return of (say) 9% per annum then this rate should be used as the valuation rate. Using a lower rate would increase the probability of generating a surplus in the ongoing scheme. With surpluses soon to be effectively earmarked for members in schemes where all (non-GMP) pensions do not yet have LPI (see section 2.4.4), and the increasingly popular view that money once in a scheme "belongs" to members, employers will not thank actuaries for strengthening their bases (though members may feel differently!).

7.4 An approach such as this allows the actuary to take full account of expected future investment returns in the ongoing scheme without jeopardising the solvency of the accrued benefits at any point in time. Freed from the constraints of having to choose a single interest rate which attempts to meet both requirements, a less conservative rate may be used for the valuation rate.

7.5 Such an approach is also justifiable from an investment point of view. In order for the assets to match the liabilities, it would be necessary to move the investments towards a fixed interest portfolio following a decision to wind up. The subsequent return would then be close to the rate earned in the fixed interest market. Over the long term we would expect this to be below the return on a balanced portfolio.

7.6 Whilst we have concentrated so far on the situation if the trustees were to purchase the benefits in the deferred annuity market, they could decide to continue the trust (with the agreement of the PSO) and pay pensions and other benefits as they fell due. In this case the appropriate type of asset would also be fixed interest stocks, and so again a lower rate of return should be assumed once benefits have ceased to accrue within the scheme.

7.7 Thus the process of valuing the accrued liabilities at any point in time using a lower interest rate than is assumed in the ongoing fund can be seen as a proxy for the pricing mechanism of the deferred annuity market. This reflects the lower return expected on fixed interest investments, such investments being more appropriate once the scheme has become paid-up.

PART TWO
SPECIFIC CIRCUMSTANCES

8. Sales and Acquisitions

8.1 Recent experience suggests that the vast majority of actuaries involved in advising on sales and acquisitions now agree that the transfer payment should be calculated using the PUM. This has an obvious appeal, especially to the purchaser. Looking at the transferring employees as a closed group, the purchaser can argue that over their future working lives with the company, these employees will be building up final salary benefits on withdrawal or retirement in respect of the past service credited to them in the new scheme. A PUM transfer basis seems to fit such a scenario perfectly.

8.2 Precisely this view seemed to be taken by the Occupational Pensions Board (OPB) in their "Protecting Pensions" report⁵. In commenting on the obligation of the vendor's scheme to offer a bulk transfer payment and how the amount should be calculated, the OPB said (para. 10.26):

"In principle the amount ... is the sum which the Trustees of an identical receiving scheme require to cover the cost of setting up, for the members concerned, pension credits for past pensionable service equal to each member's past pensionable service benefits in the paying scheme, allowing for rights and expectations based on eventual final pay."

8.3 As we discussed in section 1.1 of this paper however, some actuaries now acknowledge that use of the Projected Unit Method can lead to a scheme being insolvent even if wind-up benefits are based on leaving service rights. Where discontinuance benefits exceed leaving service rights the level of insolvency will be greater.

Where a scheme is insolvent (whatever benefits it offers members in the event of discontinuance) then the trustees would have to give serious consideration to cutting back cash equivalent transfer values. Even where the scheme is fully funded on an "early leaver" basis the payment of a full cash equivalent transfer value in these circumstances may, depending on the scheme's wind-up priorities, reduce the level of coverage for the benefits of the remaining members. One must also consider what implications this has for the calculation of a bulk transfer value.

8.4 We have also encountered cases where, on agreeing to a PUM or other type of final salary bulk transfer, the vendor (or, subsequently, the vendor's scheme trustees) has looked for some sort of guarantee from the receiving scheme in the event of significant redundancies after the transfer has been completed. This recognises that the receiving scheme could make a "profit" at the expense of the transferring scheme.

8.5 In our view one important point needs to be acknowledged. Once the transfer has taken place, the benefits to which the transferring employees are entitled are governed by the Trust Deed and Rules of their new employer's scheme. The new employer will need to consider the cost of providing reasonable pension benefits along with all the other costs of running the business. If a low transfer value is received, the future cost of funding the liabilities taken on will be higher. This will affect the profitability of the business being bought and thus the price to be paid.

8.6 Thus it is important for the actuary to be conscious of whom he is advising. Prior to completion the client is likely to be the employer. Here pensions are just one part of the overall deal and the generosity or otherwise of the pension provision may be balanced elsewhere. Ensuring that transferring members are not penalised where a low transfer value is paid across may be difficult however.

