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PROFIT REPORTING
AND
ANALYSIS IN UNIT-LINKED
LIFE INSURANCE

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ETABLISSEMENT ET ANALYSE
DU PROFIT DANS LES
ASSURANCES LIEES A UNE
UNITE DE COMPTE
2 ETABLISSEMENT ET ANALYSE DU PROFIT DANS LES ASSURANCES LIÉES À UNE UNITÉ DE COMPTE

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RESUME

L'article traite de la définition et la mesure du profit, en particulier de l'assurance-vie liée à une unité de compte. Les méthodes classiques de détermination du profit des assurances-vie, fondées sur la solvabilité, présentent l'inconvénient d'indiquer une perte lors de la vente d'une nouvelle police, même selon des conditions rentables.

On traite rapidement des comptabilités établies selon les Principes comptables généralement acceptés aux États-Unis (GAAP : Generally Accepted Accounting Principles) : elle donnent au mieux une estimation neutre du profit lié à la vente.

Pour essayer de répondre à la question philosophique de savoir quand il faut admettre l'existence d'un profit, on introduit le concept "d'événement critique", puis on examine l'apport pratique et théorique de la méthode comptable fondée sur l'application de la notion de valeur incluse, à une compagnie d'assurance-vie : elle fournit un cadre applicable à presque toutes les méthodes de détermination du profit.

Les comptabilités établies selon les principes de la valeur incluse présentent le risque de surestimer les aspects liés à la vente et de sous-estimer liés au service, dans la relation contractuelle. L'auteur suggère des solutions pour fournir aux utilisateurs de ce type de comptabilité des informations qui leur permettraient d'évaluer l'ampleur de ce risque. Il indique Cgalement une réponse préférable, à la question philosophique fondamentale posée plus haut.
"I guess I should warn you, if I turn out to be particularly clear, you have probably misunderstood what I said" - Alan Greenspan, Chairman of US Federal Reserve.

1 - INTRODUCTION

1 - 1 Life assurance can be a complicated business. But it is a business, not a higher art form, and normal business requirements of profit and the provision of an adequate return to shareholders on the capital they have invested apply just as they do in any other business. This paper addresses the question of satisfying shareholders' needs for information on the progress of their investment so that they can direct it and make investment decisions in a meaningful fashion.

1 - 2 The paper is not about actuarial valuations for solvency purposes. Such valuations are important in the context of this paper not so much because they have a significant effect on the amount of profit or on its incidence but because they determine the amount of equity that needs to be tied up in the business to earn the profit. Solvency valuations thus have a significant effect on the return on equity. We shall return to this statement later.

1 - 3 The view of life assurance as a business not unlike any other business has to be modified for with profit business, particularly where the rights of with profit policyholders to profits are not confined to their own sub-fund. This paper does not touch on the problems caused by with profit business but, in confining itself to consideration of unit linked business, it has not been possible to avoid completely the problem of how the delicate financial balance between the owners of the business and its customers is maintained in an equitable manner.

1 - 4 This problem exists because the contract wordings of modern forms of unit linked policies allow considerable discretion to the company in the charges it levies throughout a contract's life for mortality charges, administration services, etc. Getting the right financial balance between the interests of the company and of its customers is more difficult in life assurance than in other businesses for a variety of reasons, among them being the opaque nature of charges in life assurance contracts and the high costs of entry. These make it difficult (and sometimes impossible if a person's health has become impaired) to transfer from one carrier to another. Ideally, a company writing such business should define and publish its policy on revision of charges. Some of the more complex philosophical issues in relation to formulation of charging policy are ignored in the paper.

1 - 5 While the paper confines itself to consideration of unit linked business, the general approach outlined applies equally to conventional non profit business. Also, while the paper is written against the background of a company writing business only in Ireland, it
can be assumed by non-Irish readers that the financial and legislative background is not significantly different from the UK in its general structure. However, there is an interesting difference on the "true and fair" requirement which will be discussed later.

1 - 6 In answer to the question as to why the paper was written, the simple answer is that the author was asked to do so! However, it was a task taken on without too many objections since there is an urgent need for fuller debate on the nature of profit in life assurance and its reporting. It is hoped that this paper and the discussion of it will help to progress that debate.

1 - 7 The paper assumes some familiarity with much of the work that has been done already in this field in recent years. In particular, the paper "Recognition of Life Assurance Profits the Embedded Value Approach (1) as prepared by a working party of the Institute of Actuaries and presented to a Seminar on 7th November, 1988 should be read before reading this paper. Much of the content of that report is accepted without comment: hopefully, any areas of disagreement are noted at some stage in what follows.

1 - 8 The scheme of the paper is as follows:

- Section 2 looks at the question of how profit is defined and traces the factors leading to the development of Generally Accepted Accounting Principles (GAAP) for life assurance companies in the US and to embedded value accounting developments in the UK.

- Section 3 examines in detail the calculation of shareholders' funds on embedded value principles including the bases to be adopted for projecting shareholders' cash flows and for discounting those cash flows back to the valuation date.

- Section 4 moves from looking at the static balance sheet representation of shareholders' funds to the dynamics of profit calculations and, in particular, to analysis of profit into its various components.

- Section 5 examines the question of capital usage and the importance of projections of capital needs/emergence when valuing a life assurance company for purchase or sale. This section also compares the relative merits of earnings multiples using the analysis on the lines of Section 4 and appraisal value techniques to place a value on a life assurance company.

- Finally, in Section 6, an attempt is made to draw together the various strands of the discussion to date and to reach some conclusions on what steps need to be taken to ensure that accounts of life assurance companies provide meaningful and consistent information to the users of those accounts.

1 - 9 There is a considerable body of literature on topics closely related to the subject matter of this paper. The sparing references to other authors in the text give no hint of the vast number of articles and papers that were researched in its preparation. In an attempt to atone for failing to give credit where due for particular ideas, I have included at the end a list of references to papers which were not mentioned specifically in the text but which have helped considerably in preparation of this paper.

I would like to thank my friends, both actuaries and accountants, for their helpful comments on various drafts of this paper. All errors remaining are very much my own fault.
I am sure there are errors: if there were not, then part of the rationale for its preparation would not exist! Finally, the opinions expressed are very much my own and are not necessarily shared by my colleagues in either the actuarial or accounting professions.

2 • DEFINING PROFIT

Traditional Profit Reporting.

