

PROFIT REPORTING IN A MUTUAL LIFE OFFICE

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PART I

1. INTRODUCTION

1.1 The evolution of projection techniques and growing computer power has led naturally to the actuary's ability to deal with greater complexity and finer degrees of detail. Quinquennial valuations have given way to annual and there is pressure for more frequent assessments of companies' positions. Our company carries out a full Statutory valuation every quarter and makes estimates of these liabilities at each month-end. No doubt we will eventually achieve the state suggested by G. D. Gwilt in his paper – Continuous Valuations – presented to the Faculty of Actuaries in Scotland in 1969.

1.2 But it is not only the time frames which have changed – so also has the nature, the quality and the quantity of information expected. The traditional approach to presenting actuarial valuations, particularly net premium valuations, and the accompanying analysis of surplus has tended to confuse rather than clarify the underlying processes to non-actuarially trained management simply because the results do not fit with intuitive expectations. There was an obvious need to develop reporting methods which more clearly show how the business was performing and yet did not detract from the necessary actuarial control of solvency. From this beginning developed the concept of reporting life operations profit in a way which would be useful to non-actuarial management.

1.3 This paper sets out the methods which have been developed over the last two years. The actuarial techniques applied are not new and indeed, as will be discussed later, a variety of other approaches could be accommodated by the structure being advocated. It is the structure itself which gives clarity to the results.

2. PURPOSE

2.1 The purpose of the paper is to introduce some concepts and methods of reporting the profits earned by a life office in ways easily understood and appreciated.

2.2 It may seem, at first thought, that the profit made by an organisation in any period is an absolute entity. However the profit to be reported depends on the purpose for which it is being reported. Three obvious reasons for producing a profit calculation are:

- (a) profit reporting,
- (b) valuation of the business and
- (c) management control.

2.3 In this paper we have directed our efforts to internal profit reporting to assist with management control but in the discussion have alluded to other influences on the methods adopted.

3. CONTENTS OF THIS PAPER

3.1 The first part of the paper deals with the philosophical approach to profit reporting and the relationship between Capital and Profit.

3.2 The second part develops and studies the different elements which contribute to Profit and illustrates the relationships by way of Du Pont charts.

3.3 The third part discusses further detailed analyses of Profit and some of the practical problems that have to be overcome. It finishes by commenting on the role of the actuary in a life office.

4. APPLICABILITY

4.1 The methods of reporting we are recommending are independent of the method of determining profit or the principles used to analyse differences. Whilst it may be quite appropriate for any company to choose the profit recognition basis it deems most suited to its own peculiarities for internal reporting and management control, the same will not apply to profit reporting for general consumption. The reasons for reporting profit internally and externally will usually be quite different. The former will have as its objective (inter alia) the analysis of performance to assist with management control and the latter to assist with comparisons between entities. Greater intervention and prescription can be expected for external profit reporting and the prescriptions in particular are likely to render the external profit reporting inadequate for management – just as we tend to find published accounts do not give an adequate picture for management control. Examples of this are the treatment of notional rents on owner occupied properties and reduced interest loans to staff. Any analysis which does not increase both expenses and investment earnings for each of these elements is inherently flawed.

4.2 Much of what is written in this paper applies equally well to non-mutual offices. Both mutuals and non-mutuals have a need to determine how much of the current surplus should go to policyholders and how much should not. The balance goes to shareholders in the case of a non-mutual and is retained as working capital in a mutual. In each case it is necessary to manage the process. Non-mutual offices have the ability to raise capital and will usually have a clear definition of the surplus sharing rules contained in the articles of association or otherwise. Despite these two advantages over mutuals, non-mutuals still have a significant management reporting problem if they are to take into account the amount of capital “tied up” in the assets supporting the published policyholders’ liabilities.

4.3 In Australia the reporting and control of life offices is through the Life Insurance Act which passed through the Parliament in 1945. The Act enshrined net premium

valuations and has had some difficulty in passing the tests of time. Changes to the Act are now planned and the Institute of Actuaries of Australia has recommended to the authorities that a "Margin on services" approach be used to report realistic earnings for mutuals and non-mutuals. The methods of reporting espoused in this paper are easily adapted to this approach. Realistic earnings are comparable to profit as defined in this paper.

5. CAPITAL

5.1 The life insurance industry is particularly capital intensive. A mutual office has relatively few ways of raising capital and in the past capital has accumulated from retained earnings. It follows that the management of retained earnings or profit as we define it is, in fact, management of capital and may be the most important function of any business.

5.2 Capital is the equivalent of the "estate" in actuarial parlance. The estate has been a very useful concept in the development of actuarial science but its quantum and ownership have been controversial. This paper is unlikely to reduce the contention.

5.3 Our definition of Capital is the balance of the assets over that amount which, together with future premiums and investment earnings, is required to pay all future policyholder benefits and expenses on the best estimates of the future available.

5.4 To calculate the Capital it is necessary to make realistic estimates of all the parameters that affect the present value of future transactions. In this context "realistic" should be understood to mean equally likely to be too high or too low. In essence this is a gross premium valuation which should have future bonus appropriate to the other assumptions; in other words the future bonus assumed should be the bonus most likely to be declared given the emergence of surplus which results from the outworkings of the other parameter values and the bonus distribution policy of the company.

5.5 Capital has two components. The first can be called "free Capital" or "Reserves" and is the difference between the total assets and the statutory or solvency liabilities. The second component is "tied Capital" and is the difference between the statutory liabilities and the realistic liabilities.

5.6 In practice the methodology we have adopted for managing the control cycle (as described by Jeremy Goford in his paper to the Institute of Actuaries of Australia, TIAA 1985) has been the "Embedded Value" approach. Basically, the control cycle requires profit testing premiums, modelling the office, analysing results, modifying assumptions and then back to profit testing premiums, etc. Profit reporting in Parts 2 and 3 of the paper adapt the concepts to fit with that approach. Under embedded value methodology future

transfers from tied capital to free capital, and vice versa, are valued at a required rate of return (the discount rate) and the sum of the values is referred to as the "Value of Business". The Value of Business is equal to tied Capital, using our terminology. Where the discount rate is equal to the assumed net investment return on the assets, the following simple relationship arises:

$$\text{Realistic Liabilities} = \text{Statutory Liabilities} - \text{Value of Business}$$

We prefer to use this discount rate when determining the Value of Business and reporting Profit. A higher (risk) discount rate is used for pricing so, for new business, the difference between the values of future transfers to Reserves at the pricing discount rate and the assumed net investment return emerges as Sales Profit in the profit-reporting process (described in Part 2).

5.7 The reporting methods we use can be adapted to a variety of valuation methodologies and we leave it to the reader to develop the necessary formulae to suit his preference.

6. MEANING OF PROFIT

6.1 Profit can be defined variously as the gain resulting from the employment of capital in any transaction or the excess of income over outgo after making all appropriate provisions or allowances. The determination of profit is in the safe hands of the accounting profession and it is not our intention to usurp that profession's responsibilities. There is no doubt that if profit is to be reported to the community at large then the bases used by different companies should be consistent and should conform to the accepted standards in place. These will usually be accounting standards. It is in the area of determining policy liabilities and changes in liabilities that the actuarial profession will be required to contribute and we will do well to be cognisant of the accounting profession's principles and standards in making that contribution.

6.2 We, in the actuarial profession, have done ourselves a disservice in not creating and adhering to a conceptual definition of profit. If there is such a definition we have degraded it by loose use of words. Profit and surplus are often used in a synonymous way and an "embedded value" has been described as having as a component the discounted value of future profits rather than "transfers".

6.3 In what will be presented in the rest of this paper the strict definition of profit is not important. It is the analysis of the profit that enhances management capability. In practice we have taken a very simple definition of Profit as the "increase in Capital". In textbook parlance this is represented by $(A_1 - V_1) - (A_0 - V_0)$ where A represents assets and V represents liabilities. It will be argued that such a definition is simplistic and the results could be misleading, if for no other reason that movements of a purely capital nature

would be deemed to be Profit – and we would be among the first to agree. It is the analysis of the Profit which is of value – a point we will make often.

6.4 We have developed the concept of Profit and Capital to assist in the management of capital. Hence the Profit figure finally reported and analysed can be viewed as the return on Capital employed (subject to changes of a purely capital nature). For this to be true the interests of the policyholders must be removed from the results. Subsequently we will consider Profit-Sharing Rules and these rules will be used to determine the policyholders' interests. Profit is the excess of income over outgo and provisions less the policyholders' interests as determined by the Profit-Sharing Rules.

7. VOLATILITY OF PROFIT

7.1 The contribution to Profit from changes in asset values can be controversial. There are those who argue that the use of book values, written up or down as thought appropriate, is more acceptable than allowing the results of a gyrating stock market to flow straight through to the bottom line. In other words there should be some smoothing of investment returns.

7.2 Actuaries accept the discipline that liabilities and assets should be valued on the same basis, for example discounting probability weighted cash flows, but this has not always been acceptable. Many accountants are happier with the use of market values for assets than a value which may depend on an element of judgment or forecasting. It is easy enough to appreciate this stand, but whether the assets are held at market value or valued in some other way the principles of profit reporting suggested here are unaffected; it is in the analysis of the profit that understanding lies. The same cannot be said of the impact of policyholders' rights or entitlements on the profit reported. This is particularly true if assets are held at market value and policyholder liabilities are not affected directly by changes in capital appreciation or depreciation. The result is to have the reported profit carrying the whole of the change in market values – in effect a heavily geared result.

7.3 We have suggested an approach which avoids this particular difficulty and which shares these and other profits between the policyholder and Capital according to the business rules that apply, or implicitly apply, in benefit calculations. It is possible to have a reporting system which includes the policyholders' share of profits as part of the whole but, in our view, that share should be excluded, particularly if the final profit figure is to be related to the capital employed.

8. RECOGNITION OF PROFIT

8.1 The recognition of profit is another area over which the accountancy profession holds sway. To maintain comparability between the profit calculations of disparate

corporations the principle of reporting profit according to “work done” has gained acceptance. In life insurance it has often been said that the profit emerging from any particular policy cannot be determined until termination of the contract. Whilst this statement is true enough it is insufficient reason to avoid assessing a contribution to profit en route.

8.2 We have a bias towards recognising profit on a policy at the point of sale and that bias is reflected in Parts 2 and 3. Our approach does not find favour with those members of the accounting profession who prefer not to recognise profit at outset. This preference may stem from the belief that our definition of profit includes a discounted value of “future profits” which, in general, is unacceptable to the accounting profession. It seems a little strange to us to have such a large part of the activity of a life office, namely the pursuit of new business, deemed not to contribute to profit.

8.3 The accountants advocate the deferral of acquisition costs which at least prevents a large loss being reported at point of sale. The “Margin on Services” method of profit recognition seems to fit well with the accounting principles. However the principles of profit reporting being presented are not markedly changed under either method. There will be a component of “planned” profit which is implicit in the premium structures. That can be reported as emerging at point of sale, as we prefer, or can be respread in any way in which case the profit will emerge at different times as “planned margins”.

8.4 In general it can be said that the non-recognition of profit at point of sale may fit well with external reporting and our suggested approach has more meaning to management in assessing the value of activity. Again it is the understanding and analysis of the profit which is important.

9. PROFIT-SHARING RULES

9.1 Every life office needs rules for determining how surplus is to be distributed. Without such a set of rules there will be grave danger of inequitable or inappropriate passing of benefits from one group of policyholders to another. Even making such a statement implies a set of “acceptable” principles by which distributions can be judged; in fact an implicit set of rules. These rules may be explicitly identified and recorded but are sometimes not so clearly spelled out and must be gleaned from office practice. It is necessary to develop a set of rules to determine profit-sharing along similar lines to those used to determine bonuses if we are to report profit after allowing for the policyholders’ entitlements. There will obviously be a relationship between a set of rules governing surplus distribution and those for profit-sharing which, subject to special bonus payments from capital, should be consistent. In essence, the policyholders’ share of profit will be the same as the surplus distributed to them when each is summed to infinity

and the surplus distributed can be viewed as the smoothed profit-share, in other words the value of the policyholders' share of profit will, over a period of time, be equal to the value of surplus distributed to them.

9.2 Profit-Sharing Rules are obviously a matter for each office but should reflect the risk-sharing implied in pricing and practice.

Two examples are:

1. All experience profit goes to policyholders including share of investment earnings. All profit planned to emerge from selling new business will accrue to capital employed.
2. All profit will be split in proportion to the assets employed.

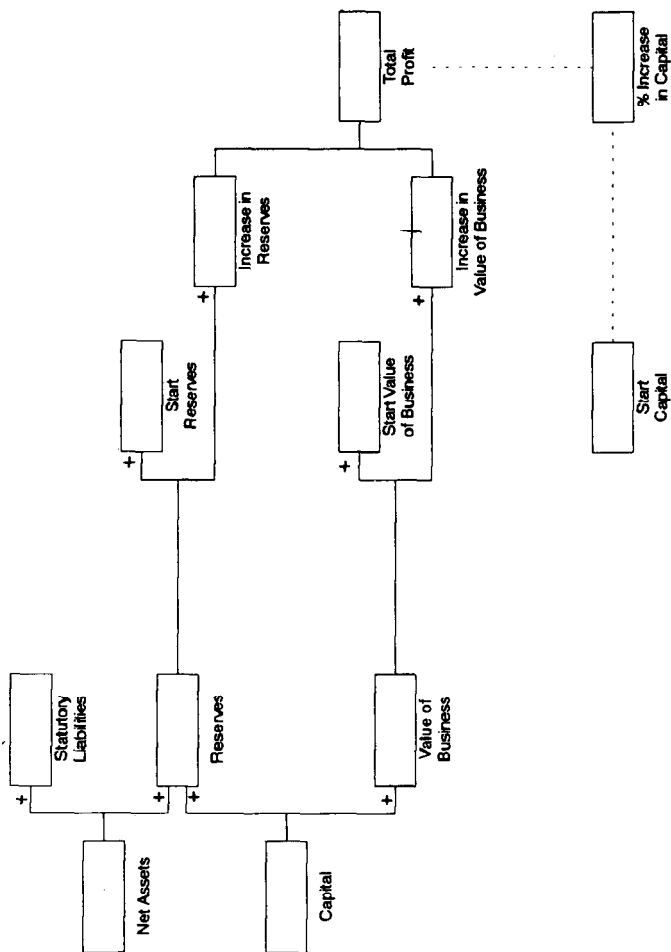
9.3 It should not be assumed that the policyholders' share of Profit in any defined period will be distributed by way of bonus or interest credits but rather the share is added to the pool from which such distributions are made.

9.4 Needless to say there is nothing presented here which would preclude a special ad hoc transfer from Capital to the policyholders' profit-share pool.

9.5 Profit as defined is not necessarily distributable by way of bonuses or, for that matter, in any other way. Distributable profit is constrained by the need to provide solvency reserves and would form part of surplus by standard actuarial definition. Treatment of surplus has been well discussed and falls outside the scope of this paper.

