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ASSET SHARES AND THEIR USE IN THE FINANCIAL MANAGEMENT OF A WITH-PROFITS FUND

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ABSTRACT

The paper describes current asset share techniques, examines alternative asset share philosophies and discusses practical issues associated with the calculations. Alternative approaches to smoothing payouts using asset shares are examined. A financial management framework is described which provides information on the financial position of a with-profits fund. A central part of the framework is the concept of risk-based capital. The factors to be considered in determining risk-based capital are described and examples given of the possible capital needs of with-profits business.

KEYWORDS

Asset Shares; Estate; Financial Management; Risk-Based Capital; With Profits

1. INTRODUCTION

1.1 *Objectives*

1.1.1 The purposes of this paper, are, firstly, to review the current basis of operation of with-profits business, in particular the use of asset shares in determining payouts for with-profits policies and, secondly, to put forward a coherent financial framework for the management of a with-profits fund. This framework is based on the use of asset shares as the starting point for the definition of policyholders' reasonable expectations, and also identifies and provides for the management of the fund's capital base. The framework is applicable in both mutual and proprietary offices, although in the latter the office will also have further measures in place to monitor shareholder value, which is not considered in this paper.

1.1.2 Few of the concepts we propose are new — rather we examine the way in which existing tools can be used:

— to determine the financial strategy;
— to monitor the financial performance of the business; and
— to communicate that performance effectively to the various interested parties; management and shareholders, policyholders and their advisers, and the industry regulators.

1.1.3 The extensive use of asset shares in the ongoing financial management of with-profits business, and in a number of demutualisations and reconstructions of with-profits companies, led us to carry out a detailed survey of practice in the use of asset shares in April 1993. The survey included 38 offices with combined with-profits liabilities of £110bn. We refer to this simply as 'the asset share survey' in the remainder of this paper, and later remarks on what constitutes

common practice are generally based on the results of the survey. We understand that the Government Actuary's Department carried out its own survey of current practice in 1993, but that the results of this are not publicly available.

1.2 *Outline*

1.2.1 The remainder of Section 1 provides a brief resumé of the history and development of with-profits business and the use of asset shares. For greater detail and insight the reader is referred to a paper by Cox & Storr-Best (1962) and the recent paper by the Faculty of Actuaries Bonus and Valuation Research Group (1994). The latter divides the development of with-profits business into the 'Prospective Era' up until the 1960s and the 'Retrospective Era' which developed in the 1970s, and provides a summary of the techniques used by actuaries over these periods to manage with-profits business and determine bonuses.

1.2.2 In Section 2 we describe the theory and current practice used in calculating asset shares, drawing on our experience in working with various life offices and the results of our survey on asset share practice. Readers familiar with this may wish to move ahead to Section 3, where we discuss the way in which asset shares are used in managing payouts and consider different approaches regarding the practice of smoothing.

1.2.3 In Section 4 we describe a framework for the financial management and reporting of the performance of a with-profits fund, which focuses on capital management within the fund and enables an office to measure the return on capital achieved. The framework also provides a possible basis for both internal and external reporting of the realistic financial position of the fund.

1.2.4 In Section 5 we consider an approach to determining risk-based capital for with-profits business, and how this should be allowed for in profit testing and asset share calculations.

1.3 *Development of With-Profits Business and the Use of Asset Shares*

1.3.1 The first bonuses were granted on a life assurance contract in 1781, when the Equitable Life provided a distribution of accumulated surplus which had arisen as a result of better than expected mortality experience. The practice quickly became the norm — most business written in the 19th and early 20th century being entitled to participate in the surplus of the office. For over 150 years the structure of participating, or 'with-profits', contracts was little changed. The bulk of the assets backing with-profits business was fixed-interest, and surplus was distributed by way of uniform reversionary bonus, usually declared triennially. This achieved reasonable equity when the main sources of surplus were the bonus loading in the premium rates and interest surplus, and a net premium valuation was used.

1.3.2 It was not until the post-War years that significant changes began to occur. From this time life offices began investing increasingly in equities and property, as well as fixed-interest investments. From the late 1960s a number of

offices had started to pay terminal bonuses on death or maturity in order to distribute some of the capital appreciation which had been earned on their equity portfolios. The use of bonus reserve valuations to determine the supportability of current bonus rates was also more common.

1.3.3 The pace of change has quickened in the last 25 years, with the introduction of super-compound bonus series, in order to match the cost of bonus more closely to the pattern of investment earnings under a policy, and the use of asset share techniques as a guide to the appropriate level of payouts.

1.3.4 The last 10 years have seen a further major development with the introduction of unitised with-profits contracts by most of the major with-profits offices. These contracts provide greater flexibility to policyholders, and have resulted in more openness regarding the accrual of the underlying guarantees and benefits under a with-profits contract. Statistics compiled by the ABI show that unitised with-profits now accounts for over 50% of all new with-profits business, and 20% of all new business written in 1993. The introduction and success of unitised with-profits has caused actuaries to rethink and refine the basis of operation of with-profits contracts.

1.4 *The Current Environment*

1.4.1 We view the current environment for the financial services industry in the United Kingdom, as in other mature financial services markets such as Australia and the United States of America, as being characterised by a number of distinct trends:

— increasing regulation and requirements for disclosure;
— the removal of tax advantages for the life industry;
— increased competition from other savings vehicles; and
— traditional companies facing greater competition from bancassurance and other non-traditional players.

1.4.2 The U.K. market is currently going through a period of considerable turmoil, as the effects of competition, regulatory control over distribution and greater disclosure requirements begin to bite. Consumers generally want more information regarding the products they are purchasing, and are, perhaps, more likely to question the financial advice they receive.

1.4.3 At the same time, volatility in the financial markets and the lower levels of interest rates and investment returns experienced in recent years have combined to place greater pressure on the capital resources of with-profits offices. Indeed, as a result of the perceived level of over-distributions made during the early 1990s, as the industry sought to readjust bonus levels to lower investment returns, some commentators have criticised with-profits quite severely and questioned its ability to deliver competitive returns in the future.

1.4.4 If with-profits business is to survive and prosper, we believe that it must be managed effectively and fairly, and its virtues need to be well communicated to the public. With-profits business is based on trust, and relies on the integrity

and professionalism of the Appointed Actuary and the actuarial profession in general. Policyholders are relying on the office to treat them fairly, and have little or no control over what happens after they have taken out a contract.

1.4.5 The new law on Unfair Contract Terms may place constraints on the wording of with-profits contracts and the extent of discretion which the company can retain. However, with-profits may not fall within the scope of the legislation, because discretion is central to the nature of the contract itself. The implications of this legislation are discussed in a recent paper by Kennedy (1994).

1.4.6 Whilst it is ultimately the directors' responsibility to determine bonus rates and the practice of the office in relation to with-profits business, it is the responsibility of the Appointed Actuary to make recommendations to the board in these matters. The Appointed Actuary and the profession, therefore, have a crucial role to play in this respect.

1.4.7 We should therefore consider a number of important questions regarding the nature of with-profits business:

— What exactly do with-profits contracts promise policyholders?
— Can we deliver what we promise, i.e. live up to the policyholders' expectations?
— Do customers/consumers understand the product we are offering?
— Do consumers want this type of product, and are they prepared to leave a high level of discretion to the company?
— Are customers prepared to pay a fair price for the benefits of smoothing or the cost of guarantees implicit in with-profits contracts?

1.4.8 In essence, a with-profits contract represents a sharing of risk between the company and the policyholder and between different generations of policyholders. If with-profits business is to continue to be successful, the benefits of this risk-sharing process should be perceived to be worth the cost. The benefits and costs, therefore, need to be well understood and clearly communicated.

1.4.9 The risk-sharing process is central to the financial management of with-profits business. An effective financial management system should focus management attention on the most important issues and, in particular, make appropriate allowance for the risks and capital requirements of the business, so as to help the company to reconcile the various conflicting interests and to take appropriate actions to ensure the ongoing viability and success of the office.

2. Asset Share Calculations — Theory and Practice

2.1 *Asset Share Definitions and Market Practice*

2.1.1 For such a widely used technique, asset shares have been the subject of surprisingly few professional papers, and, because of this, no standard definition exists of what an asset share is or what goes into one. For the purpose of this

paper an asset share will be defined as the premiums paid, less deductions, plus allocations of miscellaneous profits, all accumulated at a suitable rate of investment return. The level of allocations and deductions and the rates of investment return will normally reflect an office's past operating experience and its asset share philosophy.

2.1.2 Allocations of miscellaneous profits may include some or all of the following items:

— surrender profits on with-profits business;
— profits from non-profit business;
— allocations from the estate; and
— windfall profits such as unexpected tax gains.

2.1.3 Although allocations will generally increase asset shares, losses from these sources can also be recognised in the asset shares. Generally asset shares do not include profits or losses which have arisen because maturity payouts have been different from asset shares in the past. Such differences often form part of the smoothing mechanism, and can be separately quantified. The approach to allocations varies between offices, depending on their asset share philosophy. The asset share survey found that 45% of offices responding included surrender profits in the asset shares, and 37% included profits from non-profit business.

2.1.4 Deductions normally include all of the following items:

— commissions and expenses, net of tax if appropriate;
— the cost of providing life cover and any other benefits and options;
— tax on income, taxable realised and unrealised gains, and profits, if appropriate; and
— shareholders' transfers.

2.1.5 There may also be a charge deducted from the asset share in respect of the cost of providing the guarantees and smoothing under the contract, to provide an appropriate return on the capital employed in writing the contract or to build up the capital base of the office. The asset share survey found that 32% of companies responding included explicit charges of this nature as a deduction from their asset shares. We refer to these as *capital charges*.

2.1.6 There is no universal approach to defining the rates of investment return at which the premiums, deductions and allocations are accumulated, and the approach chosen may depend to some extent on the quality of historic data available. Approaches used by offices responding to the asset share survey included:

— notional returns calculated using a notional asset mix and returns on indices;
— the overall return on the non-linked assets in the fund; and
— the return on assets notionally allocated to with-profits business or to specific product lines within the with-profits portfolio.

2.1.7 Other methods, which span these alternatives, are also possible, such as combining the actual asset mix with returns on indices, or combining a notional mix with actual returns. The asset share survey found that 18% of offices responding were using some form of notional returns, 21% using the overall return on the life fund, and the balance of 61% carrying out some form of hypothecation of assets to the with-profits portfolio and sometimes to specific product lines within the with-profits portfolio. The most common method was to hypothecate fixed-interest assets to non-profit liabilities and to base with-profits returns on the asset mix of the remaining non-linked assets.

2.1.8 More recently, the term *base asset share* has been used to refer to an asset share calculated by excluding any allocations of miscellaneous profits or deductions of capital charges. It is a particularly useful benchmark where the company's philosophy allows discretion over the amount and timing of allocations to asset shares. A comparison of asset shares with base asset shares may also indicate the current reliance of the office on miscellaneous profits which may not be repeated in the future. We believe that the calculation of base asset shares, both at the policy level and the portfolio level, is an important starting point when deciding what allocations to make.

2.1.9 Asset share calculations can be made for individual policies, for product lines or for the entire with-profits portfolio. In this paper we use the term *policy asset share* to refer to the asset share for an individual contract and *aggregate asset share* to refer to the asset share for the entire portfolio or product line. Aggregate asset shares may simply be the sum of policy asset shares. Alternatively, aggregate asset shares may be determined directly at the portfolio or product level, either by accumulating past aggregate cash flows or by identifying, by some other method, the assets associated with particular product lines. The policy asset shares then become a mechanism for dividing the aggregate asset shares amongst individual policies, possibly with a residual item if this division is not exact.

2.1.10 In Section 4 we introduce some further definitions. However, we have found it necessary to refer to one element, the *estate*, in both this section and in Section 3. To prevent any misunderstanding, we are using the term estate to refer to the assets of the office (including future profits) which are not required to meet expected policyholder benefits. The estate is not the investment reserve as shown in the statutory accounts.

2.2 *Uses of Policy Asset Shares*

2.2.1 Policy asset shares are widely used in with-profits offices as a benchmark for determining the level of payouts to with-profits policyholders. They provide a mechanism for quantifying the ill-defined term 'policyholders' reasonable expectations'. The asset share survey showed that all the offices in the survey used asset shares as a guide to setting maturity values, and 76% as a guide to setting surrender values. We believe that some offices use base asset shares as a mechanism for quantifying the minimum level of payout which would

meet policyholders' reasonable expectations, although it could be argued that policyholders' expectations extend beyond this.

2.2.2 Another widespread use of policy asset shares is to smooth maturity values, either by calculating the asset share based on smoothed or adjusted investment returns and using this as a benchmark for maturity values, or by projecting policy asset shares on identical policies in future years to provide information on the possible direction and extent of future changes in asset shares. Given the asset share philosophy of the office, this information can be used to choose a level of maturity payout which is consistent with the expected short-to-medium-term trends in asset shares. The asset share survey showed 66% of respondents carrying out policy asset share projections for this purpose.

2.2.3 By collecting information on the past and projected relationships between asset shares and payouts and the numbers of maturities and surrenders in each year, the profits and losses arising from granting payouts at a different level from asset shares can be quantified. Such information will provide valuable input into decisions on smoothing of payouts.

2.2.4 Policy asset shares can also be used to provide a guide to the appropriate level of reversionary bonus. However, other factors, not least the current and projected financial strength of the office, will be equally important. A policy asset share can be used by accumulating it to maturity at an assumed investment return, then deducting from the asset share at maturity an allowance for the target level of terminal bonus. The reversionary bonus rate supported is then the rate of future bonus which increases the current level of sum assured and declared bonus to the asset share less terminal bonus allowance at maturity. The asset share survey showed 47% of respondents used asset shares for this purpose.

2.2.5 A further use of policy asset shares is to calculate disclosed surrender and maturity values for inclusion in key features documents. From 1 January 1995, projected surrender and maturity values are to be disclosed at the point of sale using bonus rates consistent with future investment returns prescribed by the Personal Investment Authority (PIA). The rates of bonus included in these projections will be determined, in most offices, by carrying out asset share projections allowing for expected future deductions and allocations, although the rules and professional guidance do place some restrictions on what can and cannot be included. Reduction in yield percentages will continue to be stated. These can be determined by accumulating premiums with no allowance for deductions and allocations, and solving for the rate of investment return which gives the projected asset share accumulated with allowance for allocations and deductions. The difference between this rate and the projection rate is the reduction in yield.

2.2.6 The disclosure of figures based on projected asset shares will force offices to re-examine their asset share philosophies and, in particular, the approach which they take towards allocations of miscellaneous profits, cross-subsidies between surrendering policyholders and maturing policyholders and the deduction of capital charges. It should, therefore, lead to a more formal

documentation of the office's current asset share philosophy. The actuarial profession has produced guidance on the calculation of these disclosed figures in GN22.

2.3 *Asset Share Philosophy*

2.3.1 Ideally, the current asset share philosophy of the office will be documented and will include a description of how asset shares are calculated. In fact this may become essential with the implementation of the Unfair Contracts Terms regulations to support the decisions taken by the board on the advice of the Appointed Actuary. The philosophy would normally be recommended by the Appointed Actuary and agreed by directors. The asset share philosophy can then be reflected accurately and consistently in marketing literature, the with-profits guide and other communications with policyholders. In practice, it is unlikely that old marketing material gives a comprehensive or consistent explanation of the philosophy, and there may be some discretion as to how past statements to policyholders and past practice of the office are interpreted.

2.3.2 If the current asset share philosophy is to be more precisely defined and, perhaps, communicated in more detail externally, then there is the possibility that the flexibility of the office to depart in future from this philosophy is diminished. We do not see this as a major problem given that, in most cases:

— asset shares are only a guide to payouts (see Section 3); and
— the office can make it clear that this is its current practice, and reserve the right to change its practice in future.

We believe it is better to define the current approach as clearly as possible, but retain the flexibility to amend or depart from it if this becomes necessary, or desirable, than to be so vague as to allow virtually any approach.

2.3.3 The Appointed Actuary may review the philosophy of the office from time to time and recommend changes in either the assumptions (perhaps reflecting more thorough investigations into the office's historic operating experience) or the philosophy. The latter might reflect recent statements made to policyholders in marketing material, changes in market practice, or a change in the financial circumstances of the office. We would expect the impact on policyholders' reasonable expectations to be considered, and any changes in approach to be reflected in payouts gradually. Particular care is needed when any change could significantly alter the balance of payouts between different types or generations of policyholders, or the sharing of profits between shareholders and policyholders.

2.3.4 Since an office may have significant discretion over the asset share philosophy, a number of key questions will need to be addressed in formalising or reviewing its philosophy. The asset share philosophy should define whether the actual operating experience of the office will be reflected as closely as possible in the asset shares or, if for some elements of operating experience, notional amounts or allowances will be used instead of actual experience. For

example, will the actual investment returns on allocated assets be reflected in the asset shares or some notional return? Will expense overruns be charged to asset shares or just expense allowances? Will a tax allowance be charged to asset shares or the actual level of tax paid be reflected in the asset shares?

2.3.5 Where a notional element is included in the asset share calculation, consideration should be given to what happens to the difference between the notional and actual experience. The variances could be allocated to the estate or may be reallocated to the asset shares of with-profits policyholders. In either case control systems will need to be in place to quantify the variances between actual experience and notional experience.

2.3.6 Other key issues which need to be considered include:

— whether surrender profits and profits from non-profit business should be included in the asset shares and if so how;
— what capital charges should be deducted from asset shares;
— whether shareholders' transfers and shareholders' tax should be charged to asset shares;
— whether compliance fines and losses from failed business ventures will be met by policyholders or the estate; and
— how unitised with-profits business is treated.

2.4 *Alternative Investment Approaches*

2.4.1 The asset share survey indicated that 82% of offices use what has become known as a 'managed fund' approach to determine the investment returns used in the asset share accumulation. A fund of assets is identified which backs the with-profits portfolio, and the asset share of each policy is assumed to be invested pro-rata in the fund, so that each policy has the same asset mix as the overall fund. There is no attempt to vary the asset mix by original term or outstanding term, although there may be more than one managed fund, each with a different asset mix, reflecting the different characteristics of certain product lines.

2.4.2 An alternative approach involves increasing the fixed-interest element of the assets over the term of the policy to reflect the increase in guarantees over this period. Proponents of this method argue that it provides greater fairness between products and within products lines as the level of guarantees is reflected in the asset mix. The counter argument is that the use of a notional asset mix is difficult to explain to policyholders, and can lead to a very different level of asset share compared with the more popular managed fund method. This may lead to difficulties in explaining the movement of the office's payouts in the context of industry changes.

2.4.3 The method can be difficult to apply in practice if matching gilts of adequate duration are not available, or if there are optional maturity dates in the liabilities. In addition, the overall asset mix of the fund will be determined after consideration of a number of factors, including short-term investment opportunities, the action of competitors, the size of the estate, as well as the

characteristics of the liability profile. The notional asset mix is, therefore, unlikely to add up to the actual asset mix of the office. Consequently, transfers to and from the estate will be generated in each period because the actual and notional asset mixes are different.

2.5 *Determining Historic Expense Levels*

2.5.1 In order to allocate expenses to policy asset shares, historic expenses need to be apportioned between acquisition costs, renewal costs and investment costs, and expressed in terms of suitable measures of volumes. Typically, acquisition costs may be expressed as a proportion of new business premiums, acquisition commissions or any other measure of new business production used by the office. In some cases acquisition costs may be split between sales and marketing and administration, with the latter expressed as an amount per new policy. Renewal costs would typically be determined as an amount per policy, and investment expenses expressed as a percentage of assets.

2.5.2 An alternative approach is to deduct a notional expense allowance rather than actual expenses. This may be appropriate if detailed expense investigations are not available, or if the actual expenses are thought to be high by industry standards, and the estate of the office is sufficient to fund the difference between actual expenses and the allowances used for a temporary period, or permanently. Certain items of expenditure may be spread over a number of years rather than deducted fully in the year in which they are incurred. This may be appropriate where major expenditure is incurred on computer developments or where acquisition unit costs are temporarily increased due to low new business activity levels. In the first case, it may be appropriate to spread the costs over the years in which cost savings are expected to be realised from the expenditure. In the second case, spreading of acquisition expense overruns will prevent policyholders being penalised simply because of the level of new business sales during the year the policy commenced. The acquisition expense over-runs could be respread across all with-profits policyholders by deducting them as a percentage of asset shares.

2.6 *Determining Historic Taxation Levels*

2.6.1 There are two main approaches which can be taken to I-E taxation in the asset shares of life business:

— assume net-of-tax expenses and net-of-tax investment returns; or
— treat each policy on a stand-alone basis using gross income and gross expenses until income exceeds expenses. After this point use net expenses and net-of-tax investment returns.

2.6.2 The asset share survey showed that the first method was used by almost all offices. However, the rate of tax on income and taxable realised gains and that used to net down expenses still has to be determined. These rates can be notional levels, reflecting the general level of tax rates in particular years, or rates

specially calculated to give an overall deduction for tax from asset shares at the same level as the actual tax paid. Determining actual tax paid on with-profits business will require an apportionment between non-profit and with-profits policies, and can be quite complex.

2.6.3 The treatment of unrealised gains also needs to be considered. A common method is to tax unrealised gains each year (in excess of RPI in years when indexation of gains has applied) at a rate below the full tax rate. The reduction in tax rate reflects the delay in paying tax, and is determined by discounting the full tax rate at an appropriate real rate of return for the average period until gains are realised. An alternative, which we understand is used by at least one office, is to assume that the investments are held without a tax charge until the maturity of the contract, at which time the gains are assumed to be realised and a full charge made for tax.

2.7 *Surrender Profits and Profits from Non-Profit Business*

2.7.1 The target level of payouts on surrender is often defined in terms of a proportion of the asset share, and this will determine the level of future surrender profits. For example, an office may have a future target of paying, on average, 95% of asset share on surrender, although for some offices the percentages paid in the past may have been rather lower than this. The surrender profits or losses may be allocated to the remaining with-profits policyholders or used to increase the estate. Looking forward, recent announcements that some offices intend to increase surrender values significantly will mean that consideration will need to be given to how surrender losses are to be dealt with, and whether the costs fall on the remaining policyholders or on the estate.

2.7.2 Allocations of surrender profits to with-profits policyholders can be made in a systematic way by incorporating an allowance in the policy asset share. Where surrender profits are reflected in this way there are two broad methods used by offices. The first is to accumulate the policy asset shares allowing for the actual past rates of surrender and the actual level of surrender profit or loss in each year. Effectively, the surrender profits from a particular cohort of business (issue year and term combination) are being distributed to the remaining policies in that same cohort. Alternatively, the surrender profits can be added into the policy asset shares by an increase in the investment return. This gives broader equity, and surrender profits can be spread over a wider range of contracts and product lines. The asset share survey showed a similar number of offices using each method.

2.7.3 The company should also consider who should benefit from profits from non-profit business. One factor to take into account is who provided the capital to write this business in the first place. An example of this is unit-linked business, which many offices started writing in the early 1980s. Was the extra capital expenditure incurred at this time and the capital required to meet new business strains charged to the with-profits asset shares or met from the estate? Other factors to consider are the statements made in marketing material and

whether the extra profits are, or were, needed to build up the estate.

2.7.4 Consideration should be given to how the profits from non-profit business will be measured. Profits may be defined as surplus arising on a statutory basis, surplus arising on a realistic gross premium basis or embedded value profits. The asset share survey showed that the first two methods are most popular, and that almost all offices which reflected profits from non-profit business systematically in the policy asset share did so as a percentage increase in the asset shares. It is uncertain whether any more scientific method of allocation of profits from non-profit business between product lines can be justified.

2.8 *Capital Charges*

2.8.1 Whether to take capital charges from asset shares, and if so how much, is perhaps the least well-developed part of asset share theory. With-profits policies are likely to require significant capital support, especially in the early years, to set up statutory reserves which are likely to be in excess of asset shares in the early years. The moves in the market to increase early surrender values may require greater amounts of capital in the future. Capital may also be required to allow the office to smooth payouts and, in exceptional circumstances, to meet minimum guaranteed benefits, and thus ensure that policyholders' reasonable expectations are met.

