THE DETERMINATION OF LIFE OFFICE APPRAISAL VALUES

BY R.P. BURROWS, B.Sc., F.I.A., A.S.A., M.A.A.A. AND

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ABSTRACT

The aim of this paper is to examine and document a scientific approach to establishing an estimate of the economic value or range of possible economic values of a life assurance enterprise.

This is essentially a practical paper which provides a ‘practitioner’s guide’ to performing an actuarial appraisal of a life assurance company rather than providing a rigorous theoretical derivation of the methods. There is, however, a philosophical issue, that of an appropriate risk rate of return, which cannot be completely side-stepped in a paper on appraisal values. This issue is briefly covered in Section 3. It should be noted, however, that an entire paper could be devoted to this subject.

The paper finishes on a potentially controversial note, that of UK Generally Accepted Accounting Principles (UK GAAP) for life assurance companies, suggesting that the appraisal value techniques outlined in this paper could play a major part in formulating UK GAAP.

1. INTRODUCTION

1.1. The Environment

In recent years, an increasing amount of attention has been focused on the operations of life assurance companies and the uses of appraisal values in analysing the operations of such enterprises. Some of the situations in which appraisal values have been used are as follows:

– as a basis for valuing life assurance companies which have been offered for sale;
– in the defence of a takeover bid for a quoted life assurance company;
– in assessing the financial implications of a potential merger of a life office with another financial institution;
– as input to the offer document for the listing of a financial group including a life assurance operation;
– in order to account for a life operation on a realistic basis;
– in order to place a more realistic value on the majority holding of an unquoted life assurance company by an investment trust;
– as a contribution to management information systems designed to disclose the effective progress of a proprietary life assurance operation; and
– to value shares under share incentive schemes.
In many situations, like those enumerated above, it is necessary to communicate the results of an actuarial appraisal to non-actuaries. It is important therefore that the results be intelligible to the wider financial community. A valuation technique such as a gross premium valuation with the associated actuarial valuation basis, which produces a single figure for the economic value, does not communicate well. A more meaningful approach is to prepare a report giving a range of economic values based on an actuarial appraisal, along with the relevant assumptions employed. From this the reader can gauge the sensitivity of the economic value to changes in the assumptions. In this way a whole 'surface' of economic values can be calculated which should clearly indicate the critical assumptions in the appraisal and thus the main risk factors.

It is likely that a potential purchaser of a life assurance company would have a view on many of the assumptions to be used in an actuarial appraisal. Two significant assumptions are the risk rate of discount to be used in the calculations and the level of future new business assumed in the projections. Both of these will have an important effect on the value, and it is likely that a buyer or seller will have their own view as to the most appropriate assumptions to use.

An appraisal value may be a one-off assessment to determine the value at the date of the proposed transaction, as in the case of an acquisition; or it may be a periodic assessment of value, as in the case of accounting for life assurance interests. In the latter case it is important that the calculations are carried out on a consistent basis over time.

1.2. The Concept of Value

Value is intangible; it is specific to the item, to the situation and to the party concerned. The value of a life assurance company is no exception. There are, however, elements which can be identified as making up the value of a life assurance company. These are:

- the net worth or capital and surplus;
- the value of the business in force;
- the value of the existing enterprise.

The term 'existing enterprise' can be taken to cover items of value such as capability of management, computer systems, licenses, agencies, name, goodwill and so forth. All of these exist either to service in-force business or to produce new business. If the value of the in-force business and the value of the new business are ascertained, then all of these unquantifiable components of 'plant' are swept up in this definition of value, and it is not necessary to attempt to place a value on each of these items individually.

1.3. Price Versus Value

It is not possible to calculate in advance the precise price at which a transaction will be concluded. However, the economic value is the underlying basis for the price paid. Price is defined as the amount for which a company is purchased in an acquisition transaction. The ultimate price of a transaction is a result of negotiated compromise between the minimum price acceptable to the seller and the maximum price acceptable to the buyer. Value is defined as the economic value or range of economic values derived by employing the methods outlined in this paper.

There are many factors which move the price away from the pure underlying economic value. The price will depend on the willingness of the buyer and the
The Determination of Life Office Appraisal Values

willingness of the seller, the skill of the negotiators on both sides, the supply of and demand for similar enterprises in the market place, the number of other potential buyers interested in the transaction and the possibility of a disputed bid. The extent of ownership and the degree of control envisaged after the transaction will also have an impact on the price. Any attempt to acquire a strategic holding of shares in a life assurance company can have a large influence on the price of the transaction. This is because a point of inflection in the price of additional shares occurs at or around most strategic holding levels. At these points of inflection the buyer’s price tolerance will actually change as the buyer gains in some other way that is unrelated to the inherent value of the company. One of the better known strategic holdings is the percentage of the equity required for effective control of a company. In order to gain effective control of a company buyers are prepared to pay a control premium over and above the perceived economic value. Other examples of strategic holdings of shares in a company occur around the percentage of the equity required to trigger any of the following: public disclosure, partial bids, absolute control, compulsory sale and total ownership.

The ultimate price of a transaction is a complex interplay of the definable and determinate forces with the various undefinable and indeterminate forces at work within the market place.

As with many matters actuarial, the performing of an actuarial appraisal requires the marriage of science and art, and blend of judgement and fact. This paper concentrates on establishing the scientific input for determining economic value and, where appropriate, comments on some of the artistic flourishes to which the actuary can contribute through his knowledge and experience of the life assurance industry.

2. THE APPRAISAL VALUE OF A LIFE ASSURANCE COMPANY

2.1. Definition
An actuarial appraisal value of a life office is a best estimate of the economic value of the expected returns to be achieved by that office on a going concern basis. Put another way, it is a best estimate of the present value of available future after-tax earnings to be generated by that office.

The discount rate(s) used to determine the present value should reflect the risks inherent in realizing such earnings.

2.2. Purpose
Paragraph 1.1. lists various examples of situations wherein an actuarial appraisal value is called for; the purpose of calculating an actuarial appraisal is essentially for one or more of the following:

- To establish the value of shareholder’s interests in prospective earnings.

This may be called for at the time of a takeover, merger, management buy-out, nationalization/denationalization, pay-out of a share incentive scheme and so forth.
To establish a realistic value for accounting purposes.
This arises with the need to produce UK GAAP accounts (see Appendix) or to consolidate a subsidiary life office operation into the parent’s accounts. This need is particularly acute if the life office has been acquired by, rather than developed within, the parent, and so the acquisition price must be ‘accounted’ for.

As input to a management reporting system.
This may enable management to monitor the progress of the life office operation over time. It can be used to establish ‘expected’ values to be monitored and compared with actual outcomes – the analysis of variances being a major objective with equal relevance to mutual and proprietary companies.

To establish the value of future surplus likely to emerge within the life fund of a mutual life office.
This may be used as the basis for determining the terms for demutualization. A corresponding exercise would be appropriate for a proprietary life office in preparation for mutualization.

3. Risk and Return

3.1. Rates of Return
Rates of return are set by the marketplace. At any one point in time the rate of return on a particular stock, or a particular sector of the market, will be dependent on a complex interplay of many factors, some measurable and quantifiable, others immeasurable and unquantifiable. A study by Ibbotson and Sinquefield suggests that over a long period of time a riskless investment will, on average, earn a nil real rate of return. It is generally accepted that investments such as short-term gilts or US Treasury Bills are risk free. Ibbotson and Sinquefield demonstrate that over a long period the rate of return on Treasury Bills tends to track the rate of inflation. In other words, the aggregate risk-free rate of return might be expected to be equal to the rate of inflation when measured over a long time period. The study considers further the long-term rates of return on longer term government stocks and corporate debentures and shows that premiums are paid for the risk of default and the degree of liquidity of the stocks concerned.

3.2. Risk Rates of Return
Risk-free investments such as Treasury Bills are available in the marketplace. Investors do not therefore have to take risks. If investors are to take risks, then they must be adequately rewarded. Historical data suggests that this is the case.
In general terms, the higher the risk associated with an investment, the greater an investor’s expected rate of return. Using historical data, Ibbotson and Sinquefield demonstrate that, over a long time period, investors in equity shares receive a large risk premium. The average aggregate extra rate of return from investing in equity shares of large companies over riskless Treasury Bills is of the order of 6%. The additional premium for equity shares of small companies is a further 4%. In other words, the aggregate risk premium that investors have received in the past for an equity investment ranges from a 6% to a 10% real rate of return. The smaller the enterprise the more risky the investment and therefore
the greater the expected rate of return. Indeed, by looking at the volatility of the annual returns of an equity investment over a period of time as compared with less risky investments, it can be seen that much larger swings in the rate of return occur in equities, indicating that equity shareholders have taken greater risks. Even greater volatility in rates of return is experienced by investors in small company shares.

3.3. The Effect of Taxation on the Rate of Return

In determining an actuarial appraisal value, an assessment is made of the worth of the after-tax residual earnings which the life operation will generate.

If tax were payable in proportion to gross earnings then it would be possible to project pre-tax earnings, and either discount these at a gross rate of return, or to adjust the gross earnings for tax and use a net rate of discount. Since the tax basis of life assurance in the UK is not of this form, the most appropriate approach is to incorporate the tax basis within the projection and hence to project after-tax earnings to be discounted at a net of tax rate of return.

The question often arises as to whether or not this risk rate of return is a true after tax rate, particularly when considering the dividend distribution policy of the life assurance company. As a general rule, if sufficient franked investment income (FII) is available to cover prospective dividends then no advance corporation tax (ACT) will be payable at the time of the dividend distribution. The ACT payable due to insufficient FII being available will only represent a timing difference in the payment of corporation tax unless the company’s position is such that its mainstream corporation tax liability does not fully utilize the ACT paid. The subject of dividend distribution and taxation is a very complex area and the impact of the above factors must be carefully assessed.

The effect of taxation on the gross earnings of a life assurance company is considered in Section 5.

3.4. Risk

The risk rate of return is the rate of return which is commensurate with the level of risk underlying the earnings stream being valued. There are various sources of risk which may have an impact upon the earnings of a life assurance company including:

- Exogenous economic forces.
- Performance of management.
- Risk inherent in insurance products.

3.4.1. Exogenous economic forces

Exogenous economic forces such as inflation, business confidence, unemployment, etc. will have an impact upon persistency of in-force business, levels of new business, real rates of return on assets, and the ability to maintain profit margins on business written.

3.4.2. Performance of management

Investment earnings on assets:

Residual earnings are very highly correlated with the level of earnings on assets to the extent that the return is not passed on to policyholders.

In the case of unit-linked business all of the earnings on assets, except for the management fees, will usually be passed on to policyholders (provided of course
that asset units and liability units are strictly matched, which is nearly always the case). In the case of with-profit business the bulk of the earnings on assets will be passed on to policyholders by ways of bonus distributions. All of the investment earnings on assets backing non-profit business in excess of the interest rate assumed in the pricing basis will generally be for the shareholders' account (assuming that non-profit business is a shareholder rather than a policyholder investment). Shareholders will be entitled to all of the investment earnings on shareholder capital and surplus.

The amount of additional earnings on assets will be dependent to a large degree on the extent that assets and liabilities are mismatched. A certain amount of mismatching is unavoidable and even desirable; however, taken to extremes it will threaten the solvency of the company. It has often been stated that with-profit business has the luxury of a bonus loading 'cushion' and that a more flexible investment policy can be adopted in respect of the assets backing this business. Whilst this is true, it is also true that a reduction in bonus rates can have a severe impact on the persistency of the in-force business and may also give rise to problems in respect of policyholders' reasonable expectations. Future new business levels will also suffer, particularly if the bulk of the new business is written through a broker salesforce.

In-force business:
Anticipated profit on the in-force business depends on management's ability to service the portfolio efficiently and effectively. The value of future profits on the in-force block of business is usually very sensitive to future lapse rates, to the level of future maintenance expenses and to the interest rate assumption for non-profit business.

Future new business:
The ability to market profitable new business successfully requires management to be capable of maintaining competitive pricing and profit margins simultaneously, as well as developing an appropriate and effective distribution system.

3.4.3. Risk inherent in insurance products
Although product development over the past two decades has achieved a significant transfer of the risk in policies from the life office to the policyholder (e.g. investment performance, expenses and even mortality charges), there remain substantial elements of risk to the life office. This is particularly true for those offices which have not adopted the current generation of 'low risk' products, although the cushion of the traditional bonus loadings is usually available to these offices.

The inherent risks may relate to the possible variation in the underlying decrement rates, in an adverse random variation in decrement rates, or to the actual renewal expenses exceeding the expense allowances available. Another element or risk arises from investment guarantees inherent in minimum maturity benefits on certain policies. However, life offices have made the policyholder share a significant part of these risks by allowing him to participate to a large extent in the actual experience of the office in return traditionally for a substantial bonus loading and lower profit margins to the office. The current generation of
non-profit unit-linked products offer the policyholder ‘immediate’ distribution of experience earnings in return for his assuming a larger part of the risk.

3.5. Different Risk Classes
The risk discount rate is expected to account for a diverse range of risks; in fact the range is so diverse that it may be too much to expect one risk discount rate to allow adequately for each of the risks involved in assessing the actuarial appraisal value. To this end, various discount rates are used in this paper to reflect different risk classes. Separate risk discount rates may be used for:
- Valuing the net assets of the company. For example, these may be taken at market value.
- Discounting the earnings flow of a policy after issue. For example, in the case of valuing business already in force and new business immediately at the point of sale.
- Discounting from a prospective date of issue to the appraisal date. For example, valuing business which has yet to be sold.
- Valuing capital committed to meet any surplus requirements. For example EEC solvency margins.
- Differentiating between different classes of policy (e.g. with-profit and non-profit policies) which present different risks.

3.6. The Central Rate
A central risk discount rate is defined as the rate used to determine the present value of future earnings, either on existing policies or at the point of issue of new contracts. This rate must take account of all the risks identified above except those associated with achieving future sales - i.e. the central risk discount rate is only concerned with risks after the sale of the policy.

Over the last decade central risk discount rates varying from 10% to 18% have been used in estimating actuarial appraisal values. The most commonly used rate over this period is 15% which appears to have been a widely accepted rate in a willing buyer/seller situation.

3.7. Aggregate Rate of Return
The aggregate rate of return is defined as the return on the investment implied by the total appraisal value assigned to the life assurance company being valued. (i.e., it is the overall rate of return on the capital that would have to be invested in the event of an acquisition at the appraisal value.) The aggregate rate of return implied by a given appraisal value is further discussed in Section 6.

4. PROFITABILITY

4.1. Profit Tests
Profit tests underlie the basis of calculations of two of the components of value in an actuarial appraisal, namely the value of the in-force business and the value of future new business.

For more than twenty years, profit testing has been recognized as a major tool available to actuaries involved in product development work. Many papers have now been written on the use of profit tests in the calculation of gross premiums.
The algebra for developing profit profiles is well documented in papers such as Smart's on pricing and profitability. We do not therefore propose to go into great detail on the subject in this paper.

A profit test uses projection mathematics to establish, *inter alia*, the prospective profit profile of a policy on a given set of assumptions. The resulting profit profile is discounted at a risk rate of discount to give the present value of future profits. A major strength of profit testing over conventional gross premium formulae is its ability to incorporate the statutory reserving basis independent of the assumed rate of return. This is achieved by establishing the increase (decrease) in reserve as an item of outgo in the cash flow projections.

4.2. Profit Signatures (Non-Profit Business)

The profit profile derived from a profit test is the stream of profits which flow from the policy over its lifetime. The shape of the profit profile varies greatly from product to product and will depend upon the experience assumptions incorporated into the profit test. The profit profiles are the bases of evaluating the economic value of the company. In this paper these profiles will be referred to as the product's 'profit signature'.

Exhibit 4.1. shows typical profit signatures for a front-end loaded unit-linked ten year endowment and a traditional non-profit ten year endowment.

As the graphs in Exhibit 4.1. show, compared with the unit-linked contract, the conventional contract has a much greater strain in the first year followed by a stream of much larger profits. This is due to the much higher reserves required in the first year for the traditional contract, as no Zillmer adjustment has been made. The present value of future profits at point of sale is the same for both contracts assuming a 15% risk rate of discount. Of course, once the products are in force then the conventional endowment will be worth much more than the unit-linked contract. It will, however, have consumed substantially more capital when issued. These two profit signatures have been chosen to be at extreme ends of the spectrum for illustrative purposes. Within these extremes are a whole range of different profit signatures associated with various types of products.

