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GUARANTEED ANNUITY OPTIONS: FIVE ISSUES FOR RESOLUTION

By C. D. O'Brien

ABSTRACT

This paper considers five issues arising from guaranteed annuity options in pension policies issued by United Kingdom life assurance companies. These are the investment strategies for such options, the implications for bonuses on with-profits policies, the measurement of the solvency position and preparation of accounts of the companies concerned, and the policy debate on compulsory annuitisation. In particular, the paper highlights the impact of improving mortality on the value of options, comments on the House of Lords judgment in the Equitable Life case, and suggests additional disclosures in the accounts of life assurance companies.

KEYWORDS

Guaranteed Annuity Options; With-Profits Policies; Solvency; Accounting

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1. Introduction

1.1 *Purpose*

The purpose of this paper is to set out five key issues relating to guaranteed annuity options (GAOs) provided by (certain) United Kingdom life assurance companies.

1.2 *Plan*

1.2.1 Section 2 sets out the background, describing the options and assessing their significance.

1.2.2 The key issues then considered in relation to GAOs are:

Section 3. What are the possible investment strategies?
Section 4. How to determine bonuses on with-profits policies?
Section 5. How to measure the solvency of such a company?
Section 6. How to prepare the accounts of such a company?
Section 7. Should the rules on compulsory annuitisation be relaxed?

Section 8 contains some concluding comments, and there is an appendix, which describes the statutory solvency valuation.

2. Background

2.1 *Operation of Guaranteed Annuity Options*

2.1.1 GAOs are options available to holders of certain pension policies. They typically operate as follows.

2.1.2 The policyholder pays either a single or a regular premium, securing a guaranteed benefit at a specified age (referred to in this paper as the retirement age, although it might not coincide with actual retirement) or ages. The guaranteed benefit may be:

(a) an amount of cash, with an option to convert to an annuity at a guaranteed rate; or
(b) an amount of annuity, with an option to take cash as an alternative at a guaranteed conversion rate.

While, strictly, only (a) has a GAO, we also consider (b) as a GAO, as the financial effect on the policyholder is generally identical.

2.1.3 Where the policyholder takes the benefit in cash form, this has to be used to buy an annuity, either with the original or another insurer, except to the extent that Inland Revenue regulations allow cash (which is tax-free) to be taken. Income drawdown can be used to defer purchase of the annuity until age 75.

2.1.4 Bolton *et al.* (1997) surveyed U.K. life assurers, estimating that the responses covered at least 90% of the market by liabilities. Of the 106 contracts where the survey showed the guaranteed annuity rate for a male retiring at 65, the annuity per £1,000 cash is shown in Table 1.

2.1.5 A point of historical interest is that Equitable Life adopted a set of bye-laws in the 1770s, laying down the maximum amount of annuity which could be paid; this depended on age, but with an overall maximum of 10% at ages over 70 (Ogborn, 1962).

Table 1. Guaranteed annuity rates

Annuity (£ p.a. per £1,000)	Number of contracts
114 or more	5
108-114	46
102-108	12
97-102	24
93- 97	10
93 or less	9
	106

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Table 2. Type of business with guaranteed annuity options

	Individual	Grouped individual	Other group	Total
Traditional (mostly with-profits)	60.0%	11.8%	8.5%	80.2%
Unitised with-profits and unit-linked	13.9%	2.1%	–	16.0%
Other				3.8%
Total				100.0%

2.1.6 Bolton *et al.* (1997) also showed that the business was largely, but not exclusively, with-profits, the proportion of liabilities of business with GAOs being as in Table 2. This paper, therefore, concentrates on the issues relating to with-profits policies.

2.1.7 Some policies specify that the GAO is only available if the annuity is taken in precisely the one form specified in the policy. This means that there is no guarantee if an alternative form of annuity (e.g. 'escalating', i.e. with annually increasing payments) is taken. Other policies apply a comparable guarantee to the alternative forms of annuity. Similarly, some policies restrict the guarantee to the specified retirement age; others are more generous.

2.1.8 There is evidence of guaranteed annuity options being issued in 1839 (Historic Records Working Party, 1972). Our current concern relates to pensions business sold in the 1970s and 1980s. However, of the contracts which Bolton *et al.* (1997) surveyed, 35 ceased to be sold only during the 1990s, and 11 were still being sold at the time of the survey. This is at least partly because a number of policies allowed incremental contracts to be effected with GAOs.

2.1.9 Much of the business with GAOs is personal pension business, including retirement annuities for the self-employed and those without occupational pensions. However, they also cover some policies effected under money purchase occupational pension schemes, executive pension arrangements and AVCs (additional voluntary contributions).

2.2 *Significance*

2.2.1 In 1998 the Government Actuary's Department carried out a survey of life insurance companies' exposure to GAOs. The results indicated that: "the exposure to GAOs was relatively widespread within the industry and had the potential to have a significant financial effect on a number of companies" (Treasury, 1998).

2.2.2 The Bolton *et al.* (1997) survey showed that the liabilities (in the statutory solvency valuation) for contracts with GAOs were £35bn (of which the liabilities for the options themselves would be only a part), compared with total long-term insurance business liabilities of £304bn.

2.2.3 Collier (1998) referred to an estimate of liabilities for contracts with GAOs of perhaps £40 - 50bn; on top of this would be the liabilities for the GAOs themselves, which could be 60% of this, i.e. £24 - 30bn. However, this last figure could be reduced as a result of a change in the way in which bonuses are calculated. Wilson *et al.* (2000) referred to liabilities for contracts with GAOs of £40bn, with estimated liabilities of the options being £10bn.

2.3 *The Current Position*

2.3.1 For policyholders retiring now, it will usually be advantageous to exercise a guaranteed annuity option. For a male age 65, the current market rate for an annuity payable monthly, of a level amount, and with a guaranteed term of five years, from a £100,000 single premium is £8,706 p.a., this being the average of the rates of the top five companies (source: www.annuitydirect.co.uk, 1 October 2001). Therefore, if we consider typical guaranteed annuities (from ¶2.1.4) of £11,111 or £10,000 p.a., these represent enhancements of 28% or 15% respectively above the market rate.

2.3.2 However, some policyholders will not exercise the option fully:

— they may take part or all of the benefits as tax-free cash (see ¶2.3.3 to 2.3.6);
— they may choose to take an annuity to which the guarantee does not apply (see ¶2.3.7); or
— they may choose an 'impaired life annuity' which offers better than the guaranteed rate. However, if impaired life annuities attract large numbers of those with a lower than average expectation of life, we expect standard annuity rates to be lower than otherwise, and the mortality of those continuing to exercise GAOs to be lighter than otherwise. Hence, GAOs can still be a substantial cost to life offices.

2.3.3 Most policies will allow some or all of the proceeds to be taken as tax-free cash up to the limit set by the Inland Revenue. There is a range of conditions regarding this. For many policies, the proportion which can be taken as cash is 20-25%. In the case of policies effected under occupational pension schemes, the individual's earnings at retirement may be such that all of the benefits can be taken as cash. For some AVC policies and appropriate personal pension schemes, all the benefit has to be taken as an annuity.

2.3.4 There are a number of reasons for taking cash up to the permitted limit:

— this reduces the mortality risk: the cash is then an asset of the policyholder, which, if he or she dies, passes to his/her estate; as distinct from an annuity which ceases on death;
— policyholders have the choice of how to spend or invest the cash, as opposed to the relative inflexibility of an annuity;

— credit risk is reduced: an individual may have a significant part of his wealth in his pension; the pension scheme finances may be insecure; hence taking cash reduces this exposure; and
— it is tax-free.

2.3.5 The tax-free nature of the cash means that, even if the policyholder wishes to have an annuity, he may be better off by still taking the (tax-free) cash and using it to buy a purchased life annuity (PLA). Part of each annuity instalment under a PLA is regarded as a return of the capital used to buy it, and this part, the 'capital element', is tax-free. This is an advantage compared with an annuity arising from a GAO; or from a compulsory purchase annuity (CPA), where the cash fund under the policy has to be used to buy an annuity, because otherwise the Inland Revenue limits on cash would be exceeded. In both of these cases (guaranteed annuity and CPA) the annuity is fully taxed. However, the benefit of a PLA is reduced somewhat, as PLA rates are lower than CPA rates because PLA policyholders tend to live longer than CPA policyholders (Continuous Mortality Investigation Bureau, 1999), consistent with the principle of adverse selection.

2.3.6 We can see in Table 3 some specimen guaranteed annuity, CPA and PLA rates (annuities per £10,000 cash fund). The table shows the annuity net of tax. In this example, a 40% taxpayer (but not others) would be better off choosing a PLA rather than the guaranteed annuity. Hence, companies with a relatively high proportion of higher rate taxpayers may expect a lower take-up of the guaranteed annuity (though, of course, the tax rules may change).

