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PENSION FUNDING AND EXPENSING IN THE MINIMUM FUNDING REQUIREMENT ENVIRONMENT

BY P. M. GREENWOOD, B.Sc., F.I.A. AND T. W. KEOGH, M.A., F.F.A.

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ABSTRACT

The statutory Minimum Funding Requirement (MFR) introduces fundamental change to the funding of pension schemes in the United Kingdom. While only a minority of schemes will actually be affected materially in terms of actual contributions or benefits, taken over a period of years, the *influence* of MFR will be much more widely felt. This is because the MFR is an absolute standard to be met, whereas long-term funding targets for ongoing schemes are, at least up to a point, optional and adjustable. The paper discusses the difference between MFR and long-term funding and suggests a variation on traditional actuarial methods to control explicitly the risk of MFR failure, based on a combination of traditional methods and the theories underlying asset/liability modelling. The paper also discusses the implications for pension expensing and communication of funding levels.

KEYWORDS

Risk; Funding; Pension Schemes; Minimum Funding Requirement; Conflicts

1. INTRODUCTION

1.1 The statutory Minimum Funding Requirement (MFR) introduces a fundamental change to the funding of pension schemes in the United Kingdom. Whilst it may be that only a minority of schemes will actually be affected materially in terms of actual contributions or benefits, taken over a period of years, the *influence* of MFR will be much more widely felt. This is because the MFR is an absolute standard to be met, whereas funding targets for ongoing schemes are ultimately optional and adjustable, however useful they may be in the meantime. The difference is between 'need-to-have' and 'nice-to-have'. For the first time in the U.K. there are capital requirements to be met by pension schemes which have previously been reliant totally on the capital strength of the sponsoring employer.

1.2 The introduction of the MFR has been a controversial topic, involving much heated discussion both inside and outside the profession. This paper does not attempt to add further to that particular debate, but concentrates on the practicalities of actuaries advising trustees and employers on ensuring that the MFR is covered, or otherwise responding to its introduction. The discussion is set

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in the context of a continuing defined benefit scheme. This paper considers the possibilities for moving to MFR-driven bases, and their relative attractions against the common approaches currently adopted, generally characterised by the use of single interest rates and salary projections for in-service members. Surveys show that the projected unit method or close relations (such as attained age, current unit with 20-year control period), are used for the majority of U.K. schemes. The paper also considers whether GN26 — Pension Fund Terminology, with the amendments exposed at time of writing via ED24, is adequate in the new environment.

1.3 We perceive three basic 'compliance' approaches for funding which may be used in future in different situations:

— *traditional* — projected unit or similar;
— *planned margin* — an MFR-derived target, e.g. 110% of MFR; and
— *minimum compliance* — contributions will be set at or close to the certifiable minimum.

1.4 From a professional perspective, an integrated asset/liability approach which models risks against contributions is probably best. Looking at the liabilities in isolation from an asset distribution taken as read cannot be right.

1.5 In the context of the MFR hurdle, the initial period of risk, generally around five years, is relatively short in pension fund time-scales. A full stochastic approach to asset/liability modelling is aimed at adding value on a longer time horizon, when statistics have 'long enough to operate'. In a business world where the pace of change is increasing, and few employers know with any confidence the shape of their workforce in 5 or 10 years time, the use of techniques whose theory best applies over longer time-scales may not add significant value. In this respect, Lee (1991) pointed instructively to the lack of convergence to the statistical averages, even over exceptional periods of 20 years plus.

1.6 In the shorter time frame, we suggest that the greatest added value comes from the use of suitable models to define the corridor of economic experience — the dimensions of the 'expanding funnel of doubt' as to future funding levels. This should be consistent with the chance of failure with which the trustees are happy. The boundaries of this experience should be used to test the proposed funding rates and levels, rather than setting the funding pattern by predicting chance of MFR failure over a longer time-scale. Under the Pensions Act 1995, the trustees' responsibility is to maintain the MFR, initially ensuring the short-term position is covered or will be restored within the defined time-scales. The Act requires the provision of an explanation to members if this is not achieved.

1.7 It is invidious to leave individual schemes to set the boundaries of economic conditions by past experience or models, involving inevitably arbitrary judgements. A better route would be for the profession to work together with the new Occupational Pensions Regulatory Authority to define a market corridor judged to be sufficiently normal, so that schemes should be able to cope without

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easement. It should then be made known that outside this corridor the powers to extend the MFR correction provisions would be generally applied.

1.8 For most of the profession's clients, any desire for broadly-based actuarial advice is usually tempered by a cost constraint. Given the need for MFR compliance, some clients will always be tempted to opt for a valuation approach which provides guaranteed compliance without 'going the extra mile' towards an approach which meets broader, but less tangible, objectives. This will apply in spite of the duty of the Scheme Actuary to stress that the MFR should not be the be-all and end-all of funding.

1.9 This paper, therefore, focuses on low added value/complexity solutions for the client who does not see value in substantially tailored work or analysis against multiple objectives. By simplifying the calculations without falling foul of the regulations, it is inevitable that, for the same target degree of risk, clients are likely to end up initially contributing more to the scheme than those who pay for, and take the trouble to understand, more sophisticated work. However, if the longer-term consequence of a higher funding target is an ultimate lower level of contributions and pension expense, this is perfectly rational behaviour. It is also worth noting that GAD (1994) estimates that, whilst there are only 755 defined benefit schemes in the U.K. with more than 1,000 members, there are 16,730 in the 12-1,000 member range.

1.10 Readers unfamiliar with the technical requirements of MFR and the professional guidance note GN27 may wish to refer to the summary in Appendix A before proceeding.

2. History of U.K. Pension Funding

2.1 Pension scheme funding bases and methods have evolved over the years, reflecting changes in legislative requirements, economic conditions and the nature of the schemes themselves. The MFR represents just the latest stage in this continuing process.

2.2 A common approach in the 1930s and 1940s was to use a valuation rate of interest of around 4% with no specific allowance for inflation, and the aggregate method with assets taken at book value. Early leavers had no formal rights under legislation, and were often granted a refund of contributions or a transfer value, if lucky, based on a past-service reserve or share of fund approach. Puckridge (1948) raised the issue of the settling of the valuation rate of interest, the extent appreciation of assets should be taken into account and the issue of the consistency of the valuation of assets and liabilities.

2.3 Gilley & Funnell (1958), Heywood & Lander (1961) and Day & McKelvey (1964) pursued the theme of the consistency of the valuation of assets and liabilities. By the early 1970s discounted cash flow was the most common method for the valuation of assets by consulting actuaries in a pension fund valuation. Heywood & Lander also addressed the issues of the allowance for

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future inflation and the exclusion of negative values (a hangover from life assurance valuations).

2.4 With the increased rates of interest and inflation of the 1960s and 1970s, the economic elements of bases became more explicit. The deficits caused by high inflation became easier to deal with if some of the inflated liabilities could be dealt with by increasing the post-retirement rate of return to a level closer to market rates, bearing in mind that few schemes guaranteed significant levels of post-retirement increase. By the late 1970s common valuation bases fell within the ranges:

Valuation rate of interest	8-10%
Allowance for salary inflation	1-3% lower than interest
Allowance for growth of equity dividends	just below or equal to the implied rate of price inflation in the basis (4-5%).

2.5 Solvency of pension funds, in the sense of delivering contractual benefits if the employer's support was lost, was not generally a problem. Early leaver benefits were hardly revalued prior to the introduction of contracting out in 1978. If, as part of his valuation, the consulting actuary reported on the estimated winding up position of the scheme via an estimate of the non-profit annuity funding level, this was often of the order of 150-200%. The actuary could quite happily protect the long-term funding and solvency of the scheme by concentrating on long-term funding.

2.6 The introduction of contracting out in 1978 introduced the first statutory form of funding requirement. The actuary was then obliged to certify, allowing for the priority rule of the scheme, that contracted-out liabilities were covered. With contracted-out benefits just accruing for the future, this test was rarely significant in a scheme's funding plan unless the scheme was poorly funded in respect of existing accrued benefits, had an unusual priority rule, or had a large number of pensioners.

2.7 As shown by the mathematics of Dufresne (1986), in practice the long-term application of the aggregate method meant that many schemes had a funding level and contribution rate structure which mirrored that produced by the entry age method. The business environment of the early 1980s placed increasing emphasis on the efficient use of capital and (arguably mistakenly, in some instances, if one takes into account pension fund tax privileges) produced pressure for methods that produce a balance on capital allocation between the business and the fund, whilst ensuring accrued benefits were covered. This started a movement to the projected unit method.

2.8 This change was accentuated by the introduction in the Finance Act 1986 of a maximum funding level to maintain full tax free investment status and the use of the projected accrued benefit method for that test.

2.9 The move to the projected unit method and booming equity markets drew further attention to pension fund surpluses, which became a political issue alongside that of early leavers' benefits. The steady improvement of benefits for

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early leavers throughout the early 1980s, with the introduction of revaluation and transfer legislation, and then the extension of early leaver revaluation to all service, substantially increased the accrued benefits of members and ate into the solvency margins of schemes. Many of these concessions were accepted on the basis of strong long-term funding. However, this ignored the fact that extra benefits were going to be paid out, and the additional cost would have to be met eventually. Few schemes increased their funding rates or examined in detail the underlying change in the solvency situation. Collins (1992) drew attention to the situation, that many of the more aggressive pension funding bases then in use no longer produced a target funding level that covered accrued benefits sufficiently to allow the liabilities to be met by purchase of non-profit deferred annuities.

2.10 McLeish & Stewart (1987) introduced a rather different theme — that the target wind-up benefit should be defined in the scheme's documentation, with any monies held above that amount being naturally 'owned' by the employer. Consistent with this aim, they used a valuation method which set the contribution rate as that required to produce the target wind-up fund at subsequent valuations, plus such margin as the employer might wish to provide, given that it would remain 'his' money. This the authors termed the 'Defined Accrued Benefit Method'. The technique was not widely adopted, although it has strong similarities with the philosophy behind the Pensions Act provisions, which require contributions to be targeted to ensure coverage of a wind-up liability based on minimum cash equivalents.

2.11 Another theme of McLeish & Stewart was that a stable scheme could run with a variety of funding and contribution structures, but the lower the funding target the higher the long-term stable contribution rate. Moreover, the lower the funding target, the more likely it was that the contribution rates emerging at subsequent valuations were stable. These proposals did not gain the wide support of the rest of the profession at that time.

2.12 The theme of Thornton & Wilson (1992) was that an actuary needed to know the margins actually involved in the combination of assumptions and methods used, and this was best done by setting each assumption from a realistic base for the individual element, and setting any margin overall.

2.13 Comments were made in the discussion that application of the methods and assumptions suggested for long-term funding without modification may produce funding levels that failed a traditional test of solvency. The authors themselves pointed to the possible use of a dual interest method, reconciling the trustees' need for prudence in the size of the fund covering past liabilities with the employer's legitimate desire to access the likely higher rate of investment return and reduce the commitment of further funds accordingly. Although the presentation is different for practical reasons, the approach discussed in this paper has many echoes of a dual interest approach. Both involve explicit margins, in one case in the past service interest rate, and in the other as an overall percentage loading based on a particular risk model.

2.14 Nevertheless, some interpreted Thornton & Wilson as saying that

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realistic assumptions should be adopted without margins. Commercial pressures may have had that effect anyway, as employers increasingly sought to control pension expenditure, and found it easy to dismiss actuarial prudence as an unnecessary luxury.

2.15 The move to the projected unit method and the trend for employers to correct overfunding by contribution holidays, rather than longer-term reductions in contributions, was producing more volatility, both in funding levels and in contributions. Then, in the recession of the early 1990s, as some schemes wound up without members receiving the benefits that they understood to be guaranteed, the issue of pension scheme surpluses and solvency became one of the factors to be considered by the Goode Committee, established in response to the Maxwell affair.

2.16 At the same time two fresh issues entered the arena — low inflation and maturity. The Government's success in creating a low inflation environment drove gilt yields to historically low levels, with the prospect of their staying there. The non-profit solvency position for schemes with fixed benefits started to look much poorer. Initially, many criticised insurance companies for setting over-conservative bases, but, in a low inflation environment, assumptions for gilt reinvestment in the 6-8% range now seem merely sensible.

2.17 Finally, many employers provided generous early retirement terms to employees as a means of restructuring their businesses, without general recognition of the twin consequences of gearing and maturity. Gearing came from the reduction of the size of the employer's business and/or workforce, so that the consequences of a given percentage deficit became greater for the contribution rate. Maturity came from the increased proportions of fixed liabilities for former members, with consequential loss of margins based on future salary increases. The maturity position was made worse as a greater proportion of benefits for deferred members and retirees came with attaching increases, further extending the 'tail' of the liabilities. Appendix B discusses how an increasing proportion of liabilities for non-active members reduces the ability of actuaries to control funding by contributions alone. The effects are exacerbated by moves to close schemes to new entrants and offer money purchase alternatives, which prove most attractive to younger members.

2.18 Against this background, the Goode Committee based the structure of its recommendations on the delivery of its concept of accrued rights. Accrued rights should be delivered by a minimum funding requirement, based on a cash equivalent test, i.e. some sort of best estimate of the cost of delivering the benefit. A test based on the purchase of a non-profit annuity was rejected, on the basis that the cost of such annuities in a low inflation environment was no longer regarded by business in general as commercially acceptable. A debate then ensued in the profession and elsewhere as to whether the investment returns underlying cash equivalents should be equity or gilt-edged based. Political requirements led to the equity approach to define the final MFR. Importantly,

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however, there was acceptance of the need for a more cautious approach in retirement, leading to the dual interest rate structure adopted.

3. LEGISLATIVE REQUIREMENTS

3.1 Although the MFR sets out to indicate what might happen in the event of a scheme winding up, the compromises that are necessary to formulate a standard test are such that it cannot be a full representation of what might happen, and should not be presented as such. Ultimately it is just a benchmark — a line in the sand. At the same time, the Schedule of Contributions certification required by the Act is poorly drafted and leads to a number of complexities and logical inconsistencies, which must now be accepted because primary legislation would be required for their amendment. The volatility of the overall combination of MFR and schedule test means that the tap of employer contributions will be turned on and off quite often for a employer keen on minimum funding rates. In this way the minimum Schedule of Contributions acts like an 'egg-timer', filled with quicksand, which swings from one extreme to the other.

3.2 Appendix A covers the detail of the MFR requirements, which flow from a combination of primary legislation, secondary legislation and professional guidance. From the point of view of practical management, some key points are:

— the liabilities for pensions in payment are assessed by reference to the current yield on gilt-edged securities;
— the liabilities for others are assessed initially by reference to the long-term equity return, with an adjustment for current equity market yields;
— the liability formulae are designed to model a notional switch from 100% equities to 100% gilts, occurring uniformly over the 10 years prior to retirement;
— assets are taken at mid-market value;
— minimum contributions are, broadly, calculated on the current unit method with a 5-10 year control period, with corrections for underfunding over a maximum period of 10 years initially, but 5 years in the long term;
— for contribution setting purposes, asset/liability mismatching which generates a more favourable funding position must be discounted;
— more serious consequences result from an MFR funding level below 90%, particularly after 2002; and
— trustees can only enforce contributions at the minimum level implied by the regulations, unless scheme rules grant them additional powers.

4. STAKEHOLDER PERSPECTIVES

4.1 *Trustees*

4.1.1 Since the trustees are the Scheme Actuary's prime client for MFR purposes, even if the employer is also a client, it seems worth starting with the advice that they might wish to seek, operating in isolation.

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4.1.2 From the trustees' perspective, security ought to be all. Unless the trustees are very confident of the employer's future financial strength and goodwill, this leads logically to a high level of assets within the scheme. However, so far few schemes have sought seriously to adopt a funding target based on the cost of purchasing non-profit deferred annuities. Large schemes would argue that insurance buyout was unrealistic in any case, although it is not obvious why their trustees should not seek to offer an insurance company level of security to members. The provisions of their trust deed and rules are crucial.

4.1.3 Regardless of all of these points, given that the MFR mandates a lower target than a deferred annuity, and provides a statutory discharge to trustees associated with payment of this target amount on winding up, it is not obvious that trustees will wish to become more conservative. Of course trustees will be more attuned to their responsibilities, but the "it is good enough for the regulations so it must be good enough for me" argument is a powerful one.

4.1.4 However, trustees have a general duty, arising from the Pensions Act 1995, to maintain the MFR, and are likely to be much more comfortable with strategies which have this as a clear objective with whatever margin is seen as appropriate. The problem for the actuary is compounded by the form of the standard certificate, where the actuary states that:

> "in my opinion, the rates of contributions payable in accordance with this schedule of contributions are adequate for the purpose of securing that [throughout] [by the end of] the period it covers, the scheme will meet the minimum funding requirement."

4.1.5 The giving of this opinion is qualified by the regulations, notes and professional guidance, measures which are intended to protect the actuary's legal position, but cannot protect his professional reputation. There is no expression such as 'in the normal course of events', and, in a situation where the minimum contribution permitted by the guidance is being certified, there may be easily foreseeable circumstances in which the statement will cease be true. Irrespective of the legal position of the certificate, the actuary is exposed to criticism from the trustees that he has not advised a contribution sufficient to maintain the MFR in accordance with their duties.

4.1.6 The modelling described in Section 5 can be used to give a margin which would allow a statement closer to the statutory one, albeit qualified to the extent that no absolute guarantee can be given.

4.1.7 No variation is permitted in the statutory certificate, but consideration can be given to the wording of other statements. If the planned margin already exists, we could be comfortable with a wording that:

> "we are of the opinion that the MFR will be met throughout the period in the normal course of events."

If the scheme currently meets MFR, but not the full margin, the corresponding statement is:

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"we are of the opinion that any failure of the MFR which may arise will correct itself by the end of the schedule period in the normal course of events."

4.1.8 Of course 'normal course of events' is not defined — we have borrowed it from the current Certificate A usage — allowing for some significant adverse, but not extreme, circumstances. Extreme circumstances might be regarded as those likely to be covered by a relaxation from the Occupational Pensions Regulatory Authority.

4.1.9 As advisers to trustees who consider that they have a responsibility to be fully MFR-funded at all times, this might be a reasonable approach.

4.1.10 Unless trustees confirm that the actuary's recommendations are not expected to produce MFR compliance with a high degree of probability at future valuations or annual checks, the actuary must consider being more conservative than the statutory minimum. The trustees need to appreciate that, for the time being at least, the authority's attitude to adverse general conditions will not be known before the event. In the face of, for example, two years of equity dividend reduction, not all trustees will want to play 'chicken' with the regulators.

4.1.11 The planned margin approach can be consistent with a desire for discretionary benefits — the future test for the allocation of trustee discretions is bound to include "is there a possibility of threat to the MFR as a result?", and an MFR-led approach to determining 'surplus' is a natural response, in all except extreme circumstances.

4.2 *Employer*

4.2.1 Traditionally, it has been the employer who is seen as the beneficiary of:

— allocating costs appropriately to periods of employment;
— ensuring a smooth progression of contributions; and
— tax benefits of pre-funding.

4.2.2 However, the allocation to periods of employment is dealt with by SSAP24, and smoothness of contribution is now a promise that actuaries may not be able to deliver except by luck. Tax benefits are seen as interacting with the cost of capital in a complex way, which can be argued in either direction.

4.2.3 The preference of employers to correct surpluses by short-term contribution holidays, rather than longer-term contribution reductions, also indicates smoothness is less of a priority. However, volatility the other way, i.e. large increases in immediate contributions, will be seen by most employers as less acceptable, even where cash resources exist.

4.2.4 The inability to deliver smoothness of contributions is a function of gearing and maturity, not actuarial carelessness, as discussed in ¶2.17 and in Appendix B.

4.2.5 The employer should be in a position to decide how much smoothness

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he wants; the trustees should not care as long as their security needs are addressed.

4.3 *Actuary*

4.3.1 Actuaries have an interest in all this, as well as their clients, not least because they have to explain the concepts involved. Traditional methods have proved attractive in this respect in some ways, although explaining the discounted asset valuation approach has always been harder work.

4.3.2 Refocusing attention on the MFR has the advantage that it does not require justification as a new theory — it is there for all to see. Moreover, maintenance of an existing aggressive basis may not be an option for a number of clients, and hence the introduction of some sort of new theory is almost inevitable.

4.3.3 On the other hand, a disadvantage of the planned margin method is that it is not obvious where it will lead us if the assumptions *are* borne out. Appendix C considers whether this matters.

4.4 *Members*

Clearly the members are also stakeholders, but the trustees are the legal guardians of their interests, and it is the trustees who the actuary must address from day to day.

5. PLANNED MARGIN METHODOLOGY

5.1 *Introduction*

5.1.1 Unless both trustees and employer are indifferent to excursions below the magic 100%, it will be in order to target a margin over MFR, regardless of any desire for the pre-funding of salary rises or discretionary benefits. This section considers the process of margin development.

5.1.2 It is assumed that there is a desire to minimise calculation effort by using the standard Schedule of Contribution projection, and simply adding a suitable margin to produce the funding target. The margin development process must therefore incorporate:

— allowance for risks; and
— allowance for the features of the expected experience not captured by the standard projection.

5.1.3 The discussion below assumes that:

— the optimal investment strategy is pre-determined; and
— any risk of breaching the MFR line above 'minimal', whatever that may mean, is unacceptable.

5.1.4 These assumptions are obviously capable of being amended

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interactively to reflect the degree of risk the trustees or employer (whoever is the client) wish to take.

5.2 *Interaction with the Schedule of Contributions Process*

5.2.1 The margins below are designed to change the standard Schedule of Contributions calculations from a passive, non-scheme-specific process to a tailored estimate for the particular client. Implicitly, the schedule is worked out on a best estimate basis, but with a specific margin added to the estimated liability at the end of the projection period. The result would be a desired contribution pattern, which, in principle, would need to be compared against the laid down test described in GN27, but, in practice, ought to comply automatically.

5.2.2 As part of the tailoring process, approximations are used for the effect of early retirements and the like. A more complex projection model could be built, but, as elsewhere in pension fund work, this might prove unnecessarily sophisticated.

5.3 *Asset Smoothing*

5.3.1 The traditional approach to asset smoothing — the use of an assumed 'overnight' change in market values so that yields return to a long-term 'norm' — has much to commend itself in MFR-based analysis. The underlying MFR concept uses the same approach, rightly or wrongly. Moreover, in many cases the Schedule of Contributions is based on liabilities including a mismatching reserve, and this reserve has the effect of producing a 'notional' MFR position which is analogous to the 'long-term' or 'smoothed' assessment with which pensions actuaries and clients are familiar.

5.3.2 It follows from this that unfavourable variations from the asset norm should be viewed as uses of the margins in the basis, rather than reasons for adopting further margins. If a target of 115% on a 'notional' basis has been achieved, but market conditions produce a 110% MFR on the day, this should be seen as an appropriate use of the 15% planned margin, not a cause for a contribution increase. However, this may be counter-intuitive to many clients and actuaries.

5.3.3 If failure to meet the MFR can be contemplated, because trustees are confident of the employer promise, then the baseline should be moved downwards from 100% to whatever funding level produces an 'acceptable' increase in contributions, and the standard margin added to this. Failure to comply with the Schedule of Contributions requirements without further adjustment is more likely to follow in those situations.

5.4 *What is the Margin trying to do?*

5.4.1 There are too many unknowns in funding and pension fund experience to be able to create planned valuation margins which will cover all eventualities over indefinite periods. Processes which attempt to do so are spuriously accurate.

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A more realistic process is one which targets a sufficient margin above current MFR to make the chances of unexpected failure at valuations 3 and 6 years hence acceptably low. The 6-year valuation point has been chosen to match the period of the contribution schedule in practice — i.e. a 5-year schedule period starting one year on from the valuation on which it is based, to give time for valuation production and discussion.

5.4.2 The calculated margin will be added to the expected MFR liability at the end of the period, assessed on the standard basis, thus effectively allowing for:

— expected divergences between MFR assumptions and scheme experience, e.g. in respect of promotional salary increases and equity out-performance; and
— risks.

5.4.3 Funding using such a technique will not, of itself, produce a long-term stable contribution rate. However, it can be argued that the concept of a long-term stable rate is past its best anyway, as discussed in Appendix B.

5.4.4 For practical calculations, we would propose adding the planned margin to the liability at the valuation date, i.e. at the beginning rather than at the end of the schedule period. This is convenient, but inaccurate to the extent that the discounted value of the aggregate liabilities increases or decreases, i.e. the value of fresh accrual exceeds cash outgo or vice versa. The approximation works in the direction of safety, in that it means that the margin will be excessive for mature schemes with declining aggregate liabilities, and conversely for immature situations. It does not matter for most.

5.5 *Margin Constituents*

5.5.1 The margin should reflect the importance of the risks, typically distributed as follows for a substantial fund:

	Active	Deferred	Pensioner
Mismatching — gilt/equity	x	x	xxxx
Mismatching — U.K./overseas	xxx	xxx	xxx
Low/no dividend growth	xx	xx	
Gilt match imperfection			x
Manager under-performance	x	x	
Salary increases	xxx		
Early retirement	xxx	x?	
Death/ill health strain	xx	x	
New entrants	xx		

5.5.2 Sections 5.6 to 5.14 discuss each of these risks in turn, with Section 5.15 addressing their theoretical interaction.

5.6 *Mismatch Risks — General*

5.6.1 Once asset allocation has been set, the mismatching and dividend issues are outside trustee control, and assumptions may be fed from the various theories

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covering the interaction between the returns on the various markets. Much work has been done in this area by others, e.g. Wilkie (1986), Dyson & Exley (1995), Smith (1996), and we have not sought to replicate or advance this work — rather we are users of the results.

5.6.2 Whilst the design of appropriate asset/liability models has attracted much controversy, our own experience is that the results are much more sensitive to the parameters chosen for the models than the model itself. The choice of parameters is often subjective, given that past experience provides very little or no evidence of convergence over time, and data implied by market pricing of derivatives are open to interpretation. Even where some convergence is apparent, there will always be conflicting views as to how much past analysis is relevant to the present world economy.

5.6.3 We would, therefore, merely state the parameters that we have chosen to use, acknowledging that alternatives may be preferred by other actuaries, as with any other assumptions. It is important to note that the answers tend to be materially affected by the choices made here.