8.7 To help illustrate the point, consider the circumstances envisaged by the OPB in the comment quoted in section 8.2, and suppose a bulk transfer is to be made between two identical schemes. The transferring scheme (A, say) has been funded for many years using the Current Unit Method with full allowance for statutory revaluations. The funding level has remained consistently a little above 100%, and all members' benefits have been paid in full, and on time, in the ongoing scheme.

The Trust Deed of Scheme A states that, on a bulk transfer, a full share of fund has to be paid. However, when the members concerned are deciding whether to transfer their past service benefits to their new employer's scheme (B, say), they find they are being offered less than full year for year past service. On querying this, they are told by the new employer and Scheme B's Trustees that the share of fund transfer values are inadequate to provide full past service credits in the new scheme. Who are the members to hold responsible for the drop in the value of their prospective retirement benefits?

The sharpness of the discussion may be focused by examining the position if the whole company was taken over by a new owner, with the employees remaining in precisely the same jobs on precisely the same terms. (This is equivalent to a bulk transfer of the entire scheme's assets and liabilities.) Would the new owner try to argue that accrued pension rights had to be cut back because the scheme was inadequately funded? He might wish to fund to a higher level in the future, but this could surely not be used as justification for reducing past service benefits. So why is the same argument often used when a partial bulk transfer is being made?

Our answer to the question posed at the end of 8.7.1 is that the new employer and/or Scheme B's Trustees are to blame. If schemes A and B are funded using the same method and a transfer value consistent with this method is available, then (possibly subject to minor discrepancies which may arise due to the two schemes' actuaries using different assumptions) we can see no justification for the receiving scheme refusing to offer full past service benefits.

If the target level of funding in scheme B is higher than that adopted by scheme A (because higher wind-up benefits are promised), this should be recognised for what it is. Either members should receive past service benefits which have been reduced appropriately to reflect the more generous entitlements on wind-up (although such an adjustment would be difficult to justify to employees), or the discontinuance provisions in section B's formal documents should reflect the poorer benefits in the event of wind-up for the transferring employees.

If the target company has been valued using a discounted cash flow approach, then the overall value of the acquisition should be (largely) independent of Scheme A's funding. A generously funded scheme will receive more investment income, which means company contributions will be lower and so profits higher.

On the other hand, the wind-up benefits in Scheme B may be more generous than those in Scheme A. If the transferring members' full past service benefits in Scheme B are to be funded to this higher level in future, then the fact that a lower purchase price is possible should be set against the need to inject additional funding after the deal goes through.

In advising the new owner the actuary will need to explain the position carefully. As remarked earlier, we do not believe it is right that the members' accrued pension rights should be reduced in such circumstances.

8.8 The issues have already been described in some detail by McLeish and Stewart⁹. In a nutshell the argument is that, on a bulk transfer, it is not sufficient simply to consider the basis on which the bulk transfer value is calculated. The new employer must also have regard to the level of his future contributions.

The past profitability of the enterprise changing hands will have reflected the annual pension cost, which in turn is directly linked to the funding level. If the bulk transfer value does not reflect that funding level, the future pension cost and therefore the profitability will be different.

8.9 The trustees of the purchaser's scheme need to consider how the interests of their existing members are best balanced against those of the members transferring in. Perhaps trustees in a receiving scheme should be more willing to accept a lower level of funding in respect of new members on a bulk transfer, with the rights and expectations of existing members being suitably protected in the scheme's legal documents. So long as the rights of existing members are protected and the promises made to both the new and existing members are secure then the trustees should be satisfied. They will have met their ongoing responsibility for ensuring that promises are fully funded.

8.10 Finally, the duties of the vendor's trustees should be laid down in the Trust Deed and Rules of the vendor's scheme. Where this is not the case the trustees will have to consider what is best for all the members. If the vendor has funded to a higher target than the minimum laid down by law and those additional funds are legally documented as being for the active members then it is difficult to see how the trustees can pay less as a transfer value. Where the additional funds are not legally for the active members but are clearly put aside for them then the trustees may still have a moral if not a legal duty to transfer the higher sum. To do otherwise would penalise the transferring members to the advantage of those staying. Indeed, where assets have been put aside to provide benefits on a projected final salary basis, then even if the scheme were to cease it might reasonably be argued that members had an expectation to receive such benefits whatever the contingency. Not to transfer these assets would jeopardize these expectations.

9. *Special Cases*

9.1 It is often said that the advantage of having a choice of funding methods is that the actuary can choose the appropriate one for the circumstances of any particular scheme. We have never come across a case where our preferred method cannot be adapted to meet the necessary requirements. With careful selection of the projection period and, more importantly, the funding target, we believe all circumstances can be covered. Various possibilities are considered in this section.

