

Presented to the Staple Inn Actuarial Society

on 19th February 1991

**ASSET SHARES AND SURPLUS MANAGEMENT
IN A PARTICIPATING FUND**

by

Michael Freeman MA, FIA

ASSET SHARES AND SURPLUS MANAGEMENT
IN A PARTICIPATING FUND
by Michael Freeman MA FIA

1.	Introduction	1
2.	The Accumulation and Projection of Asset Shares	4
3.	The Control of Fund Surplus	15
4.	Conclusion	25
	Acknowledgments	26
	Appendix: Examples of Asset Share Methodology	27
	Definitions	33
	References	34

Presented to the Staple Inn Actuarial Society on 19 February 1991

SECTION 1

INTRODUCTION

- 1.1 The management of a participating or with-profit fund has as its goal two key objectives: firstly, the maintenance of the solvency of the fund and secondly, the equitable treatment of policyholders. Clearly, the bonuses declared are a major determinant in the achievement of these objectives.

This paper outlines a framework by which bonus declarations may be formulated which balances the need to provide a fair treatment to individual with-profit policyholders with the need to ensure the on-going security of the with-profit fund.

- 1.2 It is becoming increasingly widely acknowledged within the actuarial profession that the fair treatment of policyholders entails that benefits should be declared with reference to suitably calculated asset shares based on historic experience.

The nature of with-profit business is such that although it is appropriate that benefits provided to policyholders reflect the accumulated value of their investments, it is also to be expected that actual benefits paid will reflect some smoothing of experience and also some contribution either to or from fund surplus so as to maintain the surplus position of the fund at an appropriate level.

Policyholders may reasonably expect that whatever method is chosen to determine the benefits payable to them, whether at maturity or surrender, those benefits should reflect

- the accumulated value of their investments, that is, their asset shares
- a consistently applied mechanism by which benefits are determined in relation to asset shares

The methodology by which asset shares are calculated combined with the methodology by which benefits are determined from those asset shares may be described as the office's distribution philosophy. The distribution philosophy determines both the bonuses declared and also the scale of surrender values. Policyholders may reasonably expect that benefits payable to them reflect the office's distribution philosophy and that this philosophy, once set, should be maintained, or if changed, should change only gradually over time.

- 1.3 This paper will argue that bonus declarations cannot be made by reference to asset shares alone but may be made only after examining the future consequences for the fund of consistently applying the office's distribution philosophy to current and projected asset shares in respect of both in-force and new business.

In particular, the projected surplus - or free asset - position of the fund will need to be assessed. This may best be done in relation to a defined surplus target, with such a surplus target likely to depend critically on the investment mix of the fund. If the projected surplus position of the fund is found to be unsatisfactory the office will need to reconsider one or all of its

- distribution philosophy
- investment philosophy
- new business growth objectives, or product mix

- 1.4 Section 2 of this paper explains why asset shares alone cannot be used to determine policyholder benefits. The need to set and maintain a distribution philosophy which will define the benefits payable is described.

Section 3 discusses the need for fund surplus and approaches to assessing whether the distribution philosophy adopted is sustainable and the possible courses of action which may be taken if it is not.

- 1.5 Throughout this paper I have concentrated on describing the theoretical outline of an approach to the integrated control of policyholder benefits and of fund surplus. Although this approach is intended to be a practical one, for the sake of clarity of the overall approach I have not discussed practicalities at any length.

SECTION 2

THE ACCUMULATION AND PROJECTION OF ASSET SHARES

- 2.1 The use and calculation of asset shares in the management of with-profit business are being increasingly widely discussed within the actuarial profession. Notable recent papers dealing specifically with these topics have included a discussion paper presented at the UK Actuarial Convention at Harrogate in September 1989¹ and a paper by David Kerr presented to the Institute of Actuaries of Australia in August 1990².

In this section I shall explore the ways in which asset share techniques may be used as a tool in the difficult task of determining policyholder benefits, but will argue that their use cannot be viewed in isolation from investigations into the current and projected financial status of the fund as a whole.

2.2 The Asset Share

The discussion paper on asset shares presented at the Harrogate conference surveyed the range of techniques currently used by UK with-profit offices. In the introduction to their paper the authors state that the objective in an asset share calculation is to 'determine the amount of money accumulated under each policy' but go on to remark that in practice this seemingly simple concept may be applied in a variety of ways.

In particular, the paper describes varying practice between offices in respect of the calculation of investment returns to be credited to policies, the allocation of expenses, the treatment of mortality and surrender profits, allowances for tax, shareholder transfers, contributions from non-profit business and financing costs and credits. As the paper shows, a variety of treatments in all of these areas are currently in use. However, I would argue that one should not infer that some treatments are necessarily more 'correct' than others.