2.3.7 The annuity market has seen a number of innovations in recent years, including the development of with-profits annuities (see Wadsworth *et al.*, 2000). These may bring advantages to policyholders compared with standard annuities, for example by including an element of equity investment which may suit the policyholder's requirements. They may, therefore, be

Table 3. Annuities and tax rates

Tax rate t	0%	20%	40%
Guaranteed annuity [(1)]	1,111.11	888.89	666.67
Compulsory purchase annuity [(2)]	894.24	715.39	536.54
Purchased life annuity [(2)] — gross	804.88		
Capital element	569.19		
Net annuity [(3)]	804.88	757.74	710.60

[(1)] Example rate (see ¶2.1.4)
[(2)] From a leading life office
[(3)] Capital element plus [$(1 - t) \times$ (Purchased life annuity minus capital element)]

preferred to guaranteed annuity rates, even if the latter are more generous than standard CPA rates available on the market. However, the new products may also have potential downsides, such as reducing bonus rates if there are significant mortality reductions.

2.3.8 There are other circumstances where the guaranteed annuity may not be taken up. The policyholder may die before retirement; or his circumstances may change, perhaps no longer being eligible to pay premiums or unable to afford them; the outcome may be making the policy paid-up or transferring the benefits to another arrangement. It could also be that the policyholder retires at an age where the guarantee does not apply, perhaps increasingly likely as compulsory retirement ages disappear; or he may have to take an annuity which is (at least partly) subject to limited price indexation, where the GAO may well not apply. In addition, policies have different conditions about how the GAO may or may not apply if a spouse's annuity is taken, and the outcome may be that the GAO is not exercised in relation to the whole of the benefits.

2.4 *Future Outlook*

2.4.1 It is common to regard GAOs as being a problem of low interest rates. However, annuity rates declined during the 1990s, partly to reflect lower interest rates, but also because of improving mortality. Since we expect mortality to continue to improve, this means that we expect GAOs to be more valuable to policyholders reaching retirement in the future than is the case now, assuming interest rates remain unchanged.

2.4.2 We wish to calculate market annuity rates on alternative assumptions. These can then be compared with specimen guaranteed annuity rates. It is helpful to make a number of simplifying assumptions. The expenses and profit of the life insurance company offering the annuity are ignored. The annual interest rate i, used in discounting, is assumed to be constant. We begin by assuming that the annuity is payable annually, beginning one year after retirement. The amount of annuity is constant while it is being paid.

2.4.3 In assessing the value of GAOs, mortality assumptions are critical. Consider:

— What is the level of mortality appropriate to policyholders retiring now (see ¶¶2.4.4 and 2.4.5)?
— What is the reduction in mortality rates in the future which it is appropriate to assume (see ¶¶2.4.6 and 2.4.7)?

2.4.4 We need to express mortality rates in some way. Let q_x be a mortality rate, i.e. the probability that a male aged x dies in the next 12 months. Then ${}_tp_{65}$ is the probability that a 65-year-old survives t years $= (1 - q_{65})(1 - q_{66}) \ldots (1 - q_{64+t})$. We derive q_x, $x \geq 65$, from the mortality experience of pensioners of life offices, the PMA92C20 table (Continuous

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Mortality Investigation Bureau, 1999), updated to reflect experience in 1995-98 (Continuous Mortality Investigation Bureau, 2000) and further (approximately, using population mortality data) to make it relevant for 2001. Let us refer to this series of q_x as $M(1.0)$. By $M(f)$ we mean a series of q_x, where the age-specific mortality rate is $f \times M(1.0)$, f being a constant.

2.4.5 We also show results for an alternative mortality assumption $M^a(1.0)$, based on the RMV tables which reflect experience of retirement annuitants (Continuous Mortality Investigation Bureau, 1999). Many policies with GAOs fall into this category. The mortality data for this table are based on lives not amounts of annuity. This is an issue, because we know that the life office pensioner tables show markedly lower mortality when using amounts of annuity rather than lives, i.e. those with large annuities live longer (Continuous Mortality Investigation Bureau, 1999). The figures using M^a may, therefore, overstate the annuity, which is consistent with retirement annuitant experience.

2.4.6 We also need to consider how such current mortality rates will reduce in the future. Let g be an improvement factor indicating that all mortality rates will reduce by a proportion g each year.

2.4.7 There are a number of approaches to projecting mortality rates. They mostly assume that improvements will reduce over time; hence g is an approximation to a more complex pattern of improvements. The Continuous Mortality Investigation Bureau (1999) prepares factors for mortality improvements; for a male now aged 65, they are the equivalent of annual reductions in mortality rates of around a little above 1%. The Government Actuary (2000) prepares population forecasts which have mortality assumptions: the comparable reduction factors are about twice as high; the same is true of Willets' (1999) projections of mortality rates. Willets also considers the mortality improvement factors in Sithole *et al.* (2000), which, for a 65-year-old male, are between the CMIB factors and his own. We later (¶2.4.10) show the effect of g being 1%, 2% or 3%.

2.4.8 The price of an annuity can be given by the present (discounted) value of future payments, which depend on the probability that the policyholder is alive. Therefore, the market annuity rate per £1,000 purchase price is:

$$\frac{1{,}000}{\sum_{t=0} {}_tp'_{65}/(1+i)^t}$$

where:

$${}_tp'_{65} = [(1-q_{65}][1-q_{66}(1-g)^1]\ldots[1-q_{65+t}(1-g)^{t-1}]$$

and where the calculation basis can be expressed as $A(i, M(f), g)$. For example, $A(0.05, M(0.8), 0.02)$ gives the annuity rate at 5% p.a. interest using

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Table 4. Annuity values on alternative assumptions

Annuity (£ p.a.) per £10,000 cash

	i	3%	4%	5%	6%	8%	10%
M	*g*						
M(1.0)	1%	702	769	839	910	1,055	1,204
M(1.0)	2%	669	738	810	882	1,030	1,182
M(1.0)	3%	634	706	779	853	1,006	1,161
M(0.8)	2%	625	695	767	841	992	1,146
M^a(1.0)	2%	653	725	798	872	1,024	1,178

80% of the mortality rates referred to in ¶2.4.4, with 2% p.a. improvements in mortality.

2.4.9 We adjust the formula so that the annuity is payable monthly, commencing on the retirement date, and with payments guaranteed for a minimum of five years, even if death takes place in that period.

2.4.10 We can then show some specimen calculations, as given in Table 4. We see that a guaranteed annuity of, say £1,111, is more valuable than market rates, on the above mortality assumptions, when interest rates are 8% or below. Hence, the value of the guarantee is not merely a reflection of long gilt yields being at their current level of around 5%, but also because mortality has improved to a far greater extent than was envisaged in the past. We also comment that any consideration of the value of GAOs must consider the precise assumptions about mortality and the rate at which it is expected to improve.

2.4.11 We can regard *M*(0.8) in 2 ways: as relating to:

— an annuity where mortality is expected to be lower than average; or
— an annuity beginning in a number of years' time when mortality is expected to be lower than now.

However, policyholders reaching age 65 in a few years' time may be expected to experience lower mortality improvements than those currently reaching age 65, owing to the cohort effect on mortality described by Willets (1999).

2.4.12 Current market annuity rates appear generous when compared to the calculations above, given the level of gilt yields. Part of the reason is that life offices invest part of their funds in corporate bonds to improve their yields above that on gilts, and reflect this in annuity pricing.

3. Investment Strategy

3.1 *Introduction*

3.1.1 The typical with-profits fund has a mixture of investments. Holtham (2000) referred to an average asset mix relating to with-profits benefits as 63% equities, 9% property, 23% fixed-interest and 5% cash and

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other. Bolton *et al.* (1997) found that the great majority of companies (then) took no account of annuity guarantees in setting investment guidelines.

3.1.2 This reflects the general practice of regarding with-profits business as largely an equity (including property) investment. The expectation was that, if investment performance was lower than assumed, then surplus (and the profits for distribution as bonuses) would be lower than otherwise; the prospect that the guaranteed benefit would exceed the amount accumulated on a policy was regarded as very low.

3.1.3 The investment issue for life offices is how to provide for the greater of a cash sum and an annuity. Consider a single premium of £1,000 and ignore expenses. The guaranteed cash sum at retirement in 15 years' time is, we assume, £1,448, representing a guaranteed return of 2.5% p.a., and the guaranteed annuity is, say, £1,448 × 0.111 = £161 p.a. Say that investment returns, net of costs, have been 10% p.a., which means that the cash sum accumulated by retirement is £4,177. If annual bonuses have been declared at 5% p.a., that means that the guaranteed cash sum is £3,011 and the guaranteed annuity is £335 p.a.

3.1.4 If interest rates change at retirement to 5%, then the market value of an annuity of £810 p.a. is £10,000, using $A(0.05, M(1.0), 0.02)$, ignoring expenses and profit. The change in financial conditions has resulted in the guaranteed annuity of £335 p.a. having a cost of £$335 \times 10,000/810$ = £4,135, higher than the guaranteed cash sum of £3,011. It is almost more than the office can afford from the accumulated premiums (£4,177).

3.1.5 If the life office believed that the annuity was a more valuable benefit than cash, then it could invest in longer-term bonds, the value of which is interest-sensitive. Such an approach may not sit easily with any representations made to policyholders about the extent of equity investment underlying the policy. It also means that the office is running a risk that interest rates may turn out to be high at retirement, in which case its assets may have a lower value than needed to meet guaranteed or reasonably expected payments to policyholders.