Exhibit 4.2. shows the present value of the future profits remaining at the beginning of each year discounted at 15% for the profit signatures shown in Exhibit 4.1. over the lifetime of each policy.

The graphs in Exhibit 4.2. demonstrate the dramatic differences in profitability between different classes of business in force. It can be seen that in the first time period (i.e. at point of sale) the present value of future profits in both cases is equal to £100. However, at the beginning of the second year the unit-linked contract is worth £250 and the traditional contract close to £750.

Exhibit 4.3. shows the impact of a change in valuation basis after five years on the profit signature of a traditional ten year non-profit endowment. Moving from a weak valuation basis to a strong valuation basis after five years caused a valuation strain of around £400, followed by a much larger stream of future profits. Moving from a strong to a weak valuation basis causes a large release of around £750 followed by a much smaller stream of future profits.

Exhibit 4.4. shows the present value of future profits remaining at the beginning of each year discounted at 15% for the profit signatures in Exhibit 4.3. over the lifetime of each policy. The graphs demonstrate the dramatic effect a change in
valuation basis can have on the profitability of the in-force business. Such changes, of course, are to some extent offset by changes in the net worth.

4.3. Profitability of With-Profit Business

Most of the theory behind profit testing has been developed for non-profit business. However, the theory can be generalized, with some modifications, to encompass with-profit business.

As in the case of non-profit business, it is necessary to establish cash flows incorporating the increase/decrease in reserve as an item of outgo in the cash flow projection. The increase in reserve will reflect, in some way, the amounts set aside
for declared bonuses and an amount in respect of future bonuses (either explicitly or implicitly depending upon the valuation method adopted). An additional item of outgo is the transfer to P&L of the shareholders’ portion of the cost of the declared bonus. In a with-profits office the shareholders are generally entitled to a given percentage of the distributed surplus. The shareholders interest will be given by:

- The P&L transfer in respect of the shareholder’s portion of the cost of bonus.
- The residual surplus after distributions to both shareholders and policyholders (i.e. the transfers to and from the estate).

The Memorandum and Articles of Association of the life office will generally refer to the terms on which surplus is divided between the policyholders and the shareholders. Additionally, section 30 of the 1982 Insurance Companies Act
Exhibit 4.3

IMPACT ON PROFITS OF A CHANGE IN VALUATION BASIS

£'s

YEAR

WEAK/STRONG

£'s

YEAR

STRONG/WEAK
governs the rate at which the shareholders’ proportion of the surplus can be increased. Typically, however, the office would be a ‘90/10’ office, meaning that the policyholders and shareholders are entitled to 90% and 10% of the distributable surplus respectively. The P&L transfer in respect of the shareholders’ interest is more precisely defined as 1/9th of the cost of the declared bonus. Additionally, the shareholder has an interest in 10% of the transfers to and from the estate.

An important feature of the surplus distribution system is that the shareholders’ interest in the estate is generally in excess of 10%. This is because, in respect of
the reversionary bonus, the bonus reserve set aside out of the current year's surplus generates interest surplus in each future year (because the implicit valuation rate is less than the earned rate) out of which shareholders will get their portion; i.e. by using a low rate of interest in a net premium valuation, a high cost of bonus amount is produced of which the shareholders are entitled to 1/9th.

Paradoxically, the more conservative the valuation basis (i.e. the lower the valuation rate of interest) the greater the shareholders' interest. The shareholders' proportion in respect of the reversionary bonus would only be exactly 10% if the valuation basis corresponds to anticipated experience. With regard to the terminal bonus, the shareholders' proportion is, of course, exactly 10% as the terminal bonus is paid for out of the current year's surplus and therefore no reserve is required.

4.3.1. Profit Signatures (with-profit business) Exhibit 4.5. shows the profit signature for a with-profit endowment, along with the shareholders' portion of the transfers to and from the estate.

The shareholders' interest in respect of a with-profit policy is 1/9th of the cost of declared bonus plus 10% of the surplus emerging each year after distributions to policyholder and shareholder.

5. CONSIDERATIONS AFFECTING THE CHOICE OF ASSUMPTIONS AND THE ACTUARIAL BASIS

The assumptions to be used in an actuarial appraisal value may be divided into the following three categories:

(i) The economic assumptions:
   - Interest and capital growth.
   - Inflation of maintenance expenses.

(ii) The demographic assumptions:
   - Mortality and morbidity rates.
   - Policyholder surrender rates.

(iii) The expense loadings:
   - Initial expenses.
   - Maintenance expenses.

5.1. Setting the Assumptions

As with any actuarial exercise, the setting of the assumptions is one of the most difficult tasks of an actuarial appraisal, requiring considerable judgement and expertise. A small change in certain critical assumptions can have a very large impact on the appraisal value.

The assumptions should be as up to date as possible, based on the company's own recent experience and they should be realistic (expected value) incorporating no explicit margins for adverse deviations. Risks of adverse deviations are substantially dealt with by the use of a risk discount rate. The company's experience should always be compared with an industry standard to ensure that distortions are not occurring due to the size of the sample, lack of a sufficient
Exhibit 4.5

PROFIT SIGNATURE – WITH PROFIT ENDOWMENT

SHAREHOLDERS' PORTION OF THE COST OF BONUS

-250 - 0 250

SHAREHOLDERS' PORTION OF TRANSFERS TO AND FROM THE ESTATE

-250 - 0 250
number of years history, etc. If there are significant deviations from industry norms then this should give rise to further investigation.

The setting of the assumptions demands that predictions are made as to the future course the experience is likely to follow. For assumptions such as interest, dividend growth, inflation and capital growth this is impossible to forecast with any certainty. However, the important point is to achieve consistency over the long term between the rates of interest, rates of inflation and risk discount rates. In the case of with-profit policies the assumed future bonus rates and future interest rates are closely related.

5.2. Sensitivity Tests

The critical assumptions can be determined by performing sensitivity tests. At this stage such tests need not be performed on the whole portfolio of business. They can be performed on an individual policy basis. Examination of the profit signatures under different assumptions will give a good indication of which parameters are critical. The interaction between assumptions can also be tested.

5.3. The Economic Assumptions

5.3.1. Interest and capital growth

The interest assumption will vary by class of business. For example, the interest rate assumption on a block of single premium guaranteed income bonds will closely follow the interest yield on matching assets, there being a slight reinvestment of investment income risk. By contrast, the interest assumption for a block of regular premium business will depend both on the interest yield on current funds and on the expected rate at which new money may be invested each year.

The interest and capital growth assumptions for unit-linked business is not usually so critical, as nowadays all investment income and capital growth, after allowing for the annual management charges and for the effect of taxation, goes to the policyholder. An exception would be a large block of single premium business where the interest and capital growth assumption would be more important. In theory there should be a difference between the rate of interest assumed for traditional with-profit and non-profit business, to allow for the greater degree of investment flexibility on with-profit business. In practice, consideration of the interest and capital growth assumption for with-profit business cannot be divorced from the consideration of future bonus rates, both reversionary and terminal. It is usual in appraisal value projections to assume that the reversionary bonuses will be maintained at current levels. When projecting future reversionary bonuses, consideration must of course be given to policyholders' reasonable expectations. The treatment of terminal bonuses is less clear as the terminal bonus rate is much less stable than the reversionary bonus rate. Also, it is often stated that terminal bonuses arise as a result of the desire to distribute excess capital growth. This is probably not so true nowadays although terminal bonuses have been cut when a downturn in the stock market occurs. The payment of a terminal bonus will however have an impact on the profitability of the business as the shareholders will receive a percentage of the cost of bonus. In general the current level of terminal bonus will be included in projections unless the rate is unrealistically high and unsupportable.
Whatever assumptions are made as to future interest and bonus rates, projection must be performed showing the impact on the estate of different interest and bonus rate assumptions.

5.3.2. Taxation

Detailed consideration of the taxation basis of Life Assurance Companies is beyond the scope of this paper. There are, however, tax issues that have to be considered when performing an actuarial appraisal value. The tax position of the office can have a major impact on the value assigned to the office.

Life assurance companies pay tax on an interest income less expenses of management basis (‘I-E’) in the life fund and on a profits basis in the pension business fund and general annuity fund. Provided that the company under consideration is paying tax on an I-E basis and on case VI profits then it is a relatively simple matter to allow for the effects of taxation on the projections by assuming that all income is taxable and all expenses are deductible in the life fund and profits are received net of tax elsewhere. If, however, the company is not in a tax-paying situation, as is usually the case for a new life assurance company, then other considerations apply. In this case the company will generally have a cumulative excess of management expenses over investment income. This is generally termed an ‘excess expense asset’ as the existence of such expenses means that tax will not be payable on interest received up to the amount of excess expenses. If the business is valued assuming tax is payable immediately then a value equal to the discounted value of the tax not payable can be ascribed to the excess expenses. It may be possible to utilize some or all of the excess expenses by calculating the statutory reserves on a gross basis rather than a net basis (effectively reducing the reserves) and allowing the decrease in reserves to fall into net worth. Alternatively the excess expenses can be valued by discounting the tax that will not be payable in the future at the risk rate of return. It should be noted that in the first case the effective discount rate is the valuation interest rate and would therefore attribute a higher value to the excess expenses (as it is almost certainly lower than the rate of discount).

The methodology outlined above essentially values the excess expenses of management using a closed fund approach. A consequence of this is that the new business will be less profitable than new business in a life company that is able to relieve expenses of management immediately as there will be a deferment of the tax relief and therefore an interest loss on initial expenses. The way this is allowed for in practice is to use a lower rate of tax relief for the initial expenses in the new business projections to reflect the period of deferment.

5.3.3. Inflation of maintenance expenses

Inflation rates are no easier to forecast than interest rates. What is important, however, is consistency between the two assumptions. Over the long term an inflation rate of 2½% – 3% below the long-term rate of interest would seem appropriate (even though current experience indicates a much wider gap).

5.4. The Demographic Assumptions

5.4.1. Mortality and morbidity

The factors which affect mortality are: attained age, duration in force, underwriting standards, sex, other risk classifications (such as smoker/non-smoker), policy type and amount of insurance.
It would be usual in an appraisal value calculation to use a standard mortality table adjusted to reflect the company's own experience.

Risk premium reinsurance costs can be allowed for by an adjustment to the mortality rates.

Similar considerations apply to morbidity rates.

5.4.2. Policyholder surrender rates

Whilst standard tables exist for mortality rates and companies are able to predict with some confidence their expected experience compared with the standard, the same is not true for policyholder surrender rates. Persistency will vary significantly from one company to the next, which may be attributed to the distribution systems, underwriting standards and other factors. Industry experience, therefore, is not usually a reliable guide for a particular company.

Economic conditions can significantly affect persistency; a downturn in the economy can lead to a large increase in surrender rates.

In general the best guide is the company's past experience where sufficient data exist.

5.5. The Expense Assumptions

5.5.1. Initial and maintenance expenses

Most companies generally have an expense analysis available. The expenses will usually be subdivided into the various functional categories. From this analysis the expenses can be allocated into the various loading categories shown in Table 5.1.

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<th>Maintenance Expense</th>
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</table>

One of the more difficult areas of expense allocation is that of the indirect costs or overheads. These expenses are not usually related to number of policies, sum assured, premium or commission. It is important, however, that the total of all expenses identified in the expense analysis add up to the company's actual expenses, both direct and indirect costs.

Once the expense analysis has been completed the expense loadings or allowances can be derived using standard actuarial techniques. Sometimes the expense assumptions derived using the above methodology may be so large as to make the business unprofitable. This may be the case for a developing office which has priced its business using expense allowances that are lower than the
actual expenses it is incurring. In this case it might be admissible to value the
business using the allowances and make a provision for the excess expenses being
incurred. The excess of actual expenses over expense allowances is generally
termed an expense overrun. It is, however, dangerous to assume that the expense
overrun will just disappear over time as there must be logical reasons for assuming
that the company's unit costs will ultimately fall within the allowances. This is
further commented on in Section 6.

6. METHODOLOGY

The basic concept underlying an actuarial appraisal value is to calculate the
present value of all of the future profits expected to emerge from the life
assurance operation at risk rates of return. In practice the actuarial appraisal
value is calculated by subdividing the process into three elements of value
identified in § 1.2.; namely:

(i) The adjusted net worth: The present value of net free assets available to shareholders
including any amounts required to cover EEC solvency margins or other surplus requirements.

(ii) The value of business in force: The present value of the shareholders' portion of profits expected
to emerge on the in force business.

(ii) The value of future new business: The present value of the shareholders' portion of future profits
expected to emerge on future sales.

The combined value placed on the net worth, the in-force business and the
future new business represents the value of all future profits expected to emerge
from the operations of the enterprise.

6.1. Adjusted Net Worth

The adjusted net worth should, in theory, be one of the more routine
calculations to perform in an actuarial appraisal value. However, in practice, it
often turns out to be one of the most detailed calculations. This is because most of
the adjustments that have to be made throughout the appraisal value process are
generally swept up in the definition of adjusted net worth. These adjustments
occur for a variety of reasons.

The accounts will contain shareholders' assets which will have been implicitly
discounted at a number of different discount rates. The discount rates will not be
equal to the central rate of discount except perhaps coincidentally. Consideration
has to be given to whether discounting at the central rate of discount is
appropriate for all of the adjusted net worth, part of the adjusted net worth (e.g.
that part required to cover EEC solvency margins) or none of the net worth.

It is likely that any change made to the net worth will inevitably have an impact
on the tax liability. An allowance should be made for this.

Items such as deferred tax liabilities or values of excess expenses carried
forward as discussed in § 5.3.2. are generally included in the adjusted net worth.
6.1.1. *The adjusted net worth attributable to shareholders*

The adjusted net worth is based on the net worth as *disclosed* in the insurance company returns to the Department of Trade and Industry ('The DTI accounts'). The *disclosed net worth* is equal to the shareholders' funds (capital and reserves) plus any surplus in the life fund. (The surplus in the life fund taken into account in the disclosed net worth is limited to the shareholders' interest in that surplus.) The surplus in the life fund is taken as the shareholders' interest in the surplus carried forward unappropriated plus any excess of assets over liabilities in the life fund less an allowance for deferred taxation on the excess assets.

The *adjusted net worth* is equal to the *disclosed net worth* plus or minus adjustments.

Adjustments to the disclosed net worth are required for a variety of reasons including:

(i) To adjust the values shown in the accounts to be consistent with the projection methodology used to calculate the value of in-force business. Strictly speaking this should usually be an adjustment to the value of the in force, but it is generally adjusted for in the net worth.

An example of this type of adjustment is the elimination of commissions paid but unearned if shown in the accounts as an asset and included in the value of the in-force by virtue of the mechanics of the projection method used.

(ii) To make allowance for items not included in the accounts and to identify margins in the accounts which are available to shareholders in establishing a 'going concern' value as opposed to a breakup value.

Examples of these types of adjustments are as follows:

- The elimination of 'over conservative' margins in reserves held within the life fund, and the strengthening of any under provisions in the reserves such as:
  - general contingency reserves where all specific risks are adequately covered by other reserves;
  - specific reserves held for substandard risks if experience indicates that the basic reserve is adequate;
  - contingent liability reserves (e.g. for capital gains tax or for *canceled from inception* policies) to the extent that they exceed 'prudent' reserves.

In each case it is necessary to adjust for any tax liability that may arise as a result of the release of these reserves to shareholders' funds.

Generally speaking any adjustments to the net worth due to over or under provisions in the actuarial reserves would be fully discussed with the appointed actuary (provided that the appointed actuary is aware that the appraisal is being performed).

- Valuing on a discounted basis non-interest bearing assets (e.g. agents' balances) and low interest bearing assets (e.g. low interest bearing mortgages held at face amount). The hidden 'cost' of holding such assets must be recognized.

- Valuing, on a market basis, assets held in the accounts at cost (e.g. an investment in a subsidiary with unquoted shares).

- Exceptional items of income or expenditure, or exceptional items affecting
asset values, which have taken place since the account date and which are not reflected in the accounts (e.g. exceptional investment gains realized after the account date).

- The inclusion of 'non-admissible assets' at full market value. The value of assets in the Life Fund shown in the DTI accounts is determined in accordance with the Valuation of Assets Regulations which may limit the value placed on certain assets and require the total exclusion of others.