9.2 A Closed Scheme

If no new entrants are being admitted then the one year funding rates will gradually increase, reflecting the rising average age of the reducing membership. The fund required at any point in time will be the amount required to purchase the benefits should the scheme be wound up. A level contribution rate calculated over the period till the last member leaves or retires will be equivalent to that which would derive from aggregate funding. However, during the life of the scheme aggregate funding would result in excessive assets being put aside and so would fail our test of Sufficiency. Our method is designed to ensure that the fund required from time to time is identified and controlled. Analysis of different projections will ensure that the employer is aware of any instability in the required rate. Thus when the scheme finally is wound up, the assets available will be sufficient but not excessive in relation to the promised benefits.

9.3 A New Scheme

In this case the sponsoring employer's view as to the future growth of the company and the scheme membership can be taken into account. The demographic analysis described in section 5 and Appendix 1 can be used to ensure that the expectations are reflected in the assumptions used. Once again the one-year rates will identify any short-term cash flow and solvency problems. The analysis of various projection periods will identify whether a stable rate is sustainable in the short term. In any event the employer can gain an appreciation of how contributions may fluctuate.

9.4 A Tight Budget

Some employers are currently experiencing difficulties in contributing to their schemes at the rate suggested by the actuary. A contribution holiday or reduction might be the lifeline such an employer needs. In such circumstances the actuary and trustees should be happy to agree to a contribution reduction (or holiday) so long as the scheme remains solvent, though the employer must be made aware of the likely effect

on future contribution rates. The method we propose makes this clear and provides the employer with the information he needs. If an actuary insists on using a method which builds up assets beyond those required he may subsequently face some searching questions as to why he required contributions to continue when the scheme is wound up and is found to be substantially in surplus.

9.5 Benefit Improvements

Prospective methods, by definition, can disguise the true cost of benefit improvements, for account is not taken of new entrants. In such circumstances the actuary is often forced to use the Projected Unit Method. The method we propose, with its attention to long projection periods, can indicate the true costs.

9.6 The Risk Averse

Some sponsoring employers and trustees are risk averse. They want to ensure minimum risk and are willing to pay the price of this through funding at a higher level than strictly necessary. This has often been the reason for using a funding method which builds up excess assets. The use of such methods along with conservative assumptions hides the true degree of the margins built in however, as demonstrated by Thornton and Wilson¹. If the employer or the trustees want a margin beyond what the actuary advises is necessary to ensure ongoing solvency they should be able to specify this. Our method identifies the true position and allows the client (trustee or employer) to specify the margin. For instance, clients using this method can build in a margin by funding to provide benefits based on projected earnings but only promising leaving service benefits on wind-up in the Trust Deed. Whilst we do not believe that this is good practice, it is not for the actuary to decide. At each subsequent valuation it allows the actuary to identify the cost of the margin both in terms of the funds allocated to the scheme and the overall contribution rate.

PART THREE

OTHER ISSUES

10. What is Surplus?

10.1 We doubt whether any one word has caused more trouble to the actuarial profession than “surplus”. To the intelligent layman who is prepared to accept that actuaries will have differing views as to what the future may hold, it must seem strange to learn that two actuaries using the same assumptions might still quantify the surplus within a particular scheme very differently.

10.2 In 1988, the Pensions Research Accountants Group published a paper⁷ which discussed the subject of pension fund surpluses in detail. The foreword to the paper began as follows:

"The subject of pension fund surpluses is a highly emotive one ... Despite Government legislation, there is still no generally accepted definition of surplus ..."

TPFM³ defines surplus as “the excess of the actuarial value of assets over the actuarial value of liabilities *on the basis of the valuation method used*” (our italics). We suspect few actuaries would disagree with this definition, but it is the words we have italicised which present the problem. Why, the intelligent layman might ask, is the method of valuation relevant?

10.3 In a paper presented to the Staple Inn Actuarial Society in October 1991, Davies⁸ discussed the matter of surpluses. He quoted a dictionary definition of an “amount left over when requirements have been met” then remarked that this definition was inappropriate in the context of an ongoing scheme.

It is interesting that this dictionary definition was dismissed so swiftly. We have argued earlier in this paper strongly in favour of Accrued Benefit or target methods of funding. If the chosen target represents (by definition) what is needed, with appropriate allowance for safeguarding ongoing solvency, then the meaning of “surplus” follows naturally. If, on the other hand, the chosen target does not represent what is needed, then one must ask why that target was chosen in the first place.

