SOME NOTES ON THE LONDON MARKET

The three papers that follow cover some aspects of reinsurance business written in the London Market. They are not meant to depict the main or even the most important features. They are simply samples that have been produced by a group of actuaries working actively in that field:

Stewart Coutts
David Craighead
Fred Duncan
Nancy Einck
Peter Green
David Hart
Ray Hunter
Graham Lyons
Peter Matthews
Stephen Mathers
John Ryan
Sally Schreiber
John Sutton

THE LONDON MARKET

Background

Until 1982, only a very small minority of delegates at GIRO conferences had any experience of the London Market. Reference to the particular problems inherent in any actuarial/statistical analysis of business emanating from this market reflected this lack of involvement, being infrequent and usually met with somewhat stilted discussion resulting from lack of comprehension by the majority whose experience was confined to the UK domestic market.

Some change has been noted at the last two meetings, and although the vast majority still have no experience of the London Market, the number who have moved into this challenging area of general insurance has increased substantially. The impact has been heightened at GIRO meetings by the fact that the group of actuaries with market experience includes some of the more vociferous members, with the result that at Bristol last year the special interests of London Market actuaries appeared to assume a significance out of proportion to the numbers involved. However, it was still apparent that there was a "credibility gap", which reflected the differing background of the participants.

Against this background it seemed sensible that part of the paper on "London Market topics" commissioned for the 1984 GIRO seminar should take the form of a basic description of what the London Market is, and in what ways it fundamentally differs from the domestic market where the majority of non-life actuaries have their base.

What is the London Market?

The terms London Market and London Reinsurance Market appear to be virtually synonymous, although not all the business involved is, in fact, reinsurance. The principal distinguishing feature of the London Market is that business is generally placed by means of the Lloyd's system described so well in Craighead's Institute paper (1). Nevertheless, there is undoubtedly a 'grey area' of business placed wholly with individual London Market companies rather than on the traditional 'slip', but this is not a significant part of the total, and will not be discussed further in this paper.

The London Market forms an important part of the world reinsurance market, and as such is a major source of UK invisible earnings, being the principal medium through which overseas insurance business is brought into this country.

Market Size and Composition.

The London Market is centred around Lloyd's and includes the majority of the business written by Lloyd's syndicates, although not all, since the UK personal lines business written by a few Lloyd's syndicates cannot strictly be termed London Market business.

After allowing for this 'rump', it is estimated that the Lloyd's syndicates (around 375 in number) involved write something like £4000m of premium income in the London Market. In addition, there are a considerable number of companies active in the London Market. These fall into a number of categories:

(a) A small number of large professional reinsurance companies, both of United Kingdom origin and of European origin, writing through UK branch organisations (e.g. Mercantile and General, Victory, Munich Re)

(b) The 'Home Foreign" or Reinsurance Departments of UK composite companies. Increasingly these Departments are being 'hived off' as subsidiary companies. Such companies include Home and Overseas (Eagle Star), British and European (Commercial Union), and Guildhall (Sun Alliance) as well as those whose names immediately relate to the parent company (e.g. General Accident Reinsurance Co. and Royal Reinsurance Co.)

(c) An extremely large number (possibly 120) of UK subsidiaries (or branches) of overseas insurance or reinsurance companies. To an increasing extent the branches are being converted into subsidiaries. The parent companies are extremely widespread geographically but there are considerable concentrations in United States, Japan, Scandinavia and the EEC. Most (but not all) such companies are designated (Parent's Name) Insurance Co. (UK) Ltd. In some cases the parent company is state-owned in the country of origin.

(d) Captive companies owned by UK or overseas industrial companies. Examples of this type include Athel Reinsurance Co. (Tate & Lyle) and GTE Insurance Co. (GTE Corporation, US)

(e) Small professional reinsurance companies set up by (or taken over by) large broking firms for the specific purpose of transacting London Market business. Such companies include River Thames (Sedgwicks), Sphere Drake (Howdens) and Sovereign Marine & General (Willis Faber). Following the move to separate broking and underwriting concerns under the new Lloyd's Act, at least one major broking firm has started selling off its insurance company subsidiaries, and this may spread further.

(f) Pools, or companies partly owned by a group of insurance or reinsurance companies. The parent companies may be UK companies as in the case of British Aviation Ins. Co., or overseas insurance companies (e.g. Scan Re Ins. Co.) or a mixture of the two (e.g. Community Re).

(g) A few small, or fairly small, independent London market companies (e.g. Walbrook).

Some of the companies are represented by managing agents who underwrite for a group of companies, usually as a single entry, each company in the group bearing a fixed proportion of the total "stamp" on each risk on which the managing agent participates. The companies involved are generally those in categories (c), (d), (e), or (f) above. The number of companies covered by a managing agency generally varies between 2 and about 8.

In this way, small companies are able to participate in the London Market without undergoing the expense of having to set up an independent organisation. However, it is noticeable that, in general, business written by managing agencies is not particularly profitable, with average loss ratios appearing to be rather higher than those in the overall market.

The overall number of underwriting units participating in the London Market is probably around 700, but this figure should be taken in the context that a large proportion of all risks are shared on the 'slip' basis, with some slips including well over 100 underwriting units, possibly including some overseas organisations without underwriting facilities in London, but added to the slip by the broker following cabled agreement with the company's overseas representatives.

As in most markets, underwriters tend to specialise in particular sectors of the overall market, but not usually to the exclusion of all other business. This specialisation is usually by class of business, but can be made more specific by geographic area.

The degree of involvement in the London market is not directly related to the size of the underwriting organisation concerned - for some of the smaller ones, the London Market is their only source of business, whereas, for some of the larger ones, only a very small proportion of their overall business emanates from this source.

TYPE OF BUSINESS INVOLVED

The business placed in the London Market originates from all parts of the world and the risks are likewise spread across the world and even beyond (e.g. satellite insurance).

