

Practical Pricing

The attached is an early draft for chapter 5 of the London Market monograph. It is anticipated that substantial alterations will be necessary before a suitable form is attained.

The aim, rightly or wrongly, is to emphasise the practical nature of London Market pricing and the necessary simplicity of calculation. The methods must be easily explained to an underwriter and therefore too much theory is out of place. However some jargon is unavoidable. Some of the methods have been used for many years, well before Actuaries were on the scene.

My unfamiliarity with many aspects of London Market pricing means that any feedback through discussion and constructive criticism is very welcome.

Practical Pricing

1. Introduction

When an underwriter is presented with a slip he is provided with basic but specific details of the risk. In addition he will receive some background data, usually in the form of a presentation, on which to assess the risk and make his decision whether to accept or decline. He (or she) will be required to reach his decision within days, hours or minutes dependent on the type of business, whether the market is hard or soft (less or more competition) and whether the underwriter is the leader of the risk or a follower. Some classes of risk will have an abundance of useful data, eg Medical Malpractice from USA, whereas the availability and accuracy of some Third World risks will be of far less quality and value.

There may be further information if the underwriter has participated in the risk in past years or if he is on a different layer of the risk (eg if the quote is for an excess of loss layer \$10m excess of \$10m, details of losses to the \$5m excess of \$5m and \$4m excess of \$1m, for example, will be of use).

The art of pricing (or rating) a risk is essentially to calculate the expected amount of eventual future outward claim payments, (although this may prove difficult for high layer, and low frequency, catastrophe cover, where the attempt is more to find an equitable price). This estimate will need to be adjusted for expenses (such as brokerage, profit commission, underwriting and claims expenses, contingencies) in a broad way. Niceties such as interest income earned are normally out of place in London Market rating where enormous variability of loss ratios may occur. Competition in a hard market, with high prices, or a soft market, with low prices, will have far more effect. (The insurance cycle is more pronounced in the reinsurance market because of gearing and the ease of entry into the market.) The strategic management policy of the company may lean towards market share (by increasing or retaining premium income levels) or selective underwriting (by rejecting business expected to be unprofitable).

Past data may be useful in providing assistance in estimating where the experience of more recent years will eventually lead, or the data may be so heterogeneous as to be almost useless. In the former case extreme care is needed to interpret the data correctly. This analysis, best performed by an Actuary, may not be very accurate, but will be of assistance to the underwriter in performing a more accurate evaluation of the risk.

The only certain fact in estimating the value of future claims is that the estimate will be wrong. Also, data relating to past years is not normally reliable, often incomplete and usually not fully developed to its ultimate. Hence a best estimate is all that can really be attempted, although making full use of all relevant facts is essential. The nature, or profile, of the risk may have changed substantially over the years (eg occurrence to claims made, or 10% liability and 90% property to 20% liability and 80% property to 30% liability and 70% property,....).

Within the London Market business is a vast variety of type of risk from first surplus to casualty excess of loss to LMX (excess of loss on other companies and Lloyd's syndicates' portfolios), all with differing characteristics and described elsewhere in the reading. Differing methods are often necessary for different classes.

The remainder of this chapter examines and assesses individual risks, enlarging on specific rating problems. The format for each example is: details of the slip, statistical information given, financial assessment, then finally an explanation of any salient features. This gives the reader an opportunity to first play the role of the underwriter.

2. Example A

(i) The Slip

<u>Assured</u>	Captive Company of XYZ Hospital Group, USA.
<u>Period</u>	Claims made during the period 1 January 1987 to 31 December 1987. The date a claim is deemed to have been made is when the primary insurer establishes that a claim has been reported.
<u>Type</u>	Excess of Loss
<u>Class</u>	Professional Liability and Associated Liability including General Liability
<u>Limits</u>	To pay up to \$4m ultimate net loss each and every loss, each and every insured, excess of \$1m ultimate net loss each and every loss each and every insured.
<u>Rates</u>	To be agreed
<u>Brokerage</u>	15%
<u>Taxes</u>	FET (Federal Excise Tax) where applicable
<u>Wording</u>	Wordings and exclusions to be agreed by leading underwriter only.