2 • 1 Traditionally, the life assurance industry has shied away from use of the word "profit" when referring to the operations of its business. Indeed, the standard textbook by Fisher & Young (2) for students of the life office subject in the actuarial examinations contains the following paragraph:

"Profit could only be determined when the last survivor of a group of contracts had gone off the books and all claims and expenses applicable to the group had been paid. The residue of the assets then realised would represent the accumulated profit in respect of that group. Normally, however, new contracts continue to enter life assurance funds, and in practice the closed position described would never be achieved. Moreover, periodical distributions of profit during the currency of the contracts would be required. In these more realistic circumstances, profit could only be determined if it were possible at each of the periodical distributions to estimate the future experience exactly, and to make a valuation of the liabilities on that basis. Apart from a virtuous choice, this is impossible, so that, like the premium scale, such valuation has to be made on an estimated basis."

The authors failed to note that similar considerations apply in every other business even though the time scale may be shorter than for life assurance. This has not inhibited the use of the term profit in other businesses. In their defence, Fisher and Young's book was written more than twenty years ago when the world of life assurance was very different to the way it is today.

2 • 2 The reality - in straightforward non-technical terms - is that the more new business a life assurance company writes on profitable terms, the more that company is worth. Ideally, this reality should be reflected in the accounts of the company as prepared for shareholders.

2 • 3 The normal solvency returns prepared for supervisory authorities do not reflect reality as defined above. Typically, a regular premium policy will generate a "loss" in solvency returns at point of sale. This "loss" will, of course, flow back as "profit" in due course. For more modern types of unit linked policy the pay back period may be quite short, less than two years. However, when one moves from considering just one policy to looking at an entire portfolio where sales are increasing constantly, as is the case for a new company, the pay back period for the portfolio is in years rather than months.

2 • 4 Thus, the more new business a new company writes, the more "losses" it generates on the basis of solvency returns. If we were influenced by such returns, the entire system would be stood on its head: -losses are good and profits (a lower losses) are bad, provided that the source of such losses is new business generation.
Pressures for change.

2 - 5 While management of life assurance companies might well appreciate the subtleties of when losses are good and when they are not good, management whose experience will have been in other industries will look for definitions of profit and loss which conform more reasonably with their own experience and expectations. Thus, their growth in conglomerates with a range of business activities across different sectors of financial services and industry generally has been a major force for change in life assurance accounting.

Group senior management of such conglomerates will wish to compare all businesses undertaken by the Group on consistent principles. Historic methods of reporting the financial results of life assurance companies have not satisfied this requirement.

2 - 6 The growth in the number of purely proprietary life assurance companies and the increasing numbers of takeovers and mergers have also contributed to increasing dissatisfaction with variations of solvency returns for reporting to shareholders. This dissatisfaction is often expressed by financial analysts who find it difficult to compare the investment merits of different life companies with each other or with companies in other sectors of the stock market.

2 - 7 Recent discussions, associated in part with moves towards European harmonisation, which have tried to address the question of whether accounts of life assurance companies should give a true and fair view of the activities of the company, cannot be ignored either. In the UK, life assurance companies are explicitly excluded from the true and fair provisions of Companies Act legislation. It is interesting to note that, while accounts of life assurance companies in Ireland are prepared on similar bases to the UK, there is no corresponding exemption from true and fair requirements although the addition of the clause "as appropriate to life assurance companies" may allow a more liberal interpretation of the words "true" and "fair".

US GAAP.

2 - 8 The question of how to account for life assurance companies has been debated very fully in the United States and comprehensive Generally Accepted Accounting Principles (GAAP) have been enunciated for financial reporting (as opposed to solvency reporting) of life assurance operations in the United States. For a comprehensive review of GAAP from an actuary's perspective, the reader is referred to Creedon (3).

There is no great enthusiasm among actuaries, or among accountants for that matter, for application of GAAP financial reporting on this side of the Atlantic. Some of the weaknesses of US style GAAP include:

a) The system is based partly on release from risk principles which have little significance in the context of a modern unit linked office which transfers most of the risk to its policyholders.

b) Only the variable expenses incurred at time of sale can be capitalised in accounts. Thus, the sale of a policy still results in a loss in financial reports. In relation to the
capitalisation of variable costs, an interesting corollary is that GAAP bears less heavily on a broker office than on a direct selling office because the proportion of initial expenses which can be deferred in the accounts is higher.

c) It treats life assurance as a form of instalment sale where the profit emerges as a constant proportion of premium (subject to release from risk principles).

2.9 Point (c) above leads to a philosophical question which lies at the heart of the debate on profit recognition. A life assurance contract has sales and service aspects, both of which should be recognised appropriately in accounting. GAAP awards no importance in profit terms to the sale aspect of the transaction. Is this "appropriate recognition", bearing in mind the importance which life assurance companies attach to the sale, as judged by the way introducing agents and intermediaries are remunerated and by the way growth in new business is trumpeted? If new business is so important and if it does add value to the company, should not this added value be recognised in some way immediately?

The critical event.

2.10 Accounting theory associates the recognition of revenue with the occurrence of the "critical event". See Underdown and Taylor (4) and Myers (5) for a fuller discussion of this concept. The literature provides guidelines as to when the critical event might occur as follows:

1) When the earning activities undertaken to create revenue have been substantially completed.
2) When revenue is measurable.
3) When the costs incurred in the generation of revenue can be measured or estimated with reasonable accuracy.
4) When the eventual collection of cash can be reasonably assured.

The value of these guidelines in the context of the present discussion is questionable in view of the fact that life assurance accounting in the broad sense of the word (i.e. financial reporting) always involves a forward view.

Thus, revenue is measurable on certain assumptions about future persistency, mortality etc. immediately a contract is issued. Revenue and costs can also be estimated or measured at various other times, both before and after the contract is issued: when the policy terminates, when a premium is received, when the proposal form is received originally, when an agent is recruited; all of these events can be claimed, with varying degrees of credibility, to be "critical events" for the purposes of profit recognition. But can revenue and costs be estimated "with reasonable accuracy" as the above guidelines stipulate?

2.11 This question cannot be divorced from the concept of a basis which, as noted by Benjamin (6), is fundamental to actuarial work and appears in almost every actuarial sentence. The reasonableness of an estimate must always be measured by reference to an underlying basis, by the stability of the experience assumptions underlying the basis and by the sensitivity of the result to changes in those assumptions.
However, the premium rate on which a policy is sold is calculated on a basis which incorporates assumptions about all items of revenue and expense which will be incurred (or have been incurred prior to sale) in relation to that policy. The reasonableness and sensitivities of these assumptions are constantly being tested by reference to actual and possible variations in each of the parameters underlying the basis.