The above adjustments to the net worth are only illustrative of any number of adjustments that might be required. The actual adjustments will vary considerably from one appraisal value to the next. The important principle is to ensure that a consistent method is used when assessing the various components of value.

6.1.2. The value of the adjusted net worth

The previous section identified all of the assets on a consistent basis which make up the adjusted net worth. There are various ways in which the adjusted net worth can be valued for incorporation into the actuarial appraisal value:

(i) **The explicit discount method**: The income expected to be generated by the assets backing the adjusted net worth can be projected forward. The value of the adjusted net worth is determined by discounting these cash flows at an appropriate net risk rate of return.

(ii) **The market value method**: The assets backing the adjusted net worth are taken at their full market value.

(iii) **The solvency margin recognition method**: A mixture of (i) and (ii) above.

(i) **The explicit discount method**

This method of valuing the adjusted net worth appears to be the theoretically most satisfying as it is consistent with the methods used to value the business in force and to assess goodwill. However, there are practical difficulties associated with valuing certain types of assets in this way. For example, the projection of future investment income expected from a portfolio of equities requires that assumptions be made as to future dividend rates, capital appreciation and date of disposal of the stock. Additionally this method does have some peculiar characteristics – for example:

- Since the risk rate of return used to discount the cash flows generally exceeds the rate of return assumed to be earned on the assets, an injection of new capital into the company would be immediately written down – a capital injection of £2m assumed to earn 7½% p.a. net in perpetuity would be written down to £1m if discounted at, say, 15%. To say the least, this may cause certain presentational problems especially to non-actuaries and to shareholders. Ultimately however, there may be an offsetting increase in goodwill assuming that the new capital will in fact be employed to support increased levels of new business.

- Given that net worth has the most tangible base of the three components of value, many investors will be disconcerted to have this one 'real' item of value substituted by an exercise in projection mathematics.
This method does however have some advantages:

- Investors in any enterprises are familiar with the concept of buying a future stream of earnings and to discounting the stream to produce a value.
- The method allows for a uniform rate of discount to be used throughout the actuarial appraisal value.
- A uniform rate of discount produces a specific expected rate of return on the total appraisal value assigned. This may be a more meaningful result to a user of the valuation.

(ii) The ‘market value’ method

Under this method the Adjusted Net Worth is taken as calculated above in § 6.1.1. (generally market value). This involves an implicit discount rate. In the case of quoted securities, this discount rate will be set by the market-place; in the case of properties it may be set by a firm of property valuers; and for other assets the implicit rate of discount may have been set by the Directors. Under this approach the total return on capital (being the appraised value for the company) will be a weighted rate of return of those rates used to discount the in-force business, the future new business and the yield on assets implied by the market values used in assessing Adjusted Net Worth.

(iii) The solvency margin recognition method

In calculating the value of the Adjusted Net Worth using the market value method, the full face amount of surplus in the life fund is brought into account and assumed to be available for distribution to shareholders immediately. However, the amount of surplus that is required to be maintained to meet EEC solvency margins is not available to shareholders immediately. The question arises as to whether this element of value should be discounted to allow for the fact that the matching assets will earn less than the risk rate of return being used to value the in-force business.

There are strong arguments to suggest that the assets backing the net worth required to meet EEC solvency margins, or any other surplus requirements, should be discounted at the risk rate of return being used to value the in-force business. In order to avoid the problems associated with discounting the net worth, the adjusted net worth can be valued using the market value method. An adjustment to reflect the lower value attributable to those assets required for EEC solvency margin purposes can be made to the value of the in-force business.

Of course, in a fund writing with-profit business this adjustment is applied only to that proportion of the EEC solvency margins which corresponds to the shareholders' interest in the total surplus.

6.2. Value of Business In Force

6.2.1. The value

The actuarial appraisal value assigned to the in-force portfolio is the discounted present value of the shareholders' portion of the estimated future after tax profits emerging from this business where the present value is determined using a
discount rate commensurate with the risk associated with the realisation of such profits.

The determination of an appropriate rate of discount will depend on many factors as discussed in Section 3. and will be unique for any particular circumstance. A discount rate of the order of 15% has been the most commonly used rate. However as discussed in § 3.6., discount rates varying from 10% to 18% net have been used in the last decade. In today's climate with relatively low interest rates a discount rate in the 12% to 15% range would seem appropriate.

Profits on a life assurance policy emerge over the duration of the policy as the balance of the cash flow on the policy allowing for, inter alia, the need to establish, and ultimately to release, statutory actuarial reserves. To project profits accurately, both in amount and in timing, it is essential to incorporate a projection of the statutory actuarial reserves which will be held in respect of the policy.

6.2.2. Modelling the in-force block of business

In theory it is possible to project the future profits expected to emerge on a policy by policy basis. As a practical matter, however, the calculations involved in projecting future profits are so complex, that it is usual to build a model of the in-force block. The projection of profits is broken down into various stages which build to a computer model of the in-force portfolio.

These stages comprise:
(i) Analysis of the in-force block of business.
(ii) Establishing model points.
(iii) Measuring the business in force.
(iv) Generating the value of the business in force.

(i) Analysis of the in-force block of business
The first step in building the in-force model is to analyse the in-force block of business into product type and class of business. It is usually essential to have the data subdivided by year of issue and if possible by month of issue (at least for the last two years' issues), as the earnings expected to emerge in future time periods vary significantly according to the duration in force. The data may be further subdivided into quinquennial or decennial age/term cells and additionally into low/high sums assured, low/high premium in force and so forth. The data is analysed until such time as it is thought that each subdivision represents a homogeneous block of business with respect to its profit signature.

(ii) Establishing model points
Having analysed the data it is necessary to establish model points to correspond to each homogeneous block of data. At this stage it is worth re-examining the data for materiality. For example, certain lines of business may be so small that the individual subdivisions contain few policies. In these circumstances it may be reasonable to represent the whole product line by one model point. For other product lines, the in force may be such a large proportion of the total in force that it is necessary to have a large number of model points for each year of issue. Common sense should prevail in determining the total number of model points to be used.

It should be borne in mind that the more model points that are used, the more cumbersome the model and the more difficult it is to perform sensitivity tests and
the like. A slight increase in the accuracy of the model by the addition of more model points may dramatically affect the flexibility.

Once the various subdivisions have been established a ‘typical’ policy is chosen to represent each homogeneous block of business. For each ‘typical’ policy a projection of the cash flows is performed. This projection is achieved using a profit test system which establishes the profit signature of the policy selected. Each representative policy is called a model point.

(iii) Measuring the business in force
For each block of business represented by a model point, it is necessary to establish a measure of the business in force. The units which could be used to measure the in force include:
- numbers of policies;
- premiums;
- sums assured; or
- initial commissions.

It is essential to choose a unit of measurement which accurately reflects the level of profits derived from each unit of business written for all durations in force.

The number of units of in-force business which relate to the model point projection must be determined. For example, if using premium as the unit of measure, £500 p.a. premium may correspond to the model point, representing a typical policy, or if using number of policies, one policy will correspond to the model point.

(iv) Generating the value of the business in force
By applying each homogeneous block of in-force business to the appropriate model point profit signature (allowing for the period for which the business has been in force) and by combining the resulting projected profit streams for all model points, a model of the aggregate ‘expected’ profit stream for the whole in-force portfolio is obtained.

The present value of the in-force business is determined by discounting this projected aggregate expected profit stream at the chosen net risk rate of return.

Generally, the model used will also be capable of generating all of the items of revenue that make up the total cash flows. It is instructive to look at all of the items of revenue; however, for the purpose of determining the value of the business in force, only the profit stream is of interest.

6.2.3. Product characteristics
In order to establish the profit signature for each model point, it is necessary to apply to the actual policy characteristics a comprehensive set of experience assumptions which fall into the demographic, economic and expense categories, identified in Section 5. The policy characteristics include the following:
- the premium rate;
- the policy fee (if any);
- initial commissions reflecting how the commission is paid and over what period it is earned by the intermediary;
- renewal commission rates;
– the actuarial reserve basis;
– the surrender value basis;
– the reversionary and terminal bonus rates;
– the impact of EEC solvency margins, etc;

additionally, for unit-linked policies, items such as:
– the unit allocation percentages by type of unit;
– the bid/offer spread;
– the renewal management fees by type of unit.

Finally, with respect to each model point, it is necessary to identify the ‘typical’ policy which is to be used. This is achieved by making model point assumptions relating to the following characteristics:
– premium and mode of payment;
– sum assured/benefit level;
– entry age;
– term.

The above list is indicative of the type of variables and characteristics for which values need to be assumed. It is not intended to be an exhaustive listing.

The value placed on in-force business is dependent upon the two sets of assumptions noted above, viz:
– the model point assumptions;
– the experience assumptions.

The appropriateness of each of these sets of assumptions must be tested.

6.2.4. Model validation – model point assumptions

The model has been built up by choosing appropriate model points to represent homogeneous blocks of the in-force business. It is important to test that the model constructed, does in fact provide a good representation of the actual portfolio. In order to ascertain whether or not this is the case, the model is tested by comparing the values of a given characteristic produced by the model with the actual value of that characteristic which applies to the portfolio.

Obviously, this test must use a characteristic other than that used as the unit of measurement for the in-force file, as the model character and the actual characteristic will necessarily correspond for that variable. The validation may be made on, for example, one or more of:
– premium;
– sum assured plus declared bonuses;
– non-unit reserves;
– unit reserves.

Additionally, the model may be run in reverse for the years immediately prior to the evaluation date to allow comparison of such items as death benefits, surrender benefits, expenses, commissions produced by the model with the actual results.

If the model values do not validate well against the actual values for the test characteristic, it is then necessary to examine the model to see where large variances exist. For these cases it may be necessary to fine tune or completely reconstruct the model.
6.2.5. Sensitivity analysis – experience assumptions

The experience assumptions are established in the light of experience analyses (e.g. mortality, lapse rates, expenses, etc.) and with respect to market conditions and expectations (e.g. interest rates and expense inflation).

Since the assumptions used are only estimates of future experience, it is essential to analyse the variability in the value of the in-force business which changes in these assumptions will produce.

For example, the impact on the value of in-force business of the following changes may be assessed:

- a one percentage point increase in income on non-unit reserves for conventional contracts;
- a one percentage point increase in unit income for unit-linked contracts;
- a one percentage point increase in the rate of expense inflation;
- a 10% increase in the base withdrawal rates assumed;
- a 10% increase in the level of maintenance expenses;
- a 10% increase in the level of mortality and morbidity rates.

These analyses help to build up a complete picture of the company and are useful in two ways:

Firstly, to highlight which assumptions are more critical in determining the value of the in force, and so to help focus attention on establishing those assumptions.

Secondly, it is possible to adjust approximately the value determined on the standard basis to reflect changes in the assumptions from the standard.

For critical assumptions and for those with a wide range of possible values, it may be useful to assess the interaction of simultaneously changing more than one of the assumptions.

In theory there is no limit to the number of sensitivity tests that can be performed. In practice by running a wide variety of carefully selected tests a complete picture of the 'surface' of values of the in-force business can be built up.

6.2.6. Actuarial reserving basis

The model is usually built around the existing statutory valuation basis on the assumption that it will be maintained indefinitely.

If, for example, a weaker valuation basis were thought to be appropriate (and were expected to be introduced imminently) then the model may be established using the proposed valuation basis. However any contemplated changes to the valuation basis should be fully discussed with the appointed actuary before incorporation into the appraisal value calculations.

A weakening of the valuation basis would produce two changes in the appraisal:

- there would be an immediate release of reserves which would emerge as a positive adjustment to the net worth;
- there would be an offsetting reduction in the value of the in-force portfolio reflecting the smaller reserves available to be released in future and smaller investment earnings.

The net effect would generally be positive since the accelerated release of reserves reduces the amount of capital on which the risk rate of return must be earned unless the assets backing net worth are also discounted at the same risk
rate of return. Effectively, assets are moved from the in force to the net worth component of value. A strengthening of the valuation basis would have the opposite effect.

This may be taken by some to imply that a gross premium valuation would be equally appropriate for valuing the in-force business. However, the model based method has distinct advantages in the flexibility of assumptions, its ability to readily generate a disaggregated cash flow of the in-force portfolio, and its realistic evaluation of the capital required (and the associated costs) under the statutory basis.

6.2.7. The estate

The analysis of the profitability of with-profit business is incomplete without an estimate of the ability of the portfolio to support current bonus rates and the impact of this on the estate. This can be gauged by projecting the existing portfolio with current bonus rates and computing the present value of expected transfers to and from the estate.

Non-profit business, if it is not 100% investment of the shareholders’, will also have an impact on the estate. In this case a projection of the non-profit portfolio must also be performed and the present value of the transfers to and from the estate computed.

The value of the with-profit business is calculated by considering the transfer in respect of the shareholders’ portion of the cost of bonus plus the shareholders’ portion of the transfers to and from the estate in accordance with the methods outlined in § 4.3. Additionally, the shareholders have a deferred interest in the residual estate after allowing for all future transfers to and from the estate in respect of the existing portfolio. In the case of a 90/10 office, the shareholders’ interest will be 10% of the residual estate and this should be allowed for in the appraisal calculations. Using 10% as the shareholders’ proportion is consistent with all of the residual amount being distributed by way of terminal bonus.

6.3. The Value of Future New Business

This element of value is by far the most subjective and the most difficult to which to assign a value. In addition to forecasting the usual economic and demographic assumptions, the calculation of the value of new business demands that sales of new business are forecast by distribution outlet. The probabilities of achieving such sales, and the probability that such sales will continue to be profitable also have to be assessed.

6.3.1. Definition

Goodwill may be defined as the company’s proven ability to make profitable use of its assets as evidenced by continuing new business sold on profitable terms. The value of future new business is closely related to the general concept of goodwill.

For evaluation purposes, this is interpreted to mean the present value of future expected sales which are to be obtained using the existing enterprise structure, including its capacity to recruit and train new salesmen (both direct salesmen and consultants/inspectors).

6.3.2. Modelling the new business

In theory, the most direct approach to assigning a value to the future new business is to project the expected future sales by product line and by time period.
One model point or a series of model points may be chosen to represent each product line making up the anticipated new business. By combining the projection of expected future sales with the appropriate profit signatures for each model point, the discounted value of the ensuing profit stream can be determined.

This modelling process is perhaps an overly detailed and intricate process to go through when in practice assumptions are being made regarding a wide range of new business levels and the continuance of profitable business.

In practice the new business is modelled by taking the present value of expected profits at the point of issue on a recent tranche of new business. The risk discount rate used in this calculation is the central rate of discount used to value the in-force business. Typically, the latest year's new business, for which complete data are available, is used. Occasionally the mix of business may be modified in some way to reflect known changes that will occur in the future; e.g. a particular product(s) may no longer be attractive due to changes in personal tax laws; a new product range has been introduced; etc. The value of last year's new business is derived by combining profit signatures for the model points representing the various product lines with the new business data for the year. The discounted value of the emerging profit stream at the appropriate risk discount rate gives the value of one year's new business.

It will generally be necessary to determine the value of one year's new business separately by distribution outlet. The value of all future years' new business can be estimated from this value of one year's new business.

6.3.3. Additional risks

In Section 3 some of the additional risks which are relevant in assessing future new business are identified. Central to these is the assumption that future new business will be written at assumed levels and will achieve the assumed profit margins. In a competitive environment the downside risk on each of these assumptions must outweigh the converse risks. These risks arise in the time interval between the present and the time of effecting the future new business. In future, once a policy has successfully been placed on the books, it is faced with similar risks as a policy issued today. On this basis, the risk discount rate used for current new business is valid for future new business at the point of issue. The extra risk (or uncertainty) is reflected in the discount rate applied between the appraisal date and the date of issue.

As in the case of assigning a value to the in-force business the most commonly used rate of discount for assessing the value of future profits at the point of sale has been 15% and in today's climate a rate in the 12% to 15% range might be appropriate. The additional rate of discount most commonly used to take account of the extra risk between the appraisal date and the date of issue is 5%, (i.e. if a rate of discount of 15% is appropriate at point of sale, then a rate of 20% is an appropriate rate to discount the present value of future profits at the point of sale to the appraisal date). This additional discount rate, however, is highly variable depending on the type and quality of the distribution outlet under consideration. The additional discount rates used in practice have been as low as 1% to 2% and as high as 10% or more.