2.8.2 We believe it is reasonable that the providers of the capital, whether other with-profits policyholders or the estate, require a return reflecting the risk of losing the capital provided. As the required return will be in excess of the rate that can be earned on the assets in which the capital is invested, then the risk premium will be met from a capital charge on the asset share. An average capital charge could be levied across the whole with-profits portfolio or, perhaps more fairly, a capital charge could be levied only on those policies requiring capital and credited to the estate or those policies providing the capital.

2.8.3 There may be circumstances under which the estate of the office and the amount of capital which can be provided from with-profits policyholders are insufficient to meet the future needs of the office. In this case the capital charge may need to be increased, in order to build up the estate of the office. We comment further on these matters in Sections 4 and 5.

2.9 *Shareholders' Transfers and Shareholders' Tax*

2.9.1 Proprietary with-profits offices must meet shareholders' transfers either by asset share deductions or from the estate. In most companies the shareholders' transfer is defined as 1/9th of the cost of bonus. The asset share survey showed that most proprietary offices deducted shareholders' transfers in calculating policy asset shares, suggesting that they intended to meet transfers from policyholder funds. The starting point for most companies was to calculate the cost of bonus in past years, although this was not always on the exact

valuation basis used in the relevant year, and deduct the appropriate amount of shareholders' transfer as a percentage of this.

2.9.2 The question of who should meet the shareholders' tax on transfers was highlighted by the taxation changes in 1990, and again as a result of current disclosure requirements. Prior to 1990, the issue only applied to tax arising as a result of shareholders' transfers on pensions business. As the tax was minimised by reservations of profits, most major proprietary offices allocated only small residual amounts of tax to the life fund, but we believe they did not generally deduct this from asset shares, instead meeting it from the estate. At least one office did, however, reduce the shareholders' share of the cost of bonus to reflect this extra tax. Since 1990 this has become a more important issue, as reservations of profits are no longer effective. The issue is now relevant to life business, as well as pensions business, since the rate of tax paid by the office on the shareholders' profits exceeds the rate of policyholder tax on I-E.

2.10 *Unitised With-Profits*

2.10.1 The calculation of asset shares for unitised with-profits presents extra challenges because of the premium flexibility often included in the contracts, whereby premiums can usually be increased or decreased, and single and regular premiums paid under the same contract. In addition, the premiums may be invested partly in unit-linked funds and partly in a unitised with-profits fund, in which case only a proportion of expenses and commission should be met from the asset shares, as the rest will be met from charges under the unit-linked part of the contract.

2.10.2 Many offices deal with unitised with-profits business in exactly the same way as conventional with-profits business for the purpose of calculating asset shares. In particular, actual expenses or expense allowances are deducted in the asset share calculations rather than the product charges.

2.10.3 An alternative approach is to calculate unitised with-profits asset shares in the same way as the unit fund. The unit fund represents the premiums allocated accumulated, net of product charges, at the relevant bonus rates. Instead of accumulating at the relevant bonus rates, the asset share is accumulated at the actual investment return earned on the assets. Thus, the unitised with-profits asset shares are calculated after allowance for product charges rather than expenses. This process is sometimes referred to as a *shadow fund.* The asset share survey showed that 42% of respondents followed this approach. The advantage of this method is that the asset share calculations may be easier, as they utilise the data and systems used to calculate the unit fund, and the method automatically spreads the product charges over the unit-linked and unitised with-profits parts of the contract.

2.10.4 Other offices do what amounts to a traditional asset share calculation, but in a two-stage process; firstly, accumulating the asset share after deductions for the product charges, and secondly, allocating back to the asset shares the difference between the expenses incurred and the product charges on a year-by-

year basis. This will involve the office identifying product margins in excess of expense allowances. There is a trade off here between equity and simplicity. The profits could simply be used to increase (or reduce) the investment return over the whole portfolio. However, this may cause some inequity between generations. A more sophisticated alternative would involve allocating the profits between different issue years to reflect the profits emerging from that particular cohort during the year.

2.11 *Deriving Historic Assumptions*

2.11.1 The initial derivation of historic assumptions to use in asset share calculations can be time consuming. The amount of detail and effort required depends on the uses to which the asset shares are to be put. If they are to form a central part of a fund reconstruction which involves ear-marking certain assets to meet with-profits policyholders' expectations, then a high degree of accuracy is needed. Similarly, if a merger of two funds is proposed, accuracy may be important to determine the relative interests of the two sets of policyholders.

2.11.2 In the majority of cases the asset shares are not calculated for these purposes, and can be reviewed and revised at a later date if required. However, the directors, on the advice of the Appointed Actuary, have a responsibility to distribute bonuses in an equitable manner, and both policy asset shares and aggregate asset shares are becoming more widely used in the management of the business and more widely understood by both management and directors. In this environment it seems appropriate that the asset shares are determined with some care.

2.11.3 A particular problem may be the lack of historic data. The asset share survey showed that offices found the derivation of past expense and mortality assumptions most difficult, with asset mix, investment returns, and commission proving a little easier. Whilst there is no right or wrong way of deriving assumptions when perfect data are not available, our experience has shown that there is generally a reasonable practical approach available, and we give some examples below for investment returns, expenses, taxation, surrender profits and profits from non-profit business.

2.11.4 For some offices historic asset mix data are not available, especially for early years. In these circumstances, rough and ready matching rectangles can be recreated from past DTI returns, in the years where market values are available, or other internal information, in order to determine the proportion of with-profits assets invested in equity, property and fixed-interest. This normally involves allocating certain assets to distinct liability classes. Often non-profit liabilities will be matched by fixed-interest, other liabilities with non-income assets and linked liabilities with unit-linked assets. It may be necessary to make broad adjustments to the non-profit liabilities to restate these on a consistent basis or on a basis consistent with the yield on assets. The remaining assets are often assumed to back with-profits business and the estate on a pro-rata basis.

2.11.5 Where actual investment returns are not available, indices may be used.

It is generally preferable to apply separate indices for property and equity, as there have been significant differences in investment performance between these asset categories. Some consideration may be given to reducing the volatility of the 1973-1975 equity returns, as our experience has been that the returns achieved by offices have not been as volatile as the indices. Sometimes the returns on the overall fund are available, but not individual returns on fixed-interest and equity type assets. In these circumstances, it may be appropriate to assume fixed-interest returns are in line with an index and the return on the equity type assets can be derived as a balancing item.

2.11.6 Where historic expense analyses are not available, it may be possible to carry out a broad analysis for specimen years from data in past DTI returns. This will normally involve expressing acquisition expenses as a percentage of some notional commission measure or new business premium measure, and spreading renewal expenses over the average number of (weighted) policies in force to derive a unit cost. The weighting will reflect the office's view of the relationships between unit costs for single premiums, pensions and life business. It is useful to consider the expense and premiums size assumptions together to ensure that there is consistency between the two. An alternative, but more approximate, method which we have used is to deflate an average of the most recent years' expenses and premium sizes at the RPI or some other measure of growth.

2.11.7 If past details of actual tax are not available, a common approach is to apply the full tax rates appropriate for various past years. Allowance would be made for indexation which was introduced in 1982.

2.11.8 Where data are not available on past surrender profits, it is generally possible to obtain details of past surrender scales in force and levels of terminal bonus added on surrender. Past surrender rates can be determined for major product lines by investigating the movement of in-force premiums or contracts allowing for new business additions. The area of most uncertainty, where approximations will generally have to be made, is in how the surrender rate varies by policy year. The past surrender rates, combined with details of how past policy asset shares compared to surrender payments, will enable past surrender profits to be quantified in a reasonable manner.

2.11.9 Profits from non-profit business can sometimes be determined from internal management information or, alternatively, by breaking down past revenue accounts on an approximate basis between non-profit and with-profits in order to determine the profits from non-profit business separately.

2.11.10 There are also practical issues involved with the calculation of aggregate asset shares. This normally requires the in-force data files to be split by issue year and between products with different historic expense and commission levels or premium patterns. Common problems are being unable to separate single and regular premiums and having no record of past single premiums paid. In these circumstances, it may be possible to obtain an approximate split between regular and single premiums by accumulating new

business net of surrenders to the current date. If the single premium benefits are known, but not the past premiums, then the latter can be estimated by using the historic premium rates in force from time to time.

2.11.11 There may be particular difficulty in dealing with historic premium data on flexible products such as unitised with-profits, where policyholders can stop and restart premium payments or switch between investment funds. Paid-up and altered policies are generally highlighted as problem areas, but they are often relatively insignificant, and approximate methods can be used to derive their asset shares.

2.11.12 Consideration also needs to be given to premium frequency, and whether it is appropriate to assume all regular premium policies have monthly payments. In addition, the incidence of new business sales throughout each year should be investigated. It is surprising how much effect different approaches can have on aggregate asset shares.

2.11.13 As a final check, it is helpful to validate all the asset share assumptions, wherever possible. This involves ensuring that the asset share assumptions, in aggregate, can be reconciled broadly with the past experience for the particular year. This is done automatically if, when determining the asset share assumptions, the starting point is the aggregate actual figure for investment return or expenses, for example. Alternatively, a method which we have found useful is to build the aggregate asset share model as a new business model, including non-profit business, and including business which has matured or been surrendered in past years. This allows the historic modelled revenue accounts to be compared against actual revenue accounts to confirm the validity of the aggregate asset share model.

2.12 *Collecting Future Asset Share Data*

Moving forward, systems can be set up to capture the required asset share information in a more accurate and user-friendly manner. Ideally the information will include:

- assets allocated notionally to non-profit, with-profits and the estate and, in some cases, further subdivided by product line;
- market values, income, realised gains and unrealised gains identified separately for each major asset category;
- revenue items split by non-profit, with-profits and the estate and, in some cases, further subdivided by product line. This will allow investment return, expenses and tax assumptions to be derived for the with-profits products and profits on non-profit business to be identified; again care will be required with flexible contracts; and
- profit on surrendering and maturing with-profits contracts.

2.13 *Impact of Asset Share Philosophy*

2.13.1 For policy asset shares the approach taken to determining investment returns, expenses, surrender profits and profits on non-profit business can have

a very significant impact on results. The first two columns of Table 2.1 show the policy level asset share at maturity for 10-year and 25-year endowments under a number of alternative philosophies and assumptions. Each change in assumption has been applied separately, so that, if a number of changes were made at the same time, the impact could be very significant.

2.13.2 The results are expressed as a percentage of a central policy asset share. The central assumption is a base asset share, determined assuming that assets were invested historically 75% in equities and properties and with no allowance for surrender profits, profits from non-profit business, capital charges or shareholders' transfers. The detailed assumptions are set out in Appendix A.

2.13.3 The impact of the various philosophies and assumptions on a model portfolio of in-force with-profits endowments is shown in the right hand column of Table 2.1. The model portfolio is described in Appendix B and the mix of in-force business reflects historic market trends. The impact is damped down a little compared to the policy level results. However, some changes still have a significant impact, and again introducing a number of changes at the same time would have a major impact.

Table 2.1. Impact of assumptions on asset shares (% of central result)

	Policy level asset shares at maturity		Aggregate asset shares
	10-year term	25-year term	
Central assumptions	100	100	100
Equity backing ratio increased 10%	101	108	102
Investment return +1% p.a.	106	120	107
Initial expenses +20%	99	99	98
Renewal expenses +20%	99	99	99
Surrender profits included	104	115	105
Profits from non-profit business included	103	109	103
Capital charge on asset shares included	98	96	98
Shareholders' transfers included	95	85	92

3. Managing Payouts Through Asset Shares

3.1. *Relationship between Payouts and Asset Shares*

3.1.1 The previous section dealt with the different methods used by life offices to calculate asset shares. If payouts for with-profits contracts were based exactly on the calculated level of asset shares, then the volatility of the maturity value, or surrender values, for with-profits contracts would be similar to those for unit-

linked contracts invested in a managed fund, with an equivalent investment strategy to the with-profits fund. With-profits payouts would still differ from the equivalent unit-linked contract as a result of different deductions for expenses compared with the charges deducted from the unit-linked contract and, possibly, as the result of the allocation of miscellaneous sources of profits to the with-profits contracts and the deduction of capital charges. In addition, the with-profits contracts have guaranteed minimum values which might apply in some circumstances, particularly for some ten-year policies which now have very low levels of terminal bonus.

3.1.2 In practice, payouts will depend on the level of bonuses, which will be influenced by many factors. Asset shares are generally used only as a guide to the appropriate level of payouts. Other factors which may be relevant are:

— the company's approach to smoothing investment fluctuations;
— the volumes of maturities and the costs should payouts deviate from asset shares (cost of augmentation);
— the financial position (both realistic and statutory) of the office;
— the level of payouts of other companies; and
— the level of payouts and bonus scales previously declared.

3.1.3 Historically, bonuses were set such that the cost of bonus matched the revenue surplus generated by the office. There were also limitations on the type of bonus scales which could be used, and thus only 'broad equity' could be achieved. Reversionary bonus rates, in the last 25 years, have typically been uniform compound, or more recently super-compound systems. Terminal bonuses were first introduced by offices in the late 1960s, in order to distribute some of the exceptional capital appreciation which had not been distributed through reversionary bonuses, and hence to bring total payouts up to an 'appropriate' level. Bonus reserve valuations were also used to give an indication of the supportability of the current level of bonus rates. Typical terminal bonus scales would be:

— a uniform percentage of all attaching reversionary bonuses;
— a percentage for each year in force applied to either the sum assured or sum assured plus reversionary bonuses; or
— a percentage applied to either sum assured or sum assured plus reversionary bonuses, depending on the year of entry and maturity.

3.1.4 Very few offices now use the first approach, and many have some form of durational basis, as in the second method, often modified to give a desired pattern of terminal bonuses for different terms. These duration-based scales are relatively inflexible compared to the last of the above methods, which about a third of offices now use. Even this last method does not provide the degree of flexibility required for unitised with-profits contracts, where premiums can be stopped and restarted or investments switched between the with-profits fund and linked funds.

3.1.5 Some offices have developed more sophisticated systems for such contracts, where each premium payment is treated separately and terminal bonus rates are determined in respect of each allocation made in each past year. This approach gives the flexibility to set payouts equal to the exact asset share in respect of each allocation of units in the with-profits fund, if required. Often the systems used to monitor the asset shares are the same as are used to account for the unit fund.

3.1.6 With intense competition between offices and greater disclosure, combined with the increased flexibility and transparency of unitised with-profits contracts, it is likely that much greater attention will be paid in future to the mechanics of with-profits contracts and the smoothing process. In this context, we believe that it is important for offices to have a well-defined and understood internal process for determining payouts, and that it would be helpful for this to be communicated more effectively to policyholders. After all, it is this process of smoothing, combined with the underlying guarantees, which provides the unique selling feature of a with-profits contract.

3.1.7 This does not mean that offices need lose their ultimate discretion in setting bonus rates and that the process becomes completely automated. The factors which need to be considered are too numerous for this to be possible, and the ability to retain some discretion, particularly in extreme circumstances, or to refine the process to adapt to changing conditions, has been one of the major strengths of with-profits business in the past, and will be essential for the future survival of with-profits as a product concept. However, such discretion will need to be exercised with greater care and is likely to be subject to much greater scrutiny in the future. We can expect our professional advice to be questioned, and must be prepared to explain and justify our actions.

3.1.8 Current methods of determining bonuses and payouts are explained in the with-profits guides issued by all with-profits offices. It is illuminating to review what is discussed in these documents. A review of a sample of with-profits guides of 20 major offices reveals some interesting factors:

— Most companies talk about fairness and equity in quite general terms, but only one is explicit about what it means by this.
— Most companies (but by no means all) mention the concept of smoothing of payouts, but none are explicit about how this is to be done, and only a few give any indication of the extent of smoothing.
— Only about half of the offices mention asset shares explicitly, although many others refer to the experience or profits earned over the life of the contract.
— About a quarter of the sample mentioned the allocation of miscellaneous profits.
— Very few offices were explicit about the basis for determining the assumptions used in calculating asset shares — for example, the approach to matching and investment returns, or the basis for deducting expenses.
— Only a few offices made even an oblique reference to the financial strength of the office being a factor in determining the level of payouts.

In summary, with perhaps one exception, it would be very difficult to gain any clear understanding of the precise approach used by most offices to determine payouts. We have attempted to define such a process below.

3.1.9 The calculation of base asset shares is a helpful starting point in the process of setting bonuses. The process will then involve consideration of the following:

(a) what adjustments to base asset shares are to be made in respect of the allocation of miscellaneous profits or deduction of capital charges;
(b) the approach to smoothing (this may be either a scientific method or a more arbitrary approach);
(c) what further adjustments may be necessary to the payout levels indicated by (a) and (b) in order to:
   — limit the cost of any overpayments and ensure the ongoing financial soundness of the office; or
   — enhance the competitive position of the office;
(d) how best to fit the determined level of adjusted/smoothed asset shares to the bonus system currently used; and
(e) how to ensure that changes in payouts from year to year are still within 'acceptable' limits.

3.1.10 Items (a) and (b) are capable of specification according to the office's agreed philosophy. Further adjustments of the form described in (c) tend to be more subjective and may also involve the actuary in commercial decisions. Dealing with the limitation of fairly rigid bonus scales in (d), and allowing for systems constraints, will often dictate the need for a fairly broad brush approach, whilst (e) is a final 'health check' on the end result from an equity perspective.

3.1.11 Some actuaries question whether it is legitimate to enhance payouts for competitive reasons. If the volume of maturing policies is small, then the cost of doing this can be minimal, but unreasonable expectations may be created in the minds of policyholders which cannot be met when the volume of maturities increases. Our view is that some limited augmentation to payouts is a legitimate use of the estate, provided it does not threaten the financial soundness of the office and it is applied in a uniform and non-arbitrary manner across a class of business. For example, an office might quite reasonably choose to make an additional allocation of miscellaneous profits on all life policies, but not pensions policies, or vice versa, for purely competitive reasons, if the office can afford to do so without disadvantaging other policyholders. However, it would seem inappropriate to enhance payouts for a 25-year endowment policy, but not for other terms.

3.1.12 Many companies appear to have spent considerable time and effort in recent years in determining the appropriate historic data for calculation of asset shares and determining their philosophy regarding such items as treatment of miscellaneous profits. This is reflected in the large number of companies which stated in the asset share survey that they were currently, or had recently,

reconsidered their approach to asset shares. It is far less clear, however, that actuaries have given as much thought to the relationship between asset shares and payouts as discussed above. The adoption of a clearly defined methodology is a prerequisite to being able to explain to policyholders or their advisers how bonuses, and hence payouts, are determined.

3.2 *Smoothing*

3.2.1 Increasingly, equity-based investments are being offered by unit-linked offices and other financial institutions with underlying guarantees over a period of up to 5 years. The smoothing process is therefore the main feature which still differentiates a with-profits contract from other savings vehicles.

3.2.2 A measure of the degree of smoothing can be gained from the volatility of payouts on with-profits policies compared to equivalent unit-linked contracts. Figures 3.1 and 3.2 show the change in payout from year to year for 10 and 25-year with-profits contracts for two typical offices, over the period 1970-1993 and 1974-1993 respectively, and compares the results with the maturity values from a hypothetical unit-linked contract over the same period, invested in an equity fund and also a managed fund with an investment strategy identical to that followed by our hypothetical with-profits fund described in Appendix A. The results have been scaled, so the absolute levels of payouts should not be compared.

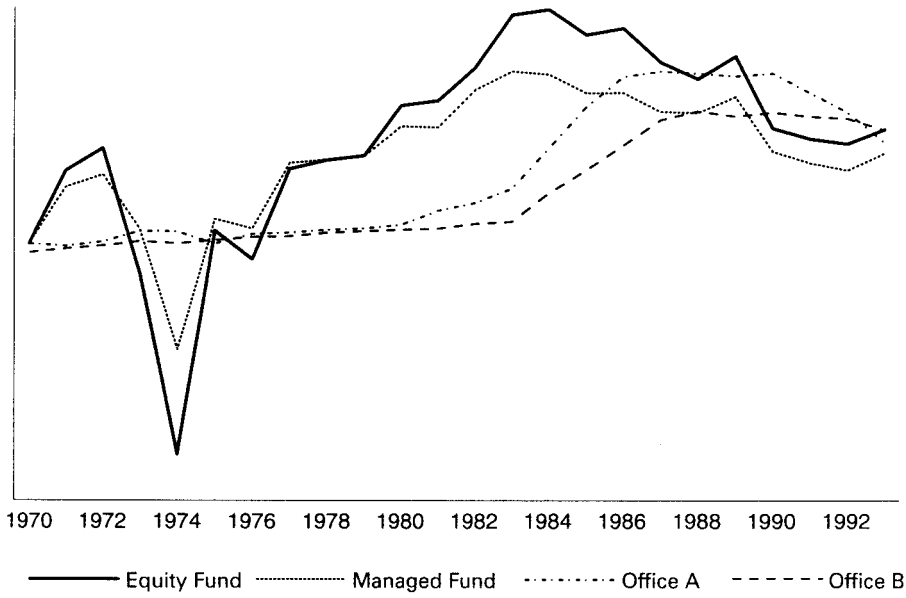


Figure 3.1. Volatility in payout: 10-year term

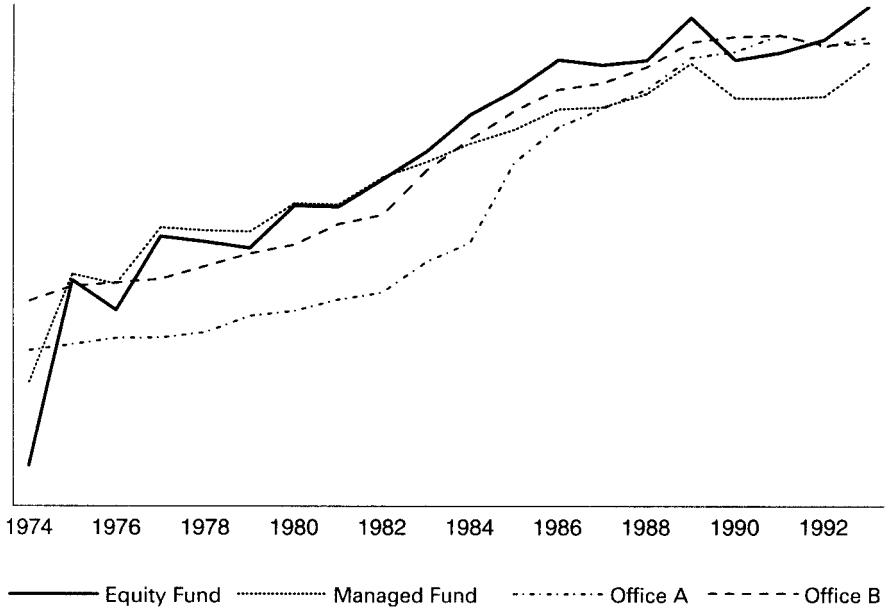


Figure 3.2. Volatility in payout: 25-year term

3.2.3 The equity fund payouts show a high degree of volatility, which is reduced to some extent with the managed fund. However, the with-profits payouts appear to exhibit a much lower level of volatility, which is indicative of the high degree of smoothing. In addition, a with-profits policy will provide smoothing throughout the year, whereas the value of a unit-linked contract will fluctuate daily. The diversified investment strategy adopted by with-profits funds appears to have accounted for only a part of the reduction in volatility. A further significant reduction is due to the smoothing process. The above conclusions lead us to consider in more detail different methods of smoothing which may be used and the potential cost of smoothing.

3.2.4 Various different methods of smoothing are used by with-profits offices. The asset share survey showed the most common methods to be:

— limiting the change in maturity payouts (24 offices); and
— calculating smoothed asset shares (11 offices).

In practice offices will often use a combination of methods. Many offices consider the projected level of future asset shares on the assumption of a certain future investment return, thus enabling the actuary to factor in the expected progression of asset shares over the next few years, as well as the historic progress to date.

3.2.5 Apart from the direct smoothing of payouts by limiting the change in

any year, other methods reduce the volatility of the payouts by smoothing the investment return credited in the calculation of the asset share. This can be achieved by either:

— managing the asset mix into less volatile assets (e.g. increasing the proportion of fixed-interest, and shortening the term of the assets as a policy approaches maturity); or
— directly smoothing the investment return of the assets backing the with-profits fund.