10. ANALYSIS OF PROFIT

10.1 A major contribution to be made by the actuarial profession is in the analysis of the sources of profit. The income and expenditure information is available to us from revenue accounts prepared to the necessary degree of detail. To prepare the analysis requires the change in liabilities to be expressed on a comparable basis and to the same degree of detail. It is worth re-stating that the analysis of the change in the assets i.e. the revenue account, and the analysis of the change in liabilities must be carried out on a similar basis using identical principles. A proper understanding of the accounting standards and methods are necessary. Full details of some recommended analyses are included in Parts 2 and 3.



PART 2

1. INTRODUCTION

1.1 The aim in this Part of the paper is to develop and study the relationship between the different elements which contribute to the profit of a mutual life office and add to its Capital. This relationship is illustrated by means of Du Pont charts. We start with the simplest example – a mutual life office writing only non-profit business – and gradually increase the complexity of the environment to finally demonstrate profit-reporting in a more realistic environment.

1.2 The reason for using Du Pont charts is that they are useful for illustrating complex relationships between financial data. They create a visual picture of these relationships in a way that improves understanding of the data.

1.3 It is assumed that adequate projection software and data are available to provide the necessary figures and that the life office management accounting system is able to produce the financial data. In Part 3 we study alternative methods which may be used where these criteria cannot be met.

1.4 The term “Assumed” is used throughout to indicate that the figures are derived from the realistic valuation i.e. the figures expected to arise on the basis of the assumptions used in the valuation. Another term such as “Expected” may be preferred.

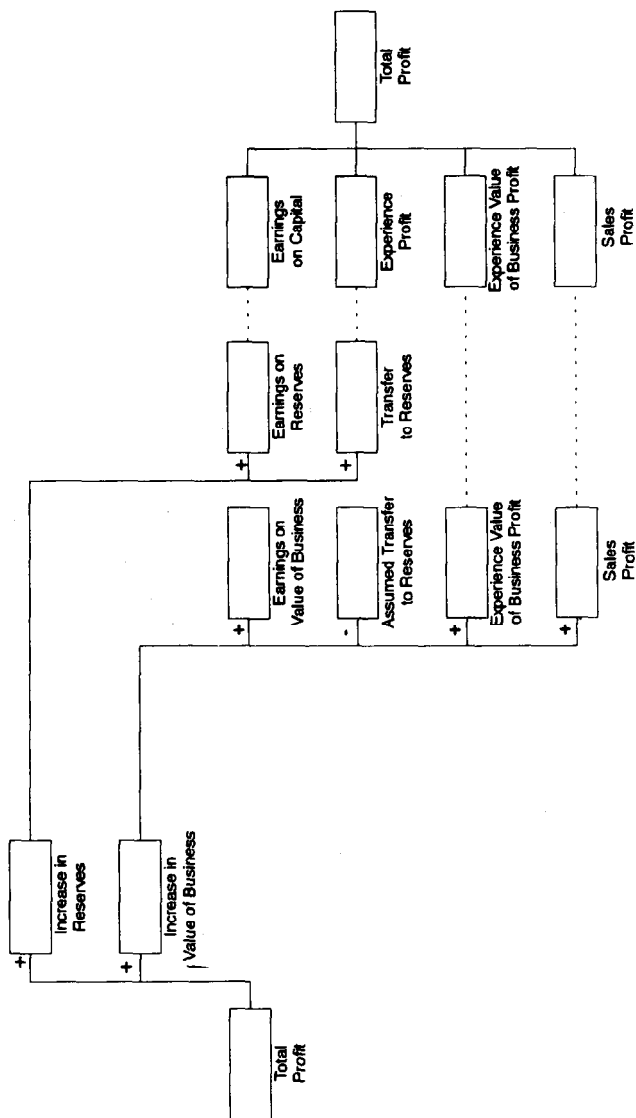
1.5 The period studied here could be any period but, for simplicity, we assume that it is a calendar year.

1.6 Throughout, the presentation is in the positive, i.e. in terms of Profit (not Loss), Increase in (not Reduction in) etc. It is understood, of course, that these items could be negative. The positive is used only for ease of explanation. Also for ease of understanding a plus or a minus may be shown next to a box to indicate whether a positive item in the box adds to or reduces Capital or Profit.

2. CAPITAL

2.1 Chart C1 illustrates the elements which contribute to the growth of the Capital of the office where the only business written is non-profit business i.e. all benefits are fully guaranteed. In the chart:

Net Assets = Assets of the life fund less current liabilities (e.g. income tax provisions, unpaid claims, etc.)



Statutory Liabilities	= the valuation liabilities on the published basis (excluding general contingency reserves).
Reserves	= Net Assets – Statutory Liabilities.
Value of Business	= “Best estimate” of the value of the future transfers to or from Reserves to be derived from the life insurance business assuming Statutory Liabilities are maintained throughout. It is the value, at the selected discount rate, embedded in the assets matching current Statutory Liabilities.

2.2 Turning to relationships, the chart illustrates that:

Capital	= Reserves + Value of Business
Net Assets	= Reserves + Statutory Liabilities
Reserves	= Start Reserves + Increase in Reserves
Value of Business	= Start Value of Business + Increase in Value of Business
Start Capital	= Start Reserves + Start Value of Business
Total Profit	= Increase in Reserves + Increase in Value of Business

It will also be noted that:

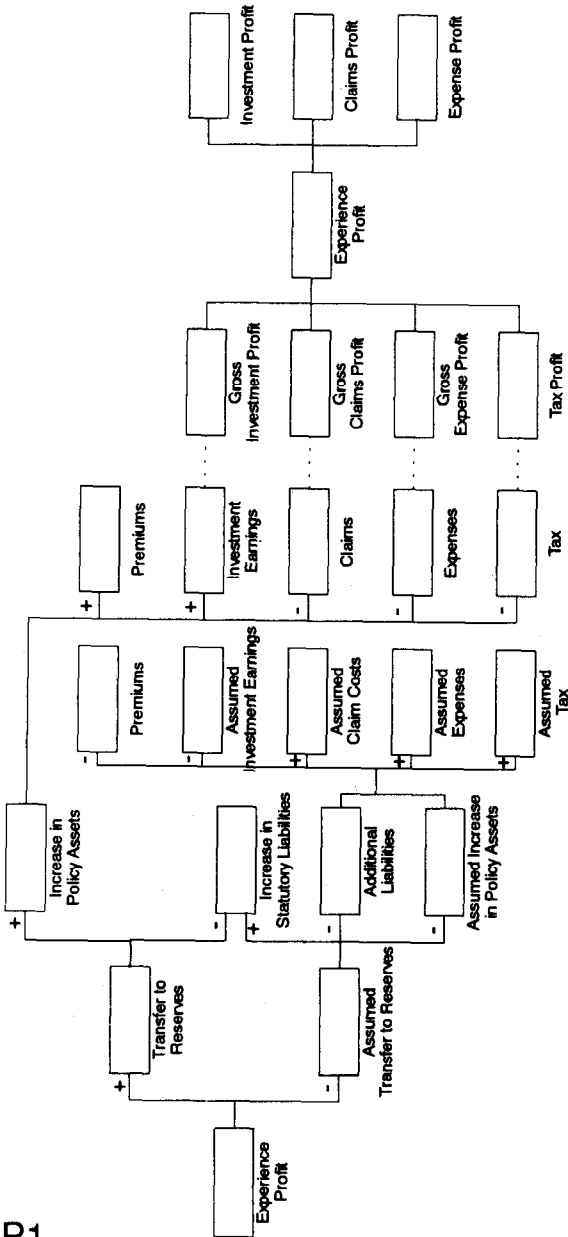
Total Profit	= Capital – Start Capital
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3. TOTAL PROFIT

3.1 We now analyse, in chart P1, Total Profit which was illustrated in chart C1 as the sum of the Increase in Reserves and the Increase in Value of Business. In this chart:

Earnings	= net investment earnings after deduction of income tax.
Transfer to Reserves	= the transfer to Reserves arising from insurance operations, after providing for Statutory Liabilities.
Earnings on Value of Business	= earnings on the average Value of Business at the discount rate.
Experience Value of Business Profit	= increase in Value of Business arising from the difference between the actual discontinuance experience and the Assumed experience.
Sales Profit	= the value, at point of sale, of the transfers to or from Reserves, assuming “realistic” future experience, arising from sales of policies during the year.

EP1



1 2 3 4 5 6 7 8

3.2 Experience Value of Business Profit arises because claims experience, for example, may be better than expected so that more policies are in force at the end of the year than expected. The expected future profit from this additional business constitutes Experience Value of Business Profit. This element of profit can be determined by deducting from the Value of Business as at the end of the year, based on the (actual) Statutory Liabilities, the Value of Business based on the Assumed Statutory Liabilities (as projected).

3.3 Chart P1 illustrates that:

Increase in Reserves = Earnings on Reserves + Transfer to Reserves

Increase in Value of Business = Earnings on the Value of Business – Assumed Transfer to Reserves + Experience Value of Business Profit + Sales Profit.

Earnings on Capital is defined as Earnings on Value of Business
+ Earnings on Reserves.

Experience Profit is defined as (actual) Transfers to Reserves
– Assumed Transfers to Reserves.

3.4 The right side of the chart illustrates that Total Profit can also be expressed as:

Earnings on Capital + Experience Profit + Experience Value of Business Profit + Sales Profit.

We analyse Experience Profit further below.

4. EXPERIENCE PROFIT

4.1 Chart EP1 is more complex than the earlier charts. In the chart:

Increase in Policy Asset = net investment earnings on the assets matching Statutory Liabilities plus the cash flow arising from insurance operations.
= the balance of the life office revenue account less (net) Earnings on Reserves.

The 5th column of the chart illustrates the (policy) revenue account, showing that the Increase in Policy Assets is equal to Premiums plus Investment Earnings less Claims, Expenses and Tax.

4.2 Column 3 requires some explanation.

It illustrates that:

$$\text{Transfer to Reserves} = \text{Increase in Policy Assets} - \text{Increase in Statutory Liabilities.}$$

Assumed Transfer to Reserves would also be equal to the equivalent Assumed Increase in Policy Assets less the Assumed Increase in Statutory Liabilities. However, because of the difference between the actual and the Assumed discontinuance experience, the Assumed Statutory Liabilities at the end of the period will be different from the actual and will need to be brought into line. This is illustrated here, where:

$$\text{Additional Liabilities} = \text{Increase in Statutory Liabilities} - \text{Assumed Increase in Statutory Liabilities.}$$

4.3 Column 4 shows the breakdown of the Additional Liabilities and the Assumed Increase in Policy Assets in a particular way, viz. so that when combined with column 5 what will emerge in column 6 will be the Gross Profit in respect of each revenue account item. For example, so that:

$$\text{Gross Investment Profit} = \text{Investment Earnings} - \text{Assumed Investment Earnings.}$$

Profit here is therefore defined as the difference between the actual and the Assumed experience.

As a consequence of differing discontinuance experience, the Assumed data produced by projection (for example, the premium revenue) will differ from the actual and will require adjustment to ensure that the full effects of discontinuance emerges as a Claims Profit or Loss. These adjustments are described in Appendix 1.

4.4 It will be noted that in column 4 the terms Assumed Investment Earnings, Assumed Expenses and Assumed Tax are used although the figures will actually be "Adjusted Assumed" ones (having been adjusted in accordance with Appendix 1). This is a personal preference with a view to keeping the presentation simple. Assumed Claim Costs could be referred to as Assumed Claims. The word "Costs" is added simply to signify that the figure is not simply the claims alone but additional (or reduced) costs associated with the claims.

4.5 Columns 6 and 7 illustrate that Experience Profit can be expressed as the sum of Gross Investment Profit, Gross Claims Profit, Gross Expense Profit and Tax Profit. We have now reached a stage where the profit on insurance operations might be understood by a non-actuary and the illustration here is one in normal revenue account format familiar to accountants.

4.6 In the final column of chart EP1, the Tax Profit has been spread over the items to which it relates so that, for example, the Investment Profit is net of tax. This is an

optional presentation. If not all tax items can be allocated to one of the three items investment earnings, claims and expenses, it may be necessary to have a residual tax profit in the final column. On the other hand if items such as investment earnings and expenses are expressed in the realistic valuation as being net of tax then the final column replaces column 6, the appropriate items in column 5 must be net of tax and the tax items in columns 4 and 5 are unnecessary.

5. INVESTMENT-LINKED POLICIES

5.1 We have completed our basic study of the methodology of analysing and illustrating Capital and Profit where the only business written by the life office is non-profit. We now turn to determine what variations are necessary where some or all of the business is investment-linked – and how the variations are presented.

5.2 The presentation of Capital and Total Profit (C1 and P1) remain unaltered. The item Additional Liabilities will include the increase in the end of year Statutory Liabilities arising from the earning rate implicit in the growth in unit prices being greater than the equivalent Assumed earning rate. The Experience Value of Business Profit will be affected by this increase. For ease of explanation we refer to the addition to unit values as “Interest Credits”.

5.3 The revised presentation of Experience Profit is shown in chart EP2 where in column 4:

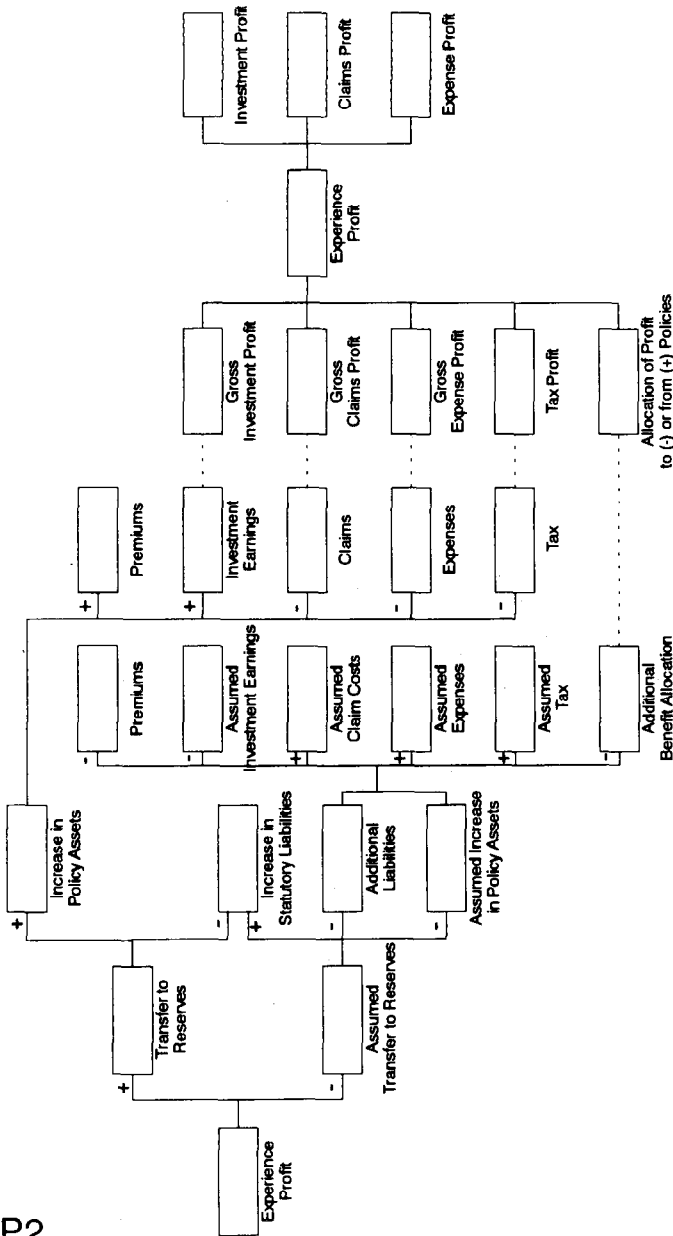
$$\text{Additional Benefit Allocation} = \text{Interest Credits} - \text{Assumed Interest Credits during the year.}$$

It should be noted that the Interest Credits here are the total Interest Credits over the year (including those on policies which are discontinued during the year). They are not the same figures as those included in Additional Liabilities. Normally the projection software would provide the Assumed figure and the life office’s analysis of the Statutory Valuation should provide a “best estimate” of the actual figure.

