

Introductory Comment

1. The subject was approached by splitting "financial planning" up into a series of connected topics with sub-groups of one, two or three people producing the enclosed papers. My grateful thanks to all concerned.
2. I believe that the choice of accounting framework in which the profitability of an insurance operation can be measured (or considered) plays an important role in financial planning.

For example Andrew Thomson has produced a useful paper showing how similar blocks of business would appear using one-year and three-year accounting conventions. It demonstrates some important concepts;

- (i) ultimate profitability can be affected through the incidence of taxation
- (ii) "emergence of surplus" differs substantially. In particular one method (three-year accounting) appears to be substantially less capital consuming than the other (one-year accounting).

Not only does the less capital-intensive accounting basis produce better results earlier on (i.e. a better accounting rate of return) it may be intrinsically more profitable in a situation where finance is a scarce resource and different 'utility-values' are attached to different blocks of capital.

This is one illustration of the choice of accounting basis affecting profitability. Other instances would be moves towards inflation accounting and towards discounting claims.

3. Even given a set of accounting rules, the way in which the information is presented for public (and possibly private) consumption and the way in which consequential profit objectives are set will have a significant effect on the decisions taken by an insurer.

Bill Truckle, Derek Allwood and Roger Davies looked at the sort of profit objectives which could be set and how such objectives might vary by class, including any specific problems relating to expense and investment income allocation.

It would be interesting to hear how in-practice insurers set about quantifying their objectives and in particular the sort of assumption built into those objectives relating to inflation. For instance, is it normal to set an objective which will vary with the achieved rate of inflation, or is it normal to set an absolute figure (e.g. a 5% "insurance profit") and consider it achieved irrespective of what happens to inflation or rates of interest?

In this connection it may be worthwhile to consider the validity of the conclusions reached by some insurers, as mentioned in 2.10, on the decision to sacrifice underwriting profit for investment income.

The third section of the note looks at a computer projection model and the "systems environment in which this model is used", emphasising that the environment and the lines of responsibility are crucial in the practical use of any model.

The paper recommends that fixed indirect expenses should be charged as a corporate cost in the profit and loss account rather than in the revenue account and this seems perfectly reasonable for management purposes. It does make one question, however, why the DOT (and ratemaking and statutory bodies elsewhere in the world) insist on the full apportionment of expenses between classes. This can never be anything other than rather an arbitrary and non-productive exercise. Furthermore it could be argued that revenue accounts as currently presented are also of questionable merit - why not just a single statement of income and outgo (including capital appreciation whether realised or not)?

The paper goes on to suggest that the present value of all investment income (at notional rates) on the technical reserves generated from the years premium income be added to underwriting profit. This approach is somewhat similar to that described by Goddard, PCAS Vol. LV (as reported in Appendix X of the paper on Profitability presented at the York conference) which brought in the concept of an "equivalent period". This certainly alleviates some of the main conceptual problems in using "insurance profit", although by bringing profit forward it introduces a new problem.

4. There has been a growing trend towards considering insurance as part of a "risk management" process. These considerations form the basis of the paper by Jim McCaughan and Robin Michaelson in which they consider

"The identification, measurement and economic control of risks that threaten the assets and earnings of an insurance company, and in particular their control through deciding on suitable solvency margin levels to be maintained".

The conference may care to consider whether it would be possible and, if so, useful for the profession to construct some guidelines of the points which should be considered in assessing whether an insurer has sufficient control over the various risk it is accepting, bearing in mind that no single profession would be capable of assessing all the risks.

5. Ray Riseborough and John Ryan considered how an insurer should set its investment policy and what in practice the seven quoted composites appear to have done. The paper succeeds in bringing together what I believe were two contrary opinions on the subject and I hope will provoke a useful discussion in Hythe.

I would like to draw particular attention to the statement at the end of 4.1 and wonder on the merits of considering the solvency of a company not on current market levels but adjusted to allow for downside potential.

6. One paper I would like to have seen, but have not, is on the use of internal claims equalisation reserves - Maybe those with some experience in this field could report on that experience.
7. My final comment is on the semantics used. Phrases such as 'policyholders surplus' and 'earned premium' appear in the papers, however the definition of these shares is by no means fixed. One further contribution that actuaries could make might be to prepare standardised forms and definitions for internal management purposes, hopefully using terms coincident with those of the DOT (and the published accounts where this is also possible).

## ONE YEAR AND THREE YEAR ACCOUNTING.

- (1) An insurance company measures profit through its revenue accounts and profit and loss account. It is common, but not universal, for the underwriting result to be derived in the revenue account and transferred to the profit and loss account where it is added to the investment income earned on both shareholders' and policyholders' funds. Some companies credit the investment income on the policyholders' funds to the revenue accounts.
- (2) The revenue account is conventionally drawn up on either a one year or three year basis and this choice can have an important affect on the results and cash flow of the company. The differences between the two approaches are:-
  - (a) One year accounting attempts to report on the cover given during a year, whilst three year account attempts to report on business written during the year.
  - (b) Under one year accounting, underwriting profit emerges at the end of one year and subsequently depending on the accuracy of the estimates, whereas under three year accounting no underwriting profit emerges until the end of three years. Nevertheless, on a three year basis, if losses are detected earlier in the development of the account these should be made up by a transfer from the profit and loss account.
  - (c) The two bases are treated in substantially different ways for tax purposes. With one year accounting, estimates of outstanding claims are accepted by the Inland Revenue and tax is charged after one year on the underwriting profit. With three year accounting, there is no tax until underwriting profits are struck at the end of the third year, but estimates of outstanding claims may not be taken into account for tax purposes. It is to be hoped that the Inland Revenue will soon see the iniquity of the latter.

There is no difference in the taxation of investment income, except where underwriting losses are set against investment income.

- (3) Appendix 1 sets out a simple example of one years business on both accounting bases.

It may be seen that because we have commission of 19% and expenses of 17% the conventional one year accounting of 20% deduction for commission and initial expenses in calculating the unearned premium reserve is inadequate and produces an initial underwriting loss, which is recouped in the following year. This reduces the tax charge in the first year, making the total profit after three years greater than under the three year accounting basis. (Since no dividends are declared, it is a simple matter to compare profitability by the size of the shareholders' funds at the end of three years).

- (4) Appendix 2 takes the previous example and considers business written over several years, with constant premiums each year.

We see that because of the reserving strain on one year business the solvency ratio for this business is rather lower throughout the period considered. However, after the first year, one year accounting produces higher profits, through having higher technical funds. After another six years, both accounting methods would have the same shareholders' funds.

- (5) In appendix 3 written premiums increase by 15% per annum. Now the three year accounting gives higher profits each year, has a usefully higher solvency ratio and gives the shareholders a bigger dividend each year.
- (6) The total of commission and expenses (36%) is quite a reasonable figure. If this percentage was higher the calculations would be more favourable towards three year accounting, and if lower more favourable towards one year accounting.
- (7) The example considered is of short tail business. Examples have also been examined of longer tail business to see how the disallowance of outstanding claims affects the three year accounting basis. In eventual profit terms, any difference lies in the investment income earned on technical funds. It has been found that medium tail business is little affected and calculations are still being carried on for long term business.
- (8) Even where results are not published on a three year account basis until after the end of three years, there may well be an internal need to strike a result much earlier so that corrective action can be taken to eradicate unprofitable areas of the portfolio and for general rating purposes.
- (9) For long tail business such as excess of loss reinsurance, it is very doubtful whether a realistic result can be struck after only one year or even after only three years.

A.K. Thomson

We assume a company starting to write business with the following assumptions:-

Initial shareholders' funds	250
Written Premiums	1,000
Claims amount to 64% of premiums with payments distributed	
Year of Accident	50
Year after Accident	50
	<hr/>
	100
	<hr/>
Claims cost includes claim handling expenses	
Commission	19%
Expenses	17%
Investment Income	10% on invested funds
Debtors and creditors	Nil

The first year's business makes the following contribution to the company's results:-

Continued.....

1 year accounting.

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
(a) <u>Revenue Account</u>			
Written Premiums	1,000	-	-
Earned Premiums	600	400	-
Incurred Claims	320	320	-
Commission	190	-	-
Expenses	170	-	-
Profit	(80)	80	-
(b) <u>Profit &amp; Loss Account</u>			
Underwriting Profit	(80)	80	-
Investment Income			
(i) Technical Funds	24	40	8
(ii) Shareholders Funds	25	22	31
	<u>        </u>	<u>        </u>	<u>        </u>
Pre-Tax Profit	(31)	142	39
Tax at 50%	-	55	20
	<u>        </u>	<u>        </u>	<u>        </u>
Post-Tax Profit	(31)	87	19
Dividends	-	-	-
	<u>        </u>	<u>        </u>	<u>        </u>
Retained Profit	(31)	87	19
	<u>        </u>	<u>        </u>	<u>        </u>
(c) <u>Shareholders' Funds at Year End</u>	<u>219</u>	<u>306</u>	<u>325</u>

3 year accounting.