3.2 *A Derivative Approach*

3.2.1 One approach is for the office to purchase a derivative to help it secure its liabilities. Developments in markets have made this easier than previously, and it is understood that a number of offices have discussed the position with the Financial Services Authority, so as to ensure that the approach taken meets the regulator's requirements.

3.2.2 Say the office buys a receiver swaption. This is a derivative which, in return for a sum paid now, gives the life office an option to enter into an interest rate swap in the future (when policyholders with GAOs are due to retire). The 'swap' is of cash flows based on C_n ($n = 2002, 2003$, etc.) where C_n is the (estimated) cash sum payable to GAO policyholders due to retire in year n. The cash flows are:

— the life office pays interest on C_n based on LIBOR (say), being a (variable) rate which it can afford;
— it receives interest on C_n at a rate specified in advance, this could be the rate at which the GAO becomes valuable;
— such interest payments last for the expected duration of the annuities; and
— such cash flows relate to a series of C_n, $n = 2002, 2003$, etc.

When interest rates are low, the office is then more likely to exercise the option to swap to receive the fixed rate. The derivative is therefore an investment which increases in value in such circumstances, offsetting the increase in the value of GAO liabilities which low interest rates cause.

3.2.3 This suggestion is referred to by Bolton *et al.* (1997); Collier (1998) and Wilson *et al.* (2000). Van Bezooyen *et al.* (1998) also discuss derivative strategies to hedging GAOs, although not specifically relating to with-profits policies.

3.2.4 There are several practical (and important) issues in arranging such a derivative, referred to by Collier (1998) and by Wilson *et al.* (2000). In particular:

— market capacity for offering such derivatives is limited;
— insurers will see such derivatives as 'expensive' compared with the expected cash flows;
— it is more difficult to obtain cover (or it becomes more expensive) of large amounts;
— the insurer may reduce the cost of the derivative by agreeing to receive interest at a rate lower than that implicit in the GAO, but accordingly has less protection;
— the insurer may reduce the cost of the derivative by not purchasing cover for the proportion of the business where it is expected that the policyholder will not exercise the GAO, e.g. through early surrender or taking cash. However, while matching its liabilities on such a 'realistic' basis, it may have to set aside further monies to meet a higher figure of GAO liabilities calculated on a more prudent basis in the statutory solvency valuation (see Section 4);
— the insurer needs to protect itself from counterparty risk; and
— the value of the derivative purchased would not be fully admissible (see Appendix) if the cover C_n exceeded the guaranteed cash sum; this implies that further derivatives should be bought as bonuses are declared. The office has also to consider the impact, through the FSA regulations, on the valuation of liabilities.

3.2.5 If such a derivative were purchased, this is an investment of the with-profits fund. The investment will perform 'well' if, at the time the annuities commence, interest rates are lower than anticipated and the option

is 'in the money'. It could have outperformed an equity investment. Alternatively if, at retirement, interest rates are high, the derivative may turn out to be valueless and would have turned out to be a 'poor' investment (with the benefit of hindsight).

3.2.6 What kind of payout is the office looking for from the derivative? Consider three types of derivative, each with a different value at retirement:

(1) the excess of the cost of the guaranteed annuity on market rates over the greater of the cost of the guaranteed annuity at the guaranteed rate and the asset share;
(2) the excess of the cost of the guaranteed annuity on market rates over the cost of such an annuity at the guaranteed rate; or
(3) the excess of the cost of an annuity on market rates compared with the guaranteed rate, applied to the asset share;

where the asset share is that part of the assets of the long-term business fund attributed to the policy, excluding the value of the derivative which has been effected. Note that (1), (2) and (3) is not a full list of the possibilities.

3.2.7 Derivatives (1), (2) and (3) are in increasing order of payouts. We can illustrate the payouts as follows. Consider, from the example in ¶3.1.3, a guaranteed annuity of £335 p.a. and where £10,000 cash buys an annuity of £810 p.a. on the market, but £1,111 p.a. under a GAO. Say the asset share is either £4,000 or £5,000. Then the payouts under the derivatives are (with a minimum of zero) as in Table 5.

3.2.8 While it is feasible to purchase derivative (2) on the market (excluding the mortality risk), (1) and (3) depend on the asset share, reflecting the life office's asset mix and investment performance. Here, such a derivative cannot be bought precisely.

3.2.9 What derivative is appropriate depends on what is the payout to the policyholder under the contract. This may not be well defined, instead referring to a distribution of surplus. The lack of clarity in the definition of the with-profits contract has been recognised by the plans in Association of British Insurers (2000), and is discussed by Clay *et al.* (2001). Offices will also

Table 5. Derivative payouts

Derivative	Asset share = £4,000	Asset share = £5,000
(1)	$335/0.0810 - \max.[335/0.1111, 4{,}000] = 135$	$335/0.0810 - \max.[335/0.1111, 5{,}000] = 0$
(2)	$335 \times (1/0.080 - 1/0.1111) = 1{,}121$	1,121
(3)	$4{,}000 \times (0.1111/0.0810 - 1) = 1{,}486$	$5{,}000 \times (0.1111/0.0810 - 1) = 1{,}858$

Notes: Derivative (1) has no payout if the asset share exceeds the market cost of the guaranteed annuity; derivative (3) is the type of asset corresponding to how a GAO would operate under a unit-linked policy.

need to take into account the House of Lords judgment in the Equitable case in 2000 (see ¶¶4.4.17, 4.4.21).

3.2.10 Given offices' mix of bonds and equities, it may be that the concern is a combination of low equity prices and low interest rates, suggesting that puts on the equity market could be combined with receiver swaptions. This suggestion is referred to by Collier (1998), who also mentions the possibility of buying protection against rising yields.

3.2.11 Dunbar (1999a) quotes an estimate of swaptions hedging about £10 - £15bn of liabilities, this being the present value of cash liabilities under the policies concerned being hedged by swaptions.

3.3 *Embedded Derivatives*

3.3.1 An insurer may, as an alternative, obtain the relevant protection by embedding derivatives in:

— a reassurance contract; or
— a bond (see ¶3.3.2).

3.3.2 Dunbar (1999b) refers to some insurers having bought tailor-made bonds. In particular, he describes in detail the bonds issued by the European Investment Bank and the European Bank for Reconstruction and Development, arranged through Morgan Stanley Dean Witter. Scottish Widows appears to have been the sole investor. The bonds were carefully structured to hedge a portfolio of guaranteed annuity cash flows. The payment by Scottish Widows was £0.53bn on each of the 2 bonds.

3.3.3 In considering whether to purchase swaptions, reassurance or a bond, a life office will be looking for the right amount of protection, taking into account the cost and the risk that the protection may fail. In particular, some of the issues it will consider are:

(a) counterparty exposure and risk (and the collateralisation arrangements to reduce risk, which may have an associated cost);
(b) the impact of the statutory solvency rules, including the admissibility of the asset;
(c) flexibility; the ability to change the protection as the exposure changes;
(d) the ability to value the asset satisfactorily;
(e) ease of execution and simplicity of documentation;
(f) the ongoing ease and cost of administering the arrangement;
(g) confidentiality; and
(h) protection against longevity risk may or may not be required (and may be perceived as expensive).

3.4 *Options within the Fund*

3.4.1 Companies issuing policies with GAOs were effectively writing derivatives; making options available to policyholders. It might be thought that the liability could have been hedged by buying a derivative externally;

this was not, in practice, done when the policies were issued. Indeed, this was not feasible; such derivatives were not available in the 1970s and 1980s, and they were not catered for in the Insurance Companies Regulations as they stood.

3.4.2 The question then arises: "If there was no external hedge, who provided the backing for the derivative (i.e. GAO) which the companies issued?" This could be one or more of the following:

— the estate, being broadly the excess of the assets in the long-term business fund over the liabilities (realistically calculated) (see ¶3.4.3);
— the with-profits policyholders without GAOs, perhaps distinguishing between life and pension policies (see ¶3.4.4);
— the policyholders with a GAO (see ¶3.4.5); or
— in a proprietary company, the shareholders.

3.4.3 Some would say that the estate represents the free assets of the office and is the appropriate party for this transaction. The role of the estate is confirmed by the Treasury (1998), although it does not rule out other possibilities:

> "Where the long-term fund [as opposed to shareholders' funds] is used, we would in the first instance expect to see the cost met out of any "estate" held by the company. However, where the cost is significant relative to the estate available, then an insurer may wish to consider adjusting the future bonus allocations for some or all of the participating policyholders, or by making a transfer to the long term fund from the shareholders' fund."

3.4.4 If the other with-profits policyholders are providing the option, then the derivative is an investment of such policyholders, and a change in its value would affect the surplus relating to and, presumably, bonuses on such policies; which may not be an understood and acceptable risk.

3.4.5 There is an argument that policyholders with GAOs should themselves bear some of the risk. If interest rates at retirement are low, do not GAO policyholders gain twice if they have the valuable annuity as well as benefiting from high bonuses reflecting bond appreciation (and, quite likely, some related appreciation of equities)? It can be argued that it is therefore appropriate to restrict the policyholders' benefits to those consistent with derivative (1). The residual risk of the asset share being less than the cost of the guaranteed annuity would be met by the estate.