5.4 The Additional Benefit Allocation is, of course, an allocation of excess net investment earnings to policyholders i.e. is an allocation of Investment Profit. Hence, in column 6, the figure is repeated as an Allocation of Profit to (-) or from (+) Policies. The label is intended to make it clear that a negative figure in the box (meaning a Loss to the life office) is an allocation of a Profit to policies.

5.5 In column 8 this Allocation of Profit to Policies is allowed for in determining Investment Profit. Where all of the business is investment-linked and the policyholders receive all net investment earnings, one would expect the life office’s Investment Profit to be nil.

EP2



6. INVESTMENT-ACCOUNT AND WITH PROFIT POLICIES

6.1 The remaining types of business we look at are investment-account policies and traditional with profit policies (endowment insurance etc.). In essence, the treatment of these classes of policy is the same as for Investment-linked policies. Where there are no defined Profit-Sharing Rules regarding the allocation of profit, any Additional Interest Credits or Cost of New Bonus would normally be charged against Investment Profit.

6.2 It should be noted that Additional Terminal Bonus should be included under Additional Benefit Allocation and not Assumed Claim Costs since Additional Terminal Bonus would also be seen as a charge against Profit allocated to policies.

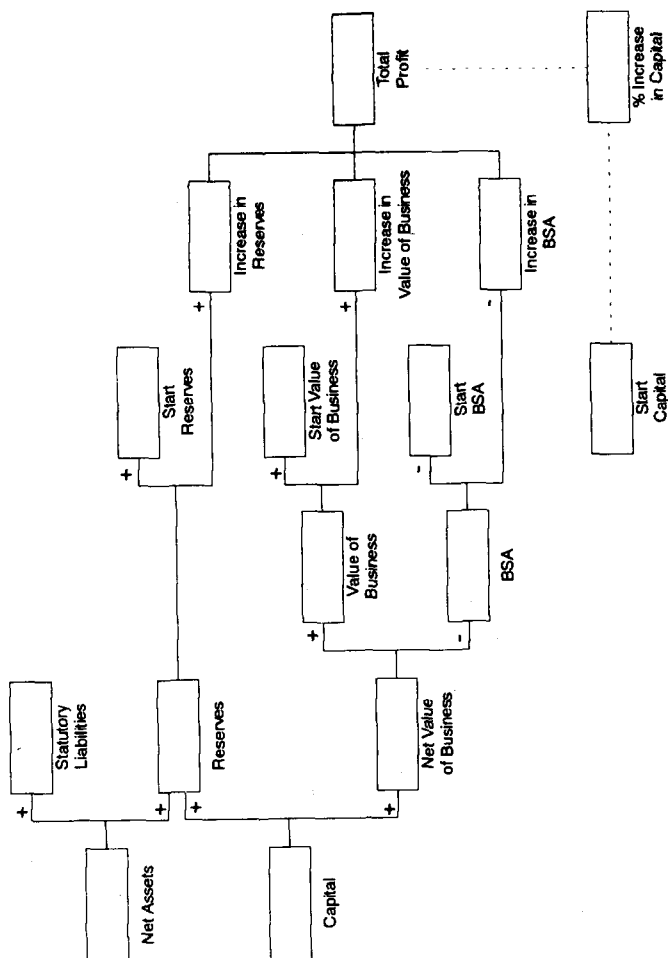
6.3 The cost of all bonus up to and including the Valuation Date should be included in the Statutory Liability. Assumed Cost of Bonus (including bonus on Assumed Claims) should be provided by the computer software. However in respect of actual Cost of Bonus, many Statutory Valuation systems provide only the Cost of Bonus in respect of the policies in force on the Valuation Date. If this is the case, then it will be necessary to gross up this figure to obtain an approximation to the Cost of Bonus including that in Claims.

6.4 We now look at Profit-Sharing Rules. A Profit-Sharing Rule is a business rule or contractual obligation which decrees that certain portions of Profit belong to specific groups of policyholders. An obvious example is that in respect of investment-linked business. All of the Investment Profit arising from the appropriate policy assets will (as indicated earlier) be credited to that class of business. The rules for crediting are clearly established by unitising the assets and allocating units to individual policies. A similar Profit-Sharing Rule which may be contractual, or a business rule could apply, to capital-guaranteed investment – account policies. Because of the nature of this product, the interest crediting rate is not expected by policyholders to fluctuate to the same extent as investment-linked earnings and it is necessary to establish a method of recording the variation between the earnings properly attributable to the business and the smoothed earnings actually credited. This record of the outstanding surplus or deficit due to the business is sometimes referred to as an Interest Fluctuation Reserve or Bonus Fluctuation Reserve. We prefer the more general term of Benefit Smoothing Account which has the advantage that it:-

- (i) can apply to both Interest and Bonus crediting business;
- (ii) makes clear the purpose of smoothing benefits; and
- (iii) uses the neutral term, “Account” which can be both positive and negative. (A Reserve is usually seen as a positive amount only).

6.5 A positive Benefit Smoothing Account (BSA) is obviously a liability as it represents additional amounts to be distributed to policies. It can be presented in

C



different ways, (e.g. as a reduction in Reserves), but we have chosen to leave the Statutory Reserves unaltered in the presentation and treat the obligation to pass on a BSA to policyholders as a reduction in the Value of Business – the term “Net Value of Business” being used for the net figure.

6.6 Chart C shows the relationship between the BSA and the other items contributing to the growth of Capital. Total Profit for the year is now the sum of the increases in Reserves and Value of Business less the increase in the BSA.

6.7 Chart P2 indicates that the increase in the BSA can be split into two parts, Net Earnings on BSA (since the account should be credited with interest each year it is carried forward) and any new Addition to BSA. The former affects the earnings on Capital and the latter is an allocation out of Experience Profit.

6.8 Chart EP illustrates how the Addition to BSA emerges from the analysis of Experience Profit. With investment-linked business the amount of the allocation of profit (the Profit-Share) was equal to the Additional Benefit Allocation. Where the benefit being credited is smoothed, this is not the case and the difference between the Profit-Share and the Additional Benefit Allocation falls into the Benefit Smoothing Account. The relationship is:

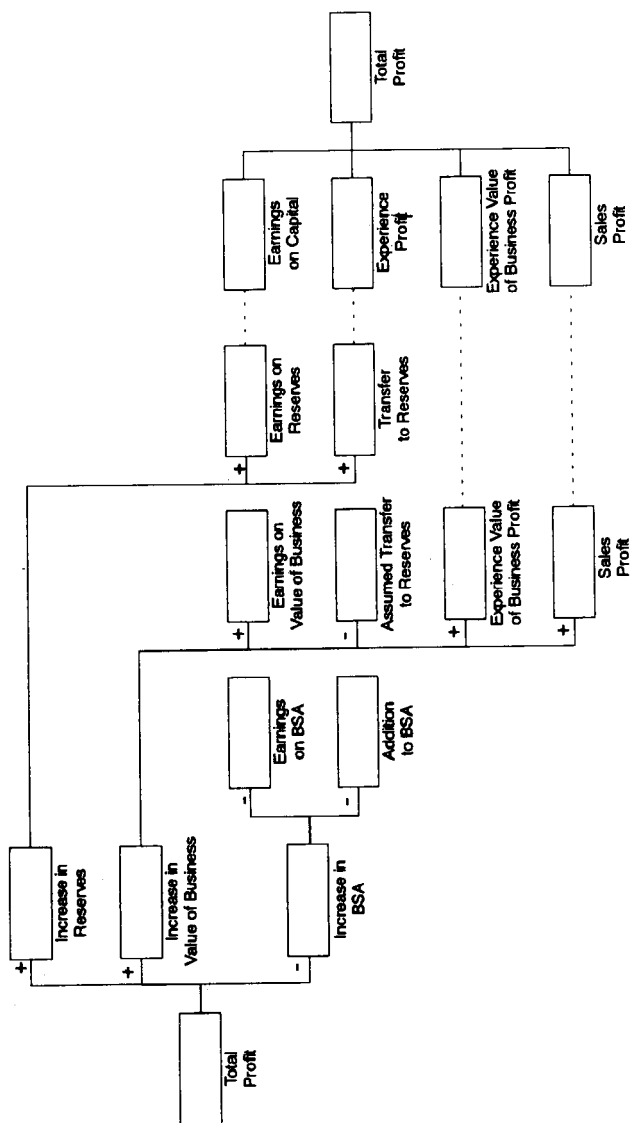
$$\text{Addition to BSA} = \text{Allocation of Profit} - \text{Additional Benefit Allocation.}$$

The Allocation of Profit will depend on the Profit-Sharing Rules and may be Investment Profit (normal for investment-account business) or all Experience Profit (before allocation) in respect of the product (perhaps for traditional business with an Asset Share business rule).

7. REVALUATION

7.1 There are two principal types of revaluation of liabilities that may take place – a revaluation of Statutory Liabilities and a change in the “embedded value” basis. Chart P makes provision for both.

7.2 When there is a change of valuation basis for the Statutory Liabilities this leads to a transfer between Reserves and the Value of Business. Normally this will take place at the end of the year – in which case the analysis of Profit will be on the old valuation basis. Technically a change in Statutory Liabilities should not change the realistic assessment of liabilities and the Revaluation figure under the Value of Business heading should be equal to but of the opposite sign to that affecting the Reserves (i.e. there should be no Revaluation Profit). In practice, this will be the case only when the rate for discounting transfers to Reserves is equal to the net investment return assumed in the “embedded value” valuation.

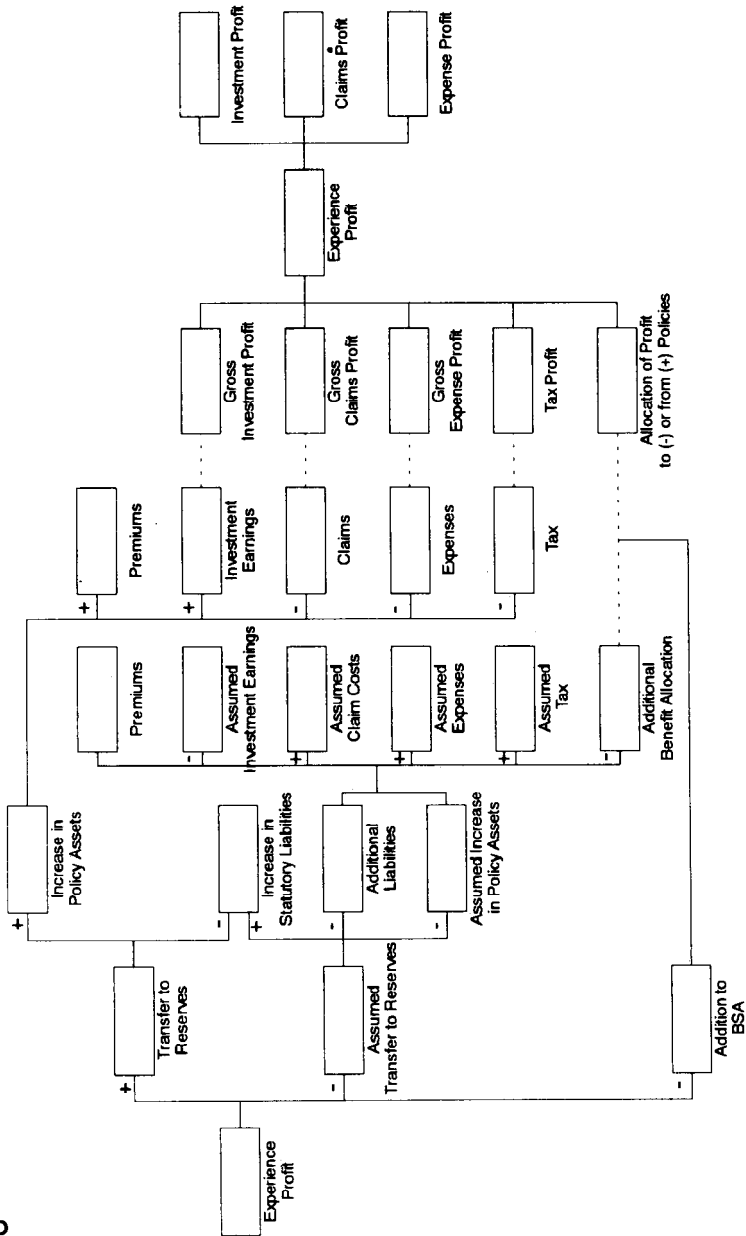


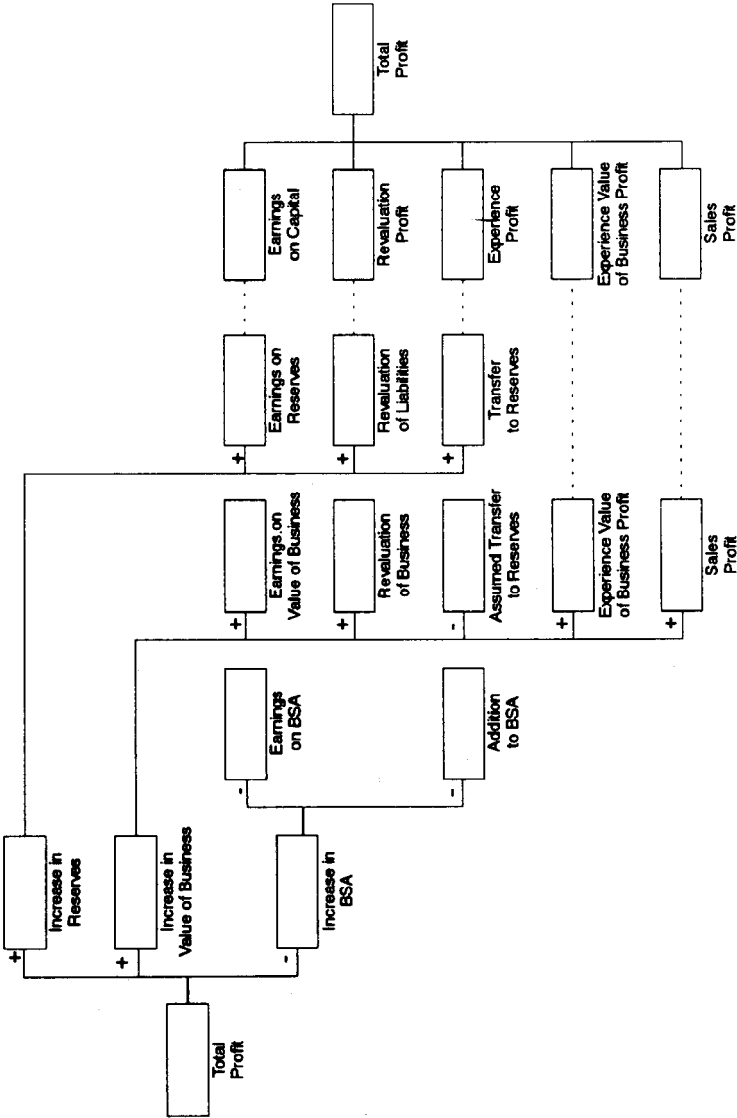
7.3 There are revaluation items which will have a direct effect on Capital – items such as AIDS contingency reserves. It may be determined that an increase in this item is realistically necessary and that the “realistic” liability should also be increased. In this instance, the revaluation amount would appear as a negative figure in column 5, reducing Reserves, Total Profit and Capital, with the Value of Business remaining unaltered.