The majority of the overseas business is in the form of reinsurance, the London Market providing the additional capacity required beyond that available in the local market. Naturally, in view of the distribution of insurable values, a large proportion of the business arises from the western industrialised countries, particularly from Europe and North America, but there are also quite substantial premium volumes arising from some third world countries.

As a result of the multinational nature of the business, there is a similar spread of currencies; a later section of this paper refers to the currency problem and a couple of particular aspects with an actuarial content.

The principal class of business divisions used by most London Market underwriting organisations are the very broad ones as follows:-

(a) Aviation
(b) Marine
(c) Non-Marine, which embraces the traditional fire and accident (or property and casualty) classes and includes the majority of the more esoteric covers placed in the London Market. Non-Marine is usually further segregated between property and casualty, although there is inevitably a grey area where business is not readily identified as specifically property or specifically casualty. Non-marine business is also traditionally divided between US and non US business, the former tending to be of a longer-tail nature. There is, in fact, an increasing trend, as in the domestic market, for packaged deals which embrace more than one major business category.

Within each of these classes, it is usually considered most important to segregate between:-

(i) Direct business
(ii) Facultative Reinsurance
(iii) Proportional Treaty Reinsurance
(iv) Non-proportional Treaty Reinsurance

Such a division almost always takes priority over any analysis by more detailed class of business; however it is usual to provide for some further differentiation between classes. Such division tends to be much less detailed than traditionally encountered in the UK domestic market. For treaty reinsurance business, in particular, the degree of coding is necessarily limited, as many of the treaties involve reinsurance of a wide range of underlying classes of business.

The prinicipal object of such division is usually to obtain an approximation to an analysis by length of tail, although such a concept is not always easy to define. It is not even necessarily true that property business is short-tail and casualty business long-tail.

In addition to the classes of business normally found within the portfolio of a UK domestic insurer, there are, as suggested above, some more unusual insurances which fall into three main categories:-

(i) Classes which arise from the nature of the London Market as a part of the world reinsurance market. These include catastrophe insurances of various kinds and London Market Excess of Loss business (LMX). It is in this latter business that the problems of accumulation are most intractable and where the 'incestuous' nature of the market, referred to by Craighead (1) becomes most severe. However, it should be emphasised that not all Underwriting Organisations write LMX business, any more than they all write any other type of business; there is a tendency to specialise in a few types of business, although usually not to the exclusion of all others.

(ii) Classes in which the London Market has established a reputation as the leading, if not the only, world market. These include insurances on new technological advances such as satellites and oil rigs, insurances of a political nature such as war, riot and 'kidnap and ransom', and the most esoteric insurances such as film stars' legs and golfing 'holes-in-one'.

(iii) Classes of overseas business which arise out of the different administrative and legislative frameworks found in other countries. Here, in particular, the United States has several classes of business which are relatively unimportant in most other countries, although there is a tendency for at least some of them to spread elsewhere. Classes such as medical malpractice insurance and Directors and Officers Liability have their roots in the litigation-conscious USA.

Accounting and Statistical Background.

The majority of London Market underwriters subscribe to one of the three corporate accounting bodies:

Lloyd's Policy Signing Office (LPSO) - for Lloyd' syndicates
Institute of London Underwriters (ILU) - for Marine business written by company underwriters.

and
Policy Signing and Accouting Centre (PSAC) - for non-marine business written by company underwriters.

These three bodies take the 'slip' entries on behalf of their subscribers, and translate them into a computerised record which provides the basic source of accounting and statistical data, using the coded reference inserted on the slip by each subscribing underwriter alongside his signature, and the percentage of the slip written.

The normal procedure is for the LPSO, ILU and PSAC to produce the required accounting and policy documents and then to provide a varying degree of basic statistical information on the medium of either punched cards or magnetic tape.

It is then left to the underwriting orgainsation to make their own arrangements for any more sophisticated statistical analysis using their own computer facilities or an outside data processing bureau.

As far as accounting is concerned, virtually all marine business and a very considerable proportion of non-marine (including all that written at Lloyd's) is accounted for on a 3-year accounting basis.

Lloyd's and many of the London Market companies keep their accounts in three currencies, sterling, U.S. dollars and Canadian dollars. However, it is believed that some of the London Market companies have a considerably greater number of settlement currencies.

At this stage, no further comments will be made on the imoact of currencies in the London Market and the problems of exchange fluctuations, in view of the major section on currencies later in this paper.

Involvement of Actuaries

It has already been noted that the number of actuaries working in the London Market has increased substantially over the last couple of years. It is almost inevitable that this trend will continue since:-

(a) there is considerable scope for such additional employment.

(b) the existence of an actuary on one side during a negotiation is liable to unbalance matters, giving an incentive for the other parties to the negotiations to have actuarial advice available to them also.

(c) most of the American casualty/property companies who code substantial portfolios of reinsurance to the London Market already employ actuaries, giving argument (b) above an initial impetus.

The underlying types of work being carried out by London Market actuaries are similar to those familiar to other non-life actuaries, although the precise details will differ because of the peculiarities of the environment. Such work will fall into some or all of the following categories:-

(a) Pricing
(b) Reserving
(c) Reinsurance program planning
(d) Improvements to, and analysis of, data bases
(e) General mathematical, statistical and actuarial matters

Each of these five sections will now be considered in turn to give some idea of the principal factors which affect this work in the London Market and the differences from similar work in the domestic market.

(a) Pricing

Actuaries are unlikely to be able to provide a great deal of assistance in the rating decision on direct and facultative London Market business, because the risks tend to be insufficiently homogeneous to provide an adequate data-base and the degree of detail in the coding is inadequate to cover the relevant rating factors. In any event, such business tends to be rated in a brief discussion between the broker and the underwriter (at the Box, in the case of Lloyd's underwriters).

However, when it comes to rating treaties, the data available can be quite sophisticated and the time available to analyse them is rather longer, ranging from a couple of days to a couple of weeks.

The information given usually includes the history of the treaty to date, often including a triangulation of the development of the different treaty years, an analysis of the current portfolio and details of the cover to be provided. Further information can sometimes be obtained if it is considered necessary.