3.4.6 Clearly, it would have been far better if these issues had been determined at the outset and communicated to policyholders in a transparent way, together with implementation by the life office of an investment strategy which is consistent with this, and a risk management process.

3.5 *Issues for Resolution*

Each office with a GAO needs to determine:

— what is the form of contract with the GAO policyholders;

— what is the investment strategy for hedging the guarantees and what, if any, derivatives, are purchased; and
— what is the impact on other parties of the guarantees which have not been hedged?

4. Bonuses

4.1 *Introduction*

4.1.1 Setting bonus rates on with-profits policies is the responsibility of the directors of the life office, advised by the company's Appointed Actuary. The Faculty and Institute of Actuaries issue professional guidance to actuaries, including the requirement to take into account 'policyholders' reasonable expectations' in bonus recommendations.

4.1.2 Involving the courts in this process has been rare. The case of Baerlein v Dickson in 1909 (*Times Law Reports*, **2**, p585-588; also see Moss (2000)) related to Standard Life declaring no bonus for a period; the court upheld the directors' decision. The Equitable Life case was decided by the House of Lords in 2000, supporting the policyholder.

4.2 *Bonuses and Asset Shares using Derivatives*

4.2.1 We start from the premise that policyholders receive benefits purchased by the premiums which they pay, and that bonuses are calculated so that this is the case. It takes the view that one of the benefits received by GAO policyholders is the guarantee, whether or not this turns out to be valuable at retirement, and it is implied that such policyholders should pay for this (like any other) benefit.

4.2.2 Terminal bonuses are usually calculated so that the payment to the policyholder is about equal to the (smoothed) asset share. The asset share is the accumulation of premiums at the investment return earned on the relevant assets, minus tax (if applicable), and with deductions for the cost of other benefits received. Such cost includes expenses, death claims, transfers to shareholders in a proprietary company and, in principle, the cost of guarantees. With-profits policies may also share in the miscellaneous profits or losses of the company. The asset share approach is described more fully by Needleman & Roff (1995) and by Lister *et al.* (1999).

4.2.3 The GAO is a benefit that can be costed as the price of a derivative, as described in Section 3.2. In other words, we invest part of the premium(s) in a receiver swaption rather than in other investments. The value of the swaption is part of the asset share. If the swaption is not bought externally, we can still calculate the asset share in this way, but recognise that there is a counterparty elsewhere in the fund (see Section 3.4). Ideally, the pricing of the swaption for this purpose would, nevertheless, be based on the market value if it had been bought externally.

4.2.4 We work on the assumption that the terminal bonus rate to be declared is that which is supported by the asset share, which will include the value at the retirement date of the derivative. This paper does not deal with the issues arising from smoothing.

4.2.5 Hare *et al.* (2000) considered guaranteed cash benefits on long-term insurance policies, and the cost of guarantees. Their suggestions can be extended to GAOs. Here, we restrict the discussion to GAOs costed using the price of a derivative.

4.2.6 This paper does not investigate whether any company's policy conditions and other representations are inconsistent with this approach; if so, the conclusions would not apply.

4.3 *Questions in Determining Payouts*

4.3.1 We now consider the questions to be answered when determining payouts to policyholders. The reader is reminded that derivatives (1), (2) and (3) were defined in ¶3.2.6.

(a) What assets are attributed to the policy, which may be consistent with derivative (1), (2), (3) or some other, whether a derivative has been bought externally or not?
(b) In attributing assets from the derivative asset, is the derivative covering:
    — the whole of the policy benefits, if taken as annuity;
    — that part of the benefit taken as guaranteed annuity by the policyholder in question; or
    — that part of the benefits taken as guaranteed annuity by GAO policyholders more generally?
(c) What charge is made for the purchase of the derivative?
(d) Does the terminal bonus rate depend on the policyholder's choice of guaranteed annuity or cash?

4.3.2 In answering (a), it may be argued that derivative (1) is consistent with the ordinary operation of a with-profits policy. If interest rates drop, the value of the guaranteed annuity increases, the excess of the assets over liabilities reduces, so there is less surplus to distribute as bonus. Hence, reduced bonus rates offset the value of the guarantee.

4.3.3 When policies with GAOs were written in the 1970s the cash option was seen as the major benefit. The policy may, indeed, have contained several guaranteed amounts of cash, applicable at different retirement ages. The level of the guarantees was such that the expectation was that, if investment conditions were less favourable than assumed, the result was likely to be bonuses lower than otherwise, rather than the guarantees 'biting'. Specifying the annuity amount helped the policyholder to understand what he was buying. Life offices may well have regarded GAOs as also operating

such that bonuses would be lower than otherwise if mortality or investment conditions changed adversely.

4.3.4 If the assets backing the policy were wholly bonds with a duration that matched the length of the annuity instalments, a drop in interest rates would lead to an increase in the value of the assets that matched the guaranteed annuity liability. No payment from the derivative would be needed, as the assets were already matched: derivative (1) is consistent with this, giving no value at retirement. Arguably, (2) and (3) would be providing 'excessive' cover. Normally, the asset mix for with-profits business will include some long-term bonds and will include equities, the return from which generally has some positive correlation with that on bonds. Such an argument may again imply that the cover under derivatives (2) and (3) is more than necessary.

4.3.5 Derivative (1) is also consistent with GAO policyholders effectively bearing some of the risk, as set out in ¶3.4.5.

4.3.6 Collier (1998) comments:

> "I do not think that policyholders would argue against an increase in the terminal bonus as a result of a successful investment strategy. The contrary argument should therefore apply when an unsuccessful investment strategy has been adopted. However, the profession should ask itself whether the significant investment exposure arising from these guarantees was by design or was the unwanted consequence of a period of neglect."

4.3.7 Some life offices offered policies where the policyholder could choose either a with-profits or a unit-linked investment. Even where the with-profits benefit carried a GAO, it was uncommon for this to apply if unit-linked benefits were chosen. Consider why this may have been (¶¶4.3.8, 4.3.9).

4.3.8 A GAO on a unit-linked benefit would relate to the whole of the fund. This is risky; an increase in the value of equity investments (generally a desirable objective) increases the value of the GAO. Such an approach is consistent with the relatively expensive derivative (3) applying to the asset share of a with-profits investment. Therefore, one reason for offering GAOs on with-profits, but not unit-linked, investments is that the with-profits GAO was regarded as consistent with derivative (1) or (2), where the GAO is less risky and has a lower cost.

4.3.9 The position may be more complex than this, for unit-linked benefits may have been written by, or reassured to, a non-profit fund which, in a proprietary company, may have been financed by the shareholders. Not offering GAOs on unit-linked benefits may have been the result of the non-profit fund having a relatively low surplus and therefore less able to support granting options, and/or the shareholders having a lower appetite for the risks in granting options than the policyholders of the with-profits fund.

4.3.10 The Bolton *et al.* (1997) report suggested a number of ways in which the costs of GAOs could be met by policyholders (where there are

questions of how the cost is spread across generations and policy types) and/or the estate. The survey in the report asked offices whether they would consider reducing terminal bonus rates to compensate for a guarantee which was biting. Only four offices said yes (there was also a small number which said yes to making an allowance in asset shares). The report suggested that, as the costs initially were relatively low, offices had not developed fully their position on how bonuses may be affected. A number of the survey responses also indicated that their approach to meeting GAO costs would be adjusted should the costs become material. It may well be that, at the outset, offices adopted a position consistent with derivative (3), and then changed to (1). The former approach is generous, the latter arguably more logical. However, if the product structure had been more transparent, the position would have been established before the guarantees began to bite.

4.3.11 The actuarial profession indicated that there were a number of acceptable approaches to determining bonuses for GAO policies. The Faculty and Institute of Actuaries Life Board (2001) referred to the following extract from a briefing statement it issued in 1999:

> "... in this case the policyholder is likely to receive the full value for the funds built up to support the policy, regardless of whether they take a cash option or pension option under the policy. The final bonus rates for individual policies will be set so that the accumulated fund equals the cost of the annuity provided. ... The guarantee will still bite if final bonus rates fall to zero."

4.3.12 The Treasury (1998) indicated that:

> "Generally, we consider that it would be appropriate for the level of the charge deemed to be payable by participating policyholders for their guarantee (or annuity option) to reflect the perceived value of that guarantee (or option) over the duration of the contract. This could be achieved in some cases through some reduction in the terminal bonus that would be payable if there were no such guarantee (or option) attached to the policy. However the selected treatment by each office would need to depend on the wording of the contract involved and how it had been presented to policyholders."

4.3.13 The author concludes that:

— GAOs are a benefit which policyholders ought to expect to pay for in some way;
— there is logic in the argument that bonuses should be lower than otherwise if surplus is depleted by an increase in the value of GAO liabilities; and
— there are a number of arguments favouring an interpretation that payouts under GAO policies should be consistent with derivative (1).

