

Reinsurance Pricing

The Actuarial and Underwriting Connection

AS ACTUARIES BECOME MORE INVOLVED IN THE PRICING OF TREATY REINSURANCE BUSINESS, either by directly analyzing the claims experience and exposures or by an internal referral path from underwriters, the question of whether actuaries should understand policy wordings and slips becomes more important.

Experience pricing focuses on claims information, and many actuaries will regularly request more years of claims history without regard for the cover being given by the wording of the coming period and portfolio. Claims analyses using ever-developing techniques will be useful only if historical claims match the terms and conditions being offered or if some allowance is made for the differences.

Much has been written about the pricing of reinsurance business using specific distributions and techniques. This article presents a broader approach to pricing and some considerations within this approach. In addition to looking at the numbers, actuaries should consider the words behind those numbers to provide the best results. This is the only way to ensure the teaming of underwriters and actuaries is aligned with business needs and goals.

What Are We Pricing?

Is it reasonable to think that slips and wordings, the traditional responsibility of an underwriter, are aspects of the underwriting process in which an actuary need not be in-

involved? After all, the actuary focuses on the numbers. But if the contract contains a clause that is substantial in terms of the exposures yet isn't represented in the claims experience, then the value of the actuary's claims analysis that ignores that clause is questionable.

How can an actuary price a piece of business without seeing the wording or understanding the coverage being provided? In this case, what exactly is being priced?

This is like asking a builder, "Can you build a house for \$100,000?" The likely response would be "Yes, but what do you call a house?"

"To avoid major blunders," says Gary S. Patrik in *Foundations of Casualty Actuarial Science* (2001), "an underwriter/actuary must always understand as well as possible the underlying primary insurance exposure and must always be aware of the differences between the reinsurance cover contemplated and that primary exposure."

In other words, it's important for the actuary to understand the "reinsurance cover contemplated" and the "underlying primary insurance exposure" within the context of



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FIGURE 1
Control cycle

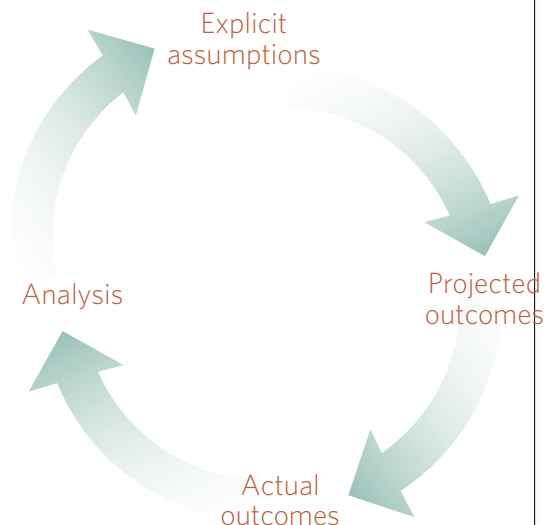
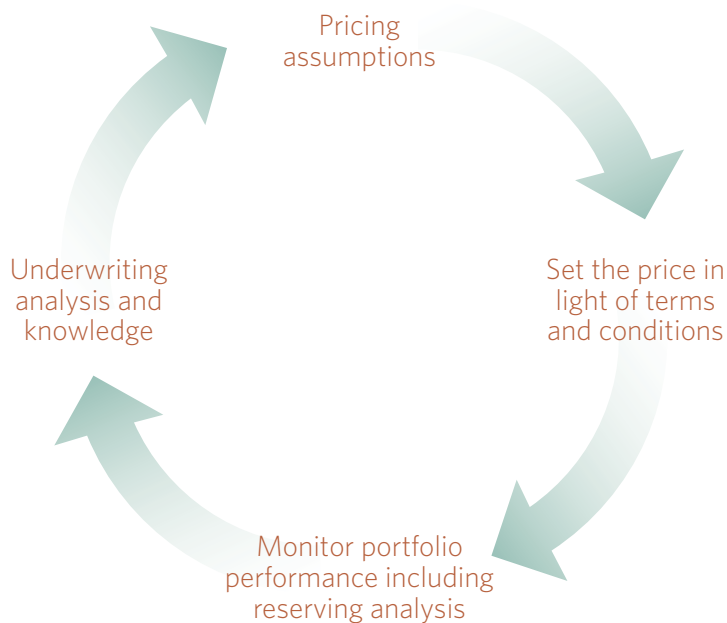