Furthermore, the sale of the policy is the start of a long term contractual relationship and formal returns to supervisory authorities and internal valuations must take full cognizance of all future revenues and costs associated with that contractual relationship. Thus, the sale of a policy and the commencement of the contractual relationship with the Insured can be deemed to qualify as a "critical event" for the purposes of profit recognition.

Embedded value accounting.

Explicit or implicit consideration of the factors outlined above have contributed to the growing adoption of embedded value accounting. The paradox of a loss being incurred when a policy is written on profitable terms is overcome by adding to shareholders' funds in the balance sheet a non-distributable reserve equal to the discounted value of the margins that will emerge in future from the long term fund on certain assumptions regarding future experience for policies in force at the balance sheet date.

Embedded value accounting is well established for management reporting, particularly in unit linked companies. Management want to be able to say to the directors: "By our activities this month, year, or whatever, we added £X to the value of the company". This £X will be equal to the change in the profit and loss account (probably a negative change in the case of a fast growing company) plus the change in the non-distributable reserve (ignoring changes of a capital nature).

Disclosure of embedded values in published accounts is a more recent phenomenon and is still at a primitive stage in that methods of presentation and attitudes towards disclosure of bases are in a constant state of development. Until very recently, the life assurance companies which showed embedded values all seemed to show the change in embedded value as a movement in reserves while the change in the profit and loss account represented movements to and from the long term fund. For parents of such life assurance companies, the earlier accounting treatment was similar to that for the life assurance companies themselves while more recently there has been an increase in the number of parent companies which are showing the change in non-distributable reserve directly in the group profit and loss account. The main reason for this difference in treatment seems to be that the accounts of the life assurance company itself can be compared with other life assurance companies on similar principles but the accounts of the parent company should apply broadly consistent principles in showing profits from different activities of the group. Taxation may also be a factor leading to this treatment. Neither of these reasons for inconsistencies in approach are sustainable in the long term.
2.15 Embedded value accounting techniques provide a framework which allows a more flexible approach to be taken to the philosophical question of how much profit should be recognised at various points in the life of a contract of insurance. This flexibility is both a strength and a weakness: - a strength in that it is possible to change the weighting for sale and service in the recognition of profit by a simple change in one or two assumptions in the basis underlying the embedded value calculation; a weakness in that, without adequate disclosure of the effects of various assumptions, misleading messages can be conveyed about the profitability of a company's operations.

The philosophical approach to profit recognition and the ways in which adequate disclosure can be achieved will be taken up again at a later stage. However, the next section considers some of the technical issues associated with calculation of embedded values and discusses the various assumptions underlying the basis. In the process, some of the philosophical issues will surface again against the background of trying to set assumptions for a particular elements of the basis.

3. VALUING THE SHAREHOLDERS' INTEREST

Shareholders' Funds
3.1 In the balance sheet of a company which adopts embedded value accounting shareholders' funds consist of:

a) Share capital.
b) Balance in profit and loss account.
c) Non distributable reserve consisting of the discounted present value of future margins to emerge from the long term fund.

The calculation of items a) and b) is straightforward but it should be noted that certain assets (computers, cars, etc.) may be valued differently in shareholder accounts than in returns to the supervisory authorities.

The main focus of attention in this section is on c), the value of margins which will emerge in future from the long term fund in respect of business in force at the valuation date.

Special reserves in long term fund.

3.2 Included in the long term fund will be special reserves which may not be required on an ongoing basis and which are not directly policy-related. The simplest example of such a reserve is the closed fund run off reserve. This is required in solvency returns to demonstrate that, if the company were closed to new business, the margins from in force policies and the income/capital proceeds from this reserve would together be sufficient to meet the expenses incurred in running off the fund which expenses could include the termination of service contracts for all sales and development staff. This example demonstrates probably better than any other why Companies Act accounts (which must be prepared on a going concern basis) should show different shareholder funds to those shown under relevant insurance legislation.
3 - 3 The question often arises as to whether or not to apply a discount factor to such reserves before adding them to shareholder funds. The justification for applying a discount factor is that the reserves cannot be released to shareholders immediately and, as the rate of return within the funds will be less than the shareholders’ required rate of return, it is appropriate to discount such reserves, thus giving them a lower value for shareholder purposes. While one cannot argue against the theoretical correctness of this approach, it is much easier to tell the shareholders that such a reserve will eventually be released to them, but until then it will be tied up earning a lower rate of return than they would like. Having explained the approach taken, the reserve can then be added back at face value.

3 - 4 A similar approach can be taken to reserves for maturity guarantees, the amount of which will be based on ruin probabilities in solvency returns. In Companies Act accounts, it will be appropriate to add the excess of the reserve over expected costs to shareholder funds. Similar principles apply to reserves for options, AIDS, etc.

**Reporting Actuary v Appointed Actuary.**

3 - 5 Similar questions as to whether or not to discount arise where the reporting actuary (the actuary employed by the directors to advise them on the calculation of the embedded value) considers that a weaker basis would be used for the purposes of the solvency valuation than has actually been used by the Appointed Actuary. The correct procedure in those circumstances is to project, using embedded value assumptions, the future margins which will emerge relative to the solvency valuation basis as chosen by the Appointed Actuary.

This approach eliminates the undesirable possibility of the reporting actuary being expected to comment on the appropriateness or otherwise of the chosen solvency valuation basis. A change in the valuation basis for solvency returns will only affect total shareholder funds to the extent that the discount rate in the embedded value calculation differs from the assumed net rate of return in the long term fund. Thus, if the valuation basis for solvency returns is weakened, the balance in the profit and loss account will increase by an amount equal to the reduction in reserves (assuming that the difference is transferred to the profit account) but the value of future transfers to the profit and loss account, as measured by the value of future margins, will reduce as a consequence of the weakening of the basis for the solvency valuation. If the assumed rate of investment return in the long term fund is equal to the shareholders discount rate then these two amounts will balance each other exactly – but subject to the overall caveat on taxation at the end of this section.