Three particular points of note on rating are that:-

(i) involvement with brokers is much greater than in the domestic UK market - this is an indication that a London actuary is likely to be much nearer the "sharp end" then a traditional non-life actuary. This may be due, at least in part, to the much smaller number of staff employed by London Market Underwriters.

(ii) more credibility tends to be given to past results than appears justified - this is perhaps not entirely surprising , but neither is it wholly unjustified, on the grounds that there is a surprising degree of 'continuity' in relationships between reinsured and reinsurer, even in the current "cut-throat" market.

(iii) expense loadings, other than brokerage, tend to be ignored, but the expense margins are generally fairly low, often of the order of 3-5%. This can be attributed to the low overheads and high volume of business written per employee. These low overheads are in spite of the extremely high rents within 300 yards of Lloyd's, where it is essential for any aspiring underwriter to have accommodation, as brokers are generally unwilling to take slips further than necessary to complete the placing. Thus an underwriter further away is likely to be offered only the poorer quality 'rejected' business.

Incidentally, another consequence of the low overheads is the flexibility which enables underwriting organisations to move into and out of the market, a factor which explains the frequent changes in market composition. Some examples of rating analysis form a later section of this paper.

An appreciation of reserve adequacy plays a very important part in the pricing of London Market business.

(b) Reserving

Most London Market underwriters produce results only annually, so the reserving exercise tends to be a reflection of this. What is more, much of the business is written on a 3-year basis which would appear to considerably reduce the scope of the problem.

However:-

(i) the length of tail involved in some classes is such that the problems remaining after year 3 can be much greater than those generated on a direct portfolio using 1-year accounting.

(ii) the degree of analysis of the portfolio tends to be inadequate to permit separate calculations on reasonably homogeneous subsets of the portfolio - an attempt to achieve a traditionally acceptable degree of homogeneity would probably result in lack of statistical validity.

(iii) the complexity of reinsurance protections, and their variability from year to year causes major problems. It is, for example, not uncommon to protect the entire net account with an excess-of-loss program in various layers, some layers with aggregate limits, some having aggregate deductibles and others having both (or neither). The changes in such arrangements from year to year can grossly distort the run-off patterns.

(iv) It is very important to ensure that the open years are considered seriously to ascertain whether it appears likely that the fund is adequate to meet the open year liabilities. This is particularly important in the current unprofitable state of the world insurance and reinsurance markets, and is an area of the work where inadequate attention has traditionally been concentrated.

(c) Reinsurance

It is common for London Market companies to buy a great deal of reinsurance protection of various types, often ceding over half the original premium for this purpose.

In purchasing such substantial amounts of cover, it is important that every attempt is made to obtain value for money, and undoubtedly an actuary is able to assist in evaluating the relative benefits of various alternative proposals, as well as introducing further ideas as to the structure of the reinsurance program.

Historically such reinsurance has often been placed without any great thought regarding the security provided by the proposed reinsurers, particularly bearing in mind that on some long-tail business, the claims recoveries will still be taking place after 20 years, it is necessary to have regard to the long-term security of the proposed reinsurers. Whilst it is often impossible to obtain adequate information to completely evaluate these reinsurers, an actuary can inevitably make a substantial contribution in evaluating the reinsurers with a view to eliminating the less secure.

(d) Data bases

As already indicated, the degree of detail possible in analysing London Market business is considerably less than could be contemplated in setting up a data-base for a U.K. motor account. However, it is certainly true that the level of refinement which is achieved falls far short of what is possible, so it is likely that a great deal of effort will be put into improvements in the data base over the next few years. At the same time, there is expected to be a trend towards more London Market underwriters using their own computer facilities, and further improvements are likely to be incorporated in the data bases as they are transferred in-house. An actuarial input to these movements appears a highly desirable one.

(e) General matters

The presence of an actuary within an organisation not used to employing actuaries inevitably results in a tendency for most, if not all, matters of a mathematical, statistical or actuarial nature being referred to him/her.

Such matters do not fall into any particular category, but can be extremely interesting and form useful input to the process of learning and understanding the construction and working of the London Market.

It is hoped that this introduction, whilst by no means giving a complete coverage of any aspect of the London Market, has given the reader some 'flavour' of this challenging environment, and possibly cleared up a few misunderstandings.

Bibliography

D. H. Craighead - Some Aspects of London Reinsurance Market in World-Wide Short Term Business.

MEDICAL MALPRACTICE EXCESS OF LOSS

This paper uses two hypothetical case studies to highlight some of the important principles which must be considered when rating and reserving London Market, medical malpractice, excess of loss, treaty business. Most of the points are also applicable to other casualty classes.

In order not to cloud the main principles the case studies have been made somewhat simpler then one would normally encounter in practice. For example I have not included any changes in cover over past years nor the effect of changes in claims estimating practice. Also one often finds that the treaty would give more complex cover than a straightforward $250,00 XS $250,000. One section of the treaty might give 250/250 protection within the $500,000 primary limits and another section might give excess cessions coverage (see below) for excess limits and/or a stop loss cover.

Both the case studies are non-indexed. The complexities of indexed casualty excess of loss should be covered by another paper.

Both the studies are assumed to cover physicians malpractice. 'Doctor-year' has been used as a measure of exposure. In practice, many doctors specialise in particular fields of practice and these can produce very different experiences. In the USA, if the primary rating has been based on an actuarial study, one often finds that exposure in available on a 'class 1 equivalent' basis i.e. the doctor-year exposure being adjusted for the relative experience of the different 'classes' of doctors, as defined by the ISO (Insurance Services Office). For hospitals malpractice, one might use 'bed-year' as a measure of exposure.

An actuary involved in rating London Market business needs to be aware of three basic requirements

(a) Speed - Brokers and underwriters are usually looking for rate indications within a few days of the receipt of the data.

(b) Data - One has to learn to adapt or design models to suit the data which is presented by the Broker. Very little, if any, additional data will be available.

(c) Simplicity - Underwriters and Brokers have more confidence in rates derived using methods which they can readily understand.