FIGURE 2
Interaction between actuaries and underwriters



All are working together—pricing actuaries, reserving actuaries, and underwriters.

the data provided to price the reinsurance business. Not having this understanding of both can lead to less than optimal results.

It may appear obvious that the actuary should clearly understand what's being priced. In many cases, however, the actuary may be involved in pricing a deal using a simple e-mail that describes the basic structural elements, together with a claim file attachment.

This may certainly be viewed as efficient, but is it optimal?

To think differently, consider the linked process in Fig. 1: Take a view on the subject, test it, and learn from the result. Then feed what was learned back into the next view. This is called the control cycle.

Then consider the interaction between actuaries and underwriters in reinsurance deals—pricing and underwriting in a collective sense (Fig. 2):

All are working together—pricing actuaries, reserving actuaries, and underwriters. Accordingly, it makes sense for actuaries to price the business with a complete knowledge of the underwriting considerations—not at the individual risk or exclusion

TABLE 1
Individual claims information received as part of pricing a non-proportional layer of USD 750,000 excess of USD 750,000

Year	Original claims A	Limit written B	Loss to layer C	As-if claims D	Loss to layer (as-if) E
1991	1,000,000	1,000,000	250,000	1,500,000	750,000
1991	550,000	1,000,000		550,000	
1992	600,000	1,000,000		600,000	
1992	900,000	1,000,000	150,000	900,000	150,000
1993	700,000	1,000,000		700,000	
1994	1,000,000	1,000,000	250,000	1,300,000	550,000
1996	1,000,000	1,000,000	250,000	1,450,000	700,000
1996	890,000	1,000,000	140,000	890,000	140,000
1997	1,000,000	1,000,000	250,000	1,400,000	650,000
1997	1,000,000	1,000,000	250,000	1,100,000	350,000
1998	1,000,000	1,000,000	250,000	1,200,000	450,000
1998	1,000,000	1,000,000	250,000	1,200,000	450,000
1999	620,000	1,500,000		620,000	
1999	1,350,000	1,500,000	600,000	1,350,000	600,000
2000	1,500,000	1,500,000	750,000	1,500,000	750,000

level, perhaps, but certainly with a solid understanding of what coverages are proposed and how this relates to the historical information received.

With this in mind, actuaries need to explore some crucial aspects of the reinsurance cover being provided.

Key Clauses to Consider

While there are many contract features an actuary should understand, some of which may be complex, there are also some simple features that, if the actuary isn't aware, can make pricing analysis less accurate:

The loss trigger applying to original policies; claims made or occurrence basis?

■ Should there be allowance for incurred but not reported (IBNR) claims? Is there a reporting tail to be considered?

■ If the loss trigger is claims made, then what is known about the exposures before the inception of this contract? Was there a period some years ago in which the reinsured undertook a high-risk occupational activity no longer undertaken but covered under the terms of the contract?

Inception and expiry; losses occurring during or risks-attaching?

■ Under a risks-attaching definition, the contract will be covering loss exposures for the next 24 months, assuming all original policies are issued for a 12-month period and they're written evenly over the year.

■ The average date for future inflation will typically be six months later for a risks-attaching cover than for a losses-occurring cover.

■ Under a losses-occurring treaty, unexpired risk exposures on policies issued during the 12 months prior to the inception of the treaty will fall into this treaty year, so the impact of any change in underwriting stance for the coming year will be blended with prior underwriting practices.

Definitions of loss/loss occurrence (including ultimate net loss), risk, and event.