4.3.14 These conclusions are consistent with the views of the actuarial profession and the Treasury, as expressed before the House of Lords decision on Equitable Life. After the decision, the Treasury letter was withdrawn

and the briefing statement of the Faculty and Institute of Actuaries Life Board (2000) was amended to indicate that it may no longer be possible to calculate bonus rates as expected.

4.3.15 Questions (b) and (d) in ¶4.3.1 are related to the issue of differential bonuses, considered in ¶¶4.4.12 to 4.4.15.

4.3.16 Question (c) asks what cost should be attributed to the derivative. We bear in mind that derivatives were not purchased externally at the outset. Some possibilities are:

— the cost for the guarantee, as originally estimated, if indeed it was estimated, noting that some companies did charge for the guarantee in this way;
— an estimate made now of the charge for the guarantee (see ¶4.3.17); or
— the actual cost at the time the protection was bought.

4.3.17 It can be argued that, had swaptions been purchased in the 1970s and 1980s, the cost would have been very low, reflecting the then high interest rates. This implies that, if the cost of the swaption were charged to the policyholders through asset shares, there would have been only a small deduction from the premiums for this. However, we have to bear in mind:

— The market did not (was not prepared to?) issue such cover, so how low was the true cost?
— The then outstanding term to retirement was high, which option pricing theory suggests would lead to a higher cost than otherwise.

4.3.18 Many companies made no charge for the guarantee in the past. This is clearly generous, and implies that payouts to policyholders with GAOs retiring in previous years could have been justified (economically) at a lower level. However, a company may feel that meeting the cost from the estate is an appropriate way of using surplus assets.

4.3.19 Clearly the appropriate bonus decision in any particular case depends on the policy conditions, policyholders' reasonable expectations and other relevant factors. Such considerations may conflict and over-rule what is expected from a strictly economic viewpoint.

4.4 *Possible Bonus Policies*

4.4.1 There are several ways of answering the questions raised in ¶4.3.1. We consider six possible bonus methods; obviously this is not an exhaustive list:

(I) 'full cover, charged for';
(II) 'free and full cover';
(III) 'cover as with derivative (2), charged for';
(IV) 'terminal bonus offset, no charge and differential bonus rates';
(V) 'terminal bonus offset and ring-fencing'; and
(VI) 'same as non-GAO policies'.

4.4.2 It is usual to have a terminal bonus rate which is multiplied by the guaranteed benefits to give the terminal bonus, and we shall assume initially that the guaranteed benefit is independent of whether there is a GAO or any derivative; we relax this assumption in ¶4.4.6.

4.4.3 Consider the implications for terminal bonus rates of the following; in particular, the d_n figures are hypothetical:

1,600 = asset share if no derivative purchased
d_n = proportionate reduction if derivative (n) was bought ($n = 1, 2, 3$)
$d_1 = 0.05$ $d_2 = 0.10$ $d_3 = 0.15$
1,200 = guaranteed cash
120 = guaranteed annuity
0.10 = guaranteed annuity rate
0.08 = market annuity rate.

4.4.4 Now consider bonus method (I), which answers the questions in ¶4.3.1 as follows:

(a) use derivative (3);
(b) the derivative covers the whole of the guaranteed annuity;
(c) a charge is made = d_3; and
(d) the terminal bonus rate is independent of the policyholder's choice.

4.4.5 Applied to the example in ¶4.4.3 this gives:

— asset share excluding derivative = $1{,}600(1 - 0.15) = 1{,}360$;
— derivative payout = $1{,}360[(0.10/0.08) - 1] = 340$;
— total asset share = $1{,}360 + 340 = 1{,}700$;
— this buys an annuity of $1{,}700 \times 0.08 = 136$, compared with a guaranteed annuity of 120, the terminal bonus factor is $136/120 = 1.13$, i.e. the terminal bonus rate is 13%;
— the benefits to the policyholder are either cash of $1{,}200 \times 1.13 = 1{,}356$, or annuity of $120 \times 1.13 = 136$; and
— since the annuity is worth $136/0.08 = 1{,}700$, we expect policyholders to choose this (which the office can afford from the asset share).

In saying whether we expect the policyholder to choose annuity or cash, we have to recognise that there may be personal preferences for cash, almost regardless of economic conditions (see ¶7.2.3). However, where the cash has to be used to buy a compulsory purchase annuity, the case for not selecting the GAO when economic conditions value it more highly is generally weaker.

4.4.6 Alternatively, the guaranteed benefits may have been less than 1,200 cash, 120 annuity. For example, annual bonuses may have been lower than on a policy without a GAO. Or, very logically, the originally guaranteed benefits may have been lower: perhaps by the cost of the derivative; or by some different factor reflecting policyholder perception of the benefit of the

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guarantee (although this was uncommon). Let us assume that the guaranteed benefits are reduced by d_3 to cash of $1{,}200(1 - 0.15)$ and annuity of $120(1 - 0.15)$, i.e. 1,020 and 102 respectively. Then the terminal bonus factor is $1{,}700 \times 0.08/102 = 1.33$. The policyholder benefits are $1{,}020 \times 1.33 = 1{,}356$ cash, or $102 \times 1.33 = 136$ annuity. So, the outcome is the same as in ¶4.4.5, but the terminal bonus rate is higher because the guaranteed benefit is lower.

4.4.7 Method (I) is consistent with the premise in ¶4.2.1 if the GAO policyholders are considered as a group for this purpose (differential bonuses adopt an alternative approach). It works similarly to a GAO on a unit-linked policy, which is relatively risky to the office. Hedging externally requires a derivative which goes beyond the guaranteed benefits; this may be inadmissible (some alternative approaches may be possible to minimise the effect of this).

4.4.8 Method (II) is (I), but without the charge. It is generous in attributing assets above the 1,600 which has been earned. The excess is met from the estate, assuming that this is sufficiently large and the office is content to use it in this way.

— The assets attributed to the policy are $1{,}600(0.10/0.08) = 2{,}000$.
— This buys an annuity of $2{,}000 \times 0.08 = 160$, so the terminal bonus factor is $160/120 = 1.33$, i.e. the terminal bonus rate is 33%.
— The benefits to the policyholder are either cash of $1{,}200 \times 1.33 = 1{,}600$, or annuity of $120 \times 1.33 = 160$.
— Since the annuity is worth $160/0.08 = 2{,}000$, we expect policyholders to choose this.

4.4.9 Compare the terminal bonus factor on a policy without a GAO. This is $1{,}600/1{,}200 = 1.33$. The policyholder benefits are $1{,}200 \times 1.33 = 1{,}600$ cash or $1{,}600 \times 0.08 = 128$ annuity.

4.4.10 We observe that the 33% terminal bonus rate on the non-GAO policy is the same as that on the GAO policy if the latter:

— uses Method (I) and charges for the GAO by reducing the guaranteed benefit (which is uncommon); or
— uses Method (II) (which, with no charge, is generous).

4.4.11 Method (II) produces the same cash benefit (£1,600) as the non-GAO policy, and the same annuity, except that it gives a higher annuity if guaranteed annuity rates exceed market rates. So, we have two policies, and the benefits on one (the GAO policy) can be greater than on the other (the non-GAO policy), but never lower. Many would question whether that was a fair way of distributing the profits of the life office.

4.4.12 Method (III) answers the questions in ¶4.3.1 as (I), except that derivative (2) is used. The results are:

— the asset share is $1{,}600(1 - 0.10) + (120/0.08 - 120/0.10) = 1{,}440 + 300 = 1{,}740$;

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— the terminal bonus factor is $1{,}740 \times 0.08/120 = 1.16$, the terminal bonus rate is 16%;
— the benefits to the policyholder are either cash of $1{,}200 \times 1.16 = 1{,}392$, or annuity of $120 \times 1.16 = 139$; and
— since the annuity is worth $139/0.08 = 1{,}740$, we expect policyholders to choose this.

4.4.13 Method (III) is consistent with the premise in ¶4.2.1, if the GAO policyholders are considered as a group for this purpose. It does not require purchase of a derivative that would be inadmissible. If the method were changed so that there was no charge, that would clearly be generous.

4.4.14 Method (IV) answers the questions in ¶4.3.1 as follows:

(a) use derivative (1);
(b) this relates to that part of the benefit taken as a guaranteed annuity by the policyholder in question;
(c) no charge is made; and
(d) the terminal bonus rate depends on the policyholder's choice of benefit.

4.4.15 This would give:

— if cash is taken, the asset share is 1,600; if an annuity, we add the value of the derivative, but this is zero, since $120/0.08$ is less than the asset share;
— if cash is taken, the terminal bonus factor is $1{,}600/1{,}200 = 1.33$; if an annuity, $1{,}600 \times 0.08/120 = 1.07$: i.e. the terminal bonus rate is 33% or 7%;
— the benefits to the policyholder are either cash of $1{,}200 \times 1.33 = 1{,}600$, or an annuity of $120 \times 1.07 = 128$; and
— the value of the annuity is $128/0.08 = 1{,}600$, the same as the cash.

4.4.16 It can be argued that this method preserves equity between policyholders, since the value given to any policyholder equates to what has been earned (£1,600) and does not ordinarily depend on whether he takes cash or annuity. Then note that, if the theoretical terminal bonus applied to the annuity were negative, and is then put to zero, that does mean that the annuity choice is more valuable, and the policyholder has benefited from having the GAO.