- 2.3 The pooled nature of the participating fund with its complex (and unrecorded) internal financing flows, tax and investment cross-subsidies and mix of participating and non-participating policies mitigates against the establishment of the precise theoretical components of a policy's asset share.

This is not to undermine the importance of asset share calculations, but merely to emphasise that no single quantity can be described as the 'true' asset share of a policy.

- 2.4 If asset shares are to be used to provide guidance on the determination of surrender values and bonuses, then they will need to reflect the experience of the fund in respect of investment returns, expenses and the cost of risk benefits and be based on a methodology that treats policyholders of different generations and of different duration in an equitable manner. These requirements may however be legitimately interpreted in a number of ways.

The pursuit of a rigorous theoretical basis for the asset share calculation may be less valuable than the development of a consistent approach to the determination of policyholder benefits taking account of actual and projected asset shares however calculated. In this way it is possible to establish a consistent distribution philosophy that does not result in unsustainably high or unreasonably low benefits for policyholders.

- 2.5 It may be more appropriate to consider the basis for calculating asset shares as akin to a pricing basis. Just as the pricing basis for a non-participating contract determines profit and the rate of return for the proprietor of the fund, then the asset share methodology and distribution philosophy determine profit for, and rate of return on, free surplus.

- 2.6 To explain this further it is useful to consider the analogy with the accumulation of policyholder benefits under a unit-linked plan. Under a typical unit-linked plan premiums are invested in units after a deduction to provide for expenses and profit. In addition some premiums may not be allocated at all in the early part of the contract. Deductions are made from the unit fund representing administration and/or fund management expenses. Deductions to pay for death benefits in excess of the unit fund may also be levied. Although offices typically retain the right to vary deductions made from the fund, these deductions will not usually be frequently altered, except to allow for expense inflation. Thus, in essence, the future expense and mortality deductions made from policyholder premiums are fixed at the commencement of the unit-linked policy. The determination of these deductions will, of course, have been made by the office on the basis of its assumed pricing basis and profitability criteria. Deviations in experience from that assumed in the pricing basis in respect of expenses, deaths and surrenders will not impact the benefits received by the policyholder (except through changes made to the deductions levied on the fund, and these are likely to be minor). However, any variation in investment return will represent an additional gain or loss to the policyholder.
- 2.7 By contrast, policyholder benefits under a with-profit contract are determined by the office at each bonus declaration and at each review of the surrender value basis. The process can be thought of as an on-going re-pricing of the contract in the light of actual experience. For the unit-linked plan, such pricing is in essence performed once only, namely at the sale of the contract. Hence if the asset share calculation is used as a guide to the determination of bonuses and surrender value scales it may best be viewed as a pricing calculation which like any pricing calculation is simply a mechanism which determines simultaneously the earnings to be retained and the policyholder benefits payable.

2.8 The analogy between the asset share calculation and the pricing calculation suggests two key aspects of the basis on which asset shares are assessed. First, that just as there is no universally 'correct' pricing basis in any given circumstances, there is no universally 'correct' asset share basis. Secondly, just as the impact of a pricing basis needs to be assessed in relation to desired profitability criteria, the impact of an asset share calculation which is used to determine policyholder benefits needs to be assessed in relation to its impact on the surplus - or free asset - position of the fund as a whole.

2.9 The Attributable Share

At this point I wish to introduce a further theoretical concept, namely that of the 'attributable share'.

One of the great strengths of the with-profit contract as an investment vehicle is that the policyholder does not expose himself to the full investment risks of equity investment and yet may still benefit from an investment policy which is heavily weighted towards equity investment. This characteristic implies that the proceeds of a with-profit contract do not simply equal the asset share of the policy but include a 'smoothing contribution', which may be either positive or negative. This contrasts with the unit-linked saving plan under which proceeds are strictly determined by the returns achieved from the underlying assets.

In theory, smoothing of experience extends beyond investment returns to include all items of experience, but in practice, the smoothing of investment returns is likely to form the major component of the smoothing contribution.

The 'smoothing contribution' represents one adjustment to the asset share. A second adjustment may be termed the 'surplus contribution'. Surplus contributions provide free assets which may be used to finance new business strain. If the office's new business growth plans are such that it is not possible

to finance the costs of writing new business from the asset shares of existing policyholders then surplus assets will be required to finance that growth. To build up such surplus assets a contribution from policyholders' asset shares is required.

The total benefit value which may thus be ascribed to an individual policyholder I shall term the 'attributable share',

$$\begin{array}{rcl}
 \text{ie} & \text{Attributable Share} & = \text{Asset Share} \\
 & & \pm \text{Smoothing Contribution} \\
 & & \pm \text{Surplus Contribution}
 \end{array}$$

- 2.10 In practice, depending on the calculation methodology used, the asset share itself may already comprise either or both of the smoothing contribution and surplus contribution. However, it is useful in setting and describing a distribution philosophy to make the theoretical distinction between the asset share based on actual experience and the smoothing and surplus adjustments determined by the office's distribution philosophy.