**Valuing future margins • the discount rate.**

3 - 6 The value of future margins is determined by the directors acting on actuarial advice. They will rely more heavily on actuarial advice for some elements of the basis than for others; one area where the directors will have substantial input is the choice of interest rate for discounting future shareholder cash flows (relative to solvency valuation reserves). Where the life assurance company is a wholly owned subsidiary of a public company, the shareholders will have set objectives for a return on equity (ROE) for every business in the group. This target ROE will have a significant bearing on the discount rate used in the valuation.
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However, the considerations governing choice of discount rate for the embedded value calculation are different to those relevant to the setting of ROE objectives for the entire company. For example, the fact that the business has already been written when the embedded value is being calculated means that the risk element is considerably reduced and can be used to justify a lower discount rate than the ROE objective for the business.

3.7 The factors affecting the choice of discount rate are discussed in detail by Burrows and Whitehead (7) in the context of appraisal value calculations. They looked separately at the risk-free rate and at the premium to be added for the various risk factors. Normally the discount factor for embedded value calculations is in the region of 10% to 15% per annum net of tax.

Assumed policy termination rate.

3.8 A natural starting point for the policy termination rate assumption is the office's own lapse experience. Different lapse rates are normally assumed for policies in their first year, in their second year, and for those which are more than two years in force. For policies in their first year, the lapse rate assumption is sometimes considered separately for policies less than three months old, between three months and six months in force and from six months to twelve months in force. It is normally assumed that the probability of lapse reduces with duration in force but recent American experience suggests that this may not always be true in the case of Universal Life policies.

3.9 In the normal situation where positive shareholder cash flows will emerge in future on a contract, the lower the lapse rate assumed, the higher the embedded value. Thus, it is important not to underestimate the probable level of future policy terminations and thus overstate the value of future margins when completing the embedded value calculation. The question of whether or not deliberately to overestimate future policy termination rates when completing an embedded value calculation will be addressed when we return to the question of recognising sales and service aspects of the contractual relationship in reporting profit for a period.

Renewal expense levels.

3.10 Expenses must be analysed between initial, maintenance (or renewal) and overrun of actual expenses in a period for standard loadings / allowances for a business sold or renewed in the period.

The importance of various aspects of this analysis to the overall financial direction and valuation of a life assurance company will be discussed in later sections but for the purposes of the embedded value calculation only unit renewal expense levels are relevant. The units for renewal expenses analysis purposes are premiums (for renewal commission), policies being terminated or claimed (termination costs), funds under management (for investment expenses) and policy numbers (most other expenses).

3.11 Assumptions regarding renewal expense levels must be considered in conjunction with corresponding assumptions about charges against policyholders for maintenance expenses in respect of contracts of the flexible whole of life variety. This leads us back to the question raised in the introduction of how the conflicting interests of the policyholder and the company are balanced when such charges are being set from time to time.
Investment return I inflation.

3 - 12 Ideally, the assumed rate of investment return should be considered separately for the taxable portion (mainly investment income) and the untaxed portion (unrealised gains and indexed realised gains in the main). This breakdown of the investment return assumption is particularly important for valuing the tax asset and for projecting requirements for extra capital from the shareholders in the context of a model office open to new business.

3 - 13 The assumed rate of inflation of renewal expenses should be consistent with the investment return assumed and with the assumption on indexation of gains for CGT purposes. The assumed future rate of increase in the expense charge against policies (where increases in such charges are allowed) also falls to be considered under this heading. This will normally be assumed to increase at the same rate as unit maintenance costs. However, if the current unit renewal cost per policy (net of tax) is less than the regular policy administration charge, then the higher the rate of inflation assumed for both costs and charges in future, the higher the value of future margins (this may not be true for high life cover contracts).

If this is the case then the prudent (and probably more realistic) assumption is to allow for maintenance charges to increase in future at a lower rate than unit costs since a margin increase is unlikely to be sustainable in competitive conditions.

Projection period.

3 - 14 On purely pragmatic grounds, to reduce the amount of computer processing time, it is advisable to specify a maximum projection period for embedded value purposes. Ten years from policy issue is not too short, particularly bearing in mind the effect of discounting and of policy termination assumptions. Such an approach is made more justifiable by virtue of the fact that the usual contract design allows for most margins to be realised during the first ten years of a contract's existence. A quasi-theoretical justification, particularly in relation to more modern forms of unit linked policies, is that a policy which is more than ten years in force is more like a unit linked "deposit" account and can be treated like a bank deposit, where profit is only recognised for accounting purposes on the realisation of margins. This justification is associated closely with the "income" as opposed to "asset" approach to embedded values, the philosophy of which will be outlined in more detail in later sections.

To measure the projection period from the valuation date rather than from the policy commencement date introduces another element of profit into the analysis of income viz profit from extension of projection period. This causes no particular theoretical problems.

The suggestion of ten years as a suitable projection period is not unrelated to the problems encountered in trying to project cash flows after ten years on flexible whole of life policies where cover cannot be maintained after that period without premium adjustments.
Mortality assumptions.

3 • 15 The reasonableness of the margin between the rate of mortality assumed in the embedded value calculation and the assumed future mortality charges against policyholders' unit accounts must be tested by reference to current practice, illustrations at time of sale, practice in the market, general considerations of equity, etc. The onset of AIDS has not made resolution of such issues any easier.

When looking at mortality assumptions, consideration must also be given to contractual guarantees on sustainability of cover.

Taxation I value of unrelieved management expenses.

3 • 16 All embedded value calculations of future policy margins are carried out net of tax. For business in the Life Fund, the emerging cash flows after allowing for tax on investment income and for relief on expenses are discounted at the chosen risk discount rate. For pension fund business, the cash flows after allowing for gross interest and gross expenses are netted at the corporation tax rate and discounted. This approach assumes that investment income in future will exceed policy maintenance expenses. This is very likely to be the case for the business in its entirety when future new business and associated expenses are excluded from the calculations.

3 • 17 The cumulative excess of relievable expenses over total investment income at the valuation date is an asset, the value of which depends on how long it will take before cumulative taxable income exceeds cumulative relievable expenses ignoring future new business.

In calculating excess E, it is important to include only that portion of capital allowances that has been "earned" to date in accordance with the company's depreciation policy for its Companies' Act accounts. Also, in projecting future investment income and expenses in order to assess the discount factor to be applied to the tax rate for valuing excess E, appropriate allowance should be made for expenses that are unrelievable for tax purposes.