General Condition

A series of clauses relating to arbitration,
insolvency, excess of original policy limits,
nuclear incident, claims review, commutation,.....

(ii) The information

(a) Bed exposures:-

1980	22,080
1981	24,213
1982	26,400
1983	25,260
1984	25,115
1985	24,720
1986	24,866
1987	24,500 (estimated)

(b) Estimated Premium Income \$420m

(c) Claims closed during years 1980-1986, \$4m xs \$1m

<u>Year of</u> <u>Notif</u>	<u>Number</u> <u>Closed</u>	<u>With</u> <u>Payment</u>	<u>Without</u> <u>Payment</u>	<u>Number of</u> <u>total Losses</u>	<u>Total</u> <u>Payment</u>
1980	15	13	2	2	\$30,220,000
1981	18	14	4	4	\$39,217,222
1982	23	18	5	5	\$65,138,847
1983	24	21	3	5	\$65,266,288
1984	26	22	4	4	\$66,253,876
1985	23	19	4	6	\$55,777,096
1986	18	15	3	4	\$51,371,061

(d) Cumulative number of closed claims development (last diagonal for 9 months only)

	<u>Development Year</u>						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1980	3	5	8	8	11	13	15
1981	5	7	8	11	15	18	
1982	8	11	15	18	23		
1983	11	14	20	24			
1984	13	18	26				
1985	15	23					
1986	18						

(iii) Assessment

(a) Number of closed claims

	<u>% with payment</u>	<u>Est Ult</u>	<u>% total losses</u>	<u>Number with payment</u>	<u>Total Losses</u>	<u>Claim Freq %</u>
1980	87%	16	15%	14	2	0.72%
1981	78%	20	29%	16	5	0.83%
1982	78%	25	28%	20	5	0.95%
1983	88%	28	24%	25	6	1.11%
1984	85%	29	18%	25	4	1.15%
1985	83%	28	32%	23	7	1.13%
1986	83%	30	27%	25	7	1.21%
1987	90%	34	35%	?	11	1.40%
(est)						

(b) Average claim closed to layer less than limit

	<u>Total Payment</u>	<u>Total Losses</u>	<u>Remainder</u>	<u>Number of Losses in Remainder</u>	<u>Average</u>
	\$	\$	\$		\$
1980	30,220,000	8,000,000	22,220,000	11	2,020,000
1981	39,217,222	16,000,000	23,217,222	10	2,321,722
1982	65,138,847	20,000,000	45,138,847	13	3,472,219
1983	65,266,288	20,000,000	45,266,288	16	2,829,143
1984	66,253,876	16,000,000	50,253,876	18	2,791,882
1985	55,777,096	24,000,000	31,777,096	13	2,444,392
1986	51,371,061	16,000,000	35,371,061	11	3,215,551
1987	114,000,000	44,000,000	70,000,000	20	3,500,000
(est ult)					

Allowing 20% for brokerage and expenses,
rate = $114,000,000 / 0.8 / 420,000,000 = 33.9\%$
or say 34% of overall base premium income.

(iv) Explanation

The Slip shows the class of business to be hospital medical malpractice business (as opposed to doctors) written in the USA. Only claims notified to policies issued during the period of cover to the XYZ Group are acceptable, although additional cover is sometimes available in certain risks at additional premium or implicit pre-paid discovery for, say, up to 5 years. This gives the hospital temporary cover if it leaves the captive. This is in contrast to the traditional occurrence based contract where claims occurring during the period are covered. Claims made results in a much shorter run off and hence assists the insurer

in assessing his liabilities. It also avoids the situation where a long period of time between occurrence and reporting may result in the claim requiring payment and the insurer no longer being around.

The conditions include a Commutation clause. This will detail whether either party may elect to conclude the reinsurance agreement by a payment made by the reinsurer after a certain number of years.

The arbitration and other clauses relate to the procedures involved if specific events occur.

It is necessary to clarify whether the claims made form is from insured to insurer or from insurer to reinsurer (or both). The former may be occurrence based and the latter claims made.