10.4 The question of surplus can be explored from another angle: one which has received much publicity in recent years, but usually for the wrong reasons. Companies have been taken over only to find that the new owner has stripped (or at least attempted to strip) their pension schemes of all the surplus assets. In many cases we suspect the sums involved will have come as a great surprise to the companies taken over, and the directors (not to mention the trustees) may well have been left wondering why they were not aware of what could be done. Indeed, disputes involving substantial sums of money have ended up in court. If the funding target chosen for the scheme prior to the takeover represented what was needed, then how could such a dispute arise? Should the trustees and company directors not have been fully aware of the scheme’s funding position?

10.5 Perhaps a more common source of difficulty regarding surplus arises on the sale or acquisition of part of a company, when a bulk transfer payment representing only part of the assets of the vendor’s scheme is to be made. As remarked in section 8 it is now almost invariably the case that the actuaries will agree on some sort of projected unit reserve being transferred. The trustees of the vendor’s scheme will often, however, seek some safeguard against the possibility of the purchaser’s scheme gaining a significant withdrawal surplus should the new employer soon make a substantial number of the transferring employees redundant.

In the extreme case a new owner who takes over a company and its pension scheme lock, stock and barrel may simply decide to wind the scheme up. (There may be no ulterior motive involved: the owner may, for example, decide that he cannot afford to fund the final salary scheme and set up a money-purchase scheme instead.) In such circumstances, the legal provisions of the scheme on wind-up become of paramount importance. Once again it could come as a shock to the vendor to find that a substantial surplus exists in the discontinued scheme, some of which may find its way back to the purchaser.

10.6 In conclusion we suggest that the most helpful and realistic definition of surplus is the excess of the assets over and above the cost of the liabilities if the scheme were to be wound up. Indeed, “deficit”, the opposite of surplus, is already defined in legislation as the shortfall of the assets below the value of the benefits due when a scheme is wound up.

11. Social Security Act 1990

11.1 We briefly discussed the main provisions of the Social Security Act 1990 (SSA90) in section 2.4. In this section we go on to examine how surplus might be defined for the purpose of determining whether a scheme can afford to award LPI on past service pensions.

11.2 As noted in 2.4.4(i), the surplus test will have to be based on an actuarial method which has regard to existing assets and accrued liabilities; in other words, an *Accrued Benefit* or *target method*. Thus only the assumptions and the definition of accrued liabilities are to be decided. As we are more concerned with principles in this paper we will concentrate on the latter, although assumptions cannot be ignored altogether.

11.3 Given that a “surplus test” already exists under the Finance Act 1986 (FA86) (see section 2.2), it is natural to begin by asking whether the same test can be used for SSA90 purposes, with amendment if necessary. No doubt it could be, but there are drawbacks.

The FA86 test is designed to place a ceiling on the size of fund which is eligible for tax relief. Whilst one may disagree with the precise structure of the test, it is difficult to argue against the Government’s view that a balance had to be struck between the interests of taxpayers and pension scheme members.

11.4 In deciding whether a scheme has sufficient money to award escalation on benefits already earned however, a different balance must be struck. (We are not debating the pros and cons of this part of SSA90: it is already on the Statute book.) *In an ongoing scheme there should be sufficient assets to provide adequate security for active members’ accrued benefits, but regard must also be had to the interests of pensioners and members with preserved benefits.*

11.5 Although the picture is now changing, experience in the first two or three years following the surplus regulations taking effect was that the test for tax relief purposes was not unacceptably harsh (subject to the important caveat that this may not be true if a scheme’s discontinuance liabilities for active members are described in terms of projected earnings). We suspect most actuaries would agree that the assumptions used, particularly in valuing equities (and other similar investments) were comfortably on the conservative side. More recently the assumptions have begun to look less conservative and the time may have come to reconsider the basis used.

For the reason outlined in paragraph 11.4 however, we think use of the same basis for both the surplus regulations and SSA90 purposes would pay undue regard to the interests of active members, because “too much” surplus could be held within the fund without pensioners and preserved pensioners having a claim on it.

11.6 If these arguments are accepted, the next question to ask is whether the PABM (see section 2.2) could be used for SSA90 purposes but with different assumptions (or even just the elimination of the 5% “safety margin”)? Again the simple answer must be yes, but how satisfactory would this be?

11.7 Our major reservation comes back to a recurrent theme of this paper. If use of the PUM is recognised as not always giving an acceptable degree of security to the accruing rights of active members, then how can its use (or, technically, the use of the PABM) for SSA90 purposes be justified? Pensioners and preserved pensioners may be delighted if they receive LPI on benefits already earned, but active members would take a very different view if it was found shortly thereafter (or even at the same date) that the remaining assets were insufficient to cover even leaving service rights. The position would be exacerbated if the scheme’s Trust Deed promised better than leaving service rights to active members in the event of discontinuance. Indeed in this case its use under FA86 must also be called into question.