Another question worth debating is the extent to which cognizance should be taken of unrealised taxable gains on investments when trying to estimate the length of time it will take to generate enough taxable income to cover unrelieved expenses at the valuation date. All other things being equal, a company with a high level of unrealised gains at the valuation date is likely to realise its excess E tax asset sooner than a company without such unrealised gains and will thus assign a higher value to it.

3 • 18 - In any discussion about tax, it is very difficult to talk about broad principles without considering the detail of the tax computations. Among the items of detail that need to be considered are:

- The possibility that a Notional Case 1 restriction may impact adversely on the value of the excess E tax asset.
- The fact that excess E carried forward cannot be relieved against franked investment income.
- The possibility that a portion of shareholder profits in future may be deemed to be paid out of franked investment income.
An alternative approach to the question of tax to that outlined above is to project gross investment income for a period in the valuation of future margins, the period for which the projection is completed on a gross basis being determined by the time it will take to use up the excess E existing at the valuation date when future new business is ignored.

4. MEASURING PROFIT

The embedded value calculation as described in section 3 is a static representation of shareholders' interest in the long term fund at a particular point in time and has no real meaning unless considered in conjunction with the assumptions underlying its calculation.

The use of embedded value techniques to help in analysing the dynamics of profit generation within a life assurance company will be discussed in this section as will the communication of those dynamics to the people charged with the responsibility for direction and management of the company. The emphasis is on variances rather than on absolutes. It is about giving messages that are clear and actionable in relation to improvement of the profitability of the company.

The constituents of profit

The net income or profit in a period on embedded value principles can be expressed as:

\[
\text{Premium income} + \text{Investment income and gains} - \text{Claims} - \text{Expenses, Commission and Taxation} - \text{Gross Increase in solvency reserves} + \text{Increase in Non-Distributable reserves}
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where changes in solvency reserves and in non-distributable reserves exclude changes of a capital nature not attributable to that accounting period.

However, this analysis does not provide much actionable information for management nor does it tell directors/shareholders what aspects of the business are going well and what aspects are going badly. An alternative analysis of the net income figure which does address these questions in a meaningful way is the following:

i) Value of future margins at point of sale.
   ii) Persistency profits
   iii) Mortality and other experience profits/losses.
   iv) Investment performance effects.
   v) Shareholders’ investment return:
      - on invested assets
      - on value of future margins.
vi) Expense underrun (profit) or overrun (loss).

vii) Tax profit or loss.

viii) Change in assumptions.

4.4 Each of these elements will be addressed in turn in the following paragraphs but it is worth noting in advance that, like all analyses of surplus (which is what this analysis is using conventional actuarial terminology) it is essentially an arithmetical exercise and a number of different routes can be taken in exploring each element of the analysis. What follows is an example of one person's approach taken in one particular office with a particular blend of business and at a particular stage in its development. Other, equally valid, approaches would be appropriate in other circumstances.

Value of future margins at point of sale.

4.5 The value of future margins at point of sale for new business in the accounting period will be shown separately for major categories of business. Obvious divisions are between regular premium and single premium business. It is also likely that profits at point of sale will be shown separately for different sales channels.

4.6 The basis used to compute the value of future margins (relative to solvency reserves) at point of sale will be the same as that underlying the embedded value calculation. An additional assumption must be made about expenses at point of sale (which do not enter into the embedded value calculation). For the purposes of later analysis it is assumed that immediate full tax relief can be claimed on expenses. The consequences of this assumption will be explored in more detail when the "tax profit or loss" element of the analysis is being discussed. A particular effect of this assumption of immediate tax relief on expenses is that regular premium business appears to be more profitable relative to single premium business than would otherwise be the case for an office with an expense carry-forward.

4.7 This is not the only area where care must be taken in interpreting the statement of profits at point of sale. The discounted value of future margins, while taking full cognizance of required mathematical reserves in projecting future cash flows, makes no allowance for the different solvency margin requirements of different contract types. In fact, the need to hold a solvency margin is ignored completely in the analysis of income.

If solvency margins were excluded completely from shareholder funds and if they required the setting up of explicit extra mathematical reserves in the long term fund, then the interest cost of having to maintain solvency margins could be recognised in the embedded value calculation in the same way as the cost of normal solvency reserves is recognised. But the required solvency margins can be covered in a variety of ways and their effects can also be mitigated in a number of ways. Therefore, life is made a lot easier by ignoring them in the embedded value calculation and in the analysis of profit.

This has the effect of making contracts with high solvency margin requirements appear more profitable than is the case when solvency margins are taken into account.
In reality, premiums will be set and profit criteria determined after allowing appropriately for solvency margins. Therefore the dangers of wrong decisions being taken on this account are minimal. Furthermore, the question of capital usage, including solvency margin coverage, will be addressed in longer term planning exercises. These will be discussed in section 5.

4 - 8 While the statement of profits at point of sale must be handled with care, it can provide very important information to management and to directors on the progress of the business, particularly when it is supplemented by analyses of new business profitability which allow for other approaches to tax and which allow for the need to set up solvency margins. This item in the analysis of net income will be one of the largest contributors to profit in a company selling good volumes of business on reasonable margins.

The interpretation of the result can be helped by expressing the total margin on new business as a percentage of total new business written in the period (the measure of volume probably being commission value to eliminate the "apples and oranges" effect of combining single and regular premium business, etc.).

Thus, it is easy to follow the trend from one accounting period to the next in both volume and margins, a significant change in either being a possible cause for management action.

Persistency / Service profits.

4 - 9 The easiest way of measuring persistency profits is to calculate the value of future margins at the end of the accounting period for policies still in force but which were assumed to have lapsed during the accounting period in accordance with the lapse assumptions underlying the embedded value calculation. There will also be a minor revenue effect for margins on premiums actually received during the period on such policies which can be ignored in a practical analysis (particularly if the analysis period is short - say a month or a quarter).

4 - 10 A strong argument can be advanced for assuming a higher lapse rate in the analysis than is expected to be experienced in practice. The deliberate retention of a margin in the lapse rate would satisfy the accounting requirement to recognise the service aspect of the contract as well as the sale aspect. To illustrate this argument, suppose a company works very hard at ensuring superior service quality to existing customers. As a result it experiences lower lapse rates than are normal in the industry. Is it right to recognise profit now on the assumption that the level of service quality will be maintained in future? Would it be better to recognise only the profits arising from the better retention of customers this year and, if superior service is maintained in future years, then profits will also emerge from this source in future years?