In this way one can identify the amount the policyholder may be said to have earned, as determined by the asset share, and then address the distinct questions of what are appropriate smoothing and surplus contributions. This allows the methodology used in the asset share calculation to be fixed and the actual historic experience of the fund to be reflected in the resulting asset shares.

- 2.11 Both the smoothing and surplus contributions are made at the time the policy matures, or is surrendered, rather than being built up over the lifetime of the policy. Thus, while a policy remains in-force, no contribution has in practice been made. The approach of defining the contributions to be made to or from the policy at the time the policy leaves the fund has two particular advantages.

Firstly, it enables the distinction between the asset share and the attributable share to be clearly maintained. The deduction of contributions from the asset share on, say, a year-by-year basis will distort the accumulation of income and outgo for individual policyholders and thus will not enable the amount the policyholder may be said to have earned to be explicitly identified.

Secondly, a different treatment of surrendering and maturing policyholders may be an element of the office's distribution philosophy. A regular contribution to surplus over the lifetime of the policy may not generate the desired distinction in treatment between surrendering and maturing policyholders. This is not to argue for or against a distinction in treatment between surrendering and maturing policyholders, but merely to highlight the point that a distribution philosophy based on contributions made at the time the policy leaves the fund will provide the office, if desired, the opportunity to make such a distinction.

- 2.12 The distribution philosophy should typically provide a formula or set of rules by which the smoothing and surplus contributions are to be derived. The size and direction of the smoothing contribution will depend on the relation between historic experience and the expected long-term outcome. This contribution will naturally fluctuate over time. By contrast, the surplus contribution should not be allowed to fluctuate merely so as to provide for particular outcomes of new business growth. To do so would unjustifiably alter the benefits payable to different generations of policyholders.

2.13 Policyholders' Reasonable Expectations

Policyholders' reasonable expectations have recently been addressed by an Institute working party³. In their discussion paper the working party reported views that 'policyholders are entitled to expect that benefits will reflect the accumulated value of premiums paid less expenses and the cost of risk benefits, in accordance with the actual experience of the office'. However, I

do not believe that this implies that policyholders reasonably expect asset shares to be calculated in one particular fashion or another. What is as important is that once the methodology by which asset shares are to be calculated has been determined and the distribution philosophy of the office has been set it is reasonable to expect that the defined approach is maintained.

Nevertheless, restricting the office to the indefinite maintenance of its existing distribution philosophy may not be in the best interests of policyholders. In some circumstances - such as a change in operating environment - it may be more advantageous to policyholders for the distribution, or investment, philosophy to change, than for the distribution philosophy to remain unaltered with a long term deterioration in benefits. For example, it may be preferable to increase the surplus contribution to allow for more rapid growth if this has the longer term effect of reducing unit costs. Equally if equity returns were perceived to be becoming more volatile, adjustments may be necessary to the smoothing contribution so as to allow for a continuation of the existing equity backing ratio.

However, as the reasonable expectations working party paper comments, gradual changes in distribution philosophy are more likely to be accepted by policyholders than major discrete changes. The only exception to this would be a change in approach that enhanced policyholder benefits.

- 2.14 The requirement that policyholder asset shares reflect the experience of the office leaves open the question of precisely which elements of experience should be incorporated into the asset shares. It also leaves open the question of whether the office's actual experience should be fully incorporated into the asset share calculation or whether elements of the experience - such as those of an exceptional nature - should be excluded.

For example, although it may be expected that asset shares should incorporate the expenses of policy administration and the costs of risk benefits it remains

an open question as to, say, whether surrender profits or financing costs should be included. There is no necessarily correct answer to this. The office can only be guided by past practice and by its ability to sustain its choice in relation to the future impact on the fund.

It is the suggestion of this paper that whatever elements of experience are included in the asset share calculation, the calculations should incorporate as fully as possible the experience of the office rather than say a notional basis of assumed credits and costs. This ensures that 'benefits are in accordance with the actual experience of the office'. In this way fluctuations in experience will be incorporated into the asset share. The derivation of the attributable share will determine how these fluctuations are to be smoothed.

- 2.15 There is however a case for excluding from the asset share calculation elements of experience which may be identified as being of an exceptional nature and outside the normal fluctuations of experience. Such elements would be those which fall outside the capacity of the pre-defined smoothing mechanism to allow adequately for the proper smoothing of experience.

An example might be those expenses of a non-recurrent nature incurred in a particular period which it would be unreasonable to deduct from the asset shares of one particular generation of policyholders. A further example could be unusually high mortality costs sustained for a short period - such as those incurred as a result of AIDS.