7.4 The second principal type of revaluation is a change of basis for determining the Value of Business. This also would normally be at the end of a year and would lead to a direct change in the amount of Capital. The change may be a change of parameters such as future interest rates, inflation rates, expenses, etc.

7.5 A further type of revaluation of Value of Business relates to a change in the future terms and conditions applicable to specific products. For example, if the management fees charged are, within limits, at the discretion of the life office and the life office decides to increase the fees in future, this obviously increases the Profit likely to emerge from that product and that Profit is reflected as a Revaluation Profit and an increase in the Value of Business.

EP





PART 3

1. INTRODUCTION

1.1 Part 2 has shown how, for various different classes of business, Profit and Capital of a life office can be determined. The illustrations were shown for each type of business individually but the real-life situation is that an office normally manages all of the types mentioned and Profit and Capital will be determined by adding together the data for each type.

1.2 In Part 3 we look at using computer models to determine the Value of Business then at some further analyses of profit that would be useful in life office management. We finish the paper by stating our view of the role the actuary should play in the management of a life office in addition to performing traditional duties.

2. MODELLING

2.1 At the time of writing this paper, it is not practical to use computer software on individual policies to provide the necessary Assumed revenue accounts, etc. for profit analysis. Current computers are not fast enough to provide results in reasonable time. The solution lies in creating computer models of the life office's business. The advantage of a model is obvious – speed in processing. The main disadvantage is, of course, a concern about possible lack of accuracy when projecting data. The model may reproduce the business well at the beginning of the year but there is no guarantee that the end year result will be quite so precise. Creating a good model is an art in itself and the results depend on the skill of the artist.

2.2 Creating a model for profit reporting and analysis is a much more precise exercise than creating one for appraisal value purposes. The modeller has to have regard to the possibility that each parameter in the model may become subject to analysis. This applies particularly to expenses since the life office management and its Board of Directors will be concerned to compare Actual Expenses with Assumed Expenses.

2.3 In addition to a concern about accuracy when using a model is the problem of the elapsed time that it takes from any valuation date to create a satisfactory model for profit reporting. It is necessary to match up the model Statutory Liabilities with the actual figures so the completion of the model must follow on from the finalisation of the Statutory Valuation. This means that the re-creation of the model at each valuation date will delay the reporting of Profit. This is unfortunate since the sooner the report is produced the more useful it is.

2.4 Another important feature about reporting Profit on a yearly basis (our example to date) is that as soon as reporting commences, requests will be made for such reports monthly, or at least quarterly. This is perfectly sensible. No Board can expect to oversee a business if it receives a progress report only once a year. The actuary now will be under

pressure to produce such reports quarterly or monthly during a year and as soon as possible after the end of each profit period. This is a far cry from annual Statutory Valuations produced some months after the end of a financial year!

2.5 The request can be met on a “best estimate” basis using a computer model. The life office may have to compromise between speed, cost and accuracy. A possible compromise is to report quarterly with an accurate Statutory Valuation each quarter but an update of the computer model only once a year. (A by-product of the quarterly Statutory Valuation process is that the end-of-financial-year valuation is available sooner because fewer problems arise at that busy time).

2.6 Where the model is updated only once a year, then for the other three quarters the Experience Value of Business Profit, referred to in Part 2 (the increase in the Value of Business arising from the difference between the actual experience and the Assumed experience) will not be available. If the assumptions in the model (the discontinuance rates in particular) are close to the actual experience, the amount of this item will be small and might be ignored. It is, however, more reassuring, even in “best estimate” reporting, if some adjustment is made between full valuations for known movements in value. A simple “best estimate” approach is to report Experience Value of Business Profit as the sum, for each product type or product group, of the average Value of Business per policy times the difference between the Actual and the Assumed policies in force on the valuation date.

2.7 The quarterly valuation process above has been found, in practice, to lead to reporting five or six weeks after the end of each quarter—due mainly to the need to collect data from multiple product databases and reconcile valuation results with accounting data. If the life office has only a limited range of policy types and an integrated database, the whole process can be speeded up. It may well be practical to do a Statutory Valuation monthly and report on Profit each month. If the valuation process cannot be completed within two or three weeks of the end of a month and the actuary wishes to report on a monthly basis, the next step in “best estimate” reporting must be taken, viz. to estimate the Statutory Liabilities between valuation dates. This is not as daunting a task as it appears. There should be no difficulty in producing Assumed data (updated with new sales). All that is necessary is to estimate the increases in the Additional Liability since the last valuation. This can be done on a product by product basis having regard to the number of policies in force (usually available), the increase in claims and the previous data for the Cost of Bonus, Interest Credits and Additional Benefit Allocation. If a full Statutory Valuation is carried out quarterly, the monthly reports should be reasonably, if not completely, accurate. Certainly there is no reason why they should not give an accurate picture of the *trend* of Profit from different sources during the interval valuation period. A frequent and regular “best estimate” report to management and the Board of Directors is more useful than one that is absolutely accurate to decimal places but is provided, for example, only once a year.

2.8 The reference to regular profit reporting raises the question of the order of magnitude of the figures in any such report. If our figures are approximations, we should, of course, limit the order of magnitude in which they are presented to the extent that we have a fair degree of confidence that they paint a true picture. Should figures be in complete units of currency, in thousands, in millions to one decimal place? This is not a trivial point. The purpose of any report is to convey information to the receiver and many financial reports fail to do this by providing figures to such a degree of accuracy that it is difficult to determine the order of magnitude of individual items. It is important to realise that the Board of a life office with assets of say ten billion is unlikely to be interested in profit results of less than a million. If the report is only in millions then the picture is much *clearer* than one with smaller units. The important point is to report figures of an order of magnitude appropriate to the size of the life office.

3. FURTHER ANALYSIS OF PROFIT

3.1 So far we have looked at reporting only the Total Profit of the life office split up into broad categories of Profit. There are, however a number of breakdowns of Profit which are useful indicators to management of the success or failure of different elements of the business. We consider briefly a few of these, viz. Expense Profit by Function, Expense Profit by Department and Product Profitability.

3.2 We look, first of all, at *Expense Profit by Function*. When determining the Value of Business various assumptions will have been made about the management costs of running the business. These assumptions, in addition to the assumptions regarding commission, will relate to a number of functional operations of the life office. These can be grouped in a number of ways. A typical high-level breakdown of expense assumptions would be Distribution Costs (all sales costs other than commission), Investment Management Costs, New Business Costs (underwriting and policy issue) and Administration Costs (all other costs). Investment Management Costs may be taken as a percentage of assets under management. Other cost parameter values will vary by product. Distribution Costs may be expressed as a percentage of commission, New Business Costs as a unit cost per new policy and Administration Costs as a unit cost per policy in force.

3.3 The Assumed Expenses split by these Functions, Investment Management, Distribution, New Business and Administration will be made available by the computer software at each valuation date. To present Expense Profit by Function, all that is needed is to split actual expenses the same way. This is not an easy task and we do not intend describing the various techniques and pitfalls associated with such an analysis of expenses. What we do say is that any life office that does perform a realistic valuation must have some knowledge of these Functional costs in order to establish the parameters for the valuation. Hence the life office should be able to split its overall actual expenses by Function. The effort is worthwhile – even on a “best estimate” basis using defined algorithms to allocate overheads. The value of this report is that it directs attention to the

areas of expense that require action. This may lead either to tighter expense control or, in the early period of reporting, to a reassessment of the assumptions in the valuation.

3.4 If the actuary is able to assist management by reporting on Expense Profit by Function, he is likely to be pressed to report *Expense Profit by Division or Department*. For many years, management (and the accountants in life offices) have been asking actuaries "How much can we afford to spend?" It has been evident that the regular process of basing departmental expense budgets on the costs incurred the previous year must have flaws in it. Management has been searching for a more scientific tool to control costs. Comparing costs to expense loadings determined on the traditional basis was not appropriate since the incidence of the costs differed from the incidence of the receipt of expense loadings. "Now", says management, "the actuary has the answer!"

3.5 How does the actuary respond? He can only indicate truthfully that an "actuarial" allocation of Assumed Expenses to Departments is not possible. However, there must be an inherent breakdown of such Expense "Allowances" in the assumptions made. What is it? The actual Expense Allowances by Department for a given volume of business will depend on how the work has been allocated by Department and this will vary from life office to life office and even from year to year within an individual life office. One solution to the problem of how to use Expense Profit as a management tool is to determine the (approximate) percentage contribution of each Department's costs to either the *total* costs of each Function (say, in the current year or in the budget for the following year) or the costs of each Function on a product by product basis, then allocate to each Department the same percentage of Assumed Expenses of each Function. Thus each Department will receive an Expense Allowance appropriate to the work it is doing and the total of Departmental Expense Allowances will equal the total Assumed Expenses at any time. Hence it will be possible to demonstrate Departmental profit or loss *in relation to these Allowances*.

3.6 There are a number of problems with this approach of course. The initial allocation is only as good as the initial estimate of the contribution to the different Functions. Any change in the work done requires agreement between Department Heads to vary the percentage allowances by Department. It is certainly an imperfect tool. However, it is a management tool that forces cost control discipline on Departments and one that is well ahead of earlier practices of basing expense budgets purely on past levels of cost.

3.7 We turn now to consider *Product Profitability*. An analysis of the profitability of the various products or Product Groups is an important element in managing the business of the life office. Management would be assisted if the actuary is able to report on the contribution of each Product Group to Profit and Capital. To achieve this what is required is a breakdown by Product Group of all the elements adding up to Total Profit (See Chart P) other than Earnings on Reserves. An analysis of Experience Profit (see Chart EP) by Product Group is also useful.

3.8 We have used the term Product Group here rather than suggest reporting on individual products (although the base data may relate to individual products within a Group) simply to indicate that, at the top level of reporting, the figures are likely to be more meaningful if the business is split into only five or six broad groups rather than into the greater numbers of products that the life office may be managing. An example of a Product Group might be all whole life and endowment insurances and pure endowments; another might be all term and disability business; a third, all regular premium unbundled policies, etc.

3.9 When producing the analysis of Experience Profit, there should be no difficulties with Assumed data since this would have been produced on a product by product basis in any event. Problems will undoubtedly arise when attempting to split up the life office revenue account by Product Group for the first time. The problem area is likely to be that of expenses. Expenses split by Product Group will not normally be available. It should be possible to obtain a split of expenses by Function as outlined in Section 3.2. Where no other data is available it is necessary to have recourse once more to a "best estimate". A simple "best estimate" is to apportion each (actual) total Function cost to Product Groups in the same proportions as the Assumed Function costs by Product Group. While this produces an artificial Expense Profit by Product Group (although the total will be correct) we believe it better to use such a "best estimate" for this item rather than not report at all on Product Profitability. Since the realistic valuation is attempting to simulate actual experience and the expense parameters are important in that experience, the variation between Actual and Assumed Expenses in total should not be substantial. This, however, may hide the fact that for some Product Groups both the "best estimate" Actual and the Assumed Expenses are significantly too high or too low. Only a thorough analysis of costs leading to a reassessment of the parameters for the realistic valuation will solve this problem. Such an analysis should, of course, be undertaken, if not previously carried out for the purpose of determining the expense parameters.

3.10 The profit data can be broken down in other ways to assist management. For example there may be breakdowns of Expense Allowances within Departments. Expense Allowances for Sales Branches may be deemed to be allocated on a product by product basis, proportionate to sales, the total of all such Expense Allowances being that proportion of Assumed Distribution Costs attributable to such Branches. The Point of Sale Profits may also be allocated to Sales Branches and used as a management tool to direct activities in the most advantageous direction. Each additional use of the Profit "tools" leads to a greater focus on "managing by Profit" and directs the activities of the life office towards greater effectiveness in managing its business.

4. THE ROLE OF THE ACTUARY

4.1 In the past, the actuarial role was confined to concern for financial solvency. Actuarial work was, in the main, limited to determining premium rates, carrying out an

annual solvency valuation and distributing surplus to with profit policyholders. We believe that this should no longer be the case. The actuary should see his additional role as one of using his skills to provide management with the best possible tools to manage the business – and he should be pro-active in doing so. Managing by profit is one of those tools which an actuary can provide – a tool which will be welcomed both by executive management and by the Board of Directors.

4.2 In presenting the results of the financial analysis of the life office, the actuary should choose the approach which gives the clearest picture to those receiving the report. Du Pont charts can assist in showing the movement of cash flow, as is illustrated in this paper. The order of magnitude of the figures presented is a key element in providing clarity. Where it is important to illustrate trends (and this would apply to much of the data provided to management) the visual effect of a statistical graph or chart is much more powerful than simply providing a series of numbers. Presentation is vitally important and “best estimate” reporting of key elements better than providing no information at all to management.

4.3 We hope that this paper contributes to encouraging actuaries to take an active role in using all of their analytical skills to assist in the management of their office.

APPENDIX I

DISCONTINUANCE ADJUSTMENTS

As a consequence of the actual policy discontinuance experience differing from the Assumed experience it is necessary to adjust the various items in the Assumed revenue account in order that a picture as true as possible be given of the Profit emerging in relation to each item.

While the primary purpose of the adjustments might be taken as ensuring that the Profit on discontinuances (the Claims Profit) is properly illustrated, the effect is that the Profit relating to all of the other items in the revenue account becomes more meaningful. The adjustments bring these other items into line with what the Assumed experience would be for each item were the Assumed discontinuance rates equal to the actual rates. For example, they ensure that Assumed Investment Earnings relate to the same asset base as the actual Investment Earnings and that Assumed Administration Expenses relate to the actual business volume. All such adjustments are offset by a reverse debit or credit to Assumed Claim Costs so there is no change in the Assumed Increase in Policy Assets.

The reasoning behind the adjustments is that the Claims Profit should be the overall effect on Profit arising from retaining in force non-experienced discontinuances (i.e. those discontinuances that were Assumed to occur but did not). This total Claims Profit may be taken as being:

	The Assumed transfer to Reserves at the Assumed time of discontinuance
plus	the transfers to Reserves which would arise on the Assumed basis between the Assumed time of discontinuance and the end of the year
plus	the (embedded) value of future transfers to Reserves at the end of the year in respect of the non-experienced discontinuances.