4.4.17 The House of Lords considered the practice of Equitable Life Assurance Society [Equitable L.A.S. v Hyman (2000)], which adopted method (IV). The House supported the policyholder's complaint, Lord Steyn indicating: " ... a differential policy which was designed to deprive the relevant guarantees of any substantial value ... the directors were not entitled to adopt a principle of making the final bonus of GAR [guaranteed annuity rate] policyholders dependent on how they exercised their rights under the policy." The Lords' decision did not accept the argument that GAO

policyholders themselves bear some of the risk in accordance with the argument in ¶3.4.5.

4.4.18 Now turn to method (V), terminal bonus offset with ring-fencing. This would answer the questions in ¶4.3.1 as follows:

(a) use derivative (1);
(b) the derivative covers that part of the benefits taken as a guaranteed annuity by GAO policyholders generally (we assume 75%, i.e. 25% cash);
(c) a charge is made based on d_1; and
(d) the terminal bonus rate is independent of the policyholder's choice.

4.4.19 This would give:

— the asset share is $1{,}600[1 - (0.75)(0.05)] = 1{,}540$; which is not enhanced by the derivative, which pays zero, because the value of the guaranteed annuity ($120/0.08 = 1{,}500$) is less than this;
— the terminal bonus factor is $1{,}540/[1{,}200(0.25) + 120(0.75)/0.08] = 1{,}540/1{,}425 = 1.08$;
— the benefits to the policyholder are either cash of $1{,}200 \times 1.08 = 1{,}297$, or annuity of $120 \times 1.08 = 130$; and
— the value of the 25% cash plus 75% annuity is the asset share of 1,540.

4.4.20 This method preserves equity between GAO and non-GAO policyholders as classes. It is consistent with the premise in ¶4.2.1 in this sense. Clearly, those policyholders who choose 100% rather than 75% annuity have benefits greater in value than the asset share, and those choosing less than 75% have less. Note that, if no charge were made, the terminal bonus rate would be 12% instead of 8%.

4.4.21 The House of Lords, in the Equitable Life case, considered ring-fencing: "a differential bonus which varied ... according to whether the policy did or did not include GAR." The judgment was: " ... the object would still be to eliminate as far as possible any benefit attributable to the inclusion of the GAR in the policy ... the suggested course is not open to the Society."

4.4.22 Method (VI) is to have the same bonus rate on GAO and non-GAO policies, consistent with the House of Lords judgment. Some ways in which this can be the outcome are:

— with a charge only on the GAO policies if (but only if) this was done by reducing the original guaranteed benefits and applying method (I);
— with no charge on either the GAO or non-GAO policies, and applying Method (II) to GAO policies, the cost being met by the estate or shareholders' funds; or
— with a charge on non-GAO policies such that the terminal bonus rates are equivalent (see ¶4.4.23).

4.4.23 Terminal bonus rates can be equalised, as Equitable Life has done following the House of Lords judgment; it transferred £1.5bn 'economic

value' from non-GAO to GAO policies. Now, we have seen that non-GAO policyholders can bear the risk of GAOs (¶3.4.4). However, the perspectives of the GAO and non-GAO policyholders are different. If non-GAO policyholders are now to contribute to the cost of the options, they ought to have received the charge of d_n (but would not, in practice, have done so). There does not appear to be any economic logic for GAO and non-GAO policyholders to bear the cost of GAOs in a way that means they have identical terminal bonus rates. Indeed, many non-GAO policyholders would not have been aware of their position in a fund with GAO policies.

4.4.24 The Faculty of Actuaries and Institute of Actuaries Life Board have commented (2001):

> "It should be recognised that a guarantee on a with profits policy can be charged for either by imposing a higher premium or making deductions from asset shares and thereby ultimately from bonuses, or by some combination of the two, but the guarantee should be charged for in one way or another."

4.4.25 In the Equitable Life case, Lord Cooke of Thorndon said:

> "... I agree with Lord Woolf M.R. (as he then was) that the assumption on which the policy was based was that, when current rates fall below the GAR, the annuity which the policyholder should receive would be higher than if there was no GAR."

Such an assumption would conflict with the position if the office made an economic charge for the option and if current market rates were only slightly below the guaranteed annuity rate.

4.4.26 It must be emphasised that what is appropriate in any case depends on the particular circumstances of the case, including, of course, what was specified in the policy.

4.4.27 Some would say that the Lords judgment, indicating that (in the Equitable Life case) bonus rates should not depend on whether the policy included a GAO, is economically illogical. Other reasons for the decision may, of course, prevail.

4.5 *Issues for Resolution*

4.5.1 Companies have now had to decide how to determine bonus rates in their particular circumstances. Any new bonus procedure ought also to cover situations where market annuity rates exceed guaranteed annuity rates.

4.5.2 The court case involving Equitable Life began with a focus on its practice of differential terminal bonus rates. Companies not having differential rates expected to be unaffected by the outcome, but they will have considered the court's ruling against ring-fencing if that was their practice. The position is less clear if an office wrote GAO, but not comparable non-GAO policies.

5. Solvency

5.1 *Introduction*

5.1.1 The solvency of insurance companies in the U.K. is measured in accordance with the regulations in the *Interim Prudential Sourcebook: Insurers*, issued by the Financial Services Authority (2001b). These rules are derived from the requirements of the E.C. Life Framework Directive 1994. The appendix gives a summary of the main points in the valuation of assets and with-profits liabilities for solvency purposes ('statutory solvency valuation'). In particular, it refers to the net premium valuation method, which is at the heart of the regulations.

5.1.2 The solvency of companies has been monitored by the Department of Trade and Industry and, later, the Treasury. From 1 January 1999 the Treasury's role was contracted to the Financial Services Authority (FSA). The Government Actuary's Department has provided actuarial advice to the FSA to assist in this supervision, with staff in the Insurance Division of GAD transferring to FSA in April 2001.

5.2 *GAOs and Solvency*

5.2.1 Bolton *et al.* (1997) carried out a survey of companies' practice in reserving for GAOs. About half of companies then took no account of guarantees; the remainder calculated the liability for each policy as the greater of the value of the cash and the guaranteed annuity.

5.2.2 Bolton *et al.* (1997) carried out specimen calculations for reserves (liabilities) on alternative assumptions. Their 'standard' result implied a reserve of 11.7% of the fund was needed. Incorporating the resilience test would increase this. Changes in interest and mortality since 1997 would further increase the result. Note that it may not be appropriate shorthand to express the reserve as a proportion of the current fund (or liability without the GAO). This is because the GAO liability relates to a comparison of cash and annuity at retirement, and may be significant even if only one premium has been paid and the fund therefore low. Similarly, policyholders should not think of the value of the option as being a constant proportion of their fund.

5.2.3 Bolton *et al.* (1997) went on to consider the cost of guarantees using a stochastic model (see Wilkie, 1995). A stochastic approach has the advantage of recognising that, if, for example, interest rates are just above the level at which the guaranteed annuity is more valuable than cash, it would be wrong to establish no reserve for the option, because interest rates could change so that the guaranteed annuity were more valuable.

5.2.4 Cairns *et al.* (2000) highlighted the difference, in valuing contracts with GAOs, between [E indicates the expected value]:

(1) E{max.(cash, annuity)}; and
(2) max.{E(cash), E(annuity)};

and which a stochastic model can be used to assess. The true value of the policy is given by (1), as the policyholder can choose the greater of the value of the cash benefits and the value of the annuity; it is the expected value of this which we seek. In practice, it is (2) which is commonly used, which leads to an answer lower than using (1). However, certain elements of practice then increase the figure for liabilities: the restriction on the maximum re-investment rate being used; the resilience test; and the use of prudent assumptions (for example on the take-up of GAOs and on mortality). Nevertheless, the current procedure cannot be considered satisfactory.

5.2.5 Bolton *et al.* (1997) also considered the cost of a receiver swaption to match liabilities. On the assumptions made then and the then market cost of swaptions, the cost was about 13% of the fund. This, on the stochastic modelling assumptions in accordance with ¶5.2.3, would cover the average cost on about 80% - 90% of the scenarios. The swaption cost assumed that all policyholders were due to reach retirement in the next 15 years.

5.2.6 Van Bezooyen *et al.* (1998) discuss the value of GAOs on unit-linked policies, and again highlight the value of guarantees.

5.3 *Regulatory Requirements*

5.3.1 On 13 January 1999 the Government Actuary (1999a) wrote to Appointed Actuaries to explain his advice on the existing requirements for calculating reserves applied to GAO contracts. His view was that, where the cost of meeting the guaranteed annuity was significantly greater than the cost of cash, companies should hold reserves for the contract at a level close to the full value of the guaranteed annuity. Some limited allowance (of a few percentage points of the reserve) could, in some cases, be made for a reduction in the reserve on account of the advantages to policyholders of taking cash or other non-guaranteed annuity benefits.

5.3.2 On 22 December 1999 the Government Actuary (1999b) sent a further letter to Appointed Actuaries, mentioning in particular:

— the reduction in reserve from the full annuity value should be limited; and
— the allowance for future mortality improvements, both before and after the retirement date, should take proper account of the recommendations in the latest Continuous Mortality Investigation Bureau reports.