It is unlikely that 'exceptional' investment returns should ever be excluded from the asset share calculation, since the smoothing mechanism should specifically incorporate allowances for even extreme investment conditions.

- 2.16 The asset share should thus incorporate the actual experience of the office in respect of the elements of credits and debits to be included in the asset share calculation. Only features of experience which are clearly of an exceptional

nature should be excluded. Even if actual historic experience is unavailable (indeed this is most likely to be the case) the use of proxies such as investment indices, expense indices and so on should be fashioned as far as possible to reflect the experience of the fund. The asset share calculated in this way provides an anchor point from which considerations of equitable smoothing and surplus contributions may be made.

- 2.17 It is important to recognise that calculating asset shares on any basis other than that representing the actual experience of the fund will result in total asset shares being unequal to total assets. For example, if less than the full costs of mortality or full costs of expenses are deducted from the asset shares of in-force policies then, assuming there is no contribution from other sources, total asset shares will exceed total assets. Equally, if surrender profits are not credited to in-force asset shares this will result in total assets exceeding total asset shares. The Appendix to this paper shows some simple illustrations of this effect.

These examples illustrate that it is not possible to determine the basis on which asset shares are to be calculated without considering also the impact on the fund as a whole.

- 2.18 The manner of the derivation of the attributable share from the asset share defines the office's distribution philosophy.

The need to meet policyholders expectations requires that once set, the office's distribution philosophy should be set so that it may remain unaltered, unless that alteration improves the benefits payable to policyholders. Hence there is a need to ensure that in determining policyholder benefits, the existing or proposed distribution philosophy is sustainable with respect to the projected surplus position of the fund. This provides the link between meeting the reasonable expectations of policyholders and ensuring the security of the fund.

2.19 Practical Application

The practical application of this approach requires that, in setting bonus scales or surrender value scales, asset shares based on historic experience should at least be calculated for sample representative policies. These asset shares may then be projected based on the office's assumed future experience in the same manner as that experience would be incorporated into future asset share calculations. This requires assumptions as to the office's future investment mix, investment returns and other operating experience. The application of the office's distribution philosophy to the current and projected asset shares determines the attributable shares. Bonus scales and surrender value scales may then be fashioned so as to reflect the attributable shares.

2.20 The suitability of new business premium rates may be assessed by comparing projected asset shares of new policies with the projected bonuses indicated from projections of in-force policies. If the application of the distribution philosophy to projected asset shares of new policies implies bonuses inconsistent with the bonuses payable to in-force policies this indicates a need to revise new business premium rates if all policies are to receive benefits under a single scale.

2.21 The sustainability of the distribution philosophy may then be tested by projecting the fund as a whole, together with assumed new business growth, under the office's projected experience and under the bonus and surrender value scales derived from the projected attributable shares.

2.22 Summary

Policyholders are reasonably entitled to expect that benefits will reflect the accumulated value of premiums paid less expenses and the cost of risk benefits, in accordance with the actual experience of the office. Nevertheless there is no single method by which asset shares are calculated which may be said to be the correct method in any given circumstance.

The methodology by which asset shares are to be calculated should be assessed with regard to the expectations of policyholders generated from past practice and if changed should be changed only gradually.

Asset shares should however incorporate as fully as possible the actual experience of the office except for exceptional items which it would be unreasonable to include in the asset shares of a single generation of policyholders.

The attributable share, representing benefits actually payable, should be derived from the asset share by application of the office's distribution philosophy. The office's distribution philosophy describes the way in which smoothing and surplus contributions are deducted from (or credited to) the individual asset share.

The sustainability of the distribution philosophy may be determined by projections of the fund under the continued operation of the proposed philosophy.

SECTION 3
THE CONTROL OF FUND SURPLUS

- 3.1 Having established projected benefit levels based on the application of the office's distribution philosophy, the sustainability of the distribution philosophy can be tested using a projection of the fund, incorporating estimates of new business growth.

Two surplus measures may be used to assess the viability of the distribution philosophy:

- Statutory Surplus defined as Total Assets less Statutory Reserves
- Realistic Surplus defined as Total Assets less Reasonable Expectations Liability

The Reasonable Expectations Liability is determined using the benefits projected under the application of the office's distribution philosophy to projected asset shares. All other elements of future experience should be based on a realistic, or best estimate, basis.

- 3.2 Realistic Surplus may be seen to be equivalent to

Assets less Current Attributable Shares
 less Liability for elements excluded from Asset Shares

To demonstrate this, consider the case where at maturity, policies are paid their whole asset share with no surplus or smoothing contribution, where the asset share is calculated so as to include all items of income and outgo experienced by the fund. In this case the prospective Reasonable Expectations Liability is equal to the total retrospective in-force asset shares.