The last item is referred to as the Experience Value of Business Profit in the main body of this paper and is dealt with there. We are concerned here with the first two items which affect the presentation of Assumed revenue and the Experience Profit (as defined) in the current year.

The Experience Claims Profit can also be expressed as:

	Assumed Claims – Statutory Liability at Assumed time of discontinuance
plus	the increase in Policy Assets over the period to the end of the year
minus	the increase in the Statutory Liability during the period in respect of the non-experienced discontinuances.

Since the Statutory Liability of such discontinuances at the end of the year in the case

of non-profit business should be equal to the Additional Liabilities (as defined) and the Assumed Claims of these discontinuances are included in the total figure for Assumed Claims, the adjustment that has to be made to Assumed Claims (as produced by the computer software) to properly illustrate Claims Profit is:

Increase in Policy assets on the Assumed basis of non-experienced
discontinuances over the period between the Assumed date of discon-
tinuance and the end of the year

minus the Additional Liabilities

In order to calculate the above Increase in Policy Assets a degree of approximation may be used to determine some items in the revenue account. For example, the following method of adjusting may be employed:

Premiums

(actual) Premiums – Assumed Premiums

Assumed Investment Earnings

$\frac{\text{Assumed Investment Earnings} \mp \text{Additional Liabilities}}{2 \mp \text{average Assumed Statutory Liabilities}}$

Assumed Expenses

$\frac{\text{Assumed Administration Expenses} \mp \text{Additional Policies}}{2 \mp \text{average Assumed Policies}}$

where Additional Policies = Policies at end of year – Assumed
Policies at end of year.

and Administration Expense is expressed in the “embedded” valuation basis as a unit cost per policy.

plus $\frac{\text{Assumed Investment Management Expenses} \mp \text{Additional Liabilities}}{2 \mp \text{average Assumed Statutory Liabilities}}$

where Assumed Investment Management Expenses are expressed as a percentage of invested assets.

Assumed Tax

Tax on the Assumed Investment Earnings adjustment

less the tax deductions on the Assumed Expenses adjustment.

These adjustments arising because of differing discontinuance experience appear complicated but they can, in fact, be carried out fairly easily if the work is done on a computer spreadsheet. The simple approach (which ensures that the figures balance) is to calculate all of the other revenue account items directly then determine Assumed Claim Costs as a balancing item equal to:

Premiums

- + Assumed Investment Earnings
- Assumed Expenses
- Assumed Tax
- Assumed Increase in Policy Assets
- Additional Liabilities

(This Appendix relates to non-profit business, but where the business is investment-linked, investment-account or consists of traditional with profit policies, a similar approach can be used. In these situations, the adjustment to Assumed Investment Earnings and the tax thereon are offset by corresponding adjustments to the Additional Benefit Allocation and not Assumed Claim Costs.)

APPENDIX 2

A PRACTICAL EXAMPLE

In this Appendix we demonstrate the calculation of Capital and Profit for a hypothetical mutual life office which writes only two classes of business, non-profit (Class of business 1) and investment-account (Class of business 2). What follows below is a sample spreadsheet which might be used to bring together the data from the life office accounts and “embedded value” and statutory valuations based on policy records. The Profit Report is at the end of the year, but it could be at the end of any quarter (or even month) during the year.

PART 1 – ACTUAL FINANCIAL INFORMATION

	Total	Reserves	Statutory Liabilities	
A1 Start Net Assets	1,484.6	297.41	1,187.2	
A2 End Net Assets	1,837.7	297.17	1,540.6	For Reserves and Policy Assets:
A3 Investment Earnings	237.38	42.48	194.90	Total A3* Ratio of Average Assets
A4 Investment Mgt. Expenses	4.86	0.87	3.99	Total A4* Ratio of Average Assets
A5 Tax on Earnings	71.21	12.74	58.47	Total A5* Ratio of Average Assets
A6 Tax on Inv. Mgt.Expenses	1.46	0.26	1.20	Total A6* Ratio of Average Assets
A7 Net Earnings	162.76	29.13	133.64	A3-A4-A5+A6

NOTE: Allocation of investment earnings might be unnecessary since the policy liabilities might be in separate investment portfolios. Alternatively the investment earnings might be determined as part of a process of hypothecation of assets. In this simple example we assume that investment earnings are allocated in proportion to invested assets. Invested policy assets are equal to Statutory Liabilities.

		Total	Class 1	Class 2	
B1	Premiums	394.85	44.73	350.12	
B2	Investment Earnings	194.90	5.73	189.17	Total B2 = Stat. Liabs. A3
B3	Claims	85.14	22.02	63.12	
B4	Expenses	174.49	19.31	155.18	
B5	Income Tax	6.12	(4.07)	10.19	
B6	Increase on Policy Assets	324.00	13.20	340.80	B1+B2-B3-B4-B5
B7	Start Statutory Liabilities	1,187.2	36.00	1,151.2	Total B7 = Stat. Liabs. A1
B8	End Statutory Liabilities	1,540.6	41.85	1,498.7	Total B8 = Stat. Liabs. A2
B9	Increase in Liabilities	353.36	5.85	347.51	B8-B7
B10	Transfer to Reserves	(29.36)	7.35	(36.71)	B6-B9
B11	Interest Credits	108.04		108.04	
B12	Start No. of Policies	513,914	216,563	297,351	
B13	End No. of Policies	584,671	240,699	343,972	
B14	Tax on Earnings	58.47	1.72	56.75	

PART 2 - ASSUMED FINANCIAL INFORMATION

		Total	Class 1	Class 2	
C1	Premiums	390.27	44.71	345.56	All Data from a computer projection of Start policy data plus new business.
C2	Investment Earnings	150.18	4.66	145.52	
C3	Claims	174.21	35.24	138.97	
C4	Expenses	159.78	17.92	141.86	
C5	Income Tax	(2.88)	(3.98)	1.10	
C6	Increase in Policy Assets	209.34	0.19	209.15	C1+C2-C3-C4-C5
C7	Start Statutory Liabilities	1,187.2	36.00	1,151.2	C7=B7
C8	End Statutory Liabilities	1,437.0	41.81	1,395.2	C8-C7
C9	Increase in Liabilities	249.77	5.81	243.96	
C10	Transfer to Reserves	(40.43)	(5.62)	(34.81)	C6-C9
C11	Interest Credits	84.45		84.45	
C12	Start No. of Policies	513,914	216,563	297,351	
C13	End No. of Policies	568,939	240,466	328,473	
C14	Tax Rate on Earnings	0.30	0.30	0.30	
C15	Tax Rate on Expenses	0.30	0.30	0.30	
C16	Administration Expenses	29.81	4.11	25.70	
C17	Investment Mgt. Expenses	3.90	0.12	3.78	
C18	Start Value of Business	320.69	64.49	256.20	C19-(C18-C10+C21)
C19	End Value of Business	411.83	77.35	334.48	
C20	Earnings on Val. of Bus.	29.01	5.62	23.39	
C21	Sales Profit	21.70	1.62	20.08	

PART 3 - CALCULATION

		Total	Class 1	Class 2	
D1	Additional Liabilities	103.59	0.04	103.55	B9-C9
D2	Additional Policies	15,732	233	15,499	B13-C13
D3	Adj. to Premiums	4.58	0.02	4.56	B1-C1
D4	Adj. to Investment Income	5.92	0.00	-5.92	$C2 * D1 / (C7 + C8)$
D5	Adj. to Expenses	0.79	0.00	0.79	$C16 * D2 / (C12 + C13) + C17 * D1 / (C7 + C8)$
D6	Adj. to Tax on Earnings	1.78	0.00	1.78	$C14 * D4$
D7	Adj. to Tax on Expenses	(0.24)	0.00	(0.24)	$-C15 * D5$
D8	Assumed Premiums	394.85	44.73	350.12	$C1 + D3$
D9	Assumed Inv. Earnings	156.10	4.66	151.44	$C2 + D4$
D10	Assumed Claim Costs	98.24	35.22	63.02	$D8 + D9 - D11 - D12 - C6 - D1 - D13$
D11	Assumed Expenses	160.57	17.92	142.65	$C4 + D5$
D12	Assumed Tax	(1.34)	(3.98)	2.64	$C5 + D6 + D7$
D13	Add. Benefit Allocation	19.45		19.45	$B11 - (C11 + D4 - D6)$
D14	Allocation to Policies	(26.41)		(26.41)	$(1 - C14) * D9 - (B2 - B14)$
D15	Start BSA	57.56		57.56	
D16	Addition to BSA	6.96		6.96	$-D14 - D13$
D17	Earnings on BSA	5.75		5.75	$D15 * (B2 - B14) / (B7 + B8) / 2$
D18	End BSA	70.28		70.28	$D15 + D16 + D17$
D19	Experience V. of Bus. Prof.	15.86	0.07	15.78	$D2 * C19 / C13$
D20	End Value of Business	427.69	77.42	350.26	$C19 + D19$

PART 4 - RESULTS

		Total	Class 1	Class 2	
E1	Transfer to Reserves	(29.36)	7.35	(36.71)	B10
E2	Ass. Transfer to Reserves	(40.43)	(5.62)	(34.81)	C10
E3	Addition to BSA	6.96		6.96	D16
E4	EXPERIENCE PROFIT	4.10	12.97	(8.87)	E1-E2-E3
E5	Gross Investment Profit	38.80	1.07	37.73	B2-D9
E6	Gross Claims Profit	13.10	13.20	(0.10)	D10-B3
E7	Gross Expense Profit	(13.92)	(1.39)	(12.53)	D11-B4
E8	Tax Profit	(7.46)	0.09	(7.55)	D12-B5
E9	Allocation to Policies	(26.41)		(26.41)	D14
E10	EXPERIENCE PROFIT	4.10	12.97	(8.87)	E5+E6+E7+E8+E9 = E4
E11	Investment Profit	0.75	0.75	0.00	(E5-B14+C14*D9)+D14
E12	Claims Profit	13.10	13.20	(0.10)	E6
E13	Expense Profit	(9.74)	(0.98)	(8.76)	E7+E8-C14*D9+B14
E14	EXPERIENCE PROFIT	4.10	12.97	(8.87)	E11+E12+E13=E4
F1	Increase in Reserves	(0.24)			A2-A1
F2	Increase in V. of Business	107.00	12.93	94.06	D20-C18
F3	Increase in BSA	12.72		12.72	D18-D15
F4	TOTAL PROFIT	94.04			F1+F2-F3
F5	Earnings on Reserves	29.13			A7
F6	Earnings on V. of Business	29.01	5.62	23.39	C20
F7	Earnings on BSA	5.75	5.75	D17	
F8	Earnings on Capital	52.39			F5+F6-F7
F9	Experience Profit	4.10	12.97	(8.87)	E4
F10	Experience V. of Bus. Profit	15.86	0.07	15.87	D19
F11	Sales Profit	21.70	1.62	20.08	C21
F12	TOTAL PROFIT	94.05			F8+F9+F10+F11=F4

	Total	Reserves Business	Value of	BSA	
G1 Start CAPITAL	560.54	297.41	320.69	57.56	A1(Res.)+C18-D15
G2 End CAPITAL	654.58	297.17	427.69	70.28	A2(Res.)+D20-D18
G3 Increase in CAPITAL	94.04	(0.24)	107.00	12.72	G2-G1=F4
G4 % Increase	16.8%				G3/G1

PART 5 - COMMENTARY

1 ANALYSIS OF RESULTS

1.1 *Experience Profit* was 4.10. Investment returns were higher than Assumed but because the bulk of the business is investment-account business most of the investment profit was allocated – under the life office’s Profit-Sharing Rules – either directly to existing policyholders or to a BSA. The only experience Investment Profit was that on the non-profit business, viz. 0.75. An amount of 6.96 was added to the BSA.

1.2 Due to favourable claims experience on the non-profit business (which was, in fact, term insurance) a Claims Profit of 13.10 arose.

1.3 There was a significant cost overrun giving rise to a significant loss of net 9.74 on expenses. (A more detailed analysis would reveal that the cost overrun was in the sales area).

1.4 The *Total Profit* for the year was 94.05. The profit arose from an increase in the Net Value of Business – the Reserves remaining virtually unaltered.

1.5 Analysing Profit from another viewpoint – more than half of it (52.39) arose from Earnings on Capital, 4.10 from Experience (already discussed) and 21.70 from Sales. The balance was an Experience Value of Business Profit of 15.86 arising, in the main, from a much more favourable discontinuance experience in investment-account business than Assumed.

1.6 *Capital*, of course, increased by the amount of the Total Profit, 94.04 – an increase of 16.8%.

2 PRESENTATION OF RESULTS

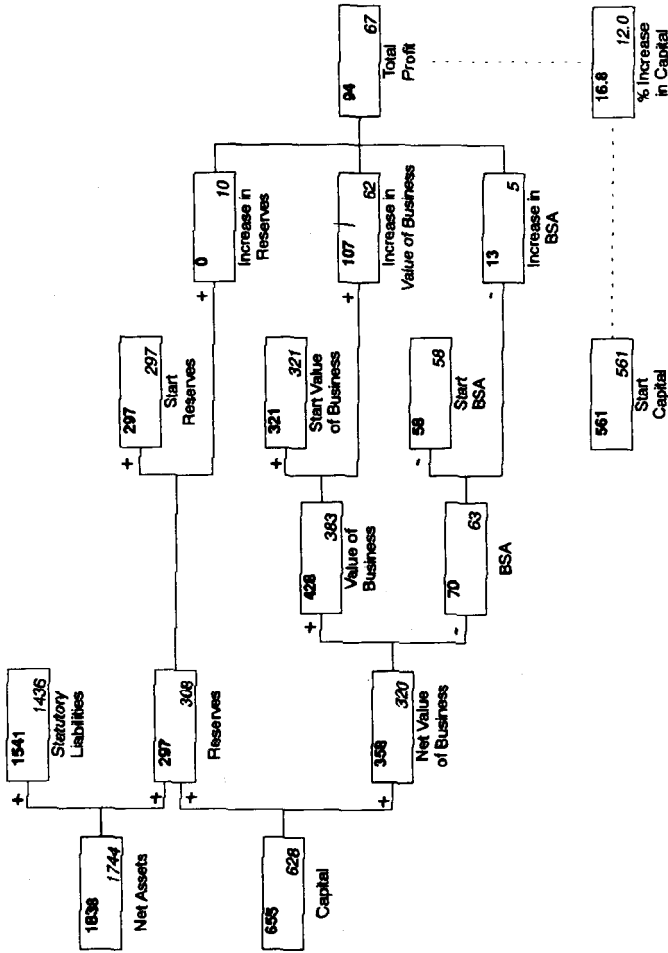
2.1 In the following pages, the results are presented in Du Pont Chart form along with illustrative Budget or Planned figures.

2.2 It will be noted that because of rounding, inevitably some figures do not always add up precisely to the total shown. In addition, there is no indication as to whether the figures illustrated are in thousands or millions, in pounds or dollars. The reason for this is that we wish to make the illustration as “neutral” as possible. In practice, the currency and the order of magnitude of the figures illustrated would be clearly shown on each chart.

