

Step 2: Determine Whole Contract Requirement Before Term Restriction

Net Valuation Requirement = Value Future Gtee Cost & Expenses – Value Total Future Fee Income

Step 3: Determine DAC Balance

Unamortized DAC = min (scheduled unamortized DAC, max recoverable amount using fee income excluding pre-set bp amount allocated to offset gtee cost)

Step 4: Determine Gtee Reserve

Gtee Reserve = max (0, Net Valuation Requirement + Unamortized DAC)

This approach satisfies the need to determine component DAC and guarantee reserves. It also permanently bifurcates a set amount of fee income to the guarantee reserve allowing this “margin offset” amount to be recognized in the capital calculation as an offset to the benefit cost. It may lead to higher overall balance sheet requirements than method 1. It should generally produce the same net result as a “component” valuation, if all components are valued using the same stochastic model

When applying the Whole Contract Approach using multiple scenarios to develop a net cost distribution, the actuary must take care in setting an appropriate CTE level for the valuation. However, once chosen, the actuary can be confident that the liabilities for that block will reflect that level of coverage. However, where blocks are added together, the coverage level of the sum of the blocks will need to be reviewed to make sure the liabilities for the total portfolio are not excessive.

5.1.2 Component Approach

This method is known as a bifurcation approach because the “host” and “feature” are severed for valuation purposes. The principle advantage of this method is that it allows different methods to be applied to different components. This may also be practically desirable as it allows the use of complex methods to be limited to those components of the valuation where use of such methods is necessary to ensure that the valuation results covers an appropriate range of plausible experience. Another advantage of this approach is that the actuary can review the effects of the valuation on the component pieces. The actuary can then develop insight into the “feature” separate from the “host”. This knowledge will be useful in establishing assumptions (pricing and valuation), in changing the design of products and in developing/modifying risk mitigation approaches.

The Component Approach will often provide a different result for the valuation than a Whole Contract Approach. However, the reasons for choosing one method over the other should be based on capability/desirability/feasibility of performing the approach rather than on the results produced. Toward that end, the Component Approach method would be employed where:

- the actuary is unable to value the contract as a whole;

5. Adjusted Net Asset Value

5.1 Life Insurance Company

5.1.1 The adjusted Net Asset Value (NAV) for a life insurance company is intended to eliminate accounting and other distortions to arrive at a current value of what the company's net assets are worth, based on the market value of its investment portfolios. Adjusted NAV thus represents the value to shareholders of their share of the surplus, which is not required to support the in-force business.

5.1.2 The net asset value can be split into two parts:

1. The excess of non insurance assets over non insurance liabilities.
2. The existing surplus attributable to shareholders within the long term fund.

5.2 General Insurance Company

5.2.1 As with this component of the appraisal value of a life company, the adjusted NAV is intended to arrive at a current value of what the company's net assets are worth, based on the market value of its investment portfolio. Adjusted NAV thus represents the market value of investments in excess of those required to match the insurance liabilities.

5.2.2 Adjustments may be needed for reserves that have characteristics similar to shareholder funds (e.g. equalisation reserves), unrealised gains, acquisition goodwill and excess/deficient technical reserves.

5.2.3 It is the latter of these potential adjustments that requires a detailed actuarial review. The technical reserves fall into three main categories:

(i) case reserves in respect of reported claims. An analysis of the consistency and historic bias (if any) towards redundancy or deficiency at the time of settlement needs to be made. Adjustments to the case reserves can then be made – these tend to be known as incurred but not enough reserved (IBNER) adjustments, and may be positive or negative. IBNER adjustments are relatively straightforward for short-tail risks, but are less easy to quantify for long-tail risks, where the case reserves are subject to inflation over and above normal price rises from changes in the social, legal and earnings environments that prevail over the period from incident, notification and settlement of a claim – which can be considerable. For this reason, it is not unusual to estimate the IBNER component (if any) as part of the reserves described in (ii) below;

(ii) the second category of reserves are those for incurred but not reported (IBNR) claims. By their very nature, particularly for long-tail risks, IBNR claims are the most difficult reserves to estimate, but do lend themselves to statistical analysis, although such techniques are by no means precise. Indeed, even the most accurate projections can be undermined by retrospective legal changes, e.g. the extent of environmental pollution liability in the United States;

(iii) for the majority of business written by an insurance company the results are accounted for on a one year basis. It is therefore necessary to set up a third category of reserve at each year end for unearned premiums, i.e. premiums received which are still exposed to risk after that year end. The normal practice is to reserve a proportion of the written premiums (net of acquisition costs) reflecting the unexpired portion of the risks assumed. The underlying assumption is that as the premiums are earned they will equal the claims and expenses arising and so the net impact on profits is zero. However, where premium rates are known to be inadequate, then an explicit extra reserve will need to be set up to cover the emerging losses.