3.2.6 The approach of switching the asset mix increasingly into fixed-interest as a policy reaches maturity has been discussed in Section 2.4. It has some intuitive appeal in so far as the theoretical asset mix matches the build up of the guarantees under the policy. However, it may be difficult and too restrictive to operate in practice. The majority of offices now adopt the approach of using a uniform investment mix throughout the life of a contract (the 'managed fund' approach, also outlined in Section 2.4).

3.2.7 There are numerous methods of directly smoothing the achieved investment return. These can be categorised as:

— methods which smooth historic returns in a deterministic manner; and
— methods which factor in the actuary's view as to long-term expected returns.

The first approach has the advantage of complete objectivity, whereas the second approach allows for an element of judgement. This may be considered an advantage, especially if the choice of future return is consistent with that adopted for other purposes (e.g. projecting the statutory solvency of the office), and the impact of different future returns is fully tested. The various methods can be applied either to smooth the investment returns used, or to smooth the asset shares directly.

3.2.8 Examples of methods which smooth historic returns in a deterministic manner are:

— averaging historic investment returns (or capital gains) over 3-5 years;
— smoothing equity values by adjusting them by the ratio of the current dividend yield to a weighted average historic yield;
— solving for the average annual investment return achieved on policies maturing in each of the last 3-5 years, and assuming that this is the return earned on the smoothed asset shares; and
— regression analysis on historic levels of unsmoothed asset shares.

3.2.9 Examples of methods which factor in the actuary's view as to long-term expected returns are:

— smoothing investment returns on the basis of a trend line model for the gilt/equity yield (e.g. adjusting equity values by the ratio of current dividend yields to the assumed long-term market yield); this is the same as the second

method in ¶3.2.8, except that fixed assumptions are used for the assumed long-term yields;

— crediting an investment return equal to k% of the actual return plus $(1-k)$% of the long-term expected rate of return; and

— determining the smoothed asset share SAS_t, at time t, from a weighted average of the unsmoothed asset share AS_t at time t, and the smoothed asset share SAS_{t-1} at time $(t-1)$, accumulated at the expected investment return.

The last method requires the calculation of two series of asset shares (smoothed and unsmoothed), but has the advantage that the implied investment return on the smoothed asset share is higher the further the smoothed asset share is below the actual asset share and vice versa.

3.2.10 The impact of these different methods of smoothing can be illustrated by considering the effect on smoothed asset shares of 10 and 25-year contracts for £50 per month over the period 1974 to 2003. We have assumed the asset mix described in Appendix A applies in all cases except for the variable asset backing approach, where the proportion of fixed-interest assets is increased over the term of the contract. The fixed-interest assets are assumed to be matched to the liabilities, and their term shortens as the policy approaches maturity. The future investment return is assumed to be 11.5% before tax. The linear regression method uses the trend in payouts over the last ten years (or payouts since 1974 for years before 1983) to determine a formula for the payout in the current year. The investment returns for the period are also as described in Appendix A.

3.2.11 The methods of smoothing we have considered are a selection of those described in ¶¶ 3.2.8 and 3.2.9, namely:

(1) increasing fixed-interest asset backing over the term of the contract;
(2) linear regression on unsmoothed asset shares;
(3A) 5-year geometric average of investment returns;
(3B) 5-year arithmetic average of investment returns;
(4) average of returns at maturity over last 5 years;
(5) crediting 50% of actual return plus 50% of a long-term assumed return; and
(6) SAS_t = 50% of AS_t + 50% of SAS_{t-1} accumulated at the expected return.

In both methods (5) and (6) the long-term assumed return has been taken as 11% p.a. The results are shown in Figures 3.3 to 3.8.

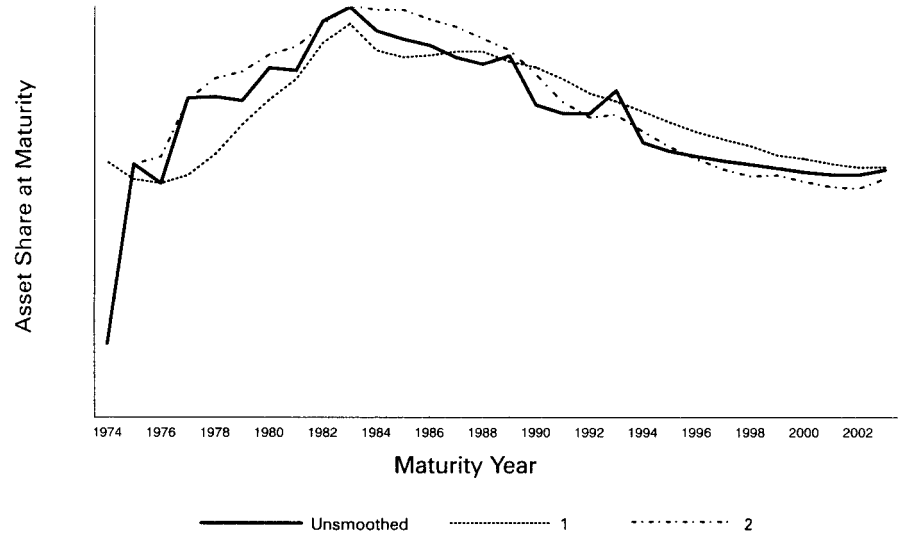


Figure 3.3. Term 10 years: methods 1 and 2

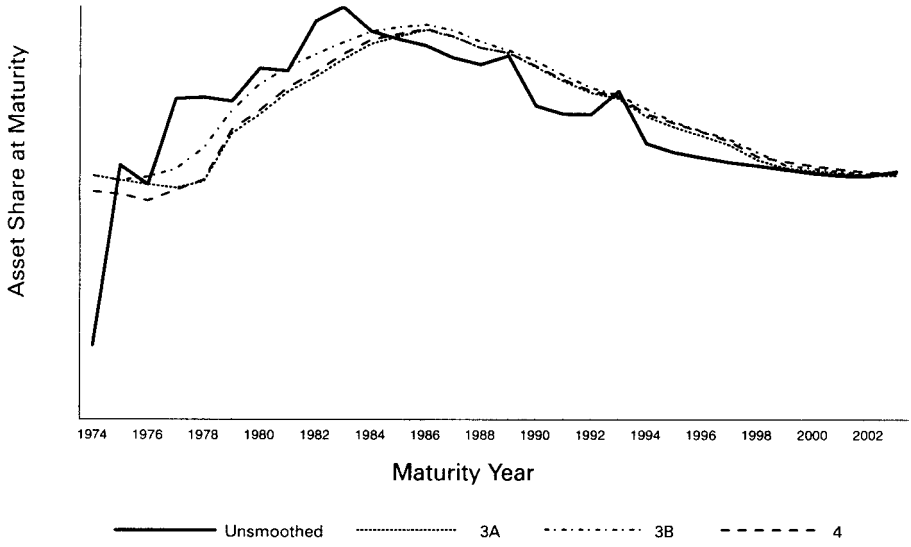


Figure 3.4. Term 10 years: methods 3A, 3B and 4

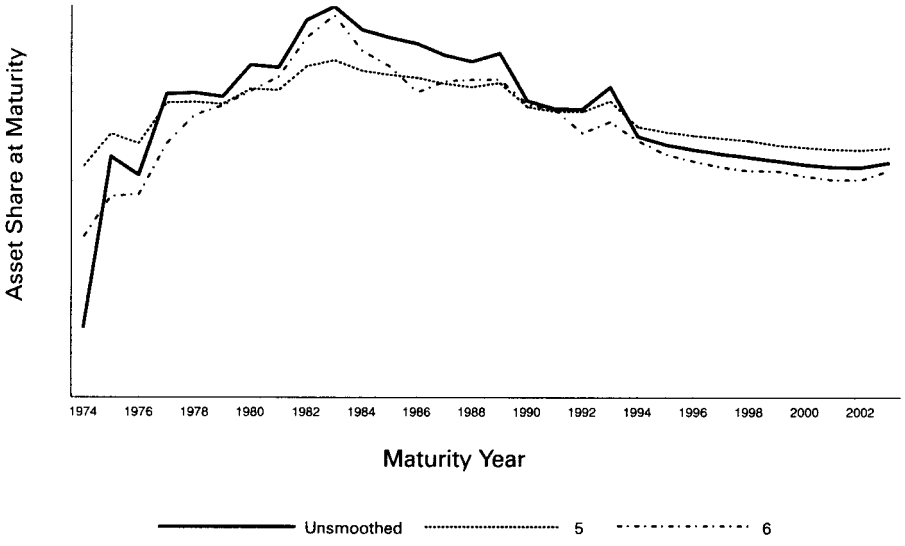


Figure 3.5. Term 10 years: methods 5 and 6

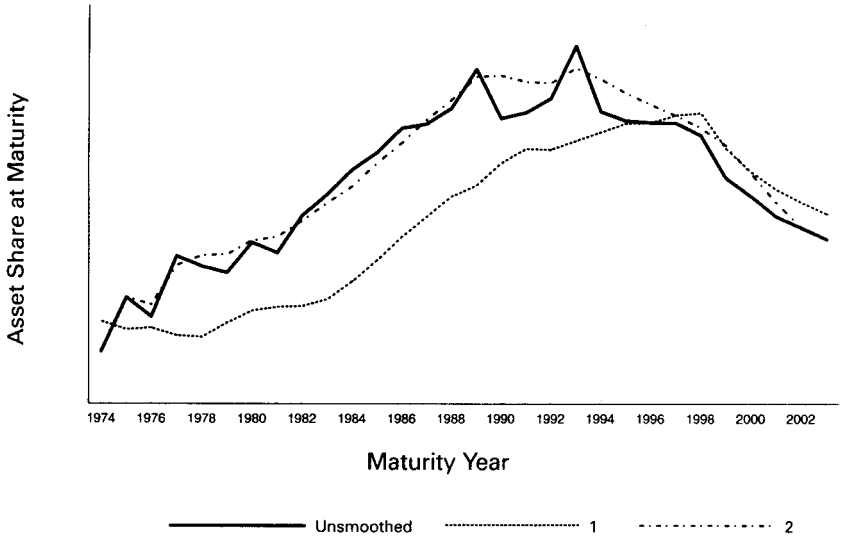


Figure 3.6. Term 25 years: methods 1 and 2

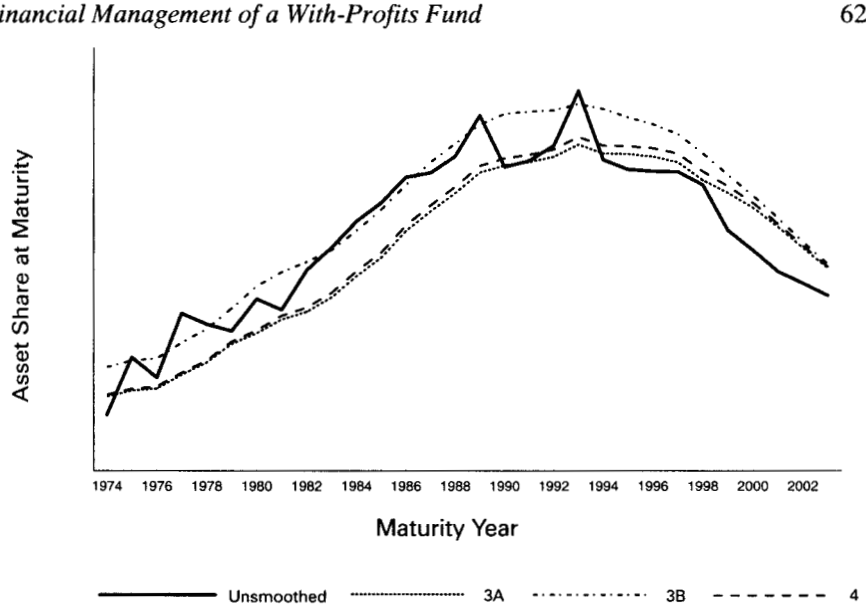


Figure 3.7. Term 25 years: methods 3A, 3B and 4

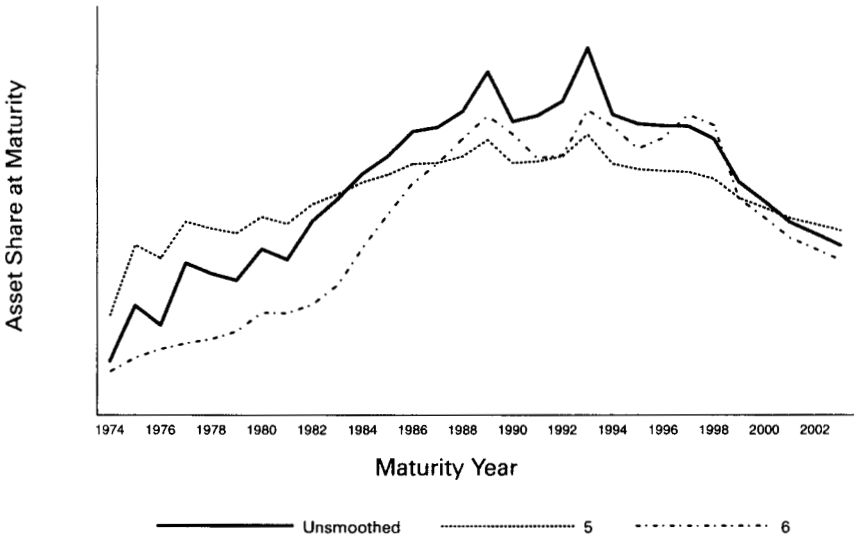


Figure 3.8. Term 25 years: methods 5 and 6

3.2.12 Method 1, which increases the fixed-interest contract content over the duration of the contract, produces significantly different results from the other methods, particularly for the 25-year contract, since, for most of the 1970s and 1980s, returns on fixed-interest stock have been significantly lower than on equities. Another interesting feature of this method is caused by the high equity content at early durations; very volatile equity returns in 1974-75 lead to a sudden drop in payouts, in 1999 for a 25-year contract, and in 1984 for a 10-year contract.

3.2.13 Method 2 provides smoother returns which are generally closer to the unsmoothed returns, but does take some years to adjust from steadily increasing to steadily decreasing payouts. Methods 3 and 4 provide the greatest degree of smoothing, but also require significant time to adjust to lower asset shares. Method 3A, using geometric averages of investment returns, and Method 4 provide very similar results. However, the difference between Method 3B, using arithmetic averages, and Method 3A were much greater than expected, particularly for the 25-year contract. The results using arithmetic averaging were consistently higher than those using geometric averaging — by as much as 10% during the last 15 years.

3.2.14 Method 5 produces a reasonable level of smoothing, but the absolute level of smoothed asset shares is sensitive to the choice of assumed long-term return, and can be materially different from the unsmoothed asset shares if this rate is much different from the average historic return. Method 6 produces relatively little smoothing unless a high weight is given to the smoothed asset share component, and also suffers from the arbitrary choice of expected return.

3.3 *Cost of Smoothing*

3.3.1 Consideration of the impact of smoothing on policyholder payouts is, of course, only part of the story. The financial impact on the office must also be considered. Before any decision on payout levels can be taken, the cost of paying claims in excess of the theoretically justified level or generating profits from underpayments needs to be investigated. This will require consideration of such losses or profits historically, as well as in the current year and the expected position in the future. This was the subject of a report by the Faculty of Actuaries Bonus and Valuation Research Group (1994).

3.3.2 In order to identify the cost of smoothing, it is necessary to determine assumptions on which to accumulate asset shares, against which the cost of smoothing can be measured, and also to decide over what period, historically, the amount of under or over-payments should be measured. It is important to adopt a consistent basis and framework for these investigations. It is also useful to project forward the likely costs of smoothing in the future, given different approaches to smoothing and investment strategies, and allowing for different investment scenarios on either a deterministic or stochastic basis.

3.3.3 It is usually intended that the process of smoothing should be a zero sum game — i.e. the overall cost should be zero over a long period. The main

problem is how to decide where to start in the smoothing process, how far to depart from a 'nil' accumulated cost, and over what period the average cost should be zero. The impact of guarantees is also a complicating factor, although, in theory, it is possible to track the accumulated costs of smoothing for all contracts written from a certain point in time (including those which have already terminated), in order to identify an accumulated smoothing reserve. In practice, we feel that it is difficult to distinguish the impact of 'smoothing' from guarantees and other effects. Thus, attempting to identify the historic accumulated figure may not provide any significant additional insights into the current position. Indeed, one could argue that the total estate represents the accumulated 'smoothing reserves', in its most general sense, but we do not believe this interpretation is appropriate for most offices.

3.3.4 Most benefit can be gained by consideration of in-force policies. By applying any smoothing rule historically to these contracts, it is possible to determine the current extent of differences between smoothed and unsmoothed asset shares. By applying the philosophy of the office going forward, the future level of payouts can be determined under different scenarios and the cost of under/over payment (referred to as 'augmentation') in each future year can be determined and compared to the available internal resources of the office.

3.3.5 In order to illustrate the potential costs of different smoothing methods we have calculated the 'smoothing cost' for maturities over the three 10-year periods 1974-1983, 1984-1993 and 1994-2003. We have assumed that a uniform volume of business (1000 policies each with £50 premium per month) matures in each year for both the 10-year and 25-year policies. The actual smoothing costs for each 10-year period are given in Tables 3.1 and 3.2. A positive figure indicates net augmentation and a negative figure net underpayment. These costs are then expressed as a percentage of the total unsmoothed asset shares at maturity for the period. The results are shown in Tables 3.3 and 3.4.

Table 3.1. Smoothing costs, £m: 10-year term

		1974 - 1983	1984 - 1993	1994 - 2003	Total
1.	Increasing fixed-interest content	(4)	1	5	2
2.	Linear regression	4	6	(1)	9
3A.	5-year geometric average investment returns	(9)	5	3	(1)
3B.	5-year arithmetic average investment returns	(4)	7	4	7
4.	5-year average of returns to maturity	(10)	5	4	(1)
5.	50% of actual return plus 50% of assumed return	(2)	(8)	4	(6)
6.	50% of unsmoothed AS + 50% of smoothed AS	(5)	(8)	(3)	(16)

Table 3.2. Smoothing costs, £m: 25-year term

		1974 - 1983	1984 - 1993	1994 - 2003	Total
1.	Increasing fixed-interest content	(85)	(121)	28	(178)
2.	Linear regression	7	6	33	46
3A.	5-year geometric average investment returns	(52)	(68)	45	(75)
3B.	5-year arithmetic average investment returns	21	22	87	130
4.	5-year average of returns to maturity	(47)	(56)	56	(47)
5.	50% of actual return plus 50% of assumed return	78	(86)	(43)	(51)
6.	50% of unsmoothed AS + 50% of smoothed AS	(112)	(91)	(20)	(223)

Table 3.3. Smoothing costs as % of unsmoothed asset shares: 10-year term

		1974 - 1983	1984 - 1993	1994 - 2003	Total
1.	Increasing fixed-interest content	(4)	1	6	3
2.	Linear regression	3	5	(2)	6
3A.	5-year geometric average investment returns	(9)	4	3	(2)
3B.	5-year arithmetic average investment returns	(4)	6	5	7
4.	5-year average of returns to maturity	(9)	4	4	(1)
5.	50% of actual return plus 50% of assumed return	(2)	(7)	5	(4)
6.	50% of unsmoothed AS + 50% of smoothed AS	(5)	(7)	(3)	(15)

Table 3.4. Smoothing costs as % of unsmoothed asset shares: 25-year term

		1974 - 1983	1984 - 1993	1994 - 2003	Total
1.	Increasing fixed-interest content	(15)	(20)	4	(31)
2.	Linear regression	1	1	5	7
3A.	5-year geometric average investment returns	(9)	(11)	7	(13)
3B.	5-year arithmetic average investment returns	4	4	13	21
4.	5-year average of returns to maturity	(8)	(9)	9	(8)
5.	50% of actual return plus 50% of assumed return	13	(14)	(7)	(8)
6.	50% of unsmoothed AS + 50% of smoothed AS	(19)	(15)	(3)	(37)

3.3.6 For both 10-year and 25-year policies, five of the seven methods predict that there will be smoothing costs after 1993, with the 25-year policies taking the longest period before smoothed asset shares and unsmoothed asset shares converge. The cost of smoothing for ten-year policies is lower, mainly due to the smaller size of the asset shares at maturity. The pattern of maturities is rather artificial, as in practice the volumes would increase each year.

3.3.7 The actual cost of smoothing in future will depend on the future pattern of investment returns, as well as the smoothing method adopted. However, the choice of smoothing method can clearly have a significant impact on the financial position of the office.

3.4 *Surrender Values*

3.4.1 Whilst companies were not slow in introducing terminal bonuses to enhance payouts at maturity, it was less common, at first, to include any significant allowance for terminal bonuses in surrender values. Surrender values would often be substantially below the asset shares of the policy, particularly in the later duration of a contract. Assuming that the portfolio of with-profits business was mature, surrenders resulted in a release of statutory surplus (as surrender values would generally be lower than statutory reserves), and could result in substantial profits measured on a more realistic basis (as the difference between the asset share and the surrender value would be even greater).

3.4.2 Over the last few years, increasing attention has been placed on the low level of surrender values paid by some offices — both in the early years (where they are compared to the premiums paid) and close to maturity (where they are compared to the ultimate level of maturity payouts). In many cases offices have improved surrender values significantly, and now aim to pay out close to asset shares for policies close to maturity. This appears to us to provide a more equitable approach, as it seems hard to justify paying substantially less than the equivalent maturity payment in the years immediately prior to maturity. Recent press announcements have suggested that some offices will increase surrender values further, possibly above asset share in the early years. This is due, in part, to consumer pressure and comparisons made between surrender values and the sum of premiums paid in the early years. Increasing surrender values at early durations is likely to put further pressure on offices to contain costs and adversely affect the level of payouts at maturity.

3.4.3 The greater focus on surrender values has made it important for offices to consider the accrual of asset shares throughout the policy term as well as at maturity, and very similar considerations apply in moving from asset shares to surrender values as would apply in determining maturity values. Current surrender value bases for conventional contracts are somewhat inflexible, and the value placed on guaranteed benefits is often determined by a fairly rigid method. The part of the surrender value attributed to the terminal bonus is commonly determined using a scale similar to that used for terminal bonuses at maturity —

usually applying a proportion of the scale depending on the duration in force, and increasing to 90-100% prior to maturity.

3.4.4 For unitised with-profits contracts, greater flexibility with regard to surrender values is possible through the use of market level adjustments which all companies have generally incorporated as part of the policy conditions. This allows companies, at their discretion, to pay less than the face value of the unit fund on early surrender, and in theory would normally be applied if the asset shares are below the face value of the unit fund at any time. This could often occur at early durations, but is less likely at longer durations when asset shares would normally exceed the face value of units. In the latter case a terminal bonus would apply, as for a traditional contract. In practice, some offices have been reluctant to give surrender values below the unit fund.

3.4.5 As a result of upward pressure on surrender values, it is clear that surrender profits will be a much less significant source of profits in future. Indeed, significant surrender losses may arise in the early years of a contract, and the method of dealing with such losses needs to be considered. A common method of allocating surrender profits has been to respread these profits amongst the asset shares of the surviving policies in the cohort of new business written in the same year. If the same approach is applied to respreading surrender losses, this can result in a large reduction in asset shares, particularly for policies where the initial expenses are high (e.g. longer-term contracts with high initial commissions). This approach may no longer be considered equitable, and, in future, such profits or losses will perhaps be treated in the same way as other miscellaneous sources of profit or loss and not be directly reallocated within the same cohort.

4. Financial Management Framework

4.1 *Overview of Financial Management Framework*

4.1.1 The published DTI returns and Companies Act accounts give little indication of the financial performance of a with-profits fund. The results are used primarily to demonstrate to the regulators the solvency of the office, and the solvency standards used are generally regarded as conservative. The changes to the accounts which take effect in the Companies Act in 1995 will do little to improve the situation, especially for a with-profits office. Although the intention is to separately identify provisions and reserves, in practice provisions are unlikely to provide fully for future bonuses to with-profits policyholders, and the part of the fund for future appropriations which represents the estate will not be identified separately. Consequently, we believe that there is a need for additional internal management information to report the performance of the fund on a more relevant and realistic basis.