6.3.4. Generating the value of the new business

The general approach to valuing all future years' expected new business is to
value the latest year’s new business in accordance with the methods outlined in § 6.3.2. and apply a multiplier(s) to this. The multiplier is an attempt to represent the capitalized value of all future sales. In calculating an appropriate multiplier it is generally assumed that the product mix and hence the profitability levels of future years’ sales is the same as the latest year’s sales. There is, however, an argument that the growth in new business should be offset by an increase in the presale discount rate, because real increases in sales may only be achieved if profit margins are cut. On the assumption that the same new business growth rate and the same risk rate of discount are appropriate rates to use in perpetuity then the value of new business can be represented algebraically approximately as follows:

\[ \text{Value of new business} = PV_0 (l + i)^{1/2} a_{\infty} \]
\[ = PV_0 (l + i)^{1/2} (i - g) \]

where, … the appropriate net rate is \( i \) per annum in perpetuity
… the new business levels are assumed to increase at \( g \) per annum in perpetuity
… \( PV_0 \) is the present value at issue of the latest years new business at the central risk rate of discount

There is a case for assuming that the salesforce is a wasting asset and therefore the assumption of new business continuing in perpetuity is incorrect. However, this ignores the office’s ability to recruit and train new agents. Additionally, the assumption of new business growth at \( g \) per annum in perpetuity, given a high rate of discount \( i \) involved, will not significantly differ from limiting the growth to, say, 15 years, followed by no new business growth thereafter. In any event, the above formula could be suitably modified to reflect, for example, a graded growth rate with no future new business after 20 years if it were thought to be warranted.

The new business multiplier can be defined as \((1 + i)^{1/2}/(i - g)\) based on the above formula. Table 6.1 illustrates the sensitivity of the new business multiplier, to the absolute and relative sizes of \( i \) and \( g \), and also shows the assumptions which may underlie a given multiplier.

Table 6.1 "Goodwill" multiplier

<table>
<thead>
<tr>
<th>Growth rate p.a. gross</th>
<th>Risk rate of discount (i)</th>
<th>0%</th>
<th>10%</th>
<th>15%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>7.2</td>
<td>21.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td>5.5</td>
<td>11.0</td>
<td>21.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25%</td>
<td>4.5</td>
<td>7.5</td>
<td>11.2</td>
<td>22.4</td>
<td></td>
</tr>
</tbody>
</table>

As can be seen from Table 6.1 the multiplier is extremely sensitive to the growth rate in new business assumed. As the rate of growth in new business approaches the rate of discount used, the multiplier and hence the value of future business approaches infinity. Clearly this is a totally unrealistic result and emphasises the care which must be taken when setting multipliers.

The mechanical application of a formula to assess the multiplier to be used to value the new business would be wrong. The multiplier ultimately chosen will depend upon the reputation of the insurance company; the type(s) of distribution
outlet (e.g. broker, direct sales, mass marketing, etc.); the quality, the size and maturity of the distribution outlet and the expected growth rate in future sales. The multiplier must be assigned by a valuer with considerable experience in assessing the value of a sales force or any other type of distribution outlet. The difficulty associated with producing a single value for the value of new business generally results in a range of multipliers being used. In today's conditions, it is extremely unlikely that a multiplier outside the range of 0 to 20 times one year's new business should be used. Examples of multipliers that may be used for regular premium business by distribution outlet, are as follows:

- Established broker outlet: 5-8.
- Established direct sales force outlet: 6-12.

Appropriate adjustments would be made for such factors as newly established, poor quality, top quality and so forth. Additionally, different multipliers would be used for group business, single premium business and business sold using direct response techniques.

6.4. Expense Overruns

In Section 5 reference is made to an expense overrun (i.e. actual expenses in excess of those allowed for by the appraisal value expense assumptions). As a general rule it is advisable to use expense assumptions that reproduce the actual expenses. However, in the case of a developing operation the use of actual expense assumptions may produce unrealistic results. In this case it may be justifiable to restrict the expense assumptions to the levels of expense that are considered adequate to meet the ultimate level of recurrent expenses identified in the expense analysis.

The recurrent expenses will include all overhead costs associated with maintaining the existing systems including, for example, the costs of recruiting and training replacement salesmen.

It is necessary to establish the source and nature of the non-recurrent expense to determine whether or not it will be incurred in the future. The non-recurrent items identified (for example, the costs of relocating to a new office building) can be eliminated from the assessment for future expense assumptions. If, however, it reflects expense as a result of restructuring or systems development and implementation, there may be grounds to expect this source of non-recurrent expense to run-off over the development period, rather than to cease forthwith. Under these circumstances, it is necessary to estimate the amount and timing of the 'expense overrun' and to capitalize it (net of tax) as a liability.

6.5. Summary

6.5.1. Appraisal value

The methodology for calculating the various components of an actuarial appraisal value has been developed in §§ 6.1 to 6.4. The actuarial appraisal value can now be defined as the sum of:

- the adjusted net worth;
- the value of the in-force business;
- the value of new business;
- less the capitalized value of any expense overruns.
The adjusted net worth would generally be valued using the market value approach. Although some allowance should be made to reflect the fact that part of the net worth is required for EEC solvency margin purposes and hence would not be immediately available for distribution to shareholders.

The appraisal value would generally be calculated using at least two rates of discount and the new business would be valued using a range of multipliers. The results of an actuarial appraisal value would be presented as a range of acceptable values.

6.5.2. Aggregate rates of return

If, in the appraisal value calculations, a uniform rate of discount of say 15% is used throughout, the net worth is fully discounted and it is assumed that there is no additional risk involved when discounting the new business from the point of sale to the appraisal value date, then the expected after tax rate of return on the total appraisal value assigned to the company would be 15%.

This however is not generally the case and the rate of return is not usually determined or presented in actuarial appraisals. By examining the value assigned to each individual component and by calculating the yield on each component of value, it is possible to determine an aggregate rate of return on the appraisal value assigned to the company.

6.5.3. Control premium

The actuarial appraisal value methodology developed in the paper appraises a life assurance company on a willing buyer/willing seller basis. It might best be described as the price that should be paid for individual shares in an insurance company bought for investment purposes. In § 1.3. a number of reasons are identified as to why the price paid may not equal the actuarial appraisal value, control of the company being one of the reasons.

In most acquisition situations, control of the company is transferred and thus the price tolerance of the buyer changes. The amount of premium paid for the control of a company (i.e. the excess of the price paid over the actuarial appraisal value) can vary enormously and will be unique to any given situation. It will depend on the willingness of the buyer and seller, on the skills of the negotiators on both sides of the transaction, on the size of the company and its reputation and many other factors. Control premiums can be, and have been, in the range 0% to 100% of the actuarial appraisal value. A more reasonable level for the control premium would, however, be in the 10% to 20% range.

In the case of a forced sale the company may be sold for less than the appraisal value. This could be viewed as a negative control premium.

7. Conclusions

The principal purpose of this paper is to document a scientific method of establishing the economic value of a life assurance company which is in common use in the UK. No originality is claimed; it is hoped, however, that general agreement can be reached on the methodology outlined in the paper.

Of particular importance are the concepts outlined in the Appendix on UK Generally Accepted Accounting Principles. A number of companies in the UK
are now publishing supplementary information to their accounts. Certain companies have disclosed additional information in their balance sheets, others have provided information in directors’ reports. Some of the adjustments make use of methodology similar to that outlined in this paper, others employ methodology more akin to US GAAP. As more and more companies adopt varying methods to disclose additional information, the more confusing the picture will become, both from within and outside the insurance industry. Clearly it is desirable to have one uniform approach to disclosure in the accounts. If a consensus is reached on the concepts underlying the appraisal value techniques in this paper and it is thought appropriate to utilize these concepts in the formulation of UK GAAP, then the actuarial profession will be in a strong position to react to the criticisms on the shortcomings inherent in the statutory reporting to the shareholders of UK life assurance companies.

An actuarial appraisal value provides a revealing insight into the workings of a life assurance company, particularly if it is performed on a consistent basis over a number of years. An actuarial appraisal value is a very powerful tool. It can be used in a variety of situations from the acquisition of a life assurance company, where it will form the basis of the price negotiations, to the internal management reporting and control of a company, where it might even be used as a basis for executive incentive compensation schemes. In addition, the methods outlined in this paper have the advantage that they can be understood by both actuaries and non-actuaries and can be seen to be a logical method of evaluating the worth of a life assurance company by potential buyers, shareholders, professional advisors, share analysts and management.

REFERENCES

Introduction

This Appendix examines the possibility of using the appraisal value techniques outlined in this paper to calculate the various components of an appraisal for incorporation into a life assurance company's published accounts.

The Environment

Life assurance companies in the UK are required to file annually with the Department of Trade and Industry (DTI) forms completed under the Insurance Companies (Accounts and Statements) Regulations 1983 having regard to the 1982 Insurance Companies Act and the 1983 Regulations. The purpose of these forms is to demonstrate solvency and to enable the DTI to supervise life assurance companies (they are generally referred to as the DTI returns). The need to demonstrate solvency requires that the reserves are calculated on a conservative basis and full deferral of initial expenses is not usually possible. There may be substantial hidden margins in these reserves and considerable new business strain may result, particularly in the case of a rapidly expanding operation. There may also be margins on the asset side of the balance sheet due to the practice of not writing up the assets from cost to market value. These returns are of little use to the shareholder who is interested in the progress the company has made over the last year, the investment analyst who wishes to value the shares, or the management of the company who may wish to track how well the company has performed over the year. However, this is not really relevant to the DTI where the principal concerns are whether or not the company can demonstrate solvency and satisfy policyholders' reasonable expectations.

A second set of financial statements is prepared in accordance with the Companies Act. These accounts should in theory give a true and fair view of the life assurance company's operations (subject to the use of disclosure exemptions), and allow the financially oriented shareholder or investment analyst to gain an indication of the worth of the company or the movement in value over the period. In this respect these accounts have failed. Only a few minor adjustments to the DTI returns are normally incorporated into the Companies Act Accounts, and therefore they are of little more use to the shareholder, investment analyst or the management than the DTI returns.

Generally Accepted Accounting Principles In The United States (US GAAP)

In the USA, a set of generally accepted accounting principles, known as US GAAP, have been formulated largely by the accounting profession and adopted by the Securities Exchange Commission (SEC). Nowadays all publicly held Stock Life Assurance Companies operating in the USA have to report on a US GAAP basis. The central concept underlying US GAAP is that of matching revenues and expenses attributable to the insurance transaction in each time period by:

- The release-from-risk reserving system.
- Allowing earnings to emerge as a level percentage of premium.
This is basically achieved by restating the statutory balance sheet as follows:
- Computing benefit reserves on a realistic net premium valuation basis with a margin for adverse deviations including the incorporation of a withdrawal assumption into the valuation basis.
- Deferring acquisition expenses at the outset of the policy and amortizing these over the term of the contract.
- Establishing assumptions at the date of issue of the policy for calculating GAAP benefit and expense reserves, to be used throughout the lifetime of the policy. (The principle of lock-in).
- Holding assets at amortized cost.

US GAAP is essentially an earnings based method and does at least produce more meaningful earnings than the US statutory returns. However, it is probably true to say that US GAAP has not completely satisfied the critics of Statutory Life Assurance Company reporting. Many groups of professionals on both sides of the Atlantic, particularly actuaries, are critical about some of the methods employed in producing US GAAP statements. One of the main criticisms is that the reserves bear no relationships to those that the statutory authorities require to be held, and thus the earnings are not distributable and therefore the results are misleading. This is slightly unfair, as many other types of industries report undistributable earnings. However, there are a number of practical difficulties associated with US GAAP, and certain points of principle, such as those of lock-in and not discounting deferred tax assets or liabilities, which make the overall concept of US GAAP difficult to accept. There are also problems associated with defining what expenses are deferrable acquisition expenses. This is a major source of disagreement between accountants and actuaries, particularly in the area of overhead or indirect costs.

The practice of holding assets at amortized book value arose largely because in the past most US companies held their fixed-interest assets to maturity. These assets were mainly backing conventional policies. Nowadays, most US companies are selling interest sensitive products such as universal life, which demand a more active investment policy and a greater awareness of the asset/liability matching requirements. Also, as a result of the uncertainty as to the future level of revenue under universal life plans, it is difficult to apply standard US GAAP techniques to benefit reserve calculations. This is causing many companies to re-examine the GAAP basis for valuing assets and liabilities.

It is likely that any attempt to introduce a reporting system into the UK along the US GAAP lines would be resisted by the life assurance industry and the actuarial profession. However, it has to be said that the life assurance industry must do something about its Companies Act Accounts and its reporting to the public at large.

**UK GAAP**

This paper describes a method of appraising a life assurance company. The method involves calculating three separate components of value, which, once the computer systems are in place, are relatively easy to calculate. The method takes the statutory valuation basis as given, and thus overcomes the objection to US GAAP that an artificial reserving basis is used. The method allows for assets to be held at market value. The method also provides a realistic insight into how the company has progressed from year to year.
Clearly appraisal values could form an important part of the methodology for UK GAAP and it should be possible for life assurance companies' financial statements to show as an additional disclosure to the existing Companies Act accounts:

- The adjusted net worth.
- The present value of future profits generated by the in-force business at the statement date.
- The present value of future profits generated by the previous year's new business at point of sale, by distribution outlet.

The first component, the adjusted net worth, can be calculated using the solvency margin recognition method outlined in this paper. The second and third components can be computed at various rates of discount. The central rate of discount could be disclosed and the change in value for a 1% change in the rate of discount could also be shown in the statement.

Many companies in the UK are already modifying their company's accounts in one way or another. Several companies are using techniques similar to those outlined in this paper. It is hoped that a uniform standard using methodology along the lines of this paper can be developed in the UK.
Mr R.P. Burrows (presenting the paper): Because of the simplified approach adopted in the paper we may have understated some of the practical difficulties that are associated with an appraisal value calculation, which is not a simple matter to perform. There are considerable practical problems. The building of a model office for the first time is a complex exercise requiring a detailed analysis of the office's financial situation. The experience studies required can also be time consuming to produce, particularly, the expense analysis which is a major exercise.

I would like to emphasize that the profit signatures chosen for this paper are not supposed to be real life examples. Neither should the profit signatures be taken to mean that non-profit business is inherently more profitable than with-profit business or vice versa, nor, for example, that unit-linked business has smaller margins than conventional business. The profit signatures presented have merely been chosen to illustrate the point that different classes of business can exhibit remarkably different profitability profiles and that therefore any rules of thumb that might be used to place value on a life insurance portfolio are extremely subjective.

In § 6.3.4 we mention that an appropriate range of goodwill multipliers for an established direct sales force is 6-12, and that an established broker operation is 5-8. We thought that it was important to give examples of ranges that might be appropriate for the two main distribution channels. However, it is not our intention to suggest that these ranges are appropriate for all offices. It will be a mistake for an office with a direct sales force to consider that the correct multiplier for them is in the range 6-12. If the sales force in question is of poor quality, for example it exhibits a very high turnover rate, low average earnings of salesmen and so forth, then the multiplier must be moved downwards and could be much less than 6. Similarly for a rapidly expanding top quality broker operation the multiplier could be way in excess of 8. For this reason it is extremely important that the valuer setting the multipliers has a good understanding of life insurance distribution systems and is not merely applying a mathematical formula.

There are a number of papers worthy of mention that are not in our original list of references. These are: Harroyd and Ferguson, Business Projections: A Critical Approach, The International Congress of Actuaries 1980; Bowles and Turner, Acquisition of a Life Insurance Company: Determination of Value and Price, International Congress of Actuaries 1980; T.S. Bunch, The Valuation of With-Profits Business and the Estate, presented to the Staple Inn Actuarial Society on 2 December 1986; R. Lee, A Profit of Profits, JSS, 28, 1; S. Benjamin, Profit and Other Financial Concepts in Life Assurance, JIA, 103, 233.

Mr J.H. Sutcliffe (opening the discussion): The number of purchases and mergers of life assurance companies, and the greater focus on the management of industries in the United Kingdom over the recent past, makes the timing of this paper very opportune.

The subject has been addressed much more deeply in the United States because of the frequency of acquisitions, mergers and so on of life assurance companies and we should learn from their successes and failures. There are far more owners of life assurance companies that are not life assurance people in the United States and I think this gives some of our American colleagues an advantage in explaining the kinds of methods that are described in this paper to non-actuaries. It is also important to note that there are other groups of people that have strong interests in this subject. Stockbrokers, merchant bankers and other members of the investment fraternity address this issue too. On the other hand accountants, auditors and regulators have another kind of interest.