11.8 In our view the measure of accrued liabilities for active members should recognise the benefits which the trustees have an obligation to cover at the date concerned. Leaving service rights will be the minimum, but if the scheme’s Trust Deed provides for more generous benefits on wind-up then the trustees have a duty to ensure the assets are sufficient to cover these higher liabilities (together with associated expenses).

11.9 Consideration will have to be given to the value placed on the assets. Throughout this paper we have concentrated on the value of liabilities without discussing in any detail the other side of the balance sheet. It is clearly important that the value of assets is consistent with the way in which the liabilities have been valued, and the interested reader is referred to paragraphs A.22 et seq in the Appendix to the McLeish and Stewart paper⁹.

12. SSAP 24

12.1 Statement of Standard Accounting Practice Number 24 has generated an enormous amount of discussion and correspondence since it was published in 1988 - far more, we suspect, than the Accounting Standards Board ever envisaged. Whilst we are reluctant to add to the general debate in this paper, there is one aspect of SSAP24 which we feel is particularly relevant to the matters we have considered.

12.2 What constitutes an acceptable funding method for the purposes of SSAP24? Finding an answer to this question proved so difficult that the Institute and Faculty of Actuaries felt it necessary to consider the issue in detail in Guidance Note 17. GN17 did not give an unequivocal answer however; rather it discussed circumstances in which each of a wide variety of methods might be inappropriate.

12.3 For schemes which are not closed to new members, it would appear that the tide of opinion is now strongly behind use of the Projected Unit Method for SSAP24 purposes. (GN17 already requires disclosure of the funding level on this method.) Use of the PUM in its "pure" form, where accrual of benefit over only one year is considered, may not be quite sufficient. A projection period, possibly equal in length to the average remaining working lifetime of active members and with allowance for new entrants may be necessary, in order to ensure the regular pension cost can be expected to remain stable. Subject to this possible qualification however, the PUM method looks a strong favourite, particularly if the accountancy profession eventually decides to prescribe one method for SSAP24 purposes.

12.4 It is very easy to understand why this should be so. For example, the PUM seems to meet the general accounting concept - embodied in SSAP24 - that regard should be paid to the ongoing situation. We are very concerned about the danger of PUM being prescribed in a revision of SSAP24 however, for we do not consider it to be the only satisfactory method for an ongoing scheme. Indeed, in the following example we illustrate why we believe flexibility to be essential.

12.5 Consider two companies with (non-contributory) pension schemes which provide identical benefits, and suppose the two scheme memberships are also identical. Within each scheme, the annual benefit outgo equals 25% of pensionable payroll, and the assets of each fund earn an annual return of 10%. There is no prepayment or provision on either company's balance sheet.

At this stage let us interrupt the example with two questions. If the actuaries for each of the two companies were using the same (best estimate) actuarial assumptions for their SSAP24 figures, would the reader expect the reported pension costs for each company to be the same? If the answer to this question is no, then should SSAP24 be revised to ensure the costs are the same?

Company A's actuary uses the Projected Unit Method and the pension scheme has built up a fund which will now remain stable at 120% of pensionable payroll. The annual investment income is thus 12% of pensionable payroll, and so the company's contribution rate is 13%.

The actuary to Company B, on the other hand, uses a different Accrued Benefit method for funding purposes, and in this case a stable fund equal to 110% of pensionable payroll has built up. Company B's contribution rate is therefore $25 - 11 = 14\%$ of pensionable payroll.

In the circumstances described, the two contribution rates would clearly apply in the ongoing situation. Other things being equal, Company A must have made greater contributions than B in the past, for its scheme is now funded to a higher, stable level. This will benefit A in the future, because the company can now contribute at a lower rate than B.

We feel that a 'true and fair view' would be to say Company A's (regular) pension cost is 13% of pensionable payroll and Company B's is 14%. If necessary, the companies could be forced to disclose the level to which their schemes were being funded, but the fact is that in the ongoing situation the actual cost of funding each scheme will differ. Forcing Company B to use the Projected Unit Method for SSAP24 purposes would, in our view, be misleading rather than helpful.

13. Comparison of Methods

13.1 If a scheme promises only leaving service rights to active members on wind-up, and the settlement and valuation rates of interest are the same, then ongoing contribution rates under both the PUM and our preferred method are likely to be fairly similar. The exact relationship will be influenced by the actuarial assumptions regarding withdrawals, new entrants and salary scales (i.e. merit or promotional increases awarded in addition to general earnings growth).