The type of risk is excess of loss (XOL). On a \$0.5m claim the reinsurer is not liable. On a \$4m claim the reinsurer pays \$3m. On a claim of \$5m or more the reinsurer pays \$4m. However if two hospitals in the captive are involved in one claim the maximum claim payments increase to \$8m, and so on. The wording will stipulate whether claim expenses are included, or pro rata in addition (ie in proportion to the claim payments). This will be on the slip.

For many classes of non-life insurance, obtaining a measure of exposure is a problem. Fortunately for hospital medical malpractice the number of beds has historically been seen to provide a reasonable measure. The rate per bed is thus a guide to pricing levels. The term 'bed exposure' relates to the number of occupied beds in the captive's hospitals during the year. However, claims made in one year can have occurred many years previously and so the exposure should really be a combination of prior years' "beds". Any increase or decrease in bed exposure would, therefore, falsify the results. Moreover, there is an increasing trend towards outpatient therapy giving increasing exposure for the same number of beds.

The total estimated premium income, or base premium income, received by the Group for 1987 is given as \$420m. This is the captive's total premium income from all hospitals in the Group. Details are shown of losses to the layer. The number of claims closed, with or without an eventual payment in excess of \$1m and also the number of total losses, ie in excess of \$4m, are shown. The total payment to the layer is given. Sometimes this is expressed as FGU (from the ground up), meaning including the \$1m deductible.

The development of the numbers of closed claims is shown to assist in projecting the ultimate number for recent years. A chain ladder, or some modification thereof, could easily be used. Allowance must be made for the last diagonal being for 9 months only. Usually a development of incurred claims (i.e. paid and known case reserves or outstanding losses) is shown, especially where there is a long run off to closure and the numbers of claims closed to date is small.

In assessing the risk, the numbers of claims are analysed first. The proportion closed with a payment to the layer is shown in the first column. The second column shows the projected ultimate number of claims to the layer based on a chain ladder type of approach. The third column is the percentage of "claims closed to date with a payment" that are total losses. The fourth column is the expected ultimate number of claims closed with payment ($\text{Col 1} \times \text{Col 2}$), and the fifth column is the expected number of total losses ($\text{Col 2} \times \text{Col 3}$). The sixth column shows the projected ultimate number of claims as a proportion of hospital beds.

The bottom row is found by projecting the earlier years, the increasing trend of claim frequency giving the estimated ultimate number of losses.

The analysis of amounts of claims can now be performed. The total payments comprise total and partial losses. The average of the latter is found and hence a projected total payment. Note the 1987 estimates relate to the ultimate position and not the 'to date' position.

From the ultimate losses, the rate may be calculated (with due allowance for brokerage, expenses, profit, contingencies, etc) as a percentage of estimated premium income. The rate may alternatively be expressed as per bed.

There are clearly other methods of arriving at a rate and small changes in assumption may have substantial effects on the rate. Hence too much theory is out of place.

In practice because of the problems of exposure in claims made risks, an occurrence rate is often calculated and the claims made rate derived from this.

3. Example B

(i) The Slip

As example A but for limits \$5m ultimate net loss each and every loss, each and every insured, excess of \$5m ultimate net loss each and every loss each and every insured.

(ii) The Information

Bed exposures and estimated premium income as example A.

(c) Claims closed during years 1980-1986, \$5m xs \$5m

	<u>Number Closed</u>	<u>With Payment</u>	<u>Without Payment</u>	<u>Number of total Losses</u>	<u>Total Payment</u>
1980	2	2	0	0	\$ 3,500,000
1981	5	4	1	0	\$ 7,127,500
1982	6	5	1	1	\$13,273,424
1983	5	4	1	0	\$ 9,720,000
1984	4	4	0	0	\$11,472,000
1985	6	5	1	1	\$17,210,000
1986	4	4	0	0	\$12,223,000

(d) Number of closed claims development (last diagonal for 9 months only).