2.3 We leave it to the reader to compare the actual results with expected Budget figures.

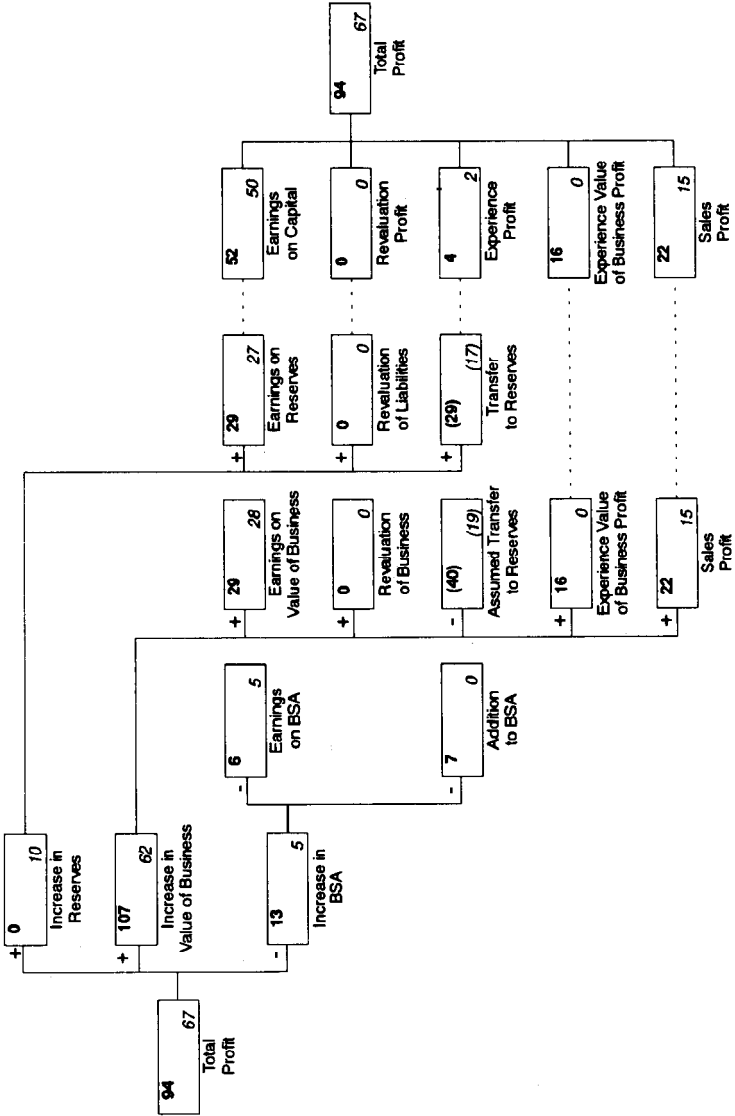
Actual Budget

Capital 1993

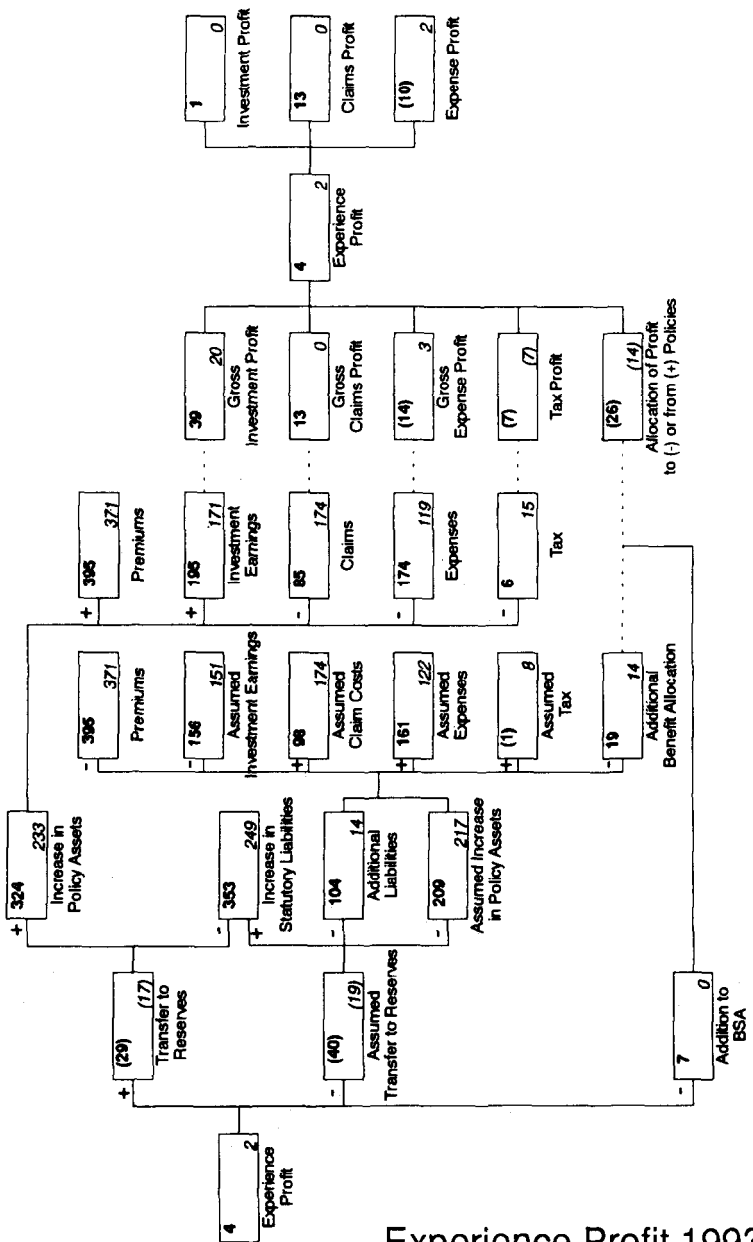


Actual
Budget

Profit 1993



Actual Budget



Experience Profit 1993

The President welcomed guests, including Mrs P. McCabe, Senior Vice President of the Institute of Chartered Accountants of Scotland, and Mr G. Whittaker FIA, FIAA.

Mr W. A. Scott, introducing the paper said: Mr Lang and myself both went out to Australia immediately after qualifying, 32 and 28 years ago respectively. We have spent most of our time working for a mutual life office, and in the last few years we have been concentrating on management reporting systems. Much of this paper has come about because of the need for additional management information, and the actuarial division in Colonial Mutual seemed best suited to carry out the research work.

Before moving on to the paper itself I would like to applaud the change in format of sessional meetings with which the Faculty is experimenting. In Australia we have been using a workshop technique for some, but not all, of the papers that are presented. We are finding that a more interactive form of discussion takes place. I think it is a good idea to try and move away from formal speech-making.

Turning to the paper, I would like to focus on some of the areas which are controversial and, I hope, point out those areas where discussion may be helpful. What I intend to mention to you is just how the concepts of the paper evolved, why they came into being, a brief review of the main ideas expressed and how these concepts have helped management in practice. If time permits I will allude to some future developments that are possible.

The reason these concepts on profit reporting emerged was because of the desire of the company for which we worked to expand quite dynamically. The Board and the Managing Director viewed the expansion as going to take place by purchasing subsidiary companies and moving into non-life areas. Such companies would be associated in some way so that there could be some synergy involved. In establishing the criteria of measuring the success or failure of these subsidiaries, the Board came to the firm conclusion that return on capital was the correct measure to be applied. In practice the Life Company was also going through a phase of dynamic development, mainly in non-traditional policies, and so it was not long before someone asked whether we could show a return on capital for the Life Company. Of course, as soon as that question is raised there are a lot of ancillary questions. In particular we need to decide the definitions of capital employed, and from that the return on the capital, and hence the profit. No obvious answers came forward on first looking at those definitions and so a Working Party of practising accountants and actuaries in the CML Group gathered together over several days to try and thrash out the issues. That process led to concepts very similar to those presented to you in the Paper today.

Finally, after actually implementing some reporting methods on profit and capital, we discovered that the ideas are quite complex. Getting the message across to lay members of the company was not easy and hence we came to the conclusion that the quality of presentation was vital to the success of having the whole concept and the principles accepted.

The main thrust of the paper is about internal reporting although the paper does allude to the constraints that can exist if external reporting of profit is required. In essence we are talking about a management tool and the important parts are the methods of analysing profits and the method of reporting.

There are some things we are not trying to do in the paper: we are not trying to defend a particular definition of profit; nor for that matter a definition of capital; nor are we defending any particular methodology for establishing realistic liabilities. In our case we are suggesting that realistic should mean equally likely to be too high or too low. Many other forms of definition can be established and will reflect the needs of an individual office.

In particular we do not wish to get bogged down in a discussion of whether embedded values are the correct way of establishing realistic liabilities. Such elements do not detract from the process of reporting profit or its analysis, although they may change the emphasis of any particular component. I would like to see a discussion on whether the concepts of profit reporting and of capital management are appropriate to a Mutual Life office. Once it is accepted, if it is accepted, that profit reporting is needed, then there are a large number of hurdles to be cleared. They are the definition of profit, which can be quite individual to a company for internal purposes, the determination of the share of gross profit to which the policyholders should be entitled, the quality of analysis and, of course, the communication of results. This last point puts the responsibility on us to start using accounting terminology rather than standard actuarial terminology for

getting our ideas across. We have not been custodians of reporting methods on profit and accounts already have a set of terminology which we would do well to pick up and use.

Lastly, how has this reporting system really helped management? This is beyond the scope covered in the paper, simply to keep it down in size and minimise the complexity of the ideas expressed, but in the real world we have gone much further. One of the important points is that we have shown our method of determining an analysis of surplus more or less for a single period. In practice it is the analysis of trends of changes in components over time that gives much better information to management. Such an approach certainly gets over the problem of minor inconsistencies in the quality of the data being used because the trend analysis becomes independent of the data quality. Additional value has come from providing better data for pricing products and for operation of the control cycle.

As a small aside the paper by Jeremy Goford, which I allude to in our paper, was presented in Australia. It was also presented to the Staple Inn Actuarial Society. In Part III of the Goford paper there is discussion of how the methods can go on to analyse profit and profit by-products. Although the actual reporting methods are not shown in the paper, they are being used at present. This analysis of expense profit can be added to standard budgetary control in producing a great improvement in management's understanding.

There are some areas which do allow future development. One is to marry the principles of profit, as we have defined it, with standard asset share philosophy. In fact we believe we are quite a long way down the road to performing that sort of analysis. Another is that there is always a difficulty with any change of basis. I believe in the long run it will be possible to separate out the impact of such changes of basis and incorporate it with the main components of the analysis. This will produce much more sensible results in the long run, particularly if we move to continuous valuations.

Mr B. R. Macdonald said: I would like to thank the authors very much for their most useful and timely paper. It is timely because, in my own office, we are in the process of introducing embedded value reporting for with profit business (we already have embedded value reporting for unit linked business). We have already undertaken the budgeting and allocation of expense loadings to departments to which the authors refer. As they say this was a very worthwhile exercise and it was useful to have done this before undertaking the embedded value work.

Mr Scott asked us not to get bogged down in questions about profit definitions but to consider whether this form of reporting is appropriate to a mutual. My response is that this form of profit reporting is clearly appropriate, and instead it will be necessary to discuss the practicalities.

For unit linked business, the embedded value approach will be familiar to many, and the principles involved for mutuals are not significantly different to those for proprietary companies. However, there are significant differences for with profit business, including profit and its distribution, the best estimate of the liabilities, and also the discount rate which I will consider.

The main difference for mutuals is perhaps in the profit distribution. The authors give two examples in Section 9, neither of which seem to work very well. The first example is where the new business profit goes to the company as working capital and then any subsequent experience profits go to the policyholder. This seems like a heads we win tails you lose approach to profits: it means that management have the incentive to sell profitable business but no incentive to ensure that it remains so. The second example distributes profits in proportion to assets. Here the profits seem to include bonus loadings and I am not sure why the free capital should take a proportionate share of these loadings, although of course proprietary companies, in general, take a ninth of the bonus loadings. In the UK, I imagine most offices would prefer to use an asset share approach to profit distribution. This then leaves only the profit from other sources to be distributed which might be done by one of the authors' methods.

The question the mutual then needs to decide is how much profit, if any, can reasonably be held back from the policyholder to bolster free capital. This of course depends on the policyholders' reasonable expectations which will in turn depend on how the office presents its mutual status. Some offices' marketing campaigns imply that all profits go to the policyholder. On the other hand an office may justify holding back a small amount of profit because the existence of the free capital enables it to invest more freely. This ought to result in higher returns and any profits held back might be a proportion of that extra return.

This takes us on to capital. If the office is using an asset share approach then the best estimate of the liabilities is related to the asset share. Any method which projects forward liabilities and estimates terminal bonus at the end is really nonsensical and is impossible to make consistent with the earned rate of interest.

If the discount rate equals the earned rate then, as the authors suggest, the capital becomes something like assets minus asset shares. Alternatively if we use risk discount rates then projections need to be made to determine the release of tied capital. Incidentally, this approach has the effect that the tied capital can be less than zero, when the asset share exceeds the published liability, because there is no terminal bonus reserve in the published liability.

The next question is the risk discount rate. In favour of the authors' approach of having discount rate equal to earned rate, I agree that it is better to allow for risk in the basis itself. Also if tied capital is less than zero, then increasing the discount rate also increases the embedded value and this may not be the desired effect. On the other hand where capital is scarce, the use of higher discount rate reduces the sales profit from capital hungry products. This may be desirable, although it is somewhat ad hoc. On balance I prefer the use of a risk discount rate from the point of view of explaining the results of the sales people when calculating the sales profit.

Finally if asset shares are used, the analysis of profits needs some adjustment because otherwise experience profits or losses are cancelled out by the asset share calculation. For example an expense overrun would be offset by a reduction in asset share and the resulting profit becomes zero which is not particularly helpful. This problem can be rectified by analysing expenses against the loadings in the premium rates and calling the result operating profit. Later on in the analysis the experience profit or loss can be transferred to the asset shares as an exceptional item.

Mr P. Needleman said: Prior to and throughout the eighties, we have had a period of very high investment returns in an era when capital for with profit life companies was hardly a scarce resource. We have now entered a period when the effective management of an office's capital is really crucial to its success.

For most companies, and mutuals in particular, the primary source of capital is retained earnings. To maintain and enhance the capital base it is very important to write profitable business. Many companies will not have had a clear idea of the true profitability of their business in the past. They might still find it difficult to quantify the size of their capital base and whether they are growing it or eating into it. The techniques in the paper are therefore very important.

There are many concepts discussed in the paper which are worthy of comment but I would like to focus on three in particular. Firstly, the definition of capital, secondly the analysis of earnings or the movement in the capital base, and thirdly the modelling software and its required accuracy.

Because of complex movements of capital between free capital (or net worth as it is sometimes described) and the tied capital that is locked up in statutory reserves, any meaningful definition of capital must include the latter. Thus an embedded value approach which measures both the net worth and the future release of capital from the in force business is essential. I have had some interesting discussions with some accountants who prefer a retrospective approach to capital. I still find such an approach difficult to focus on as a meaningful management tool. The fact that one might have invested £50m in a business, or a part of a business, in the past, is irrelevant if that business now has an embedded value that is significantly different from the original investment. You need to start measuring performance against the current situation going forward. Perhaps for stand alone investment decisions a retrospective approach, which looks at the return on the initial investment, may be more appropriate. However for internal management reporting the approach suggested by the authors is more appropriate.