5.7 *Equity/Gilt Mismatching*

It would be common ground between most actuaries that equities could be expected to out-perform gilts over time, but with a substantial variability. We have assumed that, on a market value basis, equities will out-perform gilts by 2.1% p.a., with the distribution of results averaged over 6 years showing a standard deviation of 3.1% p.a. Taking the MFR base gilt yield of 3.85% p.a. real, this implies a real return on equities of 6.0% p.a. The 2 standard deviation range over the 6 years, based on these data, is +/– 40%, with a 13% expected out-performance.

5.8 *Overseas/Dividend Growth*

5.8.1 A price or salary-linked liability, measured by reference to equities, still involves investment risk because:

— the investment is typically not 100% U.K. equity, but, perhaps, 2:1 U.K. equity: overseas equity; and

— even within U.K. equity, dividend growth at the rate of price inflation plus 0.5%, which is implicit in the MFR basis, cannot be taken as guaranteed.

5.8.2 What work has been done on the risks arising from the overseas versus U.K. point suggests that it is sensitive to complex issues, such as the degree of currency hedging employed, as well as the usual problems of assumptions choice.

5.8.3 We have assumed that a typical equity portfolio, split 2:1 U.K./overseas, will produce a 6.0% real return, with the distribution of results averaged over 6 years showing a standard deviation of 0.8% p.a. Given that the bulk of the equity-measured MFR liability is based on a real return of 4.81%, to allow for expenses, although the underlying equity assumption is 5.77%, we have

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a 2 standard deviation range of +/−10% over the 6 years, with a 7% expected out-performance.

5.8.4 Note that it is unnecessarily conservative to assume an investment return in line with the MFR or a traditional valuation assumption — we should be realistic, and let the risk margin do its job. To do otherwise is to double count.

5.8.5 The offsetting excess return becomes negligible for equity-backed pensioners for large schemes, where a return of 5.77% real is already demanded by MFR without expense adjustment.

5.8.6 We would note that the standard deviation of 1.6% p.a. is probably on the low side where a significant proportion of the equity portfolio is overseas and there is no currency hedging. There are more complex models which can split out these effects individually, if required.

5.9 *Gilt Match Imperfection*

5.9.1 A holding of gilts is not usually a perfect match for pensioner liabilities. Where there is a holding of fixed gilts, to match fixed payments or LPI assumed as 5%, the match is probably good enough, provided that the holding is switched from time to time in order to maintain the match. This does not hold for index-linked (IL) gilts.

5.9.2 For IL gilts backing IL liabilities, it would seem sensible to allow a worst case of, say, 2% of the liability for the inconsistencies in calculations of payments. More importantly, where IL gilts back LPI liabilities, it must be sensible to increase this to 5% of liability, for the fact that the 0.5% margin against actual IL yields permitted by the MFR might never materialise. This would produce a loss of 3% over the 6-year horizon if inflation stayed below 5% throughout.

5.10 *Manager Under Performance*

5.10.1 Whilst manager performance is volatile in relation to the market median, it does not follow that adopting a passive (i.e. index-portfolio) investment stance is a sensible way to reduce MFR risks. It could never, of course, eliminate them. Hence the choice of active or passive investment manager may not influence the margin selected. By the same token, the choice of active or passive asset allocation is not crucial, as long as the median passive allocation varies little from year to year.

5.10.2 This is, however, an area where different actuaries could have different views. Apart from anything else, trustees who need to defend a poor position will find it easier if the cause is external — poor index performance — rather than internal — poor manager choice!

5.11 *Salary Increases*

5.11.1 The correlation between average earnings growth and price inflation is close, and the investment models allow for average earnings growth. Client-specific salary behaviour is less clear — it is open to judgement based on past

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client habits and detailed discussion with the employer about future policy. A theoretical approach would include analysis of past variability relative to the long-term trend, but this is probably excessive. The margin should also depend on:

— the salary definition — PAYE type definitions require the highest margins and multi-year averages of basic the lowest; and
— the employer's willingness/ability to consider the implications for the pension scheme of salary increases — the margin can be lower if the pension fund will definitely be considered.

5.11.2 A view on the industry trend applying to the employer, relative to National Average Earnings (NAE) may be appropriate, and/or an explicit allowance for the effect of promotion. For example, after discussion with the particular client, one might decide that:

— 1% p.a. above NAE was a best estimate of the expected increase in average pensionable salary across the work force;
— members representing 20% of the liabilities would receive additional promotional increases of 15% over 6 years; and
— the actual outcome would be in the range +/– 10% of these assumptions, bearing in mind the salary definition of basic pay, unaveraged.

So, the expectation would be that the 'standard' MFR projection would be exceeded by 9% (1.01^6 x [1+ 0.15 x 0.2]), with +/– 10% tolerance.

5.12 *Early Retirements*

5.12.1 Retirement behaviour is similarly client specific. Margins should consider the potential strain, measured on the MFR basis, and the proportion of total liability which falls inside the 'at risk' zone at any point in time. Depending on scheme rules, the risks associated with actives may be higher than those associated with deferreds, either because the formula is more generous or consent is more likely.

5.12.2 Typical MFR-neutral early retirement factors are reductions of about 7% p.a. *compound* (net of early leaver revaluation). The table below shows how this develops against a typical simple reduction factor of 4% p.a.

Years early	Theoretical	Actual	Strain
0	1.000	1.000	nil
2.5	0.834	0.900	8%
5	0.696	0.800	15%
10	0.484	0.600	24%
15	0.337	0.400	19%

5.12.3 Whilst the typical minimum compliance Schedule of Contributions might ignore early retirement altogether, under a more sophisticated approach it

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might be felt appropriate to allow for 75% of actives and 25% of deferreds to select against the scheme in the worst possible way. For actives, we could take credit for some release of the 2% p.a. salary increase reserve — say by assuming that the events occurred, on average, 4 years through the period. If 40% of the liability for each group was in the range exposed to early retirement, mainly in the region from 5-15 years prior to the age used in the MFR calculation, then the loadings would be:

Active	40% x [15% (strain) – 4% (salary release)] x 75% (take-up) = 3.3%
Deferred	40% x 15% (strain) x 25% (take-up) = 1.5%.

5.12.4 The expected strain, not in the standard MFR projection, might be 30% of this, or 1%.

5.12.5 As with salaries, the risk element is reduced or eliminated if there are adequate procedures for the MFR impact to be assessed before early retirement is permitted. However, nominal provisions for employer/trustee consent may not be adequate here.

5.13 *Death/Ill Health Strain*

5.13.1 These effects are open to analysis, although the theory is complex — depending on the spread of liabilities as well as on the likely levels of deaths. The comments below are based on various oversimplifications, and should only be regarded as an attempt to define the significance of the issue relative to others.

5.13.2 For the standard situation where there is an insured lump sum death benefit, but spouses' pensions are risks to the fund, the risk is generally significant only when there is a prospective benefit, although this might not be true for very small funds. The risk associated with prospective benefits for younger members is significant, even in more substantial schemes, particularly if there are children's pensions involved.

5.13.3 For a 1,000 life scheme, the probability of a strain of more than 2% appears, from unpublished work seen by the authors, to be less than 5%, and may be ignored. For smaller schemes the risk is low, but the consequences of a single bad experience become more significant — at 100 lives, a death amongst the high risk (in future service terms) groups is a once in 10-year event, but it would typically add 5% to the liabilities — this could double with children's pensions. Beyond this point, it is necessary to ask serious questions about insurance.

5.13.4 The issues on ill health early retirement on prospective terms are broadly similar, with the important caveat that an employer veto, where scheme underfunding is an acceptable ground for exercise, is a suitable escape mechanism.

5.13.5 Lump sum benefits which are not re-insured exhibit slightly different characteristics to spouses' risks, because there is a substantial death strain at risk at higher ages, where death is more likely. However, the principles are similar. As an example, unpublished analysis conducted for two schemes with

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approximately 4,000 lives has been considered. This is the size of scheme which might be expected to self insure.

5.13.6 This showed that claims could exceed expectations by a factor of 1.7, with a probability of 2.5% over 6 years. On the basis that the sum at risk would be about the same as the value of active liabilities involved, it follows that a margin of 0.35% would be adequate — this is not worth considering.

5.13.7 For pensioners, the risk is that there are inadequate deaths — in particular amongst single pensioners and spouses, since the change in liability when a married pensioner dies and the spouse's pension is substituted is often not large. The modelling here is also complex, particularly where the distribution is skewed by a small number of pensioners receiving well above average pensions. However, it seems likely that, for groups of 100 or fewer youngish pensioners, strains of the order of 5% arising from nil deaths amongst the key lives are quite within the 2.5% probability boundary.

5.13.8 By contrast, a homogeneous group of 1,000 pensioners would require a margin of, say, 2%. It would be unwise to go below this, since a margin on the long-term mortality experience relative to PA90-2 would seem prudent in most cases. A figure of 2% is sufficient to cover a PA90-3 outcome. For larger schemes, the mortality will be scheme best estimate rather than a standard table, but the principle still stands.

5.14 *New Entrants*

5.14.1 The new entrant experience may affect the development of the liability to the extent that its profile is different from that assumed in the calculation of the MFR regular cost itself. A related issue is that deficit/surplus contributions based on percentages of pay may not have the desired effect if the implicit assumptions on the size of payroll are not borne out.

5.14.2 The actuary has some control over the new entrant assumption in setting the MFR regular cost, although he may not wish to use this for reasons of conservatism and/or convenience of calculation. The work in this paper assumes that the MFR regular cost is based on best estimate new entrant assumptions, and that the effect of variation is not material. Clearly new entrants may be a material issue in some cases, but we would note that their importance tends to reduce with scheme maturity, and hence be lower for those schemes most exercised by the MFR.

5.14.3 For instance, if the MFR regular cost is 3% of the fund and new entrants not replacing existing members generate a liability 40% below the MFR regular cost, the effect of a 50% increase in membership over 6 years via additional new entrants is only [3% x 6 years x 0.4 x 0.5] = 3.6% on the funding level.

5.15 *Interaction Matrix*

5.15.1 The suggested approach to combining these factors is to compose a

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matrix which shows the risks associated with each factor, weighted for the part of the total liability affected.

5.15.2 The expected deviation from the projection on the MFR-prescribed assumptions can then be summed, with the variances added in accordance with standard statistical techniques.

5.15.3 Appendix D provides examples of this process in operation.

5.16 *Picking the Contribution*

5.16.1 Contribution setting should be a more subtle process than mere arithmetic. The valuation report which recommends a 0.2% of pay reduction for 10 years to deal with a surplus (or a 4-month contribution holiday) may well betray a spurious accuracy.

5.16.2 If the scheme is below target, the 'deficit' against target can be spread over the contribution schedule period, or longer if the trustees are content that they might be below at the end of the schedule, but with funding for the residual shortfall already committed. Contribution holidays should be discouraged, although they might be theoretically possible relative to the statutory minimum.

5.16.3 If the scheme is above target, we should start to worry that our best estimate would be that the surplus will get bigger and become an embarrassment, given the margins in the MFR relative to a true best estimate. The first step would be to reduce normal contributions to a level at which the surplus generated on best estimate (e.g. 6% real return) assumptions would be offset by the reduction — this might be a 25% reduction for a mature case. This reduction would be long enough to return to target — if target return would take longer than 6 years a bigger reduction would be desirable, unless surplus accumulation is actually wanted.

5.16.4 A contribution holiday to return to target as rapidly as possible would be appropriate if desired — we should probably even be encouraging this if the surplus is more than, say, 10% above the target.

5.16.5 The process here owes its origin to the dual interest concepts introduced by Thornton & Wilson (1992).

5.17 *Can we Rely on this Approach to Produce Compliant Figures?*

5.17.1 The margins are such that the (notional + margin) position should almost always be better than the actual position at either the MFR effective date or the actual signing date. This is because the margin is designed to cover yield mismatch problems *and* the underlying deterioration of the funding position. Hence, a total contribution rate based on the (notional + margin) position with spreading of surplus/deficit to the end of the schedule period should be automatically compliant, except in extreme cases or where the 90% test is failed.

5.17.2 This allows us to recommend, without worrying that the recommendation will not be capable of certification once agreed, except in exceptional circumstances, an important practical gain.

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5.18 *Statistics — Rationale and Limitations*

5.18.1 *Basic issues*

5.18.1.1 The concept of this paper is to extend the statistical approach used for asset/liability studies to non-investment issues to build a more comprehensive model.

5.18.1.2 The characteristic of many asset/liability models is that they are based on returns which are assumed to be normally distributed. Normal distributions can be added by summing means and variances and, somewhat heroically, this need not be confined to investment points. So, if we know the mean and variance of the effect of mortality experience on the liabilities, this can be compounded with the investment variation. Real distributions may not be normal, but the use of a normal approximation can still be valid in identifying optimal strategies.

5.18.1.3 It is assumed that the various independent influences on funding levels can be applied multiplicatively, which is equivalent to adding their logarithms. The standard, albeit imperfect, assumption has been made that small percentages can be added rather than compounded properly.

5.18.1.4 Some experience items are clearly anything but normal, e.g. mortality experience is binomial. Hence, assuming that the standard equations for combining normal distributions are appropriate is clearly imperfect. However, the only alternative would seem to be stochastic modelling of the combination of dissimilar distributions, which advance on our work we leave to others for the present.

5.18.1.5 Any routine application of stochastic techniques and complex distributions needs to be tested against a key message that we would echo from the basic pensions textbook used for many years: "Over-meticulous calculation is a waste of resources and may lead to unnecessarily high costs to the client." (Lee, 1986).

5.18.2 *Residual risk*

In any model, it is necessary to decide at what level events will be regarded as so improbable as to be not worth planning for. We have taken this to be a 2 standard deviation event, i.e. one which occurs with a probability of 1 in 40 over the 6-year period, assuming the normal distribution assumption is valid. It is accepted that models do not satisfactorily describe more extreme events, and clients cannot be protected against all eventualities, other than by way of regulatory easements.

5.18.3 *Non-statistical items*

Whilst factors like mortality are independent of employer influence, and hence can be modelled, the same is not true of arbitrary decisions like an early retirement programme. The best we can do is to observe that we are allowing for 1-in-40 statistical events, and imagine equivalently unlikely decisions. Clearly some of these risks are better eliminated by introducing appropriate

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communication and planning mechanisms involving the employer, trustees and actuary, but this will not always be possible. In some cases there will be a correlation between retirement patterns and economic conditions, but this is difficult to model.

5.18.4 *Dominance*

The examples in Appendix D show that, for cases where the biggest single risk is investment, the effect of other risks is often marginal. This is what might be expected — if one takes a relatively unlikely investment disaster, it is very unlikely to coincide with other disasters. Conversely, if the investment margin is not required, it can cover a multitude of other sins. However, as clients seek to control their investment risks, it becomes more important that they pay more attention to the others.

5.19 *Clients wishing to adopt Less Caution*

5.19.1 Given that margins based on success 39 times out of 40 might seem cautiously drawn, it might be appropriate, in some cases, to take a fraction of the normal margin based on client attitude. The following statistics from the normal distribution might be helpful in deciding what fraction.

Margin	Probability of margin being eroded to nil
1 x	2%
3/4 x	7%
2/3 x	9%
1/2 x	16%

5.19.2 So, a cut of 50% in a margin designed to miss the target with a 1-in-40 probability can be enough to move it from conservative to much less so — a 1-in-6 miss probability. And these are margins based on MFR failure as the criteria — trustees without faith in the employer's security might still desire something stronger.

5.19.3 The margin reduction applies to the risk element — for example if the planned margin is 12%, made up of 10% for risk and 2% for expected under-performance relative to the MFR assumption, a 50% cut in risk margin should lead to a 7% planned margin.

6. THE METHODS COMPARED

6.1 *Traditional*

6.1.1 Most clients will be starting with a traditional valuation method and the proposition that anything which is not broken should not be mended.

6.1.2 However, the results of the traditional valuation must be subject to a minimum of the MFR. Hence, either we do two sets of calculations, with the

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risk that the MFR numbers undermine the carefully explained traditional basis, or we ensure that the traditional basis is adequately conservative.

6.1.3 We can explore the consequences of this by considering how projected unit bases react to the MFR situation. As noted in ¶1.2, the projected unit method, or a method with many similar characteristics, appears to be the most common approach at present in the U.K. In seeking a suitable projected unit basis, we need to recognise that such bases have a different 'shape' to the MFR. Relative to projected unit bases, the MFR tends to incorporate elements of conservatism for pensioners and older members, whilst the reverse is true for younger members. The conservatism element for pensioners may exceed the credit we can take for the release of the explicit margins for salary increases, etc. in younger member bases. The following table from the model scheme described in Appendix E illustrates this:

	Ratio of ongoing liability to notional MFR%		
Interest	9.0	8.5	10.0
Salaries	7.0	7.5	8.0
Pensions — LPI	4.5	4.5	4.5
Dividend growth	4.5	4.0	5.5
Actives — future	101%	123%	93%
Actives — past	128%	152%	117%
Deferreds	94%	109%	71%
Pensioners	95%	99%	88%

6.1.4 It will be seen that the relative strengths differ substantially by category. The past service figures reduce by a further 5% if pension increases are fixed rather than LPI/RPI. The future is all LPI, of course.

6.1.5 If these figures are assembled into a number of model schemes by varying the pensioner proportion, we find as follows for past service. In each case, the percentage is the proportion of liability representing pensioners on the 9.0% interest ongoing basis:

	Ratio of ongoing liability to notional MFR%		
Interest/salaries/LPI/dividend growth	9/7/4.5/4.5	8.5/7.5/4.5/4	10/8/4.5/5.5
Maturity/pension increase			
15% / LPI	120%	140%	109%
45% / LPI	110%	123%	100%
45% / fixed 3%	104%	117%	96%

6.1.6 The picture is worse if we allow for comfort margins derived using the planned margin methodology of Section 5. Using these techniques, the margins might be 9% for the immature scheme, but 15% for the mature (see Appendix E for derivation):

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	Ratio of ongoing liability to comfortable MFR% (rounded)		
Interest/salaries/LPI/dividend growth	9/7/4.5/4.5	8.5/7.5/4.5/4	10/8/4.5/5.5
Maturity/pension increase			
15% / LPI	110%	129%	100%
45% / LPI	96%	108%	88%
45% / fixed 3%	92%	102%	84%

6.1.7 Moreover, the current unit method (the nearest traditional method to the MFR test) produces a very different relationship between past and future liabilities, as the first table shows. An 'MFR-proof' projected unit basis may tend to produce an excessive normal cost relative to incremental liabilities.

6.1.8 For example, for the mature fixed-increase scheme, we find that a typical 9/7/4.5/4.5 basis gives a margin of about 4% over the notional MFR, which is not adequate to cover all market conditions. We have to go to 8.5/7.5/4.5/4 to get to a 'comfortable' margin of 15%; but the normal cost now turns out to be 17.8%, compared to 14.5% under MFR. How do we justify the extra 3.3% of pensionable salaries if the projected unit basis has only been strengthened as a device to ensure MFR compliance and the client does not want the full strength of the 8.5/7.5/4.5/4 basis?

6.1.9 The reverse can also be true. For the immature LPI scheme, 10/8/4.5/5.5 is enough for past service, giving just the right 9% margin over notional MFR. However, the normal cost turns out to be 13.5% — 1.0% of pensionable salary short of that demanded by the MFR. To produce the 'right' normal cost, we need to strengthen the projected unit basis. In the process, we will add a needless margin on past service.

6.1.10 So, the risk is that we either have to choose an undesirably conservative projected unit basis, or watch our back against the projected unit basis failing to cover either past or future service appropriately, and hence a possible test failure. Clearly the exact interaction between past and future will depend on the exact dynamics of the scheme.

6.2 *Planned Margin*

6.2.1 If the funding target is restated as a percentage of MFR, the shape of the basis is automatically adjusted to the shape of the MFR. For those clients who wish to take the view that all actuarial bases are actually conservative, and therefore the only desirable margin away from 'best estimate' is for protection against failing regulatory tests, this should be the lowest cost solution.

6.2.2 The percentage will ultimately be a matter of judgement. However, there is scope for some science in laying the foundations, and Section 5 discusses a possible strategy designed to cover a range of types of scheme and situation.

6.2.3 The basic approach is to identify a genuine best estimate funding position in 2 valuations' (6 years') time, i.e. at the end of the contribution schedule, and the variation about that. The best estimate will typically be surplus, because the MFR returns are lower than we really expect, but with variability.

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6.2.4 In a typical case, such as that described in example D.3, a current position of 111% MFR might lead to a 6-year position of 120% +/– 20%. The +/– 20% involves 2 standard deviations of statistical variation, in other words only 2.5% of outcomes will be worse than this. It will be appreciated that no absolute guarantees of safety can be given — actuarial science cannot cover wars and plagues. However, 111% is a comfortable position to be in, because in the worst case worth contemplating, the scheme just scrapes home. This could be presented to the client as a 111% target.

6.2.5 It is not suggested that this process be carried out in detail for every scheme, but rather that it gives intellectual backing for common responses which an actuary might adopt for common situations, and a process for dealing with less frequently encountered situations.

6.2.6 There are two major disadvantages:

— lack of fit with the current standard for expensing pensions in company accounts (SSAP24); and
— lack of a costing approach for benefit improvements.

6.2.7 As we discuss in Section 9, the approach adopted for expensing is currently up for review, and it may be that the result of this review will be a closer match to MFR-related funding techniques in any case.

6.2.8 Benefit improvements are more problematic, at least in terms of employer cost. The MFR might be a good measure of the immediate value to individual employees, but not necessarily of long-term cost over a group.

6.2.9 The planned margin approach is very suitable for deciding whether the trustees should authorise benefit improvements without contribution — because it identifies a surplus above the margin needed for general risks. Any improvement which leaves the planned margin intact, after allowing for any subsequent contribution reduction, has a high probability of not leaving the trustees exposed by a subsequent MFR failure which questions a decision to accept benefit improvements.

6.2.10 However, an employer probably needs to consider several bases before deciding whether he can afford a benefit improvement which he intends to provide, or announce an intention to provide in the long term, irrespective of circumstances. Consideration should extend to the MFR effect, a conservative long-term funding cost allowing for salary increase effects, and also the non-profit deferred annuity cost. The grounds for the latter approach are that is the 'market' cost of the benefit improvement, and the true cost of an immediate escape from the commitment without risk of damaged employee relations at the very least.

6.3 *Minimum Compliance*

6.3.1 The actuary is likely, in many cases, to be asked to produce minimum compliance numbers as a matter of routine, because either:

— the trustees legitimately believe that the employer is strong enough to correct

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any shortfalls rapidly;
— the trustees have no power over the contribution rate beyond that given by the Pensions Act 1995; or
— the trustees are persuaded by the employer or other influences.

6.3.2 This basis is, by definition, the cheapest for the employer, at least short term. It gives us short-term and long-term problems:
— if the markets move against the scheme, the actuary may not be able to sign off the proposed contribution at all; and
— there may be a subsequent failure, as early as the first annual check, which may still be assigned as 'the actuary's fault', despite any provisos recorded at the time of signing.

6.3.3 The short-term problem is that the contribution must be based on the MFR position at the date of signature of a contribution schedule.

6.3.4 To control the medium-term risk, the actuary may need to establish the worst case '*in normal course*', work out the potential damage, and tell both employer and trustees. The message would be given, whether they wanted to hear it or not. For example, our sample mature fixed 3% increase scheme (Model E.2.3) needs a 15% margin for comfort, i.e. it could end up at 87% (100%/1.15) if things go badly; 87% at a 6 April 2000 valuation means catching up 13% over 7 years, giving a contribution correction of 6.3% on top of the normal 14.3%, and a likely disclosure to members that the trustees had failed in their responsibility to maintain MFR.

6.3.5 At a practical level, the bare minimum calculation is extremely involved, requiring 4 different measures of deficits to be rearranged to a combination of 3 different contribution rates.

7. ROBUSTNESS

7.1 One argument for moving away from traditional methods is that they tend to respond weakly to changing circumstances. The ongoing basis for a typical scheme has a margin against a true 'best estimate' which is often sufficient to allow it to wind up without undue embarrassment. However, all the margin lies in the active part of the membership — in the salary growth assumption and a conservative assumption on equity returns. Take the actives away, by bulk transfer, redundancy or a switch to defined contribution, and, suddenly, the same basis has no margins.

7.2 This has been a problem without MFR, but the existence of MFR reinforces it. The flaw in the best estimate argument is that it assumes that employers and schemes are immortal, which they are demonstrably not. Indeed, if they were the MFR would have little useful purpose!

7.3 A planned margin method will more naturally deal with such situations,

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because the MFR liability profile is already embedded. The message is no different from Thornton & Wilson (1992) — identify your margins, rather than relying on the rounding working sufficiently in your favour!

8. OTHER ISSUES

8.1 *Projections and Margins*

8.1.1 No doubt some schemes will wish to adopt a more sophisticated approach to modelling the development of the scheme over the period under review. Indeed, this is the most complete approach — as we mention in ¶5.4.4, the use of the current liability measure as a base for the margin is purely a convenience for use in stable situations where changes in the liability mix and new entrant flow are not crucial.

8.1.2 Clearly the economic and demographic basis of the projection then needs to be decided. If the approach to funding is 'planned margin', then we believe that no further margins should be added into the projection basis — it should be on a best estimate approach.

8.1.3 The margin to be added at the *end* of the projection period will be purely to cover variability, with the adjustment for the expected difference between investment return and the corresponding MFR assumption included directly in the projection. Given that most 'true best estimate' economic assumptions will be less conservative than the MFR basis (which is adjusted implicitly for expenses), the end-of-period margins will tend to be larger than the 'discounted' margins applied to the valuation date liability.

8.2 *'Surplus'*

8.2.1 Regardless of the techniques used, the profession needs to be much more circumspect in the use of the term 'surplus' in future. Rather than define two situations — *surplus* and *deficit* — we need three:

— *clear deficit* — MFR and/or alternative calculations demand extra contributions;
— *broad balance* — ratios generally above 100% but not by much; and
— *clear surplus* — money which can be spent without threatening the future MFR status of the fund, or such higher reserves (e.g. cautious long-term funding) as may be desired.

8.2.2 We should ensure that only clear surplus is spent. Once back in the central corridor of 'broad balance', normal contributions and funding for improvements should be the order of the day.