I believe that the actuarial profession can, and should, make, if not the greatest contribution to this debate, certainly a great one, but I think it is important to remember to say to our students, that they must communicate the results of this kind of work very clearly and very fully, because it is so complex. Any steps we take to accept or to reject the kind of methods that are being proposed have an impact on the way we price our products and probably the products we sell.

Although the paper primarily addresses methodological points, it is important to consider the philosophical foundations on which it rests. One of the first is that accountants have made great,
or at least substantial, play in distinguishing between capital and revenue. Traditionally life insurance companies have not placed the same emphasis on this division and, even with the advent of more sophisticated pricing and measurement tools, aiming at producing rates of return on capital, I suspect that many of our managements are not very clear on the amount of capital consumed and released in their businesses from year to year as distinct from their revenue profits. If they were, some of the items like value of the in force and net worth in the paper would be far more readily available. This paper offers us a valuable opportunity to open up avenues of thought that lead to better measures of capital and hence of return on capital. This presents us with a particular advantage to enable us to compare ourselves with each other, and to compare ourselves with other industries.

One place where this paper could be extended is in considering the capital required for financing future new business. New business growth sucks in capital as is shown in almost all of the profit signatures in the paper. In using a multiplier for calculating the value of future new business you need to be sure that you are not ignoring the fact that further capital may be required. It is also helpful to compare the valuation methods suggested with others. The paper refers to the traditional actuarial gross premium valuation. Clearly the valuation methodology that we have aims at solvency, or perhaps its variant bonus support, rather than profitability or value to owners. All these methods have the weakness that capitalized values often conceal interesting trends and this is shown in several of the papers that are referred to in the references. One advantage of the kind of methods that are proposed in this paper is that it is fairly easy to convert the data that are produced into projections of revenue accounts that underlie the values of the three components. It is very useful in looking at these kinds of results to do so for each of the separate tranches proposed. I believe that the development of these future revenue accounts is more important than the capitalized values. I think it leads to a particular alternative method of valuation that is used in other industries. This is projecting forward the profits over a period of perhaps ten years and looking at the value of the business at the end of the year on a fairly arbitrary method and comparing that with what might be considered as the present value on the basis described in today's paper.

There are other methods of valuation such as price earnings' multiples and multiples of book value. These have the advantage of speed and ease of calculation and can be calculated from published figures, but I feel that the exposure through the appraisal values of items that are hidden in published accounts is of substantial value to an owner or purchaser of an insurance share. I suggest that the comparison of an appraisal value, as described in the paper, with the book value, does give some additional guidance as to the reasonableness of the multiplier that might have been used in valuing future new business.

Another point that is raised in this paper and has been discussed many times is the value of the estate, in particular, to an owner of an insurance company. Implicit in the paper is that the value of the estate in a 90/10 office, is some 10% of its face value to an owner. North American experience, particularly from papers written on demutualization, suggests that at least that portion of the estate that is being left by previous generations of policyholders can be sold and hence valued fully, that is to say if you have a pound of estate you probably have a pound of value which may well produce an estate of value greater than 10%. I also suspect that many shareholders in life assurance companies feel that their interests in the estate are very vaguely defined and consequently feel they are not getting full value. There are several ways of looking at this problem. If you look at the value to a mutual company of the estate of a stock company I think you end up with a different value to that which might be used by one stock company buying another stock company. I think there are many methods that are used in different countries to move the shareholders' proportion above 10% and use of reassurance is one that is quite common in some countries.

Another question that this paper raises is should a stock company, seeking to buy another insurance company or another block of insurance, buy from within its life fund or from within its shareholders' fund? Traditionally businesses have been bought from within shareholders' funds, but it does seem that the estate, which has the purpose of buying and financing your new business, is in many ways a more natural answer. There is no substantial difference between
buying an existing block of business and sending out your agents or your brokers to sell new business.

The paper mentions taxation briefly and rightly points out that this is a very broad subject. I feel that it can be fundamental and can produce an appraisal value, or a variation in the appraisal value, that would swamp many of the other movements considered, and this subject is worthy of full treatment. One of the dangers of the appraisal value method, and the sensitivity tests which I feel are an important part of it, is the plethora of numbers that result and the wide range of results under what seem to be fairly small changes in assumptions. This tends to reduce the credibility of some of the methods of calculation of appraisal values in the eyes of non-actuaries and, returning to what I said earlier, we do need to be careful to present these results well and clearly. We also need to be cautious in looking at someone else's appraisal value. One thing you can be sure of is that if you are buying a company the price the seller wants is likely to appear as the reasonable central column in the appraisal report.

When valuing future new business I find it helpful to have the values of future tranches of business split by product and by year of sale. This too would be a helpful development from the paper. A buyer typically does not want to pay for his own future management efforts. He may be prepared to accept that the existing organization that he is buying will produce, under its own momentum, some declining amount of future sales and this pattern that he might envisage is easier to quantify by splitting the future new business by year of sale.

It is important to recognize that negative values might be attached to future new businesses. This can happen in several different ways: current products may be making losses and as a prospective owner you may not wish to pay for your own product development efforts. In bonus cycles there are clearly periods when new business, looked at in conjunction with current bonus rates, could produce negative values.

Another area where I feel that it would be useful to extend the paper is on the asset side. It is particularly important to think about the accounting policies that would be used after any merger or acquisition or in the course of any use of appraisal values in measuring management performance. The treatment of capital gains can be an important issue, also the treatment of goodwill on purchase. The way in which it is written off can produce substantially different effects on earnings per share. Another effect that probably is of less importance but tends to loom very large, is that of the introduction of this kind of measurement system on a management remuneration scheme. It would need a thorough review of the incentives produced. Also, in using appraisal values for management remuneration, one of the greatest difficulties is the dependence of the results on the assumptions and on changing the assumptions there are discrete jumps in the values. This can make the advantage of the sophistication of the underlying method not so helpful in practice.

Mr Burrows mentioned that the common accounting standard, the UK GAAP needs much more work. I support the general thrust of developing a more common accounting approach for life assurance business. The issue is very deep and I believe that at the moment FASB, the American Accounting Standards Board, is in course of making substantial changes to the current US GAAP methods.

It seems to me that control premiums per se have a value of nil. The reason why you might pay more for control of a company relates to the discount rate that you might be assuming in your calculation. I do not think that any item of the type of control premium, has any value until you can actually determine the ultimate realization value.

Mr A.E.M. Fine: In determining the appraisal value we are discounting projected shareholders' surplus streams. The methods discussed are essentially an approximation to this process. The paper is about whether the approximations can be generally agreed and whether some of the assumptions underlying the projection of future surplus streams can also be agreed.

In § 2.2 there is a reference to mutual life offices being interested in the approach suggested. It might be difficult at first to see how they can benefit from the appraisal value approach, but the determination of a demutualization value on a reasonably consistent basis from year to year can
give the management of a mutual life office an excellent indication of its progress. There is also
reference to the possibility of a proprietary life office preparing for mutualization. While there
have been a number of mutualizations in the past I suspect that in the UK these will become rare,
mainly because of the difficulty in reconciling the unwillingness of policyholders to pay for
goodwill when the share price already includes a significant figure for it.

There is the suggestion in § 3.1 that investments such as short-term gilts or Treasury Bills are
risk-free investments giving a nil real rate of return over a long period of time. I suggest instead
that index-linked gilts should be regarded as risk-free investments, showing a significant positive
real rate of return. Starting with the index-linked gilt as a risk-free investment and allowing for
various gradations of risk in other investments such as ordinary gilts, a suitable model can be
derived for use in the appraisal calculations, for instance, by reference to yields on suitably
chosen gilts and index-linked gilts a market’s view of future price inflation can be obtained. Using
this, coupled with the real rate of return on index-linked gilts, the risk-free rate of return can be
derived, to which can be added some percentage points to obtain the risk rate of return for use in
the appraisal value calculations. On the model used by myself and a number of my colleagues the
market is anticipating 5% p.a. future price inflation and net risk-free rate of return of about 7½%
p.a.

The treatment of tax is always difficult in appraisal calculations. I agree with the authors that
the approach should be to value net after-tax earnings at a net rate of discount and I also agree
with the opener that tax is of fundamental importance. The real problem is to reflect the present
value of the impact of tax without having the benefit of detailed tax projections. The ACT timing
point is mentioned, but I suggest that this is not usually important in practice. Points which are
important in practice include: the treatment of tax on pensions and annuity business and how this
impinges on shareholders particularly in a 90/10 situation and the treatment of tax losses
including Excess E. A way of valuing Excess E alternative to that given in § 5.3.2 is by reference
to the income bond or reinsurance market. The method of allowing for new business Excess E by
using a lower rate of tax relief in the first year in the profit testing is a reasonable one, but the
same rate of tax must not be used rigidly in all cases. A further difficult area in appraisal value
calculations is that of the treatment of Notional Case 1 assessments. With the rate of corporation
tax now somewhere near the base rate tax level one aspect of the Notional Case 1 assessment
(Corporation Tax on shareholders’ income) has become less important. However, where the
company is in a heavily gross position with large amounts of Excess E and the appraisal
calculations are assuming immediate payments to shareholders then the Notional Case 1
calculation is important. Tax arising at the time the payment is made has to be allowed for,
coupled with the value of the additional Excess E so created. Unfortunately the two are not
self-cancelling.

The central risk discount rate is discussed in § 3.6. The rate should vary with market conditions
and in particular should depend on the nature of the contracts themselves. It should also reflect
the requirements of the capital providers (shareholders and with-profit policyholders) and, as the
authors state, in a purchase/sale situation the purchaser or vendor will have his own views. It
should also reflect the variability of the items incorporated in the surplus stream calculations, the
incidence of these surplus streams and possibly also the size of the stream. I do not argue with
the statement that 10% to 18% represents a range of discount rates used over the last decade, but I
do not necessarily agree with the statement that 15% is the most commonly used rate. From
many appraisal valuations and valuations for purchase and sale, it is clear that lower central
discount rates have been in evidence in many cases. The authors suggest a range of 12% to 15%
in current conditions, but I suggest that there are situations where a central rate of discount as
low as 11% or even lower corresponds to the net risk-free rate of return of 7½%.

The reference to the treatment of with-profit business in § 4.3 is particularly important. The
paradox that the more conservative the valuation basis the greater the shareholders’ interest is
first described in Mr Bangert’s definitive paper (JIA, 99, 131).

The overall situation is a function of three interest rates, the valuation rate of interest, the
anticipated experience rate of interest and the shareholders’ discount rate. Simple models that
concentrate on these three rates of interest and ignore other factors such as expenses, mortality,
etc, give a good practical insight into the interactions of the interest rates. The main point in a 90/10 situation is that the shareholders cannot get any surplus without a distribution being made to policyholders. The approach in the profit signature for with-profit business, exhibited in § 4.5 is based on the assumption that 10% of the residual surplus item accrues to shareholders. The practical reality is that the shareholders cannot realize part of the residual surplus without a further bonus allocation. Their share depends on the form of bonus.

In § 5.3.1 the question of whether or not to allow for the continuation of current levels of terminal bonus is raised. This is an important issue in the calculations and the reality is surely somewhere between the two approaches. There is an argument for using higher pre-issue discount rates when the assumption of terminal bonus not being continued is made, on the grounds that because of the competitive situation there is a greater risk of not being able to write the business assumed.

My approach is to determine inflation of maintenance expenses, as referred to in § 5.3.3, by reference to an objective model based on gilts and index-linked gilts, and to bear in mind that offices' expenses are related to salary inflation as well as price inflation. Assumed new business growth might also be related to a similarly determined inflation figure when calculating the goodwill part of the appraisal value.

Adjusting the company's net worth for locking-in is important, as discussed in § 6.1.2. The locked-in element is the greater of the share capital and the explicit solvency margin. An appropriate rate of discount for valuing the locked-in element will be somewhere between the risk-free rate and the central rate of discount. One practical problem is handling future movements in the solvency margin, particularly for business in force. For future new business the margin can usually be handled by incorporating it into the actuarial reserves.

The treatment of the estate and the shareholders' share thereof in § 6.2.7 is very important. Taking the shareholders' interest as 10% of the residual estate is not, in my view, the correct approach, bearing in mind that the shareholders cannot get at any part of the estate without going through the bonus system. The opener discussed this in some detail. For instance, if the estate is distributed by way of terminal bonus on the in-force business the shareholders' proportion could be as low as 5% taking the shareholders' risk discount rate into account. Distribution by way of special bonus on in-force business can produce a shareholders' proportion in excess of 10%. Distribution by using the estate to support future new business can give even higher shareholders' proportion. The right approach in practice is to specify a bonus model.

The valuation of future new business in § 6.3 is obviously important, given the significance of the goodwill element. For with-profit offices I suggest that the best approach is to calculate the goodwill by reference to the term to exhaustion of the estate. Bearing in mind that the estate is being used to support future new with-profit business, a model that values future new business over a longer period than the term to exhaustion seems incoherent. There is a very good discussion of the term to exhaustion point in the paper entitled 'The Valuation of With-Profits Business and the Estate', by T.S. Bunch, presented to the Staple Inn Actuarial Society on 2 December 1986.

The pre-issue discount rate is discussed in § 6.3.3. I take issue with the authors when they say that the additional rate most commonly used is 5%. It very much depends on the situation and the risks associated with the assumption that the current momentum will continue. The nature and type of the distribution outlet is obviously an important factor here. The proportion of the goodwill element to the total appraisal value is also an important factor. Multipliers should be determined by reference to the underlying assumptions.

One key element is the assumed new business growth rate. Frequently the inflation rate is used here on the assumption that the market will increase in line with inflation and the office will retain its current share of the market. For some situations there are arguments for incorporating higher new business growth rates using management forecasts, although the effects of this might sometimes be reduced by using a higher pre-issue discount rate. In some cases it might be appropriate not to include any significant new business growth assumption. There may be circumstances where this type of method is not appropriate for valuing goodwill and alternative approaches have to be considered such as valuing the established sales force directly by perhaps
assigning a value to each trained agent. Mr Smart's paper (JIA, 104, 125) gave an excellent example of this process.

There is a reference in the Appendix to US GAAP at least producing more meaningful earnings than US statutory returns. I would dispute this. It is the statutory return that determines distributions to policyholders, dividends to shareholders and tax payments. Any method of reporting earnings that totally ignores this approach is surely deficient.

I welcome suggestions made for UK GAAP in principle, an idea alluded to in Professor S. Benjamin's paper (JIA, 103, 233) but if figures are introduced into accounts, users of these accounts might want to understand the reasons for changes from year to year. A clear analysis of such changes in the appraisal value might be required and such an analysis could provide competing companies with useful ammunition. The basis might have to be shown in some detail and perhaps some standardization might be called for even though no two companies are alike. Also there may be tax problems. Before any general move in this area we need to sort out these problems and satisfy accountants and others that the authors' UK GAAP suggestions will be doing a useful job in practice.

Mr C.J. Hairs: I am uncomfortable with the paper and feel at the very least that we are not yet ready to use this method for UK GAAP. The appraisal value approach was developed in the context of unit-linked business and has been applied with some success to various forms of non-profit business, but I do not see evidence that the general problem of adapting the approach for with-profit business has yet been resolved. Also, the way the paper deals with the shareholders' interest in with-profit business seems too simplistic.

Suspicion is aroused in § 5.3.1 where it is stated that it is usual to assume that current reversionary bonus rates will be maintained. With less certainty it is suggested that the same approach would, in general, be adopted for terminal bonus unless the rate is unreasonably high and unsupported. It is very hard to feel comfortable with this approach when support of current bonus rates requires gross investment returns of 16%, 17% or more. What would the current best estimate of investment return be?

The paper quite properly qualifies its statement of usual bonus assumption with advice to examine the bonus rate interface with interest rates and the effect on the estate. This is most important. What is not clear is whether, as a result of these investigations, the appraisers should feel free to change the bonus rate assumption or whether the estate should be allowed to take the strain. I am suspicious of a deterministic approach to setting bonus rate assumptions. The sensitivities are of such an order that even a slight inaccuracy is likely to give quite a misleading impression of the health of the office and its capacity to support new business. Would not a more fruitful approach be for the office to develop the set of external assumptions it feels it wishes to label as best estimates? Let us not delude ourselves that we can tell the future, and then reach a view as to the bonus rates we would be likely to declare in specific circumstances. Where the resulting rates differ from current rates a view would also be required as to how rapidly current bonus rates would be adapted to those appropriate to the projection. Mr Fine said that we need a bonus model and perhaps by dint of multiple feasibility projections the authors would reach the same conclusion. It seems that further work needs to be done.