For non profit and unit linked business I would disagree with the authors on the risk discount rate. I think a risk rate is more appropriate for the sorts of business that inherently have guarantees, lapse risks and expense risks. It is really no different whether one is investing shareholders' funds for a proprietary office or investing the mutual's capital base. One needs to earn an appropriate return for the proprietors/owners of that capital, consistent with the riskiness of the business.

For with profits business a different argument applies and a net earned rate is more appropriate. To apply the techniques for with profits business it is necessary to have a very clearly defined bonus philosophy in order to quantify a realistic level of policyholder liabilities. Most companies now use asset shares as a measure, so that the excess of assets over aggregate asset shares represents the free capital for this class of business. Any excess of asset shares over statutory liabilities, although it is working capital from the point of view of a statutory position, is neither free nor tied capital. It is committed since it is required to meet the future and reasonable expectations of with profit policyholders and therefore should not be included in the

capital base. If an office makes a charge against asset shares or aims to distribute only a proportion, say 95%, of the accumulated asset shares at maturity, then the value of these future charges against the asset shares should be included in the value of business in force since they represent a future stream of profits to the capital base. Conversely, and perhaps this is easier to forget, if payments well in excess of asset shares are expected to continue for the foreseeable future then the discounted value of the expected future augmentations should be calculated and included as a liability. Similarly where an office is suffering large expense overruns and these are not fully allocated directly to the asset shares then it will be appropriate to value future expense overruns as a liability.

The analysis of earnings is the most useful and helpful management tool for monitoring the progress of the business. The concept is identical to an analysis of embedded value earnings and would typically be split into four major categories: the unwinding of the investment return or the discount rate on the value of in-force business; the value added by new business; experience variances in the year; and the impact of any change either in the statutory reserving bases or in the valuation assumptions used to value the future margins. The value added by new business is a crucial item and provides a direct link with the pricing basis. On that point I would disagree with the authors who suggest using a different discount rate for pricing and profit reporting. I think it is helpful if the two are tied together. Using different rates leads to unnecessary confusion.

It is obviously helpful if the various sources of surplus can be separately identified and even more helpful if analyses can be carried out by major product line. The difficulty here is that many companies have yet to develop the accounting and management information system which provide sufficient detail. It is a major challenge, therefore, to make these techniques work. In my experience, data has always been a problem, especially for group business which can be quite a large proportion of the total. A valuable benefit of carrying out a full analysis of movement is that if there are problems in the data then the analysis will not reconcile. A large unreconciled item usually indicates a major data problem.

My third and last point is on modelling techniques and the accuracy needed to implement these techniques. I think the authors are suggesting, and I agree with them, that it is better to produce some figures on an approximate basis rather than none on an accurate basis. It can be quite a time consuming process to implement a full capital management and profit reporting system. It is better to take it step by step. There are some actuaries who believe that it is essential that profits are projected on a policy by policy basis and forget that there are very large approximations in deriving some of the assumptions which can have many times the impact of minor modelling inaccuracies. It is better to focus the effort initially where it can pay the greatest dividends and the actual modelling process itself can be refined over the years.

In conclusion the establishment of an effective capital management and financial reporting system is both a worthwhile and a lengthy process. However I would imagine most, if not all, mutuals would find it very worthwhile.

Mr D. O. Forfar said: The question of "profit" has often been looked at just from the point of view of the effect of new business on the free capital of an office. My definition of free capital is the difference between the value of the assets and the value of the statutory liabilities. On this definition the writing of a new policy produces large losses in the first year caused by the fact that incoming premiums less expenses cannot finance the statutory liability. However the financing of the statutory liability is more akin to an investment and the repayments from this investment should be taken into account in analysing the profits. The authors have done so in their definition of profit (which is the change both in the free capital and in the value of the business) and this seems to me to be the right way of looking at the whole picture. It enables the profit to be analysed, if I understand it correctly, into six main components namely (1) investment earnings on the free capital and the earnings on the value of the business, (2) claims profit, (3) expense profit, (4) sales profit, (5) other items arising from the actual investment earnings as opposed to the assumed investment earnings and finally (6) the difference between actual and assumed discontinuance rates.

One problem is that assets do not tend to progress smoothly from one period to the other in quite the same way as liabilities. They are subject to the will of the stock market and follow the latter's swings. I see problems in calculating the profit if investment earnings on the free capital and investment earnings on the statutory liabilities swing about. For example if there is a significant decline in asset values then you could have a significant loss arising because of investment losses on the tied capital or even negative earnings on the statutory liabilities. Unless specific action is taken these investment fluctuations will tend to dominate the profit analysis from one year to the next, even if it all worked out alright over the total term of the policy.

I am not entirely sure of the best way to counteract such a problem. Certainly one could use an element of smoothing and assume that the assets behave in an orderly manner and grow at an assumed growth rate. I am not sure how one calculates this growth rate and I think the rate then has to be subject to certain constraints. If you have a block of ten year business maturing and you follow it through from beginning to end and it makes neither profit nor loss at the end of the ten year period, the chosen method of assessing the yearly profits would have to show broad balance overall when looking back over the ten year period. I am not quite sure how one achieves this balance if the chosen growth rate is not at the rate which has actually occurred. I see significant problems on the asset side and I wonder how the authors cope with such variations when they are reporting within their own company.

Turning to the expense analysis by function and by department, I would like to add a word or two to Mr Macdonald's comments on how we approach this matter in my own office. We started out a few years ago by creating a large number of budget centres throughout the offices. These budget centres prepared in advance a statement in an agreed format as to what their expenditure was likely to be for the next two periods ahead, each period being six months. When each six month period had finished a statement was sent to each of the budget centres showing how the actual expenditure compared with the anticipated expenditure. This was clearly useful, but one side of the equation – namely how much income they each have to spend – was missing. This income should depend on the loadings in the premium rates. Accordingly an initial level of income was determined based on loadings and this was divided up among the budget centres, effectively by reversing the product costing process. Those areas operating at a level in excess of their loadings found that their income was less than their expenditure with some salutary results. Thus we are able to supply each budget centre with a statement of anticipated expenditure, or budget, their allowed expenditure, or income, and the actual expenditure.

Mr A. K. Gupta said: The issue of reporting profit in a mutual life office is of fundamental importance to everybody who works in a mutual life office. Proprietary life offices have struggled with this over the last decade and the authors have done the profession a great service by putting forward their views as to how mutuals should go about this task.

My own preferred approach differs from that of the authors in two key aspects. Firstly the authors have chosen to base their analyses for with-profits business against what is essentially a bonus reserve valuation on realistic assumptions. My own preference is to carry out the analysis against asset shares. I have a tremendous distrust of bonus reserve valuations especially for with-profits business since my own experience is that the answers vary enormously with the assumptions. Some of the problems can be overcome by putting in payouts as a percentage of asset shares and then carrying out a prospective valuation, but my preference is still to stick with a retrospective valuation for with-profits business and a prospective one for non-profit business.

The second key difference is to link the valuation bases to the asset values, the key link between the two being the relative yields earned on assets and liabilities for different classes of assets. I then introduce what I term risk capital, in other words, the amount of capital that you need to set aside to reflect the unequal movement in assets and liabilities that happens when interest rates change. This leads to a further element in the analysis but it does help to separate the issue of solvency and profit within a mutual life office. The role of a mutual, and indeed the role of any company, is to maximise profit for its shareholders whether they be a different group of people to its customers or a subset of its customers. Solvency for any company is a hygiene factor. That is not intended to underplay the importance of solvency – as with any hygiene factor, if you do not get it right you are not even in the game. The approach which I suggest recognises the cost of remaining solvent but focuses primarily on profit. Basing the analysis on asset shares also helps to overcome some of the problems associated with changes in the valuation bases.

I'd also like to make some miscellaneous comments on the paper. In Section 7.2 of Part 1 the authors consider the approach of valuing assets by discounted cash flow. Whilst I have some sympathy with this approach, the market value of assets is the reality. I find it difficult to focus on any other valuation basis for valuing assets.

In Section 8.2 of Part 1 the authors express a bias towards recognising profits on the point of sale. I think this is essential. The approach adopted in the US in the 1980s was to recognise profit as a proportion of each premium paid. That meant that no particular profits emerged at the start of a contract and no recognition was given to the distribution process. US companies, therefore, started to focus on managing the existing

portfolio and not on selling profitable business. This helped to undermine the profitability of the entire US life insurance industry. We must be sure we do not fall into that trap.

In Section 8.4 the Authors concluded this section with the statement that the understanding and analysis of profit is most important. I could not agree more strongly with this sentiment. This is the key strength of embedded value reporting and the analysis of movement is the most important aspect of the whole process.

Depending on how one goes about the analysis there is a possibility of another element of profit emerging which the authors have not identified. This only came across to me when I got involved in the reconstruction and privatisation of a company which to all intents and purposes was a mutual life office. When the with-profits business was put into a closed fund and ring fenced we then had to consider what assets should be put into the closed fund. The preferred approach was to match the guaranteed part of the with-profit liabilities with gilts and the non-guaranteed part with equities and property. When we came to look at the Company's actual assets, which should be put into the closed fund, the preferred approach was to match the guaranteed part of the with-profit liabilities with gilts and the non-guaranteed part with equities and property. When we came to look at the company's actual assets we found we did not have enough gilts. In other words, the company was mismatched. So a mutual, if it were matched appropriately in investment terms, would normally have a profit profile of stable earnings and the earnings resulting from this gearing can be classified as mismatching profits.

The last sentence of Section 2.1 recognises that creating a good model is an art in itself and that the results depend upon the skill of the artist. I find there is a danger of using a model a bit like a black box. Too many students attempt to run numbers through the model and if the numbers do not look right they re-run the model. The end result is that you have masses and masses of output and you do not understand any of it. My own preference is to run the model as few times as possible and study output in great detail before re-running it.

I agree with much of what we said in Section 2 of Part 3 and in particular I agree strongly with the sentiments regarding the need for models. A good model can eliminate the need for frequent valuations and it also has the added advantage that it re-orientates the actuary so that he is facing forward and not backwards. Facing forwards is my preferred position for the person I see as being the financial navigator of a life insurance company.

I agree with the authors' comments in Section 3.4, but the process of basing expense budgets on the previous year's budget is highly flawed. For example, where sales are budgeted at a 100 and expenses at a 100 and the company might hit its expense budget but falls short on sales by, say, 10%. The next year the company ups its expense budget by 10% to 110% and its sales budget by 10% to 99%. This leads to creeping expenses.

It would be easy for me to go on and make many more comments on various aspects of the Paper with which I agree, but I will conclude simply by saying that the issue of profit reporting for mutual offices is one which I think is not given sufficient airing.

Dr W. F. Scott said: My practical knowledge of life office business is less extensive than others present, but I can recall a meeting over 20 years ago when a visitor from Australia mentioned the question of lapse rates. He observed that the lapse rates in Australia were much higher than in Britain. I do not know if this is still the case, but in any event it makes me wonder what attention is paid to lapse rates in the authors' calculations. *Wonderful but complex diagrams are all very well, but is the whole question not dependent on the continuation of business?* The assumptions concerning lapse rates are very unpredictable dependent as they are on economic conditions.

Mr G. Whitaker FIA said: I work for an Australian mutual life office, National Mutual Life. My office has introduced profit measurement over the last four or five years as a gradual development. The main purpose is for internal profit measurement in order to better financially manage the business, not just the life office business but also various other interests. In addition, we have grown very rapidly over the last ten years and have already demutualised in readiness for raising external capital. You need a profit record in order to raise capital. I would therefore add that a similar approach can also be used for external reporting.

The effects of profit measurement on the company have already been very beneficial. Business managers have become familiar with profit measurement, whereas some years back growth and premium income were

the main objectives. This covers both the life insurance business managers and the managers of subsidiary companies and overseas life subsidiaries.

More recently capital is being allocated to all the various lines, including those where traditionally this has not been done before. I guess a lot of proprietary offices may have done this in the past and mutual offices are now tending to follow the lead of the proprietary offices. It is really quite amazing that we have been able to operate profitably in the past and to have survived without much profit measurement.

The Managing Director and the Board have changed corporate objectives to emphasise profitability rather than growth, although growth is still there. Business managers are being held accountable for the profitability of their business. We have not actually seen managers being sacked, but this can happen if they make bad decisions or do not run their businesses properly.

I would like therefore to finish by expressing my opinion that it is essential for mutual life offices to use profit measurement in the modern competitive business environment.

Mr C. B. Russell said: I am puzzled by 6.1 and some of the comments therein. First of all the authors say that the determination of profit is in the safe hands of the accounting profession. So far as the UK is concerned, this is not correct. No attempt at determining profit is in the hands of the accounting profession. Surplus is disclosed in the fourth schedule of the DTI return which is not audited. If one takes the authors' concept of profit as something different from surplus then the reality is that its determination is not in anyone's hands at the moment. Perhaps part of the message of the paper is that it should more strongly be in someone's hands.

A more significant and puzzling comment is that it is in the area of determining policy liabilities and changes to these liabilities where the actuarial profession will be required to contribute. This comment does seem to imply a difference from the UK situation if not from the situation in other parts of the world. I have been the actuary of a subsidiary of an American company where such a situation does prevail. As the actuary, I wanted to see accounts before determining the value of the liabilities so that I could look at aspects like the yield on the fund, which any UK actuary would think fairly normal. If one asks a chartered surveyor to value your buildings, the chartered surveyor does not refuse to value the buildings until he has seen the accounts. Similarly in an American environment people do not expect the actuary to refuse to value the liabilities until he has seen the accounts. I cannot believe that such is the situation which the authors are advocating. In fact my understanding is that the American approach has led to problems such as the cost and risk of guaranteed surrender values not being brought properly into the calculation of profit.

Finally, I would say that my interest in life assurance, apart from a particular technical area, is as a non-executive director. I will be delighted with any improvement that the authors can encourage in the clarity and brevity of reports to boards of insurance companies.

Mr P. Needleman FIA said: One of the very important uses of these techniques is in a capital management system. The measure of performance that is preferred by Mr Scott's Board is the return on capital. Having that measure across a number of different businesses which are competing for capital enables rational decisions to be made about where capital should be channelled. I would be interested to hear the extent to which such an approach is actually used in his office.

In particular, taking the system to its extreme, one could be very careful with any capital emerging from the in force business. Rather than allowing it to be used, or perhaps abused, by the existing business units in order to support future new business that is being written on rates and returns of capital which are inadequate, it would really be grabbed back by some central capital management group function. They would re-allocate it, perhaps on a three or five year planning cycle, back to the businesses that are making most effective use of that capital.

In the past, where capital emerging from existing business was re-used without real thought being given to the effectiveness of its use, problems arose. Indeed some of the problems in the US were very much along those lines.

I would be interested to hear how the methods and the techniques have been developed in that respect.