13.2 If wind-up benefits for active members are more generous than leaving service rights, then use of the PUM will often be insufficient to provide adequate funding. While the scheme is maturing, the contribution rate required under our method is likely to be higher than that which would result from use of the Projected Unit Method since a larger fund must be accumulated to cover accruing liabilities. Once the scheme reaches maturity however, the fund will exceed the PUM's "standard fund". The extra investment income generated by this larger fund means that the contribution rate resulting from our method will thereafter be lower than the PUM rate. (A mature scheme can of course become immature again, through, for example, an influx of new members with no past service benefits or by granting future service improvements.)

13.3 The PUM is often described as a method which funds on the basis of projected final earnings. Actuaries will understand that this is true only to a certain extent, but what will ordinary scheme members think? Everyone will agree that all benefits should be paid in full and on time in an ongoing scheme, but the fact that schemes are wound up from time to time should not be ignored. (If such a contingency could be ignored then one would have to ask whether funding is necessary at all.) Where the PUM has been used for years and the actuary's assumptions are borne out, active members caught in a wind-up could be forgiven for finding it difficult to understand why they do not then receive preserved benefits based on projected final earnings. (The problem will be much worse if the fund is insufficient to secure even leaving service rights.)

13.4 When use of our preferred method was first put to the profession⁶ many actuaries said they felt it would encourage "weak" or "thin" funding, which was felt not to be in members' interests. There can be no doubt that prospective valuation methods would lead to larger funds than we feel are necessary, even if accrued liabilities were defined in terms of projected final earnings. In the last few years however, there has been a marked swing by pensions actuaries to use of accrued benefit methods, and the PUM in particular (see section 2). Thornton and Wilson¹ and then Collins² have found that the PUM can lead to insolvency on wind-up in today's market conditions. This conclusion was reached on the assumption that schemes' wind-up clauses provide only for leaving service rights to active members. However, we advise many clients where the benefits promised on wind-up are more generous, yet many actuaries still seem to shy away from use of our method in such circumstances, preferring to use the entry-age or one of the other prospective methods. If the actuary's assumptions are borne out in practice, the PUM can lead to technical insolvency and prospective methods will lead to surpluses. Our preferred method is designed to minimise both of these dangers.

14. Conclusion

14.1 The method we have described in this paper has been named the “Defined Accrued Benefit Method” (DABM). “Defined” because the accrued benefits are those defined in the Trust Deed, “Accrued Benefit Method” because it belongs to that category of methods.

14.2 As we have explained, we believe that this method is very powerful and meets the needs of employers and trustees. It recognises the actuary’s role as an adviser rather than a decision maker.

It is for the actuary to provide information to the scheme sponsor to enable the correct business decisions to be taken. If the employer wishes to tie up as few assets as possible in the pension fund then he needs to know what is possible and what the risks are. If he wants to build in margins he needs to know the cost. Similarly the trustees need to be confident that accrued benefits are expected to remain secure.

14.3 The method also addresses the matter of members’ expectations. Our intelligent layman (see 10.1 and 10.2) expects to receive, from his pension scheme, a benefit based on his final salary. How many scheme booklets explain the benefit he would get if the scheme were to be wound up? Whether it is decided to adjust members’ expectations (by full explanation of the benefits in every eventuality) or to ensure that the expectations are met by adjustment of the benefits (notably those promised on wind-up), the DABM assumes that their expectations are reflected in the funding of the scheme.

14.4 Since the DABM was first proposed it has been subject to a great deal of criticism. Much of this criticism has, we believe, been due to misunderstandings of the method. We hope that our paper has clarified some of these misunderstandings. However, we would like to finish by addressing three criticisms which appear in the paper by Thornton and Wilson¹.

First, they claim that the DABM leads to “... a lower level of assets to meet past service liabilities than under the Projected Unit Method”. We have explained in this paper why this is not necessarily the case. Indeed where the employer wishes to secure benefits based on projected earnings the DABM (unlike the PUM) builds up sufficient assets to do this.

As part of the same point they go on to say that the method “... does not fully reflect the cost of the promised benefits projected on a basis which assumes that the scheme continues indefinitely”. This seems to be a common misunderstanding. The concentration on examining various projection periods and the use of consistent and realistic withdrawal, early retirement and new entrant rates means that the **full** cost of future benefits is identified and easily communicated to the employer.

The second main objection is that the approach “... exposes the sponsoring organisation to an unacceptable level of risk in relation to the need for additional finance on winding-up if the assumptions used are realistic ones”. The use of a settlement rate to value accrued liabilities is designed to help ensure that discontinuance benefits are always adequately funded. There is no absolute guarantee that this will be achieved however, so who should set the “acceptable” level of risk? Any attempt to reduce the risk requires additional assets and so has a cost.