4.1.2 An internal system to monitor the financial performance of the office should provide a range of information, for example:

— to monitor the use of and return on capital employed in the business;
— to provide a basis for the equitable allocation of profits between policyholders, policyholders and shareholders, and policyholders and the estate, and to demonstrate that an equitable allocation has taken place;
— to quantify and manage the risks in the business such as providing guarantees and mismatching of assets and liabilities; and
— to indicate the potential for growth and the financial consequences of different business strategies.

4.1.3 Although the main users of the information will be the management, and perhaps shareholders, certain of the information could be shared with regulators to give a more realistic measure of financial strength and to demonstrate that the fund is being run soundly with regard to both current and future solvency. Some of the information may also be of interest to policyholders or to informed commentators, but it is unlikely that such data would be released on a regular basis at the current time. The policyholders may still benefit, in that such a framework allows their interests to be properly quantified and thoroughly considered.

4.1.4 In this section we describe a framework which we have found to be useful. It involves constructing a realistic balance sheet and a realistic profit and loss account. It is realistic in that it recognises all of the liabilities of the office including accrued terminal bonus and it recognises cash flows between with-profits policyholders and the estate. The framework recognises profits which will be realised in the future. It also introduces the concept of an amount of risk-based capital which would not, in the normal course of events, be needed to meet policyholders' benefits, but is set aside and can be called upon to meet benefits in adverse conditions or to demonstrate solvency to the regulators. An important part of the framework is an analysis explaining the reasons for movements in key items during the period, and this can be taken further with a comparison of actual experience against that planned.

4.1.5 The framework can be used in monitoring the ongoing financial position of a fund and, in situations where the basis on which a with-profits fund operates, may be subject to major change such as demutualisation, partition of the fund or possible merger. We do not suggest that there is one framework which will perfectly meet the reporting needs of every office. Any general framework will need some customisation to support the objectives of the office and reflect its approach towards with-profits business. Even if the framework meets the needs of the organisation, some changes to the definitions and to the presentation of results may make the results more meaningful. The real benefit comes from applying the chosen method consistently over a period of time.

4.1.6 The use of a financial framework, including a well-defined philosophy for the calculation of asset shares and the smoothing of payouts, will not necessarily, in our view, restrict the offices' freedom of action or make the concept of what is a with-profits policy uniform across the industry. It is

appropriate that different offices should have different approaches to with-profits business in the areas of investment policy, guarantees and smoothing. A financial management framework should not restrict their choice of approach, but should be a mechanism to quantify and support it. It is the public statements to policyholders which will define, to a large measure, the policy of the office, and these need to be carefully thought through and communicated well in advance.

4.1.7 Used in a proactive manner, the framework may be a powerful tool for the actuary to demonstrate the consequences of making certain statements to policyholders or following certain bonus strategies such as a rigid approach to bonus interest or to the smoothing of payouts.

4.2 *Net Worth*

4.2.1 Asset shares now play such an important role in the determination of benefits in most with-profits offices, that we believe they should be the starting point for any financial framework for the management and ongoing monitoring of with-profits business. The challenge is to develop a framework which recognises both the importance of the statutory solvency position and the ability of the office to meet commitments to policyholders.

4.2.2 Our starting point is to define the *net worth* of the fund as the accounting value of investments less non-profit and unit-linked statutory liabilities and adjusted aggregate asset shares for with-profits business. The statutory liabilities for non-profit business and unit-linked business include the resilience reserve, but exclude the required minimum solvency margin. The *adjusted aggregate asset shares* for with-profits business are the aggregate asset shares plus amounts identified for planned future augmentation to asset shares on claims paid due to smoothing, competitive pressures or circumstances where guarantees are expected to exceed asset shares. Amounts will also be set aside as part of the adjusted aggregate asset shares to meet shareholders' transfers and tax on shareholders' transfers if these are not charged against asset shares.

4.2.3 The *accounting value of investments* will include inadmissible securities, but not the value of in-force business or the full value of subsidiaries which will be included at net asset value. The net worth definition is shown in Figure 4.1, and is similar to shareholders' assets and reserves in a non-profit fund. The liabilities should include allowance for *deferred tax* on a basis which is consistent with that used in the calculation of asset shares.

4.2.4 With-profits business and non-profit business are treated in different ways. We prefer to use aggregate asset shares as a measure of liabilities for with-profits business, as the statutory liabilities will not usually include an appropriate provision for future policyholder benefits. Depending on the level of investment markets, the statutory liabilities can be greater or less than the adjusted aggregate asset shares. The aggregate asset shares include allowance, where appropriate, for historic profits on a statutory basis from non-profits business, but not future profits. For non-profit business, we prefer to use the statutory liabilities as a measure of liabilities rather than aggregate asset shares.

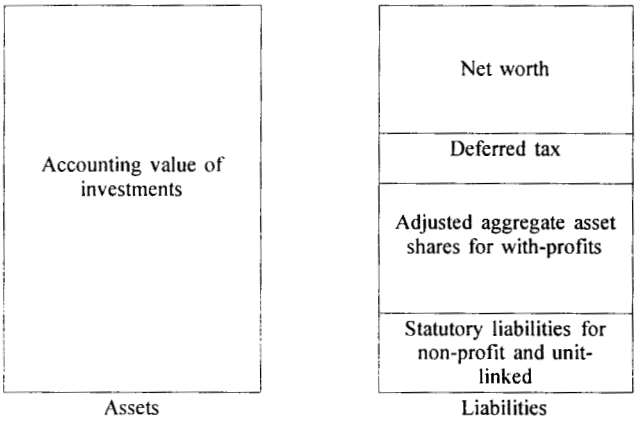


Figure 4.1. Definition of net worth

The margins in the statutory liabilities can then be valued at a later stage using an appropriate risk discount rate.

4.3 *Free Capital*

4.3.1 The balance sheet above has little or no regard to solvency. However, there are two forms of insolvency which need to be considered:

— That the office is unable to meet the regulator's solvency test or unable to demonstrate a sufficient level of statutory free assets to prevent the regulators intervening in the office's affairs. Alternatively, the office is unable to demonstrate a sufficient level of financial strength to the press, intermediaries and credit rating agencies. This may result in adverse comment and a significant decline in new business, which may itself bring insolvency closer.

— That the office is unable to meet in full amounts which it considers meet policyholders' reasonable expectations. This would take into account the level of smoothing which the office considers appropriate in the light of the statements made to policyholders and its past track record on smoothing.

The first example may not be insolvency in the true sense as, in some circumstances, policyholders' benefits could continue to be met. In the second case, it could also be argued that insolvency can be prevented by a change in smoothing practice. However, the two examples are illustrative of situations where an office would run into severe financial difficulties.

4.3.2 The extra assets which the office, as a whole, should hold in order to guard against both of those definitions of insolvency we have called *risk-based capital*. The risk-based capital will be partly in respect of with-profits business and partly in respect of non-profit business, although the former is likely to be

a far larger amount. The concept of risk-based capital is described in more detail in Section 4.8. The impact of including risk-based capital in the balance sheet is that part of the net worth is allocated to support in-force business, as shown in Figure 4.2. The remaining net worth is *free capital* not needed to support in-force business.

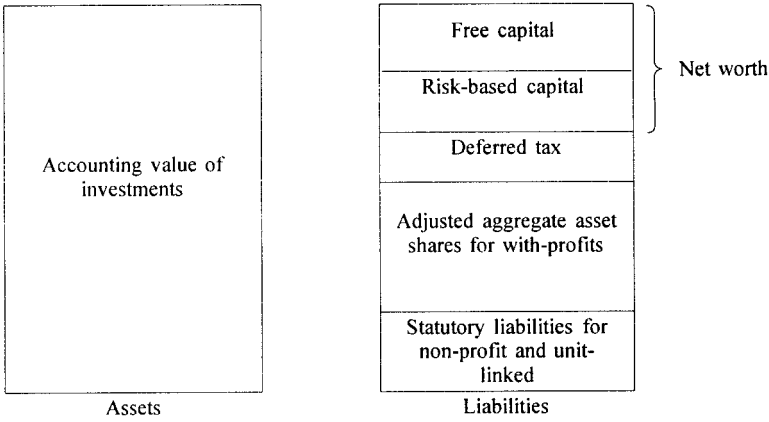


Figure 4.2. Definition of free capital

4.3.3 Free capital is the internal solvency measure of the office. If the free capital is positive, the office has excess capital not currently needed to support in-force business. If the free capital is negative, then the office is running greater risks than are appropriate, and should take some action to correct the position. Such action might include:

— building up free capital through extra charges on asset shares; or
— reducing the risk-based capital required by reducing the risks in the in-force business.

The latter might involve an asset mix more closely matched with the liabilities, a bonus policy more heavily weighted towards bonus in terminal form or a bonus policy more responsive to investment conditions. The impact of these actions on policyholders' reasonable expectations would need to be considered.

4.3.4 The free capital in our framework is different from the available assets shown in the DTI returns. However, a reconciliation between the two can be made. Available assets are equal to:

free capital;
plus risk-based capital; and
the excess of adjusted aggregate asset shares for with-profits over the statutory liabilities (this amount could be negative);
less inadmissible assets.

4.3.5 Projections of free capital will be important in determining what level of new business can be supported and what new ventures can be funded.

4.4 *Realistic Balance Sheet*

4.4.1 Whilst the free capital provides information on the solvency of the fund, it does not provide a realistic comparison between assets and liabilities. For this purpose, a measure is needed which recognises all sources of value including the value of future profits from in-force business.

4.4.2 On the asset side, the extra value of subsidiaries over and above net asset value should be included, thus placing all investments onto a 'market value' basis. We refer to this as the *excess value of subsidiaries.*

4.4.3 On the liability side, non-profit and unit-linked statutory liabilities may contain margins, which, when released, will increase free capital. In addition, the risk-based capital allocated to these products will flow into free capital as the business matures, as long as it is not required to meet the risks it has been set aside to cover. The value of these future contributions to free capital can be determined by discounting future cash flows on a best estimate basis. We have described this value as the *value of in-force non-profit and unit-linked business.*

4.4.4 The discount rate used will depend on the requirements of the provider of capital, which will be either the with-profits policyholders, the estate or shareholders. At one extreme a discount rate equal to the net of tax investment return assumed to be earned on assets could be used, but we suggest that a higher discount rate is used to reflect the extra risks of investing in this business compared to investing directly in marketable securities. For a more comprehensive review of discount rates, the reader is referred to the paper by Mehta (1992).

4.4.5 The adjusted aggregate asset shares for with-profits business may also contain margins such as future charges on the asset shares or future surrender profits. To the extent that these do not accrue for the benefit of remaining with-profits policyholders, when released in the future they will increase free capital. The release of risk-based capital allocated to these products will also increase free capital in the future. The future contributions to free capital in respect of with-profits business can be valued using the same discounted cash flow techniques used for non-profit and unit-linked business. We refer to this as the *value of in-force with-profits business.*

4.4.6 We suggest that a discount rate incorporating a risk premium is also used to value margins in the aggregate asset shares and future releases of risk-based capital for with-profits business. This approach provides a return to the providers of capital in excess of the expected return on marketable securities. It provides a useful discipline on the use of capital, as capital hungry products or ventures will look relatively less attractive on this measure as capital injected will be valued at less than face value. Alternatively, to meet the rate of return requirements, the capital hungry products will have to generate extra profits sufficient to meet the risk premium in the discount rate.

4.4.7 The alternative argument is that capital provided by with-profits policyholders or the estate does not have the same rate of return requirements as shareholders, and returns equal to the net earned investment return will suffice. In the current environment, with many offices attempting to run and develop the business with limited capital resources, we feel that such an approach does not reflect the demand and market price for capital and may lead to inadequately priced products.

4.4.8 Whether or not future margins in the with-profits adjusted aggregate asset shares should be capitalised depends on the likelihood of the margins being realised compared to those on non-profit business and also on the preference of the individual office.

4.4.9 Part or all of the value of in-force non-profit or with-profits business may accrue to the benefit of the with-profits policyholders. We have referred to this amount as the *value of future allocations to with-profits.*

4.4.10 We are now in a position to define *realistic liabilities for with-profits* as adjusted aggregate asset shares plus the value of future allocations to with-profits.

4.4.11 We have used the term *estate* to refer to the residual value of assets not needed to meet future policyholders' benefits. Although the term estate is often used, and misused, very loosely in a number of contexts, we believe that our definition of the estate is the one which might most commonly be implied by the use of the word. It is perhaps worth stating that the estate is not the investment reserve identified in the statutory accounts.

4.4.12 It will be seen from Figure 4.3 that the estate is equivalent to:

accounting value of investments;
plus excess value of subsidiaries;
value of in-force unit-linked and non-profit business; and
value of in-force with-profits business;
less statutory liabilities for non-profit and unit-linked;
realistic liabilities for with-profits;
deferred tax; and
risk-based capital.

4.4.13 A simple alternative, but equivalent definition, is:

free capital;
plus excess value of subsidiaries;
value of in-force non-profit and unit-linked business, and
value of in-force with-profits business;
less value of future allocations to with-profits.

Figure 4.3 illustrates the derivation of the estate.

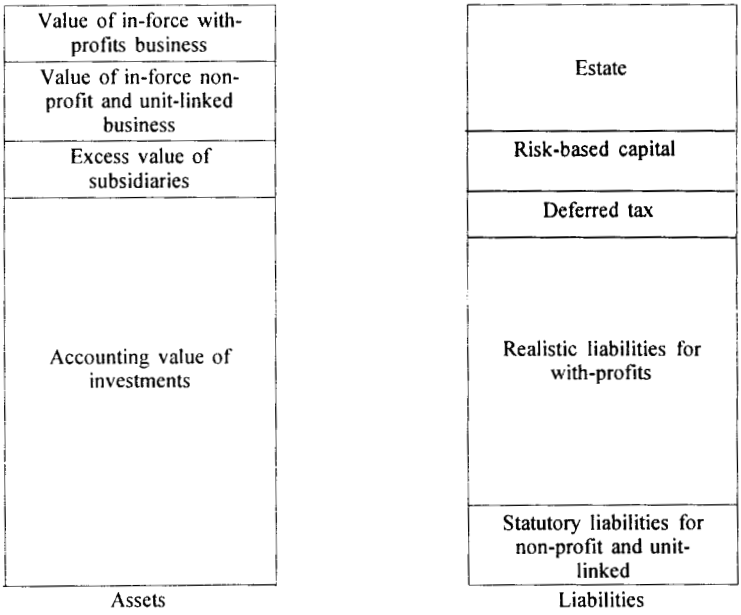


Figure 4.3. Realistic values balance sheet

4.4.14 An alternative presentation might be to net off the value of with-profits business against the realistic liabilities and risk-based capital of this business. This presentation could also be adopted for non-profit.

4.4.15 The estate is a similar concept to the embedded value of a non-profit or unit-linked fund, with the present value of future margins representing the value of in-force business and the free capital the shareholders' capital and reserves. However, for a mutual office it is not necessarily the value which a shareholder would pay if the office demutualised, as this would depend upon the structure of the scheme and the way in which the shareholders' interest in the fund is defined. A new shareholder may also make a payment for the goodwill in the business.

4.5 *Change in Free Capital*

4.5.1 We believe that the dynamics of a with-profits fund can be better understood and communicated with the aid of a profit and loss account tracking the change in free capital over a period.

4.5.2 During a period the income to free capital will come from:

— investment return on the free capital itself;
— statutory profits from non-profit business, after allowing for changes in the accumulated amount of risk-based capital;

— surrender profits;
— capital charges on asset shares; and
— any other positive variances between actual operating experience and the assumptions used to determine adjusted aggregate asset shares for with-profits business.

4.5.3 Outgo will be in respect of:
— increases in planned augmentation to claims in excess of asset shares;
— increase in accumulated risk-based capital for with-profits;
— any other negative variances between actual operating experience and the assumptions used to determine adjusted aggregate asset shares for with-profits business; and
— allocations of any of the above sources of income to asset shares.

An example of an analysis, using hypothetical figures, of the change in free capital is shown in Table 4.1.

Table 4.1. Analysis of change in free capital, £m

Income	
Investment return on free capital	9
Profits from non-profit business	7
Surrender profits	14
Capital charges on asset shares	5
Other positive variances	2
Total income	37
Outgo	
Increase in planned augmentation to claim payments	7
Increase in with-profits risk-based capital	10
Other negative variances	5
Total outgo	22
Increase in free capital before allocations	15
Allocated to policyholders asset shares	10
Increase in free capital after allocations	5

4.5.4 It is possible to net off certain items of income against outgo. This might be the case if, for example, all profits from non-profit business are allocated to the asset shares. However, we believe that a full statement of the individual income and outgo figures provides a more helpful picture.

4.5.5 Other positive variances might include taxation, to the extent that actual tax is lower than that charged to asset shares. Other negative variances might

include expense overruns if expense allowances rather than actual expenses are charged to asset shares.

4.5.6 Such an analysis provides information on the relative and absolute size of items of income and outgo, which may help to demonstrate the importance of decisions concerning allocations and augmentations.

4.6 *Change in Estate*

4.6.1 We do not intend to describe in detail the analysis of the change in estate. This type of exercise has been described in detail elsewhere, most recently in a paper on analysis of life company performance by Collins & Keeler (1993).

4.6.2 The authors of that paper suggest analysing the change in value between expected return, variances in operating experience during the year, the value of new business and changes in assumptions as to future experience. It may be helpful to distinguish between movements in free capital and movements in the other components of value, which together make up the estate. We have set out an example, using hypothetical figures, in Table 4.2.

Table 4.2. Analysis of change in estate, £m

	Free capital	Other components of value	Total
Expected return	29	24	53
Variances in operating experience during year	4	0	4
Value of new business	(18)	24	6
Changes in assumptions as to future experience	0	0	0
Increase in estate before allocations	15	48	63
Allocations to policyholders	(10)	(8)	(18)
Increase in estate after allocations	5	40	45

4.6.3 The analysis of the change in free capital is the same as that presented in Table 4.1, but with the various items of income and outgo grouped together. The variances in operating experience are the net impact of surrender profits, other positive variances, increases in planned augmentations and other negative variances. The expected return is the investment return on free capital, and the expected contributions to free capital from in-force non-profit and with-profits

business, less any expected increase in risk-based capital. For this purpose the statutory profits were split between in force and new business, and the new business strain is clearly shown. Further details can be found in Appendix C.

4.6.4 The change in other components of value show the remaining part of the unwinding of the discount rate under expected value and the value of new business. We have assumed that none of the variances during the year impact on future value and that there are, rather unusually, no changes in assumptions as to future experience. The table shows the increase in the estate both before and after allocations to policyholders.

4.6.5 We believe it is useful to analyse the change in the value of non-profit and unit-linked business irrespective of whether the profits will accrue to policyholders or to the estate. The analysis will demonstrate whether the terms on which new business is being written are adequate and whether management is successfully realising the planned margins in the in-force business. Whether these margins accrue to policyholders or the estate, the management has a responsibility to run the business in an efficient manner for with-profits policyholders as well as shareholders.

4.7 *Performance Measurement*

4.7.1 The return on free capital is not a very meaningful performance measure, as it excludes the value of future profits. Taking, instead, the estate as the definition of the capital of the fund, a rate of return can be determined as the increase in estate, before allocations, as a percentage of the opening estate. This could be compared to a benchmark or target return which would typically be the risk discount rate used to discount future profits. The return on capital will then depend on achieving the assumptions used in calculating the value of in force, and the value added by new business. Alternatively, the target return could be set in terms of value added in absolute rather than percentage terms. A number of mutual offices are now using performance measures such as these to measure the financial performance of their funds, and this may also be of interest to proprietary companies wishing to track the performance of their with-profits fund separately.

4.7.2 Any performance measure in a mutual organisation will need careful consideration, as increasing the estate may not be consistent with the interests of the current generation of policyholders. The framework we have described shows the increase in estate before allocations, which can be used to measure the performance of the organisation. Subsequent allocations to policyholders effectively act as a release valve to pass some or all of the increase back to the policyholders. This is a similar concept to a dividend payment to shareholders who, in this case, are the with-profits policyholders.

4.7.3 The performance measure can be constructed to reflect the aims of the organisation and the way it thinks about with-profits business. For example, if expense efficiency is an issue that management wishes to focus on, then the asset shares and value of non-profit and unit-linked business could be determined using

expense allowances such that any under or over performance falls into the estate. Similarly for investment performance, the asset shares could be calculated on a benchmark asset mix and investment return with the excess falling into the estate.

4.8 *Risk-Based Capital*

4.8.1 Perhaps the least familiar part of the financial framework is risk-based capital. For non-profit business, the risk-based capital will form a cushion to ensure that statutory minimum liabilities can be established in respect of this business both now and in the future, and that the office can meet claims as they become due. We are using the term *statutory minimum liability* to indicate the minimum reserves which would be acceptable under the current regulations, including any resilience reserve, but excluding the required minimum solvency margin.

4.8.2 The major risks for non-profit business will be asset liability mismatching, poor expense control and poor mortality and morbidity experience. For non-profit business, the risks are generally limited and the risk-based capital may not be great — say, 125%-150% of the required minimum solvency margin — although the level of risk-based capital should take into account the extent of any margin between the published statutory liabilities and the minimum statutory liabilities. The level chosen will inevitably be somewhat subjective.

4.8.3 For with-profits business, the risk-based capital will provide a margin that may be called upon to meet policyholders' expectations and to meet the statutory solvency requirements both now and over a number of future years. There are a number of further issues to be addressed, such as over what time period is statutory solvency to be maintained? As there is an actuarial working party carrying out a review of the valuation regulations, it may be inappropriate to assume that the current regulations continue indefinitely. Other issues are what investment scenarios to consider and whether a resilience reserve should be allowed for. The resilience parameters are only guidelines from the Government Actuary's Department, and the Appointed Actuary may be justified in relaxing these in certain adverse scenarios.

4.8.4 The level of risk-based capital will depend on the approach taken to such issues, and there is no one right or wrong answer or approach. Choosing the level of risk-based capital will often involve significant judgement, after having weighed up a whole range of issues. However, the importance of the concept is that, once the risk-based capital benchmarks are chosen, these should be reflected in product pricing, asset share philosophy and in capital management systems. It would be expected that products or projects of similar risk which consume more capital should generate a higher return in absolute amounts to reflect the cost of consuming more capital. The source of the capital funding should also be clearer, and policyholders providing capital might receive some reward for this, as they are effectively passive shareholders.

4.9 *Example*

A pro forma set of management information is set out in Appendix C, showing, for a hypothetical office, managment information that might be prepared.

5. Risk-Based Capital and Implications for Profit Testing and Asset Shares

5.1 *Risk-Based Capital*

5.1.1 In the first part of this section we consider an approach which can be taken to determine risk-based capital using stochastic modelling. We then go on to consider how the risk-based capital requirements should be allowed for in profit testing and in asset share calculations. We believe that, for the successful implementation of the financial management framework, it is useful to drive the principles down to these activities.

5.1.2 In practice, the determination of an appropriate level of risk-based capital will be subjective, and a wide range of factors will be considered, including the sensitivity of the office's sales to the market perception of financial strength and the actual amount of free capital available. The figures illustrated in this section are helpful, but not sufficient on their own to decide on an appropriate level.

5.2 *Failure to meet Policyholders' Reasonable Expectations*

5.2.1 We have investigated the amount of risk-based capital which may be required to guard against the risk of failing to meet policyholders' reasonable expectations with the help of an interactive asset liability model and a stochastic investment model. For a 25-year endowment assurance we calculated the risk-based capital as a percentage of asset share which was sufficient to guard against failure to meet policyholders' expectations in 95% of scenarios at various stages in the contract life. Failure is defined as having insufficient assets to meet payouts at maturity, using the chosen smoothing method. We generated one hundred equally likely investment scenarios from the stochastic investment model and projected future maturity payouts. For each scenario we calculated the amount of assets required to meet the maturity payout. We ranked these amounts of assets and determined risk-based capital by choosing the sixth largest amount.