	<u>Development Year</u>						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1980	0	0	0	1	1	1	2
1981	0	1	2	4	5	5	
1982	1	3	5	5	6		
1983	2	2	4	5			
1984	2	3	4				
1985	4	6					
1986	4						

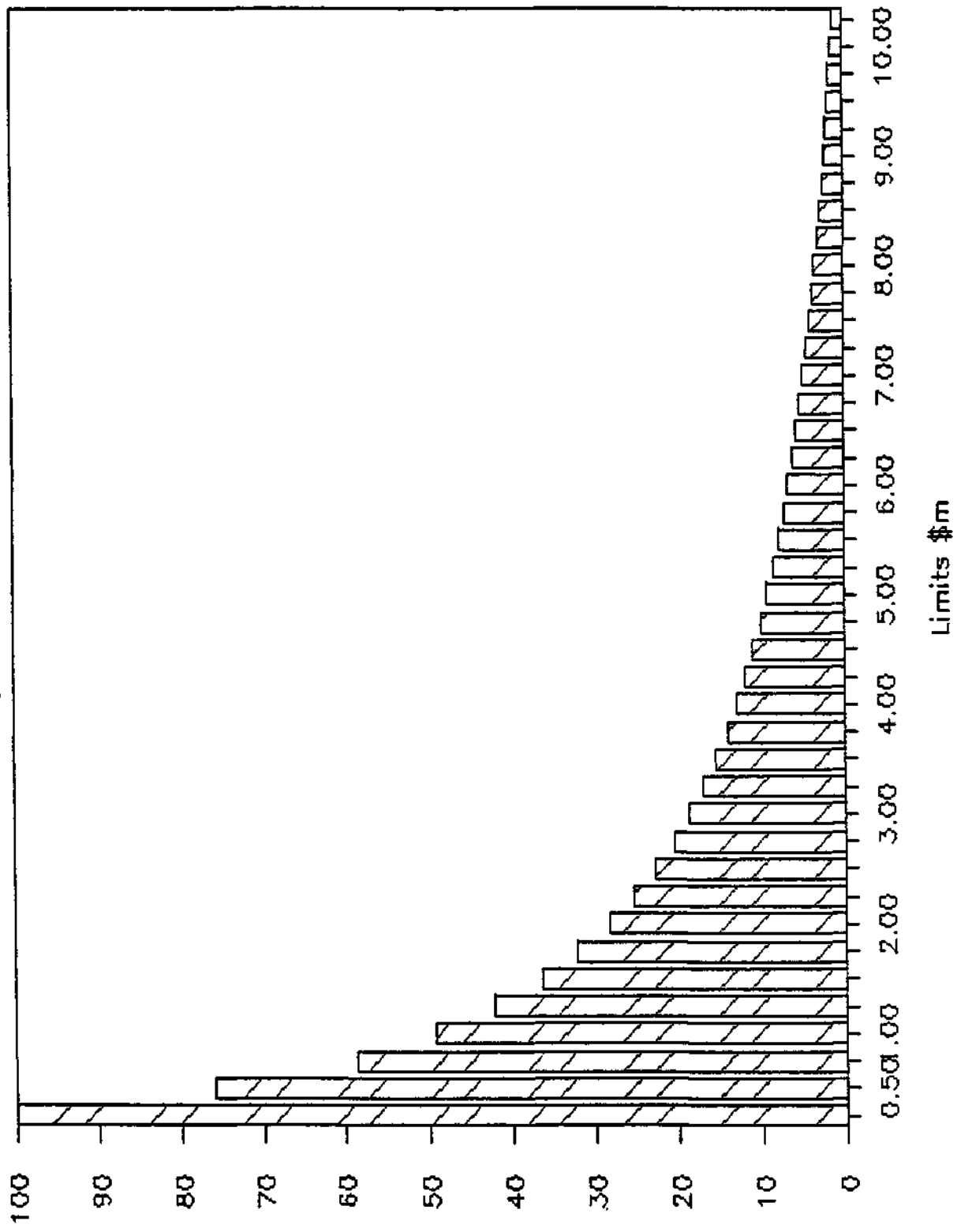
(iii) Assessment and Explanation

An exercise similar to that used in example A may be performed, but less data due to fewer claims reaching the lower limit reduces the credibility of the results.

It is often better to use the rate arrived at for a lower limit and adjust it. One such method involves the use of I.L.F. (increased limit factors) or M.I. (manual increase) techniques. The ILF's would apply separately for each different upper limit of the original assureds. It is assumed here that these are all equal, to simplify the calculation.