It is only the sponsoring employer and the trustees who together can balance the cost against the risk to decide the best approach. Our method enables the actuary to give the parties concerned the information needed to make this decision.

Finally, Thornton and Wilson, like many others before them, suggest that the method fails to treat the pension scheme as an ongoing entity. However, by taking full account of withdrawals and new entrants and by looking into the future, the method explicitly assumes that the scheme continues: there is no assumption that the scheme discontinues. What is assumed is that, at all points in time, the scheme sponsors and trustees want the scheme to be solvent.

14.5 We hope our paper has clarified some of the misunderstandings which have occurred in the past and will be the catalyst for open discussion of the advantages and disadvantages of the method.

APPENDICES

A.1 Demographic Projections

It is fundamental to the analysis described in this paper that the assumptions reflect the expectation that the scheme is to continue. In most instances sponsoring employers expect their scheme to continue in its current form for the foreseeable future and have no reason to expect the demography of the membership to change substantially. Where an employer has good reason for feeling that the membership will increase or decrease, or that the age distribution will change markedly, the actuary needs to take account of this.

With this in mind we feel it is imperative that the assumptions used by the actuary are shown to reflect these expectations. In our experience assumptions which at first sight look perfectly reasonable and seem to reflect past experience often do not meet this objective. We are aware of cases where, if the actuary's assumptions were to be borne out in practice, the demography of the scheme would change dramatically.

It is therefore our practice to test the demographic assumptions by applying them to the current membership and analysing the projected demography at various points in the future. In this way we can verify that the demographic assumptions chosen are reasonable in every respect. It is only by analysing the combined effect of the assumptions regarding withdrawal rates, the ages at which new entrants join, early retirement rates and mortality rates that one can be sure of this.

To do this we use a computer program which takes the assumptions given and applies them to the current membership. The resulting membership is determined at various points in the future and analysed, giving the number and proportion of members and the average past service at each age.

In this Appendix we show an example of the analysis used. Table 1 shows the demography of a typical scheme at the valuation date. Table 3 shows the demography at the end of a 30 year period, resulting from applying the assumptions listed in Table 2. We believe Table 3 shows demography which might reasonably be expected for this scheme. In any case it provides a basis for discussion with the sponsoring employer to ensure that the assumptions reflect his expectations. Whilst the demography in Table 3 shows a slight maturing of the scheme, the membership seems to be relatively stable. It is up to the actuary in consultation with the employer to agree on the amount of maturing which is appropriate.

In our experience it is easy to fall into the trap of using assumptions which cause the demography to be radically changed at the end of the analysis period. Table 4 shows another projected demography after 30 years, using the same assumptions as before with the sole exception of all new entrants joining at age 30. We suspect many actuaries would feel the assumptions might be reasonable for the purpose of assessing future contribution rates, but we believe few actuaries would be happy with the projected demography in Table 4.

It is only by carrying out such an analysis that the validity of the demographic assumptions can be confirmed. Assumptions which do not produce the type of workforce envisaged in the future may well also lead to contribution rates which do not correctly reflect the expected cost to the employer. Assumptions implying an ageing and maturing membership which will not be seen in practice will lead to an overestimate of the long-term cost of benefits. Similarly the use of unreasonably high withdrawal rates along with low ages of new entrants will result in a younger projected workforce than is likely to arise in practice. This may result in an underestimate of future costs.

In our view this approach is more powerful than analysis of past trends with regard to withdrawal rates and new entrants. Movements within the workforce are affected by short-term economic fluctuations. Analysis carried out to ascertain withdrawal rates is often done over a relatively short period. In addition, many pension schemes are still somewhat immature. The analysis we propose allows the actuary to see the scheme mature in the future whilst taking account of long-term recruitment and retention policies of the employer.

TABLE 1 - Demography at valuation date

	MEN			WOMEN		
	Members %	Payroll %	Average Duration (Yrs)	Members %	Payroll %	Average Duration (Yrs)
Age Group						
Under 25	3.1	2.5	2.1	5.1	5.0	2.2
26 - 30	8.2	7.8	4.2	8.9	10.1	5.1
31 - 35	12.9	13.0	7.7	12.0	13.0	7.4
36 - 40	13.6	14.5	9.7	11.9	12.7	8.2
41 - 45	16.0	16.8	11.1	14.2	14.7	9.3
46 - 50	13.9	14.7	12.3	17.1	16.4	9.0
51 - 55	13.1	13.0	14.3	14.5	13.5	11.3
56 - 60	11.5	10.8	15.3	12.4	10.9	13.0
61 - 65	7.7	6.9	16.7	3.9	3.7	14.2
Average age 44.5 Average duration 11.1			Average age 43.9 Average duration 9.1			

TABLE 2 - Demographic Assumptions

A summary is given below of the demographic assumptions underlying the 30-year projections shown in Table 3.