In an algebraically simplified form this may be seen as follows:

$$\begin{aligned}
 \text{Realistic Surplus} &= \text{Assets less Reasonable Expectations Liability} \\
 &= \text{Assets} - (\text{Value Future Maturity Benefits} \\
 &\quad + \text{Value Future Claims} \\
 &\quad + \text{Value Future Expenses} \\
 &\quad - \text{Value Future Premiums})
 \end{aligned}$$

$$\begin{aligned}
 \text{Maturity Benefits} &= \text{Accumulated Value of Current Asset Shares} \\
 &\quad + \text{Accumulated Value Future Premiums} \\
 &\quad - \text{Accumulated Value Future Expenses} \\
 &\quad - \text{Accumulated Value Future Claims}
 \end{aligned}$$

where the accumulation is performed under the same assumptions as those used to calculate the Reasonable Expectations Liability.

$$\begin{aligned}
 \text{Hence, Value Future Maturity Benefits} &= \text{Current Asset Shares} \\
 &\quad + \text{Value Future Premiums} \\
 &\quad - \text{Value Future Expense} \\
 &\quad - \text{Value Future Claims}
 \end{aligned}$$

so, by substitution,

$$\text{Realistic Surplus} = \text{Assets less Current Asset Shares}$$

This amount represents the accumulated value of past differences between asset shares calculated allowing fully for all elements of experience and the benefits actually paid.

In the terminology of this paper, this amount could have arisen from three sources:

- past smoothing contributions
- past surplus contributions
- income (or outgo) not allocated to the asset share

If, at maturity, policies are paid less than their asset share, that is they are paid their attributable share after deducting a smoothing and/or surplus contribution and the asset share is calculated excluding certain elements of experience, then the Realistic Surplus in the fund may be defined by

$$\begin{aligned}
 \text{Realistic Surplus} &= \text{Assets less Reasonable Expectations Liability} \\
 &= \text{Assets less Current Asset Shares} \\
 &\quad \text{plus Value Future Contributions} \\
 &\quad \text{less Liability for elements excluded from Asset Shares} \\
 &= \text{Assets less Current Attributable Shares} \\
 &\quad \text{less Liability for elements excluded from Asset Shares}
 \end{aligned}$$

3.3 Role of Surplus

Surplus, however defined, has essentially two roles. These may be characterised as 'development' and 'operational'.

The role of development surplus is to provide finance for the costs of writing new business - that is, to fund new business strain.

The role of operational surplus is to provide a cushion which can be used to smooth out fluctuations in experience. Smoothing of experience may be used in respect of any item of the office's operating experience - expenses, mortality, discontinuance rates and so on - but the major component of such smoothing is likely to be that of investment returns. It is the existence of operational (or smoothing) surplus that permits the fund to reduce the volatility of investment returns credited to policyholders and hence enables the fund to maintain a high equity backing ratio.

- 3.4 The office's distribution philosophy will define what contributions policyholders are to make to development and operational surplus and how those contributions are determined. The resulting contributions - referred to in Section 2 as the surplus and smoothing contributions - determine the benefits to be paid to policyholders in relation to their asset shares.
- 3.5 The question then naturally arises of assessing what is an appropriate level of surplus.

Clearly, at any time fund assets need to be sufficient to meet statutory reserves. Moreover, in terms of the equitable management of the fund, surplus is required so as to ensure that the office's distribution philosophy can be maintained with an acceptably low degree of risk. In this way the expectations of policyholders that the office's distribution philosophy will only change gradually over time may be met. Thus it is important to consider not only current levels of surplus, but projected levels of surplus assuming a continuation of the office's distribution philosophy.

- 3.6 Asset-liability models of the fund under varying new business scenarios may be used to examine the progress of future surplus levels. In assessing any such projections the office will wish to test the outcomes against some desired standard or target. Different measures may be examined. Ultimately the most important measure is that of statutory solvency but it is the argument of this paper that the office will wish also to test the realistic surplus position of the fund against the risk of policyholders reasonable expectations not being met.

3.7 Surplus Target

An office may define a surplus target under which the perceived risk that the existing distribution philosophy could not be maintained was at an appropriately low level. Such risks would result from either or both of

- fluctuation in new business strain
- fluctuation in experience, including in particular, fluctuation in asset values

To the extent that adverse fluctuations should not be permitted to impact the benefits paid to policyholders - who are expecting a smoothing of fluctuations in experience - surplus will be required to meet the costs of adverse experience.