5.2.2 The assumptions used are set out in Appendix D. The most important of these are:

— sum assured and reversionary bonus are targeted to make up 60% of payouts on maturity;
— assets are invested 25% in gilts and 75% in equities;
— payouts are based on asset shares, but with investment returns geometrically smoothed over 3 years;
— surrenders are 10% p.a. in year one, falling to an ultimate level of 5%;

— rates of reversionary bonus and asset shares are dynamic and vary with the investment scenario investigated;
— investment scenarios are generated by the Wilkie model, but with some reduction in the level of volatility; and
— past investment returns and reversionary bonuses are assumed to be at the expected level.

5.2.3 The results of our investigations are set out in Table 5.1. The risk-based capital requirement for the contract starts at around 35% of annualised premium, and increases over the life of the policy to 14% of asset share in year 20. The risk-based capital, as a percentage of asset share, is quite stable from year 10 onwards.

Table 5.1. Level of risk-based capital to meet policyholder expectations

End of policy year	1	5	10	15	20
Risk-based capital as % of asset share	170	19	12	12	14
Risk-based capital as % of premium	35	81	145	315	668

5.2.4 We also calculated the aggregate risk-based capital requirements for our model portfolio of with-profits business, set out in Appendix B, which has an average expired term of 13 years weighted by asset shares. This time we assumed that historic investment and bonus experience were at typical levels, as shown in Appendix A, rather than at expected levels. The risk-based capital requirement was 9% of asset shares for the whole portfolio. Approximately one third of this would be required, even under expected conditions, to follow the chosen smoothing method and, in terms of our framework, this part would be included in adjusted aggregate asset shares with the balance included as risk-based capital.

5.2.5 It is interesting to examine the sensitivity of these figures to changes in the assumptions, and we have tested the impact of different levels of volatility in the assets, different guarantees, different asset mix, different surrender rates, different risk tolerance levels, smoothing assumptions and reversionary bonus rates.

5.2.6 Table 5.2 shows the results of our sensitivity runs for the whole portfolio and for an individual policy in the tenth year. The pattern of results at the individual policy and aggregate level are similar.

5.2.7 The Joint Actuarial Working Party (JAWP) considering risk-based capital provided a short paper containing similar calculations to these at the 1993 Actuarial Convention at Blackpool. They reported figures for risk-based capital in the range of 4%-39% of asset shares, depending on the level of guarantees and the equity backing ratio, but based on the standard Wilkie volatility assumptions. For a 75% equity backing ratio, which is our central assumption, and what they

Table 5.2. Sensitivity of risk-based capital to meet policyholders' expectations (as % asset shares)

	Individual policy	Aggregate result
Central assumptions	12	9
Higher volatility (standard Wilkie assumptions)	13	10
Higher guarantees (premium rates reduced 10%)	12	9
Less equities (60% equity backing ratio)	10	8
Higher risk tolerance (10% risk of failure)	9	8
Lower rate of surrender (75% of central level)	13	10
Less smoothing (two-year asset share smoothing)	9	6
Lower reversionary bonus (75% of central levels)	12	9

considered to be a typical level of guarantees, they showed risk-based capital of 14% of asset shares using the same 5% probability of failure. Our results, using this higher level of volatility, give risk-based capital of 10% of asset shares, which is slightly lower. Our results build in an allowance for historic investment and bonus experience, whereas the working party set these at expected levels. They state that this may have led to some overstatement in their figures. There may also be a number of further differences in approach or assumptions used, and this is an area worthy of further investigation.

5.2.8 The results show the significant impact of the smoothing policy followed and appear to indicate that the likelihood of the guarantees cutting in is low. Thus, the impact of reducing reversionary bonus or increasing guarantees is limited. The significant impact of smoothing suggests that an office should retain discretion to amend its smoothing policy if this becomes necessary.

5.3 *Failure to meet Statutory Requirements*

5.3.1 We have also investigated the amount of risk-based capital which may be required to guard against the risk that the office becomes insolvent on a statutory basis. Again, we started by investigating the position of an individual policy, but this time we expressed the results for risk-based capital as a percentage of the statutory minimum liability. We have assumed that, to prove solvency, the office must be able to establish statutory minimum liabilities (including the resilience reserve) plus an additional required minimum solvency margin.

5.3.2 The assumptions used were as set out for the previous runs, but with the additional main assumptions:

— risk-based capital was established at levels which would be sufficient to guard against failure to meet the regulators' standards over the next 10 years; and
— we used the original plus and minus 3% resilience rule with a 25% fall in equities and limited the maximum valuation rate of interest to 5.4% net of tax.

This time a 10% probability of failure was used rather than 5%. The risk-based capital to guard against statutory insolvency can be significantly reduced by assuming that management takes action to protect solvency as adverse scenarios unfold. We felt that our central assumptions, which make no allowance for this, should use a higher probability of failure to compensate for this. The results are shown in Table 5.3.

Table 5.3. Level of risk-based capital to guard against statutory insolvency

End of policy year	1	5	10	15	20
Risk-based capital as % of statutory minimum liabilities	142	23	24	33	46
Risk-based capital as % of premium	64	105	281	701	1662

5.3.3 Again, we also determined risk-based capital requirements for our model portfolio. Assuming that past experience was at typical historic levels, as set out in Appendix A, gave risk-based capital requirements of 23% of statutory minimum liabilities.

5.3.4 We investigated the sensitivity of the results to changes in the assumptions, again comparing the results for an individual policy after ten years and our model portfolio. The results are set out in Table 5.4. The results are expressed as a percentage of the statutory minimum liabilities on the central assumptions, although some of the changes would affect the level of statutory minimum liabilities themselves.

5.3.5 With this alternative risk-based capital measure, the level of reversionary bonus and guarantees becomes more important, whilst smoothing of payouts has relatively little impact. The higher volatility has much greater impact, because the assets and liabilities under statutory reporting do not move in a consistent manner.

5.3.6 The calculations above assume that the resilience test parameters are unchanged in even the most adverse of investment scenarios. In practice, it may be appropriate for the Appointed Actuary to weaken the resilience assumptions in certain adverse scenarios, and the choice of resilience parameters would be at his or her discretion, provided the basis can be justified. It may also be possible, in practice, to suspend reversionary bonus in some of the adverse scenarios or

Table 5.4. Sensitivity of risk-based capital requirements to guard against statutory insolvency (as % of statutory minimum liability)

	Individual policy	Aggregate result
Central assumptions	24	23
Higher volatility (standard Wilkie assumptions)	31	29
Higher guarantees (premium rates reduced 10%)	38	29
Less equities (60% equity backing ratio)	16	11
Lower risk tolerance (5% risk of failure)	34	32
Lower rate of surrender (75% of central level)	26	24
Less smoothing (two-year asset share smoothing)	24	21
Lower reversionary bonus (75% of central levels)	20	19

allow implicit items to count towards the required minimum margin. We are less inclined to allow for these in the calculation of risk-based capital, as we feel that such actions may lead to adverse comment on the financial strength of the office, significant reductions in new business and themselves cause the office financial difficulties.

5.3.7 We have produced further results to illustrate the impact of these factors by removing the requirement to set up a resilience reserve and including implicit items. In addition, we have shown the impact on risk-based capital of adopting a dynamic investment policy such that, when solvency becomes endangered, the office switches assets from equities to fixed-interest. We have assumed that the switching takes place with the intention of holding the ratio of assets to statutory minimum liabilities of 115%, although, in some scenarios, the proportions switched might, in practice, be impractical. The result of these extra investigations is shown in Table 5.5 for the model portfolio.

Table 5.5. Further sensitivity of aggregate risk-based capital results (as % of statutory minimum liability)

Central assumptions	23
No resilience reserve	8
Include implicit items	19
Dynamic investment strategy	20

5.3.8 The level of risk-based capital is sensitive to the profile of the portfolio, the assumptions used and the stochastic investment model employed. It is therefore advisable to carry out calculations reflecting the characteristics and

strategies of an individual office. The relative size of risk-based capital arising from testing different strategies is, perhaps, more reliable than the absolute levels.

5.3.9 We investigated the impact on our results of carrying out the tests using higher and lower numbers of scenarios, and consider that our conclusions would not be altered significantly by investigating a larger number of scenarios, but that the results are less stable using a lower number of scenarios. A larger number of scenarios would be required if probabilities of failure lower than 5% were being considered.

5.3.10 The calculation of risk-based capital and other forward-looking investigations can help the actuary and the management of an office plan for the future and consider whether current strategies and policies leave sufficient room for manoeuvre in adverse circumstances. They can also help the actuary to identify what flexibility there is to reflect adverse conditions in the valuation of liabilities. Used in a proactive way, they give the actuary an opportunity to advise in a very general way on the relative merits of bonus and other strategies and on the shape of the office in different future climates.

5.4 *Impact of Business Profile*

5.4.1 To take into account the risk of both failing to meet policyholders' reasonable expectations and failing to meet the statutory solvency test, a starting point might be to determine risk-based capital for the whole portfolio as the greater of:

— x% of aggregate asset shares; and
— (100 + y%) of statutory minimum liabilities less 100% of aggregate asset shares.

The level of risk-based capital will then depend on the relationship between the statutory minimum liabilities and the aggregate asset share as well as the appropriate level of x% and y%.

5.4.2 The level of risk-based capital, expressed as a percentage of aggregate asset shares, (*RBC*%) can be defined as:

RBC%	=	max (x%, (100 + y%) x (*SML/AS*) — 100)
x%	=	risk-based capital ratio to protect against failure to meet reasonable expectations
y%	=	risk-based capital ratio to protect against statutory insolvency
SML/AS	=	ratio of statutory minimum liabilities to aggregate asset shares.

5.4.3 In theory the amount could be a little higher than this, as in determining x% and y% it will not necessarily be the same scenarios which cause the office problems. However, we think the above simple formula is a useful starting point.

5.4.4 According to this formula the office has a reasonable degree of control over the level of risk-based capital. Both x% and y% will vary with the risk tolerance of the office and future bonus and investment policy. In addition the

ratio *SML/AS* can be varied with immediate effect by changing the asset mix. This is because the valuation rates of interest are linked to the redemption yields on fixed-interest assets and the running yields of equities and properties. As the former tends to exceed the latter, a switch to fixed-interest will reduce the *SML/AS* ratio. Examples of possible levels of risk-based capital using this formula for the whole portfolio are given in Table 5.6.

Table 5.6. Possible risk-based capital levels

x%	*y%*	*SML/AS*	*RBC%*
5	15	1.0	15
5	10	1.0	10
5	10	0.75	5
10	15	0.75	10

5.4.5 To limit the amount of risk-based capital, the office needs to manage the relationship between statutory minimum liabilities and asset shares such that the greatest risk-based capital measurement is in respect of the failure to meet policyholders' reasonable expectations rather than the failure to demonstrate statutory solvency.

5.4.6 We believe that risk-based capital should be seen as a catastrophe reserve to meet obligations in adverse scenarios. A benchmark level would be defined which is appropriate in stable conditions. In favourable conditions higher amounts might be appropriate if the view was held that these conditions were temporary. If risk-based capital is totally or partly depleted, this would be re-established over a period of time, possibly naturally as investment conditions recover or alternatively by taking an extra charge on with-profits policyholders. However, the freedom which the actuary has to manage the ratio will depend on how changes impact on the reasonable expectations of policyholders.

5.5 *Allowance for Risk-Based Capital in Profit Testing*

5.5.1 A traditional profit study carried out on a with-profits policy with liabilities equal to statutory minimum liabilities will show a loss in the first few years, as the initial expenses and amounts required to set up reserves are in excess of the premiums received. After this there is a stream of positive cash flows as terminal bonus entitlements are built up, but not consolidated into the reserves. In the final year there is a large loss as terminal bonus is paid which has not been reserved for, as shown in Figure 5.1. The profit signature is based on investment returns at the expected level, no allocations and a capital charge. The scales used in Figures 5.1, 5.2 and 5.3 are not necessarily consistent, but give a broad indication of the pattern of profits.

5.5.2 An alternative is to consider the cash flows arising if liabilities are taken as asset shares. Income is then the charge on asset shares. Assuming that a

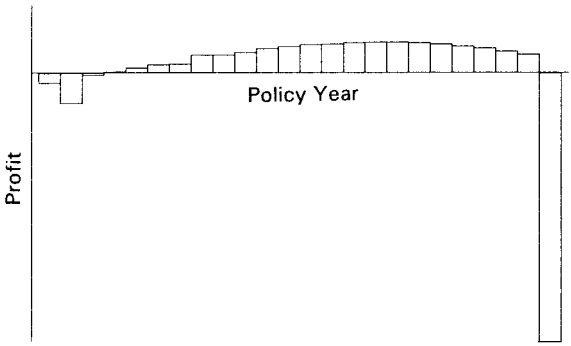


Figure 5.1. Profit signature based on liabilities equal to statutory minimum liabilities

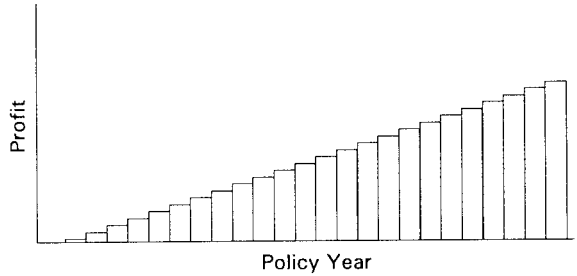


Figure 5.2. Profit signature based on liabilities equal to asset shares

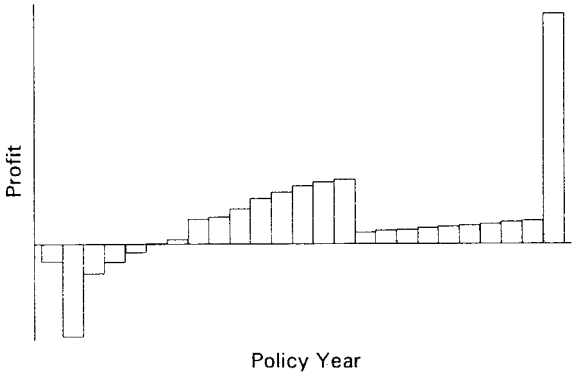


Figure 5.3. Profit signature with allowance for risk-based capital

charge is levied, this will be positive throughout the term, increasing as the asset shares increase, as shown in Figure 5.2. Although this profit signature is more appealing, as there is no loss at the end of the contract, it does not recognise the capital requirements of the contract.

5.5.3 Under the framework which we have proposed, the profit signature would show the contribution of the policy to free capital. The liabilities would therefore be the greater of (100 + x%) of asset share and (100 + y%) of statutory minimum liabilities. In our example we have fixed x% and y% over the term of the contract at 5% and 15% respectively. The profile is now rather different, with a greater loss in the early years as risk-based capital is set up, followed by a series of profits until the asset share part of the equation takes over from the statutory minimum liability part of the equation. At this point the capital flows continue, but at a lower level. At maturity there is a once off extra contribution to free capital as the risk-based capital is released. An example is set out in Figure 5.3.

5.5.4 The contributions to free capital, including releases of risk-based capital, can be discounted at an appropriate risk rate of return to determine the value of a with-profits contract.

5.5.5 In our example, risk-based capital was included as constant percentages reflecting the portfolio position. Alternatively, risk-based capital could be determined on a stand alone policy basis. One approach is that the overall portfolio risk-based capital could be allocated to individual policies in proportion to their stand alone needs. In this way the 'shape' of the risk-based capital over the term of the policy is maintained.

5.6 *Allowance for Risk-Based Capital in Asset Shares*

5.6.1 Before considering what allowance should be made for risk-based capital in asset shares, it is appropriate to consider whether any risk-based capital is actually needed. One of the principles of with-profits business is self insurance, with one generation of policyholders providing some measure of insurance against the risks of another generation.

5.6.2 It is interesting to consider the position of a revolving fund and an entity fund with regard to their risk-based capital requirements. The term *revolving fund* is often used to describe a fund where all assets are assumed to belong to the current generation of with-profits policyholders. The revolving fund, by definition, has zero estate, and the cost of paying guarantees in excess of asset shares or of operating a smoothing policy where the net cost may not be zero is shared between existing and future policyholders. It can therefore be argued that no capital charges are needed. However, we believe there is a need to demonstrate that the realistic liabilities for with-profits business are sufficient to meet any costs of guarantees, and that the office's chosen smoothing policy is practical under reasonably adverse scenarios and consistent with the bonus philosophy described to policyholders. Even in a revolving fund it would still be appropriate, in order to ensure equity between different generations of

policyholders, to accrue expected costs of guarantees and smoothing on an appropriate basis consistent with the investment strategy and level of guarantees provided at the time.

5.6.3 In an *entity fund*, there is an estate in which it is assumed that the current generation of policyholders has no entitlement if the fund stays open to new business. It is fair to assume that there are circumstances under which the office would be prepared to call on these assets to meet guarantees and meet any net smoothing costs. As part or all of the estate may be required to supplement payouts in adverse scenarios, this part of the estate is subject to a greater risk than just exposure to the investment market, and we consider that it should earn a risk premium.

5.6.4 The total return on this risk-based capital would be made up of the normal investment return on the assets backing the capital plus a risk premium in the form of a charge on the asset shares. The charge on asset shares can be determined as the extra return which could be achieved on the risk-based capital from alternative investments with a similar risk profile or the costs of reinsuring the risk associated with the business.

5.6.5 Consideration needs to be given to whether the charge on asset shares should be determined on an individual policy basis or on a portfolio basis. For example, the sum of individual policy risk-based capital may be greater than the risk-based capital required for the portfolio overall, as mature policies provide some of the capital for writing new policies. The disadvantage of determining an overall portfolio charge is that the same charge would be taken from both immature and mature policies.

5.6.6 An alternative, but rather more complicated approach, is to take a charge from those policies which need risk-based capital and allocate this to policies which have provided part or all of the capital. A further consideration is how to express the charges. These could be deducted as a percentage of asset share, the capital required, or the cost of bonus.

5.6.7 If no capital charge is imposed for the use of risk-based capital the value of the with-profits contract will be negative — assuming that the providers of capital wish to earn a return greater than that on marketable securities. By introducing a charge on asset shares where risk-based capital is required, the present value can be increased to zero (or above). Table 5.7 shows the relationship between this extra charge, the discount rate and the net of tax investment return, assuming that the present value of the contract at sale should be zero. We have used the simplifying assumption that risk-based capital is a constant percentage of asset shares. Investment returns are assumed to be at expected levels and there are no allocations to asset shares.

5.6.8 The level of capital charge will also take into account the future capital requirements of the office as well as the total return requirements of the providers of capital. In other words, the charge can be used to build up the capital base of the office, particularly in a rapidly growing office. The simple formula put forward by Leckie (1979) is very useful. In order to maintain a stable ratio of

Table 5.7. Possible level of charge on asset share

Discount rate % p.a.	Net of tax investment return % p.a.	Risk-based capital as % asset share	Charge as % p.a. of asset shares
15	10	10	0.5
12	10	10	0.2
12	10	20	0.4

risk-based capital to aggregate asset share, the extra charge needs to make up for the difference between the growth in the asset shares and the return on risk-based capital:

$$c = r \times (g - i)$$

c = charge on asset share (% p.a.)
r = ratio of risk-based capital to aggregate asset share ($RBC\%/100$)
g = growth in asset shares (% p.a.)
i = return on risk-based capital (% p.a.).

5.6.9 For example, a risk-based capital ratio of 10% of aggregate asset shares will require an extra capital charge of 0.5% of asset share if the growth in asset shares is expected to exceed the return on risk-based capital by 5%. Alternatively, an extra capital charge of 0.25% of asset share is needed if the excess growth is expected to be 2½%, or, alternatively, if the risk-based capital ratio is 5%. The formula also indicates that, if the growth in aggregate asset share is less than the return on risk-based capital, then an amount of capital could be distributed to with-profits policyholders.

6. Conclusions

6.1 Asset share techniques provide the foundation upon which most offices determine payouts for with-profits contracts. Many offices appear to have spent considerable effort on developing their approach and refining it to meet the demands of modern with-profits contracts. Considerable diversity exists in the approaches used by different offices.

6.2 It is less clear that offices have well-defined processes for smoothing asset shares and determining payouts, nor have they communicated their approach well to policyholders. Different smoothing methods can lead to surprisingly different results in respect of both the level of payouts and the smoothing costs and capital needs of the office, and are an extremely important part of the process of determining payouts.

6.3 We believe that the increased flexibility of with-profits contracts, the greater requirements for disclosure, and the increasing demands for capital, will force offices to pay greater attention to these factors in the future. A suitable financial management framework will provide a better understanding of the capital requirements of the business and the costs of providing the guarantees and smoothing inherent in a with-profits contract. Companies, and their actuaries, will then be in a position to demonstrate that their actions, as reflected in their bonus decisions, match the expectations of policyholders to be treated fairly.

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APPENDIX A

ASSET SHARE ASSUMPTIONS

A.1 *Base Asset Share Assumptions*

A.1.1 *Premium rates*

10-year term, age 45: 110.00 per 1,000 sum assured
25-year term, age 30: 44.44 per 1,000 sum assured

All premiums are paid monthly.

A.1.2 *Mortality*

85% A67/70 Select.

A.1.3 *Bonus rates*

Table A.1. Historic bonus rates (% of sum assured and declared bonus)

1969 - 1975	4.5
1976 - 1983	5.0
1984 - 1987	5.5
1988	4.5
1989	4.5
1990	4.0
1991	4.0
1992	3.5
1993	3.5
1994	3.0

A.1.4 *Acquisition costs*

Table A.2. Initial commission rates (% of premium)

	10-year term	25-year term
1969 - 1975	18.0	45.0
1976 - 1988	25.0	60.0
1989 - 1994	42.0	89.0

Initial expenses 50% of premium.

A.1.5 *Renewal costs*

Renewal commission	2.5% of premium
Renewal expenses	3% of premium.

A.1.6 *Net of tax investment return*

Table A.3. Net of tax investment returns (%)

Year	
1969	-4.9
1970	-0.1
1971	30.7
1972	11.1
1973	-15.2
1974	-31.3
1975	80.6
1976	2.5
1977	40.0
1978	7.4
1979	7.1
1980	21.7
1981	7.1
1982	25.2
1983	16.9
1984	15.6
1985	13.0
1986	15.1
1987	9.5
1988	11.9
1989	18.8
1990	-1.3
1991	12.6
1992	13.6
1993	21.4
1994	-3.9

A.1.7 *Derivation of investment returns*
The investment returns are based on assumptions as to historic asset mix, returns and taxation as set out below.

A.1.7.1 *Asset mix*
25% fixed interest, 15% property, 60% equities.

A.1.7.2 *Returns*
Gross of tax returns derived from BZW equity and gilt indices and from JLW property index.

A.1.7.3 *Tax on income*

Table A.4. Tax on income (%)

	Equity & property	Fixed-interest
1969 - 1972	37.5	37.5
1973	30.0	37.5
1974	33.0	37.5
1975 - 1976	35.0	37.5
1977	34.0	37.5
1978	33.0	37.5
1979 - 1985	30.0	37.5
1986	29.0	35.0
1987	27.0	35.0
1988 - 1989	25.0	35.0
1990 - 1992	25.0	25.0
1993 - 1994	20.0	25.0

A.1.7.4 *Tax on capital gains*

Table A.5. Tax on capital gains (%)

1969 - 1981	15
1982 - 1989	25
1990 - 1994	20

From 1982 tax is on gains in excess of RPI.
There is no tax on fixed-interest gains.

A.1.8 *Tax relief*

Table A.6. Tax relief on expenses and commissions (%)

1969 - 1985	37.5
1986 - 1989	35.0
1990 - 1994	25.0

A.2 *Allocations and Deductions*

A.2.1 *Surrender profits*

85% of asset share paid on surrender, and 15% of asset share allocated to remaining policies in same term, issue year cohort.

Table A.7. Surrender rates (%)

Policy year 1	Policy year 2	Policy year 3	Policy year 4	Policy year 5	Policy year 6+
10	9	8	7	6	5

A.2.2 *Profits from non-profit business*

0.5% p.a. of asset share.

A.2.3 *Capital charges*

0.25% p.a. of asset share.

A.2.4 *Shareholders' transfers*

1/9 of cost of bonus. Reversionary bonus valued at a 3% valuation rate of interest.