5.3.3 The practice of some offices has therefore been to calculate a liability figure slightly lower than max.{E(cash), E(annuity)}, to allow for the incentives to choose cash, together with any additional amounts arising from the resilience test.

5.4 *Comments*

5.4.1 There have been many concerns that the net premium valuation method is an inadequate way of calculating a life office's liabilities. In particular:

— the value of the liabilities depends on the assets in the fund; many would regard this as invalid, as a switch in assets, say from equities to bonds, reduces the value attributed to the liabilities;
— although regard is had to policyholders' reasonable expectations, there is no link to asset shares, which underlie management of the fund; and as future bonuses are not valued, the differences in the forms of contracts implied by derivatives (1), (2) and (3) are unlikely to be apparent; and
— the assumptions are deterministic, and do not adequately recognise the implications of stochastic variations in conditions or the cost of liabilities as would arise in market transactions, the resilience test being a poor proxy for this.

5.4.2 Scott *et al.* (1996) suggested more 'realistic' alternatives to the net premium valuation. Wright *et al.* (1998) made recommendations, particularly regarding unitised with-profits business, which influenced changes to the Insurance Companies Regulations in 2000. Hare *et al.* (2000) considered the market cost of guaranteed cash values, and concluded that reserves on the net premium method would be insufficient in some circumstances.

5.4.3 Such comments confirm that the reserves established in a net premium valuation may be an inadequate reflection of the costs of GAOs. In particular:
— the deterministic approach will tend to understate the cost; but
— the liability calculated includes an implicit allowance for some future bonuses, but, if bonuses are expected to be lower than otherwise because of GAOs, the GAO liabilities may be overstated.

5.4.4 One further problem is where policyholders have an option to effect incremental policies with GAOs. If the GAO can be of value, how is the office's liability determined? How might we estimate the take-up of increments, or we might ask what extra amount a purchaser of the portfolio would require? These are not easy questions.

5.5 *International Developments on Solvency*

5.5.1 The International Association of Insurance Supervisors (IAIS) has assisted the co-ordination of the work of supervisors and issued a set of core principles (IAIS, 2000). Its Sub-Committee on Solvency and Actuarial Issues (2000) has surveyed a number of solvency practices, including the use of risk-based capital, and suggested some basic principles.

5.5.2 The European Union is reviewing solvency margin requirements, as considered by Dickinson *et al.* (2001).

5.5.3 The International Accounting Standards Board's consideration of the fair value of liabilities for a company's accounts may, therefore, have a part to play in assessing liabilities for solvency purposes. See Section 6.3.

5.6 *Issues for Resolution*

5.6.1 In the above context, it is to be hoped that there will be a review of the rules for calculating:

— the liabilities under life insurance contracts, so that they are adequate for dealing with GAOs with their special features; and
— the minimum excess of assets over liabilities in a way which recognises appropriately the risks being run.

5.6.2 The author's view is that 'current value' approaches to calculating GAO liabilities (discussed in Section 6.3) will be needed.

5.6.3 Additional disclosures in the Returns to the FSA may also be helpful: the suggestions in Clay *et al.* (2001) are relevant; also see the proposals in ¶6.4.4.

6. Accounts

6.1 *Introduction*

6.1.1 Life insurance companies prepare their accounts in accordance with the Companies Act 1985 (Insurance Company Accounts) Regulations 1993, which implemented the E.C. Insurance Accounts Directive and removed the exemption previously enjoyed from the requirement to show a 'true and fair view'.

6.1.2 Companies in the U.K. generally prepare their accounts in accordance with the Statement of Recommended Practice issued by the Association of British Insurers (1998). This describes the so-called modified statutory method of accounting; in other words, some modifications are made to the statutory solvency valuation to produce the accounts.

6.1.3 A brief summary of the outcome, as far as it affects with-profits policies, is:

— assets are at market value;
— liabilities are calculated as the figure in the statutory solvency valuation, modified by excluding certain reserves regarded as inappropriate for a 'true and fair view', such as resilience test reserves; and
— for a mutual company, the excess of assets over liabilities is regarded as the 'fund for future appropriations' (FFA); in a proprietary company, the FFA is determined such that the (net of tax) profit for the year is the amount transferred to the shareholders in the allocation of distributed surplus.

6.1.4 The accounts for a proprietary company, prepared on the above basis, are regarded by many as an unsatisfactory basis for assessing the value of the business. This partly reflects concerns that the net premium method, which underlies the result, is artificial. Furthermore, an increase in GAO or

other liabilities would not affect profit as calculated, unless it happened to affect bonus rates, and hence the transfer to shareholders. Hence, many companies disclose, as supplementary information, the embedded value, being the present value of future transfers from the long-term business fund to the shareholders; from the increase in embedded value is derived the 'achieved profit' (Association of British Insurers, 2001).

6.2 *GAO Liabilities in the Accounts*

6.2.1 It is not straightforward to determine the cost of GAO liabilities. Consider some of the ways in which this can be done:

(a) possible methodologies:
   - — the net premium method in the statutory solvency valuation;
   - — the modified (net premium) statutory approach, commonly used in the accounts;
   - — a bonus reserve valuation, intended to be more 'realistic' than the net premium valuation, with explicit assumptions about future bonuses;
   - — a deterministic calculation of the present value of the value of excess payments above asset shares;
   - — expected excess payments consistent with embedded value calculations;
   - — stochastic methodologies; and
   - — a 'current value' approach (see Section 6.3);

(b) assumptions, regarding e.g. future interest, mortality, take-up of GAOs, new increments being effected; and
(c) bonus policy.

6.2.2 It is worth emphasising that a sensible calculation of the provision for GAOs in the accounts has to start with what is the company's liability to its policyholders, where there are several possibilities. If this has not been resolved, the accounts are unlikely to be satisfactory.

6.2.3 Indeed, the choice of calculation method is even greater than shown above, since companies using accounting methods from other countries, e.g. U.S. GAAP (Generally Accepted Accounting Principles), can derive still further results.

6.2.4 The Treasury Select Committee (2001) asked the Financial Services Authority and the Institute of Chartered Accountants in England & Wales to consider whether the accounts and statutory solvency valuation could use the same assumptions wherever possible. However, the present position is that the assumptions are determined with different responsibilities (directors for the accounts, Appointed Actuary for the statutory solvency valuation), in accordance with different regulations set for different purposes.

6.2.5 Therefore, it is not surprising that there is confusion regarding the cost of GAOs!

6.3 *Current Value Approaches*

6.3.1 Conscious of the wide disparity in insurance accounting practices, the International Accounting Standards Board (IASB, formerly International Accounting Standards Committee, IASC) is intending to issue a standard on insurance. IASC (1999) published an *Issues Paper* which considered a number of possible ways forward. It did not regard the modified statutory approach of the U.K. as a solution; it also looks unlikely that the embedded value, as used in the U.K., will be adopted.

6.3.2 A particular issue is whether to value assets and (especially) liabilities at fair value (broadly, market value). A possible alternative would be to calculate liabilities at entity-specific value. Hairs *et al.* (2002) reviewed current developments in this area.

6.3.3 Fair values raise some quite difficult issues. For example, for GAOs, does the company's calculation of liabilities take into account what the market is assuming about future mortality, the potential for more impaired life annuities, and changes in the rules on compulsory annuitisation? How does the market come to a conclusion about these factors? How does the company incorporate this in its calculations? Does it matter that the company might think that the answer is imprudent or inaccurate?

6.3.4. Corley *et al.* (2001) referred to the possibility of using stochastic models or other methods derived from modern financial economics for the purpose of valuing options. The 'Baird Report' (Financial Services Authority, 2001c) recommended (paragraph 7.2.1) that:

> "... financial guarantees and onerous options in life insurance policies should be valued stochastically and consistently with traded option prices in the market."

The 'Tiner Report' (Financial Services Authority, 2001a) referred to the regulator's proposals for a market test on reserves for guarantees and options, and indicated that it: "will discuss with the industry and professions how firms can achieve a market-based approach to provisioning for options and guarantees so that this can be introduced as soon as possible" (paragraph 4.2.10). The author's view is that a development on these lines is the way forward.

6.4 *Risk and Disclosure*

6.4.1 We now consider the disclosures in life company accounts. This is in the context of the reader of the accounts being able to appreciate the risks to which the firm is exposed. Consider, for example:

— the ASB Statement of Principles refers to disclosures being useful if they disclose, *inter alia*, the principal risks underlying financial performance

and how the firm is responding to them (Accounting Standards Board, 1999); and

— International Accounting Standard IAS32 (Financial Instruments: Disclosure and Presentation) encourages disclosures of the risks associated with financial instruments and management's policies for controlling these risks.

6.4.2 In contrast, life insurance company accounts in the U.K. give quite limited disclosure. The main assumptions used in calculating the liabilities are given, but usually quite briefly (although the length of disclosures in the statutory solvency valuation returns made to the FSA may well be excessive for the accounts).