Further work also seems necessary in respect of my second area of discomfort, the way in which the paper deals with the shareholders' proportion. In § 4.3 it suggests that typically the office will be a 90/10 office giving rise to P & L transfers of 1/9th cost of bonus. We then have the apparently innocuous statement that additionally the shareholders have an interest in 10% of the transfers to and from the estate. This suggests that the shareholders' interests can be treated like a tax on bonus cost and estate transfers. Things are not that simple.

Proprietary offices are not all 90/10 offices. Profit sharing conditions of the 'at least 90% of policyholders' variety are common, giving the Board of the company the task at each valuation of deciding what proportion of distributable surplus in the range 0-10% to pass to shareholders. Other offices may have fixed rules for distribution of surplus in respect of with-profit policies, but allow the Board discretion in respect of non-profit business. It is not at all clear that the current proportion is the one that should necessarily be projected nor that the proportion currently
applying for P & L transfers will be the same as the shareholders’ proportion for transfers to and from the estate. I recently looked at the ten largest proprietary offices in terms of UK with-profit business. Only four of them are 90/10 offices, four are distributing less than 10% and two are distributing more.

Reverting to the shareholders’ interest in the estate, it may not be necessary to specify how transfers to and from the estate should be regarded in terms of proportions between shareholders and policyholders. The function of the estate, looking at the company on a going concern basis, must be in its capacity to support the earnings of future profits for the benefit of both policyholders and shareholders. A necessary intermediate step in the appraisal value approach to with-profit business would seem to be an examination of the projected health of the fund itself. This examination could well provide a clue to the future pressures on the company as a going concern and indicate possible future developments. It is not impossible, for instance, for a strict 90/10 office, that such an examination could indicate future pressure on its capacity to service its profit-sharing article.

I foresee the pressures to provide more meaningful Companies Act reporting as irresistible in the long term, perhaps even in the medium term. If I am right and further work is needed then we must push ahead with it. In § 1.1 the authors describe one possible use for appraisal values as a contribution to management information systems designed to disclose the effective progress of a proprietary life assurance operation. It would seem a matter of some importance that any of us not already attempting this should start doing so as a means of forcing our ideas towards a workable system.

Mr J. Goford: There are many ways in which appraisal values are used internally, for example for management reporting and for incentive schemes. I want to concentrate on their external appearance as they are currently included in the accounts of life companies and also in the accounts of their holding companies. They are also going to be highly relevant when considering the EEC Directive on insurance company reporting. Of course, in these contexts, goodwill would be excluded and instead of a full appraisal value net worth plus the value of future profits of the existing business only would be used, otherwise known as embedded value.

We have a responsibility to explain the nature of the value of future profits. It is an uncertain asset and is sensitive to the assumptions made in calculating it, although that sensitivity is somewhat reduced by the use of the risk discount rate rather than using an earned rate to bring events in the future into a present value. A question arises as to how much of the future profits already exists and how much has yet to emerge. This debate revolves around the incidence of profits. Certainly, because of the conservatism in the actuarial valuation, some of what are future profits, measured strictly against that basis, could well be said to have been earned already. Perhaps in so far as the actuarial valuation exceeds the current surrender value, or maybe as it exceeds the minimum valuation basis in regulations 55-64, then to that extent some of the value of future profits has been realized already, but is buried in the application of regulation 54. On the other hand, to the extent that future premiums are expected to be paid, it is at best uncertain that some of those future profits will arise.

Taking the view that the key event is the sale of the policy, then all of the future profits, allowing for lapses and so on, are earned on the sale. If each premium payment in the future contributes to profit then some of the future profits have not yet been earned. The distinction between the two will be a matter of extreme sensitivity in the debate between the management of the company, its shareholders, auditors and advisers. However, it is important to note that all of the profits of the company and its in-force business are included in the embedded value. The distinction to be drawn is between that earned already, which may be included in net worth, and that which is not, which must be taken into reserve. This is demonstrated by including the value of future profits on the asset side of the balance sheet and then taking it to non-distributable reserve on the liabilities side. This treatment implies that, at least in part, there is double counting on the liabilities side of the balance sheet in so far as some profits are contained in the fund and also again in the non-distributable reserve. Alternatively, taking the view that some profit emerges when future premiums are paid, then this profit can by no means be reflected
already in the fund and is only in the non-distributable reserve. So it is only the 'profits already earned and in the fund' which can be said to be double-counted.

I believe that this is something which is capable of resolution and then the embedded value contains all the virtues we are looking for in recording true and fair earnings and values to the shareholders of the in-force business. On the other hand, measures which merely revalue the liabilities, for example US GAAP, mutualization price or other 'realistic' revaluations of the liabilities, are all open to the criticism that they may neglect the incidence of distributable profit and the impact of the actuaries valuation.

We should also note one very important feature of appraisal values, which is that they have been taken on board by the management and directors of life companies to provide a communication to their shareholders. This has not come through any pressure from the accounting side, but a desire on the part of management and directors to give something to their shareholders other than dividend paying capacity or excuses for new capital requirements. These organic developments of the use of appraisal values should be noted and respected. They may need formalizing in their calculation and presentation and I hope that this will be possible without diluting the message which they currently give.

If the solvency margin recognition method is to be used, then I suggest that it is done in conjunction with the revaluation of the actuarial liabilities on the minimum basis plus, maybe, a test for the maintenance of reasonable expectations of policyholders. The danger in this approach, as I see it, is that, by implication, it calls into question the valuation basis that the appointed actuary has chosen to use. Also, like many questions involved in the whole presentation, we must not forget the possible impact of tax on what we are suggesting.

I welcome this paper as an additional contribution to improving the communication between management, directors, shareholders, auditors and their advisers, in the hope that in contrast to some of the likely contradictions in the EEC legislation we, in the UK, may adopt standards which are sensible, true and fair.

Mr. G.N.C. Ward, (a visitor): As a chartered accountant I shall concentrate my thoughts on the Appendix. In general Companies Act accounts are not a satisfactory record of the economic progress of a life assurance company nor are they generally a satisfactory record of the economic progress of any other sort of company. I agree with the authors' criticisms of US GAAP.

The idea of including appraisal values in accounts, which some companies do already, is welcome and I hope that the accountancy profession will support it. Some of us already sign accounts which contain such information, certainly in so far as net worth and the value of in-force business are concerned. This forward-looking view is not necessarily shared by all accountants. In some minds the balance between providing useful information and providing information which is relatively immune to legal suit falls rather in favour of the latter. The depth of information which the auditor will require and the depth and breadth of the discussions which he will require with the actuary should not be underestimated. This will reflect nervousness with the unknown more than anything else and should not be viewed as being discouraging. Please exercise as much patience as you are able with the enquiring auditor who is trying to struggle through the difficulties of an appraisal value calculation for the first time.

The recent problems with current cost accounting are well known, and the accountancy profession has recently delivered another blow against the inclusion of forward-looking judgements in accounts by issuing a critical commentary on the Byatt Report, which was recently submitted to the Treasury, for suggesting including assets in accounts generally at their economic value. The authors have shown good judgement, therefore, in excluding from the disclosures that they suggest near the end of the Appendix the value of the enterprise as defined in §1.2, in other words excluding goodwill.

Mr Goford and the authors refer to true and fair view. While life office accounts at present do not generally give such a view, nor under the law are they required to do so, this is changing. The EEC is producing a Fourth Directive on insurance accounts which will make reference to the concept. Like much law, however, it is drafted without its terms being fully understood. Active debate can be expected in this country in the near future and let us hope that agreement will be
reached, and for the sake of my professional indemnity premiums, if nothing else, that the law here does not have to have its meaning tested in the courts. The eventual definition will, however, have a fundamental bearing on the conclusions of this paper.

Mr T.A.L.M. Wakeling: The background to this paper for the UK in unit-linked business and the idea of putting profit tests together based on a suitable selection of model policies and discounting back the emerging profits seems to be sound. Although the practitioners in the field may well dispute the details I think that there is much for us to agree about here. I can imagine the proud new owner of a unit-linked life company looking to the consulting actuary who advised him on the purchase and saying: 'if the world works the way your appraisal value said it would work, I should get a stream of profits that, discounted back, come to this value. Is that correct?' It may be rather a nervous discussion for the consulting actuary but it does seem a reasonable basis for a dialogue.

As we move to with-profit business, life becomes significantly more difficult. The point has already been made about the difficulty of accepting necessarily that a tenth is the right share to take of the value of the estate for shareholders. The authors pick up the point which was originally raised by Mr Bangert (JIA, 99, 131) about the value of the estate to shareholders on a conservative valuation basis exceeding one tenth. Perhaps they might say that in ignoring this in their valuation they are erring on the cautious side. For a strong 90/10 with-profit office that may not be so. The difference between the net earned rate and the shareholders' rate acts progressively to dilute the interest of shareholders and the delay in getting their money out may quite significantly depress the value to shareholders well below one tenth of the estate. So the value of a strong with-profit life office is very much dependent on the projected way in which the bonuses may be used and the ways in which this may erode the estate. If we hold that the estate and the earnings from the estate are inviolate then presumably the value to shareholders is nil. If the policyholders can have some portion of this estate, or the earnings from it, then presumably the shareholders receive their share and it is reasonable to take some credit for that. However, the broad message for shareholders is that it is generally in their interests to get profits out as fast as possible, which means one-off special bonuses rather than a steady declaration; it means reversionary bonuses rather than terminal bonuses; it means simple bonuses rather than compound. Although that might not be a welcome message for most actuaries concerned with the more conventional approach to managing with-profit business, they may need to recognize the pressures of not only existing but perhaps potential new, shareholders in managing bonus strategy. It seems at first sight odd that shareholders should get so little mention in the literature on managing with-profit life assurance whereas in the unit-linked literature, the interests of the shareholders are paramount.

So what should be done for with-profit business? I believe the answer lies eventually in the much more sophisticated projections which should take into account the particular strategy of the existing management or, perhaps the potential new management, with regard to bonuses, the estate and new with-profit business. However, well before these new techniques are in place, those in with-profit life offices, who are interested in establishing appraisal values, perhaps in part as a defensive move, need to ask more than just one question which should perhaps be: if the life office was to be run, or perhaps closed, so as to maximize the value to shareholders, what would the value be and what strategy would be followed? As far as is possible in that projection the responsibility of the actuary as regards equity in bonus distribution and reasonable expectations should be sacrificed to the informed avarice of shareholders. We might call this a 'rape and pillage' basis. There may be a second question: if the life office is to continue running broadly in its current way projecting current bonus rates and reasonable volumes of new with-profit business, what would be the value to shareholders; and for how long could the office continue to write new with-profit business if current bonus rates are maintained?

A third question might be: if the office is closed to new with-profits business and then run off for the benefit of shareholders, what would the value be, how would the office then be run and what therefore, is the implied value of management in maintaining the office open to new business?
The answers to these questions may give some insight as to how outsiders may view the great with-profit life offices and it might also give some useful opening to a dialogue with the Board about the relative interests of with-profit policyholders and shareholders. I think that it is in this area that the most interesting developments for appraisal value techniques will come and they may have a particularly significant role in influencing the financial management of the with-profit life office.

Mr R.J. Squires: I take issue with the authors with regard to assessing the multiplier to be applied to the value of one year's new business. Their approach is to assume a constant rate of growth of future new business, but I do not think that can be justified to the extent that it exceeds the assumed rate of inflation.

I am not sure how to approach a broker sales force, but my observation is that the level of sales through a sales force is largely dependent on the number of men and that in turn is dependent on the company's success in recruiting, training and retaining them. The number of men that a company can successfully recruit and train in a year is not a variable that progresses smoothly. If the facilities exist to recruit and train, say, 20 men a month, which in practice is about the maximum number that can be conveniently accommodated on one course, it would require a significant reorganization and input of capital to move to a higher level. I would suggest, therefore, that the basic assumption should be that the company will continue to recruit new men at the same level that it has in recent years or months, unless a specific investment in higher recruitment and training capacity has just been made. The turnover rate among salesmen is such that, with a constant intake, a stationary population is reached quickly. For example, with recruitment at 20 men a month, I would expect the total to stabilize between 400 and 500 men within five years. So my approach to valuing future new business would be to allow for growth in production in line with the expected growth in numbers until that plateau is reached, but only in line with average earnings thereafter.

Mr S. Creedon: In an ideal world management addresses itself simply to achieving sustained increases in the economic value of the enterprise for which it is responsible. The techniques outlined in the paper provide the most comprehensive framework available for quantitative definition of objectives and for measurement of results. The challenge lies in the consistent objective application of these techniques, particularly with what the authors call the value of the existing enterprise. In introducing these techniques for management accounting, time devoted to establishing detailed and durable criteria for valuation of, for example, the future sales capacity, would be very well spent.

While objectivity is desirable for management, for investors it is essential that performance be reported regularly on an objective basis which is consistent both over time and as between different types of enterprise. Earnings have replaced dividends as the measure of corporate performance. I agree with the authors that life offices generally do a poor job of accounting for their performance in this regard. I take issue with the implicit substitution of value for earnings as the key measure for investment analysis, because of the subjectivity associated with the value concept. Value is, however, relevant in that any definition of earnings should not be inconsistent with management to increase value.

I believe that US GAAP has been somewhat maligned and that the underlying methodology of margins reflecting release from risk, which was developed by an actuary, is potentially a sound basis for assessment of performance and therefore for measurement of earnings. Failing the introduction of such methods in the United Kingdom, I believe that the principal weakness in disclosure of profitability is the effect of new business strain. I support the suggestions in the Appendix for greater disclosure of components of value and suggest that the methodology in the paper might provide a useful proxy for UK GAAP earnings by bringing the value of future margins into account to the extent necessary to eliminate new business pricing strain.

Mr D.I.W. Reynolds: This paper is described as a practitioners' guide and it does a very good job in that context. It discusses a large number of necessary assumptions spread throughout the
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paper. I think that this paper will very soon be in the list of reading for our examinations and it would be helpful to bring all the assumptions together in a second Appendix. Mr Ward has already commented on the inappropriateness of Companies Act accounts in giving a true and fair value of companies. The Confederation of British Industries, with its Task Force on the City and Industry, is turning its attention to the valuation procedures for companies and their shares. One of the attractions of the methodology of appraisal values is that it returns to a fundamental approach, looking at the individual profitability of products and building up from them the profitability and value of the company. That can be applied not only to life assurance, but to a range of other financial organizations and probably wider still. For general insurance, for unit trusts, even for insurance intermediaries, it can and has been applied within the financial services sector.

In general insurance, as in life assurance the reserving basis is an important influence on the appraisal value. We do not need to decide either way whether discounting of reserves in general insurance is appropriate, or not, to know that it affects the release of profit. As the methodology brings in the net present value of profit, discounting affects the value of the organisation. The renewal of general insurance policies represents to the policyholder a different set of decisions than the lapsing of life assurance policies. Nevertheless in calculating an appraisal value of a general insurance company the same procedures are involved. Initial expenses differ from renewal expenses and it is important therefore to separate new business from renewals. There is, however, a distinction possible in the valuation process. The in-force business can be calculated with the inclusion of future renewals. Alternatively the in-force value can be restricted to any surplus or deficit in the reserves plus the value of future interest income on them less unallocated claims expenses. The choice of procedure may not change the overall value, but it will transfer value from goodwill into in force, or vice versa.

For life assurance companies the valuation of unit trust business is growing more important. The effect of SIB rules could well be an increase in the proportion of life company business coming directly from unit trust sales. Appraisal values can produce a realistic value of unit trust operations, taking account of the business source and differences in expense levels. The practical difficulties may be aggravated because lapse rates and future management income are both correlated with stock market levels, but the valuation procedure for a unit trust is akin to that for a single premium bond.

Mr D.E. Purchase: In his opening remarks Mr Burrows mentioned Lee's paper (JSS, 28, 1) and I am glad that he rectified that omission from the references, because, although that paper was more on profit testing than appraisals, many of the points developed in this one were outlined there.

In § 6.3.4 there are a number of references to multipliers. I was rather surprised at the relationship between the ranges for broker sales and direct sales forces unless more optimistic growth rates are assumed for the latter than the former. I did not follow why that should be. Also at the end of that section single premium business is mentioned and I should be interested to learn how the authors' suggestions might adjust the multipliers for such business.