8.3 *Inland Revenue*

8.3.1 The Inland Revenue's existing principle, that funding be limited to that required to provide benefits, is a potential difficulty. It would be ironic if a

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valuation based on a planned margin was rejected on the grounds that the margin was inappropriate, and replaced by a more conservative traditional basis which generated more tax relief still.

8.3.2 In practice, the Inland Revenue is aware of the MFR, and we believe will eventually review its funding rules in the light of this. A system which embeds potential conflict between regulators cannot be in anyone's interest. As the conservative funding examples in Section 6 indicate, the limits introduced by the Finance Act 1986 seldom conflict with MFR except in unusual circumstances — the main area where MFR margins are required is equity mismatching, and the 4.72% equity norm yield used by the Inland Revenue prescribed basis immediately gives a 10% margin over the MFR.

8.3.3 An integrated approach would be for the Inland Revenue's basis to be revised to define the maximum amount of reserving against the MFR, eligible for full investment tax exemption, representing an appropriate balance between taxpayer needs and scheme member security. Discretionary benefits absent from the MFR can be allowed for on a basis consistent with disclosure to members. The opportunity could be taken to remove nonsense such as the use of inconsistent mortality bases for different statutory tests, and the cliff-edge situation whereby the existence of a surplus £1 above that deemed acceptable 5 years' hence triggers a tax charge on all current surplus. The Government has failed to deliver on this recommendation of the Goode Committee so far.

8.4 *External Financing*

8.4.1 Higher funding will not always fit the bill. In particular, funding cushions:

— tie up employer cash assets;
— may be irrecoverable if the trustees have control of surplus; and
— may not be affordable.

They may, however, be expected by trustees with the right to set the contribution rates, having regard to their duty to secure the maintenance of MFR.

8.4.2 Some of these situations may be solved by investment switches. For mature funds, it is often found that a high equity strategy involves simultaneously:

— a significant risk that the MFR will be failed at some point; and
— the most likely outcome is a substantial surplus which can ultimately deliver a contribution holiday for decades.

8.4.3 Add the difficulty of using surpluses for the employer imposed by trust deeds and the Pensions Act 1995, and, in some cases, the employer has no access to the upside of successful investment performance. Hence, to the extent that the employer can influence policy, he has no reason to take the associated risk of an aggressive investment strategy. In theory, the trustees should actually be more willing to take the risk than the employer, since it maximises member benefit.

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8.4.4 Even with a more conservative stance, it is still likely that the employer will resist funding a cushion, on the grounds that it is money down the drain. This could turn out to be true in a proportion of instances, but not all.

8.4.5 In these cases, the employer could offer the trustees external guarantees sufficient to convince them that they do not need a cushion in the fund. Such guarantees have no status in the MFR valuation, but can provide the cushion element of a desired funding strategy. If the scheme never fails the MFR, the employer keeps the money. If the MFR is failed, the employer can find the funding elsewhere or let the guarantee be called.

8.4.6 The guarantee routes will either be:

— charges over employer assets; or
— third party guarantees.

8.5 *Charged Assets*

8.5.1 Charges will be on assets owned by the employer, and subject to tax on income generated. They can be over assets bought for the purpose or any other assets not already spoken for by other lenders. Where the value is variable, e.g. property, it will be up to the trustees to be convinced that the minimum available value is sufficient. Income can be taken into account (at extra complexity), if required.

8.5.2 Charged assets should preferably be saleable — hard cash is ideal. In particular, trustees should avoid assets which would be self-investment if claimed. This may severely restrict the options. Ultimately, costs incurred for charges should be limited to the legal and accounting work required to establish the guarantee and track the value. Many of the same problems occur with this route as with using charged assets to provide security for an unfunded unapproved scheme.

8.5.3 If the employer, rather than the trustees, is seeking protection, the solution is similar, but, it is to be hoped, more straightforward. An employer does not need to legally reserve assets as a precautionary margin — it simply needs to avoid spending them on something else! This might be hard for a public company to explain to shareholders.

8.6 *Third Party Guarantees*

8.6.1 Third party guarantees, as the name suggests, are guarantees provided by outside organisations. Effectively they are insurance, and, as with other insurance, they involve payment of a premium which will be lost if the guarantee is not needed. Moreover, the premium will be a function of the amount of money involved rather than the paperwork generated, and hence more costly than a charge, at least superficially.

8.6.2 Guarantees could be in the form of either:

— fixed sums payable if the employer defaults on subsequent MFR payments; or
— fixed sums payable if the funding position deteriorates in a particular manner.

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8.6.3 The latter is effectively a derivative designed to pay out if the equity market falls against gilts in a pre-determined way. Investment banks will surely be interested in developing over-the-counter options, although the existence, at the present time, of a market is debatable. We believe that it is likely that products will be expressed in market terms rather than in terms of funding level triggers. They may also distinguish 'jump risks' from more routine variations, in order to given the optimum level of coverage against price.

8.6.4 All external guarantees involve counterparty risk — they are only as good as the credit rating of the financial institution giving the guarantee.

8.6.5 The bigger obstacle is understanding — e.g. many trustees translate 'derivative' into 'Leeson', relate to the risks surrounding the Barings collapse and will have no further involvement. A degree of faith in financial engineering is involved, plus sufficiently large sums at risk to justify the effort.

8.6.6 There are also doubts about the capacity of the derivatives markets to provide these options at economic cost if many schemes/employers decide to protect risks via these routes.

8.6.7 Obviously the investment banks intend to make money in the derivatives markets by offering terms which incorporate margins above the true risk cost of the cover provided. The assumption is that the purchasers have utility functions which will justify meeting this cost, e.g. because it allows them to use their own money more profitably elsewhere. In reality, for a particular scheme/employer, there may be a trade off between:

— the risk of any alternative increase in funding being lost to extra benefits;
— the reduction in long-term cost by the favourable tax treatment of that additional funding; and
— the margins for profit in investment bank derivative terms.

8.6.8 Unlike charges, derivatives cost the same regardless of who asks for them.

8.6.9 We believe that such external financing devices are best used in combination with 'planned margin' techniques, as the protection provided is a direct reduction from the required margin.

8.7 *Funding vs. Pricing vs. Expensing*

8.7.1 Historically, the same basis has been used for these three different tasks.

8.7.2 Pricing is the basis on which the employer decides to make a pension promise. We believe that it should reflect the degree of security to be given to that promise and communicated to employees. The most adverse economic circumstances under which the employees are expecting to receive the promised benefits should be reflected in the pricing basis, and used to set the maximum cost which the employer may have to meet to deliver the benefits. This may be a combination of a long-term guaranteed annuity basis with a limited allowance for projected earnings increases. As the scheme develops, strains from actual

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earnings increases may be offset by the surplus anticipated from the release of the margins in the annuity. There is a great danger that the MFR basis, involving a very limited security level, will be used for pricing.

8.7.3 The funding target should reflect:

— the degree of wind-up security it is desired to offer to members, whether the early leaver/closed fund approach underlying the setting of MFR, or a non-profit annuity target, or somewhere in between;
— the risk management strategy adopted; and
— implicitly, the employer's credit rating.

8.7.4 The pension expense is the charge to be made against the employer's profits with regard to the pension promise accruing and general accounting principles for a continuing company — see Section 9.

8.7.5 The above concepts have comparison with those used in life assurance, with separate analysis of the capital demands created by products and the cost of servicing that capital. The use of a 'prudent best estimate expensing' basis as a 'pricing' basis may have, in the past, lead to the granting by employers of benefits that they were, in practice, not prepared to live with in hard times, without adequate communication of that fact to employees/members. This has ultimately contributed to the current fall in confidence in private pension provision.

9. Expensing Techniques

9.1 *Background*

9.1.1 There is a potentially significant conflict between the current accounting standard SSAP24 and the MFR. SSAP24 is based on the concept that the pension scheme is an extension of the corporate treasury, and funding can be adjusted at the treasurer's convenience. MFR takes away that control, and imposes a funding standard which may well exceed a true best estimate of the cost of providing the liabilities.

9.1.2 How SSAP24 will react remains to be seen — the Accounting Standards Board (1995) have reviewed the suitability of SSAP24, but this document did not recognise the existence of the MFR. At the time of writing, it would appear that a new international standard, substantially the same as FAS87 in the United States of America, may come to dominate future U.K. practice and standards. At this stage we can, therefore, only speculate.

9.1.3 The ultimate purpose of accounting standards is to reflect economic exposures, preferably on a basis consistent from company to company. Given that the MFR creates absolute contribution exposures as opposed to theoretical ones, and the MFR-based debt creates a legal contingent liability on the employer should the scheme wind up, the MFR actually has the potential to be more meaningful than any 'long-term best estimate' system. However, it is not

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consistent with the principle that continuing companies account as going concerns, assuming continuation of the company and the scheme indefinitely. Moreover, it fails to deal with the accounting need to value the creation of member expectations which constitute economic commitments, but which are not sufficiently guaranteed to come within the scope of the MFR.

9.1.4 Modifications to the best estimate approach have already started to creep into SSAP24 in the form of FRS7 (acquisitions). This limits the taking of credit for surplus to situations where it is 'realisable', i.e. will lead to a cash benefit to the company in the foreseeable future. So far, this distinction has only been applied in a few cases. However, MFR has clear potential to make far more surpluses or contribution reductions unrealisable in this sense.

9.1.5 More dramatically, it is possible to envisage situations where the SSAP24 cost is less than the MFR statutory minimum. Auditors will, and possibly should, question whether the difference can be credited as a balance sheet asset in such circumstances. It could be that some would want to go further, e.g. by insisting that any MFR deficit be fully provided, or, at least, spread over the MFR correction period, not the future lifetime.

9.1.6 However, this would be inconsistent with a pure going concern approach. The margins in the MFR relative to true 'best estimates' are ultimately expected to emerge as surplus. This surplus will be of economic worth to the employer, even though its realisation may be contingent on certain events — specifically the employer's continuation in business and avoidance of winding up the scheme in circumstances where the surplus proves irrecoverable. The recoverability of surplus on winding up is a complex area, not captured by simple accounting standards. There are parallels with other areas of current academic debate within accountancy to do with assets which are beneficial, but which can never be converted to cash, e.g. brands.

9.2 *United States Influence*

9.2.1 It is also worth considering the way in which FAS87 has grown naturally from the ERISA-driven funding culture. FAS87 essentially values minimum funding liabilities based on the bond-based funding standard, and then recognises that the assets produce a higher return than the discount rate through the operation of interest cost. Reserves for future salary increases are an adjustment to the statutory liability, rather than based on some new long-term theory.

9.2.2 In stable market conditions, liabilities are higher than best estimate, but periodic pension costs are low, reflecting the return generated by capital implicitly invested in the scheme. This is exactly the model one would expect for MFR in a mature equity-invested scheme — a conservatively valued fund which then requires little cash input to maintain adequate funding. It has similarities to the planned margin approach that we propose for the U.K.

9.2.3 FAS87 is a function of the statutory funding culture, at least in part. By contrast, SSAP24 was created in a vacuum as regards funding mechanisms, doing

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its best to reflect the most common practices. Given a legally-imposed funding process, it is not obvious why SSAP24 should not follow suit, albeit that the timing might be imperfect.

9.2.4 There is international pressure for SSAP24 to move in the direction of FAS87, whether the changes are suitable for U.K. conditions or not. With the MFR in place, there is some element of suitability, and the going concern based argument for funding to be distinct from MFR loses ground, albeit that there is a considerable element of chicken-and-egg. Add a degree of disinterest as to the need for smooth cash flow from the employer perspective, and an MFR-led approach has considerable potential.

9.2.5 However, there is anecdotal evidence that volatility of pension expense is a factor which encourages employers to move away from defined benefit pension provision. Therefore, in order to maintain the acceptability of defined benefits to employers in the long term, there must be a case for the retention of the present SSAP24 approach to pension expensing in the face of possible pressure from auditors, who would wish to argue that the general accounting concept of prudence should override.

9.3 *The Real Issue*

9.3.1 The crux of the matter may be the true nature of a final salary defined benefit promise for a U.K. defined benefit pension scheme for a continuing company. We think that auditors and actuaries need to address whether changes in recent years, including the deficiency on wind-up regulations, cash equivalent transfer values and the MFR, have changed this. If the benefit promise or expectation is a final salary related pension or lump sum on retirement or death or deferred pension on leaving service, then such benefits should be those valued for expensing purposes on an appropriate long-term basis.

9.3.2 Accountancy standards and principles now increasingly require a 'fair value', i.e. market value, approach. The problem for pension scheme accounting remains that, in the crucial area of allowance for future salary/earnings inflation, there is no 'market' and an accountancy market value/fair value approach still requires this item to be 'guessed'. There is no market test of consistency with the other market-derived elements of the basis.

9.3.3 Moreover, if the 'MFR' debate on the degree of pension security to be ultimately offered to the U.K. final salary pension scheme member has changed, or will ultimately change, the actual level of guarantees or expectations existing, a change to the expensing may be appropriate anyway. In the 'continuing company' accounting scenario, expectations are key. If these are now to be an MFR-based transfer value on leaving service, and a level of pension security consistent with the MFR basis in retirement, then a more MFR-based/market-based approach may be naturally justified..

9.3.4 The lack of a market settled estimate for earnings/salary inflation is still present with this approach, but it may be less critical than with traditional long-term salary-related reserving. If the MFR basis is adopted directly, there is no

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earnings allowance in the past service reserve, and the assumption for earnings is only used in the projection part of the regular contribution calculation, not the reserve for accrual. Salary projections will thus tend to influence profits more than the balance sheet.

9.3.5 MFR planned margin approaches are capable of partly accommodating this conflict by providing for non-guaranteed benefits and removing short-term volatility. It is possible to consider the use of the planned margin technique, with fixed surplus/deficit spreading periods, to avoid manipulation of accounts via short-term changes to contribution rates, and to remove the choice of margin from the employer's control. A standardised margin implicitly allows for the risks associated with the investment strategy adopted, and, as such, gives a measure of the employer's exposure. A higher margin adopted for funding purposes would create a balance sheet asset; a lower margin would convert into a prudential provision. The FAS87-derived international standard may well have much this effect anyway.

10. Communication, Comparison and Terminology

10.1 The layman has traditionally found comparison of the funding positions of two different pension schemes a complex issue. Twenty years or more ago, that may not have mattered. However, the trend in society over that time has been for greater openness in both government and corporate affairs. Pension funds, as investors, no doubt gain from the more open regimes won by the corporate governance lobby, and, in turn, are under pressure from the press and elsewhere for similar openness.

10.2 The roles of trustees confirmed by the Pensions Act 1995, and the associated introduction of member nominated trustees, mean that a greater proportion of those taking the decisions will have little or no financial experience. Moreover, finance professionals now move more rapidly between posts, and hence have less time to build up an understanding of a number of subtly different actuarial philosophies. These trends emphasise the need for clear mechanisms for comparing funding positions which are accessible to non-actuaries.

10.3 A traditional funding basis contains many varied elements, and even those whose main economic elements are the same can differ in strength due to differences in demographic assumptions and likely experience. Analysts have struggled to provide perceptive analysis within reasonable bounds of error from even fully compliant SSAP24 disclosures.

10.4 GN26 — Pension Fund Terminology, tends implicitly to assumes a one-to-one relationship between the funding target and the value of accrued benefits. There is the implication that different investment strategies are reflected in the prudence or otherwise of the actuarial basis. The problem is that two funds with identical liability profiles and funding bases can, in reality, be in substantially different funding exposures, according to the conservatism, or otherwise, of the investment policy.

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10.5 In the place of such confusion, the MFR funding level is likely to become a natural comparison benchmark for the funding position of schemes. It has the advantage of providing a common actuarial basis valuation of the contractual accrued liability of the scheme, with the basis broadly reflecting equity investment pre-retirement and gilt-edged investment post-retirement. This would solve some of the problems of previous comparison methods, but other dangers remain. If the employer has provided funding above that required to meet the statutory minimum in order that the trustees can follow a more aggressive, or less matched, investment policy without excessive risk of MFR infringement, this is shown as 'surplus'. Similarly, if more money is placed in the scheme because of higher expected increases in pensionable earnings or levels of discretionary early retirements, this is initially declared as 'surplus', although intended to meet a liability expected to crystallise in the relatively short term, This would not encourage the prudent management of schemes.

10.6 The profession should, therefore, adopt, through the formality of GN26 revision, additional terminology to address these points. As for other financial institutions, reserves behind those required for immediate liabilities should be identified. For example, a first tier of capital which we shall call an Uncertainty Reserve might be identified, this being the risk-based capital required to reduce the possibility of regulatory failure to an 'acceptable' level. Beyond that might come additional reserves designed to cover discretionary benefits, salary progression, etc., to the extent that these are necessary beyond the first tier.

10.7 In talking about 'acceptable' risks, the question 'acceptable to whom' must be asked, and this cannot be answered simply. Reduction in risk for one party is usually an increase for another. However, the emergence of this structure would promote reasoned debate between scheme sponsors, member interests and the regulatory authority OPRA, perhaps enabling OPRA to indicate the level of prudence that it would expect to see before offering relief from MFR difficulties. OPRA guidance on dealing with 'step change' events, eg tax changes, would be particularly helpful.

10.8 Such a method of identifying risk-based capital would also provide a clear and fair comparison for company analyst use between schemes, on the basis of their current funding level and the short-term risks to that level being accepted. This might not be required for all schemes, but the need is increasingly apparent for schemes which are large in relation to the sponsoring employer and produce large gearing effects.

11. CONCLUSIONS

11.1 This analysis suggests that, when traditional methods are used, automatic MFR compliance can only be assumed if the basis is at least as conservative as current 'middling' assumptions. Even at this level, any significant deficit could correspond to a MFR position close to the 90% MFR mark, with

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potentially severe consequences once the MFR is fully in force in 2002. For 1997-2002, the consequences are less severe, but deficits may still have to be spread over the MFR period, which will usually be shorter than the future working life.

11.2 If the existing ongoing valuation basis is adequately conservative, there is no obvious reason to change. However, a strengthening of the ongoing basis purely to ensure MFR compliance is an inefficient technique, because it fails to pick up the fact that the MFR liabilities have a different 'shape' from the traditional ones.

11.3 We believe that planned margins above MFR can be used as a more efficient approach. The technique described in Section 5 can be used to identify margins which have a high probability of being adequate, and address both asset and liability risks. The exact formulae will need to be developed in parallel with more sophisticated asset/liability techniques.

11.4 Clients may wish to focus on the legal minimum contributions, and that is their privilege. However, actuaries must protect their own position when this happens, possibly by using the Section 5 technique to establish the 'worst credible disaster scenario'.

11.5 We believe that the communication of pension funding levels on the basis of the MFR level, adjusted by a margin to cover future short-term risks relevant to the particular scheme, is most likely to produce competent management of schemes in an MFR environment.

11.6 The MFR should influence the development of accounting standards covering the presentation of pension expense in company accounts. There is scope to develop an MFR-based framework, which acknowledges a capital margin based on the risks being undertaken and the nature of the commitments made to scheme members. This would have important advantages for standardisation between companies, the ability to use common basic calculations to derive funding and expensing, and the avoidance of mandatory contributions showing as prepayments on company balance sheets.

11.7 All this debate does, of course, become academic if the surplus is big enough. If any reasonable valuation method or basis adopted produces a contribution holiday, the choice is not important. However, few clients are in this position, and some of those who are may not always stay there.

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APPENDIX A

OVERVIEW OF MINIMUM FUNDING REQUIREMENT AND SCHEDULE OF CONTRIBUTIONS

A.1 *Reporting Procedures*

A.1.1 *Valuation reports*

A.1.1.1 The valuation report is the normal one required under disclosure, with additional MFR information. A percentage funding level on the MFR basis, quoted in a prescribed format, will generally be required, except that:

— if the level is over 120%, a statement to that effect is in order; or
— if the level is 105%-120%, a 5% band within which the MFR figure lies can be quoted (e.g. if the valuation shows 108%, at extreme 107.9% to 112.9% could satisfy the rules!).

A.1.1.2 If the funding level is below 100%, reasons would be required, along with a statement of the effect on the priority order. Where the funding level was previously above 100%, or below 100%, but not as far below as now disclosed, the trustees will have to produce an explanation which members have a right to see on request.

A.1.1.3 The existing statement for the trustees' report is modified to fit in with the MFR. The actuarial statement now covers future security only. The MFR statement deals with the accrued benefits position, and, surprisingly, is not included automatically in the annual report, although members do have a right to ask for it.

A.1.1.4 All these statements have to be in standard forms.

A.1.2 *Schedule of contributions*

A.1.2.1 Each valuation generates a contribution schedule. If the trustees and employer can agree, this may be the long-term agreed funding pattern, not necessarily the minimum required to achieve MFR. The distinction is as currently applied to Certificate As for contracting out purposes. If there is no agreement, then the contributions to be included in the schedule must be the minimum that the Scheme Actuary certifies as necessary to maintain or achieve the MFR.

A.1.2.2 The schedule must specify payments and due dates aimed at:

— maintaining the MFR for 5 years from the date of signing the new schedule if it results from a formal valuation, i.e. some way beyond the next valuation;
— reaching 90% after 1 year and 100% after 5 years, or such longer periods as are permitted under the transitional rules, if MFR not achieved; and
— making up any assessed shortfall evenly over the required period, or faster.

A.1.3 *Ongoing checks*

A.1.3.1 The annual MFR check simply says that the Schedule of Contributions is still adequate to maintain MFR, if MFR was covered at the last

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valuation, or to reach it within the specified time limits. The Scheme Actuary is required to consider the investment and salary experience since the previous valuation and anything he is told in consequence of an employer's or trustees' undertaking.

A.1.3.2 If the annual check shows that the current schedule is inadequate, the schedule has to be rewritten for the balance of the period over which the previous schedule was valid. If the actuary believes that the MFR funding level would be less than 90% (a minority of cases?), then a full valuation will be mandatory if this situation arises after April 2002. A full valuation leads to a fresh 5-year period to 100% (with potential for respreading of a deficit outstanding from the previous valuation); a schedule rewrite does not.

A.1.3.3 The same principles will ultimately apply if something else happens which leads to the impression that the MFR position has deteriorated, e.g. a substantial early retirement programme. Either a new contribution schedule is signed off within 6 months or a new valuation is needed. However, again, this provision will not come into effect until April 2002 — annual checks will be sufficient until then.

A.2 *Liability Calculations*

A.2.1 *Actives/deferreds*

A.2.1.1 The valuation has the following rules:

— for those not yet entitled to a deferred pension through shortness of service, the value of the cash refund and/or CEP due on leaving;
— for others, value the deferred pension accrued assuming immediate exit at the valuation date for a current active. This is to be valued payable from MFR pension age;
— 'MFR pension age' is the earliest age at which an unreduced deferred benefit is payable, ignoring, for this purpose, any sub-parts of the benefit payable early for equalisation or contracting out reasons;
— where there are uncertainties over equalisation, the actuary should ask the trustees for their interpretation;
— any as-of-right commutation should be allowed for if (and only if) this is more valuable than the pension alternative and the terms are fixed; Inland Revenue maximum commutation should be assumed to be 2.25 x pension;
— the same valuation principle should be applied to other options at MFR pension age; and
— money purchase benefits, including underpins and AVCs, are *included*, at market value.

A.2.1.2 The actuarial assumptions to be used are:

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Factor	Assumption
Inflation	4.0%
Investment return	9.0% in deferment 8.0% in payment
Loading for reducing investment return during 10 years to MFR pension age	Add 5% to liability if >10 years to MFR pension age, else add $0.5n\%$ where n is number of years to MFR pension age
Pre-retirement statutory revaluation 5% LPI — post-retirement 3% LPI — post-retirement (i.e. GMP post-88)	4.0% 3.5% 2.75%
Mortality — pre and post-retirement	PA90-2
Proportions married	80% (M)/70% (F)
Market value adjustment (MVA) >10 years to MFR pension age <10 years to MFR pension age	Multiply by: (4.25 / FT equity index yield) Interpolate between >10 years equity adjustment and adjustment for 100% investment in: { 15-year conventional gilt 15-year index-linked gilt cash — for lump sum (as appropriate)

A.2.1.3 The gilt MVAs should be valued by reference to the annualised published yields on the FT-Actuaries Fixed Index 15-year Medium Coupon Index or the Index-Linked over 5 years (5% inflation) Index, as appropriate. For example, if the published conventional yield is 8.70%, which annualises to 8.89%, the MVA is:

$$0.08 \times a_{\overline{15}|}@8.89\% + v^{15}@8.89\% = 92.8\%.$$

A.2.1.4 For index-linked, if the published yield is 3.56%, which annualises to 3.59%, the MVA is:

$$0.0385 \times a_{\overline{15}|}@3.59\% + v^{15}@3.59\% = 103.0\%.$$

A.2.1.5 If the scheme has a specific policy to match pensioners and/or deferreds with gilts, e.g. because it is closed, gilt yields and MVAs should be used. This only applies if the Statement of Investment Principles provides for gilt investment.

A.2.2 *Pensioners*

A.2.2.1 Liabilities for pensioners, and any others who could retire immediately without reduction, should normally be valued by reference to the 15-year medium coupon gilt yield at the effective date of valuation, PA90-2, and proportions married which are consistent with 80%(M)/70%(F) at age 60. No MVA is used.

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A.2.2.2 Index-linked liabilities should be valued by reference to the yield on IL gilts (over 5 years, 5% inflation) at the effective date of valuation. No MVA is used.

A.2.2.3 LPI liabilities should be worked out as the cheaper of 5% fixed and (full RPI less 0.5%).

A.2.2.4 A scheme with over £100m of pensioner liability and an investment policy which is to *not* to match pensioner liabilities with gilts *must* value any liabilities which are more than 12 years out by reference to:

Discount rate	10%
RPI	4.0%
LPI	3.5%
MVA	4.25/equity dividend yield

A.2.2.5 Remaining liabilities remain valued by reference to gilts; if this produces a figure of less than £100m for the gilt portion, the number of years is increased from 12 until the gilt figure equals £100m.

A.2.2.6 If the pensioner liability exceeds £100m, the scheme must use its own mortality for valuing pensioners, but not actives.