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
(a) <u>Revenue Account</u>			
Written Premiums	1,000	-	-
Fund b/fwd	-	480	160
	<u>1,000</u>	<u>480</u>	<u>160</u>
Claim Payments	160	320	160
Commission	190	-	-
Expenses	170	-	-
Profit	-	-	-
Fund c/fwd	480	160	-
	<u>1,000</u>	<u>480</u>	<u>160</u>
(b) <u>Profit &amp; Loss Account</u>			
Underwriting Profit	-	-	-
Investment Income			
(i) Technical Funds	24	32	8
(ii) Shareholders Funds	25	27	30
	<u>        </u>	<u>        </u>	<u>        </u>
Pre-Tax Profit	49	59	38
Tax at 50%	25	29	19
	<u>        </u>	<u>        </u>	<u>        </u>
Post-Tax Profit	24	30	19
Dividends	-	-	-
	<u>        </u>	<u>        </u>	<u>        </u>
Retained Profit	24	30	19
	<u>        </u>	<u>        </u>	<u>        </u>
(c) <u>Shareholders Funds at Year End</u>	<u>274</u>	<u>304</u>	<u>323</u>

Business is written on a continuing basis with level premium income. A dividend is paid from the second year onwards equal to the investment income less tax on shareholders funds. The results over the first 5 years are:-

1 Year accounting

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
(a) <u>Revenue Account</u>					
Written Premiums	1,000	1,000	1,000	1,000	1,000
Earned Premiums	600	1,000	1,000	1,000	1,000
Incurred Claims	320	640	640	640	640
Commission	190	190	190	190	190
Expenses	170	170	170	170	170
Profit	(80)	-	-	-	-
(b) <u>Profit &amp; Loss Account</u>					
Underwriting Profit	(80)	-	-	-	-
Investment Income					
(i) Technical Funds	24	64	72	72	72
(ii) Shareholders Funds	<u>25</u>	<u>22</u>	<u>27</u>	<u>30</u>	<u>34</u>
Pre-Tax Profit	(31)	86	99	102	106
Tax @ 50%	<u>-</u>	<u>28</u>	<u>49</u>	<u>51</u>	<u>53</u>
Post-Tax Profit	(31)	58	50	51	53
Dividends	<u>-</u>	<u>11</u>	<u>14</u>	<u>15</u>	<u>17</u>
Retained Profit	<u>(31)</u>	<u>47</u>	<u>36</u>	<u>36</u>	<u>36</u>
(c) Shareholders Funds					
at Year End	219	266	302	338	374
<u>Solvency Ratio</u>	<u>21.9%</u>	<u>26.6%</u>	<u>30.2%</u>	<u>33.8%</u>	<u>37.4%</u>

3 Year accounting

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
(a) <u>Revenue Account</u>					
Written Premiums	1,000	1,000	1,000	1,000	1,000
Fund b/fwd.	<u>-</u>	<u>480</u>	<u>640</u>	<u>640</u>	<u>640</u>
	<u>1,000</u>	<u>1,480</u>	<u>1,640</u>	<u>1,640</u>	<u>1,640</u>
Claim Payments	160	480	640	640	640
Commission	190	190	190	190	190
Expenses	170	170	170	170	170
Profit	-	-	-	-	-
Fund C/fwd.	<u>480</u>	<u>640</u>	<u>640</u>	<u>640</u>	<u>640</u>
	<u>1,000</u>	<u>1,480</u>	<u>1,640</u>	<u>1,640</u>	<u>1,640</u>
(b) <u>Profit &amp; Loss Account</u>					
Underwriting Profit	-	-	-	-	-
Investment Income					
(i) Technical Funds	24	56	64	64	64
(ii) Shareholders Funds	<u>25</u>	<u>27</u>	<u>30</u>	<u>33</u>	<u>37</u>
Pre-Tax Profit	49	83	94	97	101
Tax at 50%	<u>25</u>	<u>41</u>	<u>47</u>	<u>49</u>	<u>50</u>
Post-Tax Profit	24	42	47	48	51
Dividends	<u>-</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>19</u>
Retained Profit	<u>24</u>	<u>28</u>	<u>32</u>	<u>32</u>	<u>32</u>
(c) Shareholders Funds					
at year end	274	302	334	366	398
<u>Solvency Ratio</u>	<u>27.4%</u>	<u>30.2%</u>	<u>33.4%</u>	<u>36.6%</u>	<u>39.8%</u>



Written Premiums now increase by 15% p.a.

### 1 Year Accounting

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
(a) <u>Revenue Account</u>					
Written Premiums	1,000	1,150	1,323	1,521	1,749
Earned Premiums	600	1,090	1,254	1,442	1,657
Incurred Claims	320	688	791	910	1,047
Commission	190	219	251	289	332
Expenses	170	195	225	259	297
Profit	(80)	(12)	(13)	(16)	(19)
(b) <u>Profit &amp; Loss Account</u>					
Underwriting Profit	(80)	(12)	(13)	(16)	(19)
Investment Income					
(i) Technical Funds	24	68	86	99	113
(ii) Shareholders' Funds	25	22	26	30	34
Pre-Tax Profit	(31)	78	99	113	128
Tax @ 50%	-	24	49	57	64
Post-Tax Profit	(31)	54	50	56	64
Dividends	-	11	13	15	17
Retained Profit	(31)	43	37	41	47
(c) Shareholders Funds at					
Year end	219	262	299	340	387
<u>Solvency Ratio</u>	21.9%	22.8%	22.6%	22.4%	22.1%

### 3 Year Accounting

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
(a) <u>Revenue Account</u>					
Written Premiums	1,000	1,150	1,323	1,521	1,749
Fund b/fwd.	-	480	712	819	941
	<u>1,000</u>	<u>1,630</u>	<u>2,035</u>	<u>2,340</u>	<u>2,690</u>
Claim payments	160	540	740	851	979
Commission	190	219	251	289	332
Expenses	170	195	225	259	297
Profit	-	-	-	-	-
Fund c/fwd.	480	712	819	941	1,082
	<u>1,000</u>	<u>1,630</u>	<u>2,035</u>	<u>2,340</u>	<u>2,690</u>
(b) <u>Profit &amp; Loss Account</u>					
Underwriting Profit	-	-	-	-	-
Investment Income					
(i) Technical Funds	24	60	77	88	101
(ii) Shareholders Funds	25	27	30	34	39
Pre-Tax Profit	49	87	107	122	140
Tax @ 50%	25	43	54	61	70
Post-Tax Profit	24	44	53	61	70
Dividends	-	14	15	17	19
Retained Profit	24	30	38	44	51
(c) Shareholders Funds at					
Year end	274	304	342	386	437
<u>Solvency Ratio</u>	27.4%	26.4%	25.9%	25.4%	25.0%

## Profit Objectives

### 1. Introduction

- 1.1 The title 'Profit Objectives' implies that corporate aims are envisaged and defined solely in terms of profit. But profit depends upon other variables such as growth; so that objectives are more realistically expressed as alternative strategies each embodying a set of related parameters of profit, growth, etc. Thus although 'profit' may be the ultimate long-term criterion determining the health and survival of a company it cannot be divorced from other components of the strategic objectives.
- 1.2 The starting-point seems to be the broad corporate objectives envisaged by top management, i.e. at Board level. These may be expressed in terms of some or all of the following aims:-

- Company 'image'
- Types of business
- Rate of return on capital
- Dividend policy
- Price of Company's shares
- Solvency strength
- Strength of reserves
- Rate of growth
- Overall insurance profit
- Relative contributions of underwriting and investment profits
- Investment policy

There may be other aims but this list, which we discuss in greater detail below, will suffice to demonstrate that profit is not the sole aim.

- 1.3 These aims may emerge initially by way of a process which could be termed 'naive'. They may in the first instance be the outcome of intuitive rather than strictly logical considerations; and as a consequence the various aims may be mutually inconsistent, impractical or unattainable. Nevertheless they represent a valid view of the company's needs seen from the position of those who are ultimately responsible for its survival and progress as a viable financial and commercial enterprise.
- 1.4 At the other end of the spectrum the underwriter sees the problem from the point of view of someone who has to price and sell the various lines of business in a competitive market-place. The underwriter's knowledge of the sales outlets, their reactions to price changes and the terms and conditions of the covers offered, the likely actions of the company's competitors, - in short, his knowledge of what the market will bear, - provides a view of the practical constraints to the achievable objectives.
- 1.5 The process of determining realistic aims involves a dialogue between these different points of view; i.e. between the 'imperial' view of the Board and the 'grass roots' view of the underwriter. The object is to arrive at an accommodation between them so as to define a set of acceptable and consistent corporate aims which are achievable in terms of practical underwriting objectives.

- 1.6 In practice this dialogue takes place through the medium of the planning function. The latter therefore plays a key role as an intermediary or catalyst by which the 'imperial' and 'grass roots' views are fused into a common set of objectives.

## 2. Broad Corporate Objectives

### 2.1 Company 'image'

Although intangible this concept probably exercises a powerful influence on the general direction in which management points the company. The company's image of itself as 'establishment', 'iconoclast', 'socially aware', 'commercial', etc. may induce, almost involuntarily, an attitude to decision-making which pervades the management structure.

### 2.2 Types of business

The Board may wish to pursue a policy of concentrating its insurance business in certain well-defined categories (for example industrial and commercial risks) and classes. For many companies the existing distribution of its business portfolio will reflect its origins and connections. But changing conditions may call for a change of emphasis and require the Board to cultivate hitherto neglected lines of business; or to run down lines which have become unattractive.