In § 5.5.1 the authors comment on the treatment of overheads and they make some further remarks in § 6.4. I find it easier to treat such expenses separately rather than trying to force them down to the individual contract level. However, that is not to say that I then like to go on to make optimistic assumptions that such overruns will disappear within a very few years. Values brought out by these techniques are, as other speakers have told us, extremely sensitive to the assumptions made. We are told in § 5.1 to adopt expected values without margins for adverse deviation. It is very easy when determining those assumptions to be guilty of wishful thinking, particularly in such areas as the mix of new business and its future growth rate, as well as the future expenses. I feel that the minimum difference between \( i \), the risk discount rate, and \( g \), the new business growth rate, in Table 6.1, is shown as 5% simply because lower values give multipliers which are unjustifiably high rather than because there is a rational basis for determining these two parameters. I am in sympathy with the thought that the inflation rate is a
reasonable assumption for future new business growth unless, as Mr Squires mentioned, justifiable alternative bases for deriving it can be produced.

I find the apparent arbitrariness of the risk discount rate of some concern. It almost seems that 15% is chosen as a round number between 10 and 20. The authors comment that an entire paper could be devoted to the subject of determining the risk discount rate and I hope that they will present it soon. I agree with Mr Fine that there should be some relationship between the risk discount rate, the current market assessment of equity shares and the yields on index-linked gilts, but I admit that I have not developed the concept through.

The results of appraisal value calculations, like many other of our techniques, are of most help for comparative purposes, whether to compare several offices appraised on consistent bases or to look at the trend of results for one office over a period of time. Many of the situations discussed by the authors obviously require individual point values. The methods discussed are vital on such occasions where there are no other methods available with anything like the same usefulness, but in presenting the results to the outside world we must always guard against giving them an authority greater than is appropriate.

Professor S. Benjamin: I have often said that US GAAP is intellectual garbage. In 1976 I presented a paper 'Profit and Other Financial Concepts in Insurance' (JIA, 103, 233) which gave a detailed and lengthy critique of US GAAP and recommended that the change in appraisal values, which I called capitalized values, should be used as the measure of earnings. I think that this is the only paper presented to this Institute going into this subject in detail. I wrote that the fundamental concept and the starting point should be the capitalized value at a point of time as represented by the present value of all future profits which may be earned. Then the earnings for the year become the difference between the two capitalized values. I also gave a detailed comparison of the difference between US GAAP and the change in value method which is often referred to as the added-value method. There was also a considerable discussion at the meeting including the reading of a contribution from an American accountant who had written a seminal book on the subject of GAAP. The subject was argued again in written contributions which followed the paper and it would have been a help if the authors had continued from where we left off then. We even had a research working party at the time that reported that it did not find US GAAP useful for the UK.

The authors give a value to goodwill by applying an undefined multiplier to the value of one year's new business. In my paper I explained the method of allowing for goodwill which is now widely used and I also ascribed it to E.H. Potter. It would be a pity if the memory of the original author of the idea were lost. Until about 20 years ago I used to value an insurance company by projecting five years ahead as the opener suggested, and taking its value at that time. Then E.H. Potter came along and I wrote in my paper:

'In the case of assessing the value of a company for purchase or sale an approach to the assessment of the monetary value of goodwill which was shown to me by E.H. Potter, and which I use, is that of taking the estimated capitalized (discounted) value of all future profits from last year's new business, say £X, and of assuming that the goodwill is represented by the ability to produce this £X p.a. in perpetuity. If the purchaser is looking to a return of 20% p.a. then the value of £X p.a. becomes £X/20% or £5X i.e. 5 years' purchase. As always with an explicitly stated basis, it acts as a constructive guide for subsequent discussion'.

I think that this approach gives an interesting intellectual background, otherwise, as others have said, the multipliers appear as if in an economic vacuum. I am glad that the authors mentioned Lee's paper (JIA, 28, 1) in their opening remarks, which is in the current examination reading, and Mr Bunch's paper which was probably too recent to be mentioned in this paper.

Several years ago when a well known company went public, I had to sign the prospectus and we used the methods described in the paper to produce a range of values. Now the merchant bank and the stock-broker independently fixed a price and the auditor asked me what I would have
done if the offer price had not fallen inside my range. That conversation lay at the back of my mind for many years and a few years ago I decided that we needed something else, especially since, as others have mentioned, the sensitivity of the assumptions can give you an assortment of values. I decided that we needed a market model, one which would indicate to us the price which the market was likely to put on a company independently, given the behaviour it normally showed towards pricing companies in the insurance sector. I now consider that the actuarial appraisal method has two interlocking parts. One part is the part described in the paper, but the other part is the pricing produced on a market model.

Although the market model, certainly as first developed, is fairly simple, it has proved to be extremely powerful. A potential American purchaser of a UK company would not talk anything other than GAAP earnings. We could not get him off the subject and the UK company, as is often the case, showed very poor earnings on a GAAP basis. That is why we have British actuaries writing to their American parents telling of a very profitable policy design, but which is going to produce GAAP losses. However the company was and is actually a very good company, and it was only when we showed the market model that the Americans admitted that the price of the company was consistent in the market and that the fault lay with GAAP.

Mr J. Plymen: The system described in the paper was first developed for mutualizations about 20 years ago and for mutualization there is rather a special pricing requirement. Mutualizing means making a bid for the capital distinctly above the market price for there to be any hope of success. If any industrialists are making a bid for a company they have to put up about 40% more than the market price initially, otherwise they will never get anywhere.

This method is far from precise and all it does is to give a range of prices. For mutualization, the top end of the range is quoted and the hope is that that price is so high that no prospective buyers will step in and over-bid. There was one proposed mutualization about 15 years ago where the price was not high enough and it turned into a takeover by a very beneficial foreign insurance company.

I am surprised that this system seems to be regarded as the only way of pricing a life business. This mutualization method was developed years ago before we had computers. Now that we have computers with all that they can do in the way of projections, I maintain that this system is out of date. Surely it is far better to develop a stream of profits from carefully considered projections, as the authors do for the business in force. They say that they might consider doing the whole thing by projection, but then they state that it is very difficult and complicated. I cannot understand that because the projection system was already organized for the business in force. Why do not they just use it for the new business as well? I think it is much easier to obtain a reliable stream of profits by working on the business in force and the new business together. If the two are separate then the following questions apply: do you allow for withdrawals as regards the business in force and what is the rate of growth caused by the new business? If the two are together, only one factor, the net gain of business, that is the new business less the withdrawals, has to be estimated. You do not have this curious evaluation system to put a price on the business. If you have a logical and well developed system which projects the profits under various assumptions for 5, 10, 15 years that gives you the trend of profits and the trend of dividends, the growth rate and, given that, it is perfectly simple to assess a reasonable price by methods of investment analysis.

Professor Benjamin mentioned a certain flotation some years ago. I was the stockbroker concerned. The price was determined more by considering the yields of comparable life offices with comparable rates of growth and comparable status than by anything else. The yield basis was fixed on quite a ridiculous basis, as the company concerned, which was subsequently very successful, was floated on a yield basis of about 9%. That was the yield basis applicable at the time to the least progressive of the existing traditional life offices. It did happen that it was right at the bottom end of the actuaries' assessment, which was fortunate. The pricing was remarkably successful, because pricing an issue is a very delicate matter. Usually either the pricing is too low, there is frantic oversubscription and everybody says that it was given away, or else the pricing is too high and there are no subscriptions. In this case the issue was between 4 and 5 times
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over-subscribed. The whole market dropped like a stone afterwards, so the share price went below the issue price and then a year or two later it went up like a rocket, but at any rate the pricing was successful at the time.

I see no reason for doing this other than by projection, which is much simpler and sounder and, particularly for linked life, it is very simple. In my contribution to the Actuarial Congress in Australia, 'A Profit Model for Linked Life' (1984) (22nd ICA, 4, 135), I described my profit model for linked life which enabled the earnings of a linked life company to be projected for five years on various assumptions as to new business and expenses. In fact, it is quite easy to do, without a computer, but with a computer it could be done much better and the assumptions could be varied to give everything needed for a proper pricing.

There is a further fact as regards working a combined operation, projecting the business in force and the new business, and that is the question of I - E. This is a very difficult question. Many life offices will find, that with the transfer perhaps to high cover policies with a higher rate of cost and with very little I emerging from the policies themselves, that they are going to run out of I so that the expenses have to be charged gross. If the projection is of the combined operation with the new business and the business in force the I - E can be considered overall.

It may be that for presentation purposes this rather curious old fashioned system has advantages. It is easier to put across to people outside, but I think that if it has to be used it needs very considerable skill. I find the authors' comments about the rate of interest quite extraordinary. They seem to be obsessed by the magic 15%. This seems to be the rate which has been used for the last 20 years during which time the gilt-edged rate has gone up and down many times. I do not know why the rate used remains at 15%. Also there seems to be some confusion between the rate of interest and the risk, which surely should be included in the projections and the assumptions, not in the rate of interest.

I do not like the system of pulling back the profits to the date of issue and bringing them out in a lump at that time. That is unrealistic, and is what is called soft profits, which can certainly not be used to pay dividends or expenses. Surely, the best thing to do is to project genuine profits as they fall in, with possibly some adjustment to Exhibit 4.1 which shows the initial losses, and profits thereafter. With linked life business the adjustment might be to take the first year loss from the second year profit so that no loss has to be projected. In the same way the endowment loss of 500 might be spread over the next five years so that again there is no negative figure, but surely projecting genuine statutory profits, as they fall in, is going to give a better assessment of the value than projecting these rather curious profits.

Mr F.R. Wales (closing the discussion): The determination of the economic value of a life assurance company is a subject which has received relatively little attention here up to now. Apart from Bangert's paper (JIA, 99, 131) the references to papers concerned with valuing life assurance companies are exclusively to ones presented to the Society of Actuaries. There are several notable omissions from the list of references. The first is one by Mr Plymen, which he wrote with Woodward, (TFA, 37, 2), Life Assurance Profitability, Performance and Prospects. This paper is of particular relevance because it was written from the point of view of the investment analyst. The second omission is the paper by P.R. Smith (JIA, 99, 249), More Informative Disclosure of Life Office Affairs, which did at least propose a new way of presenting life office results. Also Professor Benjamin reminded us that he began the discussion of the subject of GAAP and appraisal values in his paper Profit and Other Financial Concepts in Insurance, (JIA, 103, 233).

The timing of this paper is apposite. One symptom of the financial services revolution has been a large number of changes of ownership of life assurance companies and there is no doubt that the Financial Services Act and accompanying regulations are going to lead to a further considerable shake up in the life insurance industry, helped by the Chancellor of the Exchequer. Apart from the large number of valuations for purchase that are required, owners who are new to the life assurance industry find traditional reporting methods obscure and the authors' proposals offer a
more comprehensible approach. As Mr Goford pointed out, a number of non-insurance holding companies and their life company subsidiaries are already using an appraisal value approach in their published accounts, a practice that received the active support of Mr Ward.

The paper also has particular relevance in the context of the Government’s proposals for profit-related pay. For a developing unit-linked life office, the year-on-year growth of appraisal value is a much more satisfactory profit index than actuarial surplus, although, as the opener pointed out, changes in the underlying assumptions do lead to discrete changes in the appraisal value itself.

Apart from Mr Plymen there has been general support for the basic principles of the paper. However, as Mr Fine suggested, it is important to review some of the detail.

In § 3.3 the authors suggest that the appraisal value calculation should be carried out on a net basis. I agree that this is the only feasible approach given the taxation basis of life assurance companies. However, it is an approach which is very hard for non-actuaries to grasp and in many cases we are communicating with non-actuaries. Financial managers from outside the life assurance world are used to thinking in terms of pre-tax, that is to say gross, profits, a concept which has little meaning in life assurance. I have been involved in attempts to restate life assurance results on a gross basis analogous to an ordinary trading company. In practice the artificial distortions that this introduces make the results even more misleading than traditional reporting formats.

In § 3.4.2 the authors raise the question of mismatching. The recent problems of a well-known mutual life assurance company underline the points made there. However, there is one aspect of mismatching which the authors have not touched upon and which has considerable significance in the calculation of an appraisal value. An office writing non-profit business must hold a specific reserve to cover any mismatch between assets and liabilities. The question is whether this mismatching reserve can count as part of the adjusted net worth of the company. In my view it can; the assets representing this reserve exist, and are at the disposal of the shareholders until, and if, an adverse change in market conditions leads to outright loss. I make one important proviso and that is the cost of rematching must be excluded from the adjusted net worth. That is to say the appraisal value is calculated, in effect, as if the investment portfolio had been rearranged to ensure perfect matching. This is an important proviso, as otherwise it is perfectly possible to manipulate artificially the appraisal value by switching into higher yield investments of inappropriate term. Whether this is long or short depends upon the shape of the yield curve at the time.

Mr Fine had a number of interesting observations concerning Section 4. I welcome the authors’ suggestion that profit testing theory can be applied to with-profit business. I believe that this is a discipline that proprietary life offices should undertake. However, Mr Wakeling did point out the ‘rape and pillage’ dangers of following a policy of maximizing shareholder returns without regard to anything else.

As Mr Hairs pointed out 90/10 is not the norm. Furthermore, Section 30 of the Insurance Companies Act does not govern the rate of increase of the proprietors’ proportion of the surplus. What it does do is to insist that companies should publicize their actions if they intend to increase the proprietors’ proportion above the limits specified in the Act. Concerning §§ 6.2 – 6.7 both the opener and Mr Fine made some interesting comments regarding the valuation of the estate. The former suggested that in North America the shareholders’ interest in the estate could often be well in excess of 10% for a 90/10 office.

I disagree with the comments in § 5.3.1, that the interest and capital growth assumptions in unit-linked business are ‘not usually so critical’. In fact the assumptions regarding interest and realized capital gains are absolutely crucial in projecting the tax position of the company. Furthermore assumptions regarding interest and capital gains, whether realized or unrealized, are essential in determining the value of future management charges. These assumptions are therefore of very considerable importance in determining the value of a unit-linked company. Also in § 5.3.1, I feel that the authors have given somewhat cursory treatment to the problem of terminal bonuses. Although it is true that shareholders will receive a percentage of the cost of terminal bonus 10% of a reversionary bonus is worth considerably more to shareholders than
10% of a terminal bonus. It follows that the mix of reversionary and terminal bonuses has considerable consequences for shareholders.

I am unhappy at the authors' proposal in § 5.3.2 for adjusting for deferment of tax relief by using a reduced rate of tax relief in the new business projections. Like Mr Fine I believe that it is important to project the progress of the company's tax position. Crucial to this are new business growth and the economic assumptions. The projection is either going to show divergence, with permanent growth in Excess E, in which case I suggest that the new business assumption had been over optimistic, or convergence, with eventual cross-over to Excess I. In either case a constant lower rate of tax relief cannot be appropriate. Furthermore as explained by Mr Fine, the situation is complicated by a number of other factors such as the proportion of annuity business.

Considering demographic assumptions there seems to be a significant omission from the factors affecting mortality in § 5.4.1. Social class is an important characteristic and the categorization of policyholders of a particular company is a function of its marketing and distribution strategy, that is to say that the company's own marketing strategy will have consequences for its mortality experience. It also affects policyholders' surrender rates which are referred to in § 5.4.2. The change of ownership of a company could affect persistency, despite the best advice requirements for the SIB rulebook.

The authors' approach to expense assumptions set out in § 5.5.1, assumed that detailed information is available from a company's own records. However, in many cases, this information will not be available, for instance to a would be purchaser or to an investment analyst. Plymen and Woodward's paper (TFA, 37, 2) suggested some rules of thumb for determining expense assumptions. I am sure that the authors must have used similar rules in carrying out appraisals when only published information is available. It is a pity they could not have told us more about this. The value to be placed on excess expenses depends upon who is doing the valuing. For instance, a purchaser who intends to merge the life office with an existing operation could probably eliminate excess expenses at a stroke. In general Section 6 ignores the problem of non-availability of company data in certain circumstances.

The reference to agents' balances reads slightly oddly for a UK company, as these will be shown as nil in DTI returns, so probably they would need an adjustment to add them back, rather than to reduce them.