A.2.2.7 No explicit judgement is required on how pensioners would be dealt with on winding up, e.g. through a closed fund or annuity buyout — all expenses are dealt with via the global expense loading.

A.3 *Expenses*

A.3.1 An explicit expense allowance is added to cover the cost of winding up. This is intended to cover:

— general costs of organising wind up;
— costs for paying transfer values in respect of actives/deferreds; and
— annuity payment costs for pensioners.

A.3.2 These costs might emerge as the running costs of a closed fund or loadings in insurance annuities, as appropriate on size grounds, but the actuary does not have to consider which. The overall loading, applied to all active/deferred/pensioner liabilities is:

On first £50m	4%
On next £50m	3%
Thereafter	2%

A.3.3 Although it is not absolutely clear from the guidance, the specimen calculations indicate that this loading should also be added to the future service cost.

A.4 *Asset Valuations*

A.4.1 Assets must be based on audited accounts, or at least a net asset

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statement — no audited asset figure, no valuation. Contributions due, but unpaid at the valuation date, count, unless the trustees have reason to believe that they will not be paid. Current liabilities/assets must be considered.

A.4.2 Listed securities are generally taken at mid-market value, as shown in the accounts. Property, etc. is taken on a willing buyer/willing seller basis. There is a default of the value shown in the accounts where no other definition fits.

A.4.3 Insurance policies are generally taken at surrender value, so that, for example, any bulk surrender penalty potentially applying to a managed fund contract would need to be deducted. There are special considerations for insurance policies where an enhanced internal transfer could be used to settle liabilities.

A.4.4 Self-investment will generally count to begin with, provided it is permissible under the other provisions of the Pensions Act 1995. From April 2002, self-investment above 5% which is retained by transitional concession, e.g. property, will not count.

A.4.5 For the purposes of adjusting asset values over time, the market value adjustments (MVAs) used for the liabilities may be adopted, on the basis that:

— overseas equities count as U.K. equities;
— property counts as U.K. equities;
— overseas bonds count as U.K. gilts;
— cash counts as cash;
— insurance policies count as cash, gilts or equities, according to the surrender value basis; and
— the actuary has discretion over any other classes.

A.5 *Smoothing*

A.5.1 There is no requirement or provision for smoothing the asset and liability calculations as far as the calculation of the MFR position goes. The MFR position, at any time, is calculated using market conditions 'on the day'. However, the basis for minimum contributions is more complex — see below.

A.5.2 Contributions and corrections are generally based on conditions when reports are signed, so there is some scope for short-term market crises to be dealt with by selective choice of signature date, subject to the trustees considering this reasonable.

A.6 *Annual Checks*

These can be based on approximate calculations to the extent that the actuary considers professional. The actuary must state on his certificate which 'relevant changes' — material developments since the valuation — he has taken into account. The following must be taken into account:

— anything which the actuary has been made aware of by any route, noting that the employer and trustees will be completing undertakings to report unusual events;
— actual contributions paid;

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— investment policy developments and index movements; and
— scheme-specific investment, salary and pension increase experience 'if known'.

A.7 *Contribution Calculations*

A.7.1 *Basic principles*

A.7.1.1 The contribution schedule is supposed to be the long-term agreed funding pattern, not the minimum required to achieve MFR.

A.7.1.2 The actuary will certify that the schedule maintains/achieves MFR "in my opinion in accordance with the Act and as prescribed in the professional guidance" — this means that the actuary can certify, based on the criteria in the rules, even if he thinks that it is quite likely that the MFR will be failed during the period. The actuary may wish to point out any residual concerns to the client (in this instance the trustees) for professional reasons, but the employer will be at liberty to ignore the point, as the contribution rates that the actuary is able to certify are the maximum (and minimum, see below) that can be imposed under the legislation without agreement.

A.7.2 *Minimum contributions*

A.7.2.1 The actuary has to check that the contributions exceed the defined bare minimum. The bare minimum is the default if the employer and trustees cannot agree.

A.7.2.2 The bare minimum must ensure either:
— the funding level exceeds 100% throughout its period; or
— the funding level gets to 100% by the end of the period, but not necessarily at any point *en route.*

A.7.2.3 The certificate wording depends on this choice, which is made on the actual market-related MFR position at signing the certificate. If the test is passed at that time, the stronger wording, requiring at least a 100% MFR funding level throughout, applies. The actuary needs to consider specific events between the valuation date and the signing date, as described below.

A.7.2.4 In working out the minimum (whichever certificate wording applies), allowance must be made for:
— service accrual during the period of the schedule;
— salary increases at 2% above RPI;
— expenses of operation; and
— markets to return to long-term normal yields (4.25% equity/8% gilt) if, and only if, the surplus would be lower/deficit bigger if this change occurred overnight; otherwise market conditions should be assumed to stay at the level taken into the calculation.

A.7.2.5 The test of overnight market movement is based on the change in the

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monetary amount of surplus/deficit — in some circumstances the percentage funding level might go the other way.

A.7.2.6 If the MFR is met exactly, the minimum contributions (the 'MFR Regular Cost') are the amounts required to cover early leaver benefits in 5 years' time, expressed as a percentage of payroll, i.e. the method is broadly a current unit valuation with a 5-year control period. The contribution does not actually have to be a constant percentage throughout the 5 years, provided that the benefit accrual is fully covered year-on-year. If the scheme satisfies the MFR test when the schedule is signed, it is necessary to check whether shorter control periods produce higher rates, and use these if necessary. This ensures that the test is met continuously if the assumptions are borne out, for example where a senior executive with a high accrual rate is retiring from a small scheme in 2 years.

A.7.2.7 The guidance is silent, and hence gives freedom, on the inclusion or otherwise of new entrants and withdrawals in the current unit calculation. It should be noted that, for some schemes, the current unit normal cost will exceed the projected unit normal cost, although the past service MFR liabilities are lower than the ongoing. This happens for schemes with high average ages or past service liabilities through the effect of funding the difference between statutory early leaver revaluation and earnings inflation as the earnings inflation occurs.

A.7.2.8 The precise shortfall or surplus is calculated as at the signature date of the schedule, *not* the valuation date. It is necessary to:

— take the MFR deficit (surplus) at the valuation date on the notional, i.e. long-term, MFR basis;
— add additional liability accrual since the valuation, measured by multiplying the normal cost by salaries and adding any augmentations, etc., all discounted at 9% to the valuation date;
— deduct the value of contributions paid since the valuation date, discounted at 9%;
— adjust for any extraordinary investment profits or losses, e.g. on sale of property — normal market variations in equities and bonds can be ignored; and
— recalculate the MFR position using current MVAs, allowing for any specific change in investment strategy.

A.7.2.9 This calculation determines the certificate wording (see ¶A.7.2.3) and also the spreading adjustment. The surplus/deficit is spread forward following the principles that:

— a surplus can be spread in any convenient way;
— any significant shortfall must be spread either as a constant cash amount or a constant percentage of pay; and
— the less favourable of the smoothed and current conditions results is used.

A.7.2.10 A surplus is a credit at the signature date, i.e. a contribution holiday can apply until the MFR surplus is exhausted.

A.7.2.11 A deficit can be paid off in any way, e.g. on the last day of the

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schedule period, if the funding level at the *valuation* date exceeded 98%. This does not, however, apply to any deficit arising only from the notional position being poorer than the market position.

A.7.2.12 Any other deficit of over 2% must be spread uniformly, either as a fixed amount or as a percentage of pay. In practice, annual payment in arrears, on the anniversary of the signing date, can be assumed.

A.7.2.13 Provided that they are greater than the minimum, contributions can be in any convenient form, and have any desired frequency of payment. The test must be done by comparing the value of the chosen contributions with the minimum over periods of 1,2,3,4 and 5 complete years from the signature date. If the schedule period is covered by transitional rules, this would be extended to cover subsequent exact year periods and the total period to 5 April 2007.

A.7.2.14 Since the minimum depends on market variations right up to date of signature, a calculation will be out of date before it reaches the client. Hence, some margins may be necessary anyway. This will be more true if the proposed contribution pattern is complicated, and hence affected by the requirement to consider each year's worth of contributions in isolation. It will obviously be easier if, as at the time of writing (November 1996), the notional MFR result gives the lower surplus/higher deficit, and this is not expected to change. Even so, proposals on minimum payments will still need 'health warnings' about the possibility of market movements reversing the notional/market comparison, and hence increasing the required contributions.

A.7.2.15 It will be noted that the framework does not guarantee an extension to 2007 for all schemes which show a deficit during the first MFR exercise. If the scheme was in surplus at the valuation date, but then goes into deficit by the time of signature, the correction period is the strict 5 years. Residual deficits at subsequent valuations may be respread.

A.7.2.16 The control period for the MFR regular cost is affected by the past service MFR position, since it is lengthened from 5 years to the balance of the period to April 2007, where the contribution schedule is so lengthened.

A.7.3 *Contribution frequency/payment dates*

The MFR does not precisely specify the frequency of contributions, but the following points must be observed:

— each contribution must have a due date, which will be used for the actuary's calculations, and at which point the payment becomes a debt due from the employer;

— because the contribution schedule must be tested by separately comparing the contributions due over 1,2,3,4,5,... years from the signing date, it is quite hard to make a recommendation if contributions are not due monthly and the signing date is unknown, because the year into which a key contribution might fall is uncertain;

— the MFR Regular Cost must be payable at least annually — if payable annually in arrears the appropriate discounting should be applied; and

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— any days of grace may have to be justifiable on administrative grounds.

A.8 *Situations where Funding falls below 90%*

A.8.1 The rules on the actual contributions required are particularly complicated, because the element up to 90% and the excess are dealt with separately. The principles are that:

— the shortfall to 90% is based on market conditions, unsmoothed, as at the *valuation* date; this precise amount is payable without adjustment for interest, timing, market movements, etc.;
— the rest of the contribution schedule is based, as usual, on the poorer of the smoothed and unsmoothed position at *signature* date, with the total contributions allowing for timing adding up to the shortfall; and
— payment of the shortfall to 90% must be integrated with the overall contribution rates in such a way that the overall contribution rate, either as a percentage of pay or cash, is constant or decreasing over the schedule period.

A.8.2 It would appear that the shortfall is deemed to be paid off if the measured amount is contributed, regardless of further accrual in the intervening period.

A.9 *Sources*

A.9.1 The formal definition of the MFR requirements is scattered around a number of documents, which we have endeavoured to summarise. Key sources are:

— Pensions Act 1995 (c26) Sections 56-61 — HMSO;
— Occupational Pension Schemes (Minimum Funding Requirement and Actuarial Valuations) Regulations 1996 SI 1996/1536 — HMSO;
— GN27: Retirement Benefit Schemes — Minimum Funding Requirement — Practice Standard actuarial guidance version 1.0 — Institute/Faculty July 1996; and
— Specimen and Example Calculations for the Minimum Funding Requirement and Schedule of Contributions — Institute/Faculty July 1996.

A.9.2 These were the relevant documents at the time of writing the paper. Amendments have been made between the time of writing and the time of final printing, but none of these amendments are crucial.

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APPENDIX B

STABILITY OF PROJECTED UNIT METHOD

B.1 Consider a scheme where the accrued liabilities equal 10 years' normal contributions and the future working lifetime is 15 years. Taking existing and future liabilities for current members together, 40% lie in the past and 60% in the future. A 10% past service surplus/deficit means a change of 6.7% in future contributions — say +/−1% on future normal costs of 15%; possibly a modest change, and the reason that the aggregate method served a generation of actuaries well. Even if the employee cost is a fixed 5%, the change in the employer cost is still only +/−10%.

B.2 However, most schemes are no longer like this. Accrued liabilities of 40 years' normal contributions (20 years' pensioners and the rest split deferred/active) are routine. For this scheme, the split is 73% past/27% future. A 10% reduction in past service funding is equivalent to an increase of 27% in the future funding required, equivalent to a 40% increase in the employer's share. Given that a 10% surplus/deficit can arise routinely, e.g. on two years' dividend non-growth, it is not surprising that we tend to lose control of the funding. The problem is that, for a mature scheme like this, the investment return arising each year is typically 3.6 years' normal cost, and any experience differences will render our attempts to fiddle with contributions worthless.

B.3 Moreover, employers often do not seem to thank actuaries for their emphasis on the long-term nature of funding. With the expected average remaining service life of the finance director at 3 years, the 3-year contribution holiday will win over the 10-year reduction almost every time (if not necessarily the reverse). This is not just cynicism by finance directors; the requirement for business performance generally has been over short terms due to market pressures, and this is a reality that we cannot expect to 'educate' our clients away from. Lewin *et al.* (1995) provide the theoretical background to this in their review of capital projects and hurdle rates.

B.4 The employer attitude that "I'll have the holiday — you're only being cautious" has the advantage of being right on typical 'slightly prudent best estimate' assumptions. This does not mean that margins are inappropriate, but we have failed to define the margins that we have and how they relate to the risks. One is reminded of the death of the once-popular use of an artificially low interest rate to allow for discretionary increases — this failed because it did not target the margins required accurately. The same might be said of the net premium life company valuation.

B.5 Any review of historical experience suggests that, if actuaries have achieved stable contribution rates with mature schemes, this has been done by varying the benefits or the actuarial assumptions. Such practice is perfectly legitimate, but it is wrong to attribute stability to the original basis.

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APPENDIX C

INTELLECTUAL PURITY

C.1 A desirable aim for a new theory would be a set of concepts whereby the funding policy arising from a given set of circumstances could be broken down into separate user-friendly components. This is easier on the client and the actuary. Such methods usually require an intellectually sound proof of the standard behaviours, for example by proving that, if the assumptions are borne out, the ultimate funding level will be 100%.

C.2 However, it may be an unnecessary luxury to require this of a composite methodology. Provided that the likely outcome over 10 years is in a sensible range, proof of exact delivery may be of academic interest only. There must be an argument that a methodology which can produce a perfect outcome, but only in a hypothetical 'all assumptions borne out' situation, is less useful than one which has an uncertain long-term outcome, but allows the stakeholders to assess the likelihood that they will deliver the scheme in good order at the end of their tenure.

C.3 Stakeholders, in this context, are trustees, members, employers and actuaries. In practice, the likelihood must be that the position in 10 years' time will be very different anyway, and the perfect 50-year projection will be correspondingly academic.

C.4 There would seem to be a parallel with running a nuclear power station — when and how it will finally be taken down is an unknown, and the next best thing is simply to run it as effectively as possible over the next 5 years and build up a decommissioning fund which is believed to be of the right order. Actuaries have a good role in setting the boundaries of future experience, but not in claiming possession of a perfect crystal ball.

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APPENDIX D

EXAMPLES OF PLANNED MARGINS

Example D.1

D.1.1 Take the risk elements described in Section 5 for a 100 life 100% active scheme with 20% of liabilities gilt-matched and a 100% equity investment strategy. The risks are:

	Risk margin needed	Expected strain
Investment	16.0% (10% x 0.8 + 40% x 0.2)	–8.2% –(7% x 0.8 + 13% x 0.2)
Salary	10.0%	9.0%
Early retirement	3.3%	1.0%
Death	5.0%	nil
Totals	19.8%*	1.8%
Aggregate margin	21.6% (19.8% + 1.8%)	

*square root of (sum of squares)

D.1.2 The target is the 'standard' MFR calculation projected forward 6 years plus a 22% (rounded) margin. This figure feels quite high, but it is mainly because of the expectation that salaries will be systematically higher than National Average Earnings (NAE).

Example D.2

D.2.1 Take Example D.1, but with all salaries expected to go up in line with NAE only, and no early retirements expected. The risks are:

	Risk margin needed	Expected strain
Investment	16.0% (10% x 0.8 + 40% x 0.2)	–8.2% –(7% x 0.8 + 13% x 0.2)
Salary	10.0%	nil
Early retirement	3.3%	nil
Death	5.0%	nil
Totals	19.8%	–8.2%
Aggregate margin	11.6%	

D.2.2 The rounded target is now 112%.

Example D.3

D.3.1 An alternative might be a 1,000 life scheme with salary expectations in line with NAE, apart from 20% of members receiving 10% promotional increments and no liabilities within 10 years of NPA. There are 100% equity assets. The same table would give:

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	Risk margin needed	Expected strain
Investment	10.0%	−7.0%
Salary	10.0%	2.0%
Early retirement	3.3%	1.0%
Death	negligible	nil
Totals	14.5%	−4.0%
Aggregate margin	10.5%	

D.3.2 A net target of 111% would be appropriate here. If the client wished to be aggressive, then 103% would be a logical target, covering a 1 standard deviation rather than a 2 standard deviation event, i.e. a 1-in-6 instead of 1-in-40 chance.

Example D.4

D.4.1 Consider a 100 pensioner closed scheme with 50/50 GMP and LPI liabilities, invested 50/50 in fixed and IL gilts of suitable term. As at present, the MFR liability is based on (IL gilt yield + 0.5%).

	Risk margin needed	Expected strain
IL gilt match imperfection	2.5% (50% x 5%)	nil
Death	5%	nil
Totals	5.6%	nil
Aggregate margin	5.6%	

D.4.2 So, it would be prudent to run this scheme with a 106% funding target if the opportunity existed; another way of looking at this would be that distribution of surplus should not be allowed to reduce the funding level below 106%.

Example D.5

D.5.1 This is a real scheme with the following characteristics:

	Members	Liability	Split
Actives	500	£25m	£20m equity/£5m gilt
Deferreds	300	£5m	£4m equity/£1m gilt
Pensioners	300	£10m	
Assets	85% equity/15% gilt		

Fixed 3% pension increases
Salary expectations in line with NAE
Salary 3-year average of basic — +/−5% sufficient

Early retirement, as example D.1, for actives only.

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	Risk margin needed	Expected strain
Investment	16.0% (10% x 0.6 + 40% x 0.25)	–7.5% (7% x 0.6 + 13% x 0.25)
Salary	2.5% (5.0% x 0.5)	nil
Early retirement	1.7% (3.3% x 0.5)	0.5% (1.0% x 0.5)
Death — actives	1.5% (3.0% x 0.5)	nil
Death — pensioners	1.6% (4.0% x 0.4)	nil
Totals	16.4%	-7.0%
Aggregate margin	9.4%	

D.5.2 The suggested target is 109%, or 101% for an 'aggressive' 1 standard deviation client.

D.5.3 An alternative approach for an employer seeking to retain some risk himself might be to acknowledge acceptance of a 1-in-40 risk of the MFR level deteriorating to 95%, with a resulting target of 104%.

Example D.6

D.6.1 This is the same as example D.5, with the actives removed. It is operating as a closed fund; investment is now 50/50 equity/gilt.

	Risk margin needed	Expected strain
Investment	11.9% (10% x 0.27 + 40% x 0.23)	–4.9% (7% x 0.27 + 13% x 0.23)
Salary	nil	nil
Early retirement	nil	nil
Death — deferreds	nil	nil
Death — pensioners	2.7% (4.0% x 0.67)	nil
Totals	12.2%	–4.9%
Aggregate margin	7.3%	

D.6.2 The suggested target is 107%; this client has no business being aggressive! However, the target would go down to 103% if the investment strategy was matched.

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APPENDIX E

MODEL SCHEME USED IN SECTION 6

E.1 *General Data*

E.1.1 The comparison of projected unit and MFR results described in Section 6 was based on the following scheme.

Origin	genuine 112 member scheme, scaled up by factor of 10
Basic benefits	1/60 final salary
MFR pension age	65
Contracting out basis	contracted out GMP past/Reference Scheme future
Early leavers	revaluation 6.25% GMP/5% LPI excess
Pension increases	5% LPI or 3% fixed on non-GMP 3% on post88 GMP
Discretionary benefits	none
Early retirements	none
Member contributions	5% of pay
Pensionable salaries	£18.3m

E.1.2 The scheme data were manipulated to analyse particular features of the results. This led to 3 individual schemes with different maturity and pension increase characteristics.

E.1.3 Maturity was chosen on the basis of a pensioner liability of approximately 15%, or 45% calculated on the 9/7 ongoing liability. The object was to represent a range of situations found in practice — clearly higher maturities are also found. Maturity measured in an MFR sense of the amount of liability measured by reference to gilt-edged yields was 40% and 66% respectively.

E.1.4 The existing valuation bases adopted had the following key features:

Investment return	i	9.0	8.5	10.0
Salary growth	s	7.0	7.5	8.0
Pensions — 5% LPI	p	4.5	4.5	4.5
Dividend growth	g	4.5	4.0	5.5

E.1.5 The existing asset valuation technique is assumed to be based on the following formula:

$$\text{Actuarial value} = \text{Market value} \times \text{Market yield} / \log((1+i)/(1+g)).$$

The 'norm yield' at which actuarial value equals market value is thus approximately 4.22% in each case.

E.1.6 Investments were assumed to be 85% equity/15% conventional gilt, with the equity portfolio split 2:1 U.K./overseas.

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E.2 *Individual Scheme Data*

E.2.1 *Immature/LPI scheme*

E.2.1.1 *Liability data*

	Notional MFR results		Projected unit results		
	£m	%	9/7	8.5/7.5	10/8
Actives £m	26.36	76	33.75	40.06	30.89
Deferreds £m	1.78	6	1.68	1.94	1.27
Pensioners £m	6.37	18	6.07	6.34	5.60
Total £m	34.51		41.50	48.34	37.76
Normal cost	14.5%		14.7%	17.8%	13.5%
Normal cost first year £m	2.65		2.69	3.26	2.47

E.2.1.2 *Mismatch position*

	Asset	Liability	Mismatch
Equity	85%	60%	25%
Conventional gilt	15%	20%	5%
IL gilt	0%	20%	20%

E.2.1.3 *Analysis*

	Margin needed	Expected strain
Investment	16.0% (10% x 0.60 + 40% x 0.25)	−7.5% − (7% x 0.60 + 13% x 0.25)
Salary	3.8% (5.0% x 0.76)	nil
Early retirement	nil	nil
Death — actives/deferreds	1.6% (2.0% x 0.82)	nil
Death — pensioners	0.9% (5.0% x 0.18)	nil
Totals	16.5%	−7.5%

E.2.1.4 *Result*

So, a margin of 9% (16.5% − 7.5% rounded) is appropriate.

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E.2.2 *Mature/LPI scheme*

E.2.2.1 *Liability data*

	Notional MFR results		Projected unit results		
	£m	%	9/7	8.5/7.5	10/8
Actives £m	26.36	45	33.75	40.06	30.89
Deferreds £m	1.78	3	1.68	1.94	1.27
Pensioners £m	30.80	52	29.35	30.64	27.04
Total £m	58.94		64.78	72.64	59.20
Normal cost	14.5%		14.7%	17.8%	13.5%
Normal cost first year £m	2.65		2.69	3.26	2.47

E.2.2.2 *Mismatch position*

	Asset	Liability	Mismatch
Equity	85%	34%	–51%
Conventional gilt	15%	33%	18%
IL gilt	0%	33%	33%

E.2.2.3 *Analysis*

	Margin needed	Expected strain
Investment	23.8% (10% x 0.34 + 40% x 0.51)	–9.0% (7% x 0.34 + 13% x 0.51)
Salary	2.3% (5.0% x 0.45)	nil
Early retirement	nil	nil
Death — actives/deferreds	1.0% (2.0% x 0.48)	nil
Death — pensioners	1.0% (2.0% x 0.52)	nil
Totals	24.0%	–9.0%

E.2.2.4 *Result*

So, a margin of 15% (24.0% – 9.0% rounded) is appropriate.

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E.2.3 *Mature/fixed increase scheme*

E.2.3.1 *Liability data*

	Notional MFR results		Projected unit results		
	£m	%	9/7	8.5/7.5	10/8
Actives £m	24.83	45	30.54	36.14	28.10
Deferreds £m	1.73	3	1.53	1.76	1.17
Pensioners £m	29.33	52	26.24	27.32	24.30
Total £m	55.89		58.31	65.22	53.57
Normal cost	14.3%		14.7%	17.8%	13.5%
Normal cost first year £m	2.62		2.69	3.26	2.47

E.2.3.2 *Mismatch position*

	Asset	Liability	Mismatch
Equity	85%	34%	–51%
Conventional gilt	15%	33%	18%
IL gilt	0%	33%	33%

E.2.3.3 *Analysis*

	Margin needed	Expected strain
Investment	23.8% (10% x 0.34 + 40% x 0.51)	–9.0% (7% x 0.34 + 13% x 0.51)
Salary	2.3% (5.0% x 0.45)	nil
Early retirement	nil	nil
Death — actives/deferreds	1.0% (2.0% x 0.48)	nil
Death — pensioners	1.0% (2.0% x 0.52)	nil
Totals	24.0%	–9.0%

E.2.3.4 *Result*

So, a margin of 15% (24.0% – 9.0% rounded) is appropriate.

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ABSTRACT OF THE DISCUSSION

HELD BY THE INSTITUTE OF ACTUARIES

Mr T. W. Keogh, F.F.A. (introducing the paper): I find it sad that this Hall is full for a discussion on the implications of a statutory basis for pension scheme funding. Some might argue that this represents a bad moment for the actuarial profession. We have had self regulation for some time, and now the Government has concluded that self regulation in this area has failed, and the result is a statutory minimum. Moreover, the inevitable 'horse-trading' surrounding the definition of this minimum leaves a standard of monumental complexity, riddled with logical flaws and practical difficulties.

Our paper does not attempt to argue the rights and wrongs of the MFR basis, but merely what we do now that it is with us. Our clients will expect us to address it positively and effectively.

In starting to look at this, three options presented themselves. The first is to do nothing, since most current funding bases are more stringent than the MFR appears to be. However, we are not convinced that this is the point. The MFR tends to sneak up when you do not expect it, and continuing with current approaches, whilst constantly looking over one's shoulder does not appeal. The second is to make the minimum into the norm; that we advise our clients to target the MFR, without any margin, as a suitable funding target for their schemes. We have three objections to this — covering both practical and philosophical considerations. The practical objection is that, as soon as you accept that, in the real world, the processes of calculation, discussion and signature are not simultaneous, then it is almost impossible to work out the minimum legal contribution within the meaning of the Pensions Act. A more substantial objection is that payment of the statutory minimum in a no-surplus situation is likely to deliver subsequent failure of the MFR test many times in future. This has potentially serious consequences for employers, not least the possible loss of contracted-out status, even if contributions are increased. Our fundamental point is that if employers and trustees are prepared to own these risks, all well and good, but we doubt whether this will be the case for most of them. Moreover, for those trustees who have the duty of contribution setting in their deeds, we doubt whether the MFR minimum is consistent with their duties under the Act.