### 2.3 Rate of return on capital

The idea behind this objective is the proposition that the shareholders should receive a return on their investment which is commensurate with that to be expected from investment in comparable enterprises. Assuming that there is an active market in the shares of the company the book value of the share capital is an historical irrelevancy. And we must look to a measure which reflects the expectations of the rational holders of newly-acquired shares. This suggests that the practical substitute for the rate of return on capital should be 'earnings per ordinary share': which when viewed against the price of the shares provides a meaningful measure of the current rate of return. Scurfield in GIRO 8 suggests that shareholders are entitled to a risk payment, in excess of the return on direct investment, equal to 1% or 2% of premium income. In general the level of earnings per share will conflict with the rate of growth; i.e. the maximisation of earnings will in the short-term tend to be associated with a low growth rate, and vice versa. This may call for nice judgement from the Board as to the optimum strategy required in the light of the company's past and future progress.

### 2.4 Dividend policy

It is to be expected that the Board would have a reasonably long-term view of the progression of dividends from year to year, taking into account any changes in capital structure. Against this long-term strategy there would be superimposed short-term tactical requirements dictated by external considerations such as statutory dividend restraint and defensive dividend policies aimed against potential take-over manoeuvres. The latter are of course no more than an extreme example of the recurring need to balance the allocation of the net profit between transfer to reserve on the one hand and contribution to dividend on the other.

## 2.5 Price of Company's shares

The market's valuation of the company's shares will be influenced partly by an underlying long-run appraisal of the company's performance; and partly by the immediate view of the company's current dividend performance and reserve strength. The long-run effect will reflect the past history of earnings and the continuing prospects for the future. Short-run disturbances in the share price may arise from decisions taken by the Board in the recent past with regard to the allocation of earnings between reserves and dividends; and may be extremely sensitive to such decisions. Hence the directors are constantly faced with the task of judging the impact of share-price variations on the company's prospects; and adapting their long-term strategy to counter any adverse features.

## 2.6 Solvency strength

The statutory solvency margin represents the point below which the company would in effect be forced to cease trading. The Board will therefore aim to keep the actual solvency margin at a suitable increment above the statutory minimum. The size of the increment to be aimed for will involve consideration of the possibilities of falls in asset values and their extent; and the risks of unforeseeable escalation in claims liabilities. It may be possible to bring to bear on this problem some limited use of scientific estimation; but the imponderables may outweigh the rational elements so that judgement of the appropriate solvency margin may involve highly subjective, even emotive, considerations. In halcyon times long past British insurers were able to maintain solvency margins well in excess of 100 per cent of premium income. The effects of inflation and competition have whittled those margins down to the order of a modest 30-40 per cent; and the combination of falling asset values and escalating liabilities has provided a sobering insight into the vulnerability of the margins. It might therefore be supposed that companies should seek to return to the former level of margins. However it is doubtful if the new intensity of competition, whether regarded as 'healthy' or 'unhealthy', will permit such a return. Indeed it may be questioned whether the with-holding of an excessive part of the assets from productive employment in the insurance operations is a proper way of using the shareholders' funds. The question of whether increases in solvency margins should be financed out of the insurance business or by the raising of additional capital is discussed in section 6.3 below.

## 2.7 Strength of reserves

For the purpose of this discussion it is assumed that the Board would not be concerned with fixing the amounts of the technical reserves; these normally having been determined by the appropriate line specialists. Apart therefore from their general overseeing responsibility the directors would not be expected to involve themselves in decisions on the specific levels of such reserves. Rather the focus of attention would be the amount of free reserves; and the disposal of net profit between dividend distribution and transfer to retained profits. Management may be inclined to see some virtue in the pursuit of the goal of accumulating large reserves in the interests of protecting the company against the risk of insolvency; on the other hand the demands of the shareholders for adequate dividend distributions in a period of declining profitability acts as an effective counterweight to any excessive building-up of reserves. In the future the balance seems likely to be struck at a relatively lower level of reserves than may have been customary a few years ago.

## 2.8 Rate of growth

Apart from the emotive attractions of 'bigness' as a prestige symbol there are sound reasons for the Board wishing to see a sustained rate of growth (which for the present purpose we take as being in real, rather than inflationary, terms). For example, a heavy investment in fixed expenses may need to be financed by a growth in business volumes; an increase in the company's market share may give it a greater influence on matters affecting the conditions in which business is transacted. But high growth is usually achievable only by cutting underwriting profit margins and/or increasing operating expenses (e.g. commission); and unless there is some counterbalancing advantage in higher income from favourable investment opportunities the net earnings (and, consequently, dividend maintenance) are likely to come under pressure. High growth will also impose a strain on the solvency margin. As always therefore the Board will find that their 'naive' inclinations are subject to the constraints of conflicting requirements.

## 2.9 Overall insurance profit

If this paper had been written strictly within the brief implied by the heading 'profit objectives' this paragraph might have embraced the whole subject-matter. Seen from the point of view of the broader corporate aims discussed above the insurance profit becomes a consequence of those aims rather than an end in itself. Insurance profit may usefully be defined as underwriting profit plus investment income derived from the general insurance funds. Ironically, 'insurance profit' rarely appears as an item in the published accounts; which usually show separately underwriting profit and total investment income (i.e. from all sources). This may seem a strange state of affairs to actuaries who would regard the generation of insurance profit, as defined, as a fundamental criterion in judging the success of the insurance operations.

## 2.10 Relative contributions of underwriting and investment profits

During a period when investment conditions are expected to be especially favourable the company may wish to take advantage of the opportunity of a high rate of return. This might involve a deliberate decision to maximise cash flow by expanding the volume of insurance business; almost invariably the concomitant of such a decision will be a reduction in underwriting profits. And the reverse will apply; if the investment outlook is unsettled it may be thought prudent to focus attention on generating increased underwriting profit margins. The balance between the two sources of profit is therefore one of the basic ingredients, explicit or implicit, in the set of corporate objectives.

## 2.11 Investment policy

The directors will have views on the long-term investment strategy of the company which will include aims such as for example to concentrate on property development. It may also include the objective of increasing the company's market share by investment in the acquisition of competitors. Clearly these decisions will be linked to the composition of the insurance portfolio and the company image. Short-term considerations (see 2.10 above) may intervene to cause temporary modifications to the long-term strategy.

- 2.12 The above review of the main components which may, or may not, enter into the Board's concept of the corporate objective is incomplete and superficial. Nevertheless, it is hoped that the discussing brings out the feature that although the components may be seen and expressed as separate and independent objectives they are in fact closely inter-dependent. And that this inter-dependence may be cause of conflict between different aims. It is part of the planning process, as envisaged in 1.6 above, to resolve these conflicts and to bring the various objectives into harmony.

### 3. Strategic Planning

#### 3.1 Introduction

- 3.1.1 Having considered the corporate objectives of senior management for the company's future progress and having defined the characteristics by which the underwriter understands his class of business, there exists the need for a communication system which permits the aims of the former group to be translated into objectives which can be agreed and acted upon by the latter. Furthermore, this system must allow for a two-way dialogue to ensure that a set of underwriting objectives will indeed result in a corporate strategy acceptable to senior management.
- 3.1.2 At the centre of the communication system is the corporate planner. His role is to establish relationships between the various aims of the two parties, taking account of the detailed flows of money within the company and the numerous lags between transactions and actual cash flow. To produce rapid and accurate forecasts under a variety of alternative assumptions, the planning function is best achieved by the development of a computer projection model of the financial operation of the company.
- 3.1.3 In addition to its use as a forecasting tool, such a corporate model has other effects:-
- (i) It demands explicit assumptions to be given for loss ratios, expense ratios etc.
  - (ii) It requires a detailed analysis of cash flow through the company.
- 3.1.4 The basic principles of the computer model are similar to those described in the paper "Management Accounting-Company Profitability", presented at the York conference. In this note, we consider the systems environment in which this model is used.

#### 3.2 Company Structure

- 3.2.1 Profit objectives must be set in a form which reflects the division of responsibilities within the company. The basic division lies between
- (i) Financial Management : The allocation of financial resources.
- and (ii) Operational Management : The application of financial resources.
- 3.2.2 Operational management can be further divided into
- (i) Investment Management : responsible for investing the funds generated by the Insurance operations,
- and (ii) Insurance Management : responsible for
- (a) Underwriting control
  - (b) Premium collection and credit control.

- 3.2.3 In the following discussion, we assume that the underwriters exercising control of the various classes of business can be grouped under the control of "Profit Centre" managers, with separate profit centres representing the gross direct business of the main classes : Fire, Accident, Motor, Marine/Aviation. (When comparing the effects of alternative strategies, it is preferable to split the Accident profit centre between Liability and Property to reflect differences in the length of the claims run-off period).
- 3.2.4 This preliminary grouping at profit centre level does not affect the principles of the planning process. For a company writing a large number of different classes of business it provides a convenient level at which alternative strategies can be examined to produce broad corporate objectives. We consider the planning process in more detail in section 3.3.
- 3.2.5 There will usually be a further profit centre representing the Reinsurance function, which can usefully be subdivided into constituents representing each of the main classes.
- 3.2.6 The Investment Department will also be considered as a profit centre.
- 3.3 Planning Function
- 3.3.1 The corporate planner provides the medium through which corporate aims and practical underwriting objectives are synthesised to produce a coherent and consistent corporate plan. This role embraces the use of a corporate model not only to assist senior management in planning future strategy and setting objectives but also to take account of the views and experience of the underwriter. The aim of the planning process is to ensure that objectives can be agreed with each underwriter and that their combined objectives will indeed reproduce the required corporate targets.
- 3.3.2 To achieve this aim, two main stages are envisaged, each requiring the use of a computer model based on the same basic principles.
- 3.3.3 Profit Centre Model
- (i) The first of the models operates at profit centre level. This higher level is chosen for ease of processing various alternatives and to enable a corporate view to be taken without becoming too entrenched in portfolio details. Furthermore, expenses levels and loss ratios, are likely to be more predictable at this level, particularly under different assumptions of premium growth.
  - (ii) In addition to the basic insurance profit centre model, submodels are included at this level to project the results of the investment profit centre and to process items unrelated to a specific profit centre (e.g. corporate expenses, taxation, dividends etc.)