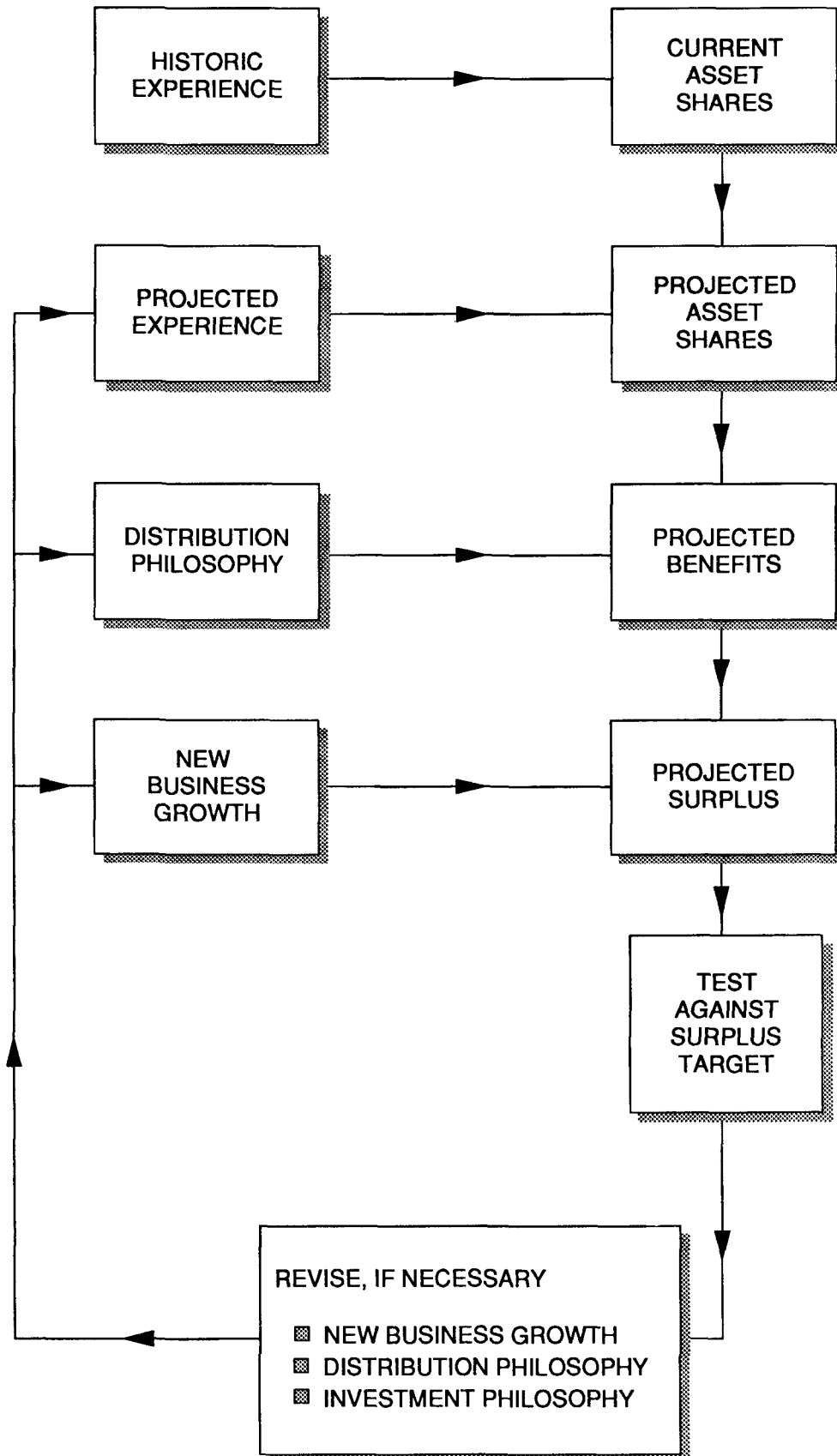
Equally, an office may need to consider if it is unjustifiably maintaining a level of surplus in excess of that which, in even the most extreme circumstances, would be required to ensure that its existing distribution philosophy could be maintained.

In this paper I will not attempt to define suitable surplus targets - a topic which merits a paper of its own - but note that the stochastic modelling of future asset performance may provide an alternative approach.

3.8 Fund Control

The process by which the distribution philosophy and projected surplus may be harmonised is represented in the following diagram. Projected surplus based on the continued application of the office's distribution philosophy will indicate whether that philosophy is sustainable or appropriate. If projections indicate that the risk that the philosophy cannot be sustained is at an unacceptable level then the office will need to begin to move towards a more sustainable philosophy or take steps to reduce its need for surplus. Equally, if projections indicate that inappropriately high levels of realistic surplus may develop then this indicates a need to consider whether the distribution philosophy adopted is sufficiently generous to policyholders.

THE SURPLUS MANAGEMENT FRAMEWORK



3.9 The actions the office may take if projections of the fund are found to reveal an unsatisfactory outcome are:

1. **Revise planned new business growth**

A revision to the new business mix may also effect the need for surplus.