APPENDIX B

MODEL ENDOWMENT PORTFOLIO

B.1 *Historic New Business Levels*

Broadly 3% market share of regular premiums endowments. 30% of new business is for a 10-year term and 70% for a 25-year term.

B.2 *In-Force Portfolio at 31 December 1993*

New business volumes have been depleted by surrenders, deaths and maturities up to 31 December 1993 using the assumptions set out in Appendix A.

Table B.1. In-force volumes at 31 December 1993 (annualised premiums £000s)

Year of issue	10-year term	25-year term
1969		211
1970		241
1971		294
1972		392
1973		496
1974		508
1975		665
1976		895
1977		985
1978		1359
1979		2107
1980		2614
1981		3268
1982		4027
1983		7519
1984	3118	7275
1985	2999	6997
1986	4822	11252
1987	5964	13917
1988	7618	17776
1989	7270	16963
1990	8697	20292
1991	9609	22422
1992	10074	23505
1993	10049	23447
Total	70220	189427

B.3 *In-Force Portfolio at 31 December 1994*

The in-force portfolio is rolled forward to 31 December 1994 with the addition of new business during 1994 at 85% of the 1993 levels. During 1994 the in-force portfolio is depleted by surrenders, deaths and maturities.

B.4 *Aggregate Asset Shares and Statutory Minimum Liabilities*

At 31 December 1994 the ratio of aggregate asset shares to statutory minimum liabilities for the portfolio was 105%.

APPENDIX C

PROFORMA INTERNAL ACCOUNTS

Table C.1. Free capital position, £m

	31 December last year	31 December this year
Statutory liabilities for non-profit and unit linked	1200	1323
Adjusted aggregate asset shares for with-profits	2039	2338
Deferred tax	48	50
Risk-based capital	228	260
Free capital	90	95
Accounting value of investments	3605	4066
Free capital as % of adjusted aggregate asset shares for with-profits	4.4	4.1

Table C.2. Reconcilliation to statutory position, £m

	31 December last year	31 December this year
Free capital	90	95
Risk-based capital	228	260
Adjusted aggregate asset shares less statutory liabilities for with-profits	239	306
Inadmissible assets	(25)	(25)
Available assets (statutory position)	532	636
Available assets as % of adjusted aggregate assets shares for with-profits	26.1	27.2

Table C.3. Realistic values balance sheet, £m

	31 December last year	31 December this year
Statutory liabilities for non-profit and unit-linked	1200	1323
Realistic liabilities for with-profits	2132	2439
Deferred tax	48	50
Risk-based capital	228	260
Estate	348	393
Realistic liabilities	3956	4465
Estate as % of realistic liabilities for with-profits	16.3	16.1
Accounting value of investments	3605	4066
Excess value of subsidiaries	50	60
Value of in-force non-profit and unit-linked business	93	101
Value of in-force with-profits business	208	238
Realistic assets	3956	4465

Table C.4. Reconciliation of free capital and estate, £m

	31 December last year	31 December this year
Free capital	90	95
Excess value of subsidiaries	50	60
Value of in-force non-profit and unit-linked business	93	101
Value of in-force with-profits business	208	238
Future allocation to with-profits	(93)	(101)
Estate	348	393

Table C.5. Movement in estate, £m

	Free capital	Other components of value	Estate
Expected return	29	24	53
Variances in operating experience during year	4	0	4
Value of new business	(18)	24	6
Changes in assumptions as to future experience	0	0	0
Increase before allocation	15	48	63
Allocation to policyholders	(10)	(8)	(18)
Increase after allocation	5	40	45

Table C.6. Further details of movement in free capital, £m

Expected return	
— with-profits	5
— non-profit	15
— free capital	9
	29
Variances in operating experience	
— surrender profits	14
— increase in planned augmentation	(7)
— other positive variances	2
— other negative variances	(5)
	4
Value of new business	
— non-profit capital strains	(8)
— with-profits risk-based capital	(10)
	(18)
Changes in assumptions as to future experience	0
Increase before allocation	15

Table C.7. Further details of movement in other components of value, £m

Expected return	
— non-profit in-force business	(3)
— with profit in-force business	21
— subsidiaries	6
	24
Variances in operating experience	0
Value of new business	
— non-profit business	11
— with-profits business	9
— subsidiaries	4
	24
Changes in assumptions as to future experience	0
Increase before allocation	48

APPENDIX D

RISK-BASED CAPITAL

D.1 *Individual Policy*

D.1.1 *Fixed projection assumptions*

— equity backing ratio 75%;
— no allocations, capital charges or shareholders transfers;
— surrender value 100% asset share;
— maturity value 100% smoothed asset share or guarantees if higher; and
— smoothed asset share based on investment returns geometrically averaged over 3 years.

D.1.2 *Dynamic projection assumptions*

D.1.2.1 *Investment returns and yields*

Investment returns are generated by the Wilkie model. The reduced standard model is used with adjustments to two parameters to reduce volatility. Neutral starting conditions are used.

$$YSD = .16 \text{ (normally } .175) \text{ and;} \quad DSD = .05 \text{ (normally } .1).$$

We have generated 100 scenarios. The distribution of returns and the yield on assets is set out in Tables D.1 and D.2.

Table D.1. Average annual returns (%)

	Year 1	Up to year 10	Up to year 25
5th percentile	41.0	18.5	16.7
Median	12.6	11.7	11.3
95th percentile	(7.4)	6.1	7.7

Table D.2. Yield on assets (%)

	Year 1	Year 10	Year 25
5th percentile	6.1	7.0	7.6
Median	5.2	5.4	5.3
95th percentile	4.4	3.9	4.0

The yield on assets is determined as the combination of the redemption yield on fixed-interest and the dividend yield on equities.

D.1.2.2 *Reversionary bonus rates*
Reversionary bonuses have been chosen such that in expected conditions the reversionary bonus rate is 3% of sum assured and declared bonus resulting in terminal bonus of 40% of payout. If investment returns are different from expected, the reversionary bonus rate varies depending on the average annual rate of return over the past 3 years. The distribution of bonus rates is shown in Table D.3.

Table D.3. Reversionary bonus rate (% sum assured and declared bonuses)

	Year 1	Year 10	Year 25
5th percentile	4.3	4.3	4.3
Median	3.1	3.5	3.1
95th percentile	0.8	0.0	0.0

D.1.2.3 *Statutory minimum liabilities*
Statutory minimum liabilities are determined in each year of each stochastic investment scenario. The valuation rate of interest is taken as 69.4% of the yield on assets subject to a maximum of 5.4%. The old 'three up, three down' resilience test is allowed for together with a 25% fall in equities. The statutory minimum liabilities exclude the required minimum solvency margin.

D.1.2.4 *Asset shares*
Asset shares have been accumulated at the investment returns appropriate for each stochastic investment scenario.

D.1.3 *Historic assumptions*
For past years it is assumed that investment returns, yields on assets and reversionary bonus are at the expected levels of 11.5% p.a, 5.25%, and 3% of sum assured and declared bonuses respectively. The asset share in past years is assumed to be accumulated using the expected investment return. This leads to the relationship between asset shares and statutory minimum liabilities shown in Table D.4.

Table D.4. Statutory minimum liabilities as a percentage of asset share

End of policy year				
1	5	10	15	20
218	105	91	84	78

D.1.4 *Other assumptions*
These are as set out in Appendix A.

D.2 *Portfolio*

D.2.1 *Reversionary bonus rates*

As described for the individual policy. This results in terminal bonus in the medium to long term of 10%-15% of payout on a 10-year contract and 35%-45% on a 25-year contract if expected investment returns are achieved.

D.2.2 *Other assumptions*

These are as set out in Appendices A and B. The main change from the policy calculations is that actual past investment returns and bonuses are used.

D.3 *Determination of Risk-Based Capital*

D.3.1 *Risk-based capital to meet policyholders' expectations*

For each future projection year, in each investment scenario, the difference between maturity payments and the unsmoothed asset shares are calculated. In each scenario these amounts are discounted to the beginning of the projection using the actual net of tax investment returns appropriate for the scenario. This discounted amount is the assets needed in addition to the aggregate asset shares to meet policyholder benefits. These amounts are ranked and the 6th largest out of 100 represents the risk-based capital to meet policyholders' reasonable expectations in 95% of scenarios.

D.3.2 *Risk-based capital to meet statutory requirements*

The initial assets in the projection are set equal to the aggregate asset shares. For each of the first ten projection years, in each of the investment scenarios, the statutory minimum liabilities are calculated. An extra 5% allowance is added for the required minimum solvency margin. The excess of 105% of the statutory minimum liabilities over the accumulated assets is determined in each year and a present value calculated by discounting at the net of tax investment return appropriate for that particular scenario. The largest of the ten present values is recorded for each scenario, and the excess of the aggregate asset shares over the statutory minimum liabilities at the beginning of the projection is added. These revised amounts are ranked and the 11th largest out of 100 represents the risk-based capital to meet statutory requirements in 90% of scenarios.

ABSTRACT OF THE DISCUSSION

HELD BY THE INSTITUTE OF ACTUARIES

Mr D. G. Heeney, F.I.A. (opening the discussion): I believe that with-profits business has provided an admirable balance of limited risk, yet high return, opportunities to millions of investors over many years. There are, in my opinion, no sound marketing or economic reasons why these benefits should look any less attractive to future investors, and every reason why with-profits business should continue to flourish for many years to come. However, greater transparency and clear, rigid definitions of benefit structures are being demanded increasingly vehemently by the consumerist lobby, the media and, most recently, Europe in the form of the European Union (Unfair Contract Terms) Directive, now incorporated into United Kingdom law. Many view these forces as irresistible, and impossible to accommodate within the current framework of most with-profits products, which depend so heavily on the application of actuarial discretion.

With-profits business relies, crucially, on the trust placed in actuaries by policyholders. To date, our rather vague and various references to smoothing and equity in with-profits guides and elsewhere have offered only a limited insight, and are now attracting questions and even suspicion, which seriously threaten to undermine this trust. Unless the value of our work can be demonstrated and clearly understood, this suspicion will grow. Likewise, unless we can present some credible consistency of approach from one office to the next, the public could be forgiven for losing confidence in the industry and the profession alike. If we are to avoid the dilution of the benefits with-profits business can bring, or its complete demise, we must be able, not only to operate, but also to communicate effectively, a sound, robust and consistent methodology for its financial management. Asset shares will, inevitably, be one of the foundations on which this methodology is built. This paper is, therefore, very timely, and presents a comprehensive review of the principles and practical considerations surrounding asset share calculations. It then goes on to develop the concept of a 'financial management framework' based on the use of these techniques.

I was particularly pleased to see the extent to which the authors drew attention to the importance of the effective communication of these concepts, as well as covering the theory so fully.

The later sections of the paper explore the applications of risk-based capital analyses to with-profits business to improve our understanding of the nature and magnitude of the risks involved. In particular, it considers the risk-based capital required to secure against the failure to meet policyholders' reasonable expectations (PRE) and the failure to meet statutory requirements. The differing results and sensitivities are interesting. Arguably, they provide further evidence of the inappropriateness of the current statutory regime in relation to with-profits business. In Section 5.4 the authors explore the requirements of mitigating the risks of both types of failure. Meeting PRE consistently is surely the real objective. Shortcomings in the ability of the statutory framework to assess this risk properly could, therefore, lead to unnecessarily high levels of risk-based capital being required. Whilst this sounds commendably prudent, it could restrict unnecessarily the capacity of individual life offices to write with-profits business. I would certainly suggest that it is an undesirable consequence, and some might even view it as anti-competitive.

In Section 3.1 the authors consider the possibility of enhancing payouts for competitive reasons. Cynical enhancements, aimed solely at key surveys, are clearly inappropriate, but bonus setting is essentially a form of pricing. If, through higher payouts, a contract appears significantly more competitive, higher new business volumes may be generated. This could reduce unit costs, since some expenses will be fixed rather than variable. Understanding these relationships, in particular the effect of past performance on future new business prospects, could be important in maximising long-term bonus earning potential.

Control of the volatility of payouts is the essential differentiating feature of with-profits business. In ¶3.2.2 the authors demonstrate the historic effectiveness of with-profits policies in reducing payout

volatility. Clear, straightforward explanations of the value of this feature are key to the successful marketing of with-profits business, and I believe we still have a long way to go to achieve this.

In ¶3.4.4 the authors refer briefly to the widely varying approaches taken by U.K. life offices to surrender values in general, and to the use of market level adjustments in particular. The principles of the E.U. (Unfair Contract Terms) Directive may lead to offices feeling obliged to describe much more clearly how, and under what circumstances, they would change surrender terms, and to keep records documenting their adherence to these principles. This would, I believe, be a discipline which we should welcome — it will help to eradicate discrepancies which could, in time, be damaging. The consistency of approach as between surrendering and maturing policies may become a key indicator for judging the soundness of with-profits business management.

In Section 3.2 the authors set out some examples of smoothing methods which could be, and are, used. The results of applying these different methods are interesting, and I found Figures 3.3-3.8 particularly clear and helpful. Perhaps, in time, these and other methods could be refined into recognised standards, ideally incorporated into professional guidance. A similar evolution has taken place in connection with pension scheme funding methods. These are now well documented and widely reported outside, as well as within, the profession. In addition, work has been carried out to develop a greater understanding of the circumstances under which each recognised method is likely to be appropriate. Smoothing could, I believe, be tackled in a similar way. The results of investigations, such as those referred to in Sections 3.2 and 3.3, could be very valuable in establishing the relative appropriateness of the different methods to different situations.

The fundamentals of asset share calculations, described in Section 2, might be inclined to lull the reader into a false sense of security. Some of these can be very difficult to apply in practice. In particular, while the attribution of items, such as commission, to individual policies might be straightforward, other expenses (e.g. costs of head office accommodation or corporate advertising) can be apportioned in a wide variety of equally reasonable ways. Similarly, the treatment of tax synergy and the accommodation of delays in finalising tax settlements can be very difficult to represent at individual policy level. Apparently anomalous results may also emerge where the form and incidence of policy charges and expenses are not closely matched. There is an enormous temptation to develop ever more 'sophisticated' models to attempt to cope with all of these variants as rigorously as possible. It is very important, however, to remain aware of the relative sensitivities. A simple analysis, such as that shown in Table 2.1, can help to avoid the real danger of becoming bogged down in spurious detail. In general, investment return matters enormously, and other factors, while they cannot be ignored, often have effects which are 'second order' by comparison.

I think that we sometimes overplay the differences between proprietary and mutual offices. This paper deliberately blurs the distinction in setting out an approach to financial management which could be applied equally effectively, regardless of capital structure and ownership. I found the reference to controlled releases of bonus allocations to policyholders being equivalent to shareholder dividends a particularly helpful reminder of the fundamental similarity of all with-profits offices. Similarly, I would agree with the authors' views that the return required on capital should be assessed primarily by reference to the risk involved in its use, rather than by consideration of whether it was provided by shareholders, the estate, or with-profits policyholders.

The authors have readily acknowledged that more work needs to be done, and that much of the material relates to established techniques and concepts. They have, however, concentrated on the practical application of these ideas and their incorporation into a coherent framework which includes some of the latest thinking on risk-based capital techniques. This unquestionably moves us a long way forward.

There is one important aspect which the paper rather 'glosses over' — how can we achieve greater openness without imposing the constraints of onerous guarantees or anti-selective investment risks? I believe that this will be difficult, but not impossible. As a profession, I think that there is now an urgent need to establish as much common ground as possible as a basis for communicating much more clearly what we really mean by the financial management of with-profits business. First, however, we must define and understand fully the framework we want to operate, and be confident that this will allow with-profits business to continue to develop and flourish, and so benefit many more generations of investors.

Mr J. A. Jenkins, F.I.A.: The benefit of smoothing under the with-profits approach is, in my view, a very real benefit for the policyholder which can be provided at a reasonable cost. However, while most offices talk generally about their smoothing approaches, very few are willing to be at all specific. It will be necessary for offices to think much more about this aspect in the future, and to develop smoothing strategies which can be communicated to the market and put into practice. The with-profits investment approach may well face decline if we are unable to be clearer as to how smoothing will be carried out.

I know that some actuaries have expressed the view that being more specific in the area of how with-profits returns will be smoothed would have implications for policyholders' reasonable expectations, and would possibly give rise to additional reserving requirements. There would, of course, be implications for PRE, but I believe that they would be positive implications and would be capable of being fulfilled. I do not, however, agree that additional reserves would be required. If a smoothing strategy is communicated properly to the market and to the office's policyholders, with the appropriate caveats, and properly explained, then there should be no reserving difficulties. The authors give some example smoothing methods in ¶3.2.11. My own view is that, whatever smoothing method is adopted, it should normally be a totally retrospective method. Any smoothing method which relies on an assumption as to the future will, sooner or later, come to grief. While it is important to incorporate caveats into the smoothing strategy, it is clearly desirable to attempt to minimise the number of occasions when they have to be called upon.

Concerning the documentation of an office's asset share philosophy, the new disclosure regime, which came in at the start of 1995, requires offices to produce projected surrender, transfer and maturity values which are, in general, intended to be 'realistic' estimates for a given rate of investment return, and these are referred to in ¶2.2.5. In carrying out the investigative work to produce their supportable bonus rates, most offices appear to be drawing heavily on their asset share philosophies; that is that the various parameters for the projections are being affected and determined by the asset share philosophy. Examples of these parameters are the deductions from earned investment yields to allow for the cost of guarantees, capital, etc., and the level of initial expense where the office has a temporary initial expense overrun. In general, I see no problems with such approaches — in fact, it is difficult to see how else the task could be undertaken.

However, there are, in my view, very critical documentation issues involved here, as it will be important for an office to ensure that the key aspects of its asset share philosophy, relied upon when projections are issued, are followed through when asset shares are calculated to set actual payout levels in the future. Some aspects of an office's asset share philosophy might remain stable over long periods of time, and other aspects might change. If a particular aspect is relied upon at a particular time in order to justify a projection at a particular level, it seems only fair to the policyholders concerned that any future change in this aspect of an office's philosophy is not allowed to be detrimental to them. It, therefore, appears to me to be vital for all offices to keep quite detailed cohort-based records of their asset share philosophies, particularly in the areas where such philosophies impact on the projections of policy proceeds.

Mr M. R. Kipling, F.I.A.: What should be done with asset shares and what is actually done with them are often two different things. In covering the diverse uses to which asset shares are put, the authors highlight, intentionally or otherwise, several examples of this divergence.

Figure 3.1 exhibits, perhaps, the most obvious example. Payouts on 10-year policies clearly failed to keep up with asset shares from 1978 to 1985. Thereafter, actual payouts rose in the face of generally falling asset shares. For several years now, the fat built up in those years of underpayment has been available to fund overpayment and also to fund competition for distribution. However, in some cases, I suspect that the well is now beginning to run dry. In 1985 bonus rates were rising, not just because of guilty consciences about past underpayments, but because projected maturity values on new policies were commonly then based on full current bonus rates. With the benefit of hindsight, which consumerists possess aplenty, have we given the right signals about changing asset shares in the intervening 10 years?

Considering ¶¶2.2.5 and 2.2.6 and the difference between the asset shares which the PIA requires

to be used in determining supportable bonus rates and that which, unfettered, actuaries might choose to use, I am unclear whether, in ¶2.2.6, the authors intend to suggest that miscellaneous profits could be taken into account when determining supportable bonus rates for this purpose, because, in general, they cannot. Equally, capital charges need not be brought in. Despite input from the profession to the contrary, the PIA rules require only expenses and shareholder or other permanent transfers to be included. Profit from non-profit business may be offset against transfers, but not otherwise taken into account. The Regulation Committee of the Life Board is currently carrying out a survey of practices adopted when giving advice on matters covered by GN22.

Now considering ¶3.1.8, I agree with the authors and Mr Jenkins, that fuller disclosure of bonus philosophy to policyholders will be necessary in the future. So far as it covers bonus rates, the major influences should be highlighted, and, maybe, even quantified. For example, "to continue to add bonuses or maintain payouts at the current level we need to earn, on average, at least $x\%$ p.a." Smoothing policy should also be explicitly described, and then followed. Descriptions should be simply expressed and be jargon free. A review of the With-Profits Guide is overdue. Issues for consideration should include: whether a revised guide should require some form of actuarial certification; and whether it should be, in its simplified form, provided compulsorily to all new policyholders, or even to existing policyholders, if the bonus philosophy or the circumstances have changed significantly.

After reading ¶4.4.15, where the authors state that "The estate is a similar concept to the embedded value of a non-profit or unit-linked fund", I thought that I would attempt to satisfy myself of this. A clue to the method to use appears in ¶4.4.14, where the authors suggest netting off the value of non-profit business against the statutory liabilities, giving a realistic valuation of these liabilities. A little rearranging of the authors' implied equation in Figure 4.3 (ignoring valuable subsidiaries and, for now, with-profits business) then shows that: accounting value of investments, less realistic value of liabilities less deferred tax, (which, to my mind, is as good a definition of embedded value as any), equals estate, but plus risk-based capital. It seems reasonable that risk-based capital, which is not intended to be consumed in normal circumstances, is also to be considered part of the embedded value.

For with-profits business, I suspect that a similar equivalence of the retrospective and prospective can also be demonstrated, by means of the adjustments for the future referred to in ¶4.2.2. Embedded value movement analyses will, therefore, convey many of the same messages as asset share movements. However, what the authors have done is effectively split embedded value into a risk-based capital element and a free element.

Mr R. E. Allen (a visitor): The paper touches on the issue of the balance between policyholders' and shareholders' interests in the long-term funds of life insurance companies, upon which subject the Secretary of State for Trade and Industry issued a statement on Friday 24 February 1995.

The paper makes some comments on asset shares as a means of determining PRE, which, perhaps, do not quite line up with our own view of that position. In the DTI and GAD, we have been conscious, for some time, that the question of the attribution of what I will loosely call the 'estate' of proprietary with-profits life offices has been a topic of lively interest among actuaries and the management and boards of life offices (not to mention analysts). We have worked up, in close consultation between actuaries, lawyers and administrators, a set of principles which we consider provide a coherent conceptual framework within which particular cases can be assessed. The statement concerns general principles, which we would apply to proposals from life offices, bearing in mind that the specific circumstances of each company will be different, so that the application of these principles may lead to differing results in different cases.

The main elements of this framework are:

(1) *The factors which influence policyholders' reasonable expectations in respect of attribution of surplus.* We believe that the main factors are:
   - — the fair treatment of policyholders *vis-à-vis* shareholders;
   - — any statements by the company as to its bonus philosophy and the entitlement of policyholders to a share in profits — for example in its articles of association, with-profits guide or other company literature;

— the history and past practice of the company; and
— general practice within the life insurance industry.

(2) *The balance of interests as between policyholders and shareholders.* Any restructuring of funds should preserve this balance. I have heard the view expressed that policyholders' reasonable expectations go only to *distributed* surplus, so that whatever is left in the fund after distribution belongs to the shareholders. We reject that view. The consequence of accepting it would be that an office could deliberately suppress levels of distribution, so as to increase the proportion of shareholder interest in the fund. We consider that the proportion of policyholders' and shareholders' interests in the surplus are unaffected by whether or not the surplus is actually distributed; that is, if, in any year, surplus is not distributed, but is retained in the fund, the policyholders, as a class, retain their interest in that element of the fund.

(3) *The 90/10 split.* We recognise that stated policy and practice varies between offices with regard to the proportion of surplus going to policyholders and shareholders; but, in assessing policyholders' reasonable expectations, we take a 90/10 split as the starting point for attribution, because this is the common industry practice. In a particular case there may be good reasons for modifying that position, for example, shareholders may have injected additional capital into the long-term fund, or the 90/10 split may historically relate only to the with-profits component. However, the onus would be on the company to demonstrate that its particular circumstances were such that a 90/10 attribution was not appropriate.

I should stress that it is not part of the DTI's purpose to require companies to restructure their long-term funds, or to seek to clarify the shareholders' interest. The status quo is an option, but we recognise that some companies may wish to discuss proposals for clarification or restructuring with us.