(iii) Analyses of the results would produce:

Gross/Net Revenue Results )  
Profitability Statements ) for each profit centre

Revenue and Profit and Loss Accounts  
Balance Sheets  
Solvency Projections  
Cash Flow Analyses  
for each future year of the projection.

(iv) The form of output would illustrate, for example, the effect on solvency levels and the ability to maintain dividends under a variety of assumptions about the rate of expansion of each profit centre.

3.3.4 Within the broad qualitative and quantitative requirements of the plan set out by general management, the divisional manager (with overall responsibility for the insurance profit centres) would use this model to determine a basic strategy for each profit centre.

3.3.5 Following the basic strategy laid down by the divisional manager for each profit centre, a more detailed analysis of the results would allow profit centre managers to determine a tentative strategy for each of their classes of business. These are referred to the underwriting departments in the form of objectives.

3.3.6 Class of Business Model

The second version of the model operates at class of business level. The underwriting departments would use the model to determine the best method of achieving the objectives set by their profit centre managers.

3.3.7 When each underwriter has determined an initial strategy for his particular class, the individual results are accumulated to profit centre level and compared to the original objectives for that profit centre. The profit centre managers can either give a qualified approval to the plans of his underwriters or he may require a change in emphasis between different classes of business to enable his overall targets to be met. Changes may be expressed in such terms as faster growth or more profit.

3.3.8 The underwriters most able to supply the extra benefits or to effect the changes required would be instructed to re-examine their initial strategies and provide revised forecasts.

3.3.9 The cycle involving the procedures described in paragraphs 3.3.7 and 3.3.8 is repeated until the best possible results, compared to the original targets, are achieved at profit centre level.

- 3.3.10 The profit centre results are then accumulated to corporate level and compared to the outcome of the basic strategy on which profit centre targets were first set. If the overall results are approved by general management, then the individual underwriting targets can be confirmed. If, however, a particular profit centre is unable to meet its target, or if some specific quantitative requirement of general management has not been met (e.g. minimum solvency margin), the strategies for each profit centre would have to be revised. The procedure would then return to the stage described in 3.3.4.
- 3.3.11 On the satisfactory conclusion of the above planning cycle, there results a corporate plan which achieves the corporate aims of general management and sets out specific objectives which have been agreed by individual underwriters.
- 3.3.12 The above sections describes only part of the planning process. To illustrate the proposed system, we have concentrated mainly on the formulation of long term strategies and objectives. Part of the information resulting from this process will comprise detailed targets for the following financial year. An essential part of the annual planning cycle is to monitor the actual results as they arise during the year and compare them to those expected according to the detailed plan. A continuous monitoring process will enable decisions to be taken to attempt, where necessary, to correct any deviations from the agreed course. A detailed discussion of the analysis of actual results is not included in this note.
- 3.3.13 Finally, we emphasise that, unless the management structure necessitates their use, the introduction of profit centres merely provides a convenient way of controlling the planning function where a large number of classes of business are involved. For companies writing fewer lines, this device would be omitted from the planning procedure.

#### 3.4 The Basic Model

- 3.4.1 The flowchart in the Appendix illustrates the main functions of the model.
- 3.4.2 By applying various factors to projections of the opening written premium, relative figures for expenses, commission, earned premium and UPR are calculated. (It may, however, be preferable to use a separate submodel to project expenses since a significant proportion will not be directly related to premium volume). By means of claim ratio factors, incurred claims are calculated and, using an appropriate run-off pattern, the claim payment cash flow is produced. The payment pattern for prior years' outstanding claims can similarly be established.
- 3.4.3 The written premium, after adjusting for commission and allowing for payment delay and the run-off of outstanding Agents Balances, can be summed with claim payments and expenses to produce the expected cash flow during each year. Interest earned during each revenue year (apportioned by year of claim) is calculated from the opening funds and adjusted to allow for the effects of the cash flow. The rate of interest used in the model is a notional rate to be agreed with the Investment Department. (The role of the Investment profit centre is discussed in section 3.6).

- 3.4.4 The results of the model are stored in the relative file, the whole process being repeated for each input data file in its turn.

3.5 Data Files

- 3.5.1 The platform from which any forecast of the future is projected must be the company's financial position at the date of projection. It is therefore necessary to hold data (assumed here to be in the form of computer files) in sufficient detail to permit reasonable forecasts of the cash flows, which result from the insurance process and from which can be constructed various end-of-year reports (Profitability statements by year of claim, Revenue and P and L accounts, Balance Sheets etc.). It is against these reports that actual achievements will be judged.
- 3.5.2 For examining alternative long term strategies, yearly data files would be held at Profit Centre level and would record, inter alia, the items:

Written Premiums

UPR

Agents Balances

Paid Claims	)	
O/S Claims Reserves	)	
IBNR Reserves	)	(by year of claim within
Interest allocation	)	revenue year)
Claim Handling Expenses	)	

Commission

Management Expenses (excluding non-allocable expenses)

The above data are also stored for each class of business comprising the insurance profit centres.

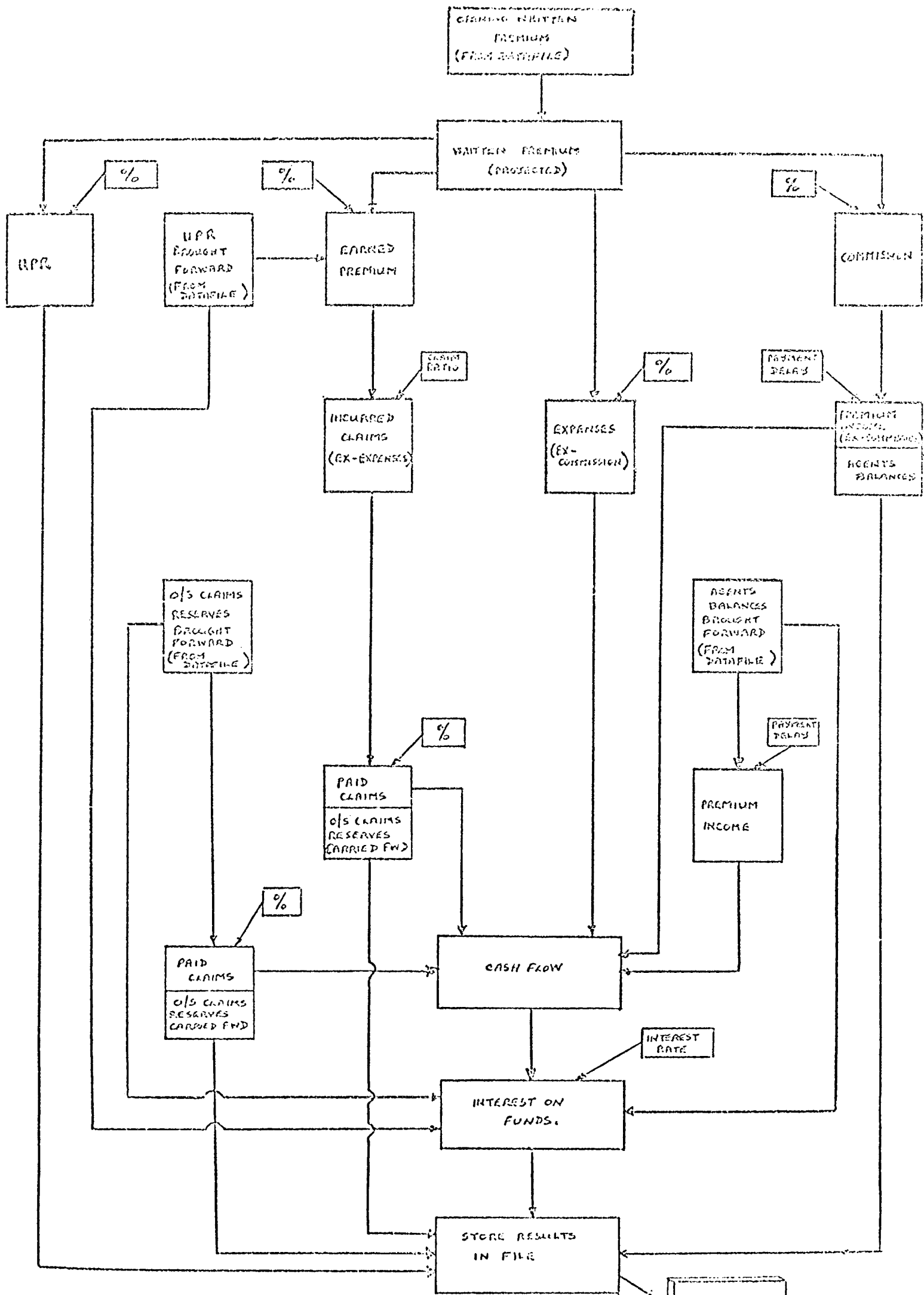
- 3.5.3 A further data file is required to store items unrelated to any specific profit centre. This file will include: shareholder's capital, Revenue reserves, interest allocation (on non-specific reserves), non-allocable (trading account) expenses, taxation charge and dividends paid.