2. **Revise the planned distribution philosophy.**

As already described, if alterations are to be made that will reduce policyholder benefits then changes should be made only gradually in order to ensure that the reasonable benefit expectations of policyholders are maintained. A change in distribution philosophy that will enhance policyholder benefits, is by contrast, more likely to be acceptable to policyholders.

3. **Revise planned investment philosophy.**

Revision of future investment philosophy will determine the assumed investment returns on which projected asset shares are based and hence will determine projected policyholder benefits. In turn this will impact the current and projected policyholder Reasonable Expectations Liability.

A changed investment mix will also, of course, influence the choice of surplus target and the outcome of the projection of asset returns within the fund.

Investment philosophy may also be considered to be part of policyholders expectations and so, if changes are to be made that are likely to reduce policyholder benefits, then such changes should be made only gradually.

It is suggested that this iterative procedure of establishing the consequences of a proposed distribution philosophy and of reviewing as required that philosophy in the light of surplus projections should form part of the annual process of bonus declaration.

3.10 Revolving Fund and Entity Fund Models

Two strands of thought have been developed in the actuarial literature which describe the theoretical operation of a participating fund. These two theories - the 'revolving fund' model and 'entity' model are usefully summarised by Franklin and Lee in their paper on 'Demutualisation'.⁴ In essence the difference between the two models lies in their approach to the charging of a surplus contribution. Under the entity model a surplus contribution is charged to policies while under the revolving fund model no such surplus contribution is charged. Nevertheless the addition or deduction of a smoothing contribution to policyholders asset shares is equally applicable under both models.

Since no surplus contribution is applied under the revolving fund model, no development surplus is generated. Under this model the cost of writing new business is financed solely from the asset shares of current policyholders who would thus expect to receive a return on that investment. Under the entity theory, development surplus may also be used, or may be used exclusively, to finance the cost of writing new business.

The control mechanism suggested in this paper is equally applicable to both models. A fund operating under the revolving fund model simply faces the additional constraint of not being able to draw on development surplus to finance growth.

3.11 Proprietary Funds

Proprietary with-profit funds are, in principle, able to raise capital from the shareholders of the fund and hence do not need to rely on with-profit policyholders to provide capital.

In practice, however, it is unlikely that shareholders would find it attractive to invest capital in a with-profit fund. This is due to the fact that, in the normal course of events, the return on only a proportion of the capital invested could be returned to shareholders.

As a consequence, the surplus requirements of a participating fund within a proprietary office do not differ in any significant way from that of a participating fund in a mutual organisation. The 'entity' or 'revolving fund' theories of mutual fund operation may be equally applied to a fund in which shareholders are allocated part of the distributed profits.

3.12 Summary

The consistent application of a methodology by which to calculate asset shares and the consistent application of a distribution philosophy to determine benefits payable in accordance with those asset shares are both required to ensure the equitable treatment of policyholders.

Policyholder expectations are that the distribution philosophy of the office should remain constant or change only gradually over time. This requires projecting statutory and realistic surplus under best estimate assumptions and incorporating the benefits payable under the proposed distribution philosophy. The sustainability of the distribution philosophy may be assessed by determining its impact on projected surplus within the fund and assessing the outcome in relation to a defined surplus target.

SECTION 4

CONCLUSION

The management of a participating fund requires that a distribution philosophy be set that defines how policyholders' asset shares are to be determined and how surrender and maturity benefits are to be related to those asset shares.

The sustainability of the distribution philosophy should be tested by projecting both the realistic and statutory surplus - or free asset - position of the fund. If projections indicate that the distribution philosophy is not sustainable through a lack of surplus, or conversely is likely to generate unreasonably high levels of surplus, then action will need to be taken to move new business growth, distribution philosophy or investment philosophy and hence projected surplus towards a sustainable position.

ACKNOWLEDGMENTS

I would like to thank all those who have provided advice and helpful comments to me during the preparation of this paper. Errors are, of course, solely my responsibility. I would stress that the views expressed are my own and do not necessarily represent the views of any of my colleagues.

APPENDIX
EXAMPLES OF ASSET SHARE METHODOLOGY

To illustrate some of the implications for the fund of varying the basis of the asset share calculation I consider some simplified examples which focus on mortality costs, expenses and investment credit. In these examples I have considered the cash flows over a single period of time for a fund that comprises only with-profit policies.

The examples show the accumulation of the asset shares under a given methodology for the policies which remain in-force at the end of the period. Also shown are any residual cash flows which generate any excess (or deficit) of total assets over total asset shares. The quantity 'total assets less total asset shares' is described as 'Orphan Assets'.

The examples show different ways in which revenue may be allocated between survivors at the end of the period and orphan assets.

For the purposes of my examples I have assumed the following somewhat arbitrary model (chosen for ease of illustration, rather than for practical accuracy).