Mortality

Males A67/70 ultimate rated down 3 years

Females FA75/78 ultimate rated down 1 year

Withdrawals and early retirements

Specimen annual rates are as follows:

	Men	Women
Age	%	%
20	7.5	8.0
30	7.5	7.5
40	5.0	5.5
50	2.0	4.0
60	20.0	20.0

Salary scales

In addition to general increases in earnings levels, we assumed members would receive merit/promotional increases. Specimen annual rates are as follows:

Age	%
20	5.0
25	2.0
30	1.5
35	1.0
40	0.5
45+	0.0

New entrants

It was assumed that members who retire, leave service or die in service would be replaced by new entrants of the same sex in the following proportions:

Age	Men %	Women %
18	5	5
20	8	10
25	19	19
30	17	16
35	14	14
40	12	12
45	10	10
50	8	8
55	5	5
60	2	1
	100	100

TABLE 3 - Demography after 30 years

	MEN			WOMEN		
	Members %	Payroll %	Average Duration (Yrs)	Members %	Payroll %	Average Duration (Yrs)
Age Group						
Under 25	5.9	4.4	2.1	6.8	5.0	2.1
26 - 30	8.3	7.3	4.0	8.9	7.8	4.2
31 - 35	10.3	9.9	5.7	11.0	10.5	6.1
36 - 40	11.0	11.1	7.5	12.2	12.3	7.9
41 - 45	11.8	12.2	9.3	12.8	13.3	9.8
46 - 50	12.7	13.4	11.1	12.9	13.6	11.5
51 - 55	13.7	14.5	13.6	13.0	13.8	13.6
56 - 60	15.0	15.6	17.8	13.1	14.0	17.4
61 - 65	11.3	11.6	23.8	9.3	9.7	22.4
Average age 45.5 Average duration 11.5			Average age 44.3 Average duration 11.0			

TABLE 4 - Demography after 30 years
All new entrants at age 30

	MEN			WOMEN		
	Members %	Payroll %	Average Duration (Yrs)	Members %	Payroll %	Average Duration (Yrs)
Age Group						
Under 25	0.0	0.0	0.0	0.0	0.0	0.0
26 - 30	5.5	5.1	0.0	5.6	5.3	0.0
31 - 35	23.7	23.0	2.9	24.3	23.7	2.9
36 - 40	19.0	19.1	7.9	19.6	19.8	7.9
41 - 45	14.7	15.0	12.9	16.0	16.3	12.9
46 - 50	12.2	12.6	18.0	12.4	12.8	18.0
51 - 55	11.1	11.4	23.4	10.4	10.6	23.4
56 - 60	10.1	10.3	29.1	9.2	9.3	29.4
61 - 65	3.7	3.5	37.7	2.5	2.2	37.9
Average age 42.9 Average duration 13.2			Average age 42.3 Average duration 12.6			

A.2 Terminology

Ongoing Funding should not be regarded as synonymous with final salary funding, as we hope this paper has demonstrated.

Deficit Funding has been used by some actuaries to describe a situation where it is deliberately intended to fund to less than 100% on (say) the Projected Unit Method, so long as discontinuance liabilities remain secure. Recent papers^{1,2} have shown this is not a sensible concept in modern conditions.

Accrued Liabilities in an Ongoing Scheme are not the same as past service reserves. We hope we have exploded the myth that defining accrued liabilities in terms of the discontinuance position is inconsistent with regarding the scheme as ongoing.

Surplus was discussed in section 10 of the paper. In our view surplus should be defined as the excess of assets over accrued (ie discontinuance) liabilities, the latter including due allowance for expenses in the event of wind-up. The only debate is then whether to use “valuation values” (ie values calculated using the actuary’s funding assumptions) or market values. While the latter approach would give a measure which is completely independent of the actuary’s assumptions, it is not particularly meaningful in the context of an ongoing scheme. We therefore advocate defining surplus (or deficit) as the difference between the values of assets and accrued liabilities, both values being calculated using realistic funding assumptions. If surplus is regarded as a random variable, then in statistical terms this approach can be thought of as estimating the mean of the distribution, while a market-related approach would simply give one observed value of the variable.

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