3.6 The Investment Profit Centre

- 3.6.1 Each insurance profit centre generates funds, representing technical reserves (net of Agents Balances), which are available for the Investment Department to borrow until all claims fall due to be paid. In order to assess the profitability of the premiums of a given class of business that are earned during a particular revenue year, it is necessary to estimate the interest income which will be generated from investing the funds of that year's business over the run-off period. By agreeing a rate of interest on new funds accruing as a result of that year's business (the rate perhaps depending on the expected mean term that the funds will remain invested), notional interest earnings during each year comprising the run-off period can be estimated. (It is noted that the cash flow profile must allow for transfers to the P and L account at the end of each revenue year).

- 3.6.2 The underwriting departments can thus plan what they have to achieve in the way of insurance profit and can be held accountable for their results. The expected (notional) interest income can be accumulated for each revenue year over all classes of business to provide annual targets for the Investment profit centre. (Market value constraints would also form part of Investment objectives).
- 3.6.3. During the transition period for the introduction of investment accountability, the interest earnings on existing technical reserves would be merged with the projected interest on new business until all interest targets came under the proposed basis.
- 3.6.4 Having guaranteed a rate of interest on new funds, the Investment Department remains free to pursue any policy which will meet the income targets implied by this rate and satisfies the constraints of capital security (including stability of asset values).
- 3.6.5 For planning purposes, the Investment Department will project expected future income from its knowledge of the actual investments currently held, its future investment policy and the expected rate of return on new funds, including those generated by the insurance operations. Included in this projection is the income earned by the funds representing shareholders' capital and free reserves, allowing for projected transfers to reserves in future years. The extent to which capital appreciation is included as income will depend on the actual accounting practice.
- 3.6.6 From this expected income is debited the interest which has been credited to each class of business according to the guaranteed rate. The resulting investment profits or losses are included in the projection of the P and L accounts, together with transfers from the Insurance profit centres.
- 3.6.7 Finally, we note that monitoring the performance of the investment profit centre need not be restricted to a twelve month period. However, provision must be made for unrealised gains (or losses), which are not passed through the P and L account, to be taken into account when comparing actual performance to expected results.
- 3.6.8 In the above discussion, we have assumed that transfers to the P and L account do not anticipate future interest income. If accounting policy were to change to introduce discounted claims reserves into the balance sheet (and therefore to accelerate profit releases and increase solvency margins), this could be allowed for by adjusting the cash flow to reflect the new basis for transferring funds to the P and L account at the end of each revenue year.

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#### 4. ALLOCATION TO CLASSES OF BUSINESS

##### 4.1 Allocation of expenses

The management expenses normally attributed to a line of business within a company can be divided into three types.

1. Variable direct expenses - which are directly attributable to the line in question, and vary more or less precisely with the volume of business being written.

example: salaries of line new business clerks.

2. Fixed direct expenses which although directly attributable to the line, do not vary significantly with new business volumes.

example: line manager's salary.

3. Fixed indirect expenses - which are not attributable directly to the line but are shared among all the company's lines on some more or less arbitrary basis.

example: general management costs, which could be allocated in proportion to premium income.

Items 1 and 2 present no real difficulties in that they are costs which are recognisable as having been incurred by and for the line and are largely within the control of the line manager. The major problems arise with item 3. Here the implicit assumption is that although the costs in total are incurred on behalf of the company, that is the lines in total, they cannot be allocated on any accurate basis to individual lines of business. A further anomaly arises which can be demonstrated by considering the effect on a two line company if one line contracts in size while the other retains a constant premium income from one year to the next. The second line will experience an increase in its allocated corporate costs which is entirely unrelated to any action taken by its manager, and over which he has no control. This is unsatisfactory, particularly in management accounts which are used to judge underwriters performance.

The solution I propose is that item 3 expenses should not be allocated at all, but should be charged against corporate profit in the Profit and Loss account. This system gives a more realistic build up of the overall company image, and in particular it indicates those lines which, if removed, would lead to an increase in company profits. It would enable the company to identify lines which, although currently not profitable in an absolute sense, nevertheless make a contribution to overheads. It is, of course, important to ensure that the contribution from all lines in total

is sufficient to cover overheads and leave a profit, and this requires a different interpretation of the concept of profit by management. In particular, the lowest level of contribution acceptable in the long term from any line of business is somewhat higher than under the traditional system.

A further problem arising from the current method of allocating expenses to lines of business arises because while premiums and losses shown in the revenue account relate to the same block of business, some of the expenses, the maintenance and loss expenses, do not. This distorts the account as a representation of profitability. The obvious solution is to set up a reserve for all expected future expenses associated with a policy in the year in which the premium is received. A similar problem arises with investment income, and a somewhat similar solution is proposed in the note on allocation of investment income.



#### 4.2 Allocation of Investment Income

Traditionally, general insurance companies have measured the profitability of individual lines of business by reference to underwriting income, treating investment income on reserves as a company-wide "extra". More detailed consideration of the relative profitability of different accounts with differing lengths of tail however requires an allocation of this income between individual lines and, of course, shareholders' funds. An obvious approach would be to allocate in proportion to some measure of the current income earning power of each line, and the most relevant measure would seem to be reserves. The allocation can be made simply in proportion to the mean reserves, or it can be made more sophisticated by the introduction of allowances for the effect of the yield curve on differing lengths of tail, and the differing investment opportunities of growing and shrinking accounts. The concept of allocating actual investment income has been criticised because it makes the profitability of the line of business dependent on the performance of the investment managers. To overcome the difficulty the concept of a notional rate of interest has been proposed. The individual lines are allocated investment income based on mean funds and a rate of interest agreed by the investment managers with reference to current market conditions and the characteristics of the particular account. The rate then becomes a target for the investment managers, who are responsible for managing the funds so as to be able to meet all the requirements of the lines for notional investment income allocations.

It is now proposed to take this concept a step further, and allocate investment income based not on funds generated by historic underwriting, but calculated according to the expected cash flow on the current year's business, again using a notional rate of interest.

A simple approach is to attach a cash flow pattern to each element of the revenue account for current year premium, and discount each of these at the notional rate of interest. The revised revenue account will then produce on the bottom line a profit including projected investment income, and by deducting underwriting profit, we can arrive at the notional investment income which should be credited to the line. The major problem of agents' balances can be overcome in two ways; either by allowing for delay in premium receipt in the premium cash flow pattern or by reducing the notional rate of interest to allow for non-interest bearing assets. The rate of interest used should be that which could be earned if the premium were to be invested in assets matched in nature and term to the current year expected liabilities. In this way, the investment profits which are earned by virtue of the company writing a number of lines of business in a number of years are allocated to shareholders. This seems reasonable, because these profits cannot be allocated other than in

an arbitrary fashion to a particular revenue year for a particular line of business, and any attempt at such an allocation will simply distort the pattern of relative profitability among the lines and years.

A change in emphasis under the new system arises because allocating income on the basis of historic reserves ignores the fact that for branches of business written at an underwriting loss, some of those reserves were funded by the shareholders, and the income on them should be given back to them, rather than counted towards the overall profitability of the line. Both of these latter items will tend to reduce the amount of investment income allocated to the line of business, and in some cases could substantially outweigh the increase in allocation caused by growth.

5. Underwriting profit - brief thoughts on fundamentals

5.1 As an afterthought we add some brief observations on the nature of 'underwriting profit'.

5.2 As a starting-point it is useful to consider what meaning, if any, is to be attached to the following statement:-

"The objective is to make an underwriting profit of £3 million in 1978."

5.3 The first point to be made is that the profit for 1978 will not be definitely established until some years later. At the end of 1978 the profit can only be estimated; and having regard to the uncertainty of some of the components which contribute to it the estimated result may be a very crude approximation to the truth; indeed it may be quite misleading. The position is aggravated by the feature that decisions made by the underwriter to not immediately manifest themselves in the revenue results of the year in which they are implemented. Reference may be made to Section 3 of the York paper on Measurement of Profitability by Class of Business.

5.4 In the second place the insurance process is essentially an exercise in uncertainty and the standard deviation of expected claims costs may be large in relation to the profit target for one year.

5.5 Reinsurance helps to dampen down the extreme fluctuations in claims experience; but its primary purpose is usually to protect against the more serious consequences of adverse claims and it is not intended as a claims-smoothing device as such.

5.6 The use of claims-equalisation reserves is superficially attractive; but the problem of devising satisfactory accounting rules for determining the flows to and from the reserves merely aggravates the measurement problems referred to in 5.3 above.

5.7 As it stands therefore the statement in 5.2 implies a precision which is unrealistic; and it sets a target which is unobtainable except quite fortuitously. It might be re-phrased to read -

"The objective is to achieve an underwriting profit in 1978 of between - £2 million and + £8 million, as assessed by the run-off position in 1981."

This does not seem to be a helpful or meaningful statement of aims.

5.8 We conclude therefore that the nature of insurance business with its inherent fluctuations renders the experience of an isolated year almost meaningless in terms of corporate and operating objectives.

5.9 Whilst therefore it may be necessary to specify corporate objectives for individual years of account such objectives should be regarded as strictly components of a long-term sequence. As a corollary the monitoring of results needs to view performance over a period of years.

## 6. Miscellaneous points

- 6.1 The overall corporate plan and its component sets of business objectives are not to be regarded as immutable; they merely provide a target at which to aim. The objectives should be realistic and internally consistent; and be based upon a common set of feasible assumptions. If the assumptions change then it has to be accepted that the achievements will diverge from the targets.