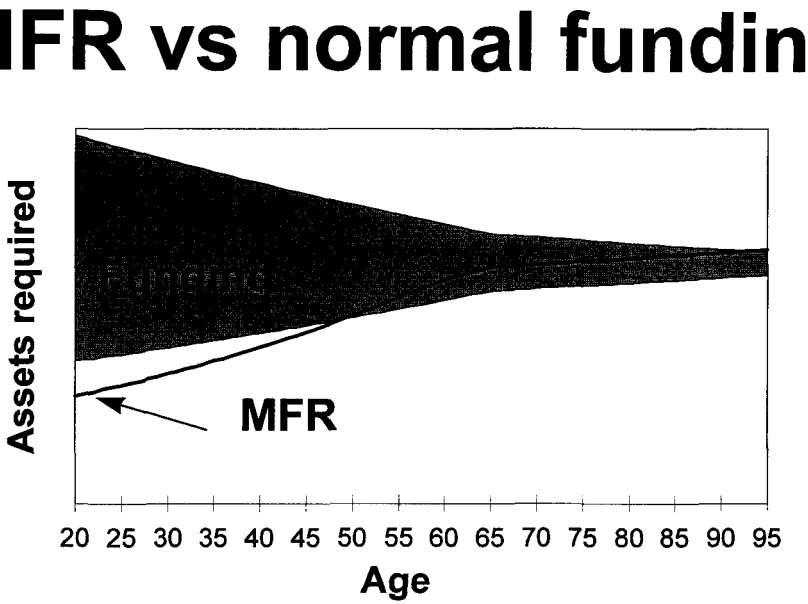
This led us, inevitably, to consider funding on the basis of explicit risk margins above the MFR. A major driver for this is the fact that the MFR is a different 'shape' from a traditional funding target, as can be seen in the figure on page 551; and there is, of course, a range of traditional funding targets, given the actuarial propensity to disagree. However, it is usually found that at younger ages the MFR target is lower, but this is not the same for pensioners, where a real return assumption above the return achievable on index gilts is often found. So, the impact of the MFR is very age dependent, with schemes with older average ages most affected. This age maturity is often compounded by a bigger gearing effect driven by scheme size relative to company size, producing a double 'whammy'.

Thus, in that situation, a method based on the MFR plus planned margin will give the most efficient mechanism for the future for those employers seeking to minimise contributions whilst demonstrating prudent management, given this difference of shape. We should say that contribution minimisation seems a legitimate technique when the Act has failed to give employers, automatically, the same rights to surplus as they have obligations relative to deficits.

It is this principle of risk margin which we wish to establish as a basis for the funding of final salary schemes, and hence decisions on surplus, benefit improvements and, possibly, accounting. The choice of the margin itself depends upon assumptions as to the variability of future events, and it is not our absolute brief to offer more than a hint as to what these parameters might be. Different actuaries may have different professional views as to what the appropriate margin should be. In the context of different client requirements and concerns, that is fine. Indeed, even with a common set of parameters, the resulting percentage margins will differ by client.

However, we think that a theory for liability risks is important, given that most work to date has

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focused on asset risks on the assumption of well-behaved liabilities. Liabilities are not always that well behaved, and their variability is particularly important if the assets are 'tamed'.

We seek to establish a framework for assembling margins for asset and liability risks and communicating the results to the outside world. This we have done with some normal distribution arithmetic. However, the mathematics does not represent the most important part of what we have to say. Communication is a much more important part of the task, because we seek a fundamental change in the nature of the advice given to the majority of schemes.

At present this is largely in terms of point estimates of future outcomes. There are margins implicit in the assumptions, but there is little or no discussion with the client about how large these margins are and whether there will be enough, and hence no clear division of ownership of the margins between the actuary and the other stakeholders. This may be fine when a deficit leads to a soft landing, but inadequate when the regulatory system sets a hard floor. Moreover, where risk has been analysed and used, it has often been via asset/liability modelling in the context of longer time frames well beyond the period until the next MFR valuation. As the pace of corporate change increases, taking scheme demographics with it, we doubt the value of much of the longer-term work other than for schemes which are exceedingly mature.

In addition, we need to accept the MFR as an inevitable benchmark of the funding strength of a scheme, regardless of any technical weakness that we might identify, just as the DTI Returns are used as an insurance company standard, even without a common basis.

As a profession, we may have forgotten that the analysis of risk represents our unique selling proposition, not the ability to do discounted cash flow calculations. In drawing up these remarks, we were struck by a number of comments in the debate on the paper, just 12 months ago, on 'The Future of the Profession' (*B.A.J.* **2**, 398-428). Again and again there was concern that actuaries responsible for pension funds regarded risk modelling as not being for them. This has arisen because most pensions actuaries have been able to dispatch risk analysis into the 'too-hard' box in favour of general management of schemes and the legal niceties of their operation. We do this at our peril — by focusing purely on valuations as a single point calculation exercise, which can be reduced to a

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commodity, we are in danger of losing our ability to contribute when our ability to add value has never been higher.

However, if we want to introduce more risk analysis into our valuations, then this does not give us the right to impose complex bespoke modelling on the thousands of medium-size and small schemes that need our advice. For them the risk analysis must be packaged, albeit at the cost of some loss of precision. Many smaller schemes will be happy to accept that loss of precision for small fees or no fees, and adopt a more conservative benchmark. Somewhere in between there has to be a relatively straightforward technique that does address the risks that the MFR brings and addresses the other regulatory calculations. It seems to us that, as a profession, we ought to lead developments in the direction of consistent approaches, not just for the MFR, but for the Inland Revenue and for accounting purposes. The absolute measures might be different, but they should behave in a consistent way so that they are easy to explain to clients. If larger schemes seek more specific work, well and good. By the same token, if more conservative funding is found attractive and ensures an MFR pass across the board, well and good.

However, there must be something more basic, and it should be sufficient to address all regulatory needs, Inland Revenue and corporate accounting included. That points to a need for consistent regulation as well as advice. It is that basic ground that we seek to address.

Mr A. F. Wilson, F.I.A. (opening the discussion): In Section 2 the authors begin by giving a short history of United Kingdom pension funding, and I have some problems with their version of events. This is probably due to one's perspective being coloured by one's own experience. For example, I believe that the move to projected unit method in the 1980s was a natural one from previous funding methods as schemes matured and economic conditions changed. I do not think that it was driven by the business environment. Nor do I believe that the problems referred to at the end of ¶2.9 arose in the 1980s, nor for the reasons that the authors give. They arose subsequently from the reduction in interest rates in the early 1990s, coupled with the collapse of the insurance market for deferred annuities. I mention this because it is important to realise that many of the statements made in the paper are subjective, and should not be taken by future readers as necessarily the agreed viewpoint.

Section 4, setting out the stakeholders' perspectives, leads to the crux of the paper. In Section 4.1 the authors set out their understanding of the trustees' responsibility. It is here that I first take serious issue with them.

A trustee's duties and responsibilities, under any trust, are simply to operate the trust in accordance with the Trust Deed, subject to the requirements of legislation. Pension fund trustees are no different, and any attempt to go further is inherently dangerous. For example, in ¶4.1.2 the authors contend that, from the trustee's perspective, security ought to be all; but this would suggest that surpluses which arose should simply be retained in the fund to add to security and not be used to give discretionary increases to pensioners nor be applied to reduce company contributions. Given the suggestions, later in the paper, effectively to fund for surpluses, this seems totally unreasonable. Security *is* important, but the trustees must also have regard for the reasonable aspirations of all the beneficiaries of the scheme, including the employer, without whose goodwill the aspirations of at least the younger members could be jeopardised.

The authors are right to state that the trustees have a duty to maintain the MFR through a schedule of contributions, and, if there is disagreement with the employers, the trustees have the responsibility of setting an adequate contribution. However, the wording adopted in the Act for them is identical with the wording for actuaries as set out in ¶4.1.4. Unless they are actuaries, the trustees are not competent to judge what is adequate, and must rely on the advice of the Scheme Actuary. If the trustees and the employer cannot agree on a contribution rate, it seems likely that the employer will request his actuary to advise what the minimum contribution rate should be. This implies a contribution rate which takes into account none of the margins that the authors introduce under Sections 5 and 6. I conclude that the advice of the Scheme Actuary cannot take these margins into account. The important question is whether existing scheme rules, which place the contribution rates in the hands of the trustees, are over-ridden by the Act. That is open for debate. I believe that there is a strong case for suggesting that, even if the Trust Deed says that the trustees must do more, the

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company can say, "You only have to do what is in the Act, and you must do what is in the Act". My reading of the Act, which the authors seem to concede in ¶6.3.1, is that the trustees' responsibility is limited to the mechanical act of ensuring, through the Scheme Actuary, that the schedule of contributions is at least the minimum required. I suggest that trustees will be playing a dangerous game if they try to insist on a higher contribution.

Where the trustees do have power is in how the scheme invests. If they are worried that an employer will try to fund at the minimum level possible, such that there is a danger of under funding, they could decide to be much more cautious in how they invest, and, through the threat of low returns, cause the employer to reconsider. Obviously they would wish to avoid getting into an adversarial position with the employer, which is potentially dangerous.

The need of the trustees to consider investment strategy leads directly to the idea that the trustees should seek to understand the risks which are involved in adopting a minimum contribution. This leads to Section 5, which describes a methodology for establishing the risks inherent in a defined benefit pension scheme. These fall into two categories — investment and demographic.

As far as the investment elements are concerned, the inherent volatility has been badly under-estimated. Historical analysis, the Wilkie model and many other models all lead to much higher deviations in both the gilt/equity risk and in the dividend growth risk. However, the decision has been made to ignore the possibility of manager under-performance. The CAPS reviews of balanced managers have consistently shown that the distributions of returns achieved by managers are consistent with a normal distribution with a standard deviation of approximately 1% p.a., almost regardless of the period reviewed, providing that it is at least 5 years. This, of itself, would suggest that, at the two standard deviation level, 12% should be added from this source alone.

The disagreement between actuaries about the size of investment risk indicates such a level of subjectivity about such risk, and so little is added to the standard deviation from the demographic elements that it makes detailed analysis of them unnecessary, as the authors conclude in ¶5.18.4. In these circumstances, I question the need for a stochastic approach to the demographic elements, and would much prefer to see it replaced by scenario testing — which has much more meaning, especially to clients, with whom control of many of these risks lies. As an example, the effect of an abnormal number of early retirements is often worth testing. The employer may well have a view as to how many retirements might occur early, but may not wish that view to be shared with the trustees, who could, nevertheless, be appraised of the effect through scenario testing.

The authors use the criterion of two standard deviations away from the normal, which implies a probability of 2½%, given that a one-sided risk is used. That is much too fierce. From what I have seen of presenting results of asset/liability modelling for clients, anything less than a one-in-ten chance is regarded as too small to be worrisome.

Furthermore, if the risks are being presented, it is not only the downside risk which needs to be covered. In most cases the suggestions made by the authors for the amount of contributions to be paid over the next six years may lead to a position after that period where the scheme is 'in orbit', and no further contributions will be required. In a number of the cases suggested, that will happen more often than not. That, of itself, could lead to difficult problems. I suggest that it is wrong to put forward suggestions to clients which show one side of the coin without the other.

Whilst it is undoubtedly desirable to understand the risks being taken, I am unhappy about the implications that valuations in the future may be restricted to MFR valuations, with a margin added derived from the stochastic process. The MFR is no more than a fuzzy snapshot at a given point in time. There are grave dangers if these snapshots are used to replace the long-term approach hitherto normally adopted by actuaries. This is most clearly seen by considering two schemes, both of which allow members to retire at any time between ages 60 and 65 without reduction in accrued pension. The only difference between the two is that in the one scheme, say scheme A, retirement requires the consent of the company, (which is never unreasonably withheld), whereas in the other no consent is required. Preserved pensions under scheme A are payable from age 65, whereas those from scheme B are payable from 60. With a loyal workforce this difference may be slight, but the MFR requirements for active members will differ by 40%. With Scheme A an MFR of 100 gives a totally inadequate measure of the long-term liability, and the employer could be taking extreme risks even

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by funding as low as 120. On the other hand, an MFR for scheme B of 100 may prove cautious, because some employees will stay in service beyond age 60. I doubt that the methods proposed by the authors, of simply looking at the next 6 years, would adequately allow for these fundamental differences.

The MFR, by itself, is often a bad test of how well a scheme is funded, and league tables of schemes, by reference to their MFR funding level, will be misleading. Furthermore, for any reasonably mature scheme the minimum contribution under the MFR, with the sort of margin which the authors propose, would be nil, and accurate calculations of the MFR will not be necessary. I see no good reason for moving from previous funding methods simply because there is an MFR hurdle to be met. This is not to say that a test of volatility should not be made, but, given that the only volatility which needs testing through stochastic method calculations is the investment volatility, that can be done quite adequately using the long-term funding position to work out what risks are being taken.

I am reinforced in these views when considering the question of expensing. In Section 9 the authors discuss the impact of the MFR on SSAP24. In ¶9.2 they mention pressures towards a common practice for accounting for pensions internationally, and it is difficult to see why the MFR, of itself, would be sufficient to alter international methods; indeed, I do not see it as sufficient to overturn normal accounting practices in the U.K. Nevertheless, I welcome the authors' division between funding and expensing, which is something that we are seeing more companies practise. When SSAP24 was first introduced the two were usually regarded as the same, with the funding base used for expensing. We are gradually moving away from that position, and the introduction of international standards will accelerate the trend, although I feel that SSAP24 should recognise the requirement placed upon the funding of schemes. I am concerned that current practices are deficient in placing amounts on balance sheets which do not reflect money that could readily be realisable by the company.

I believe that the projected unit method of funding still remains the appropriate long-term funding method, and also the correct expensing method. However, I would now make one change, partly for the reasons which the authors identify in Section 6. If one really believes that, as a scheme matures, so the investment strategy should become more cautious, why should this not be taken into account in the funding method and parameters? The MFR uses different rates of interest in payment and in deferment, and there is no reason why the projected unit method should not do likewise, to reflect changes in the investment pattern. Indeed, to do so would have some substantial advantages: it would mean that the funding of the scheme accurately reflected the need for either a greater cushion or in a more cautious investment approach as the scheme matured. A change to such a method would not necessarily mean an increase, either in overall reserves of the average fund or of the average contribution rate, if the rates of interest in deferment were slightly more than currently used throughout and the rate of interest in retirement was slightly less. Such a two-interest rate basis would have the advantage of coherence, would adequately meet changing circumstances and would give answers closer to the MFR. If an employer felt that its strength enabled it to invest more adventurously, then immediate allowance for the extra return which it is expected to achieve may be given directly in setting the contribution rate, as suggested in Section 6.5 of the paper 'A Realistic Approach to Pension Funding' (Thornton & Wilson, 1992).

Mr C. M. Stewart, C.B., F.I.A.: In ¶2.10 the authors draw attention to the paper 'Objectives and Methods of Funding Defined Benefit Pension Schemes' (McLeish & Stewart, 1987), in which we suggested that the funding target should be the projected value of wind-up benefits. The projected wind-up liability was calculated on prudent bases, the aim being to have sufficient assets to secure the wind-up benefits by the purchase of annuities and deferred annuities. We called this the 'defined accrued benefit method', and experience has shown that our margins were sufficient in all but the most adverse market conditions. There was strong opposition within the actuarial profession to our suggested use of wind-up benefits as the funding target. The authors say only that the technique was not widely adopted. However, they point out that the Pensions Act now *requires* contributions to be targeted to ensure the coverage of a wind-up liability on prescribed bases, so the defined accrued

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benefit method is to become a minimum statutory requirement for *all* schemes, whatever else they may choose to do in addition.

We also tried to convince the Accounting Standards Committee that our method would meet their requirements too. In this we were unsuccessful, which was perhaps not surprising, given the opposition to the method within the actuarial profession itself, and its exclusion from the list of methods in current use in the profession's note on *Pension Fund Terminology*.

With its new minimum funding requirement based on wind-up benefits, the Government has effectively deposited a cuckoo in every pensions nest, and the authors are doubtful if other species of valuation method will survive for long. I agree with them, at least as far as funding is concerned, but it remains to be seen what the accountants have to say about expensing. In that regard, with a *uniform* valuation method, and a *uniform* valuation basis, the cost of pensions will be spread over working lifetime in a *uniform* manner for all company schemes in the U.K. Who is to say that this *uniform* spread would be any less valid as a measure of expense than the varied results obtained when different valuation bases are adopted, even with the same valuation method?

Being based on accrued rights, this uniform spread would also correspond with reality, which is that pension schemes are now effectively in the business of financing accrued rights for early leavers, or for men and women becoming divorced, rather than for the minority of members who remain in service until retirement age. I expect that there will be an inclination for the accountants to leave well alone and persevere with the present projected unit method, which has international acceptance. I hope that they will not. The new Government requirement seems to me to offer an opportunity to reach agreement on a single method which satisfies both funding and accounting criteria.

The authors also believe that, with the advent of a prescribed valuation basis, it will now not be so easy for actuaries to adopt prudent valuation bases, including unspecified margins for contingencies. Employers will be more enquiring than hitherto, and will insist on having a say on the amount of any explicit margin to be added to the minimum statutory requirement, and on whether the margin need be held in the fund, or can be external. Again, I agree with them.

Schemes already funded by the defined accrued benefit method will not escape change. Although it has been customary practice for them to disclose what it would actually have cost, on the valuation date, to secure the accrued wind-up benefits in the insurance market, they, too, will now be expected to agree with the employer in advance what the planned margin over the statutory requirement should be.

The manner in which the authors have identified, and attempted to quantify, the various risks present will be a great help to all concerned in the new environment. It will help all parties concerned to understand the risks involved and to identify the nature of their respective responsibilities. Actuaries, in particular, will have to word their certificates with care. The authors make it clear why it can never be certified that the risks have been totally eliminated.

In final salary schemes it is still the employer who pays the piper, although obstacles have been put in the way of the employer calling the tune. Also, there is still a public perception that any surplus *must* be used for the *members'* benefit, whereas a deficit has to be made good by the *employer*. In the circumstances, it would not surprise me to see many employers switching to money purchase schemes, and those who are willing to continue with final salary schemes doing so on a minimum-compliance basis, with any margin that they can be persuaded to provide being held outside the fund.

I would be content with clearly-labelled external margins — on one condition. There is a provision in the guidance note on transfer values to the effect that cash equivalents should be cut back if a scheme is in deficiency. In my view, it would be quite unreasonable for such cuts to be imposed while there was an external solvency margin available. Indeed, it may be difficult to impose such cuts, given the new statutory obligation for employers to make good any deficiency in five years or less. Perhaps the profession could take an initiative here, and consider whether trustees could now safely ignore this provision, or whether a change in legislation would be required.

Can the authors tell me what has become of the employer's obligation, under the rules of many schemes, to secure the specified wind-up benefits by means of insurance policies? The Government's

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MFR has certainly taken centre stage, but has the original requirement been abolished, or is it still waiting in the wings?

Mr. D. J. Parsons, F.I.A.: Section 2 stirred my memory of the evolution of pension scheme valuations, when we only did a valuation every 5 years, and the results were nearly always a modest surplus, just enough to allow the trustees to award pension increases to mitigate the effects of inflation since the previous valuation. Valuations then were a simple form of profit testing, using a single cautious set of assumptions. It was all that was feasible with the technology available at the time. We were aware that there were margins, but had little idea of how large they were. It was like the net premium method, and was comfortable for employers and trustees alike.

Improving technology and legislation has led us to a more advanced form of profit testing which tries to predetermine the levels of pension increase, but still on a single set of assumptions, similar to a bonus reserve valuation. This is where most actuaries are still, pre-MFR. The impact was a dramatic increase in the volatility of results, both in declared surpluses and in recommended contribution levels. As the authors remark, in ¶¶4.2.4 and 6.3.2, this was not the fault of the actuary. What was, perhaps, incumbent on the actuary was to give even the least financially sophisticated stakeholder some idea of that volatility, in terms that he or she could understand. It is hoped that something better than a warning like "contribution rates can go up as well as down" was used. Sensitivity testing was sometimes introduced, but not very scientifically.

The first real step forwards was the derivation of the Defined Accrued Benefit Method. Regrettably, the method was met with a certain amount of prejudice and has not yet been widely adopted. Its concept, if properly developed, was 10 years ahead of its time, but also of the technology which could support it. The technology is now with us.

The parallels between this method, asset/liability studies and dynamic solvency testing (which the authors never quite propose for funding in the MFR environment) are clear for all to see. I have never quite understood why asset/liability studies are usually limited to determining investment strategy when they are so obviously suited to developing funding strategy.

Dynamic solvency testing is a vital tool in most financial areas where actuaries are involved, but it is not easy for non-financial people to understand, or to act prudently on, the results. Insurance company management can cope with it, as it is their day job, but sponsoring employers and pension scheme trustees have other day jobs and often cannot cope. Are we threatening them with information overload? I sometimes think, as actuaries, seeing all the regulations of the Pensions Act, that we are facing that as well. I do not know the solution, but I do know that, whatever insurance company management might do in the privacy of their own offices, their published valuation is still on a net premium basis, and it is still comforting. We should remember this.

We may have wonderful technology, but we will be trusted more as professionals if we can keep the message simple.

Miss W. M. Beaver, F.I.A.: My comments are not necessarily the views of my employer, the Government Actuary's Department, nor of my clients, which include the DSS, and OPRA, the new pensions regulator.

The MFR is a central feature of the Pensions Act. As noted by the authors, it follows the original proposal of the Goode Committee that there should be such a requirement, in order to provide members of pension schemes with a minimum level of security for their pension rights, independent of the fortunes of the sponsoring employer. The MFR is, therefore, a discontinuance test, aimed at ensuring that schemes hold sufficient assets at all times, on the basis given, to meet minimum accrued liabilities. Its purpose is to give members and trustees an objective minimum benchmark of the adequacy of their fund and a focus for ensuring that the minimum funding level is monitored and maintained.

My involvement with the MFR is somewhat different from that of others represented here, and thus it is possible that I have a slightly different perspective. Most of you are pensions practitioners, whereas I have a key role, together with colleagues, for advising OPRA in the enforcement of the new duties placed on trustees and others. These duties include, of course, those relating to the MFR.

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However, the role of OPRA is not confined to the enforcement of duties under the Act, for, as is noted in several places in the paper, Parliament has granted OPRA discretionary powers, in certain circumstances, to extend the time periods for making good deficiencies measured against the MFR. The intention is that this power might be exercised by OPRA on application from an individual scheme in difficulties, provided certain tightly-drawn criteria are satisfied, as laid out in Regulations. Also, in a period of exceptional economic conditions, where it might be anticipated that a large volume of such applications to OPRA would be made, OPRA has been given the power to grant a blanket extension to such applicant schemes. Having regard to this power, the authors seem to suggest, in ¶1.7, that it should not be left to individual schemes to set the boundaries of normal economic conditions by past experience or models, as these would involve arbitrary judgements. The authors suggest, instead, that the profession should work together with OPRA to define a set market corridor judged as 'normal', within which schemes should be able to cope without easement. This idea is then picked up again in ¶10.7, where it is more explicitly suggested that OPRA might indicate the level of prudence that it would expect to see before offering relief from MFR difficulties.

I appreciate that these ideas are well meant, and there is certainly some attraction in putting some 'clarity on the situation', but, I would suggest, *only* if this can be achieved and if it would be desirable. OPRA is already making its mark as an open, approachable and communicative regulator. Thus, it might be considered to be receptive to any such proposals which could be demonstrated to be workable. However, I do have some reservations concerning this suggested approach. For example, in consultation before the MFR Regulations were laid, the DSS firmly rejected an idea which had been put forward — namely that there should be an exact prescription in regulations of the circumstances in which an application to OPRA for an extension of the time limits would automatically succeed. This idea was rejected by the DSS, on the grounds that there could be no such prescription in regulations, because Parliament had granted OPRA a *discretionary* power.

So, if OPRA were now to specify more precisely the conditions under which an application to it would be likely to succeed, it, too, would be restricting its own ability, granted by Parliament, to consider each extension or individual application on its own merits. However well intended such guidance might be, it would add an extra layer of prescription to the framework set out, and perhaps even envisaged as final by Parliament. In doing so, there could be a risk that OPRA might inadvertently prevent some applications which would otherwise have reasonably been made to it for consideration. Conversely, it might encourage some applications to be made which, otherwise, would not have been made nor needed.

Therefore, it could be questioned whether such an approach of developing explicit guidelines would, necessarily, be in the interests of sponsoring employers, trustees or scheme members. I will leave for lawyers the question as to whether it would be legally proper for OPRA to fetter a discretionary power granted to it by Parliament in this way. However, this is a worthy subject for airing within the profession. Such debates, even if theoretical, are extremely helpful in assisting all who are concerned with the MFR to come to terms with its practicalities. I simply wish to put down a marker that OPRA might need to reserve its position on the question of explicit guidance on this issue, at least at this time, this being a position which, in ¶4.1.10, the authors seem to anticipate as a possibility. In any case, to borrow from the words of the authors at the end of Appendix C, it might be that OPRA, as well as actuaries, cannot claim possession of a perfect crystal ball!

Inevitably the paper also covers the implications arising if the funding strategy is to pay only minimum compliance contributions. Section 6.3 is devoted to this issue, although, while accepting such a strategy as the privilege of clients, the authors are careful to point out the very real problems likely to arise. For example, the authors note the practical difficulties in the calculation of these minimum contributions as well as the increased risk of adverse market movements, even before the actuary certifies the chosen contribution level as being adequate.

It is, of course, right that the authors should additionally draw attention to the increased professional risks assumed by the actuary when signing off such a schedule of minimum contributions. However, I am sure that the authors do not intend to place the focus solely on the protection of the actuary's own professional position, as might be interpreted, for example, from a reading of ¶11.4. I think that there is potentially *more* at stake here, for the risk of damage to an

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actuary's professional reputation might be of little consequence when measured against the loss of a sizeable proportion of the value of the accrued rights of the pension scheme members, on an actual discontinuance.