Increased Limit Factors

Original Policy Limit \$1m



Clearly each segment will have a direct rating relationship to the others. In the above example the primary \$250,000 obviously has the highest rate as some claims will be settled below that level. \$250,000 xs \$250,000 has a lower rate, and so on. Actuarial assistance can provide the underwriter with a series of factors, in certain conditions, ie ILF or MI factors, based on similar risks and experience.

We have calculated a rate for \$4m xs \$1m of 34% in example A. Our ILF table gives a relative factor of say, 30% for \$5m xs \$5m, hence a rate of 10%.

4. Example C

(i) The Slip

<u>Reassured</u>	XYZ Doctor Mutual Risk Retention Group, ABC State, USA.
<u>Period</u>	Continuous contract from 1st January 1987 covering claims made (and/or losses occurring where applicable) during the calendar year. Subject to 90 days prior notice of cancellation to any anniversary date.
<u>Type</u>	Excess of Loss Reinsurance
<u>Class</u>	Covering Medical Professional Liability policies, but excluding Hospital Liability coverage
<u>Limits</u>	To pay the difference between \$2m each and every loss, each policy and \$250,000 each and every loss each policy, indexed as below.
	Before any recoveries are made from reinsurers, the reinsured shall first retain losses equivalent to 15% of Gross Net Written Premium Income (GNWPI). Pro-rata costs in addition.
<u>Warranty</u>	Warranted maximum Policy Limit \$1m/\$3m or so deemed, except as respects Excess of Original Policy Limits or Extra Contractual Obligations where coverage hereon applies up to a maximum of \$3m.
<u>Indexation</u>	Recovery hereon to be based on retention at time of first payment hereunder. Original retention of \$250,000 to be increased by \$25,000 1st January 1988 and annually thereafter.
<u>Premium</u>	Annual Deposit Premium \$2m payable quarterly in arrear at 1st April, 1st July, 1st October, 1st January of each year. Adjustable as soon as practicable after anniversary date at a rate of

15% of GNWPI, and further adjustable two years after inception of each annual contract period, and annually thereafter, until all claims are settled at 110% of incurred loss cost, including loss adjustment expenses, plus a minimum rate of 5% of GNWPI. In no event shall the minimum rate plus 110% of incurred losses exceed a maximum rate of 25% of GNWPI.

Claims

Reassured to provide quarterly bordereaux of both paid and outstanding claims. Total of paid claims as per bordereaux to be recoverable as soon as practicable after receipt of bordereaux.

Cash Loss

\$100,000

Deductions

1% FET where applicable, and brokerage of 10% of premium (subject to a maximum of 1.5% of GNWPI)

(ii) The information

(a) Incurred losses "as if" claims made basis:-

	<u>GNWPI \$</u>	<u>X/S \$250,000</u>	<u>X/S \$300,000</u>	<u>X/S \$350,000</u>
1982	5,461,323	557,055	372,131	210,494
1983	6,570,696	959,322	624,315	371,400
1984	8,422,232	1,448,624	1,016,949	800,920
1985	11,828,292	1,514,020	1,121,402	860,402
1986	12,900,313	1,122,327	823,740	633,340

(b) Estimated Premium Income \$12.5m to Reinsured

Estimated number of doctors 5,600. Over 95% claims made. No intention by the Group to expand on the small proportion of occurrence based policies.

(c) Development of incurred losses excess of \$250,000:-

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
1982	313,477	527,211	540,340	560,111	557,055
1983	702,400	1,211,420	1,061,700	959,322	
1984	722,434	1,422,080	1,448,624		
1985	979,240	1,514,020			
1986	1,122,327				

Latest Year to 30 September 1986

(d) Doctor Profiles. One profile would normally be given for each limit of primary cover (e.g. \$0.5M, \$1M,...). For simplicity on one level of primary cover is assumed.

Class

	<u>Total</u>	<u>1</u>	<u>2</u>	<u>2B</u>	<u>3</u>	<u>4A</u>	<u>4B</u>	<u>4C</u>	<u>5A</u>	<u>5B</u>
1982	5708	3057	1320	590	304	120	15	20	90	122
1983	5887	3195	1335	595	318	118	16	8	97	130
1984	6401	3430	1501	623	341	127	23	22	109	143
1985	5990	2967	1421	622	327	176	40	57	121	157
1986	5760	2766	1354	602	323	122	57	68	134	172

(e) Actuarial Report

It would normally be the practice to include on Actuarial Report justifying the level of the basic original rates for each type of doctor.