Acceptance of this argument - which is really saying that revenues and costs should be matched - has fundamental importance for the meaning which should be attached to the embedded value calculation in the balance sheet. That calculation changes from being an approximation to the "market" value of the shareholders' interest in the long term fund to being more of a reference point for the calculation of earnings. The consequences of this approach for the valuation of a company will be pursued in sections 5 and 6.
Mortality and other experience profits / losses.

4.11 The mortality profit is the actual mortality strain in the period compared with the expected strain on the mortality table underlying the embedded value. It would, of course, be wrong to equate the mortality profit for flexible whole of life policies to the excess of total mortality charges over the non unit (in Ireland we cannot say sterling!) element of death claims. The charging system, whether it be for mortality or for administration expenses, is purely a matter of product design and has no bearing on true profitability.

4.12 Other profits / losses is a bit of a catch all and might include, for example, profits / losses due to timing differences between creation and allocation of units, margins on sales charge, rounding charge a bid offer spread more or less than had been anticipated in the embedded value basis. Some of these elements may merit more detailed investigation from time to time, mainly with a view to improving aspects of the company's administration systems or to revise the assumptions for pricing and embedded value purposes.

Investment performance effects.

4.13 Assuming unit liabilities are matched exactly, profit arises under this heading when units grow in value at a faster rate than had been anticipated in the embedded value calculations. If one assumes a random walk pattern for unit price movements there is no presumption that unit prices, having increased by more than expected, are more likely to revert to some trend line in future.

The value of future income from fund management charges for units purchased prior to the valuation date is thus greater than expected by a percentage equal to the excess of the actual growth in unit price in the accounting period over the expected growth in price in the same period.

Future expected expenditure is increased only to the extent that a portion of expenses may be assumed to vary in proportion to fund values.

Shareholders' investment income.

4.14 The first part of this element of profit will include not only investment income and gains (net of tax) on explicit shareholder investments but will also include the net investment return on actuarial reserves set up in an ad hoc manner without any explicit allowance for future investment return e.g. closed fund run off reserve. Policy specific non linked reserves have been ignored. It will also include net interest on the excess of current assets over current liabilities to the extent that such interest has not been anticipated otherwise in the analysis.

4.15 The second part of the profit under this heading is interest at the rate assumed in the embedded value calculation on the "value of future margins" shareholder asset. The effect of adding interest to the excess E portion of this asset will be to increase the effective tax rate at which excess E is being valued Regular premium new business will act in the opposite direction to reduce the effective tax rate because it extends the period to realisation of the asset. The overall effect will be "mopped up" under the tax loss heading as discussed below.
Expense **underrun** or overrun.

4 - 16 The value of new business at point of sale as analysed above will have allowed for initial expenses at standard rates based on product allowances for new business written in the period. Also, the embedded value calculation at the end of the previous period will have anticipated standard renewal expenses in the accounting period. To standard expense allowances should be added charges against policyholders for partial encashments, switches etc. which have not been allowed for in profit tests. The total of these standard expense allowances (netted as appropriate for tax relief) should be compared with actual expenses incurred in the period, also netted appropriately for tax. The result is the expense **underrun** or overrun to be included in the analysis.

4 - 17 The analysis of the expense **underrun** or overrun can get very complicated, particularly when a company is growing fast. In such circumstances it is quite possible that total expenses incurred will exceed product allowances and it is very easy to justify the overrun on the basis of "development". While there may be a lot of merit in arguments for deferring expense recognition of development expenditure, the fact is that all expenditure must ultimately be recovered from product allowances or as a charge against shareholder profits. If we capitalise a portion of our expenditure we must charge more than the amount capitalised to future revenue periods in order to justify the expenditure as an investment. Too often, people have been quite prepared to capitalise expenditure but have forgotten that the other side of the same coin is to charge it against revenue in future periods.

**Tax profit or loss.**

4 - 18 The inclusion of this item in the analysis results from the fact that, up to now, we have assumed that all expenses are immediately relievable for tax purposes (the same approach can be taken for commercial pension fund losses). The loss can be analysed in two parts:

a) Expenses which are **unrelievable** for tax purposes (e.g. entertainment expenses, a proportion of motor expenses etc.) : the loss is the full tax rate (35% in Ireland) applied to such expenses

b) Relievable expenses in excess of taxable investment return should only be included at the tax rate used in calculating the excess E tax **asset**. The loss under this heading is calculated by comparing the actual excess E tax asset at the end of the period with its amount at the start of the period after crediting interest at the shareholders' required rate of return and after subtracting notional tax at the full rate on the excess of taxable investment return over relievable expenses in the period (adding where expenses exceed income). This loss will almost invariably be attributable to new business and can be associated with it in the overall analysis. Even then, the analysed tax loss will understate the **effect** of delayed relief on new business expenses on a stand alone basis. It is a moot point whether the beneficial **tax effects** of the capacity of existing business to generate future excess investment income should be awarded to new business in this manner.
Change in basis.

4 - 19 If the embedded value calculation is looked at as a reference point for the calculation of profit in a period, as has been the view taken in this section, then a passive approach to the calculation of embedded values is indicated.

This is because changes in values resulting from changes in assumptions under an active basis are difficult to assign as profit / loss to the correct accounting period. A consequence of adopting the passive approach is that, as far as is reasonable, the valuation basis remains unchanged from when business is transacted. However, each year's tranche of new business will have its own valuation basis.

The attraction of this approach is that it is a type of book value / premium basis approach to embedded values and the progression of earnings (i.e. net income) from year to year, as well as the constituent elements of each year's earnings, can be assessed in investment terms like any other stream of earnings, with a minimum of actuarial interpretation. (Some may see this as a disadvantage!).

Against this can be put the fact that the balance sheet embedded value ceases to have much meaning in its own right as it is now an amalgam of values calculated on different bases. A suitable analogy is a statement of assets at book costs rather than at market value.

Gross and Net Profits.

4 - 20 Income / earnings as defined in this section are net of tax. The quoted owner of a life company which calculates life business profits using embedded value principles will gross up the increase in the value of the long term business in force for tax at the Corporation Tax rate in arriving at a gross profit amount for comparison with gross profits from other areas of activity within the group.

5 - MODEL OFFICE, CAPITAL USAGE, APPRAISAL VALUES.