The President said: This meeting is not the only event on life office matters of significance today. I started off this morning in York chairing the first session of the two day Symposium on Modelling

Techniques in life office management. At that meeting attention was paid to the increasing sophistication of models and the dangers of whether or not people fully understand the tools they are using. I wonder if there is any danger of this work becoming a little bit too sophisticated for communication to lay people.

Mr C. G. Thomson said: I should start by saying that I regard profit reporting in a mutual life office as vitally important. I do not now how else you think you can manage the business unless you try and approach it in this kind of way. In the company for which I used to work I was trying hard to introduce similar processes when other events overtook us. Since then I have had to move from trying to introduce profit reporting in a mutual to introducing actual profit reporting in a proprietary office. The speed of the learning curve has been dramatic. I think there is an enormous gulf from one level to the other and until you get close to some of the issues you do not really appreciate what the difficulties are. Nonetheless, if you do not start then you will not get any of the answers.

It seems to me that the most difficult area that we have is that the recipients of our information are looking for a smooth progression of earnings. They think that they have a stable long term business and that they should get regular earnings which will increase in line with inflation and in line with the growth of the business. Thus they expect that we will report profits in an orderly fashion to them. My impression of the nature of profit reporting systems is that they manifestly try to do almost everything other than produce a smooth stream of earnings. You have to sit on them hard to produce something that can be reported. It was suggested that smoothing the asset values is not appropriate. However, if you do not smooth the asset values then you will have immensely volatile earnings. If you do smooth the asset values then you have to try and attach some kind of handle to it so that you don't drift away from reality. Even with three year moving averages you still run the risk that the market carries on moving in one direction. In the example Mr Forfar gave, you might then have this block of ten year business and discover that you have not actually smoothed to the right place at the end of the term. Suddenly you have an unexplained deviation to present to the Board of Directors.

I have found it difficult to explain the results of these methods to management and Boards of Directors, whether they have an accounting or actuarial background or not. The innate volatility of the answers, the fact that they do not relate to definite profits, and that they are still very much an expression of assumptions for the future, seem to be very difficult ideas to get across. I wonder if the authors have been more successful than I have been, and if they have recommendations to make.

Mr W. A. Scott said: One point I would like to pick up on is this perceived difficulty of Boards accepting volatile results. This is no more than a matter of education, particularly if you are showing the Board the analysis of the profit you are reporting. They do not have a difficulty with the fact that you have violently fluctuating profits or losses from your investment returns. This is the area of the business that they understand best. They know about investments and they know that if you have expected to earn 10% and you earn 3% that you've made a 7% loss. There is no trouble in this area so long as you can show them the analysis.

The other components of profit do tend to be non-volatile and move in the manner everyone thinks life insurance companies should be like. However if we are using market values of assets we are going to have volatility of results.

Mr J. Lang said: You will notice in the paper that we have brought in a benefit smoothing account. In practice most of our business is either participating traditional business, investment account business or unit-linked business. There is very little-non-participating business.

In these circumstances, of course, the volatile investment returns are passed on to the policyholders so that in actual fact the capital does go up relatively smoothly. Obviously the earnings on the reserved will vary according with the investment returns, but the experience profit goes up smoothly.

There is an example in the Paper where there was a fair change in the investment return compared with that expected, with the investment fluctuations being passed onto the benefit smoothing account for the benefit of participating policyholders.

Mr I. Bain said: I was fascinated by the diagrams. However, one of the most difficult things in managing a life company is trying to make actuarial reporting reflect back to real decisions. In either a proprietary

company or a mutual company money is made because of good or bad decisions. One company might make more money or declare higher bonus rate because it spent £2m developing a system rather than £5m. Another reason could be because it actually priced its products properly and either made more sales with thin margins or else made less sales with fatter margins. One of the problems I found reading the Paper was actually how the analysis relates back to management decisions.

In Section 3.3 the analysis is broken down by department. If I had been in charge of the Systems Department which was given £1m to develop a particular system and then been told that I had made a loss because we did not sell enough policies, I would have been very upset. Perhaps the method needs to be adapted to allow some sort of fixed commitment of capital. This way the Systems Manager is assessed against the spend of £1m, and a Product Manager is assessed against selling £xm worth of business at a given price. Perhaps we have to think of developing a management information system which is effectively a bundle of bills that people send each other.

I am in a small subsidiary company in the Republic of Ireland and we are trying to localise our efforts. We find that some of our expenses are coming from other people but we do not find out about them until a year later. It does not help when someone in Systems sends you a bill next year for something over which you no longer have any control. Perhaps if we invented a billing system and assessed profit relative to that we would make the results more meaningful in terms of general management rather than just for the actuarial profession.

I was interested in the methodology and I would like to know how you develop trends. I assume there is a computer system in which you can keep different versions of the data analysis and thereby review the results over time. I would welcome a follow up Paper on the different methods of sub-dividing the numbers.

Mr J. F. Hylands, closing the discussion, said: Firstly can I join previous speakers in thanking the Authors for giving us a stimulating paper which has produced an interesting and wide-ranging discussion.

The actuarial profession, in the UK at any rate, does not enjoy much of a reputation for being able to communicate clearly and succinctly on complex technical matters. Barry Riley, the *Financial Times* journalist, has described actuaries as "mathematically-inclined professionals with a natural tendency to invent mumbo-jumbo even where none is necessary." It is interesting that he seems to believe that mumbo-jumbo might sometimes be necessary. I doubt if any of us would agree but nonetheless I think many of us recognise a grain of truth in what he says. Reporting the profits of a life office is perhaps one of the areas in which Barry Riley might consider a little mumbo-jumbo to be excusable.

In seeking to describe a structure for reporting life profits in ways that will be easily understood by the non-actuary, the authors have set themselves a demanding task. As the authors themselves point out, the actuarial techniques which they use are not new. What is new, at least to most of us, is their method of presenting the results. The calculation of capital and profits which the authors describe uses a projection method which is essentially equivalent to a gross premium valuation based on realistic assumptions, although that definition is not essential. Here we encounter our first barrier to communication. The concept of realistic or best estimate assumptions is one which non-actuaries and, perhaps, especially accountants have some difficulty with. We actuaries feel comfortable with the idea of an assumption which is equally likely to be too high or too low. Others may feel, either intuitively or because of their professional background, that experience assumptions ought to include some element of conservatism or prudence.

Actuaries may become a little less comfortable in trying to explain to colleagues who are not actuaries, or to non-executive directors that a realistic investment assumption means that 50% of the time we expect to report an investment profit and 50% of the time an investment loss. Mr Forfar has referred to the problems that might arise in presenting the results of swings in asset values which might dominate the analysis. The fact that the profit or loss might be largely or entirely passed on to policyholders through bonuses or investment linked products might lessen our discomfort but it still leaves us with some explaining to do. We may find it even harder to explain that expense overrun is just as likely as an expense profit.

I am not arguing against the use of realistic assumptions: on the contrary! I do think, however, that communicating the meaning of realistic assumptions and the consequences of using them demand some effort.

I agree with Mr Gupta, and other speakers, that for with-profits business the natural basis for analysing profit is not a bonus reserve valuation but rather the sum of the relevant asset shares. Of course, as Mr Scott

remarked at the outset, it is the development of trends rather than the results for a single period which is most illuminating.

The authors make extensive use of Du Pont charts to illustrate the relationships between the components of capital and profit. Clearly these charts are powerful tools for demonstrating how the components can be combined in different ways. For me, however, this was the first time I had come across Du Pont charts and I would have welcomed rather more explanation of their structure. Although it was always fairly clear how the elements of the charts combined vertically, I sometimes had difficulty in following the relationships across the horizontals. Indeed I found that I was using the sample spreadsheet calculations in Appendix 2 to help me understand the Du Pont charts rather than the other way round. I thought also that one of the drawbacks of the Du Pont charts was that without some form of highlighting it was difficult to pick out the important information. Many of the components illustrated may be humbly small and of little significance in building up an understanding of the financial development of the office. It would be desirable, especially for presentation to non-specialists, to summarise the key elements in a simpler chart. Without such a summary there is a risk that attention will be focused on elements that may be of little real significance but which may appear to be familiar and easily understood. Expense profit might well fall into this category.

The reporting of profits in the ways described in the paper is likely to be of greatest value when it's carried out at the product group level. Mr Needleman mentioned this and I would support the view that it is worth making some estimates to allow reporting of profitability on a best estimate basis, rather than not reporting it at all. Having said this, many offices may lack adequate accounting data even to make the estimates.

Reporting at the office level alone might well obscure important results if, for example, an expense overrun in one product group is offset by an expense profit in another. The objective of reporting profits is to assist management to manage the business most effectively. If reporting is only at the office level it is hard to see how this objective can be properly achieved. At best, management may be prompted to ask for additional investigations to try to identify the sources of profits or losses which have emerged at the office level, but without the results of these additional investigations they are unlikely to have the information they need to take decisions with any real confidence.

The authors consider a number of practical issues in profit reporting such as how many significant figures should be shown. I agree that this is not a trivial matter and I support their conclusion in paragraph 2.8 that the important point is to report figures of an order of magnitude appropriate to the size of the life office. The authors point out rightly that once profit reporting has begun on a yearly basis requests will be made for more frequent reports.

The authors describe how quarterly or even monthly reports can be produced and they support the provision of frequent and regular reports even if these have to be prepared on a best estimate basis. The benefits of frequent reporting, and these depend on the uses to which the information will be put, must be weighed against the cost of providing the information. It seems unlikely that any life office management would be able to absorb, let alone act upon, monthly reports of the level of detail of the Du Pont charts given in the paper. It would seem preferable to confine monthly reporting to a few key components of profitability which management can hope to influence in a relatively short timescale. More detailed reports could then be produced quarterly or perhaps even less frequently. Where I do agree with the authors is that all reports should be produced as soon as possible after the end of the period to which they relate.

In this introduction Mr Scott asked us to consider the question: "Is the approach that the authors put forward in their paper appropriate for a mutual office?" I think the answer from virtually every speaker has been resoundingly "yes", and I would agree strongly with that. My own office has been using a similar approach to profit reporting for some years although its presentation has been very different from that of the authors.

The authors are to be congratulated for giving us such a clear outline of their framework for profit reporting. As they stress, the structure which they describe is capable of accommodating a variety of approaches apart from their own. Different actuaries will want to adapt the structure to suit the circumstances of their own offices. Reporting profits to management and perhaps especially to non executive directors is one of the most challenging tasks faced by the life office actuary. Tonight's paper gives them both a possible approach to the problem and, in the use of Du Pont charts, a tool for the presentation of the results. The paper is to be welcomed, especially for the stress which it lays on the actuary's role as a communicator, and for encouraging life office actuaries to be proactive in using their skills to improve the financial management of their offices.

Mr J. Lang, responding to the discussion, said: I would like to respond to one or two of the points which were raised. Mr Macdonald did not like the examples of profit sharing rules that were given in 9.2 of Part 1. He can feel free to disagree with these examples as they were simply examples and, frankly, I do not particularly support them myself. The profit sharing rule that we adopt is to allocate investment profits to participating policyholders. This is a very simple approach which means that the insurance company bears the mortality and expense risk and so forth.

Mr Needleman had something to say about risk discount rates and specifically the discount rate that was used for reporting. I think we made it quite clear in our paper that we prefer to use a discount rate equal to the expected future earning rate and let anything else emerge as a profit. This is specifically not the discount rate used for pricing. The disadvantage of using the discount rate used for pricing is of course that your sales profit then must be zero. This means that a very major portion of your business is being shown as having zero profit. There is another advantage of using the earning rate as the base rate but a different rate for your pricing. This means that in your pricing you can put a price on the capital that you are using. Automatically, as you know, if you are assuming a certain earning rate in your pricing and you are using a higher discount rate, then the more capital you use in setting up reserves the more difficult it is to produce a profitable product.

I think we answered the question raised by Mr Forfar who indicated that investment fluctuations would dominate results. It is certainly the case for the gross profit but when it gets down to the net profit, which is the addition to capital once you have allocated the investment profits to your participating business, your unit linked business, your investment account business etc., then the actual investment profit emerging is relatively small. It emerges only in a widely fluctuating way on the investment return on your reserve. However, your Board would expect that to be the case. This is the same as for a proprietary company where the investment profit on shareholders' funds would be expected to vary significantly from year to year.

Dr Scott indicated that someone had advised him that lapse rates in Australia were very bad. I would agree with that. In these circumstances the assumed lapse rates are high, probably a lot higher than you would use in the UK. If your actual lapse rates are much higher than those assumed then it emerges quite clearly in the experience value of business profit.

Though Mr Russell was somewhat concerned about us saying that profit was in the safe hands of the accounting profession, that particular section of the paper was referring to public reporting. With public reporting all of your returns are subject to audit and, of course, we are therefore in the hands of the accounting profession. It certainly was not referring to internal reporting. It is however important to work closely with accountants to obtain co-operation for analysis of expenses. You will find that they are very co-operative because in many ways they are even more concerned than actuaries about expense analysis.

The President and Mr Thomson raised the question of communication and education. It is true that there has to be a period of education of Boards and certainly in our company this was done deliberately outside the normal Board meetings. Mr Thomson made some comments about the fact that the analysis might be seen as a result of a variety of assumptions produced by the actuaries. In our case the assumptions are approved by the Board. If we are changing any of the assumptions we go to the Board so that they know exactly what is happening.

Mr Bain raised the point about a computer department who had their budget allocation cut off. The way our company works is that the allocation of expenses to our computer department is virtually zero. They work by doing jobs for other departments and hence are a purely service organisation. The work is costed by individual departments who might make use of information services. They have budget allocations and it is up to them to use these budget allocations and give jobs to the computer department, almost as though they were a separate company. We find that system works.

Mr Hylands raised the question of Du Pont charts and had some very interesting comments to make on them. He indicated that highlighting would help the presentation and that is certainly true. He indicated also that it might be better to use smaller charts with less information on them to make it more understandable, and that can certainly be done. It is important in any chart to have only one message coming across otherwise it becomes very confusing. If you were starting to report in this format it might be an idea to cut out some of the analysis and simply show the final figures, because it does take a period of time to get used to working with Du Pont charts. I find it very easy because I have been doing it for some time.

Mr Hylands said many things with which I agree. One of them was that monthly reporting should be a limited report. Our monthly reporting is very limited and only each quarter do we produce a full report.

I would like to say that I believe that a mutual office has to report on the basis of profit of some form. I think it critical for the financial management of the organisation. I think everyone knows that we are no longer in the position of running a mutual life office the way it was when I was a student over 30 years ago. The world has changed and we have to change too. I think we are changing. I am not aware of how many of the mutual offices already do some form of reporting in this format – I hope there are a number of them. If not, I would hope that our paper will motivate others to do something similar.

The most important point about presenting profit is in the presentation. It is important that the figures be easily understood by the people to whom they are presented.

The other point is that the analysis we have shown here is the least of the things that might be looked at. Trends have been mentioned a few times this evening and the trend of profit, or the trend of the profits for individual elements, can be much more important than the absolute figure itself. The absolute figure to a Board might be relatively meaningless, and for this reason most of our reporting is in the form of charts showing the trends in a quarter by quarter basis. We record on a quarter by quarter basis over a period of up to two years or more.