As an illustration of this point, the authors show, in ¶6.3.4, that a possible scenario for one of their mature model schemes would be a funding level of 87%, against the MFR, if minimum contributions are paid and if things go badly. The authors note that this means catching up 13% over 7 years. An alternative consequence, however, and very damaging to the scheme members, would arise if the scheme happened to discontinue at the wrong time. This might not be an unlikely scenario, given that, as we know, the wish of a sponsoring employer to pay minimum contributions to a pension scheme might not be unconnected to underlying financial difficulties in his business, and this, in turn, could be associated with unfavourable movements in the markets. These could have been the trigger for things going badly in the pension scheme in the first place. This alternative consequence, therefore, could be that, in aggregate, members lose 13% of their accrued pension rights in the scheme, measured on the MFR basis.

The content of the paper is extremely thought provoking, and I am sure that it will be an essential reference for all actuaries advising on the MFR for a long time to come.

Mr C. J. Exley, F.I.A.: If it just adds more complexity and expense to the running of a defined benefit pension scheme, then there seems little point, once a basis is prescribed, in doubling up all the calculations, by funding on the sort of ongoing bases currently used in the U.K. The most charitable comment which can be made about existing ongoing valuation bases is that they are rather arbitrary, and simply regulate the pace of funding.

The situation would be rather different if we could establish the existence of some optimal pace of funding. From first principles, this would need to take account, from the sponsor's perspective, of possible taxation gains, the possibility of loss of surplus or default on deficit if the scheme winds up, the costs of raising or distributing capital, etc. However, the MFR would also be likely to rear its head in an optimal policy as well, since there are probably economic costs associated with distressed refinancing of deficits, even if, superficially, this just represents raising capital and then reinvesting it. Depending on the magnitude of such costs, a pace of funding mechanism, based on the MFR plus margin approach, may not turn out to be a bad approximation to an optimal policy, especially if the tax penalties of the 1986 Finance Act are also brought into line on this basis.

The authors also suggest that the MFR basis could be used for expensing. The main aim of expensing is to disclose information to shareholders. A discontinuance approach approximates to the replacement cost of the workforce, and the basis also has the advantage of consistency across different companies.

If we take the MFR basis as prescribed, there are a few problems associated with the rather arbitrary, and illogical, line-in-the sand basis to which the profession has signed its collective name:

(1) Returning to the expensing issue, the drawback is that the liability numbers, themselves, are meaningless quantities to a shareholder. If he wants to look at the economic costs, he will need to convert them to a proper market basis by stripping out the equity yield switch and discounting, using appropriate gilt yields, plus a credit spread, as is proposed broadly by the international accounting body.

(2) There is no point in tying a contribution plan to the rate of dividend increase. Dividends represent spare cash for which management has no better use. When dividends grow rapidly, there is much spare cash being distributed to shareholders, and it might be more cost effective, from a transaction cost perspective, to pay more into the pension fund. When dividends are falling cash is tight, and companies probably want to reduce budgeted pension contributions. Sadly, the equity-linked calculations in the MFR act in the wrong direction, budgeted contributions are cut back in the first case, and increased in the second!

(3) It is worth keeping an eye on the underlying economic position, as well as the arbitrary line in the sand, since I suspect that the MFR basis will be modified periodically, to realign itself with the real world. The long-term rate of interest, of 8% p.a., is so uncannily close to current yields, that a cynic might suggest that short-term market conditions had influenced this choice. How

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long will this long-term view survive if rates remain consistently above 12%, or consistently below 6%? The long-term dividend yield of 4.25% is already looking a bit shaky. Such step changes introduce basis risk, which might represent quite sharp jumps, since the profession will probably wait until the basis looks really silly before throwing in the towel.

Therefore, I like the paper, but it is a shame about the MFR basis.

Mr R. J. Chapman, F.I.A.: Whether or not the authors think that the mathematics in the paper is important, the paper is a very welcome addition to pensions research. Currently actuaries have not done enough research in the pensions field, I suggest, because they have been comfortable with the smoothing techniques for long-term funding. Now we have got the MFR and it is short term, market-orientated and potentially painful. What does that mean? It means that the MFR is going to be a wake-up call to pensions actuaries, and should encourage them to recover ground from the financial economists and to come up with new funding techniques which tie in much more closely with what the market is telling us. I hope that we can produce a range of new methods of financial modelling and risk analysis for pension schemes out of the research.

The authors have started that particular ball rolling, and have suggested a new funding method. It seems to me that their 'interaction matrix' could be applied to any funding method, and is, therefore, an interesting technique in its own right, leaving aside the MFR application. The inherent concept of stripping out implicit margins and, instead, adding an explicit funding cushion at the end has clarity and honesty to commend it.

However, the authors may be on dangerous ground if they pin their funding method just to the MFR. Clients may, indeed, want a cheap, straightforward approach to funding, but the MFR is no more than an arbitrary line in the sand. So there could be embarrassment if, and when, the arbitrary line diverges too much from economic reality. Schemes funded on the MFR approach could then find themselves underfunded on a more realistic basis.

If relying on the MFR as a funding target is dangerous, then the corollary is that we have to build financial models which incorporate the MFR and a more soundly-based target. The authors recognise this, but I sense a feeling in the paper that they think that, having to use more complicated models, will be an embarrassment with some clients, especially the small and impecunious ones. However, as with many areas of the Pensions Act, life is going to be much more complicated, at a stroke, from 6 April 1997. So, let us not be apologists for the Pensions Act; let us use the Act as a catalyst to overhaul our techniques for matching assets and liabilities. The paper gives us an interesting start on that road.

Mr A. J. Wise, F.I.A.: I comment briefly on Section 9, which discusses expensing techniques. Here it is suggested that the MFR might provide a suitable basis for revision of the Accounting Standard SSAP24. The authors, and also Mr Stewart, are attracted to the use of the MFR as a common basis for funding and expensing calculations. This is, indeed, a tidy and appealing notion, but surely this is equally a rather odd conclusion, bearing in mind the authors' own comments that the MFR is not consistent with the principle of accounting for continuing companies as going concerns. Also, they have their historical background wrong, in saying, in ¶9.2.3, that the United States Standard FAS87 is, at least in part, a function of the statutory funding culture. On the contrary, FAS87 was designed with a clear view that pension liabilities should be assessed on a market-related basis which is independent of the funding arrangements. My impression is that any idea that accounting for pension cost should depend in some way on funding would now be doomed to failure.

The actuarial profession needs to understand what the accounting standards bodies are trying to do, and it needs to help them achieve their objectives without throwing away the good parts of current methodologies. Work is being done in this area. As the authors say in ¶9.3.1, the crux of the matter may be the question of what is the true nature of a final salary defined benefit promise. Given the nature of statutory requirements and the discretionary aspects of the benefits, there are clearly important differences between liability profiles from one pension fund to another, aspects which the International Accounting Standards Committee draft E54 fails to pick up. The actuarial profession is certainly willing and able to help the accountants to capture these aspects as necessary for financial

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reporting; but I am not persuaded by this paper that the MFR, which is merely a U.K. political compromise on funding, can offer the right approach, in principle, to the issue of accounting for pensions.

I agree, nevertheless, with the suggestion that a more market-based approach than that of SSAP24 may be justified, because it is becoming unsustainable to show actuarial valuations of assets other than at market value.

Mr D. B. Duval, F.I.A.: I support the objective of the authors, particularly for the medium-sized scheme, of producing something that is manageable and will actually mean something to the client. If anything, the problem is that they have not gone far enough.

I agree with Mr Stewart that, in practice, the MFR will have to be explained to clients. I cannot see that they are going to want any more than that. Any additional explanation which starts from a completely different point will not be of interest to them.

I have doubts about the theoretical basis of this paper, and additional research would be desirable; in particular, the assumption of normality for the distribution of investment returns is undoubtedly wrong. I agree with the opener's comments that there is an understatement there. This also needs further research.

The paper produces a wide variety of results which do not differ that much; they are more dependent on the assumptions chosen than on the difference between the schemes. The difference between pension schemes, in most cases, is rather less than the difference between banks. Banks manage satisfactorily with single rules for capital adequacy, and I do not see why pension schemes could not do the same. We are close to a position where the MFR capital adequacy rates (which would be disclosed) could be used for the supervision of pension schemes. This would make the supervisor's life a lot easier and make comparisons between schemes a lot easier. It would not be as good as if you employed an actuary to do a full detailed comparative report, at great expense, but it would be better than anything else that will happen in practice.

The other big omission from the paper, which I think the authors recognise, is that it is fundamentally taking a static view, and it omits the importance of managing the funding position over time. In any financial institution that is the most important way of reducing risk. The critical thing is the way in which the institution is managed, not its financial position at a point in time nor its projected financial position at a future point in time. One obvious management technique which flows out of the paper is that you can reduce the gearing of the contribution rate by getting rid of some of the liabilities, in particular the deferred pensioners (if they will go).

I had some difficulty with the statement about the trustees, that security ought to be all. There is a tendency among the actuarial profession (which is not mentioned in the history section, but ought to be there) for actuaries, nowadays, to insist on pension schemes being much more secure than 20 or 30 years ago. If we had taken such a cautious view in the past, many people would have received much poorer benefits than they are now receiving. The trustees' interest, in this context, is the interest of the members, and a good benefit poorly secured may still be worth more than a bad benefit well secured. It is an interesting problem, but it is not obvious which is better.

I have the same concerns about the suggestion for pricing. It is suggested that the pricing of benefit improvements should be done on a conservative basis. I do not agree. It emphasises too strongly the separation between the scheme and the employer. It almost implies that the employer has to buy the benefit improvement from the scheme, and that the scheme should sell it to the employer at the highest price it can get.

There have been discussions on the wording of actuarial certificates:

— As a *practitioner*, I am happy to word my actuarial certificates as carefully as I can, and take legal advice to ensure, so far as is possible, that anyone who sues me will not succeed.
— As a *profession*, it is a complete waste of time and a waste of reputation. It does not matter what the wording is; it is the fact that there is a certificate signed by a professional. If that certificate turns out to be wrong, and the professional weasels out on the basis of clever wording, this may be more damaging to the profession than a successful lawsuit against the professional.

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One point ignored in the paper, which is also important for the management of risk, is current market conditions. We often know quite a lot about the current funding position. In any actual practical case, that should be used as the starting point for the modelling, and therefore for the margins allowed for.

Concerning Miss Beaver's remarks about OPRA's possibility of fettering its discretion, I understand that legal argument well, having previously been on the regulatory side. I have no doubt that it is legally correct that OPRA cannot fetter a discretion that Parliament gave. This does not preclude OPRA telling the rest of us how it might use its discretion in a number of circumstances without in any way fettering it. It also does not preclude going back to Parliament, suggesting that such a wide discretion might not have been a good idea in the first place. Having said that, I can see considerable difficulty in actually doing much in that area at the moment, because there is such wide disagreement among the actuarial profession, which is where OPRA would seek advice on how it should exercise its discretion.

Some speakers have described the MFR as being just a line in the sand, and have implied that this devalues its worth against existing funding methods; I do not know what an existing funding method is, if it is not a line in the sand. It is just that we like our lines in the sand, not the Government's lines in the sand. I prefer the Government's, for two reasons: first, I have to use it anyway; secondly, I have someone else to blame, in some respect.

There is a fundamental question which has been referred to in the discussion and was demonstrated in the opening remarks of Mr Keogh. It is that the actuarial profession has, rather suddenly, changed its view about the right actuarial basis to use, and the first public evidence of the change has been the MFR basis. The change has been to begin to use different yields for equities and gilts. In insurance companies we changed our view quite a long time ago, but in pension funds it is only just beginning to happen: the use of different rates of return for equities and gilts; and different investments for the different portions of the liabilities.

The reason for the different shape of the MFR from existing funding bases is that most actuaries' funding bases are rather behind the times. We are going to have to catch up quickly. That is where the shape issue comes from.

The question that practitioners need to address is: do we believe that the MFR basis is right in that respect — as I do — or do we think that it is wrong? In that latter case we will carry on with the older methods, and then try to fit the MFR round them.

In practice, competitive pressures will come from all the clients who are concerned about cost and about simplicity. We will be driven to a basis fundamentally dependent on the MFR, that is the MFR plus a margin, which will be simpler than what is in the paper, although, no doubt, based on the same principles and research.

Mr A. D. Smith: The authors would have us discard the ongoing analyses to which we have all become accustomed. I find this concept appealing. Section 2 illuminates how, in recent decades, choices of methodology have been made on grounds of expediency rather than by scientific argument. I was amused to read, in ¶2.14, how "employers ... found it easy to dismiss actuarial prudence as an unnecessary luxury". I suspect that the reason why we were not more tenacious was a lack of clarity as to why all those arbitrary margins were there in the first place. Given, therefore, that, at first sight, no method seems preferable to any other, we may as well have one that is cheap to compute. In my view, the question of whether or not a method is a good one is determined by issues such as credit risk, transaction costs and taxation, which actuaries typically ignore; hence the current confusion.

I am not sure, however, whether sticking within an MFR environment, as proposed here, removes the problem of multiple objectives. For example, you might want to ask the question: "I want to be 110% MFR funded in one year. What do I have to do now?" Alternatively, you might ask the same question with a 5-year horizon. In general, the two answers will be completely different. This is not a necessary evil of all financial models. For example, derivative traders take care to use models which are consistent, both internally and with external markets, and avoid this problem. The MFR, on the other hand, is a muddle. I have found it impossible to give simple and relevant advice using

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just the MFR basis, because all the inconsistencies rear their ugly heads to defeat any attempts at rational argument. To make matters worse, for many corporate treasurers the MFR is the first tangible example of actuarial science that they encounter. Perplexity, followed by disbelief and then ridicule, is the typical response. The MFR is not a good ambassador for our profession.

This paper is a refreshingly frank account of the mess that we have got ourselves into. I applaud the authors' efforts to find a way forward, particularly since the MFR is such an awkward starting point.

Mr C. V. Gillespie, F.I.A.: This paper is a useful step forward for trustees who consider that asset/liability modelling is too expensive for them. I now suggest some alternative assumptions so that one arrives at a one-in-40 chance of not meeting the MFR in six years' time, based on both the Wilkie model (*B.A.J.* **1**, 777) and on M. J. D. Kemp's paper, 'Asset-Liability Modelling for Pension Funds', presented at a Staple Inn Actuarial Society meeting on 15 October 1996.

For the mismatch risk, a margin of 40% is a reasonable target. However, these other two papers would lead you to a margin in excess of 50% to cater for the mismatch risk. The dividend growth risk has been underestimated somewhat. The standard deviation of 0.8%, quoted by the authors in ¶5.8.3, has been converted to a margin of one standard deviation rather than two standard deviations. A margin of 25% is more consistent with dividend growth volatility over the last 20 years.

Mr D. R. Linnell, F.I.A.: In 1977 contracting out required us to certify that a scheme could provide GMP over the next 5 years in the normal course of events. The need to renew certificates meant looking at a 3-year horizon too. We designed a basis looking at winding up in the short term on sensible assumptions, plus a planned margin, and programmed it into the same computer system that produced our normal long-term funding rates, which were based on the concept of an ongoing scheme and a projected unit method. We continued to do this, with a lower rate of interest in possession than in deferment. We had a portfolio of schemes ranging from the medium-sized down to the very small, and were aware of the costs involved in the process for the smaller schemes. However, the smaller the scheme is the greater is the risk. In some schemes our short-term basis gave higher results than those with a long-term approach. We had no difficulty in explaining these concepts to employers and trustees.

So, what has changed? The MFR and the way in which pension schemes have been constrained by legislation make it more complicated now. I cannot pretend to say whether the technology has caught up faster than the legislation has gone ahead.

Picking up Miss Beaver's comments, it often seems that legislation is brought in by Parliament; it is then embroidered by regulations by Government departments, and then constrained over a period of years by decisions in the courts, until it gets to the point where it is so tied down that Parliament needs to step in again to complete the cycle. I hope that OPRA will respond to the call to, at least, sketch out some of the boundaries which it sees, and how it might exercise its discretion, even if it takes care to point out the background circumstances at which it is looking.

Mr C. D. Daykin, C.B., F.I.A.: The ideas put forward by the authors are helpful in terms of one potential approach to the management of funding in the MFR environment, particularly for small and medium-sized schemes that do not wish to spend vast amounts of money on many alternative actuarial bases.

An alternative approach for large schemes may be necessary, because the resources will be there to look at a number of alternative approaches, and to adopt the approach perhaps more espoused by the opener, where one continues with a long-term funding approach and then measures that against what might be required under the MFR. I am not sure that we can expect everybody to embrace wholeheartedly, with a single leap, the ideas which are being put forward by the authors. Some will recall how long it took for the projected unit method to acquire even respectability within the actuarial profession; and a market valuation for the assets seems to have been quite a long time coming.

We ought to look at the possibility of introducing technologies which have been introduced

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systematically in the insurance area, such as financial condition reporting. This is the area that the MFR is forcing us into, which is not unlike the situation that a life office finds itself in, with the problem of managing the surplus of the office at the same time as having to meet statutory requirements which are on a different basis from those which the actuary would typically use for its ongoing purposes or, indeed, for the determination of the bonus within a with-profits office.

I am keen that we should think actively about the application of dynamic solvency testing methods in the pensions field. These do not need to be stochastic methods. The dynamic solvency test in Canada — they call it dynamic capital adequacy testing — is based around the scenario approach, which is not as expensive to implement as a full stochastic model. However, for large schemes already engaged in asset/liability modelling exercises, the use of that same technology to look at the funding scenarios seems to be a logical way forward, notwithstanding the authors' arguments in ¶5.18.1.5, where they seem to be rather down on the application of stochastic techniques.

We should perceive dynamic solvency testing, not so much as introducing a lot of additional complication, but as providing a tool for the actuary to explore with the trustees — maybe also with the employer — the risk profile to which the scheme is subject as a result of the various different factors which will impinge upon the scheme, including the need to meet the MFR in future years. The purpose of the DFC is to identify risks and to identify risk reduction strategies which will be helpful in that context.

I commend the authors for their contribution, and urge the profession to continue working on new theoretical approaches to this problem, which are not just theoretical, but practical in their orientation, and which will go in the direction of resolving some of the inconsistencies between funding approaches, the MFR, expensing and the Inland Revenue's statutory surplus limitation process.

On the last point, the profession can expect to receive a consultation document fairly shortly from the Inland Revenue on the review of the Inland Revenue basis in the light of the introduction of the MFR and developments since 1987.

Mr A. Cook (a visitor)**:** I am from the Accounting Standards Board. What I have to say is not a proper critique of the paper, but what seems relevant to some comments which have been made.

As accounting gets more detailed in its approach to accounting for pensions, the interest of the actuarial profession will increase considerably. When you could rely on accounting standards to take a fairly broad brush approach to the actuarial method and assumptions used, you could then sit back and be comfortable that, whatever the accountants said, you could always set the picture and instruct the client to think of it in your terms.

What is worrying now is that, led particularly from the U.S.A., accounting standards bodies are trying to close in, not only on the method, but even on the assumptions. Ten years ago the U.S. accounting standard FAS87 was introduced. This claimed to make a breakthrough, in that it refused to work on simply a valuation rate of interest, and insisted that the liability should be discounted at a risk-free rate, which, in their terms, they interpreted as the rate on AA quality corporate bonds. (In this country it would be gilts.) That was all very well for U.S. companies. It did not immediately affect us, except if you wanted to file at the SEC. What is now happening is that there is pressure to make that the basis of the international accounting standard. We are in an environment of much more harmonisation, and so there will be considerable pressure brought to bear on us at the Accounting Standards Board to adopt a standard similar to what comes from the IASC.

We strongly disagree with the U.S./IASC approach. We believe that a case can be made for discounting the liability at something equivalent to what is commonly used today: a rate that is much more reflective of the kinds of assets that you would invest in. It may be that we will have to move away a little bit from the way in which that is done today. Typically, today, you take the long-term rate of return on the fund assets. One of the major criticisms of the U.K. approach is how the rate of return on the assets can have any relevance to measuring the liability. Suppose that I choose to invest my fund in junk bonds; are you telling me that I should then discount at 25%, or even higher?

With the assistance of actuarial support, we are trying to develop an idea which is similar to that of the MFR, in that it would discount different portions of the liability at different rates, using gilts

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or index-linked gilts for the pensions in payment and deferred pensions, but using some other kind of rate for the main part of the final salary liability. One of the big challenges that we have to overcome in doing that for a liability which is uncertain, such as that determined by final pay, is how one can justify the use of a discount rate that is higher than the risk-free rate. The Americans think that we are wrong to propose that. Certainly, when you examine that argument in accounting terms, it is difficult to refute it.

We are working on ways of trying to prove that there is some correlation between the movements in final pay and movements in real assets, such as equities, property, and so forth. That is an interesting exercise, but difficult to do neatly, because these assets, particularly equities, have had such a bull run over the periods for which evidence is available.

Mr M. R. Slack, F.I.A.: I was involved in the production of GN27 and in the earlier discussions with the DSS on the whole approach to the MFR. Professor Goode, when he published his report of the Pensions Law Reform Committee, was proposing a minimum solvency requirement. There was much discussion whether we wanted to have a solvency requirement. In the course of that discussion the proposed basis was weakened. The actuarial profession was much at the fore of saying that now that it is so much weaker it should not be called a solvency requirement, and so the name was changed to the MFR.

What, therefore, disturbs me in this paper is that it appears to suggest that we should be modifying our funding bases to something lower than what we thought was an adequate solvency standard. We must not forget one of our responsibilities as a profession, which is to ensure that the pension funds are adequately funded and are able to provide the benefits that they are there for, when the employer is not able to do that because of its failure.

We must check to ensure that we always have adequate solvency. I find it slightly disturbing that we appear to be moving through this paper towards funding standards which may not meet adequate solvency requirements. If one looks at the situation of a new scheme, starting without any pensioner or deferred pensioner liability, and one were to adopt the funding policies being put forward in this paper, are we not quite close to a method that we universally rejected, the current unit method? I put these warnings out.

This paper is useful for the way that it has highlighted the different shapes of the MFR liabilities and those that arise from conventional funding techniques. We saw that in Mr Keogh's introductory remarks. It is important that we recognise this in the way that we approach valuations, and we need to readdress our traditional methodologies.

The opener raised the concept of a dual interest methodology, which is adopting the MFR approach of one rate of interest based on gilt yields for valuing pensioner liabilities, or the liabilities after retirement, and another, possibly higher, rate for valuing liabilities prior to retirement. That is certainly a technique that deserves further investigation.

There has also been reference by earlier speakers to the concept of setting minimum contributions to pension schemes simply to meet the MFR liability. I am not sure how far the speakers thought this process would go. I would remind you that GN27 was carefully drafted to give actuaries as much protection as possible when they are certifying the contribution schedules, so as to minimise the scenarios that they have to worry about. When the trustees and the employer cannot agree a rate of contribution, there is a provision under the Pensions Act for the trustees to set that minimum. It is to be hoped that they would consult their actuary, but, in giving advice to the trustees, the actuary does not have the protection of GN27, and therefore might feel that he or she needs to consider a wider range of scenarios than is required under GN27. It gives rise to the anomalous situation that the actuary, in giving that advice, might advise one level of contributions, but when it comes to certifying the contribution schedule, he could certify less than that, even though his advice to the trustees was that more should be contributed. This is highlighting the distinction between the real advice that we need to be giving to our clients and the statutory duties that we have, where we are merely certifying whether or not certain procedures have been completed in accordance with the requirements.

The paper has been a helpful process in our understanding of the interaction between the MFR

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and funding levels. To date the discussion has been very much about the strict technicalities of MFR and trying to come to terms with them. It is appropriate for us to consider how this is going to impact on us in the real world.

Mr G. K. Simmons, F.I.A. (closing the discussion): For about two or three years I have been thinking along the lines of MFR-based funding, but approached this by looking at funding bands rather than at explicit margins. The approaches are equivalent, although I was trying to remove the artificial concept of surplus from the debate.

Many speakers stressed the need for communication. I suggest that, as a profession, we have been quite poor in explaining funding methods to the users of our advice. This was exampled by Mr Parsons describing techniques of the distant past; the valuation once every five years, on a net premium versus a bonus reserve method, which reminds me of the text book that I was brought up on, and which had only one valuation method in it — the attained age method. The change, of a decade ago, to the acceptance of the projected unit method has not been adequately explained. I suggest that if we go forward, accepting more use of MFR-based funding, then we will need to explain very much better the ramifications of what we are doing and why.

If we see a sea change in methods, we must remember that our clients, whether trustees, members, employers or others that take our advice, are becoming sophisticated buyers of our services. The commercial stakes are getting quite high, for us as well as for our clients.

Mr Slack picked up the point about the different shape between the projected unit method and the MFR. We ignore that at our peril. To do otherwise, given that MFR-based funding is, essentially, a short-term method, but recognising that the long term is just a series of short terms, we could end up with a funding sledge hammer to crack a nut.

A number of speakers referred to economic and demographic scenario testing in moving forward. It would have been useful for the paper to track some of its model pension schemes over three, six or ten-year periods, particularly allowing for situations like early retirement. As the opener pointed out, early retirement can cause a significant strain.

Section 6 indicates that margins of 15% or so above the MFR are adequate against MFR failure, or, as the authors suggest, a one-in-40 chance of MFR failure. This is, maybe, 9% for deferred pensioners. For a typical scheme, this results in something like a 12% margin above the MFR to allow for a one-in-40 chance of MFR failure; 2.5% is a small probability, I suggest, for something that is not catastrophic, but can play havoc with cash flow.

Given that many clients have funding levels probably in the range of 120% to 130% of the MFR, the economic ramifications of adopting these explicit margins could be immense. Certainly funding targets, and consequently contribution requirements over the next five to ten years, could be low indeed. Learning from history, it is going to be difficult to avoid moving towards this approach. With more disclosure in pension schemes, surely it will only be a matter of time before MFR league tables are produced, showing what funding positions are. We, therefore, need to be looking over our shoulders, whatever methods we use, and how they stack up against the MFR, and be prepared to be challenged.