6.4.3 The author is concerned that:

— life assurance company accounts are not prepared on a consistent basis, and, in some respects, are artificial and unrealistic;
— although standard setters are attempting to resolve these issues, this will take time; and
— in the meantime, more disclosures are appropriate to assist the reader of the accounts to understand the financial position of the life office and the risks that it is running.

6.4.4 The author suggests the following disclosures for life assurance company accounts (it would not be expected that the detail below would be necessary for group accounts):

(a) the division of the long-term business provision between with-profits, non-profit (non-linked) and linked benefits;
(b) the aggregate of asset shares to correspond to with-profits benefits in (a);
(c) the change in assets, liabilities and FFA arising from a specified change, at the balance sheet date, in interest rates and values of equities and property;
(d) for companies with material liabilities under immediate or deferred annuities, the liability attributed to an annuity of £1,000 p.a. to a male aged 65 (say), commencing on the balance sheet date (this would be more transparent than relying on a reference to some mortality table with adjustments);
(e) if the company has material liabilities where the valuation is uncertain, information should be included to enable the reader to understand the firm's exposure (examples in relation to GAOs might be the guarantees being available at a variety of ages, and options to effect increments with GAOs);
(f) the fact that the company prepares returns to the FSA in connection with solvency, and how and when a copy can be obtained or referred to.

6.4.5 It is hoped that this would enable a better appreciation of the accounts, in particular:

— Disclosing asset shares is a helpful step in understanding the 'realistic' liabilities of a company, and hence its estate. Clay *et al.* (2001) proposed disclosures in the returns to the FSA of asset shares for certain product groupings. However, in setting out what are asset shares, consideration has to be given to how these are affected by charges for guarantees.
— The sensitivity of the result to changes in financial conditions will help indicate the extent to which assets are matched to liabilities. There is already a similar calculation made in the resilience test reported in the returns to the FSA.

6.4.6 It could be that what are the appropriate disclosures depends on the company's size and ownership.

6.5 *Issues for Resolution*

6.5.1 We need a rationalisation of the many ways in which life insurance company accounts are prepared, which the IASB is working on. GAOs raise some particularly complex issues, and provide a good test for any proposed method.

6.5.2 In the meantime, additional disclosures would help the reader of the accounts to understand the risks involved, as suggested in ¶6.4.4.

7. Annuitisation

7.1 *Introduction*

7.1.1 Historically, the standard practice for personal pension policyholders or those with money purchase occupational pension schemes is that, upon reaching retirement date, they take tax-free cash up to a specified amount and then have an annuity (which may be at a guaranteed rate) with the remainder of their fund. This requirement was relaxed in the Finance Act 1995, which permits income drawdown, but with annuitisation no later than age 75.

7.1.2 Income drawdown accounted for 29% of the retirement income market in 1999, focusing on the relatively wealthy (Retirement Income Working Party, 2000).

7.1.3 Other countries generally allow more freedom as regards purchase of annuities, and may require no annuity to be bought; see the surveys in Gilhawley *et al.* (1999) and Retirement Income Working Party (2000).

7.1.4 Where annuitisation is voluntary, the take-up of annuities is quite low. Milevsky (2000) reports that the Health and Retirement Survey in the U.S.A. shows that only 8% of respondents with a money purchase scheme selected an annuity.

7.2 *Analysis*

7.2.1 This paper does not aim to set out all the relevant work and arguments on the subject. However, a number of comments can be made.

7.2.2. Reasons why people may choose not to buy an annuity on a voluntary basis include:

— they have a bequest motive;
— they do not want the pattern of income provided by the annuity; in particular, they may prefer higher income earlier on;
— they prefer an investment yielding more than essentially the bond returns incorporated in most annuities;
— they question the value of the annuity product terms;
— the potential for regret in the event of early onset of a life-threatening disease; and
— they know that the state will support them in the event of poverty.

7.2.3 Note that an individual's investment choices reflect his or her personal preferences, and, in particular, he or she may have a strong preference for money now rather than money later, which may not be regarded as 'rational' using market interest rates. Hence judgements about how we expect individuals to choose between cash and annuity will not always be the most onerous to the office.

7.2.4 Milevsky (2000) refers to the 'real option' to defer annuitisation, which he estimates is quite valuable until the mid-80s.

7.2.5 New product designs, including with-profits annuities, are intended to enable policyholders to have an investment with a significant element in equities.

7.3 *Policy*

7.3.1 Historically low interest rates are leading to pressure for greater freedom in the purchase of annuities. The Retirement Income Working Party (2000) suggested that an individual should, after taking tax-free cash, only be obliged to buy an annuity to the extent that his or her other income was less than £140 per week, index-linked.

7.3.2 In the Republic of Ireland, the Finance Act 1999 introduced new flexibility, which could result in an individual not buying an annuity if he or she had a specified level of resources elsewhere. Cash taken above the ordinary tax-free limit is subject to tax.

7.3.3 If such a policy were implemented in the U.K., those offices with higher-income policyholders would be more likely to be able to take advantage of the greater freedom of choice.

7.3.4 Hence, if annuitisation were to become voluntary in the U.K., or if the rules were relaxed, there is reason to believe that fewer policyholders would select a GAO, even if it were more favourable than market annuity rates. However, the impact on life offices would be offset to some extent,

because it is likely that those still exercising the GAO would have higher life expectancy than those not exercising it.

7.4 *Issue for Resolution*

This is an issue where there remains pressure on the Government to change its policy.

8. Conclusions

8.1 GAOs are a significant issue:

— for policyholders, for whom they provide valuable guarantees, but possibly with an effect on bonuses; and
— for (some) life offices; they add to the problems that low interest rates can cause for solvency.

8.2 This paper has raised issues in the areas of investment strategy, bonuses, solvency, accounts and annuitisation.

8.3 The author does not pretend to have a crystal ball to predict future interest rates and their impact on GAOs. However, it is suggested that there is the potential for increased costs relating to GAOs from future improvements in mortality, but the cost could be reduced arising from:

— annuity product innovations; and
— relaxations in the rules on compulsory annuitisation.

8.4 It is important to look for improvements in the way in which GAO costs are used in measuring solvency and in the accounts, although the factors above mean that 'realistic' costs will necessarily be a difficult problem.

8.5 The life assurance industry would benefit from greater transparency in its operations, including:

— improved definition of the contract with policyholders; and
— more disclosure in accounts.

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APPENDIX

STATUTORY SOLVENCY VALUATION

A.1 The solvency of companies is measured by the result of the statutory solvency valuation, i.e. the valuation of assets and liabilities in accordance with the regulations in the *Interim Prudential Sourcebook: Insurers*, issued by the Financial Services Authority (2001b). This valuation is carried out annually, and the results reported to the FSA. However, companies also report on whether they have met the statutory solvency margin at all times in the year. A brief outline of the main points of the valuation is below; it does not aim to cover all issues.

A.2 Assets are valued at their 'admissible' value. This is largely market value, although there are some exceptions, including:

— if the value of assets in a particular category (e.g. in one property or share) is more than a given amount, the value is restricted;
— monies owing from other companies in the group are admissible only to a limited extent; and
— a provision for adverse deviations may have to be made in the case of certain derivatives.

A.3 The liabilities (mathematical reserves) under non-linked policies are valued as the present value of the benefits payable under the policy minus the present value of future premiums. In carrying out this valuation:

— the assumptions have to be prudent rather than best estimates;
— there has to be due regard to the reasonable expectations of policyholders;
— the liabilities are the guaranteed benefits and exclude future bonuses;
— the rate of interest used cannot exceed the yield on the assets held; 'yield' means redemption yield in the case of fixed-interest securities, the average of the dividend yield and earnings yield for shares, rental yield for properties;
— the premium used in the calculation is the 'net premium', i.e. the premium to secure the benefits using the prudent mortality and interest assumptions used in the valuation, without any expense loading; hence the valuation is often referred to as the net premium valuation;
— the interest rate at which future cash flows are invested cannot exceed 3% plus two thirds of the excess of 15-year gilt yields over 3%;
— a prudent allowance for expenses and options is made in the valuation unless already allowed for elsewhere; and
— a reserve as would be needed if the fund were closed to new business is included; and also any additional reserve arising from the 'resilience test', i.e. if the excess of assets over liabilities in specified alternative financial conditions would be less than in the standard situation.

A.4 A company can use an alternative valuation method, provided it demonstrates that it is at least as prudent as the net premium valuation method. Note that Equitable Life has used a bonus reserve valuation, with explicit assumptions on bonus rates.

A.5 It is a requirement that the assets in the long-term business fund must be at least as great as the liabilities.

A.6 The minimum solvency margin relating to non-linked business is:

— 4% of the mathematical reserves;
— plus 0.3% of the 'sum at risk' (i.e. the amount payable on death less the reserves already held on the policy);
— reduced by reassurance (with some limits).

A.7 In testing whether the minimum solvency margin is met, it is possible to include certain 'implicit items' as assets. In particular, 'future profits' can be included up to five sixths of the minimum solvency margin.

A.8 It is then required that:

— the excess of assets over liabilities in the long-term business fund;
— plus net assets in the shareholders' fund;
— plus implicit items;
— must at least equal the minimum solvency margin.