Case Study A

Details of Risk

(a) Physicians medical malpractice, excess of loss reinsurance, $250,000 XS $250,000.

(b) Flat rated - i.e. calculated as a fixed percentage of the original premium income.

(c) Non-indexed

(d) Occurrence form

(e) Layer covers indemnity and allocated loss adjustment expense (ALAE).

Data Provided

(a) Incurred loss develpment to the layer.

(b) Paid loss development.

(c) Development of number of losses reported to the layer.

(d) Development of number of losses closed.

(e) Details of losses reported to the layer which were settled during the past five years with the outstanding estimate at previous year ends.

(f) Gross premium income for each year with estimate for the year to be rated.

(g) Doctor-year exposure for each year with estimate for the year to be rated.

(h) Since this layer is only part of a reinsurance programme, the same information is available for the next layer i.e. $500,000 XS $500,000.

Development of Rating Model

Most reinsurance programmes are effective from 1st January and placed during the latter part of the previous year. It is common that development data presented in triangular form shows diagonals representing the year end position except for the latest diagonal, which shows the third quarter. It is necessary to gross up the latest three quarters' movement to give an estimated year end position, otherwise one would be projecting from too low a base which could make a significant difference to the result.

The objective of this rating model is to produce an underwriting break even. There is no allowance for investment income but no specific contingency margin.

Appendices 1 and 2 show analyses of the development of number of claims reported for both the 250/250 and the 500/500 layers. In some places the data is extremely scanty. The assumed model development factors therefore include a large measure of subjective judgement. No attempt has been made to apply development factors to the latest year on layer 1 or the latest 2 years on layer 2.

From claims settled during the previous five years:-

1st Layer

Settlement Year	No. Settled	No. with payment to layer	% with payment	Average payment to layer ($,000)
1979	100	44	44%	120
1980	97	45	46%	128
1981	115	49	43%	145
1982	121	50	41%	180
1983	101	44	44%	129
TOTAL	534	232	43%	141

2nd Layer

Settlement Year	No. Settled	No with payment to layer	%with payment
1979	7	3	43%
1980	6	5	83%
1981	12	11	92%
1982	12	9	75%
1983	10	7	70%
	47	35	74%

Expressing expected ultimate reported claims as a rate on doctor-year exposure:-

Underwriting Year	Doctor-year Exposure	First layer Ult.Rep.losses (See Appendix 1)	%	Second layer Ult.Rep.losses (See Appendix 2)	%
1971	2,923	19	0.650	3	0.103
1972	3,022	21	0.695	3	0.099
1973	4,787	36	0.752	5	0.104
1974	5,122	46	0.898	5	0.098
1975	6,502	58	0.892	15	0.231
1976	9.895	94	0.950	22	0.222
1977	10,783	124	1.150	24	0.223
1978	13,964	155	1.110	30	0.215
1979	12,960	162	1.250	40	0.309
1980	17,000	221	1.300	42	0.247
1981	17,630	250	1.418	49	0.278
1982	17,744	269	1.516		

The first layer frequency has been increasing by an average of approximately 8 1/2% pa. The second layer frequencies have been more variable but over the later years shown the average increase is not inconsistent with 8 1/2% pa also.

Assuming both frequencies increase at 8 1/2% p.a. we can project 1984 loss frequencies as follows:-

Underwriting Year	Doctor-year Exposure	First layer Frequency %	Proj No. Loss Rep	Second layer Frequency %	Proj No. Loss Rep
1982	17,744	1.516	269	0.302	54
1983	17,200	1.645	283	0.327	56
1984	16,750(est)	1.785	299	0.355	59

Assuming 45% of first layer reported claims are settled with payment, 75% of second layer claims are settled with payment and that claims which are not a total loss to the first layer are evenly spread throughout the layer, we can estimate the 1984 loss cost as :

$$250{,}000.\left(\frac{299.0.45 \; + \; 59.0.75}{2}\right)$$

$$= \quad \$22{,}350{,}000$$

Estimated original gross premium income for 1984

$$= \quad \$170\text{m}$$

Allowing 20% for brokerage and expense

$$\text{Rate} = \frac{22.35}{0.8.170}$$

$$= \quad \underline{16.4\%}$$

DEVELOPMENT OF NUMBER OF CLAIMS REPORTED $250,000 XS $250,000 APPENDIX 1

Underwriting Year	Development Year 1	2	3	4	5	6	7	8	9	10	11	12	13	Proj Ult.
1971	0	5	7	12	12	16	17	17	17	19	19	19	19	19
1972	1	4	8	12	15	15	16	17	18	18	19	20		21
1973	0	8	19	24	25	27	29	31	32	34	34			36
1974	0	11	22	29	37	40	41	42	42	43				46
1975	2	15	32	37	41	45	49	49	53					58
1976	0	20	40	51	66	73	78	83						94
1977	0	27	54	69	91	97	104							124
1978	1	42	71	90	109	121								155
1979	0	41	80	110	115									162
1980	2	43	96	131										221
1981	1	58	110											250
1982	0	59												269
1983	3													

	3/2	4/3	5/4	6/5	7/6	8/7	9/8	10/9	11/10	12/11	13/12	Assumed Ult/13
Latest 3)	1.951	1.268	1.319	1.107	1.089	1.024	1.032	1.000	1.000	1.000	1.000	
link ratios)	2.230	1.375	1.211	1.066	1.068	1.000	1.000	1.063	1.056	1.053		
	1.897	1.365	1.045	1.110	1.072	1.064	1.082	1.024	1.000			
Average	2.026	1.336	1.192	1.094	1.076	1.029	1.038	1.029	1.019	1.026	1.000	
Model	2.000	1.350	1.200	1.100	1.075	1.050	1.035	1.025	1.020	1.015	1.010	1.020
Cumulative	4.552	2.276	1.686	1.405	1.277	1.188	1.131	1.093	1.067	1.046	1.030	1.020