Most speakers made reference to all manner of different risks. The opener gave an example, describing the problems of using an MFR approach with two similar schemes with two different early retirement promises. One way round this is to look at the varying early retirement margin in line with expectations. Again, economic scenario modelling will be of help in this regard. Many speakers mentioned the explicit MFR margins, accepting that they could help in the management of risks. Professional risk was also mentioned, whether the signing of MFR certificates, or the issues when faced with losses on wind up of a scheme that ended up funded at 87% of the MFR through some unfortunate event. Risk aspects went broader; some speakers mentioned the cost of capital and other financial environments that employers face, for example the risk of debt on scheme wind up. To my mind, these risks need to be factored in. To do this, we cannot look at fixed lines in the sand in the short term. Surely we must scenario test, as part of the valuation, for our clients, to incorporate the ramifications of many different futures.

There were interesting comments on expensing and the use of differential interest rates in

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accounting standards. I was heartened to hear that, in 1977, Mr Linnell produced a method of dealing with contracting-out certificates on a basis that included differential interest rates. Ten years later we had a defined accrued benefit method of funding, and after a further five years we had a similar approach in Thornton & Wilson (1992).

It has taken ten years to get the defined accrued benefit method adopted by legislation; let us hope that it is not going to be longer than three years before we have all done all our MFR valuations and we have wide acceptance of MFR funding methods. We ignore MFR-based funding at our peril. Sooner or later our clients will become more sophisticated, and they will see, more than anything else, that funding methods are no more than lines in the sand. They will grasp what the MFR is, and ask challenging questions about it. If we have in place traditional funding methods that are using sledge hammers to crack nuts, then I believe that we open ourselves to more professional risk — perhaps deliberate overfunding?

Mr P. M. Greenwood, F.I.A. (replying): What is the MFR? Mr Slack said that it is not a solvency standard. Did not Goode say that what we wanted to do was to define a solvency standard in terms of the members' transfer value? The purpose of the MFR is to define a minimum cash equivalent within that concept, and that schemes (from Goode and the Pensions Act) will deliver these as a minimum in a wind up in the future.

We have, therefore, reduced the solvency standard to a level which we feel employers can live with. There was a rejection of the previous deferred annuity funding level as a compulsory concept, although, like Mr Slack, I would regret it if everyone moved to these funding levels.

In the paper we do not say that MFR-type funding bases are appropriate for all funding levels. We see continuation of three different techniques: projected unit; minimum compliance and planned margin. We are clear that there is a band of acceptable funding levels. In practice, if you look at various published SSAP24 surveys, probably the majority of schemes fall into, or are currently in the long term, targeting the 100-120% band, where, if you totally ignore MFR funding, over some quite short time periods, employers and scheme sponsors are going to have some financial shocks. All that we are trying to do is to introduce a mechanism by which they can make a simple decision about which risks the scheme sponsors wish to take, and how they control the size of those risks.

We have had comments about normality and the various statistical models. We recognise that people have differing views on which models are appropriate. Certainly, if you try to use a model which covers 30 or 50 years, or even longer, you are coping with periods of substantially changed economic conditions, and this implies higher margins.

We have to recognise that the world has changed. Communism has substantially disappeared, with free world economic and market forces driving towards lower world inflation. The MFR basis was set by the DSS and influenced by the technical support committee in the DSS, and is a forward-looking basis, not a basis looking at the past, trying to cope with high inflationary conditions. We all recognise that, in those circumstances, if we return to high inflationary conditions the MFR would have to be substantially changed and there would have to be a period over which that change was brought in. Similarly, if it went the other way and we headed towards even lower interest rates, eventually the MFR would change, and that would be an even greater problem.

Miss Beaver referred to the use of discretion. I am surprised, with that legal view of the world, that the Revenue has issued practice notes. Are not the practice notes giving a view about how the Revenue would operate its discretion in the future? They do not limit its actions, and the Revenue sometimes acts outside them. OPRA could, at least, give a hint and help us with the problem that we do not know precisely what the future will bring. We are not the sole possessors of the crystal ball.

We support scenario testing, and we have used this method to produce some of the figures behind the paper. However, what concerns me is that, if you just suggest scenario testing, then quite often employers and scheme sponsors choose the easy option. They do not like the results of some of the least optimistic scenarios.

We have had several 'pensions scandals'. The scandal that the profession has to concern itself with now is whether, in five or six years' time, schemes are winding up and not delivering the

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minimum cash equivalent transfer value as part of the scheme wind up. That is our prime reason for the paper. When looking at the variability of what happens on funding, most of the variability happens in a short-term context of three or four years. We have concerns when people are still looking at a ten or 15-year position and putting that to the employer without explaining the short-term risk of a chance of a cash call. All that we are trying to do is to give employers and scheme sponsors helpful tools, both from the point of view of an employer trying to minimise funding, minimise cash calls or reduce the size of a prospective cash call to the size that he can bare, and for the other position, trustees trying to ensure that they have sufficient assets on scheme wind up, as required by the Pensions Act.

What we meant when we stated that solvency may well be all, is that, as we judge the MFR clause in the Pensions Act, what it does is to place a duty on trustees to deliver the MFR. Some comments made in this discussion should make us look very carefully at that clause in the Act.

The President (Mr D. G. R. Ferguson, F.I.A.): I am delighted that we have had such a full and detailed debate, and the authors deserve their fair share of fully justified congratulations for the excellent paper. I thank all those who have contributed to a lively debate. I hope that it will lead us closer towards the position where we will be able to have a consensus view of the actuarial profession on these matters; one which will be widely respected. Most important of all is the thanks which we all owe to the authors.

WRITTEN CONTRIBUTION

The authors subsequently wrote: We will first deal with some of the points made by the opener.

Some of the work of the actuarial-based investment consultants suggests that discretionary portfolio management does not necessarily add value. If trustees are confident of extra performance, they may wish to let the risk of under performance against the index for the sector run, else they may wish to add a margin. The examples in the paper were included to illustrate the technique. We said that it was for scheme sponsors or trustees, as appropriate, to decide which risks they wished to cover in advance.

We believe that adjusting to a dual interest rate projected unit approach, with different rates pre and post-retirement, is, in practice, substantially adopting an MFR-shaped funding target, with the extent of any margins depending on the strength of the basis. With the short-term nature of MFR default risks, we believe that the risks are easier to recognise and control if such margins are recognised explicitly. If the opener believes that there is greater volatility of risk than we have illustrated, then we believe that he should be either planning adequate funding to cover those risks or warning of substantial risk of MFR default or deterioration. This is especially so with implications of loss of contracting-out status for non-coverage of the contracted-out and priority liabilities on the MFR basis. These problems will be accentuated as post-April 1997 comes to dominate, with less reliance on discretionary pension increases following the introduction of LPI and with the whole accruing requisite benefit becoming the accruing contracted-out liability. We are, therefore, fundamentally in agreement with the comments of Mr Linnell later in the discussion.

We would agree that it is best if target funding levels are set between employers and trustees without confrontation, but that may require compromise.

From some of his comments, we are not sure that the opener has recognised that we base the target funding level on the MFR level reported, given neutral market conditions at the long-term MFR yields.

In response to Mr Stewart, we would suggest that it would only be correct not to cut back minimum cash equivalents for an MFR deficiency if the trustees were absolutely certain that any deficiency shortfall would be collected, but legislation is not needed to achieve that position.

In response to Mr Parsons, we would agree with the use of technology, but wonder whether dynamic solvency testing might be overkill for the less sophisticated scheme.

We would agree with Mr Chapman about the use of economic value added techniques for benefit costing, but the results may not be too different from an MFR-led approach if the commitment to the

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member is taken as the provision of the minimum cash equivalent, which may be the minimum enforceable solvency liability.

Mr Duval appeared to believe that PUC funding should be maintained to fund further discretionary benefit improvements. As schemes have improved benefit levels over the years, and with the introduction of 5% LPI, we believe that most employers now have a pension scheme at least offering the long-term benefit level that they wish to provide; the scope for further benefit improvements out of surplus is limited. Therefore, we believe that the price on which any employer takes on a pension promise, and with which he has to live with over the longer term, is fundamentally more important than making provision for further benefit improvements at a later date.

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ABSTRACT OF THE DISCUSSION

HELD BY THE FACULTY OF ACTUARIES

The President (Mr P. H. Grace, F.F.A.): I extend a welcome to David Allsop from the Department of Social Security and to any visitors from the Institute and private guests of members.

Mr T. W. Keogh, F.F.A. (introducing the paper): I am somewhat in awe of this Hall [the Hall of the Royal College of Physicians, Edinburgh]. I feel that there ought to be a corpse at the front ready for dissection in front of the audience. Some people might say that there is such a corpse, and that it is the self-regulation of pension scheme funding. It has been held that we actuaries can no longer be relied upon to look after this ourselves, that self-regulation has failed, and therefore we must have a statutory minimum funding standard for pension schemes.

Not only has that happened, but, in addition, the actual setting up of the standard has involved a huge amount of horse trading. The result is a standard of monumental complexity, riddled with logical flaws and practical difficulties. Our paper does not intend to argue the rights and wrongs of the Minimum Funding Requirement (MFR); we are stuck with it. Our clients will expect us to address it positively and effectively.

We see three basic sets of options. The first is to do nothing. Most of the analysis which has been done indicates that most funding targets adopted at the moment are stronger than the targets set by the MFR. The trouble is that the fact that, most of the time, most current bases are stronger, does not mean that they are all stronger, all of the time. Therefore, carrying on with our current processes and our current recommendations and hoping that the MFR does not sneak up on us one night does not seem terribly attractive.

The second family of options is where the MFR calculations are done, and it is agreed that the employer simply pays the minimum contribution according to the MFR formula. We have three practical and philosophical problems with such a position. The practical one is that we are not sure that we can actually work out the absolute minimum contribution, although we can probably come close to it. Certainly working it out is quite complex, and more complex than most of the contribution rate calculations that we are used to at the moment. A more substantial objection, however, is that, even if we can work out the minimum rate, and the contribution rate is set at that minimum, it is not entirely obvious that schemes will not fail the MFR test at a subsequent date. It seems to us quite likely that, at a time of recession, we can sign all the certificates and do all the calculations, yet our best expectation will be that the funding level will deteriorate over the next three years, and therefore we would not be able to renew the MFR certificate. That is not an appealing prospect. Not only does it have consequences for employers in terms of paying extra, but they are liable to lose their contracting out certificates if they cannot cover the contracting out liabilities on an MFR basis. If employers and trustees understand all the consequences, and still want the funding rate to be at the minimum MFR level, that is fine; but a lot of employers and trustees will not appreciate the finer points. They are used to the idea that the actuary delivers them a recommendation, and, if they do what the actuary tells them, it will work. Thereby lies danger for us. The issue is about ownership of risk, and the actuary not being left to be blamed when the MFR goes wrong.

Having ruled out the first two families of options, we come inexorably towards funding methods which are based on an explicit risk margin above the MFR.

We were influenced most by comparisons between the shape of the MFR basis and the shape of existing funding targets. [See the figure in Mr Keogh's introductory remarks in the discussion at the Institute of Actuaries on page 551.] There are, as ever, lots of different funding targets around. If you look at an existing funding target by comparison to the MFR, you find, for young people, that it is almost impossible to find a funding basis that is not more conservative than the MFR's basis. For older people the opposite is true. The MFR liability is based on returns on gilts; most funding bases

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in use will value pensioners on an investment assumption that has some equities in it at the moment, rightly or wrongly.

In practice, funding strength is then a balance between young people and old people. Where there are many people towards the older end of the scale, you are quite likely to find that the MFR liability is greater than the current target. There is actually a double whammy, because those schemes which have many pensioners and older members tend to be larger in relation to the sponsoring employer, and therefore the gearing of any deterioration in the funding level to the employer's contribution rate is greater.

We believe that, for those schemes where the MFR is important, techniques based on the MFR plus a planned amount of margin provide the most efficient techniques for the employer who says, "I want to minimise my contributions without running a significant risk of tripping over the MFR at a later date". For the avoidance of any doubt, we think that this is a perfectly legitimate objective for an employer. One reason is that the Pensions Act creates a very unlevel playing field, in that it makes deficits much more clearly the responsibility of employers, but it fails to do anything about surpluses. The Ombudsman has been quite busy in this area as well.

Therefore, we have put forward an approach based on an explicit risk margin. The approach covers funding, surplus, whether the fund can afford benefit improvements, and, potentially, accounting. Explicit margining is our fundamental principle.

The choice of the margin itself depends upon assumptions on future variability, and there are plenty of different theories around in this area.We do not see ourselves as being in the business of competing with those. Different actuaries may have different professional views on the level of risk associated with mis-matching investments. There should be some assessment of that risk. It may well be that different actuaries have different bases, and the same actuary will probably come up with different margins for different clients who have different risk profiles.

The other thing that we are trying to do is to extend such an approach to the liability side of the risk equation. So far most work has been done on the basis of large funds, where there are big asset risks. We find that the liabilities do not always look after themselves, particularly if you actually start reducing some of the asset risks by better matching of the investments.

The technique that we have chosen to use for trying to mix and match these various risks is normal distribution arithmetic. We are not claiming that this is the most sophisticated technique available; we are emphasising the basic approach rather than the mathematics, where there may or may not be more sophisticated techniques.

The key is communication: communication to employers and to trustees which goes further than just point estimates. For most schemes, at the moment, we make an estimate of how the funding will turn out in the future. We may well put margins in our assumptions in doing so. Nevertheless, it is a single point, and there is no measure of the actual risk involved, although we may have reduced the risk by being conservative in our assumptions; but we still have not made clear how much risk is still left with the employer and trustees. That may be fine in the traditional environment where, by and large, if you get a deficit after a valuation, you have a choice of changing the assumptions to make it go away altogether, funding it over a long period, or doing something else. With the MFR you do not have this flexibility. Whether you like the basis or not, if you fail the test there is a minimum contribution to be paid. Therefore, you have to be more careful.

Moreover, where there has been a proper risk analysis, in the sense of asset/liability modelling, it has often been applied to look at the position of the fund in the longer term — maybe 10 to 15 years out. For many of our clients, the assumption that the shape of their businesses and the numbers of active employees will be anything like they are today in 10 or 15 years' time is hopeless. Therefore, other than for schemes which are almost in run off, or at least exceedingly mature, asset/liability modelling which only considers the longer term does not necessarily add much value.

We need to accept that the MFR will become a benchmark of the funding levels of schemes and will become publicly available, at least for larger schemes, regardless of whether we think it is a good idea or not. After all, insurance companies get their DTI returns compared, and they are not even on a standard basis. So surely the standardised MFR basis must be a good benchmark for pension schemes?

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We have described the benefits for our clients; but what about us? In many respects, actuaries advising pension schemes have rather forgotten that their unique selling proposition is their ability to deal with financial risk, and not just to do discounted cash flow calculations.

Many of us have fallen into the trap of putting risk analysis into the 'too-hard' box, and just sticking to relatively simple, if substantial, calculations, and advice on the general management and legal structure of schemes. We were quite struck, looking at the debate on 'The Future of the Profession' (*B.A.J.* **2**, 325–427), by how many people said that this cannot last. Other people will do commodity processing tasks; actuaries have to find things where they can add value. There is a great deal that we can do in the area of risk analysis, but we must return to it.

However, we do not have the right to impose complex techniques on small and medium-size schemes. All right, they could all commission lengthy asset/liability modelling, but how is that going to be paid for? There is a class of small and medium-size schemes where risk analysis has to be packaged in some way, even although the packaging leads to some loss of accuracy. It is, nevertheless, a more suitable solution than the full, perfectly tailored solution that a large client might want, and pay for.

Packaging implies a common basis. What we seek is for actuaries to call for a structure where there is coherence and consistency between the various regulatory tests. They do not have to be the same, but the minimum, the accounting measure, the actual funding target set by the scheme, and the Inland Revenue maximum, must have some sort of consistent relationship between them, so that it is relatively easy to advise the unsophisticated client how they all fit together. We do not have it at the moment, but we think that, in reacting to the MFR, the actuarial profession should be proactive in trying to push for such changes, so that we do not reach the situation of the United States of America, where there are about seven different bases, and people have long since given up understanding how they interact.

How to deal with the average client's needs is the fundamental question that we are trying to ask in our paper. We are not sure whether we have the right answer. We think that it is a question that the profession needs to ask.

Mr A. F. Zegleman, F.F.A. (opening the discussion): In the introduction to the paper and in the abstract, the authors comment on the fundamental nature of the change to funding in United Kingdom pension schemes that will be caused by the MFR. Given that funding itself is a fundamental area of work for our profession, this paper is, therefore, both timely and very welcome. Indeed, it is essential to stimulate further debate on this important topic. I start by thanking the authors for establishing a very solid platform from which to take this debate further. As they admit in the paper, there is still much to be done in this area.

Sections 2 and 3 and Appendix 1 provide some useful background to the topic. I, for one, appreciated the Appendix as a brief, but very welcome, summary of the MFR requirements and calculations. Section 2, which sets out the authors' analysis of the development of funding strategies from a historical perspective, was interesting. Critically, however, the most important conclusion in that section was that, with the maturity of U.K. pension schemes, volatility of contribution rates is inevitable. As the authors mention later in the paper, delivery of a stable contribution is unlikely to be achievable by any funding method, and it seems to me essential that clients understand this point.

Section 4 introduces the politically correct term of 'stakeholder', which, in the pension fund context, means the trustees, on behalf of the members, and the employer. It then develops the arguments for funding from their perspectives. Section 4.1 deals with the trustees, for whom, according to the authors, security ought to be all. I am not sure that I entirely agree with that comment. Security is clearly one critical issue for the trustees, but not necessarily all. I am not convinced that the authors themselves believe this, as they admit, in ¶4.1.2, that confidence in the employer's future financial strength might give reason to reduce the level of asset cover that might otherwise be demanded.

Further, as is pointed out, it is almost unheard of, certainly in larger pension schemes, for trustees to fund on the basis of the only completely secure asset available — non-profit deferred annuities. This is not totally surprising, as trustees recognise that members' reasonable expectations often

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exceed their strict entitlements. It is not the view of most trustees that I come across that they must reduce the former to the latter by adopting a rigid approach towards the financing of the scheme in the name of security. For the majority of trustees, the reality of pension funding in a commercial environment must enter into their analysis of what is best for their members.

Paragraphs 4.1.4 to 4.1.7 discuss the implications of the standard MFR certificate which actuaries have to sign. As a profession, we are charged with the responsibility of signing many statutory certificates in which we give comfort to a variety of interested parties, but with which we are less comfortable ourselves. We do not seem to be very successful in getting the wording of these certificates into an acceptable form. Clearly, as the authors point out, our professional reputation will be at stake. Perhaps our reputation is, in any event, even more vulnerable to the impact of the first fully MFR funded scheme to fail to satisfy its members on wind up by being unable to secure the deferred pension that they are likely, and perhaps quite reasonably, to have thought to be guaranteed. Communication is critical here. Stakeholders need to understand what is, and what is not, possible.

In ¶4.1.10 the authors appear to give the trustees a responsibility with which they are not, or perhaps should not generally be, comfortable. The wording seems to imply that the trustees' role is to confirm, or otherwise, that the actuary's recommendations produce MFR compliance to a certain degree of probability. This is, probably, beyond the expertise of most trustee boards. The authors suggest that, without this confirmation, the actuary must then consider being more conservative than the minimum. My understanding of the Act is that the trustees have no powers to insist on higher than the minimum. Funding beyond this remains the employer's province. The role of the employer in funding the pension scheme seems, in Section 4.2, to be relegated to deciding how much smoothness he wants, the trustees not caring so long as the security needs have been addressed.

This comment worries me for a couple of reasons: first, because of the point made earlier in the paper, and again repeated in Section 4.2, that smoothness of contributions is something that we may not be able to deliver, whatever funding method is used; and, second, because the interest and role of the employer in funding the scheme will remain much greater than the authors appear to suggest in this section.

Section 5 sets out the proposed methodology for an MFR driven basis to funding. The underlying principle seems to be sensible — establish the areas of risk and quantify explicit margins to hold against them. The underlying premise, however, is that schemes will move directly to an MFR driven funding strategy.

Certainly employers who, in general, control funding, in so far as it exceeds the minimum, are going to have to review why they have such a funded arrangement. In the post-1997 environment, I expect that a result of this review, for some employers, is going to be that the only logical reason to fund is to provide security on wind up. This will inevitably lead to an MFR or quasi-MFR driven approach. However, security seems to be becoming synonymous with meeting the minimum standard. That is an issue which needs to be thought through with some care.

I doubt, however, that there will be a wholesale change from the more traditional long-term funding methods to an MFR approach, with or without margins, in the immediate future, certainly not for the larger schemes. Where it does happen, there is going to be pressure to minimise the asset levels committed to funds in excess of the strict minimum, and the margins will, therefore, be depressed.

The analysis of the element of risk, in Section 5, is very helpful, but unlikely to be rigorously applied. Most pension schemes will still home in on the investment mismatch implications. As the authors point out in ¶5.6.3, there is a material impact on this, and hence on the required margins, according to the underlying assumptions. I found the analysis of the investment risk into its component parts interesting, but the little practical experience that I have had in this area indicates that the impact of the investment risks might be somewhat greater than the authors suggest.

This, in itself, will create some interesting issues. It is only natural to concentrate on the downside of a funding strategy that is linked to meeting an absolute minimum. There is, however, an upside. On the sorts of margins that need to be held to retain a reasonably comfortable probability, whatever that is, of avoiding an MFR problem, there could, as a result, be overfunding if market conditions are favourable. The client might then be more than a little bemused, or worse, if the results of the MFR driven strategy were to breach the maximum funding limits and threaten the tax status of the fund.

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Contrary to the comments in ¶4.2, I think that tax and the tax status of funds remains an important funding incentive for employers.

In Section 6 the authors' proposed method is compared with those commonly met in practice. Their conclusion, relative to the projected unit method, is that the shape is wrong and that we are going to have to watch our backs if we use that method against the MFR. I suspect, however, that that is, in the short term, exactly what is going to happen. The projected unit method will continue to be used to assess the normal contribution rate, and the past service position will be looked at under this method with either conservative assumptions or, perhaps, an explicit margin, determined with an eye on the implications of the underlying MFR — a sort of 'what-if' strategy testing.

In Section 9 the authors extend their MFR funding approach to expensing. Here I disagree with them. The objective of expensing seems to me to be to recognise the long-term costs of the pension arrangements on an on-going basis. The fact that one looks at the on-going position is wholly consistent with normal accounting principles. If this means an increasing gap between the numbers and the methods used for expensing and those used for funding, so be it. This has been seen anyway, to a certain extent, over past years, and I think that the rate at which the two will move apart will rightly accelerate. I do not believe that an MFR driven approach to funding needs to be extended to the expensing technique.

The impact of moving to a market value approach for expensing is, I think, well understood by clients. The lack of smoothness that results from funding on an MFR basis is, albeit reluctantly, accepted by clients, but I doubt that it will continue to be if it is accompanied by a volatile profit and loss charge.

The paper provides an excellent springboard for discussion about the future of funding in the U.K. The MFR debate has been closed, and, whether we like it or not, we now have a minimum standard against which all pension schemes are going to be measured. However, this still causes me some disquiet, because the long-term nature of the liabilities of the pension scheme are rather forgotten when everything becomes driven by the short-term MFR requirement. As a profession, we still do have more to say about the impact in the longer term of this approach, and the effect it will have, ultimately, on pensions provision in the U.K.

I think that clients, and by that I include the employers who are financing the schemes as well as the trustees who are responsible for compliance, need to understand the issues. It must appear fairly odd to them that what is now discussed, with some concern, as an investment mismatch for a final salary pension scheme was, not that many years ago, discussed as the best match for its long-term liabilities.

Mr C. Patel, F.I.A.: I start by congratulating the authors on a very timely debate and for forcing us to open up all those black boxes and examine some of the issues that so easily get swept under the carpet.

I have three main comments:

(1) *Valuation methodology.* The approach suggested by the authors is based on a valuation method which has the 'wrong' liability by reference to the MFR. The planned margin technique then makes a series of adjustments to the reserve to correct whatever appears to be wrong with the traditional calculation of the past service liability and the standard contribution rate. I have an inherent dislike for patching up things; it may be a temporary expedient, but in the longer term it is clumsy, and you soon lose sight of the underlying principles and logic! I prefer to tackle the problem at its roots. If the projected unit method produces a profile of liabilities which has the wrong shape, then we need to switch to a method which gives the correct shape. The defined accrued benefit method, as described in GN26, does just that. If it is used in conjunction with the MFR valuation assumptions, then the past service liability under this method is exactly the value of the accrued liability as required by the MFR. The standard contribution rate would target the projected MFR liabilities at various future dates. (Incidentally, the targeting does not necessarily have to be on 100% of the MFR — one could build in a margin for whatever reason.) So the contribution rate produced would also be of the right shape. If the method is applied in conjunction with the 'dual interest concept', then the dilemma

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referred to in ¶6.1.7 — the one dealing with the inability of the actuary simultaneously to control the past service calculation and the contribution rate; if you get one right, you get the other one wrong — can be solved be detaching the past service calculation from the future contribution rate calculation. If you do that, then the contribution rate for the future could be assessed on the best estimate basis. I do not mean a best estimate only of the interest rate, but also taking account of the financial scenario and the demographic scenario for the future, including new entrants, etc.

We would still need some margins, but I suggest that the matrix of margins would not be as large as that suggested by the authors. The principal margin would be the one necessary for managing MFR volatility, where the technique described by the authors could be applied. The advantages of this approach are that we would not need any side calculations to check where we were with respect to the MFR; the margins held would only be those specifically required to cover the various risks in the way in which the client wished to manage them; and, of course, the whole process would be much easier to explain to clients and members.

(2) *The management of the planned margins.* The authors, quite rightly, point out the importance of proper reporting, otherwise these margins could easily be regarded as spendable surplus by the uninitiated. I would urge that GN9 should be revised to ensure that Scheme Actuaries make this distinction when presenting the valuation balance sheet (for example by showing the margin as a provision for contingencies). However, that would not be enough. The margins arise voluntarily, and they could soon grow to represent a sizeable proportion of the fund — 15% to 20% would not be uncommon. What is more, if they were put there to cover specific contingencies, then the question must arise of what to do with them if the scheme's circumstances changed sufficiently for some or all of them not to be needed any more — for example the margin to manage the MFR volatility in the ongoing scheme would become redundant if the scheme wound up. I would suggest that the actuary has a key role to play in this area, by encouraging the trustees and the employer to think in advance about what they would like to happen to these margins, not just in the ongoing scheme, but also when the scheme winds up or in the event of a bulk transfer. These decisions should then be clearly documented in a legally enforceable manner. Without that, actuaries will run the risk of inadvertently making schemes hostage to predators, or encouraging the Ombudsman and the courts to decide how to spend some of the scheme's money — decisions which were really meant to be made by the trustees and the employer.