(iii) Assessment

(a) Expressing the "as if" exhibit as % of GNWPI:-

	<u>GNWPI \$000'S</u>	<u>X/S \$250,000</u>	<u>X/S \$300,000</u>	<u>X/S \$350,000</u>
1982	5,461	10.2%	6.8%	3.9%
1983	6,571	14.6%	9.5%	5.7%
1984	8,422	17.2%	12.1%	9.5%
1985	11,828	12.8%	9.5%	7.3%
1986	12,900	8.7%	6.4%	4.9%
1987	12,500			

(b) Similarly expressing the development of X/S of \$250,000 as a %:-

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Ult</u>
1982	5.7%	9.7%	9.9%	10.3%	10.2%	10.5%
1983	10.7%	18.4%	16.2%	14.6%		16.0%
1984	8.6%	16.9%	17.2%			18.5%
1985	8.3%	12.8%				16.5%
1986	8.7%					18.0%

The ultimate figures are estimated using a chain ladder type method; however, the effect of indexation would reduce these ULR (ultimate loss ratio) %'s.

(c) Analysis of exposure:-

	<u>Total Exposure</u>	<u>Exposure (Class 1 equivalent)</u>
1982	5,708	10,851
1983	5,087	11,149
1984	6,401	12,242
1985	5,990	12,451
1986	5,760	12,630

- (d) The development excess of \$250,000 in (b) above would suggest a rate of 16-19%. However indexation would increase the effective lower limit to \$300,000, say and hence decrease the rate. The effect of the exposure profile would suggest an increase in the rate as the Doctor Mutual seems to be losing its low risk doctors whilst retaining and gaining the high risk ones.
- (e) With a premium expressed on a swing plan basis the judgement mainly involves the size of variance of incurred losses. Small premium income, and fewer doctors, will increase the possible variance and hence a wider gap between the minimum and maximum rate is necessary. An indication of the required gap might be obtained by examining past years.
- (f) Despite the changing doctor profile, the aggregate deductible of 15% of GNWPI makes the expected losses very low and hence it looks a good deal. The underwriter would however, pay particular attention to the reputation of the Mutual.

(iv) Explanation

The slip shows the risk to be a US Doctor Mutual, ie a non profit making body set up to provide insurance cover for doctors in ABC State. Hospital Liability is specifically excluded.

The reinsurance contract is excess of loss on a claims made basis. The comparatively small number of doctors involved may lead to a fluctuation in claims amounts so a "swing plan" method of rating is used on a burning cost basis.

The premium is 110% of losses (the 10% to go towards profit, expenses and contingencies), with an addition of 5% of GNWPI subject to a maximum of 25% of GNWPI (i.e. premium income before commission but after any inuring outwards reinsurance premiums). The 5% could be taken as insurance in the event of the losses exceeding 25%. This type of arrangement satisfies the reinsured who obtains protection for adverse experience and the reinsurer who can more easily assess his potential liability (although not his income), and follow the fortunes of the reinsured. The Doctor Mutual

retains incentive to settle claims conservatively. The Doctor Mutual will retain the individual losses falling within the layer up to an amount equivalent to 15% of GNWPI. This is referred to as an aggregate deductible or inner aggregate.

The additional coverages require explanation:-

a) Excess of Policy Limits (XPL)

If the original doctor's policy had a limit of say \$500,000 and a claim is made for \$400,000 the doctor would be covered. If the Doctor Mutual decided to fight the case, lose and claims of \$750,000 are awarded then the excess over \$500,000 would normally be excluded from reinsurance cover. XPL coverage includes such instances.

b) Extra Contractual Obligations (ECO)

This covers a wider variety of situations not covered under any other provision of the contract but arising from the handling of the claim, eg failure to settle because of negligence, fraud, bad faith (although not usually when fraud is by Directors of the Mutual). An example would be where the Doctor Mutual decided not to pay a claim and the Court awarded damages specifically against the Mutual in addition to the doctor.