DEVELOPMENT OF NUMBER OF CLAIMS REPORTED $500,000 XS $500,00

APPENDIX 2

Underwriting Year	Development Year 1	2	3	4	5	6	7	8	9	10	11	12	13	Proj. Ult.
1971	0	1	1	2	2	2	2	2	2	2	3	3	3	3
1972	0	0	0	1	1	2	3	3	3	3	3	3		3
1973	0	1	1	2	3	3	3	4	4	5	5			5
1974	0	1	2	2	2	4	4	4	5	5				5
1975	0	1	4	5	10	11	12	13	13					15
1976	0	0	2	9	12	13	15	18						22
1977	0	2	7	10	11	12	18							24
1978	0	4	7	15	18	20								30
1979	0	5	12	19	23									40
1980	0	5	11	20										42
1981	0	4	13											49
1982	0	6												
1983	0													

	4/3	5/4	6/5	7/6	8/7	9/8	10/9	11/10	12/11	13/12	Assumed Ult/13
Latest 3)	2.143	1.100	1.083	1.091	1.000	1.000	1.000	1.500	1.000	1.000	
link)	1.583	1.200	1.091	1.154	1.083	1.250	1.025	1.000	1.000		
ratios)	1.818	1.211	1.111	1.500	1.200	1.000	1.000	1.000			
Average	1.848	1.170	1.095	1.248	1.094	1.083	1.083	1.167	1.000	1.000	
Model	1.800	1.200	1.150	1.125	1.100	1.080	1.060	1.040	1.020	1.010	1.000
Cumulative	3.770	2.095	1.746	1.518	1.349	1.227	1.136	1.071	1.030	1.010	1.000

Case Study B

Details of Risk

(a) Physicians medical malpractice, excess of loss reinsurance, $250,000 XS $250,000.

(b) Burning cost rated. Burning cost premium calculated as 5/4 ths of losses incurred to the 250/250 layer subject to a minimum of 5% of written premium income and a maximum of 20% of written premium income. [These rates have been fixed by the leading underwriter.]

(c) Non-indexed.

(d) Claims made form.

(e) Layer covers indemnity only. ALAE are pro rata in addition to indemnity.

(f) Commutation option exercisable from 36 months after the expiry of the risk period on a basis of 100% of outstanding claims, as estimated by the reinsured's claims assessors. If the burning cost rate is less then the maximum, commutation can be excercised by either party. While the rate is greater then the maximum, only the reinsurer can excerise the option.

Data Provided

(a) Incurred loss development to the layer.

(b) Paid loss development.

(c) Numbers of incurred losses to the layer (i.e. closed with payment to the layer or with reserves to the layer) at the previous third quarter and at the two previous year ends.

(d) Written premium income for each year with estimate for the year to be reinsured.

(e) Doctor-year exposure for each year with estimate for the year to be reinsured.

Other Information

It is common with this type of burning cost case for the reinsurer to employ an independent claims assessor to ensure that burning cost premiums are based on realistic estimates of outstanding claims. Development data for items (a) and (c) above is available for both claims assessments.

The burning cost maximum and minimum premiums are based on written premiums for $500,000 limits. Liabilities higher than $500,000 are covered by a separate "excess cessions" reinsurance where the excess limits premiums are passed automatically to the reinsurer who takes over the liabilities.

Development of Model

The purpose of the model is to assess the likely burning cost premium.

Average incurred cost to the layer at the 3rd quarter 1983 was:-

Underwriting Year	Reinsured's Assessment		Independent Assessment	
	No. inc.	Average inc ($000)	No. inc.	Average inc ($000)
1971	8	235	8	235
1972	8	239	8	239
1973	14	213	14	213
1974	18	247	18	247
1975	24	220	24	220
1976	40	229	40	229
1977	55	205	55	205
1978	70	245	70	245
1979	70	215	70	215
1980	93	220	98	219
1981	92	227	100	218
1982	90	222	100	230
1983	25	219	35	220
TOTAL	607	224	640	223

1979 and prior underwriting years have been commuted and are therefore the same for both reinsured and independent assessments.

It would seem reasonable to assume an average cost to the layer of $225,000 for 1984.

We can estimate the ultimate number of claims to the layer using the reinsured's own loss estimates as follows:-

Underwriting Year	Development Year 1	2	3	4	5	Proj Ult.
1979			66	69	70	70
1980		83	89	94		95
1981	48	86	94			100
1982	34	95				111
1983	43					116
Link Ratios	1.792	1.072	1.045	1.014		
	2.794	1.093	1.056			
Average	2.293	1.082	1.051	1.014		
Model	2.300	1.100	1.050	1.015		
Cumulative	2.696	1.172	1.066	1.015		

The third quarter 1983 incurred loss frequency has been adjusted to estimated year end position by using the proportionate increase from the previous years renewal exhibits to 31/12/1983.

Alternative estimates of loss frequency can be similarly derived from the independent claims reviewers.

Underwriting Year	Development Year 1	2	3	4	5	Proj Ult.
1979			73	73	70	70
1980		90	97	99		94
1981	51	94	102			98
1982	46	110				116
1983	45					100
Link Ratios	1.843	1.078	1.000	0.959		
	2.391	1.085	1.021			
Average	2.117	1.082	1.010			
Model	2.100	1.100	1.010	0.950		
Cumulative	2.216	1.055	0.960	0.950		

Averaging the two sets of estimates and dividing by doctor year exposure:-

Underwriting Year	Doctor year exposure	Ult No. inc. loss	%
1971	2,923	8	0.273
1972	3,022	8	0.265
1973	4,787	14	0.292
1974	5,122	18	0.351
1975	6,502	24	0.369
1976	9,895	40	0.404
1977	10,783	55	0.510
1978	13,964	70	0.501
1979	12,960	70	0.540
1980	17,000	95	0.559
1981	17,630	99	0.562
1982	17,744	114	0.642
1983	17,200	108	0.628

The reduction in projected frequency from 1982 to 1983 is questionable due to the variability of the factors applicable to 1983.