The value of the planning process lies in being able to conduct an inquest into the variances between targets and achievements; distinguishing between differences caused by divergencies in the assumed conditions and differences arising from failure to anticipate the outcome of correct assumptions. The insight gained from this analysis should raise the level of understanding and proficiency in setting future objectives.

- 6.2 The previous discussion has drawn attention to the limitations of a single year's results in judging performance; such limitations arise partly from the inherent variability of the insurance process and partly from the difficulty of accurately measuring the experience at the time that it occurs. Nevertheless the latest results, reliable or not, are the most up-to-date guide available for current decision-making. It is of little use to the underwriter in fixing his premium levels for 1978 to be told that the latest accurate set of results is that for 1975! He must perforce make the best of the 1977 results; and the challenge lies in trying to bring them on to as reliable a basis as possible.
- 6.3 As the size of the insurance business grows, whether in real or inflationary terms, it seems natural for the capital base to grow correspondingly. This of course applies to almost every type of business operation but in insurance it is made explicit by the requirement for a solvency margin. In one sense the solvency margin (represented by the 'free' reserves) 'belongs' to the shareholders; for in the event of the company ceasing to transact business the satisfaction of the insurance liabilities out of the technical provisions will leave the solvency margin free for distribution to the shareholders. Looked at from this point of view it seems that increases in the solvency margin should be financed predominantly out of the raising of new capital; so that broadly speaking the gearing between the capital base and the size of the insurance business remains stable.

On the other hand it might be argued that policyholders are buying protection against unforeseen disasters; and that in order to provide that protection in the last resort the company requires the solvency margin as well as its technical reserves. In other words the solvency margin is part of the protection 'umbrella' which the policyholder buys. This view suggests that the solvency margin should be financed out of the insurance operations; i.e. that the premiums should be set at a level which is sufficient to provide adequate insurance profit for this purpose.

## Risk Management and Solvency Margin Planning

### 1. Identification of Risks - Insurance Company

1.1. The value of the invested assets of an insurance company can fall. Such a fall can be a result of one or both of the following factors:-

- (i) A general increase in interest rates; and
- (ii) the failure, or partial failure, of any particular asset. For example, shares may be held in a company which does badly.

1.2. Adverse claims experience is really a general heading which covers several risks.

- (i) Random fluctuations of claims - fluctuating number or average amount;
- (ii) catastrophe;
- (iii) increasing trend in total amount of claims - as a result of an increasing number of claims or of increasing average amount; and
- (iv) inadequate premium rates - related to underwriting standards.

Adverse experience, broadly under these headings, can emerge in many ways and the emphasis in the analysis of any particular case is likely to be a matter of opinion.

As an example, if reserves are set too low, an over-optimistic assessment of profits will be made. Rating from apparent experience will then lead to inadequate premium rates being charged. The distribution to shareholders and employees may be excessive. The result at a later stage will be that even the inadequate reserving standard will not be met.

A cycle of this sort appears to have been present with the V & G although where and when the cycle started is not immediately clear. Rate-cutting within a cycle of this sort could be aggravated by several companies getting into a position like this, possibly on only one class of business. How the position emerges will vary. For example, reserves may be set too low because of an honest but incorrect estimate of the claims run off.

1.3. Escalation of expenses can occur as a result of inflation, government requirements or ineffective management.

1.4. A number of the risks may be thought of as external influences and, therefore, can lead to particularly difficult control problems. Examples are:-

(Please see next page)

- (i) Inflation - of expenses and claims;
- (ii) legal influences - either through legislation (e.g. on liability) or the attitudes of the courts on damages awards;
- (iii) currency fluctuations; and
- (iv) government actions which can affect cash flow after a contract has been entered into through increased administration costs or taxation changes. (e.g. introduction of Selective Employment Tax, changes in corporation tax.)

## 2. Measurement and Economic Control of Risks - Insurance Company

2.1. Where risks cannot be eliminated, or it is judged best that they should not be fully eliminated, margins must be retained. The statutory minimum solvency margin may be treated as the base point. An insurer's solvency margin must be such as to reduce to an acceptable level the risk of not being able to satisfy the statutory test.

The solvency margin shown in the accounts and returns must also be sufficient to support the reputation and public image of the company.

2.2. The asset risks (1.1.) can be controlled in several ways. The effect of increases in interest rates can be minimised by matching, as far as possible, cash flow. There are several difficulties:-

- (i) Except for some fairly short term business, the cash outflow of a general business fund is difficult to forecast. Predictions regarding inflation over any extended period are particularly hazardous;
- (ii) there may be some advantage in holding assets of a longer term than the liabilities especially if the yield curve is steep.

Where the claims distribution has a particularly long tail (e.g. liability) and claims levels may be increased by inflation suitable assets for rough matching of cash flow on a range of reasonable assumptions do not exist. This indicates that very large margins may be needed here and, because of considerations of profitability, may seriously restrict the amount of such business that any company should retain.

Where a policy decision is taken to invest longer or shorter than the expected term of the liabilities, a mis-matching reserve is implied.

2.3. The numbered sub-paragraphs relate to 1.2.

- (i) Statistical fluctuations in claims contribute to the need for a solvency margin. The amount of margin needed will be determined from a model for the probability of ruin.
- (ii) Identification of possible catastrophes and appropriate re-insurance are the main ways of minimising vulnerability to catastrophe.
- (iii) The possibility of an increasing trend in claims is a further factor requiring a solvency margin. Measurement here is particularly difficult and subjective and all the features of the particular class of business must be considered.
- (iv) Management must give clear instructions relating underwriting procedure to the rating assumptions.

2.4. Reinsurance is one of the most important risk-management tools. It can be used to restrict the vulnerability of a company under all of the headings in 2.3.

One important point is that reinsurance can enable the market to accept risks that no single insurer, however, strong, could cover.

Reinsurance may be used to smooth emergence of profit.

2.5. The solvency margin of a company is conventionally expressed as a proportion of premium income. This, clearly, is not appropriate in relation to some of the risks. For example, variance of claims may be an appropriate measure of the solvency margin required for claims fluctuation risk. Any realistic theoretical model should include components proportionate to premium income, total liabilities and likely variation of claims.

2.6. It is disappointing that quantification of the risks is so difficult. The margins required and, indeed, the reserves themselves require judgements to be made.

This situation leads to the desirability of professional certification of reserves, probably with continued vetting by a supervisory authority.

### 3. Solvency Margin Planning

3.1. The precise reason for maintaining solvency margins is not immediately obvious. Most contingencies, arising from the risks already outlined, can be managed by reinsurance and margins in the reserves. Margins in the reserves may exist as specific claims equalisation reserves or as a result of setting technical reserves on a cautious basis. In addition to these forms of protection, however, an explicit solvency margin is always disclosed in order to demonstrate that failure of the company is very unlikely.

The solvency margin can, therefore, be regarded as a last line of protection for all the interests involved.

3.2. The solvency margin is conventionally expressed as the ratio of free reserves to premium income. The theoretical justification for the use of this measure is weak. Some of the risks mentioned lead to solvency margins which will not be based on premium income. For example, stochastic fluctuations, considered in the context of ruin probabilities, will lead to the need for a free reserve which is a function of the variability of the expected claim distribution.

It must be recognised that the risks involved in an insurance operation are very difficult, or even impossible, to measure and that, therefore, it is unlikely that a desirable solvency margin level can be determined from a statistical analysis.

3.3. The current U.K. statutory minimum solvency margin states that free reserves must be at least:-

20% of first £2.5m plus 10% of balance, applied to premium income net of reinsurance ceded.

E.E.C. directives, not yet in force in the U.K. but expected to come into force in July 1978, specify that free reserves must exceed the greater of:-

- (i) 16% of first £5m plus 16% of balance, applied to gross premium income; and
- (ii) 26% of first £3.5m plus 23% of balance, applied to average of last three years' gross incurred claims

multiplied in each case by the ratio

$$\frac{\text{Incurred claims net of reinsurance ceded}}{\text{Incurred claims gross of reinsurance ceded}}$$

The statutory minimum solvency margin may not be used to meet claims unless the insurer has already been declared insolvent. In practice insurers generally retain margins much greater than the statutory minimum. The acceptable level of free reserves at present, expressed as a proportion of premium income, is in the region of 30-60%.



3.4. The second conclusion in the Company Profitability paper presented at York is:-

"In setting a profit objective, the most meaningful test is to produce a return which will attract external finance to support operations and this depends on the state of the capital markets."

In 4.3.2. of that paper total profitability is related to insurance profit and solvency margin by the equation:-

$$t = f + \frac{i}{s}$$

where t = rate of total return on capital

f = investment return on free assets

i = insurance profit as a proportion of premiums

s = solvency margin on the conventional basis

The solvency margin must, therefore, be planned to be consistent with the overall profit objective.

3.5. A low solvency margin leads to a poor stock market rating. This is a result of expectation of a rights issue or of a takeover of another company (e.g. an investment trust) for shares resulting in earnings dilution. Where a capital-raising exercise is necessary it must be carried out before the solvency margin is lower than the market considers reasonable.

The requirement for a sufficient rate of return could conflict with that for an adequate solvency margin and in practice it will be necessary to plan for an acceptable compromise.

3.6. Maintenance of a high solvency margin seriously restricts premium growth and for this reason a fall in the solvency margin will often be planned.

The reduction in solvency margin from over 100% in the thirties to about 50% now, for the major U.K. companies, illustrates that whether or not such a reduction is planned, it sometimes happens.