An arbitrary addition is traditionally made to the premium to allow for the relatively low cost of XPL and E.C.O.

The information on an "as if" basis in (a) denotes the incurred losses on a variety of assumed excess points, ie excess of \$250,000, \$300,000 and \$350,000.

The doctor profiles require some explanation. The class refers to the type of doctor, class 1 = general practitioner/no surgery, class 2 = general practitioner/minor surgery, class 2B = obstetrics (no surgery), ..., class 5C = neurosurgeons. Each class can be allotted a different risk factor, usually expressed as a proportion of class 1. Hence we can derive the exposure in absolute and class 1 equivalent forms (from estimates of the relative risk factors). The latter expresses the number of general practitioners (no surgery) that would generate an equivalent exposure.

Loss expenses will be in proportion to the respective interests of the losses incurred by the parties.

The \$100,000 Cash Loss means that loss payments in excess of this amount are dealt with individually and not through the normal bordereaux settlement channel.

5. Example D

(i) The Slip

<u>Reinsured</u>	A Lloyd's Marine Syndicate
<u>Period</u>	Losses occurring in 12 Months commencing 1 January 1987
<u>Type</u>	Excess of Loss
<u>Class</u>	To pay all losses (incl war risks) howsoever and wheresover arising in the world in respect of the entire excess of loss account, including aviation.
<u>Limits</u>	\$2m each and every loss in excess of an ultimate net loss of \$10m each and every loss/catastrophe/occurrence/series of occurrences arising out of one event.
<u>Reinstatement</u>	One full reinstatement at 100% additional premium plus one pro rata, in US\$.
<u>Premium</u>	Minimum and Deposit \$200,000 payable quarterly on 1 January 1987, 1 April 1987, 1 July 1987, 1 October 1987. Adjustable at 5% of net premium income accounted for during the period 12 Months at 1 January 1987 (all years of account).
<u>Deduction</u>	Less 10% for premium, less 5% for reinstatements.

(ii) The information

(a)	<u>\$000's</u>	<u>Net accounted Premium Income</u>	<u>Losses over \$2m</u>
	1980	1,722	0
	1981	1,931	0
	1982	2,010	0
	1983	1,972	0
	1984	1,843	3,500
	1985	2,377	0
	1986	2,600 (est)	0
	1987	3,000 (est)	-

(b) Profile

Hull	15%
Cargo	15%
War	20%
General	20%
Aviation	10%
Whole Account	20%

(c) Maximum Limits

Maximum per risk	\$150,000
Average per risk	\$ 50,000
Maximum per program	\$500,000

(iii) Assessment and Explanation

Clearly this type of risk (LMX) differs considerably from those previously described. Paucity of claims and the high level of vertical coverage leaves little scope for projection. The risk must be viewed in the context of many similar ones at different levels to assess the exposure in a variety of catastrophes. The Actuary is able to assist more in the background here by analysing the total exposure and testing the effect of specified scenarios, both actual historic and hypothetical ones, instead of foreground premium estimating.

Although less so with the mobility of shipping, for static Non-Marine losses aggregating the exposure by zone is also important (eg US Earthquake (California) and Hurricane (East Coast)) to estimate outwards reinsurance requirements as well as cash flow/capital strains.

The actual underwriting is based on a demand/supply capacity interaction. LMX underwriters are generally experienced as they must have their fingers on the pulse of the market. It is important that they have witnessed both hard and soft markets to help in their judgement of a changing marketplace. The LMX underwriter will normally see, and accept, many more risks than say the medical malpractice underwriter, and base his decision on far less data and fewer calculations.

The risk described is at a high level with a low frequency. Clearly an occurrence affecting this Lloyd's Syndicate will also affect a large number of others thus increasing the chances of accumulation (hence our own reinsurers will be called upon to pay claims to us causing an LMX spiralling effect). It is in effect catastrophe reinsurance given the maximum limits of individual risks and programmes.

The premium for the second reinstatement (shown mainly for illustration) is in proportion to the time from the occurrence to the end of the term. The deductions are less for the reinstatement premium as there is unlikely to be any brokerage thereon.