It would seem reasonable to expect a loss frequency for 1984 of approximately 0.7%. With estimated doctor year exposure and original primary limits premiums of 16,750 and $170m respectively, we would estimate the burning cost premium to be

$$\frac{16{,}750. \ .007 \ .225 \ . \ 5/4}{170{,}000} = 19.4\%$$

which is close to the maximum of 20%. This would probably be acceptable to the underwriter as the maximum premium represents the maximum profit to the reinsurer (except for the unlikely result of losses to the layer being less than 1% of premiums). However the underwriter would almost certainly indicate to the broker his desire to change some of the parameters of the contract for the next year.

[One should note that the potential error in this estimate is such that there is a good chance that the maximum premium will be exceeded.]

Important points of comparison between the two case studies.

1. Case A is flat rated (i.e. the XOL premiums are a fixed percentage of the original premium income). Case B is burning cost rated. Between the minimum and maximum premiums, additional losses produce higher profits for the reinsurer.

2. Case A is on a losses occurring policy form (i.e. accident year coverage). Case B is on a claims made policy form (i.e. report year coverage). Case A will therefore be expected to have a much longer development tail due to the discovery period before claims are reported. In case B we would expect virtually all claims to be reported to the primary insurer by the end of the sixth quarter (there is usually some occurrence coverage available for retiring doctors). The continuing development of numbers of incurred losses to the case B layer is due to the deterioration on losses initially estimated not to exceed the retention.

3. The existence of the commutation option on Case B effectively makes this a short tail risk.

4. In both cases I have assumed that average loss size on a working excess of loss is fairly constant over time. Inflation affects the layer by increasing loss frequency. However the average loss size is significantly higher on case B. This is because on case B, ALAE are pro rata in addition, whereas on case A they are covered within the layer.

5. In case A we are given development of numbers of losses reported to the layer. The loss frequency development is therefore uniformly increasing and we need to allow for losses settled below the deductible. In case B we are given some development data on numbers of losses incurred to the layer. This is already adjusted for losses settled below the deductible and is therefore not necessarily uniformly increasing.

6. Both case studies are for losses occurring or reported within a calender year. An alternative which could have been considered is a 'risks attaching' basis which would have effectively given a two-year exposure period.

CURRENCIES IN REINSURANCE BUSINESS

1. Companies and Lloyd's Syndicates which operate in the London reinsurance market will normally find themselves handling business in a very large number of different currencies - quite possibly more than 100. Nor is it always known in advance in what currency a Risk will be based. Separate closings are often received in several different currencies. Nor will claims necessarily be settled in the currency of the Risk to which they relate. An Aviation policy taken out in, say, Germany may involve premiums paid in US $ but a claim arising in Japanese Yen.

   Although any given office will be involved in a large number of different currencies, its business will usually be concentrated in only a few, stemming chiefly from the source from which it derives business but determined also, at least to some extent, by underwriting policy.

2. The currencies involved can be defined as falling within the following groups:

   Base Currency: i.e. the currency in which management and statutory reporting takes place. In the large majority of cases, this will be the currency of the host country but two currencies may be used.

   For example, a UK company which is a subsidiary of United States Group will have to submit statutory returns in sterling, but may provide reporting in US $ for Board purposes.

   Settlement Currencies: i.e. currencies in which the office normally expects to receive a substantial amount of premiums or has arranged to be paid premiums, in which investments are made and in which the office maintains separate records and books of accounts and statements of assets/liabilities.

   Miscellaneous Currencies: i.e. the remaining currencies in which Risks are written but which are converted into the base currency on receipt and for purposes of record keeping, covering both accounting and statistical records.

3. It is best to consider these separate groups in reverse order for purposes of clarity and in building up records to the final summary.

4. Miscellaneous Currencies

For purposes of record keeping and for establishing satisfactory books of account, it is necessary to convert these into the base currency.

Exceptionally, one of the other settlement currencies may be used for this purpose. For example, a Canadian office may use conversion to US $ even though its base currency is Canadian $.

In London market conditions, often two "convertible" currencies are used:

Sterling — for most of the currencies, particularly where the broker settles in sterling.

US $ — for business arising in Central or South America where the Broker settles in US $.

Conversion to the base currency must take place at the time of entry of the data and my be:

At the current rate of exchange in force at that point in time, with update of the rates at more or less frequent intervals or only after substantial movements.

or

At a rather more standard rate: for example the rate that applied on the 1st January in the year concerned, perhaps with a few updates periodically when there has been substantial movement.

or

At a pre-arranged rate of exchange (which often applies to claim settlements).

Although the amounts involved must be converted to the base currency and kept as such in the books of account, the record must also carry a note of the original currency and the amount therein, for purposes of

Correct cash allocation in the Brokers Ledger.

Reserve matching of retained and released items in the Reserve ledgers.

Exchange differences (which include costs of currency sales and purchases) are usually carried to the Profit and Loss Account in bulk. This is quite unsatisfactory as it distorts the underwriting results, particularly in the case of currencies with rapidly changing exchange rate. The correct procedure, particularly with adequate computer assistance, is to carry the exchange differences back into the record of the particular Risk concerned, so as thereafter to reflect on all statistics derived from it.

In other words, the statistics should reflect the conversion rates used only while cash settlement is still outstanding but ultimately the actual amount of cash settlement.

Furthermore, in the case of outwards reinsurance which is settled in one of the settlement currencies, whether facultative or pro-rata treaties of excess layers, the correct proportion of the exchange differences should be carried into the reinsurance accounts and included in statements submitted to the reinsurers.

The details of the procedure are quite complicated.

Differences arising from premium settlements must be reflected back into premium accounts, blown up into original gross premiums and deductions of various kinds.

E.g. if a premium entry shows

	Original currency	Conv to £ as 10 to £
Gross premium	10,000	1,000
Deductions	- 2,500	- 250
Net premium	7,500	750

If cash settlement is at a rate of exchange of 12 to £ then the figures will be.