Number of policies sold	:	100
Premium payable per policy	:	1
Claim on termination per policy	:	1
Interest	:	10%
Expenses	:	50% of premium

The first example below assumes 40% of those policies sold become a claim at the end of the period and that interest is earned on the cash flow of premiums less expenses over the period.

The resulting revenue may be shown in this way:

Example A

	Total Revenue	Allocation to Asset Shares	Allocation to Orphan Assets
Premiums	100	60	40
Interest	5	3	2
Expenses	50	30	20
Claims	<u>40</u>	<u>0</u>	<u>40</u>
Total Assets	15	33	-18
Asset Share per survivor		0.55	

This analysis shows the cost of claims being levied entirely on the orphan assets with none of the claims being levied on those policies which remain in-force at the end of the period. On this basis the total asset shares of the in-force policies amount to 33. This generates a reduction in orphan assets.

Alternatively the cost of claims experienced may be levied entirely on the in-force policies. However, if this is done, the premiums credited to in-force policies must reflect both those of the remaining in-force policyholders and those of the terminating policyholders.

Example B

	Total Revenue	Allocation to Asset Shares	Allocation to Orphan Assets
Premiums	100	100	0
Interest	5	5	0
Expenses	50	50	0
Claims	<u>40</u>	<u>40</u>	<u>0</u>
Total Assets	15	15	0
Asset Share per survivor		0.25	

Note: 40% of policies terminate, hence in-force premium credit = $60/(1-.40) = 100$.

In this example no reduction in orphan assets results, since the experience of the fund has been fully reflected in the in-force asset shares.

The two examples above show two extremes of treatment. A middle way would be to levy the cost of "expected" rather than "actual" claims on the in-force policies. Say, for example, the expected number of claims is 25% rather than the 40% experienced.

Example C

	Total Revenue	Allocation to Asset Shares	Allocation to Orphan Assets
Premiums	100	80	20
Interest	5	4	1
Expenses	50	40	10
Claims	<u>40</u>	<u>20</u>	<u>20</u>
Total Assets	15	24	-9
Asset Share per survivor		0.40	

Since less than the full experience of the fund has been credited to the in-force asset shares, a reduction in orphan assets is generated.

Similarly, suppose that interest was credited to in-force policies at a lower rate than that earned on the fund as a whole. In Example D interest of 6% is credited to asset shares policies, even though 10% has been earned by the fund. (The full costs of experienced death claims are levied on the asset shares).

Example D

	Total Revenue	Allocation to Asset Shares	Allocation to Orphan Assets
Premiums	100	100	0
Interest	5	3	2
Expenses	50	50	0
Claims	<u>40</u>	<u>40</u>	<u>0</u>
Total Assets	15	13	2
Asset Share per survivor		0.22	

Total interest earned by the fund less the interest credited to asset shares represents a contribution from the asset shares to the orphan assets.

Again, suppose that not all expenses were debited from in-force policies, but that some were assumed to represent an overhead or development cost of some nature. Then the revenue breakdown could appear like this:

Example E

	Total Revenue	Allocation to Asset Shares	Allocation to Orphan Assets
Premiums	100	100	0
Interest	5	8	-3
Expenses	50	20	30
Claims	<u>40</u>	<u>40</u>	<u>0</u>
Total Assets	15	48	-33
Asset Share per survivor		0.80	

In this case, the orphan assets bear the assumed development costs.

DEFINITIONS

Asset Share	An accumulation of premiums less expenses and the cost of risk benefits which may also incorporate other elements of credits or debits in accordance with the office's experience.
Attributable Share	$\text{Asset Share} \pm \text{Smoothing Contribution} \\ \pm \text{Surplus Contribution}$
Distribution Philosophy	Methodology by which asset shares are calculated and surplus and smoothing contributions are determined.
Orphan Assets	Total Assets less Total Asset Shares.
Reasonable Expectations Liability	Reserve calculated on realistic assumptions allowing for projected benefits consistent with the continued application of the office's distribution philosophy.
Realistic Surplus	Total Assets less Reasonable Expectations Liability.
Statutory Surplus	Total Assets less Statutory Reserves.

REFERENCES

1. David Debenham, Adrian Eastwood, Peter Ford & Maurice Maple
Asset Share Techniques and The Control of Terminal Bonuses
(UK Actuarial Convention, Harrogate, 1989)
2. David Kerr
The Actuarial Management of Conventional Life Insurance
(Institute of Actuaries of Australia, 1990)
3. Bernard Brindley et al (Institute of Actuaries Working Party)
Policyholders' Reasonable Expectations
(Institute of Actuaries Seminar, Birmingham, 1990)
4. N.A.M. Franklin and W.E. Lee
Demutualisation
(Staple Inn Actuarial Society, April 1987)