One of the most difficult elements of the appraisal is the value of future new business. As Professor Benjamin reminded us, the method the authors proposed was originally suggested by E.H. Potter. The opener pointed out to us that new business can have a negative value. The rate of new business growth to be assumed must be related to the purpose of the appraisal, that is to say that it seems clear that a zero rate must be appropriate for accounting purposes, or measurement of management performance. In these cases new business growth should clearly be accounted for in the year that it actually occurs. Mr Purchase could not understand why lower multiples were applicable to broker business. It seems that the reason is that cost leadership is a key requirement for success in the broker market and hence profit margins must be highly vulnerable. On the other hand, direct sales business is largely rate insensitive.

There is clearly a relationship between the assumed rate of growth, and expense overrun. Growth requires investment and high growth requires high investment and for this purpose it is useful to consider the expense overrun as consisting of three items: inefficiencies of administration systems; diseconomies of small scale and the non-recurring development costs of rectifying the first two. This is an important point because the last one represents consumption of capital and I totally endorse the opener's comments regarding the need to identify future capital requirements.

The proposal that GAAP should be developed was welcomed by Mr Ward. However, Mr Hairs has pointed out that the appraisal value method was developed in a unit-linked context, but is still not satisfactorily developed for with-profit business.

I welcome this paper as a timely and important contribution to actuarial literature. As Mr Reynolds pointed out, its principles can be applied much more widely than simply to life assurance. In using the techniques described by the authors it must, however, be recognized that there is no such thing as a unique appraisal value for a life assurance company. In particular, the
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appraisal value in the eyes of the current owner is most unlikely to be the same as the value to a would-be acquirer. The latter may well influence management actions in a way that alters the underlying assumptions, for example, investment in new business to give greater growth, amalgamation of life funds to marry Excess I and Excess E and so on. In the end the price at which the business is sold is, as the authors say, a complex interplay of the definable and determinate forces with the various undefinable and indeterminate forces at work within the market place. Although Mr Purchase would like a further paper on risk discount rates, the authors have helped to ensure that in the field of life assurance the definable and the determinate have a greater role to play.

The President (Mr M.H. Field CBE): This paper addresses an important topic and one that, as has been acknowledged in the discussion, is becoming rapidly more important, so the timing is opportune.

Over the past three years I have had practical experience of appraisal investigations in three totally different situations and from three entirely different viewpoints.

I should like to comment on the uses of appraisals and the scope for future development, underlining comments made by other speakers. In many of the situations listed by the authors the need is obvious, but there are others where it is less obvious, but equally as important. Thanks to the caution of actuaries and the diligence of the supervisory authorities, most life offices are very strong, but this strength carries dangers with it. One danger is that of vulnerability to asset stripping by predators. Another is the denial of a proper return to those whose policies mature. A third is the obscuring of the real progress being made by the office. Each of these is worthy of closer examination and each has applicability to mutual as well as proprietary offices, because a new and thrusting management of a mutual office can be regarded as a predator. As life offices move into, and become part of, the new environment of a broadly structured and highly competitive financial services industry it is, I believe, important that judgements and actions are taken on proper information, and appraisal valuations must be the best route.

We discussed a paper on evaluating the strength of general insurance companies last month and looked to a totality of view. As I pointed out then the investor protection legislation, amongst other influences, is causing intermediaries to inquire more closely into the strength of life offices. Merely to compare the size of the free assets with the appointed actuary's statement of the liability, as documented in the DTI returns, leads to very great dangers as there will be pressure on the actuary to lower his standards so as to inflate the margin above it. I hope that an extension of the work being done on appraisal values will lead to a better solution of the intermediaries' real problem.

The treatment of UK GAAP deserves more than an Appendix and this was acknowledged by the author and by Professor Benjamin. In the USA, GAAP has been an influence for some years and the authors have been kinder to it, although not actually kind, than other commentators. Nevertheless the need remains for a yardstick. Mr Goford and Mr Ward give encouragement on the progress that has been made in the past 11 years.

Mr R.P. Burrows (replying): The opener felt that there were areas where the paper could be extended, particularly in those of capital requirements for new business and also assets. I endorse the opener's comments in these areas. I believe that the model generally will be extended once we have a reasonable outline of what the new business will look like. On the asset side there is a fair amount of work still to be done.

A number of speakers made reference to with-profit business and some of the flaws are concerned with this. It seems that some people have taken remarks which are specifically addressed at the estate of 90/10 as applying merely to the with-profit part of the business and all other remarks to relate to the non-profit sectors. I do not think this is the case and I did not want to create this impression. The building of a fairly detailed and complex model incorporating a number of assumptions including varying terminal bonuses, varying reversionary bonuses and a number of special bonuses is just as appropriate for the with-profit business. If this process is being done with the shareholders' approval obviously they would be asked for their opinions and
comments as to the likely progress and what their thinking is on bonus distributions. If it is being
done with a view to an acquisition by another group of shareholders, you might ask the other
group of shareholders what their policy towards bonus rates would be. Mr Hairs suggested that
the problem has not been resolved, but I think that it has. There are still some fairly detailed and
complex issues that have to be addressed, but the model is there and the process can be modelled,
even though we cannot predict the future. Much of the actuaries’ work is about attempting to
predict the future and giving an opinion as to what the future assumptions would be. Mr Fine and
Mr Wakeling also made comments on the with-profit approach and my comments are equally
applicable to what they said.

Mr Squires did not agree with the approach suggested in the paper regarding the new business
multipliers. I agree with his comment, and I state in the penultimate paragraph of § 6.3.4 and also
mentioned in my opening remarks that the new business multipliers must be assessed by an
expert who is very familiar with how sales forces and distribution channels build and therefore the
mere application of a mathematical formula to try and determine the new business multiplier is
not correct.

There were a number of comments by Mr Goford, Mr Creedon and Mr Ward regarding the use
of value-added concepts in financial reporting. Mr Creedon took issue with the fact that value
added could possibly be used for earnings. I think this is one of those fundamental philosophical
issues that needs to be considered by any working party that discusses this subject. Mr Goford’s
point on management or shareholders using appraisals is very much to the point. Mr Purchase’s
point regarding a relationship between the multipliers of brokers, for a broker sales force and a
direct sales force have been answered essentially by Mr Wales. I agree with Mr Purchase that
15% is merely a round number between 10 and 20%. A number of speakers have taken the
numerical value of the rate of discount, from the paper, and treated it as if it were more
authoritative than was intended. Past experience suggests that 15% has been a commonly used
number which has appeared many times in a number of papers. It should vary with economic
conditions, but I do not believe it varies as much as it should and approaches can be made to
attempt to build up to a genuine discount rate. That would involve the use of some risk-free
investments and I was interested in Mr Fine’s and Mr Purchase’s comments that index-linked gilts
might be an appropriate form of risk-free investment. That was not in our original considerations
and deliberations.

I was interested to hear that Professor Benjamin traced his paper back to E.H. Potter. We
traced many of the ideas and themes in ours to Anderson’s paper (TSA, 11, 357). In particular the
concept of risk rates of discount and the three point methodology is clearly outlined in that paper.
I agree that there is considerable reference to US GAAP in Professor Benjamin’s paper (JIA,
103, 233) and the suggestion that value added techniques could play a part in this.

WRITTEN CONTRIBUTIONS

Mr J.A. Ross: The authors are to be congratulated on producing a clear description of a practical
method of evaluating life companies. I would however, like to comment on one or two points of
detail raised in the paper.

In the Abstract of the paper the authors comment that the risk rate of return could be the
subject of an entire paper and in the discussion that follows a range of risk rates of return
emerges. I would wholeheartedly agree that it is appropriate to discount future cash flows using
various risk rates to illustrate a range of possible values: what I question is the appropriateness of
discounting cash flows using two different risk rates in one single evaluation. I refer here to using
one discount rate to evaluate the present value, at the point of sale, of future profits arising from
one year’s new business and a second, higher, to discount these values to the valuation date. I
accept the rationalisation, namely that there are additional risks such as reducing profit margins
and marketing uncertainties, but I would find it difficult to explain and justify a particular
differential to the consumer of the final report. While it is reasonably straightforward to identify
the factors which could reduce the value of a tranche of new business it is far more difficult to
encapsulate these risks in an addition to the discount rate. An alternative method which has the benefit of simplicity and avoids the possible charge of spurious accuracy is to adopt a uniform risk discount rate throughout the calculation, to illustrate (as the authors do) a range of values for future sales, to point out to the consumer the factors which could influence the profitability and volume of new business in future years and, finally, allow the client to formulate his own views on the appropriate value of the company (as he must do under the authors' system).

My second point concerns the authors' assertion in § 6.3.4 that 'real increases in sales may only be achieved if profit margins are cut'. Are the authors claiming that it is impossible for a life company to increase its market share without cutting margins? Even if this statement is intended to apply to the universe of life companies it does not look supportable. If we assume that savings, however defined, bear a reasonably fixed relationship to earnings and that earnings growth will exceed the long term rate of price inflation (as is normally assumed in pension fund valuations) then real growth in the savings is inevitable.

Perhaps the authors' point is that increasing competition in the savings market from banks, building societies and unit trust groups is squeezing the life companies' share of the market. Given that these institutions operate on lower profit margins, the life industry must reduce its own margins to preserve or increase sales volumes.

My final point is related to profit margins and sales growth. The multipliers given in § 6.3.4 look on the low side and indeed imply negative nominal growth in some cases. This seems a rather pessimistic assumption to adopt. Experience in recent sales of life companies has shown that goodwill can be by far the largest component of value. Buyers of life companies are apparently optimistic on new business prospects and it is important that advisors acting for the vendor should not underestimate the realisable value of the company.

Mr J.M. Hill: I would like to comment on the concept of the 'risk discount rate' i.e. the shareholders' required 'risk rate of return'. The rate at which future profits are discounted is critical. For example, quoted life companies currently have a dividend yield net of basic rate tax of just over 3% on average; an increase of 1% in the shareholders' required rate of return (net of basic rate of tax) would, other things being equal, reduce market prices by between 20 and 25% if we assume that dividends grow uniformly.

The paper relates the required 'risk rate of return' to the specific risks of the life company's business and indeed seeks to relate it separately to different 'risk classes' (see Section 3). Allowing for specific risks by discounting projected emerging profit at a high rate assumes that the amount of the emerging profits is broadly indicative of the size of the risk. A zero expected profit stream may be the net result of large income and outgo items subject to high risk; discounting the zero expected profit at a high rate of interest will still give a zero answer which incorporates no margin against the risk. More generally, it is difficult to accept the proposition that a risk margin in the rate of discount operating on the expected profit emergence, can be scientifically related to the risks which are inherent in the separate income and outgo items rather than in the profit which is the difference between them. Moreover, use of a risk margin in the rate of discount assumes that risk increases with the future period to the event to which that risk relates; otherwise the progressive operation with time of the risk margin would be inappropriate. Whilst risk may usually follow this pattern (Redington's expanding funnel of doubt) it may not always do so.

A more appropriate arrangement, I suggest, if allowance is to be made for specific risks, would be to express those risks as probability distributions (e.g. a particular expense item has an expected value of £10 with standard deviation of £2), to decide what insurance premium is appropriate to that risk (e.g. £1 being half a standard deviation) and to 'charge' for the risk by allowing for the expected value of the item plus the premium (e.g. an expense allowance of £11 in the example given). This is, of course, a process of 'taking margins' with which most actuaries and other business people are familiar. The margins could in many cases be taken at the end of the calculations based on appropriate sensitivity analysis.

The only theory of risk rates of return of which I am aware is the Capital Asset Pricing Model of Modern Portfolio Theory. That asserts (on the basis of both theoretical argument and
empirical evidence) that expected/required rates of return to investors are related to so called 'market risk' or beta and not to the particular risks inherent in the business of the company or even the industry of which it is a part. Since the beta of quoted life companies is generally just below 1, the net of tax rate of discount inherent in the market prices of such companies should be just below the average for equities in general, indicating (assuming expected future inflation averaging 5% and a required real return on equities of about 5% gross) a rate of less than 10% net at the present time, substantially below the rates mentioned in the paper. Higher rates of discount would probably be appropriate for smaller companies.

There is some danger of confusion between the 'internal rate of return' which a company requires on investment and the appropriate discount rate for appraisal value purposes. A company which achieves an overall rate of return of 15% on capital invested in new business and which is subject to an appraisal valuation at 15% will be found to have no 'goodwill' value. Indeed, the 'goodwill' value of any company is an expression of the company's ability to achieve profits, on the investment of tangible capital over and above the shareholders' required rate of return. Thus a company might achieve a 20% internal rate of return on capital whilst an appraisal valuation of it might reasonably be made at 10%. That is not to say that there is no place for appraisal valuations at 15% or, indeed, any other rate and in particular such valuations may be carried out for management information or management incentive purposes.

The methodology in the paper was developed primarily in connexion with unit-linked business where projection techniques are essential. For traditional business the approach of a gross premium valuation as advocated by Bangert² is an alternative which in my experience is subject to few of the disadvantages ascribed to it in this paper. Indeed the authors appear to have lacked the courage of their own convictions by accepting the possibility of a market value approach to net assets and by treating net assets, in force and new business as separate items instead of insisting on a monolithic projection.

Whatever the relative advantages of the different methodologies they pale into insignificance compared with the question of choosing an appropriate rate of discount and factors for new business profit capitalization and it is in this area that I find the paper most at variance with my own views and experience.

The joint authors: A number of comments have been made regarding references to other papers on similar subjects. We apologize to those authors mentioned for not referencing their paper. However, the subject matter in our paper is wide ranging on which numerous books, papers and articles have been published. We believe that our original list of references constitutes the mainstream of the evolution of the ideas contained in our paper.

A number of speakers commented that the appraisal value methodology was developed for unit-linked business and may not be appropriate for with-profits business. This is not the case. The methodology was developed in the United States where, at the time, insurance companies did not write any unit-linked business. It is probably true, however, that in the UK the methods were first applied to unit-linked business but these methods have been successfully extended to with-profits business. We do not contend that it is easy to extend the methods to with-profits business. There are a number of theoretical and practical difficulties to overcome, one of which is the whole concept of ownership of the estate, and how, if at all, it should be distributed. However, it is possible to arrive at assumptions for reversionary and terminal bonuses that are consistent with current distribution practice and that have regard to the current level of the estate. Careful study of the Memorandum & Articles of Association and any relevant Board resolutions, along with an analysis of past bonus distributions and a discussion with management and shareholders regarding bonus strategy should establish the shareholders' proportion. Once the future bonus rate assumptions and shareholders' proportion have been established, then the shareholders' proportion logically follows from the model, unless of course it is anticipated that the shareholders' proportion will change in future time periods, in which case this can be adjusted for in the model. Mr Wakeling made a number of relevant comments in the area of building a with-profits model.
Mr Hairs was right to point out that not all with-profits offices are 90/10. We were merely using 90/10 for illustration purposes. However, this does not invalidate the underlying arguments in the paper with regard to the shareholders' proportion.

Mr Goford spoke of the embedded value of the company and the distinction that must be drawn between those profits that are already earned and those profits which are still to be earned, which must be taken into reserve. This is an important point that is not covered in the paper. Mr Goford also mentioned, along with other speakers, that the possible tax consequences of using appraisal value financial reporting techniques must be considered.

We strongly agree with Mr Creedon's statement regarding the challenge of consistently and objectively applying the methods outlined in the paper, particularly when placing a value on the existing enterprise.

Mr Reynolds considered that the techniques set out in the paper could be applied to a range of other financial organizations such as general insurance companies, unit trusts and so forth. We agree with Mr Reynolds and would welcome an extension of appraisal value techniques to these areas.

Mr Hill, in a written contribution, argues that the use of a risk rate of discount is not an appropriate way to allow for risk in insurance business. He illustrates his argument by discounting a zero profit stream on a high risk block of business using different risk discount rates. However, Mr Hill has overlooked the fact that it is not possible, by definition, to have a zero expected profit stream on a high risk block of business if reserves have been established in accordance with the Insurance Companies Regulations. This is because the reserves will have been established on more conservative assumptions than the expected experience; thus as each risk period is passed through a profit will emerge. If there is no risk, then a zero stream of profits could emerge and discounting this at any discount rate will produce a zero value which is entirely consistent with the business being worthless. We cannot agree with Mr Hill's statement that a gross premium valuation is a more appropriate method of appraising the value of traditional business, as it is not possible using this method to use different rates of interest for establishing policyholder liabilities and for discounting future profits.