	Original Currency	In £	Corrections for exchange diff.
Gross premium	10,000	833.33	- 166.67
Deductions	- 2,500	- 208.33	41.67
	7,500	625.00	125.00

Differences arising in claim settlements, whether or not at an agreed rate of exchange, should similarly be reflected back into claims.

It is in the case of proportional treaties that the main difficulties occur. Consider for example, a typical closing in the following form:

	Original Currency	Converted to £ at 10 to £
Premium Portfolio	15,000	1,500
Gross Premium	80,000	8,000
Common A/C Excess Loss R/I	- 3,000	- 300
Other Deductions	-20,000	-2,000
Net Premium	72,000	7,200
Premium reserve retained	-28,000	-2,880
Premium reserve released	16,000	1,600
Claims paid	-30,000	-3,000
Claims reserve retained	-25,000	-2,500
Claims reserve released	10,000	1,000
Net Balance	14,200	1,420

When the treaty balance is settled in cash, say for an amount converted into sterling of £1,500, it becomes necessary to "blow up" the exchange difference between the different elements.

A complication that may occur, fortunately very rarely, is that the common account excess loss protections premiums may have been settled at a different rate. If so, the Broker's statement must reflect the fact. This possibility has been ignored in the example given.

Strictly speaking, the proportionate "blown-up" amount relating to premium reserves (retained and released) should be shown as adjustments in the Reserve Ledger. Complications will be caused, however, in matching out reserve items, particularly if done automatically, as the adjusting amounts may very likely be missed and will remain indefinately on the Reserve Ledger. Hence it is preferable to carry the amount directly into the premium figures.

Similarly for claim reserves.

Hence the settlement will result in the following adjusting entries.

Net Premiums in proportion to

Premiums		Premium Reserve ret.		Premium Reserve rel.		
72,000	-	28,800	+	16,000	=	59,200

Claims in proprotion to

Claims		Claims Reserve ret.		Claims Reserve rel.		
- 30,000	-	25,000	+	10,000	=	-4,500
						14,200

The difference of 1,500 - 1,420 = 80 which is 5.6338% of 1,420 gives rise to differences of

Premiums	333.52
Claims	- 253.52
	£ 80.00

If this procedure is followed, the reserve entries will remain at the rate of exchange at which they were input. They should be updated at the end of the year, together with all open ledger items and claim outstanding items (indeed it is implicitly required by the current DTI regulations).

Reserve items are normally released a year after retention, often at a rate of exchange considerably different from the rate at which they were input originally. In any computer matching runs, the test must be on the amount in original currency - not in the base currency - and the difference in the base currency cycled back:

> Amounts arising from premium reserves release: to premiums.
>
> Amounts arising from claims reserves release : to claims.
>
> (even in those cases when the company treats claims reserves as claims outstanding and not as claims paid).

A warning note should be sounded at this stage: fortuitous circumstances can give rise to very large exchange differences and these need to be examined for possible error. Examples are:

(i) Original input submitted with the wrong currency code and hence calculated automatically to entirely erroreous amounts in the base currency.

(ii) Large changes in exchange rates during the period elapsed, particularly in the case of premium or claim reserves.

(iii)(An occurrence that often happens in practice). The Cedant is settling on quarterly statements covering, say, three underwriting years. There is not a inconsiderable exchange difference involved. The Cedant has not broken that difference down by underwriting year and the clerk responsible for input puts it all to the latest year. The return for that year may then show something such as:

Sterling amounts in books	Underwriting year		
	1981	1982	1983
Premiums	8000	25000	5000
Claims	- 9000	- 6000	- 4950
Treaty Balance	- 1000	-19000	50
		TOTAL	£ 17950

Settled for £ 18200, exchange difference 250

"Blowing up" the exchange difference may then produce quite bizarre results, producing a "premium difference" for underwriting year 1983 of £ 25000 and a "claim difference" of - £ 24750.

5. Settlement Currencies

It has long been standard for companies operating in the London market and for LLoyd's to maintain, as settlement currencies:

US
Canadian $
UK £ (which because of exchange control requirements used to be kept separately as Convertible Sterling, and Pure Sterling).

Several years ago, as a result of pressure from a few reinsurance offices, most of the large brokers (but few of the smaller ones) agreed to settle in original currency, on request, for an agreed number of currencies.

The administrative requirements that resulted were difficult to fulfil on both sides and at best some extra delay in settlement was involved.

The currencies that were involved were, in particular

French Francs
Swiss Francs
Deutshemarks
Japanese Yen
Norwegian Kronen
Swedish Kronen
Dutch Florins
Australian Dollars

Pressure for settlement in some or all of these currencies had arisen initially at the time when the £ was weak and underwriters saw substantial losses of premium arising from Risks written in stronger currencies. Over a period of some 2 years the Deutschemark had appreciated by something like 25% and underwriters saw this as a direct loss when the premiums had been held in sterling. The differences in interest rates obtainable in the two countries was of the order of 3 1/2%p.a. over the same period and went part way towards redressing the balance, but in any case the interest income did not appear in the underwriting accounts: the premium loss did.

The adjustment to the handling of several additional settlement currencies was made over a period of a few years in the London market, but it was haphazard at best. Different Brokers adopted different policies. Different underwriting offices had different viewpoints and decided on different policies. Lloyd's kept to its traditional 3 currencies but some of the syndicates bought back amounts in additional currencies (even though it thereby involved them in 2 costs of exchange).

Apart from the administrative complexities that resulted there were mixed feelings about the dispersion of investments and accounting in new currencies:

The volume of premium was often only marginally sufficient to justify the exercise.

Where volumes are not all that large, variations in claims experience in that currency become even more significant.

Nor is there always a guarantee that claims will be made in the original currency of the Risk, particularly in the case of Aviation and Marine insurance.

> Even with the phenomenal growth of banking facilities within the last decade, a reinsurer operating from a London base will often feel that he has insufficient knowledge of a foreign country, say Germany, and insufficiently close contact with markets there, to make investments easily in that county and with the confidence he would like to feel.