5.2.4 The above reserve review will give rise to three main results:

- adjustments to the company's reserves and hence its net asset value to reflect any redundancy or deficiency in the reserves (net of tax effects). It may also indicate the need for run-off guarantees if there is considerable uncertainty attached to the likely future claim payments on a particular class of claim, e.g. environmental pollution;
- cashflow patterns of the claim and premium run-off;
- a profitability analysis of business written which can be used to help set the key parameters; e.g. loss ratios, on the ongoing business.

In practice, the projection of in force business (and new business) revenue accounts normally allow for policyholders' tax on an income less relievable expenses ("I - E") basis, with the actual impact of tax being adjusted to allow for the delay (if any) in the company moving into an excess I position.

Additional shareholders' tax (for a proprietary company) will also need to be determined as the appropriate rate on shareholders' profits after allowing for (I - E) tax on life business. In the case of pensions business (for a proprietary company), essentially the full rate of corporation tax is applied to profits.

Care must be taken to fully understand the effect of a merger or acquisition on carried forward excess expenses, rolling forward past tax losses and the crystallisation of any potential taxable gains. If there is an international aspect to a deal the tax regimes of the domiciles of all companies must be investigated and understood and any double taxation agreements allowed for. Known future changes in tax levels or legislation should be incorporated into the model.

6.6 Separate models need to be developed for each significant business line. Many companies will already have an internal model that is used for management purposes. Generally these models were not designed to be used as part of an appraisal value in a merger or acquisition and are not necessarily suitable to be used in one.

6.7 Finally, the sum of the adjusted net asset value and value of the in force portfolio is known as the life embedded value. An appropriate adjustment for the cost of capital will be needed to reflect the investor's required (net) rate of return.

6.8 With Profit Considerations

6.8.1 The previous paragraphs on the valuation of in-force life and pensions business concentrated on non profit type business. Where there is also "with profit" business other factors need to be considered. We discuss the main ones below.

6.8.2 Bonus Policy

6.8.2.1 The normal structure for bonuses on "with profit" business is:

- annual reversionary bonuses added throughout the lifetime of the policy. Once added these bonuses are guaranteed; and
- a terminal bonus added to the policy on death or maturity/vesting. (An element of the full terminal bonus will normally also be added on earlier surrender/transfer.) Terminal bonuses are not guaranteed.

6.8.2.2 Reversionary bonus rates are normally determined having regard to the gap between expected future investment returns and the investment return required to support the sum assured and reversionary bonus declared. The gap is required so that a terminal bonus can build up and allow greater investment freedom.

6.8.2.3 Terminal bonus rates are normally set with the aim of paying out benefits equal in value to smoothed asset shares (as described below).

6.8.2.4 Projected bonuses should take account of the office's historic levels and mix of bonuses. Future bonus level assumptions must be consistent with the assumptions for future investment yields, and will affect the mix of assets selected to match the liabilities and the consequent levels of aggregate future investment income. Increasingly stochastic modelling is being used to investigate the possible outcomes of different future asset liability modelling scenarios and their impact on policyholders' reasonable expectations for bonuses.

6.8.3 Asset Shares

6.8.3.1 For traditional with profit business asset shares are determined by accumulating premiums paid less charges to allow for expenses, taxation, shareholder transfers (if any) and other costs (including mortality costs) at the rate of return actually earned on the assets backing the business.

6.8.3.2 For unitised with profit business asset shares are determined by accumulating premiums paid less charges to allow for fund costs in a manner akin to linked policies at the rate of return actually earned on the assets backing the business.

6.8.3.3 In each case, miscellaneous surplus, e.g. that arising from surrender profits, may be accurately included in asset share calculations, but more normally companies enhance base asset shares in an ad hoc manner, e.g. as an addition to the earned rate.

6.8.4 The Estate

6.8.4.1 One definition of the Estate is that it represents that part of a company's assets measured on a realistic basis in excess of those required to meet its realistic liabilities, where:

- the liabilities in respect of "with profit" business are based on aggregate asset shares; and
- all other liabilities are calculated using realistic best estimate assumptions. For example, the liabilities in respect of non profit business are based on statutory mathematical reserves less the present value of future surpluses expected to emerge on that business, where the discount rate used is the aggregate (net) rate of return expected to be earned on assets backing the long term fund.

6.8.4.2 This determination of the Estate is a mix of a retrospective approach for "with profit" liabilities and a prospective approach for non profit liabilities, and relies on a record of asset shares having been maintained or being capable of creation.

6.8.4.3 If a reliable record of asset shares cannot be obtained then a fully prospective approach is the obvious alternative. This approach normally involves the determination of emerging surplus on the book of "with profit" business by projecting future revenue accounts based on an actuarial model representing the in-force "with profit" portfolio of policies, as follows:

Opening fund	=	mathematical reserves at the beginning of the year
Plus	....	premiums
	....	investment return (income and gains)
Less	....	mortality/morbidity claims, surrenders, annuities and maturities
	....	commissions
	....	expenses
	....	taxation
Equals closing fund at the year end		