5 - 1 A model office is an essential tool for studying various aspects of the finances of a life assurance company. Some applications are as follows:

i) Its most important function is to project future capital needs and emergence of distributable profits. Embedded value calculations and analyses of net income have no role to play in this regard. The model office has to be developed before a life assurance company is formed as detailed projections of capital needs are necessary accompaniments to an application for authorisation to transact life assurance business. Capital requirements also include minimum solvency requirements under the European Community Life Directive.

ii) Assumptions made in the calculation of embedded values, net income analysis and in profit tests on the relievability of expenses for tax purposes must be verified in the context of a company's overall operations. The model office has to project not only a company's "I minus E" and case IV (case VI in UK) tax charges but it also must allow for any Notional Case I restriction on relievable expenses in future.
The projections for these purposes must be completed both on an open fund basis and ignoring future new business, the latter being required to ascertain a discount factor for the excess tax asset.

iii) Ideally, the model should include its own embedded value routine. This allows the model to be used to project future profits and to verify (in general terms) the net income results for past accounting periods. In particular, this facility in the model can be of great assistance in analysing net income into its various elements. For example, the model will assume policy terminations and mortality in accordance with a defined basis (which does not have to be the embedded value basis) and actual experience can be compared with this test tube result.

iv) The model office can be used - ideally in an interactive fashion - as a powerful tool for long term planning purposes. The appropriateness of various strategies can be tested by projecting for each strategy total earnings over (say) the next five years together with the associated capital inputs / emergence to enable the ROEs implied by the projected earnings to be calculated. The factors driving earnings growth under each strategy can be indicated, at least in broad terms, by analysis of various figures in the model office projection.

5 - 2 The starting point for the model office will be profit tests for various product types (monthly cash flows) which are used to generate files of "value of future margins" on the embedded value basis at all durations in force. The model office revenue stream is generated by applying experience factors - most likely different to embedded value experience assumptions - to projected sales of policies each month (both past to reproduce the current in force and future sales). The revenue items thus generated for premiums, claims and policy related liabilities can be taken without adjustment into the final model.

Standard expense allowances will also be generated by the product driven module of the system and, depending on the sophistication of the model, these can either be taken without adjustment into the final model office or adjusted to take account of expense overrun / underrun. Investment income and gains - which must be consistent with rates assumed by the model in deriving policy liabilities - are then calculated as is the total tax liability and transfer to or from the profit and loss account.

5 - 3 Much time could be spent discussing model offices. From a distance they seem far more intimidating and difficult to construct than is the reality. The model can start very modestly - an expanded profit test - and the process of "complexification" follows a classic evolutionary pattern.

Surprisingly good results can be got from even a simple model. At the same time, it has to be admitted that the author's current perspective is from an office less than two years old which transacts only unit linked business: other people may have completely different views on this question.

Value equals multiple of earning.

5 - 4 Analysis of earnings an embedded value principles as outlined in section 4 can be used in conjunction with projections of capital needs and profit projections prepared with the help of model office techniques to get a fairly rounded picture of the profit dynamics of a company and to value it on a range of different assumptions as to future experience.
The basis underlying the embedded value calculation is not of critical importance to the process of placing a value on the company provided that the analysis by source of resulting earnings is readily available. For example, if the embedded value calculation incorporates more conservative lapse assumptions than are likely to be experienced in future, the embedded value will be lower than that calculated on realistic lapse assumptions. However, the lapse / service profits in the former instance will be higher than those shown in the profit analysis completed using realistic lapse assumptions. On the other hand, the new business element of the profit will be lower when more conservative lapse assumptions are adopted. In normal operating circumstances the total profit using realistic embedded values will be higher than the total profit shown using more conservative assumptions for associated embedded value calculations. However, the higher quality of earnings and lower dependence on new business when profits are based on conservatively estimated embedded values will compensate for their lower quantity. This higher quality could be reflected in valuation terms by assigning a higher multiple to lapse / service earnings in the analysis than that awarded to new business. Thus the final valuations of the company on both bases will be much closer than would be indicated by a straight comparison of profits. Ideally, the values arrived at under both bases for the same company writing the same business should be identical.

While it may be ambitious to expect companies to publish a full analysis of earnings on the lines of section 4, some analysis of the main important sources of earnings should be required to be disclosed in view of the importance of earnings from different sources as indicated by the above example.

Even a simple sub division of last year's earnings into new business and other and a similar sub division for current year's projected earnings would go a long way towards satisfying the disclosure requirement.

Appraisal values.

5.5 This approach to valuation of a life company differs significantly from the appraisal value approach which seems to be the most commonly used method of valuing life assurance companies. The appraisal value method is described fully by Burrows and Whitehead (7). Some of the more important features of this method of valuation are:

i) The appraisal value approach is essentially balance sheet based. The value of the shareholders' interest in the long term fund is calculated on assumptions that try to be as realistic as possible; goodwill is estimated by calculating the profitability of one year's new business and finding an appropriate multiple to apply to that figure by projecting future new business and discounting the value of that new business back to the present date at an appropriate discounting rate (normally higher than the rate used in valuing new business after sale); expense overrun is also capitalised appropriately and deducted in finding the appraisal value.

ii) The methodology finds it difficult to allow appropriately for the future capital needs implied by the appraisal values obtained. This problem was highlighted by J. H. Sutcliffe in opening the discussion of Burrows and Whitehead's paper.
iii) Results can be highly sensitive to the assumptions incorporated in the valuation, particularly the discount rate to be applied to future new business and the assumed rate of growth in future new business. Fine judgement is required when choosing the assumptions to be adopted. Unfortunately, the consultant rather than the purchaser may be the possessor of the knowledge necessary to make that judgement.

Comparison of appraisal value and earnings multiple methods of valuation.

5-6 The earnings multiple approach to valuation of life assurance companies places the purchaser more in command by approaching the problem using terms and expressions that he will be familiar with from his own business experience. Suitably advised, he will know whether earnings from persistency profits can be improved; he will be able to make a judgement on the future worse of the expense overrun, given past trends and future plans for expansion or rationalisation; etc.

5-7 While earnings from new business, analysed in detail by product and by sales channel, will be available to him if the disclosure requirements outlined above are implemented, it is quite likely that the purchaser will have his own plans for development of various sales channels in future. Therefore past analyses of new business earnings will not have much significance. Detailed plans will be prepared for volume and/or margin improvement on future sales, the consequences of which will be reflected in projected margins at point of sale and capitalised using an appropriate multiple. The consequences of these new business plans will also have capital implications which must be projected in parallel.