Ultimately it is a matter for each reinsurance office to decide in the light of its portfolio of business and its distribution in terms of currencies. In practice it is often a matter of personal expertise and attitudes.

6. Base Currency

The accounts of the office are published in the base currency and ultimately profitability will be determined in that currency.

The balance sheet and accounts represent however at any particular point in time an amalgamation of figures drawn from the several settlement currencies in use. The rates of exchange at which the conversions are made will vary from year to year and will give rise to an item in the profit and loss account of gain or loss from exchange. Provided liabilities in respect of claims outstanding plus IBNR reserves are matched to the assets held in each settlement currency, less other liabilities in the currency, no ultimate residual profit or loss exists (although there can be tax implications depending on how the reserves are treated in the tax computations).

Matching assets to liabilities is relatively easy in a currency like US $ where a considerable volume of business is likely to exist and fluctuations tend to iron out. It is much less easy in a currency where a number of Risks are in existence but not sufficient to avoid fluctuations of a type which may well occur unexpectedly just before the end of a financial period and render currency immunization difficult to achieve in practice. If reasonsable care is taken and currencies bought and sold where necessary, accounts drawn up at the end of a financial period should show a roughly balancing position.

The picture may be further complicated by the existence of a number of reinsurance outwards, expressed in currencies which may differ from those of the inwards business. In particular, non-proportional excess of loss protection treaties outwards, covering against individual large losses or acumulations of losses from a particular incident over a limited period of time (such as a hurricane) are likely to be covered by premiums payable partly in US $ and partly in UK £. Losses originating in other currencies will be converted to one of the two main currencies of the treaty at the rates of exchange prevailing at settlement.

Surplus R/I treaties outwards may also draw in both premiums and claims from a large number of currencies but be settled out in the base currency alone.

Hence the matching process is never likely to be more than roughly approximate.

The point of time at which surplus or losses in any one settlement currency should be repatriated to the base currency becomes a matter of management policy. In respect of the business of any one underwriting year it should not be until the ultimate underwriting profit or loss can be estimated with some degree of reliability - certainly not before the normal closing of the account at the end of the third year or whatever point in elapsed time is in use by the office concerned. If it is a long-tail account or involves an appreciable amount of long-tail business then there will be very strong arguments for keeping part of the solvency reserve in each of the settlement currencies - at the very minimum in US $.

7. Inter-relationship of rates of exchange, inflation and interest rates

Investment income is not normally included in the revenue accounts but it is assumed that investment income is brought into the picture when considering the profitability of any part of the business: that is, in obtaining a complete picture of the fortunes of the underwriting in any one currency, more especially in the one of the settlement currencies.

A cursory examination of exchange rates, rates of inflation and rates of interest indicates that there is some measure of cross-relationship - not very stable, anything but exact and applying more to averages over a period of time than to rates at a particulr point in time.

In practice there are all sorts of major upsetting factors:

(i) Rates of inflation applicable to insurance claims are apt to make quantum jumps from time to time as a result of Court decisions.

(ii) There is some measure of correspondence in legal attitudes between one country and another but not very much.

(iii) Rates of inflation as measured by increases in cost of living indices tend to fluctuate considerably from time to time and can be influenced by the monetary policies of the Government.

(iv) Rates of interest tend to depend more on expectatious in regard to future rates of inflation than on current or past rates.

(v) The Government can intervene heavily and effectively in regard to rates of interest through the impact of its monetary policy.

(vi) The impact of taxation varies from one country to another and tax paid may or may not be recoverable under double taxation agreements.

(vii) Rates of exchange are influenced strongly by confidence factors, by existing international debt obligations and by changes in the international terms of trade as well as by direct inflationary factors.

(viii) At best human nature is a fickle and unpredictable beast. Economic factors are seldom purely rational. Forward dealing in currencies is valuable as a hedge against future known liabilities but, when used in gambling on currencies, can produce irrational results.

Since the subject is crucial to operations in the world-wide reinsurance market, some analysis has been made, based on figures kindly provided by the International Monetory Fund covering a period of some 10 years, of exchange rates to US $, rates of inflation (RPI) and rates of interest (generally of the short-dated Government Bond type). These figures are actually available in monthly book entitled "International Financial Statistics" which is available at the City Reference Library or the Guildhall Library.

The figures were used in calculations showing the relationship between exchange and interest rates.

The underlying suggestion is that, in the long run, it does not make much difference whether you invest in any given currency because interest rates tend to move to compensate for depreciation in the currency values.

Is this supported by results obtained? Calculations were made on the assumption that $100 was invested

(a) In US $ securities throughout

and

(b) Converted into the currency under investigation, invested in short term Government bonds (or their nearest equivalent) in the currency and then converted back into US $ at the new rate of exchange applicable.

Two sets of graphs are attached, the first showing an original investment made early in 1973 and withdrawn at points of time from then onwards, right up to 1984; the second showing an initial investment made at the beginning of 1978.

The analysis would seem to show that:

(a) If it is possible to say that interest rates in one country are abnormally high (as, perhaps, is the USA at present) or that the exchange-rate is abnormal (as, perhaps, for the UK around about 1979 - 80) then it is possible to make significant gains by shifting assets between currencies. At best, however, the policy is a dangerous one and hence would require an apposite degree of extra reserving.

(b) Overall it is safest to maintain assets in the same currencies as those in which liabilities exist, particularly in the case of investments made for short periods of time or in those currencies where liabilities of reasonably substantial amount can be identified.

(c) If that be not possible and investments are made in currencies different from the liabilities, then in general the overall effect may not be too great. The longer the investment the more, in general, differences between currencies tend to iron out. In the shorter term, however, there can be aberrations in the rates of exchange due to political influences or loss or gain of confidence which can upset the results to quite a marked extent. Some currencies appear to be permanently weak.

Most offices are probably retaining reserves in UK £ against liabilities in a whole host of minor currencies but investment in the UK, apart from a brief period around 1980 when the exchange rate was correcting itself, have not fared as well as those in US $ or in some of the other currencies.