3.7. These general considerations, together with the equation in 3.4. suggest several possible decision processes by which a solvency margin might be planned. Possible stages are as follows:-

- (i) The amount of free reserves at the beginning of the control period is known.
- (ii) The range of acceptable solvency margins, given stock market sentiment in relation to current figures, is decided.
- (iii) The range of total premium levels which the free reserves can support is then determined.
- (iv) A forecast can then be made of the level of insurance profit arising from the estimated premium volume.

- (v) The total return on the possible volumes of business can then be estimated.

If any stage suggests an impossible or unsatisfactory target then alternative action, such as a higher than generally desirable solvency margin level, or an increase in free reserves through the capital market, must be considered.

Maximisation of profit over a particular control period is not necessarily a major objective, but will be a factor in an analysis along these lines.

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May 1977

## 1. INVESTMENT POLICY AND PRACTICE

1.1 Reference has been made in several earlier papers to the importance of investment income in the operations of general insurance companies. Furthermore inflation is putting increasing pressure on Company solvency margins. It follows that funds which generate this income are invested in a manner consistent with the nature of the business undertaken. The purpose of this note is to examine the principal factors and constraints affecting the establishment of a company investment policy.

1.2 The investable funds represent the liabilities of the Company, namely:

- a) Insurance funds - the estimated liabilities in respect of insurance contracts assumed i.e. claims reserves and unearned premium reserve less any requirements for working capital; and
- b) Policyholder surplus - the share capital of the Company together with any retained earnings and subordinated loan stock.

1.3 The objectives of the investment policy must then recognise:

- a) the nature of these liabilities and in particular immunise as far as is practicable against increases in inflation,
- b) the extent of the need for investment income to support the insurance profit of the business that has been written to date,
- c) the "Corporate objective", i.e. the extent to which the shareholder requires current or future dividends,
- d) external forces - legislative controls on insurance operations, political pressures.

## 2. INSURANCE FUNDS

2.1 General insurance contracts essentially indemnify the insured against loss either of property or utility, and at the point of premium payment are unlikely to be of fixed monetary amount payable on the happening of the insured event. The ultimate amount of any one claim is, therefore, subject to inflation, both from the date of inception of risk to the date of happening of the insured event, and from the latter date to the date of claim settlement.

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## 2.1 Cont

A major component of the liabilities represents the unearned premium reserve, and to the extent that an obligation could arise eg in liquidation, to pay the UPR as a cash sum to policyholders, this reserve should be invested in assets which are easily marketable and maintain their cash value. However, since on the one hand the UPR normally eventually become earned, and part of the claims reserve, and on the other hand the UPR is partly offset by agents balances, the need to hold such assets is reduced.

2.2 An investment policy must, therefore, be formulated to minimise the adverse effects on the company of inflation on the level of reserve held. Assuming that the claim reserves held at any point in time are deemed "adequate" in current conditions, any change in the expected rate of inflation leads to adjustment to the level of claim reserves required, with consequent profit or loss unless the asset values change by like amount.

2.3 In the absence of an asset whose value can be directly linked to the inflation of insurance claims, alternative investments must be found. Historically the movement of short-term interest rates over time has been roughly in line with the movement in rates of inflation - high inflation is generally accompanied by high rates of interest and vice versa. The yield on longer term bonds is fixed for the term of investment, and does not respond to a change in inflation rate, and short run fluctuations in capital values of property and equity investments make them unsuitable in view of the relatively short term of the liabilities. Consequently deposits or bonds with a term of 1 - 12 months would seem the most appropriate, depending upon the shape of the yield curve at the date of investment. However there are considerable possibilities if the concept of floating rate gilts becomes more popular.

It is perhaps worth giving some indication of the short term nature of the liabilities.

It is estimated that the mean term of liabilities for different lines of business is approximately :-

Line of Business:	Property	Liability	Marine & Aviation	Motor
Approx. mean term:	1-2 yrs	3-5 yrs	1-2 yrs	$\frac{1}{2}$ -1 yr

Traditionally outstanding claims reserves have been invested in real value assets such as equities or property on the theory that this would provide protection against inflation. However, there is no short term guarantee that this will be the case and asset value fluctuations are important given the relatively short life of the liabilities.

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- 2.4 The business of U.K. general insurance companies is world-wide (in 1975 over 60% of premium income related to non U.K. business). Investments should be denominated in currencies to match the liabilities in each country, subject to the following constraints:
- a) At present Bank of England Exchange Controls prevent full matching by currency, by only permitting a proportion of the previous years premium (up to 75%) to be held in overseas currency assets.
  - b) In many countries capital markets are insufficiently developed to permit investment in other than bank or similar deposits, though provided realistic interest rates are paid this may not matter much.
  - c) In certain overseas territories local legislation restricts movement of funds in and out of the country, though this mainly affects profits and catastrophe cover.
  - d) Catastrophe reserves should be held as far as possible in currencies whose value will not be substantially affected by the occurrence of a catastrophe loss.

- 2.5 In practice it may not be possible to determine accurately the liabilities in any one currency,

- a) as a simple example, physical damage to a marine hull can occur anywhere in the world, and the insurance claim could well be paid in a currency other than that in which the cover was written;
- b) the volume of business written in that currency may be small, and significant fluctuations in the level of claims arise.

The only reasonable solution is to ascertain the expected spread of claims by currency based upon experience over the recent few years and invest accordingly. However, floating exchange rates should reduce the seriousness of this problem.

- 2.6 The uneven incidence of claim payments requires that the insurer holds a proportion of liquid assets, in the form of cash or short deposits. In practice some of this liquidity may be provided by the cash flow generated by continuing receipt of premiums; insurers should however always be in a position of being able to pay large claims when they become due and before recoveries are made from reinsurers.

- 2.7 An essential part of insurance operations is the collection and payment of premiums and claims through intermediaries and reinsurers. The balance due to or from these parties will normally be non-interest bearing; their effect is to reduce the amount of funds available for profitable investment.

3. SHAREHOLDERS' OR SURPLUS FUNDS

- 3.1 Shareholders' funds enable it to absorb fluctuations in experience, as well as satisfying the solvency margins set on the one hand by U.K. and E.E.C. regulation and on the other hand by the market place in which the Company operates. Shareholders will expect reasonable return on their investment - whether the earnings are distributed as dividends, or retained to support further growth in business.
- 3.2 The main object as far as shareholders' funds are concerned from the Company's point of view is to preserve their real value in order to continue to be able to write the same volume of business. Hopefully it would of course be nice to do better than this in order to expand business. Consequently the natural investments for shareholders' funds are real value assets such as equities and property. This is by and large borne out by the Company portfolios shown in the Appendix.
- 3.3 Short term fluctuations of monetary values of surplus are only of significance when a company is approaching its minimum operating solvency margin, which will presumably be well in excess of the statutory solvency margin.

#### 4. Practice

4.1 In most companies no attempt is made to segregate the assets representing shareholders and policyholders' (insurance) funds. The extent to which a company departs from a reasonable well matched investment position should be a function of its solvency margin. In particular, decisions to invest substantially in properties or equities can only be justified if the solvency margin is sufficient to absorb a sudden substantial fall in market values without forcing the company's operations to contract or if it is clear that additional funds can be obtained on the capital market to finance any solvency margin shortfall. A present solvency margin of 45% would be indicated to give a reasonable chance that the actual solvency margin would remain at or above 30%. If, for instance, it were judged that the maximum probable fall in equity values was 50% from its present level, and 30% of the assets were in equities. Solvency margins are of course highest when stock markets and property values are at their highest and so have the greatest potential to fall and so, it is important to correlate the potential fall in asset values with the level of stock markets, and not absolute levels of solvency margin.

4.2 In the last few years publicity has been given to the fairly consistent pattern of underwriting losses in the industry. The clear implication of this would appear to be that management accepts the importance of investment income in maintaining corporate profitability.

It is important that investment policy generates the required investment income (correlated to inflation). Consequently policyholder funds must be invested in the appropriate fixed interest assets. Thus the uncertainty of the capital value of equities and properties rules them out for this purpose.

4.3 Few investment managers can now ignore the social responsibility to "act in the interests of the nation" they carry by virtue of the fact that insurance companies have become the largest institutional group of investors in the U.K. Increasing political pressures are applied to ensure "direction" of investments into areas which may be inconsistent with the other objectives and requirements of companies.

4.4 Reference has been made above to the need to match assets and liabilities by currency. It is rarely appreciated however that the solvency margins expressed either as at present as a function of premium, or in some other form as a function of claims reserves, should equally be expressed in terms of different currencies. Exchange controls prohibit a U.K. company writing overseas business in London to hold free reserves outside the U.K. and therefore if non-U.K. premium increases in Sterling terms by virtue of a deterioration in exchange rate, additional free reserves have to be used to support the solvency margin.

## APPENDIX

The following shows the distribution of assets of 7 large UK non-life insurers. In general policyholder surplus and a small proportion of policyholder funds tend to be invested in real value assets. The remainder being invested in bonds and mortgages. As all the information has been taken from published data no information is available about the length of life of the fixed interest assets. However, it is probable that the life is longer than we suggest should be the case.