(3) *The benefit promise.* The opener has made this point, but I should like to make it once again. The authors quite rightly deal with the distinction between funding, pricing and expensing of the benefit promise in the ongoing scheme; but, of course, there is a further promise of what will happen when the scheme winds up. Many trust deeds define that promise in terms of requiring trustees to purchase annuities, and we can assume that members understand what that means. The authors suggest, in §4.1.3, that some trustees will disregard this and be content to fund to the level of the statutory discharge at the MFR level. If they do this, then, on an actual wind up, members will get less than their promised benefit and somebody will be left with a problem. Whether it is a funding problem or a fault in the scheme's design is academic for members — the actuary is closest to the problem, and they will be looking to him for answers.

Unless we make it a duty of the Scheme Actuary specifically to address this problem with the client when setting the funding strategy, and also in any subsequent reporting of the scheme's financial condition, then it is just a matter of time before a high profile scheme winds up after April 1997, and all the fingers point in the actuary's direction.

Mr J. S. R. Ritchie, F.F.A.: As an actuary working in pensions, but employed by a life office, I often find myself looking for analogies between pensions and life assurance. Life office actuaries, nowadays, have the concept of policyholders' reasonable expectations at the forefront of their minds. As I read the paper, I started asking myself what are members' reasonable expectations in relation to the pension promise?

In this context, I should like to develop a theme touched on by the opener and by Mr Patel — yes,

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communication is critical. In ¶2.9 the authors state: "many of the more aggressive pension funding bases then in use" [this was 1992] "no longer produced a target funding level that covered accrued benefits sufficiently to allow the liabilities to be met by purchase of non-profit deferred annuities".

In ¶2.15 the authors use a telling phrase: "in the recession of the early 1990s, as some schemes wound up without members receiving the benefits that they understood to be guaranteed". In ¶2.18, talking about the Goode Committee's deliberations, the authors state: "A test based on the purchase of a non-profit annuity was rejected, on the basis that the cost of such annuities in a low inflation environment was no longer regarded by business in general as commercially acceptable". In ¶4.1.2 in the sentence: "Large schemes would argue that insurance buy out was unrealistic in any case, although it is not obvious why their trustees should not seek to offer an insurance company level of security to members".

Up to this point I was encouraged that the authors were regarding the members' reasonable expectations as being something close to those of a life office policyholder and worthy of considerable protection. I was, therefore, a little disappointed at the brevity of ¶4.4, which seems to treat the members' interests merely as an aside. If the trustees are the guardians of the members' interests, should they not also be the managers of the members' expectations?

If a test as weak as MFR or anything like it is to be an acceptable basis of funding, surely the trustees should be at pains to point out to the members three things:

(a) the difference between a promise and a guarantee;
(b) the degree to which current funding falls short of a guarantee, and hence the degree to which it is to be hoped that the employer can be relied upon for the shortfall; and
(c) the purchasing power of individual transfers out.

Such a sharp dose of reality might assist members in their personal thinking about things like additional voluntary contributions and other retirement planning. It has to be the trustees who inject this reality, because the employer may find it convenient for the workforce to have an over-rosy view of the security of the pension promise.

In a year or two's time we may be discussing a paper on a central discontinuance fund, which many see as the panacea for bridging the gap between promises and guarantees. If the price of that panacea is the taxpayer being the patsy, rather than facing up to the insurance bases that the authors describe in ¶2.16 as being merely sensible, I believe that that price is not worth paying, quite apart from being outrageously prejudicial to life offices which have to compete in a free market.

Mr G. T. Russell, F.I.A.: My comments are not necessarily the views of my employer, the Government Actuary's Department, nor of clients of the Department for whom I, together with colleagues, have responsibility. These include the DSS, the lead Government Department responsible for the Pensions Act, and OPRA, the new pensions regulator.

The MFR is a central feature of the Pensions Act. As noted by the authors, it follows the original proposal of the Goode Committee that there should be such a requirement, in order to provide members of pension schemes with a minimum level of security for their pension rights, independent of the fortunes of the sponsoring employer. The MFR is, therefore, a discontinuance test, aimed at ensuring that schemes hold sufficient assets at all times, on the basis given, to meet minimum accrued liabilities. Its purpose is to give members and trustees an objective minimum benchmark of the adequacy of their fund and a focus for ensuring that the minimum funding level is monitored and maintained.

In the course of our work, colleagues and I sometimes need to refer to the original Parliamentary debates on the Pensions Act, which took place while the Act was still a Bill going through Parliament. The debates are, of course, recorded by Hansard for posterity, and are littered with references to actuaries and their work. Some of these can make amusing reading some 18 months later.

I recently revisited part of the original debate in the Commons Committee on the MFR and, in particular, the comments made by one Honourable Member who, in struggling to come to terms with certain aspects of the MFR, was forced eventually to concede: "I do not want to get too much involved in the arcane workings of actuaries, because in that way madness lies...". There is,

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fortunately, no madness in this excellent paper and, given the thoroughness and clarity with which their thoughts are developed, I believe that it can, in no way, be described as an arcane work.

My involvement with the MFR is somewhat different from that of others represented here, and thus it is possible that I have a slightly different perspective. Most of you are pensions practitioners, whereas I am responsible, together with colleagues, for advising OPRA, the new pensions regulator, in the enforcement of the new duties placed on trustees and others. These duties include, of course, those relating to the MFR.

However, the role of OPRA is not confined to the enforcement of duties under the Act, for, as the authors note in several places in their paper, Parliament has granted OPRA discretionary powers, in certain circumstances, to extend the time periods for making good deficiencies measured against the MFR. The intention is that this power might be exercised by OPRA on application from an individual scheme in difficulties, provided certain tightly-drawn criteria are satisfied, as laid out in Regulations. Also, in a period of exceptional economic conditions, where it might be anticipated that a large volume of such applications to OPRA would be made, OPRA has been given the power to grant a blanket extension to such applicant schemes. With respect to this power, the authors seem to suggest, in ¶1.7, that it should not be left to individual schemes to set the boundaries of normal economic conditions by past experience or models, as these would involve arbitrary judgements. The authors suggest, instead, that the profession should work together with OPRA to define a set market corridor judged as 'normal', within which schemes should be able to cope without easement. This idea is then picked up again in ¶10.7, where it is more explicitly suggested that OPRA might indicate the level of prudence that it would expect to see before offering relief from MFR difficulties.

I appreciate that these ideas are well meant, and there is certainly some attraction in putting some 'clarity on the situation', but, I would suggest, only if this can be achieved and if it would be desirable. OPRA is already making its mark as an open, approachable and communicative regulator, thus it might be considered to be receptive to any such proposals which could be demonstrated to be workable. However, I do have some reservations concerning this suggested approach. For example, before the MFR Regulations were laid, the DSS issued a number of consultation papers in which views were sought from the profession and others, as to some aspects of the content of these regulations. One of these consultation papers specifically concerned OPRA's powers to extend the time limits for sponsoring employers to restore a deficiency under the MFR. While seeking views as to some aspects of this matter, this consultation paper also referred to a specific item which was not to be a candidate for further discussion. This was the idea that there might be an exact prescription in regulations of the circumstances in which an application to OPRA for an extension of these time limits would automatically succeed. This idea was rejected by the DSS, on the grounds that there could be no such prescription in regulations, because Parliament had granted OPRA a discretionary power.

So, if OPRA were, now, to specify more precisely the conditions under which an application to it would be likely to succeed, it, too, would be restricting its own ability, granted by Parliament, to consider each extension or individual application on its own merits. However well-intended such guidance might be, it would add an extra layer of prescription to the framework set out, and perhaps even envisaged as final by Parliament. In doing so, there could be a risk that OPRA might inadvertently prevent some applications which would otherwise have reasonably been made to it for consideration. Conversely, it might encourage some applications to be made which, otherwise, would not have been made or needed. I believe that it could be questioned, therefore, whether such an approach of developing explicit guidelines would necessarily be in the interests of sponsoring employers, trustees or scheme members. I will leave for lawyers the question as to whether it would be legally proper or prudent for OPRA to fetter a discretionary power granted to it by Parliament in this way.

That is not to say, however, that this is not a worthy subject for airing within the profession. Such debates, even if theoretical, are extremely helpful in assisting all who are concerned with the MFR to come to terms with its practicalities. I simply wish to put down a marker that OPRA might need to reserve its position on the question of explicit guidance on this issue, at least at this time, this being a position which, in ¶4.1.10, the authors seem to anticipate as a possibility. In any case, to borrow

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from the words of the authors at the end of Appendix C, it might be that OPRA, as well as actuaries, cannot claim possession of a perfect crystal ball!

Moving on to other issues, perhaps inevitably the paper also covers the implications arising if the funding strategy is to pay only minimum compliance contributions. Section 6.3 is devoted to this issue, although, while accepting such a strategy as the privilege of clients, the authors are careful to point out the very real problems likely to arise. For example, the authors note the practical difficulties in the calculation of these minimum contributions as well as the increased risk of adverse market movements, even before the actuary certifies the chosen contribution level as being adequate.

It is, of course, right that the authors should, additionally, draw attention to the increased professional risks incurred by the actuary when signing off such a schedule of minimum contributions. However, I am sure that the authors do not intend to place the focus solely on the protection of the actuary's own professional position, as might be interpreted, for example, from a reading of ¶11.4 or other places in the paper where this problem is mentioned.

As mentioned by previous speakers, in particular Mr Patel, there is potentially more at stake here, for the risk of damage to an individual actuary's professional reputation might be of little consequence when measured against the loss of a sizeable proportion of the value of the accrued rights of the pension scheme members, on an actual discontinuance. As an illustration of this point, the authors show, in ¶6.3.4, that a possible scenario for one of their mature model schemes would be a funding level of 87%, against the MFR, if minimum contributions are paid and if things go badly. The authors note that this means catching up 13% over 7 years. An alternative consequence, however, which would be very damaging to the scheme members, would arise if the scheme happened to discontinue at the wrong time.

This might not be an unlikely scenario, given that, as we know, the wish of a sponsoring employer to pay minimum contributions to a pension scheme might not be unconnected to underlying financial difficulties in his business, and this, in turn, could be associated with unfavourable movements in the markets which could have been the trigger for things going badly in the pension scheme in the first place. This alternative consequence, therefore, might be that members lose 13% of their accrued pension rights in the scheme, measured on the MFR basis.

Mr J. R. Gibb, F.F.A.: I have one point that I should particularly like to raise, which is that we finish up with a form of SSAP24 that is intelligible to users of accounts and is reasonably consistent. The present system has not worked at all well. I incline to the view, as Adam Smith said, that a little certainty is worth a great deal of striving after perfection. A specific basis on which the pension costs were determined would be a great improvement, particularly for listed companies. The actual basis is not too important; consistency is vital.

Mr C. M. Stewart, C.B., F.I.A.: There are two matters which have not been touched on in the discussion so far. One which has concerned me for some time is the size of the benefit payable to an early leaver from a final salary scheme. The cash equivalent of the minimum funding requirement, or possibly a bit more in schemes which still have an obligation to try to purchase deferred annuities in the market, is, in my view, inadequate. When preservation legislation first came out the benefit was a frozen pension, and M. D. Thornton pointed out at that time that, for young and middle-aged members, a return of the member's own contributions was a more favourable benefit than the value of a frozen pension, given that inflation at the time was fairly high.

We are not quite in that position now, but a member joining a scheme in his 20s and leaving at age 30, say, is going to get a cash equivalent that represents very little more than, let us say, 5% of pensionable pay for each year of service. Competition with personal pensions is growing, and may take a different turn if there is a change of Government with a change of policy. If you compare what a young pension scheme member would receive on changing jobs if his pension rights had been in a personal pension accumulating 5%-a-side contributions, i.e. a total of 10% of pay, that would produce a considerably larger benefit than the cash equivalent of the accrued rights in a good occupational pension scheme of the final salary type. For a young member who thinks that he might change his job, a good personal pension is likely to be a better buy than a good final salary scheme.

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The other matter is that there seems to be a presumption that an accounting standard will be different from a funding standard. I have never found that easy to accept. I see no reason at all why there could not be a single valuation method which covers the requirements of both the accounting profession and the actuarial profession.

In the early 1980s, when my concern, in the Government service, was with the social security scheme, my only connection with occupational schemes was as reinsurers of GMPs. Correspondingly, contracted-out schemes were required to certify that, if the scheme were to wind up at any time in the next 5 years, then, in the normal course of events, the assets would be sufficient to secure the GMPs and other priority benefits. I, therefore, suggested that we should follow D. J. D. McLeish's idea of making wind-up benefits the funding target, but also introduce a statutory requirement providing for the whole of the wind-up pension to be revalued in line with the general level of earnings up to retirement age. If that suggestion had been adopted, the funding target and the funding standard achieved would have been on a par with the projected unit method, and this would have brought us very close to having a funding method which was also suitable for accounting purposes.

Another way of arriving at much the same result as D. J. D. McLeish and I mentioned in our paper 10 years ago ('Objectives and Methods of Funding Defined Benefit Pension Schemes', *J.I.A.* **114**, 155-225 and *T.F.A.* **40**, 338-424), although we did not like it, would have been to define the member's accrued rights on wind up as the cash equivalent of past service reserves. This would have linked the members' accrued rights with funding by the projected unit method.

In his introduction, Mr Keogh showed that the MFR was well below the results for the generality of valuation methods. That would not have been the case if the members' accrued rights had been defined in either of the ways that I have suggested.

If we could improve the members' accrued rights, we could have a single approach which would satisfy both funding and accounting requirements, instead of, as seems likely, ending up with three separate valuations: one on the statutory basis; one for accounting purposes; and yet another for funding purposes, based on the projected unit method on the actuary's own assumptions.

I think that actuaries, accountants and, possibly, also pension lawyers should get their heads together and see whether they cannot make progress in this direction.

Mr C. W. F. Low, F.F.A.: The paper is timely, but it is well ahead of its time, because it will be a long while before actuaries will have time to study its implications, a lot longer before clients will be prepared to hear us talking about them, and even longer before they start to think of acting on them. All in the pension industry must be very concerned at the speed at which the MFR is being implemented. Those of us who have been close to it have been trying to influence, with varying degrees of success, how it might end up. No doubt some have been analysing approximately, and then more accurately, how it might affect their largest clients, and then advising them what they might do.

This is fine for the very large schemes which have done more than one asset/liability modelling exercise and which are, maybe, concerned about having to move out of equities into gilts; hence the equity easement. I am concerned with the smaller clients as well. I suspect that there are very many clients of life offices with small schemes well below what the authors envisage by small. We have within the MFR a very fundamental mismatch between the short term and the long term. Many of these trustees are only now waking up — if, indeed, they have yet woken up — to things like MNTs and dispute resolution procedures needed in the course of the next few weeks, and are relieved to see that their first MFR valuation is about 2 years away. Despite the best efforts of many actuaries, they will continue with their traditional valuation method, be that projected unit credit or attained age or some other traditional method, at the first MFR valuation, and only when they get a different picture at the second MFR valuation will they begin to think at all along the lines that the authors have presented. We are now talking, probably, of the early years of the next millennium.

It is inevitable, over time, that they will move to a percentage of the MFR and move away from long-term matching to short-term matching. This, however, is very many years away. Meanwhile, we must recognise that, despite the press publicity and the undoubted moves of certain large employers from final salary schemes to money purchase schemes, it is surprising just how tenaciously some small employers hold to their much loved final salary schemes.

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The insurance industry used to be able to offer a good matched product for such schemes — the deferred annuity. While there are still some contracts in use — and I am not sure how many there are open to new business — very many moved to a deposit administration contract. That is something which could not be more mismatched from the MFR, and where the dangers are not the dangers that people instinctively think of, but the dangers of a sudden rise in the equity market, making the scheme insolvent on the MFR basis.

That danger exists even with a deferred annuity contract, because virtually all deferred annuity contracts are on proximity purchase and are not purchased according to the accrued benefit. Therefore, the pound-for-pound matching, which is available as an MFR relief, does not apply, and the scheme is also terribly exposed to a sudden rise in the equity market.

Perhaps, in a Faculty meeting, it is not inappropriate to suggest to life offices that there could be a market opening up for deferred annuities throughout the age range. Of course, it may not be attractive to offices, who have to hold mismatching reserves by the Government Actuary's requirements, and who can see a more profitable use for their capital in unit-linked contracts.

There is a great need for these contracts to serve small schemes where employers appear still to wish, in some considerable numbers, for a very few employees to retain a final salary basis. Perhaps some response from some life office may appear.

Mr R. K. Sloan, F.F.A.: I have a few thoughts that lead in a certain direction. One speaker pointed out that it is no longer possible to have a stable funding contribution rate. I remember thinking that same thought when SSAP24 was being introduced, in that it seemed a bit of a self-contradiction, which now seems eventually to have been recognised. The second point relates to SSAP24, where Mr Gibb referred to the fact that we now have a single prescribed method. I remember well the debate at that time, when most of the profession argued that we needed to retain flexibility. I felt then that we should have had a prescribed method, and be done with it, for the limited purpose of accounting presentation, but continue to rely on our independent professional control to manage the actual input of real money into pension funds.

The next thought was the analogy made by Mr Ritchie in the area of life assurance. There is also a clear analogy with final salary schemes in targeted money purchase. In essence, that is what all final salary schemes are in a macro sense. At the end of the day they are basically money purchase, in that they can pay only such benefits as are supportable by their assets. Mention was made of switching to money purchase, which I believe is usually undertaken in too crude a fashion, hence the comments made by Mr Stewart. If one were to replicate final salary provision by genuinely targeted money purchase contributions, all might be more or less as it is at the moment, except that the whole fund would be split into each member's individual component parts.

The key element is on the wind up of a scheme, when this approach would still be satisfactory — provided that the members' fund shares, or cash equivalents, could be paid into a with-profits contract or the type of contract that Mr Low was suggesting. In other words, if the MFR were triggered through a fall in the equity market, or if this led to a scheme winding up, members' cash equivalent fund shares would likewise be in a similar position, and would be capable of recovery on the eventual upturn in the market. It is the requirement to buy non-profit deferred annuities that can be very difficult to meet in such circumstances.

I am not suggesting that schemes should necessarily alter in this way, but the analogy is helpful to bear in mind. What emerges, as a message to me, in trying to settle the margins which have very interestingly been put forward in the paper, is that, perhaps, we should be careful about having too many margins. If one cannot meet the MFR, again at a time when the market is low, then the requirement to inject contributions to restore the requisite level perhaps occurs at an opportune time in the market. There is always the question of whether the employer has the ability to inject extra funds, or to adopt a pace for funding that does not suit its requirements. I would, therefore, like to see existing funding patterns maintained as far as possible, while keeping an eye on the MFR, but trying not to create too many artificial margins beyond what we would otherwise really feel to be necessary.

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The President (Mr P. H. Grace, F.F.A.): Mr Stewart drew attention to the problem that a return of contributions produces a more favourable result for the young early leaver. We are still waiting for the revised GN11, and the cash equivalent transfer value is to have a floor based on the MFR. However, it would be unfortunate if the introduction of the MFR led to a reduction in transfer values, especially for younger lives, thus triggering some of the problems which Mr Stewart has raised.

Mr R. M. Paul, F.F.A.: I raise an issue which relates to public interest. The recent Presidential Addresses concentrated on the possibility of the profession taking up such issues. One such issue relates to the MFR, to which, it is my understanding, that public sector schemes are not subject. The reason advanced is that the public purse effectively underpins these schemes, which is possibly acceptable.

However, what of the cash equivalents for transfer values for people leaving service? GN11, I understand, left in the two options of the MFR basis as an underpin or the actuary's own basis. I agree with the President's comment in hoping that these bases do not automatically fall to the MFR floor. Public sector schemes do not have the protection of the MFR floor for cash equivalents.

Currently public sector schemes calculate cash equivalents on a gilt basis. Therefore, the results produced are greater than those on the MFR basis. It is possible that economic conditions could change and gilt yields increase to a level at which the public sector basis would produce results below the MFR floor. If that is the case, if it is reasonable that the MFR floor is considered a necessary minimum, should that protection be given only to the private sector and not to the public sector? Is this in the public interest?

Professor A. D. Wilkie, F.F.A., F.I.A.: I have two small points, not to do with the main substance of the paper. One is on the authors' use of statistics in Section 5.18. They seem hesitant about what they can do to add means and variances when they are summing a number of random variables. I can assure them, and other readers, that, if you sum a number of random variables, the mean of the sum is the sum of the means, quite regardless of whether they are normally distributed or anything else. It does not depend on distribution at all. Likewise, the variance of the sum is the sum of the variances plus the co-variance terms — again whether they are normally distributed or not.

The heroic assumption that the authors want to make is that investment and other aspects (mortality, etc.) are independent. This is a perfectly reasonable assumption, but it is one that we need to think about. For example, it is possible that withdrawal rates from a company might be high when the economy is booming and people are getting jobs elsewhere, or, alternatively, that redundancy rates are high when the economy is doing badly and the company is shedding labour.

In ¶5.18.1.4 the authors mention concern about the binomial distribution. Again, the binomial distribution can be extremely closely approximated by the normal, assuming that the number of deaths, or whatever, is reasonably large — at more than about 30 or 50 deaths a year, the binomial and normal distributions are almost the same. I would not like anybody to feel that the theory only works out in practice if everything has normal distributions.

The other point is to do with accounting. I happen to know, secondhand — and I am far from an expert on this — that the International Accounting Standards Committee, which represents accountants throughout the world, is seeking to lay down a system of accounting for companies world-wide, so that companies who are seeking quotations on different stock exchanges will have to prepare only one set of accounts, rather than two sets of accounts, one of which conforms to, say, British accounting standards, another which conforms to American standards, and so on. The British Accounting Standards Board is making representations to the IASC on this subject.

I understand that there is still disagreement on how to deal with pension costs. The particular point on pension costing is whether you should be using a gilt-type rate, or a corporate loan rate, or an equity-type rate when discounting the benefits for company accounts. In due course the issue will be resolved in some way, and I would guess that the British actuaries who are pressing the point are losing the case, and that eventually the gilt rate, or probably the corporate loan rate, and that might be the gilt rate plus 2%, will eventually be adopted. It does mean that, instead of SSAP24 and FAS87, we will have only one standard.

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Mr P. M. Greenwood, F.I.A. (replying): I think that the opener was being more conservative than we were, and we would not disagree with most of his comments. The point on security is one area where we would disagree. We see discretion disappearing, and certainly by the time our techniques are adopted, which, if Mr Low is right, will be 2005, there will not be too much of it left. Because of that, we see the importance of our techniques increasing.

We also disagree with the opener, to some extent, on the wording of the Act. We see the Act as placing a legal responsibility on trustees to maintain the MFR. It is just unfortunate that the Regulations have not given them the power to deliver the goods, which, to some extent, still falls in the employer's pocket. The trustees are not prevented from negotiating with the employer from a position which, we believe, starts from their duty as imposed by the Act.

We are not envisaging a pure market value expensing standard. What actually comes out of the MFR, if you adopt the schedule of contributions technique, is certainly the dominance of the notional position, which produces, in most instances, a smoothed value.

Where we disagree is on the importance of the long-term view. When I look back at the client base I last worked on, there has been a substantial change in each company. They have either been sold, bought or wound-up. Not one of the pension schemes has a demographic profile which could have been predicted 10 or 15 years ago. Indeed, the rate of economic change is probably increasing rather than decreasing. So, increasingly we see the long-term view as being of less relevance.

That leads us on to sale and purchase. Different employers, using the techniques in the paper, will undoubtedly end up wishing to bear different degrees of risk. We see the margin, when you enter a sale and purchase situation with two different margins, becoming the horse trading of the sale and purchase deal, and a commercial decision results in the same way as the current tweaking of the PUC basis is part of the horse trading and the commercial decision.

Concerning Mr Patel's points, we felt that he was playing with words to some extent. Where we see a slight difference is in the adoption of a margin above the target, and how you define that margin. We would argue that the MFR has tried to redefine the benefits promise. The debate on cash equivalents after the Goode Report came to the conclusion that the level of security implied by funding for deferred annuities was not commercially affordable. The MFR defines a minimum acceptable level and a balance of security between the member and the employer. What the 'Planned Margin' method is trying to do is to deliver that security in a majority of circumstances.

Similarly, we would agree with much of what Mr Ritchie said. We think that the MFR debate possibly changed reasonable expectations, as defined in the industry. We recognise that communication is essential, and that members' expectations may not yet be reset. We, too, have similar concerns about central discontinuance funds.

To Mr Russell and OPRA, we would say that we have heard the view from elsewhere that OPRA would not wish to specify its operation of discretion because some lawyers reckon that it does not have the power to do so. We are looking for a regime similar to the one under which the Inland Revenue operated for several years. Discretionary guidance was issued, and it still had powers to exercise its discretion outside that regime. I note, however, that the Inland Revenue has indicated that it no longer wishes to have full discretion.

On Mr Stewart's comments, we have to decide the nature of the debate and whether the debate we have had on the MFR has ultimately changed the level of security which members expect. I have estimated a time when I think that the techniques in the paper will be adopted. I suspect, like Mr Low, that it will be after the next recession or during the first part of it. I think that people will get a rough ride in respect of the MFR at that time, and will then move to what they possibly should have been doing in the first place.

I was not in too much disagreement with what Mr Paul or Mr Sloan said. One thing that I should like to add is that we foresaw, in ¶5.1.9, that, if people still wished to bear some degree of risk and they wished to do a check that the risks that they were bearing were in line with the cash calls that they could afford, back to 90% from, say, 77%, then one could set the funding level at 77% plus the margin, or check that the PUC funding level was above that level.

The President (Mr P. H. Grace, F.F.A.): We have had a very useful discussion. We are at the

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beginning of a new era of pension funding, and I am sure that it will not be the last time that we will hear the MFR mentioned at one of our meetings. I should like to thank all the contributors for the part they have played, and I appreciate the time and energy devoted by the authors in producing their paper.

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