Commenting from an actuarial viewpoint on the adequacy of the 5% premium rate is impossible given the information available here. It is likely that the minimum and deposit will be payable, based as it is on a \$4m accounted premium.

6. Example E

(i) The Slip

<u>Assured</u>	XYZ Insurance Company, UK.
<u>Period</u>	Claims occurring between 1 January 1987 and 31 December 1987.
<u>Type</u>	UK Motor excess of Loss
<u>Class</u>	Motor written by the ceding company
<u>Limits</u>	To pay £250,000 excess of £250,000 ultimate net loss, each and every loss/occurrence or series of losses/occurrences out of any one event.
<u>Rates</u>	£264,000 minimum and deposit payable in 2 instalments on 1 January 1987 and 1 July 1987, adjustable at 2.2% of GNWPI
<u>Reinstatement</u>	Unlimited free
<u>Brokerage</u>	10%

(ii) The Information

- (a) The development of F.G.U. incurred losses to date in £ above a specified level. This level should ensure that after allowance for inflation all claims applicable to the layer to be rated are identified.
- (b) Cedants rateable premium income.
The figures provided would make no allowance for IBNR.

(iii) Assessment

The cedant premium income and incurred claims for each underwriting year are revalued to 1987 by a suitable index or indices. The index might be based on average earnings plus an allowance for social inflation in respect of claims.

E.G.	U/W Year	Average Earnings	Plus 10% Social Inflation	Cumulative
	-----	-----	-----	-----
	78	14.6	16.1	2.71
	79	15.3	16.9	2.32
	80	18.8	20.6	1.92
	81	13.4	14.7	1.68
	82	11.4	12.5	1.49
	83	8.6	9.4	1.36
	84	5.7	6.3	1.28
	85	11.2	12.3	1.14
	86	7.5	8.3	1.06
	87	5.0	5.5	1.00

This would result in the following revalued premiums :

<u>U/W Year</u>	<u>Revalued Premiums</u>
78	17,003,000
79	18,852,000
80	17,239,000
81	14,191,000
82	11,900,000
83	15,079,000
84	15,772,000
85	16,310,000
86	14,506,000
87 (Est.)	15,000,000

Revaluing the F.G.U. losses in each underwriting year by the above cumulative factors to 1987 and applying the limit and deductible give the development of the cost to the layer as follows:

	1	2	3	4	5	6	7	8	9
1978	97,049	186,606	500,000	500,000	500,000	500,000	533,055	533,568	624,868
1979	260,848	169,526	111,094	111,094	271,696	266,959	319,931	256,057	
1980	-	82,261	188,126	423,462	423,113	333,884	172,039		
1981	-	-	-	-	-	-			
1982	-	-	-	253	-				
1983	-	-	-	254,835					
1984	-	248,672	249,603						
1985	-	1,657							
1986 -									

Similar developments are obtained for frequency and burning cost.

From these the ultimate cost can be obtained in the first instance by a chain-ladder method although care is needed because

- (a) The accuracy of case-estimates will influence the development
- (b) Numbers of claims may amount only to 2 or 3 a year and therefore the projection may be of little value.

Numbers of claims are obviously important particularly with a small "stretch" of cover.

The rate is taken as an average of the ultimate costs in each year expressed as a percentage of the cedant premium income.

The final rate is loaded by 100/80 for brokerage and expenses and further for security loading and profit. Hence the rate on the slip is derived.

iv) Explanation

This example is a working excess of loss of U.K. motor business. This would normally be written on an indexed basis which can be rated by increasing the limit and deductible for an average settlement period and reworking the claims that hit the layer.

The projection to ultimate may instead be based on a wider book of business, i.e. modelled on the aggregate of similar data.

Allowance for very large claims not on the individual experience will need to be considered.

Numbers of vehicles could also be of use in assessing changes in exposure.

7. Conclusion

The above examples have been selected to illustrate a few techniques used in London Market pricing. Many other methods exist. It must be emphasised that small changes in assumptions, especially for IBNR and adequacy of given outstanding claims, may change the estimate of the premium rate drastically!

For further reading - Reinsurance Underwriting by Robert Kiln, published by IRRG.

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