Each of these frequently used terms can result in a very different loss analysis according to the specific definition and the reinsurance structure. An example is whether losses are to be aggregated when applying the retention on a non-propor-

TABLE 2
Analysis of average loss to layer—original and revalued

Year	Average loss to layer	Average loss to layer (as-if)
1991	250,000	750,000
1992	150,000	150,000
1993	0	0
1994	250,000	550,000
1995	0	0
1996	195,000	420,000
1997	250,000	500,000
1998	250,000	500,000
1999	600,000	600,000
2000	750,000	750,000
Average all years (calculated from Table 1)	308,182	512,727
Average per annum rate of increase 1996 - 2000	40.0%	15.6%
Selected Average*	700,000	600,000

**Note: The range of possible selections is vast, and will vary from actuary to actuary, but the intention is to show the impact of placing relevance on recent loss information in the absence of the complete picture.*

tional treaty, or whether they're to be treated as separate.

A painful reminder of the importance of agreed definitions is the recent pension mis-selling case in the United Kingdom, *Lloyds TSB General Insurance Holdings and others v. Lloyds Bank Group Insurance Company Limited*. The decision of the House of Lords overturned a prior Court of Appeal decision permitting aggregation of the losses. Each instance of negligence was deemed by the court to be a separate act, thereby leaving no loss to reach the reinsurance attachment point. The aggregate loss would have resulted in a substantial recovery for the reinsured. *Are the insurance and reinsurance limits expressed inclusive of costs?*

Costs arising from the defense of a claim can add a significant amount to the indemnity payable. If the limits are exclusive of costs, then some allowance for costs needs to be made in the pricing of

the deal. Check to see if the data breaks out costs separately to indemnity.

It also pays to check clauses in the original policy. A change to original policy deductibles is a good example.

What are the premium payment terms?

Although not a major element in the pricing of business, the premium cash flow should nevertheless be considered. If the premium is to be paid 12 months in arrears, a higher rate would certainly be charged than for premium paid fully at inception.

If the premium is substantial and payable in installments over the treaty year, one might consider the credit risk of the cedant.

The Importance of Information

Consider the following claims experience, presented in Table 1. There is 10 years of data on this treaty, so the information is fairly comprehensive; certainly

the usual data requirements would most likely have been met.

But in this data period, there has been a change in the underlying insurance contracts. The earlier years had smaller limits of indemnity, with several claims at or near these limits. In the later years, the limit has been increased—as seen in Column B, 1999. The data should, of course, be interpreted in light of the proposed contract terms of the coming reinsurance period. This requires the actuary to understand both what is proposed and what changes were made during the period.

By reviewing the historical claims in years 1991, 1994, 1996, 1997, and 1998, shown in Column D to reflect the higher limits offered in the coming treaty period (perhaps by accessing claim information on overlying, or top-up, policies), the av-

erage loss to the layer increased substantially, from \$308,182 to \$512,727, as shown in Table 2.

In pricing such a deal using the original loss information only, an actuary might regard the trend toward higher claim amounts in recent years as a feature to be incorporated into the prediction for the average claim size in the next year. On a simple enough basis, this may be approximately \$700,000.

Using the adjusted losses would change the view on this trend, as the older losses are more in line with the recent losses. An average claim size pick on this basis might be \$600,000, although noting the tendency for higher claims to arise.

Of course, when the revalued claims are seen, the predicted trend in the original values appears excessive. But this additional data may not have been available,

and one wouldn't be able to draw such a comparison. The additional information was valuable and helped the actuary avoid taking too harsh a view on the trend when establishing price.

Conclusion

Underwriters and actuaries should work together, benefiting from their respective skills and knowledge. Communication from underwriters on changing reinsurance terms and conditions, the intent behind them, and underlying exposures is invaluable to the work of actuaries. Likewise, actuaries should communicate their work to underwriters—the assumptions taken and the reasons behind such assumptions. Ultimately, underwriting and pricing can't be considered as separate and disparate activities. ●



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