Mr A. J. Sanders, F.I.A.: Stochastic modelling can enable insights to be obtained into the operation of a with-profits fund that cannot be obtained by traditional actuarial methods. That is particularly true of assessing the impact of guarantees and of alternative bonus and investment strategies. The results of stochastic modelling are, however, very dependent upon the assumptions made, notably the asset model used, the assumptions about future investment strategy, bonus structure and smoothing. By varying these assumptions, the impact of different bonus and investment strategies can be assessed. By this means, stochastic asset modelling can make a significant contribution in the development of an office's strategy for its with-profits business and the testing of that strategy against extreme conditions.

The authors use stochastic asset modelling to quantify risk-based capital, which is then used as a central element in the construction of a financial management framework. Whilst it may be perfectly reasonable for the regulators and the profession to use stochastic asset modelling to develop new risk-based capital requirements, I am less convinced on the merits of an individual office developing its own assessment of a risk-based capital requirement, and then using it as a central element of its financial management framework. Risk-based capital assessed in this way is too sensitive to the main assumptions: the level of risk; the asset model; and the future bonus and investment policy. It is also sensitive to the assumptions made about how the management will react to adverse circumstances; how quickly they are prepared to change their approach to investment allocation and bonus policy.

In Section 4 the authors develop their financial management framework. Whilst I have no difficulty in agreeing on the usefulness of the elements of the realistic balance sheet, I am less convinced by the way the results and key measures are presented. I do not feel that either net worth or free capital are particularly useful intermediate measures, and the terminology is, in my view, liable to cause confusion. These items do not represent the statutory free assets, but, equally, they do not include all the elements of economic value. Free capital in particular, as defined, is heavily dependent upon the somewhat arbitrary derivation of risk-based capital. Actuaries have to be careful not to lose the confidence of life companies' management by confusing a subject which is already complex enough.

Another point that needs to be borne in mind is that, although the financial management framework can be used to address a wide range of issues, the same treatment and assumptions will not necessarily be appropriate to all these different issues.

I now comment on the way that risk-based capital is treated in the realistic balance sheet in the paper. Effectively, the future release of risk-based capital is discounted at the risk discount rate, thereby valuing it at less than its face value (assuming that the risk discount rate is higher than the net earned rate of interest). This also applies to the definition of the estate in Section 4.4. It seems to me arbitrary to write down the notional amount of risk-based capital attributable to with-profits business. The amount of the write down is itself somewhat arbitrary, and reflects the incidence of its expected release rather than the underlying risks which have given rise to the risk-based capital requirement. It seems more appropriate to include risk-based capital at its full value for this purpose, and simply identify its size.

Mr M. A. Pickford, C.B., F.I.A.: Concerning the relationship between asset shares and policyholders' reasonable expectations, it seems to me that the paper gets off on the wrong foot, in the very first paragraph, by referring to the use of asset shares as the *starting point* for the definition of policyholders' reasonable expectations. There are other paragraphs that more accurately reflect the correct relationship between asset shares and PRE. For example, in ¶2.2.1, it is stated that asset shares "provide a mechanism for quantifying the ill-defined term 'policyholders' reasonable expectations'." However, in the same paragraph, referring to base asset shares as a mechanism for quantifying the minimum level of payment which would meet policyholders' expectations, the authors say "it could be argued that policyholders' expectations extend beyond this." This seems, to me, to be putting the cart before the horse.

I consider that the term 'policyholders' reasonable expectations' is a concept, and not a number. Policyholders' reasonable expectations for a particular company are influenced by a number of factors, such as any statements by the company as to its bonus philosophy and the entitlement of policyholders to sharing profit. Other influences are fairness between policyholders and shareholders and the history and past practices of the company.

Once the concept of policyholders' reasonable expectations for a company is established, then one can think about how to translate this into practical terms. Asset shares are clearly one aspect, and an important one; and I think that an appropriate relationship between asset shares and policyholders' reasonable expectations could be expressed as: "Asset shares are a mechanism for assisting in deciding the amount of policy proceeds to be paid on the basis of a previously determined policy as to what are the policyholders' reasonable expectations".

Of course, policyholders' reasonable expectations cover more than with-profits business, and there are special problems in interpreting the expression above where the company's brochures and literature themselves refer to PRE in the context of 'asset shares'. However, I think the above forms a good basis for the relationship between asset shares and policyholders' expectations.

Having tried to put the term 'asset shares' into some sort of context, I would now like to do the same with the word 'estate', in the context of how it is used in the paper. I think there could be a temptation for anybody reading the paper to think that the estate, as described and used in the paper, is something that belongs to the shareholders, and is something in which the policyholders have no interest. This arises from the definitions of the estate given in ¶2.1.10 and in ¶4.4.15. In the latter paragraph, by referring to the estate as a concept similar to the embedded value, with the present value of future margins representing the value of in force business, etc., I believe that the authors are pushing the reader to that point of view. This is not how everyone, including the DTI, would see the issue of the shareholders' interest in the long-term fund. As an example, take capital charges. Who has an interest in the capital charges, referred to in ¶2.1.5, once they have been levied and a reserve built up?

When determining what should be deemed to be the shareholders' interests in the long-term fund, a proper balance of interest as between policyholders and shareholders should be preserved. One issue is whether the proportions of policyholders' and shareholders' interests in the surplus are *unaffected* by whether or not the surplus is actually distributed. We now know that the DTI considers that policyholders do retain their interest. Although capital charges form part of the estate, as defined in the paper, smoothing means nothing if it does not mean that in some years policyholders get a bit more and in some years a bit less than an accurate reflection of investment performance, etc., over the lifetime of the policy. Policyholders, clearly, have an interest in the reserve built up by capital

charges, and it would be wholly inappropriate to consider that the reserve held from capital charges previously levied can be identified as being a shareholders' interest in the long-term fund, although, of course, in a 90/10 company, 10% may be so. In short, therefore, the estate, as used in this paper, is not synonymous with the shareholders' interest in the long-term fund.

I am very supportive of risk-based capital being used for internal management purposes, although I think it is a great pity that, in Section 5.3, there are tables which use a resilience test that is described as "the original plus and minus 3% resilience rule with a 25% fall in equities". Not only have we moved on from a fixed resilience test of that nature, but we have never taken the view that that formula should be applied continuously, irrespective of where interest rates have fallen or risen to, or where the equity market has fallen to. The figures are clearly too high in Table 5.4, and it would be interesting if the authors could reproduce them on a basis which is more consistent with how actuaries are approaching resilience reserving these days.

Having said that, however, I have some sympathy for the suggestion of using the risk-based capital requirements of the resilience reserve more in the form of a catastrophe reserve, although I do not hold out much hope that we would be able to achieve this in negotiations in Europe. The E.U. is about to embark on a review of the required solvency margins, and clearly risk-based capital, as adopted in North America, will be looked at with a view to seeing whether or not it might be appropriate for use in Europe, subject to any necessary modifications. I suspect that many member states would prefer to have additional margins for prudence in their reserves rather than to strip those reserves down to realistic levels and have a risk-based capital requirement on top for solvency margin purposes.

The authors' comment, in ¶5.4.6, that risk-based capital should be seen as a catastrophe reserve, reminded me of the position of equalisation reserves in non-life insurance. One of the difficulties confronting the DTI, in introducing equalisation reserves, is the fact that they are considered to be provisions, and not reserves, under European legislation. It seems inevitable that we would have to change the position on equalisation reserves before we could adopt similar concepts on the life assurance side.

Mr P. G. Kennedy, F.I.A.: The authors believe that with-profits policies are outside the scope of the new Unfair Contract Terms Regulations, which have two tests of unfairness that are for:

(1) a significant imbalance in favour of the life office; and
(2) a lack of good faith, which is a concept similar to PRE, except that it is assessed at the time of sale.

Life assurance differs from other savings media in that, if a bank or building society investor does not like his investment returns, he can go elsewhere without penalty. Long-term policyholders cannot do so. There is a significant imbalance in favour of the life office. However, before we need to consider good faith, there is an exemption for core terms such as the premium or the sum assured. The DTI have said that they do not regard discretionary benefits or charges as capable of falling into that exemption. Nevertheless, with-profits policies can escape the regulations, because payouts depend on the level of bonuses, and, however unfairly bonuses may have been determined, policyholders are still better off with them than without them. The authors would like to define the current approach more clearly, while retaining the flexibility to amend or depart from it if that becomes necessary or desirable. However, flexibility to reduce disclosed benefits can be attacked, so perhaps we should now turn to the requirement of good faith, which can be met if we guarantee in advance to meet PRE. GN1 requires Appointed Actuaries to do just that, and the authors suggest that PRE can be quantified by smoothed asset shares.

I took out a 10-year with-profits endowment in 1990, when the life industry was shifting from bonus reserve valuations to asset shares, but, ever since their demise, the bonus rates on my policy have been steered downwards. This is to bring my projected benefits into line with my projected asset share, and I can tell from the gradual cuts each year that this bonus steering is being smoothed. However, I am not happy because, instead of receiving the subsidy that I expected, and which everyone was getting in 1990, my policy is now paying capital charges to rebuild the estate, and because, after three years of outstanding investment returns, 1994 has been an *annus horribilis* for the life industry, and, after reading Section 2.11, I now know how crudely asset shares can be calculated.

Perhaps my expectations are not reasonable. In ¶3.2.11, Method 1 is just a structured unit-linked policy in disguise, and can give very different results from what might reasonably be expected. However, the method will only produce the absurd smoothing costs or profits in the table if it is mismatched.

Paragraph 3.1.11 sanctions the allocation of miscellaneous profits to life policies, but not pension policies, or vice versa, for purely competitive reasons, if the office can afford to do so without disadvantaging other policyholders. With-profits policyholders expect to participate in profits. The extent of that participation may be defined in advance, but if insurers stop selling traditional endowments, they must not be allowed to start diverting profits into unitised business, say. That would be a fundamental breach of PRE.

It should be remembered that asset shares are just a guide. Smoothing methods should not be followed slavishly. Life offices already have discretion to re-interpret policyholders' reasonable expectations, but now they want to charge existing policies for risk-based capital as well!

Mr D. M. Pike, F.F.A.: In ¶3.1.9(b) the authors say that the approach to smoothing may be either scientific or more arbitrary. Later on they seem to imply that they prefer a more discretionary approach. The Faculty of Actuaries Bonus and Valuation Research Group, of which I am a member, came to the topic with the attitude that it is more important to understand the long-term implications of a chosen smoothing strategy. We found it difficult enough to predict the implications of a more rigorous approach, and I believe that there are particular dangers in a more arbitrary or *ad hoc* approach, especially considering the commercial pressures to which the actuary will often be subject.

In ¶3.1.10 the limited year-on-year changes in payout are mentioned as a 'final health check'. In our investigations we treated this as very much an integral part of any smoothing strategy. Indeed, we found it important to the stability and other aspects of smoothing costs.

In ¶3.2.12 the authors discuss what they describe as increasing fixed-interest backing. They give an explanation of the differences that arise; that is that fixed-interest returns have been lower than returns on equities over a long period. In our investigations, we set the reducing equity backing strategy such that the overall gilt/equity mix for the model office was similar to that for the pro rata investment strategy. Thus, any differences were primarily attributable to different methods of apportioning assets to with-profits policies and were not dependent on differences in long-term average returns on gilts relative to returns on equities. It is not clear whether the authors have done the same.

Regarding the second feature described in ¶3.2.12, we found that, when there was a very high or very low return on equities over a particular year, the pro rata investment strategy gave a clear direct effect on the model asset shares for policies maturing in the following year; but very little effect with the reducing equity backing strategy. However, while greatly reducing the impact of investment shocks near maturity, the reducing equity backing strategy does not lessen the impact of shocks in early years. In Figures 3.4 and 3.7, method 3B, the arithmetic averaging of investment returns, gives significantly greater results than 3A, which is the geometric averaging for periods of 10 and 25 years respectively, following the 1973-75 period. I suggest that the reason is that, over this period 1973-75, the equity index fell something like 58% approximately, and then rose 133%, which gets it back to where you started. Geometric averaging recognises this. The arithmetic mean of minus 58% and plus 133% produces a spurious increase, which is what I believe these figures are showing.

Mr R. Frankland, F.I.A.: With regard to ¶2.8.2, I would suggest that it is the short-term consumption of free capital in effectively inadmissible assets, rather than risk-related assets, that gives rise to the justifiable desire for a higher return, and that the term 'risk rate of return' is potentially misleading. The general conclusions remain valid.

Considering Section 5.2 and risk-based capital, in respect of the need to meet future policyholders' reasonable expectations, Table 5.2 leads to the view that the major need for this risk-based capital is due to the fact that smoothing has been included within the policyholders' reasonable expectations. The authors suggest that the office should retain discretion to amend its smoothing policy if this becomes necessary. I would suggest that, if an office is to provide details of its smoothing policy, in the with-profits guide or elsewhere, it should make it clear that the smoothing policy is based on

experience, and, rather than reserving the right to alter it in the future, should actually make virtue of the fact that the office will actively review its smoothing policy in the light of ongoing experience.

The more worrying aspect of the section on risk-based capital, for me, appears in Section 5.3. There has been much discussion about the possible need to introduce the concept of risk-based capital into the calculation of statutory minimum solvency requirements. Conceptually the idea may be appropriate, but not to the extent that it piles margin upon margin within a valuation basis. Whilst we live in a world in which it is well-nigh impossible for a with-profits life office to become statutorily insolvent without having first transgressed the resilience rules, the real test of solvency in an office these days is the resilience test, not the normal valuation rules. If we are to set up another test designed to demonstrate that an office is in no danger of transgressing the resilience rules, which presumably would also require the office to take prudent care that it has an acceptably low risk of transgression, then we are, in effect, in the situation where we have to set up three levels of margins to cover three successive hits on our asset values rather than the two successive hits which it seems necessary for us to cover at the present time. The observation has been made that one of the reasons that risk-based capital was not required in respect of asset values was that the solvency and resilience rules largely met that need already, a sentiment with which I have considerable sympathy.

Mr T. J. Sheldon, F.I.A.: One of the distinctive features of with-profits business is the combination of progressive guarantees and smoothing of payouts. A company can manage the guarantees and smoothing in two ways: it can apply a formula to smooth payouts, hold capital to act as a buffer, and possibly charge for the guarantees; or alternatively, it can adopt an investment strategy which recognises the guarantees granted and reduces the volatility of payouts to acceptable levels. It would also be possible to use a mixture of these two approaches.

In ¶3.2.11 the authors illustrate several possible methods of smoothing asset shares. The first of these adopts a declining equity backing ratio, and is fundamentally different from the other smoothing methods presented, since it describes an investment strategy, whereas the other methods are essentially mechanistic, and can be applied irrespective of the actual investment mix of the fund. While it would be possible to operate this first method using a hypothetical asset mix, such an approach would entail obvious dangers if there were significant overall differences between the actual and hypothetical investment portfolios.

The rate at which assets are switched into matching fixed-interest securities would need to reflect the bonus philosophy of the office, in particular the methods used to fix levels of reversionary bonus. As Figures 3.3 and 3.6 demonstrate, such an investment strategy produced a reasonably smooth progression of payouts over the years. While, in theory, no further smoothing may be necessary for this investment strategy, in practice, a small amount may be needed when fixing the terminal bonus scale. There may be other investment strategies which cover guarantees and yield an acceptably smooth progression of payouts. The use of options, such as lookbacks and ladder structures, may be a possibility. An alternative approach would be the creation of synthetic options within the fund by varying the asset mix according to an immunisation or dynamic hedging strategy.

Of the formula-based smoothing methods discussed, that based on regression analysis is attractive for its apparent objectivity, though some experimentation with both the period and weights will be necessary. As Mr Pike has already noted, it should be no surprise that Method 3B produces consistently higher payouts than Method 3A, and it may be that Method 3B is technically unsound. Method 4 and Method 3A, which produce almost identical results, do not appear to cope well with longer-term cycles, although that difficulty might be overcome by using a shorter averaging period. Both Methods 5 and 6 rely on the choice of an expected long-term rate of return and the weight given to actual experience. This seems unsatisfactory, as it introduces two subjective factors into the payout calculations. I also note that Method 6 consistently produces payouts below unsmoothed asset shares. The tables showing smoothing costs are based on a uniform amount of business maturing in each year. In practice, maturities will be uneven, and it will then be necessary to take into account the fluctuating volumes of maturities when applying a smoothing process. That is, of course, not necessary if the investment strategy itself produces a reasonably smooth pattern of payouts.

In Section 5.2 the authors illustrate the need for risk-based capital using a particular smoothing

method. It would be interesting to see further studies of how risk-based capital varies with the smoothing method. Smoothing obtained through a judiciously chosen investment strategy should require only relatively small amounts of risk-based capital.

As the authors lament, in ¶3.1.8, with-profits guides say little about how offices actually calculate payouts. What should an office tell its policyholders and potential policyholders? As Mr Frankland has observed, an office which uses a smoothing formula probably needs to retain some flexibility in applying that formula, so it may not be able to be explicit in the method it uses. That leaves the office with a communication problem. The alternative of following an investment strategy designed to meet guarantees and smooth payouts may sound more convincing and attractive to policyholders. Perhaps policyholders can, and should, be given a choice of with-profits funds following different and clearly enunciated strategies?

Mr T. W. Hewitson, F.F.A.: One conceptual point of difference between myself and the authors, that I should like to highlight, is over the definition of capital. This is stated, in the paper, to be essentially the excess of assets over asset shares for with-profits policies and the excess of assets over statutory liabilities for other policies. However, in my view, there is also an element of capital tied up in both the asset shares and the statutory liabilities. Therefore, in applying any risk-based capital regime to an insurer (such as that applicable to banks and investment firms), these margins in the liabilities would also need to be taken into account. This means that the risk-based capital calculations, in Section 5, that look at the cost of smoothing, are likely to be more significant in the longer term than the similar calculations that look at the cost of setting up adequate statutory liabilities. In other words, it seems more appropriate in a risk-based capital regime to look principally at the effects of adverse experience on the ability of the office to meet the expected benefits as they arise, although a deterministic assessment of the balance sheet at the end of each year will still be needed.

It will be important to bear in mind this wider definition of capital during the forthcoming solvency margin review for life insurers, and to explain the shortcomings of the alternative philosophy that is prevalent in some other circles. This says that liabilities are fixed, and, therefore, that an explicit margin such as 20% or 30% is required to be held on the assets in order to allow for volatility in the value of equities and some other investments. This alternative philosophy is clearly inconsistent with the actuarial techniques of asset/liability management that are applied to insurers and pension funds.

The issue of how to assess the liabilities for with-profits policies is being studied further by a professional working party. I hope that we will be able to tie this in with Section 5, and look at the impact of any proposed changes on the overall finances of a typical with-profits office.

On some of the detail of the paper, I was a little surprised that the difference between smoothed claim payouts and actual asset shares does not appear somewhere in the analysis of change in free capital during the year, shown in Section 4.5. I would have expected such variances to appear each year, but perhaps this is part of the item in Table 4.1 'Increase in planned augmentation to claim payments'.

I am also doubtful about the proposal, in the final sentence of Section 2.5, that acquisition expense over-runs could be respread across all with-profits policyholders. As existing policyholders are unlikely to see any direct benefit from such over-runs, this would seem a more suitable item to be charged against the free capital.

I would like to highlight the importance of achieving a proper balance between the interests of policyholders and the interests of the company. While policyholders could reasonably expect to pay a contribution towards the cost of any *real* support provided by the estate, this would, in the absence of any more explicit statement to policyholders, be in the context only of the actual estate that is genuinely needed to support the with-profits fund. In other words, it seems to me questionable whether it is consistent with policyholders' reasonable expectations that a company should (by means of some explicit charge on asset shares or otherwise) deliberately build up an additional estate from current generations of policyholders in order to accelerate the development of the office. It seems to me that any such additional estate should not be allowed to build up indefinitely if the reasonable expectations of all policyholders are to be fulfilled and a proper balance of interests is to be maintained.

Mr H. W. Froggatt, F.I.A.: There are a number of examples in the paper where offices appear to be making global, rather than individual policy-based, decisions or allocations. I would like to explore some possible consequences of this by way of a simple illustration.

Consider three offices, A, B and C, all writing just one type of business, and all with the same moderate capital employed. Office A just writes 10-year endowments. Office B just writes 20-year endowments. Office C writes a mixture of 10 and 20-year endowments and is equivalent to half of office A plus half of office B. Office A, writing 10-year endowments, has been finding its guarantees fairly onerous. The paper suggests that there is now little room for terminal bonus on 10-year policies, so this could be a reasonable assumption. It finds that it has to hold a substantial proportion of fixed-interest investments. Office B, writing 20-year policies, has no such problems, and happily holds a very high proportion of equity-type investments. Office C, with its 50/50 mix of 10 and 20-year policies, is in an intermediate position, and while it has some concerns about its guarantees arising from its 10-year business, it is able to hold moderate (intermediate between office A and office B) amounts of equities. All three offices allocate investment performance for their asset share calculations on a managed fund basis, and make no charges for guarantees or risk. For simplicity, smoothing is ignored.

Suppose equities have been outperforming fixed-interest, as seems to have been the case in the past. Consider office C's 10-year policy results compared to office A. It has more equities than office A, and so it produces better results.

Policyholders choosing a 10-year policy on the basis of past performance (or equity backing) would be expected to choose office C rather than office A. Next, compare office C's 20-year results with office B. It has less equities, therefore produces lower results. Informed policyholders choosing a 20-year policy can, therefore, be expected to choose office B rather than office C. If there is an efficient market, then one might expect 20-year business to move to office B, and 10-year business to office C, which then moves towards being like office A, which has gone out of business.

The example is over-simplified, but illustrates the potential scope for potential policyholder selection against offices operating too broad brush an approach. The fairness of such an approach is called into question.

It is clear from the example that a global charge for guarantees may not work. Office C could impose such a charge, but if it were imposed globally it would reduce its 20-year policy results even further below those of office B.

In the context of the example, a charge, just levied on 10-year policies, based on the difference between the actual investment performance of the portfolios of offices C and A, would reduce C's 10-year policy results to those of A. Its 20-year results would then be increased to the level of those of office B.

Mr D. A. Smith, F.I.A.: My comments refer to the link between payouts and asset shares, set out in Section 3.1, and to the type of financial management framework, set out in Section 4.

I was curious to read, in ¶3.1.2, that, in determining the level of with-profits payouts, a company might be influenced by the payouts of other companies. I say curious, because in most forms of savings competitor comparisons are made as part of the pricing process in advance of the determination of final payouts. The final benefit is then well defined and not subject to eleventh-hour adjustments. The same can be so for with-profits business, providing an office has a well-developed asset share philosophy.

In a well-developed asset share philosophy, asset shares could be calculated at policy (or grouped policy) level. A summation over all policies would give the aggregate asset share, which is a relevant amount when considering policyholders' reasonable expectations. If smoothing of investment volatility was built into the asset share philosophy, then terminal bonus at maturity can be set so as to link payouts to asset shares in a well-defined way. To accomplish this, asset shares need to include miscellaneous sources of surplus, such as surrender and non-profit surplus, to the extent they fall to policyholders. This can be achieved by calculating base asset shares, as defined in the paper, but with credit for miscellaneous surplus given through making adjustments in the assumptions used. For example, the investment return assumption for a particular year could be increased, or the expense assumptions decreased, or through some other adjustment as thought most equitable. This method has

the advantage that the miscellaneous surplus can be distributed on a regular basis and consolidated into policyholder asset shares on a timely basis. An unallocated surplus would be more open to the danger of an unequitable distribution, as, by definition, it has to be distributed retrospectively.

Once an asset share model has been developed and an asset share philosophy set in place, internal reporting of aggregate asset shares, along the lines of Section 4, can begin. The aim here would be for a clear, but succinct, basis, understandable by actuaries and non-actuaries alike. A company's directors could then decide, meaningfully, on the philosophy and on the distribution of miscellaneous surplus into asset shares. Further, by gaining wider agreement to the operation of with-profits business and on the amounts of policyholder asset shares, there would be less need for eleventh-hour, perhaps retrospective, adjustments in the future. If payments were truly driven by asset shares, then payouts could only be increased if, at the same time, all policyholders' asset shares were enhanced. This seems a desirable practice.