COMPANY 1

	<u>As % of Non-life premiums</u>	<u>As % of Free Reserves</u>	<u>As % of Total Assets</u>
Ordinary Shareholders Funds (book)	27.7	56.1	13.3
Revaluation Reserve	<u>18.2</u>	<u>36.9</u>	<u>8.8</u>
Net Worth	46.0	93.0	22.1
Minorities & Pref.	<u>3.5</u>	<u>7.0</u>	<u>1.7</u>
Free Reserves	49.4	100.0	23.8
Loan Stock	11.2	22.7	5.4
Unearned Premium	33.3	67.4	16.0
Outstanding Claims	86.2	174.4	41.5
Creditors	<u>27.7</u>	<u>56.1</u>	<u>13.3</u>
	207.9	420.6	100.0
Fixed Interest	46.1	93.3	22.2
Ordinary Shares	36.3	73.5	17.5
Property	29.6	60.0	14.3
Mortgages & Loans	<u>19.7</u>	<u>39.9</u>	<u>9.5</u>
Total Investments	131.9	266.8	63.4
Land for development & work in progress	5.7	11.6	2.8
Deposits & Cash including bank balances	21.7	43.9	10.4
Debtors	<u>48.6</u>	<u>98.3</u>	<u>23.4</u>
Total	<u>207.9</u>	<u>420.6</u>	<u>100.0</u>

COMPANY 2

	<u>As % of Non-Life premiums</u>	<u>As % of Free Reserves</u>	<u>As % of Total Assets</u>
Ordinary Shareholders Funds (Book)	35.4	56.1	17.5
Excess of Market over book	<u>27.2</u>	<u>43.2</u>	<u>13.4</u>
Net Worth	62.6	99.3	30.9
Minorities	<u>0.4</u>	<u>0.7</u>	<u>0.2</u>
Free Reserves	63.0	100.0	31.1
Loan Stock	0.5	0.7	0.2
Unearned Premium	39.0(a)	54.5	16.9
Outstanding Claims	72.8(a)	101.5	31.5
Marine Fund	143.1(b)	27.4	8.5
Creditors	<u>23.7</u>	<u>37.6</u>	<u>11.7</u>
	<u>202.8</u>	<u>321.7</u>	<u>100.0</u>

(a) to fire and accident premiums only

(b) to Marine premiums

Fixed Interest	53.6	85.0	26.4
Ordinary Shares	37.3	59.2	18.4
Property	20.2	32.0	9.9
Mortgages & Loans	<u>2.7</u>	<u>4.2</u>	<u>1.3</u>
Total Investments	113.7	180.3	56.1
Excess of market over book	27.2	43.2	13.4
Deposits & cash incl. bk. bal.	22.3	35.4	11.0
Subsidiary note on solidated	0.3	0.4	0.1
Debtors	<u>39.3</u>	<u>62.3</u>	<u>19.4</u>
Total	<u>202.8</u>	<u>321.7</u>	<u>100.0</u>

COMPANY 3

	As % of non-life premiums written	As % of Free Reserves	As % of Total Assets
Shareholders Funds at book excluding pref.	23.5	65.4	11.7
Excess of market values over book	9.2	25.8	4.6
Extreme weather provision	2.3	6.5	1.2
Net Worth	35.0	97.7	17.5
Minorities & Pref.	0.6	1.7	0.3
Deferred Tax	0.2	0.6	0.1
Free reserves	35.9	100.0	17.9
Loan Stock	24.2	67.5	12.1
	60.1	167.5	30.0
Unearned Premiums	33.7(a)	88.2	15.8
Outstanding claims reserves	92.5(a)	241.8	43.3
Marine & Aviation	137.0(b)	24.1	4.3
Creditors	13.2	36.8	6.6
	200	558.3	100
(a) to Fire & Accident premiums only			
(b) to Marine Premiums only			
Fixed Interest	74.4	207.6	37.2
Ordinary Shares	30.2	84.3	15.1
Property	21.0	58.5	10.5
Mortgages & Loans	23.6	65.8	11.8
Deposits & Cash including bank balances	14.3	39.9	7.1
	163.5	456.0	81.7
Debtors (c)	36.7	102.3	18.3
	200.2	558.3	100.

(c) includes funds owing from life fund.

COMPANY 4

	<u>As % of Non-life premiums</u>	<u>As % of Free Reserves</u>	<u>As % of Total Assets</u>
Ordinary Shareholders Funds (Book)	28.0	60.4	13.9
Excess of Market over book	<u>14.7</u>	<u>31.7</u>	<u>7.3</u>
Net Worth	42.6	92.0	21.1
Minorities	<u>3.6</u>	<u>7.8</u>	<u>1.8</u>
Free Reserves	46.3	100.0	23.0
Unearned Premiums	32.1(b)	60.9	14.0
Outstanding Claims	29.0	150.0	34.4
Marine Fund	126.8(c)	33.2	7.6
Creditors	<u>42.4</u>	<u>91.6</u>	<u>21.0</u>
Total	<u>201.7</u>	<u>435.7</u>	<u>100.0</u>

(b) to Fire & Accident premiums only

(c) to Marine and aviation premiums only

Fixed Interest	60.2	130.0	29.8
Ordinary Shares	26.6	57.5	13.2
Property	19.5	42.2	9.7
Mortgages & Loans	<u>11.9</u>	<u>25.7</u>	<u>5.9</u>
Total Investments	118.2	255.4	58.6
Excess of Market over book	14.7	31.7	7.3
Deposits & Cash incl bk. bal.	22.9	49.6	11.4
Shares in subsidiary not consolidated	0.1	0.3	0.1
Debtors	<u>45.7</u>	<u>98.7</u>	<u>22.7</u>
Total	<u>210.7</u>	<u>435.7</u>	<u>100.0</u>

COMPANY 5

	As % of non-life premiums	As % of Free Reserves	As % of Total assets
Ordinary shareholders Funds (Book)	34.1	66.6	15.6
Excess of Market over book	13.6	26.5	6.2
Net Worth	47.7	93.0	21.8
Minorities & Pref.	3.6	7.0	1.6
Free Reserves	51.2	100.0	23.4
Loan Stock	3.6	7.0	1.6
Unearned Premium	42.8	76.6	17.9
Outstanding claims	90.1	161.2	37.7
Marine Fund	148.1	24.0	5.6
Creditors	29.9	58.3	13.6
	218.9	427.1	100.0
Fixed Interest	53.8	105.0	24.6
Ordinary shares	38.3	74.8	17.5
Property	18.6	36.3	8.5
Mortgages & Loans	9.9	19.3	4.5
Total Investments	120.6	235.3	55.1
Excess of Market over book	13.6	26.5	6.2
Net Deposits & Cash including bank balances	22.9	44.7	10.5
Groveswood	12.4	24.3	5.7
Associates & Interest in life fund	10.7	20.9	4.9
Debtors	38.7	75.5	17.7
Total	218.9	427.1	100.0

COMPANY 6

	As % of Non-life premiums	As % of Free Reserves	As % of Total Assets
Shareholders Funds (Book)	27.3	64.0	15.4
Excess of market over book	15.3	35.7	8.6
Minorities	<u>0.1</u>	<u>0.3</u>	<u>0.1</u>
Free Reserves	42.9	100.0	24.1
Secured Loan Stock	0.4	0.9	0.2
Unearned Premiums	35.9	84.0	20.2
Outstanding Claims	82.9	194.1	46.7
Creditors	<u>15.4</u>	<u>36.1</u>	<u>8.7</u>
	<u>177.0</u>	<u>415.0</u>	<u>100.0</u>
Fixed Interest	87.6	205.2	49.4
Ordinary Shares	23.6	55.3	13.3
Property	6.4	15.0	3.6
Mortgages & Loans	<u>3.9</u>	<u>9.1</u>	<u>2.2</u>
Total Investments at book	121.5	284.5	68.5
Excess of market over book	<u>15.3</u>	<u>35.8</u>	<u>8.6</u>
	136.8	320.3	77.1
Deposits & Cash incl. bk bal.	7.3	17.0	4.1
Associates	0.7	1.7	0.4
Debtors	<u>32.5</u>	<u>76.1</u>	<u>18.4</u>
Total	<u>177.0</u>	<u>415.0</u>	<u>100.0</u>

COMPANY 7

	<u>As % of Non-life premiums</u>	<u>As % of Free Reserves</u>	<u>As % of Total Assets</u>
Ordinary Shareholders Funds (Book)	30.5	53.4	16.6
Excess of market over book	<u>26.2</u>	<u>45.9</u>	<u>14.3</u>
Net Worth	56.7	99.3	30.9
Minorities & Pref.	<u>0.4</u>	<u>0.7</u>	<u>0.2</u>
Free Reserves	57.1	100.0	31.2
Loan Stock	2.9	5.1	1.6
Unearned Premium	40.6(a)	68.8	21.4
Outstanding Claims	71.4(a)	121.0	37.7
Marine Fund	118.4(b)	6.7	2.1
Creditors	<u>11.0</u>	<u>19.3</u>	<u>6.0</u>
	183.3	320.9	100.0

(a) to fire and accident premiums only

(b) to marine premiums

Fixed Interest	67.6	118.3	36.9
Ordinary shares	33.3	58.3	18.2
Property	8.9	15.6	4.9
Mortgages & Loans	<u>2.8</u>	<u>4.9</u>	<u>1.5</u>
Total Investments	112.5	197.0	61.4
Excess of market over book	26.2	45.9	14.3
Deposits & Cash incl bank bal.	20.0	35.1	10.9
Debtors	<u>24.5</u>	<u>42.9</u>	<u>13.4</u>
Total	<u>183.3</u>	<u>320.9</u>	<u>100.0</u>