Of course, the purchaser will only be prepared to pay for the company's existing capacity to generate profitable new business. The vendor should not be paid for something that was not his to sell.

5-8 In practice, the appraisal value approach as outlined in section 5-5 and the earnings multiple approach recommended in this paper may not be that far apart. While Burrows and Whitehead produced in their paper a table of goodwill multipliers based on various risk discount rates and new business growth assumptions they went on to say that it would be wrong to choose a multiplier by mechanical application of a formula of this type.

5-9 Change in appraisal value has sometimes been suggested as a basis for measuring the success of a company in a particular accounting period. The problem with this measure is that it awards too much importance to the goodwill element of a company's total value. Thus, a relatively small change in the projected future earnings from new business or in the multiple to be applied to those projected earnings could have a significant effect on the total appraisal value. Value would then be given for earnings before they had actually been realised. Critics of all approaches of this nature, whether the approach is of the embedded value or of the appraisal value variety, will say that this is always the case in a system which makes allowance now for future cash flows. A critical difference between the two is that a change in embedded value in an accounting period only recognises future cash flows from policies sold already while a change in appraisal value could incorporate some recognition of future cash flows from future sales. It's a bit like the difference between giving credit for discovering oil deposits and giving credit for an ability to discover oil deposits in future.
5 - A better measure of success is the profit in a period on embedded value principles expressed as a return on equity. This method of measuring the success of the business gives due recognition to the ability of management to minimise the amount of capital tied up in the company. In this regard, it is surprising that Sir Edward Johnston, in his recent Institute paper on "The Appointed Actuary" (8), made no mention of this potential conflict of responsibility for the Actuary who was also Director of Finance.

6 - CONCLUSION.

6 - 1 This paper started off by noting the deficiencies in traditional methods of reporting life company results where normal logic is stood on its head in that losses can be good and profits bad. An extreme example of the dangers of placing too much credence on the virtues of statutory losses as a measure of sales success is quoted by Posnak (9):

"Take, for example, the new company phenomenon and the old adage "the more you lose, the more you make". Most people no doubt recall the explosive growth of new companies in the high flying 1950's and 1960's. Fortunes in the stock market were made on companies that reported enormous statutory losses on the basis that (1) profits were guaranteed in the life assurance business and (2) statutory losses do not mean anything.

Sad to say, in some cases the statutory losses masked real losses, and many of the companies have long since disappeared".

6 - 2 The paper then discusses the US GAAP solution to the problem. The decision to give at best neutral recognition to the sale in GAAP accounts is completely at variance with the importance accorded otherwise to sales, not only in terms of the emphasis on new business figures in annual reports but also in terms of the money spent by life assurance companies in trying to get more new contracts of insurance.

6 - 3 By contrast, embedded value accounting, under which the present value of margins in the long term fund is added to shareholder funds, runs the risk of giving too much recognition to the sale and not enough recognition in profit terms to service aspects of the contractual relationship with a customer. However, it provides a valuable framework which can be used to award virtually any desired weightings to the sales and service aspects of the relationship.

This versatility makes the embedded value technique a very valuable tool for use in life assurance accounting but its inherent power needs to be controlled: otherwise the messages conveyed can be difficult to comprehend and can be misunderstood.

6 - 4 The paper looks at various technical aspects of embedded values from both balance sheet and revenue viewpoints and the conclusion is reached that embedded values are more useful for measuring profit than for estimating shareholders' funds. It is too difficult to have a single framework for shareholder funds and for period profit. This decision leads to the concept of an 'embedded value' "signature" for each policy which is assigned to it at point of sale and which, as far as possible, remains unchanged throughout its life. Thus, the embedded value shown in shareholder accounts may be calculated on a multiplicity of bases related, for example, to year of entry. It will
therefore be of little value in assessing the "market" value of the shareholders' interest in the long term fund at a balance sheet date.

6 - 5 The strength of the embedded value approach should be harnessed and controlled, not only by limiting the scope for changing bases with the consequent risk of confusion of capital and revenue items of income/expenditure, but also by requiring a disclosure in accounts of an analysis of profit into its major components e.g. new business, persistency/service, income on existing embedded value.

Historic information on total earnings and on the progress of earnings by source should enable life assurance companies to be valued using standard techniques of investment analysis. This de-mystification of life assurance accounting should benefit not only analysts but also directors, shareholders and management.

Also, while the separation of solvency returns and Companies Act accounts is a central theme of this paper, the author believes that accounts in the suggested format will help the supervisory authorities by providing early warning signals on companies that are being managed less efficiently than others in the industry.

6 - 6 The paper does not reach a definite conclusion on what weightings should be given to sale and to service/renewal in profit recognition. Different accounting systems can be viewed as different points along the continuum of weightings to be awarded to these two aspects of the contractual relationship in life assurance. Accounting on the basis of solvency returns gives a negative weighting in profit terms (i.e. a loss) to the sale and thus a higher weighting than any other system to the service aspect. GAAP reporting on American lines reduces the negative weighting at time of sale but does not eliminate it completely because of the non deferral of some acquisition costs. Embedded value accounting can be moulded to suit any of these approaches to profit recognition and can also be extended much further to the extreme, if embedded values are calculated on best estimates of future experience, that the only profit recognised (on average) after the policy has been sold will be interest at the shareholders risk discount rate on the embedded value which, for an individual policy, reduces as the margins relative to the solvency valuation basis are realised.

To some extent, it does not matter too much where along the continuum the basis for the embedded value is pitched (subject to normal requirements of prudence) so long as the sales service weightings are reasonably clear in general terms to users of the accounts. That clarity is achieved through the analysis of profit. Differences in weightings awarded to different aspects of the contractual relationship will be reflected in the quality of the resulting earnings.

6 - 7 While saying that there should be relative freedom on the choice of basis for embedded value calculation with the associated publicity of the various financial effects of that basis on reported earnings - the author favours an approach to profit recognition which tried to allocate profit to different activities in proportion to the cost of those activities. This would be achieved by solving for the assumed termination rate in the embedded value calculation which provided the desired sales/service weightings, other elements of the basis being chosen by normal methods.

However, this debate is quite a long way down the road from where we are as an industry today in terms of how we account for our stewardship. It is hoped that this paper and the debate will help us on that journey.
REFERENCES