Mr S. H. Bell, F.I.A.: My comments are on the aspect of managing payouts and indicate a modified approach to smoothing. I am responsible for a mutual insurance company fund which is dominated by short-term endowments, and has grown in a stable manner over the years. I calculate base asset shares using notional returns, and expect to supplement the asset shares at maturity in lieu of investment and miscellaneous profits. In the three years prior to maturity the investment proportions are varied, so that the major asset backing the contract at maturity is short-dated fixed-interest stock. This process tends to smooth the asset share, but further smoothing is achieved by adjusting the asset share to reflect the effect of the yield on fixed-interest stock reverting to a central rate, taken to be 9% p.a., with a similar adjustment for equities. Recent and projected maturity values are then compared with the adjusted and unadjusted asset shares.

A further part of the process is to compare total assets, tax adjusted, with aggregate base asset shares, and to perform an 'analysis of surplus' on the annual movement. One of the objectives for this fund is to target a gradual strengthening of the ratio of assets to asset shares to provide for the statutory reserve, including a resilience reserve, to be adequately covered in the event of depressed market values. This is reinforced by annual cash flow tests, assuming no dividend growth and no terminal bonus. Armed with this information, and with the normal analysis of the statutory results, I have found it relatively straightforward to recommend both reversionary and terminal bonuses.

Mr A. S. Cherkas, F.I.A.: I believe that the authors have demonstrated powerfully how, making use of new technology, asset shares are a fundamental tool to guide internal financial management of with-profits business. In the paper they draw our attention to many methods and approximations that are needed to cope with the fact that historic information systems have not captured all the necessary data. Further, they describe the large number of reasonable permutations of various approaches to the calculations, such as the treatment of surrender profits and taxation. The temptation to consider asset share methodology as a basis for any regulatory reporting or even external comparative assessments beyond disclosed maturity values may be unavoidable. Because of these data issues, appropriate variations in practice and still emerging experience with the method, I wonder whether this temptation should be tempered or resisted for the time being. I fear that a rather hasty institutionalisation of asset shares into regulation or the realms of external comparisons will result in either an unnecessary, bureaucratic and costly set of rules or a confusing set of external comparisons that are not near to being like for like. Are we ready?

I now consider the implications for marketing and the future of with-profits business. By sounding cautious about its exposure, I am not suggesting that individual firms should refrain from using asset shares as a basis for articulating to policyholders and external commentators their with-profits payout philosophy. The authors, I believe, demonstrate how useful they are in this area. Indeed, companies cannot, and should not, resist the pull towards greater product transparency if, in their judgement, commercial reasons demand it. The authors rightly assert that adapting to changing conditions will be essential to the survival of with-profits as a product concept. This is because, as stochastic projections show, probabilities of insolvencies under extreme investment conditions are materially greater where inflexible payout rules are applied. The authors go on to say that we can expect that our professional advice on the application of discretion will be scrutinised and questioned in future; and why not?

Unfortunately, however, this greater transparency and scrutiny, as facilitated by asset shares, may actually reduce the flexibility of with-profits business to adapt to changing circumstances. This is because the practice of publicly relating payout practices to asset shares — even with a disclaimer relating to the possibility of departing from stated practice — will create market expectations, nevertheless, and, therefore, will reduce the scope for discretion in practice. The question will be: by how much, and what, will be the impact on the long-term survival of with-profits business?

In the transparency debate, asset shares are only one of the messengers. Proponents of the with-profits concept must ensure that the emerging message about with-profits does not confuse the market, and so cloud the market proposition. While accepting the inevitable loss of flexibility arising from greater transparency, the industry owes it to itself and its customers to harness asset shares and work with regulators and others to ensure that the approach is applied appropriately without getting bogged down in complex rules. If properly handled and simply communicated, asset shares can help the industry explain the with-profits proposition successfully in the long term.

Mr C. J. Hairs, F.I.A.: The paper, rightly, does not describe a single approach to the use of asset shares. We have here a varied menu from which we are invited to select; and, like most menus, we need to select carefully if we are to get a balanced meal, although the authors do include a number of hints as to what might go with what.

Section 2.4 covers how investment return is allowed for. It reports that 82% of offices surveyed adopt a managed fund approach, without varying the fixed-interest proportion or mean term according to duration to maturity. However, the paper, in ¶2.3.2, reports that, in most cases, asset shares are used only as a guide. My guess is that many offices would acknowledge that an approach which varied fixed-interest content and term would be superior, but that the modelling and the data extraction challenges have been over-formidable to-date. For as long as asset share based results are used only as a *guide* to payouts, adjustments can be made to protect maturing policies from inappropriately reflective volatility, which is driven by longer-term fixed-interest holdings.

The key consideration here is the office's investment guidelines and approach to matching. The authors refer elsewhere to the importance of consistency within the office's overall financial management framework. If the office's fixed-interest portfolio is set, having regard, at least in part, to the magnitude and term of the guarantees under with-profits policies, there are then dangers if this matching is ignored in asset share work. I agree with the opener that we must avoid spurious accuracy in asset share determination, but the investment dimension is so important that I feel that this area of linkage to the office's investment matching practice is still a development area for the asset share concept.

The authors refer several times to particular attributes of the with-profits product, including guarantees and smoothing, but a key characteristic of with-profits, as I perceive it, is the singular lack of guarantees as regards the future. Guarantees are limited to the basic benefits and past reversionary bonuses. This is in stark contrast to non-profit contracts and to linked contracts. Linked contracts offer very powerful guarantees, even if they are not fixed in money terms. This lack of guarantee provides the writing office with great strength, in the sense of its ability over time (once the with-profits portfolio is well established) to absorb shocks and to steer the fund in accordance with adaptive control principles. The benefit for the with-profits policyholder is the prospect, *though not the guarantee,* of enhancing the hoped-for product of investment return on premiums net of charges by a share of other surpluses. That, to my mind, is the justification for bringing these various other sorts of surplus into asset share calculations at all.

This role of with-profits as an absorber of risk is fundamental. It is precisely the reason why, in a statutory solvency valuation, we do not include a reserve for terminal bonus and why so many of us are so reluctant to accept the idea of reserving in a statutory sense for policyholders' reasonable expectations. In the context of the paper, this leads me to some discomfort with the analysis in Section 4, including Figure 4.3, in which risk-based capital and estate are shown *on top* of with-profits policyholders' liabilities. A modified display, which provided for a policyholder interest *as of right* in some or all of the risk-based capital and estate would, I believe, be more appropriate for many offices; but not all, of course, depending, among other things, on the office's history and its profit-

sharing conditions, taken in conjunction with how it is managed, including what it has said to its policyholders. There are, as the authors point out, different approaches to with-profits.

I am sure that the authors are right that the asset share approach is going to continue to be of importance, and, indeed, of increasing importance. The majority of offices that are still using asset shares more as a guide to the *shape* of the payout curves, rather than to the absolute amounts of payout, will be refining their approaches further. Even if we never, as I suspect will be the case, get to the point where asset shares on a formula basis are, by themselves, *determining* with-profits payouts, the way in which we are using asset shares will have benefited from the authors' work.

Dr C. D. Pickup, F.I.A.: In ¶¶2.7.3 and 2.7.4 the authors discuss the allowance for non-profit surplus in asset share calculations. It should be noted that new business strain on non-profit business need not affect asset shares, since the investment return on the invested with-profits assets is not affected. The key issue for policyholders is whether such non-profit business is written on profitable terms, and if so, how and when such profit is recognised, and how it can be equitably distributed. I believe that embedded value or achieved profits would be the best measure of profit, although a realistic gross premium valuation would be acceptable. Quantifying the value added by new non-profit business year by year makes decisions on how best to allocate such profits easier.

Asset shares only really work, as a guide to bonus policy, for endowment-type products (including deferred annuities). They do not work very well for whole life policies, which are a significant proportion of some companies' with-profits business, although, of course, they can still be calculated. The reason is that the asset share takes account of the cost of providing death benefits, so if too much is paid out at early durations, there is usually scope to reduce payouts, relatively at least, at longer durations. What is needed, in addition, is a projection of asset shares together with a payout policy, so that one can see whether such a policy is sustainable. Whether or not it is fair is another issue.

I now turn to the use of asset shares methods in company reconstructions, which can raise the question "How many assets should be put aside to meet policyholders' reasonable expectations?" Clearly the aggregate asset share is a very valuable item to answer it, but, even aside from fluctuation reserves and the like, it is not necessarily the whole answer. A company calculating asset shares, perhaps for the first time, may well find that payouts are significantly different from, and probably above, asset shares, and, perhaps, have been for some time. This is quite possibly the case if base asset shares, as defined in the paper, have been calculated. Should this be taken to imply that payouts are always, on average, 100% and more of asset shares, and thus that such a percentage of asset shares should be set aside to meet policyholders' reasonable expectations?

I think the answer must be no. Firstly, the office is unlikely to be able to afford it, particularly for recent and future new business. Secondly, in the absence of a reconstruction, the office would make decisions on bonus rates taking into account many factors, which might well lead (in current conditions) to lower bonuses. That said, the office may well have a policy of bonus rates that restricts the pace at which payouts can be changed, and such a policy should be taken into account. Even if not explicit, there may be implicit rules. For example, I imagine that few offices would wish to reduce payouts on maturing policies by more than, maybe, 5% to 10% in any year. Furthermore, policyholders will not know how their payouts compare with asset shares. What they see is bonuses declared and the ultimate maturity value. Thus, whilst asset share techniques are an invaluable tool in these circumstances, they are by no means the sole answer.

Mr A. K. Gupta, F.F.A.: The capital model in my company, a mutual operating on the entity principle, differs from the authors' in two respects: it is deterministic and does not have a risk capital component; and we have built into our valuation of with-profits business the greater of statutory reserves and asset shares on a policy-by-policy basis. Consequently, in the early years, reserves exceed asset shares and the excess is deducted from the net worth to determine free capital. We call this 'capital locked up in statutory reserves', and its release is incorporated in the value of with-profits business.

Despite these two differences, the two models, I believe, operate in a similar way, and should provide similar insights, although I accept the greater power inherent in the authors' model, particularly in their use of risk-based capital.

At the end of 1993 we analysed the movement for the first time, and found that we identified components similar to those shown in Tables 4.1 and 4.2. However, several things happened over the year which affected the movement in our equivalent line, referred to by the authors as 'change in with-profits risk-based capital': assets increased; asset shares increased; yields decreased; and, consequently, the minimum valuation basis strengthened. In addition, markets rose and the market-based long-term expected return on investments reduced. In reality, the figure (and I suspect the same applies to risk-based capital in the authors' model) is a function of market conditions at the valuation date. It contains a lot of off-setting factors, has the potential to swamp the results, and, I think, needs further explanation if it is to attain credibility. Needless to say, we did not try to explain it all to our Board, and we aggregated all of the factors as the authors have done.

On top of this, we questioned whether the risk discount rate should have been reduced during 1993. However, this could result in a mismatch between the unit-linked parts of the business, where it is preferable not to move the risk discount rate each year, and the with-profits part, where there is much justification for an active risk discount rate policy.

In Figures 5.1 to 5.3 the authors describe different approaches which can be incorporated into profit testing. Our approach is that used in Figure 5.3. If my understanding is correct, an inconsistency exists in the authors' model between their profit testing and their capital model. Their profit testing allows for the cost of excess statutory reserves over asset shares in the early years of a policy, whereas their capital model permits this to be offset by any excess in the opposite direction on older policies. This could lead to interesting discussions between the marketing and the actuarial departments, since the marketing department might view the profit-testing approach as conservative compared to the capital model.

I found ¶3.1.11 a remarkable, if not dangerous, paragraph. Without commenting on the content of the paragraph, what was remarkable was the fact that it was made in the first place. Would such a statement have been made 10 years ago? If we adopt such a statement and accept it as correct, we are opening Pandora's Box. How do you justify to policyholder A that he is getting less than policyholder B, not because his policy earned it, but, perhaps, because the marketing director was particularly persuasive that year? Maybe public disclosure is appropriate to protect the trust invested in the actuary.

I believe that development and implementation of such a framework is essential. At heart, the authors and ourselves are trying to identify profit in a with-profits fund. A profit objective is a very powerful unifying discipline within a company, and I believe that mutual companies benefit from such disciplines; but, unless they are sufficient to determine management action, they are a waste of time.

Mr P. W. Wright, F.I.A.: I was unhappy with the suggestion, in ¶¶3.1.2 and 3.1.11, that offices can legitimately declare excessive levels of terminal bonus, unsupported on any smoothing grounds, simply because the volume of maturing policies is currently small. This seems to me to reduce the with-profits concept to a form of lottery, which does nothing to enhance the standing of our profession and the life assurance industry. I agree, however, that this does appear to be going on. In the current bonus round we are seeing some offices increase 25-year term payouts after a very poor investment performance in 1994. It is hard to see how this can be explained on smoothing grounds, however notional the returns used in any asset share calculations may be. If the relevant sections of GN1 are to have any real force, it is, in my view, essential to ensure that an Appointed Actuary is not able to use a 'one-year cost of bonus defence' as justification for his or her bonus recommendations.

On the question of how smoothing should operate, the majority of offices in the asset share survey state that they calculate unsmoothed asset share results and then limit changes in maturity payouts, with only a minority calculating smoothed asset shares directly. Where the terminal bonus scale is sufficiently flexible, as regards the ability to set payouts equal to asset shares, then I believe that the majority has got this aspect right. As ¶¶3.1.9 and 3.1.10 point out, it is really necessary, in any event, to check that changes in payouts from year to year are within acceptable levels, so it seems natural to smooth the end result rather than build the smoothing into the asset share calculation itself. I do accept, however, that rigidity in the terminal bonus system can sometimes make the alternative approach more appropriate.

I disagree strongly with Mr Jenkins regarding the need to consider the projected development of asset shares. Asset shares have the ability to 'fall off a cliff' following a period of exceptional returns. A good example of this was a 15-year term policy over the period 1974-1989. Any reasonable projection of asset shares carried out in early 1990 would have indicated the likelihood of having to make big reductions in claim values on 15-year policies in the short term, and this would have been a legitimate fact to take into account when setting terminal bonus scales.

In ¶A.2.2 it is stated that surplus arising on non-profit business gives an enhancement of 0.50% p.a. to the roll up of the asset share. Apart from a very few proprietary offices with a large and profitable term assurance portfolio (where these profits do not go to shareholders), I would be surprised if many companies could justify such a large enhancement from non-profit business. I will be interested to see the results of the projection basis survey being carried out for the next CILA seminar, to see the level of 'sustainable profits' from this source for which credit is being taken.

Mr N. H. Taylor, F.I.A. (closing the discussion): My position is that I am not an asset share calculator; but am more an asset share consumer, particularly in the area of mergers, where with-profits funds are being combined, policyholder/shareholder allocations are being changed or with-profits funds are being converted to non-profit.

As I read the paper, I began to feel that asset shares were the solution to all my problems, as well as everything else to do with policyholders' reasonable expectations. Then I remembered that the established wisdom of the profession, for much of my career until recently, was that retrospective valuations were dangerous. Asset shares are just a new name for this. I never fully subscribed to that. Perhaps a period as an investment man led me to feel comfortable with assets, whereas most actuaries then seemed more comfortable with liabilities. I always saw the need to look at it both ways, and I have not changed my mind. The difference now is that, retrospective or prospective, we can play around with different scenarios and do much more on the sensitivity side. This is vital for asset shares, where the data we require for accurate calculations are, in most cases, not available except for the recent past. We have to accept that asset shares are built on insecure foundations. The paper explains ways to get over this, and many of us accept that investment returns are the main area on which to concentrate as far as accuracy is concerned.

I see asset shares as a vital tool for the actuary in helping him or her form a professional judgement, particularly as regards policyholders' reasonable expectations, and thus bonus distributions. However, I do not see it as the only tool. Mr Pickford and Mr Hewitson gave very lucid accounts of their views on this. It is a pity that the GAD has not published their recent survey, which was a wider look at how actuaries approach bonus distribution than just the use of asset shares. It is to be hoped that, if there are any confidentiality constraints, they will be able to find a way round and publish at least some of their findings.

My own view, from talking to many actuaries about their with-profits business, is that they too view asset shares as a tool, albeit with differing levels of emphasis on asset shares and prospective valuations. This would also seem to be supported by the authors' comments on their survey results.

I now comment about balancing policyholders' reasonable expectations against shareholders' demands, or, as I have said before, maybe it is shareholders' unreasonable demands. It was extremely helpful to hear Mr Allen outline the approach being taken by the regulators, and the principles that they have adopted. Mr Allen's comments are most reassuring from the policyholders' point of view. Asset shares will obviously play a major part in any discussions, and tonight is certainly not the time to argue about who owns the orphan estate.

I am fairly happy, in general, with the managed fund approach that the majority of offices adopt, but the alternative of an increasing fixed-interest element appeals to my theoretical conscience. I believe it is good practice to look at the results for the latter, even if one's office philosophy is firmly the former. I think that it is a help here in applying professional judgement.

I cannot agree more with the comments about the need to communicate with policyholders in an effective manner, and I agree with the authors that asset shares are easier to explain than bonus reserve valuations.

The with-profits market is not dead, and, like the opener, I am a fan of with-profits business. It is just going through what could be described as a bad publicity patch. The life assurance industry and

our profession have been rather poor in getting the message across that, in the last few years, the smoothing process has worked well in maturing policyholders' favour.

Surrender values have not been mentioned much in the discussion. I have a particular interest in surrender values and their relationship with the traded endowment market. The pricing of traded endowments is one of those things that you would choose to do differently if nothing had already been established, but, certainly, purchasing for a fund of such policies, one is trying to look at what you are getting, looking behind the price at the asset share of the policy you are now buying. With an increase in this market, I find a number of actuaries are now discussing both the matters of pricing and the valuation of such policies.

I share the authors' implied view that it is the discipline imposed by having a sound and suitable financial management system that really matters. The developments suggested by the authors make communication easier; and that goes for communication with other actuaries, who are not involved in the day-to-day actuarial area of an office, as well as the management as a whole, although there seemed to be many new or amended definitions to get to grips with, not least the one of 'estate'.

I was pleased that we had so many comments on the subject of risk-based capital, particularly in the area of meeting policyholders' reasonable expectations and statutory requirements. There is clearly much to do in this area, but, as actuaries, we should be able to live with the sensitivity of results to different assumptions, using stochastic processes.

The Senior Vice-President (Mr M. Shelley, F.I.A.): This paper sets out the way asset shares are currently being used by life offices for the control of with-profits business. The authors have done an excellent job of collating this information, and their work will be appreciated by a wide range of people; from those working in the with-profits industry to students and others coming to this subject for the first time.

I am a great believer in the with-profits product. The unique structure of a with-profits office means that, in effect, with-profits policyholders have an investment which gives the benefit of the upside of the equity market with a guarantee, through reversionary bonuses. In practice, this guarantee has been of investment returns in line with the prospective yields on the long-term fixed-interest market. This is a unique investment. In spite of what the authors say about the new derivative-based products, it is difficult to see how any alternative can match a with-profits investment at the price typically charged by an office in terms of deductions from the asset shares.

The different asset share philosophies, in particular the items which are, and are not, included in the calculation, and the different approaches of offices to smoothing, are not widely publicised or, indeed, understood, other than by the offices themselves. Yet small differences can have a significant effect on ultimate policy payouts. The authors commend this on the basis of customer choice. Recent changes on disclosure will do little to make these choices clearer. As an industry, we have to ask ourselves whether the buyers of with-profits policies have the information to make an informed choice. We need to provide this information and help the buyers of with-profits products to understand it if, in the long term, offices are to keep the freedom to make these decisions themselves.

Control of a with-profits fund involves a high degree of judgement in managing the relationship between investment allocations, guarantees, the level of risk-based capital and the office's ability to run down bonuses while meeting policyholders' reasonable expectations. The authors provide an example of the stochastic approach which may be used to improve the actuary's understanding of these complex inter-relations. Their methodology gives an indication of the appropriate level of risk-based capital for a given set of investment allocations, guarantees and a fixed bonus smoothing formula. That is helpful in understanding the effect on risk-based capital requirements of a change in investment allocations or an increase in guarantees, say, through a specific reversionary bonus declaration. I suggest that it is normally more helpful to define the risk-based capital available by considering the capital required for other uses, such as generating new business. The methodology of this paper, then, allows the actuary to view the speed at which it is necessary to run down bonuses in the context of several adverse investment scenarios to confirm that policyholders' reasonable expectations will be met. These might be the 90th/95th percentiles in the investment model.

We have had a most interesting debate, and are indebted to the authors for bringing the subject here for discussion. I should like to express our thanks to them for the work involved.

Mr P. D. Needleman, F.I.A. (replying): If one accepts that, for most forms of insurance savings and investment, an accumulation of the policyholders' premiums less some measure of costs is a reasonable measure of what policyholders might expect to receive back by way of benefits, then the rest is largely a matter of detail. Over 25 years or more, however, that detail can make an enormous difference; hence the need to concern ourselves with the detail, and ensure, where appropriate, that the implications of different approaches are well understood.

We did not intend that our paper should attempt to define policyholders' reasonable expectations for policyholders. Our belief, as we have stated in the paper, is that, in the normal course of business, asset shares are a reasonable starting point. We chose those words quite carefully, although, maybe, they have been interpreted slightly differently by some speakers. We acknowledge that there are many aspects to policyholders' reasonable expectations. We would agree that policyholders' reasonable expectations is a concept, and I think that the important thing is in thinking through what we have referred to as the asset share or the bonus philosophy. That, in itself, should enable the office to help define the concept, and obviously one can only then quantify the numbers once one is clear about the philosophy. From my own perspective, I would suggest that the application of those principles to different situations, and to different companies, may give very different answers.

Some speakers have referred to the practical difficulty in obtaining adequate historic data, and the significant differences that different assumptions can make to the asset share results. Whilst I would acknowledge these difficulties, it should not prevent us from making whatever approximations are necessary, and trying to draw sensible conclusions from the results of our work. We should ensure that we are moving forward in these areas. We like to think, because we are used to calculating prospective type valuations and reserves for other purposes, that we can foresee the future and pick appropriate assumptions in other areas of our work. Of course we cannot, but we do a lot of sensitivity testing, and we draw conclusions from a range of possible answers. I see no reason why the same principles cannot be applied to the work on asset shares.

We struggled, in our paper, to try to ensure that we were developing a framework that could be used equally for a proprietary or mutual office, and we may have, perhaps, caused some confusion as a result in one or two areas. A number of people interpreted our definition of the estate to imply ownership for shareholders, and that was certainly not the intention.

Mr Gupta and Mr Wright both expressed reservations regarding comments, in ¶3.1.11, about enhancing payouts for competitive reasons. The response from them and the audience is interesting; perhaps we would be honest to admit that, in the past, a significant element of our decisions on bonuses was driven by competitive pressures as much as by anything else. This may well have been true over a period when techniques for defining payouts were shifting from more traditional techniques to using asset shares, and, with the absence of detailed internal research, there was more scope for discretion. Now, as we move forward to a period where we all have better information and have developed our thinking, if the profession as a whole and individual actuaries feel it is not appropriate, then we have fewer excuses for adjusting bonuses merely due to competitive pressures.

There were several comments about the presentation and the use of risk-based capital. The key points were, first, not to include margin on margin. I would agree with that. Mr Hewitson pointed out that there is a significant amount of capital tied up in the statutory valuation reserves, and one should not ignore the strength there when one is considering any additional margins on top. One speaker preferred not to include the risk-based capital within the value of the in-force business, but to include it within the free capital. We prefer to distinguish between the two, the concept being that risk-based capital is really the capital that, in the real world, you need to hold back to manage your business. It is not sufficient to run a business just on the minimum regulatory capital, either for regulatory purposes or for competitive reasons.

We feel that it is helpful to try to distinguish between what is truly free capital that would be available, perhaps, for investing in a new venture, in non-admissible assets or in other potential opportunities which may benefit the office in the long term, compared with the capital that is needed to support the existing business in one form or another.

There was much comment on smoothing methods. It was interesting to hear that there was more support than we might have expected for the concept of adjusting the asset mix, investing more in fixed-interest as policies get closer to maturity.