Swiss Re

Reinsurance Reserving Through the Underwriting Cycle

Presented by:
Robert Giambo
Managing Director
Risk and Actuarial Management, P&C America
Swiss Reinsurance America Corp.

What Are The Issues?

- Does the P&C industry have a reserving problem? Are loss reserves just too unstable to set accurately?

  OR

- Does the P&C industry have a pricing problem that drives a reserving problem?

Swiss Re

Historical Reinsurance Development vs. the Cycle

1. Historically for reinsurers, adverse development only occurred during soft market accident years.

2. Historically for reinsurers, hard market years develop favorably.

3. For reinsurers, the years 1989-1996 are remarkably stable

Accident Year	Original Reserves	Developed Reserves	Adv/ (Fav) Dev	Percent Develop	after
1984	3.6	6.0	2.4	66.7%	10 years
1985	4.2	5.6	1.4	33.3%	10 years
1986	6.2	5.5	-0.7	-11.3%	10 years
1987	6.7	5.1	-1.6	-23.9%	10 years
1988	6.0	4.9	-1.1	-18.3%	10 years
1989	6.1	5.8	-0.3	-4.9%	9 years
1990	6.4	6.1	-0.3	-4.7%	10 years
1991	7.2	6.8	-0.4	-5.6%	10 years
1992	7.7	7.7	0.0	0.0%	10 years
1993	8.3	7.8	-0.5	-6.0%	9 years
1994	8.9	8.5	-0.4	-4.5%	10 years
1995	9.6	9.0	-0.6	-6.4%	10 years
1996	10.1	10.6	0.5	5.1%	10 years
1997	10.1	11.5	1.3	13.2%	10 years
1998	10.1	14.7	4.6	45.3%	10 years
1999	11.1	16.6	5.5	49.5%	10 years
2000	11.3	16.8	5.5	48.7%	9 years
2001	15.5	17.8	2.2	14.4%	8 years
2002	12.1	12.3	0.2	1.5%	7 years
2003	13.0	10.8	-2.2	-16.7%	6 years
2004	13.5	11.9	-1.6	-11.6%	5 years
2005	16.0	15.0	-1.0	-6.2%	4 years
2006	11.7	10.5	-1.1	-9.5%	3 years
2007	11.8	11.3	-0.5	-4.3%	2 year
2008	13.2	13.2	0.0	0.0%	1 year

Source: Bests Aggregates and Averages

Swiss Re

Historical Premium and Loss
US P&C Primary Industry
Commercial Auto/ Truck Liability/ Medical

1. **Losses grew less than 3% per year over last 20 years.**
2. **Premium remained static from 1987 to 1999 as losses grew more than 50%.**
4. **Premium and loss static since 2003. However, some downward trend now seen in 2008 premium.**

Accident Year	Gross Earned Premium	Estimated Ultimate Loss	Estimated Ultimate LR
1984	$ 6.46	$ 8.41	130%
1985	$ 8.66	$ 9.65	111%
1986	$ 13.11	$ 9.88	75%
1987	$ 14.99	$ 10.80	72%
1988	$ 14.76	$ 11.41	77%
1989	$ 15.04	$ 12.18	81%
1990	$ 15.02	$ 11.83	79%
1991	$ 14.75	$ 10.80	73%
1992	$ 14.87	$ 10.95	74%
1993	$ 15.23	$ 11.78	77%
1994	$ 15.75	$ 13.15	83%
1995	$ 15.12	$ 12.54	83%
1996	$ 15.27	$ 13.22	87%
1997	$ 15.34	$ 14.05	92%
1998	$ 15.01	$ 14.46	96%
1999	$ 15.46	$ 16.02	104%
2000	$ 17.08	$ 17.07	100%
2001	$ 18.67	$ 16.64	89%
2002	$ 21.97	$ 16.19	74%
2003	$ 24.05	$ 15.73	65%
2004	$ 24.49	$ 15.79	64%
2005	$ 25.09	$ 16.17	64%
2006	$ 24.88	$ 16.34	66%
2007	$ 24.32	$ 16.50	68%
2008	$ 22.91	$ 15.97	70%
Total	$ 428.31	$ 337.55	79%
Annual Growth			
1987-2008 (Exp. Fit)	3.0%	2.3%	
1987-2008	2.0%	1.9%	

Source: AM Bests Averages and Averages

Historical Premium and Loss
US P&C Primary Industry
Other Liability / Occ + Products Occ / Clmd

Swiss Re

c

Accident Year	Gross Earned Premium	Estimated Ultimate Loss	Estimated Ultimate LR
1984	$ 9.43	$ 19.81	210%
1985	$ 14.55	$ 19.40	133%
1986	$ 25.49	$ 15.16	59%
1987	$ 26.15	$ 13.59	52%
1988	$ 23.64	$ 13.93	59%
1989	$ 21.58	$ 14.36	67%
1990	$ 21.12	$ 14.83	70%
1991	$ 20.18	$ 14.45	72%
1992	$ 19.64	$ 14.17	72%
1993	$ 19.66	$ 14.75	75%
1994	$ 20.82	$ 15.97	77%
1995	$ 19.77	$ 15.72	79%
1996	$ 19.16	$ 16.32	85%
1997	$ 19.55	$ 18.56	95%
1998	$ 20.80	$ 22.56	108%
1999	$ 21.90	$ 27.20	124%
2000	$ 23.39	$ 28.75	123%
2001	$ 28.77	$ 30.77	107%
2002	$ 34.19	$ 27.25	80%
2003	$ 41.44	$ 26.34	64%
2004	$ 46.02	$ 24.91	54%
2005	$ 47.72	$ 26.83	56%
2006	$ 49.10	$ 29.84	61%
2007	$ 48.26	$ 31.64	66%
2008	$ 44.30	$ 31.57	71%
Total	$ 686.65	$ 528.69	77%
Annual Growth			
1987-2008 (Exp. Fit)	4.5%	4.8%	
1987-2008	2.5%	4.1%	

Source: AM Bests Averages and Averages

Note: Other Liability – Claims-made shows a more discontinuous trend in losses due to D&O. Thus was not included in this exhibit

What Are The Issues?

- Conclusion:
  - The ability to reserve accurately is related to our understanding of how the business is priced.
  - Pricing problems seem to more on the premium side than the loss side.
  - Therefore the reserving actuary needs to understand the pricing of underlying business and monitor pricing trends.

Methods for Incorporating Pricing Info Into Reserving

Swiss Re

Technique	Primary Company	Reinsurer
Price Monitoring Systems	• Relatively straightforward for renewal business or where only filed rates are used • What to do about new business? • Incorporating coverage changes?	• Added layer of complexity to aggregate results of multiple treaties • Need to incorporate reinsurance rate change on XOL? • Incorporating coverage changes? • **Generally reinsurers will capture the pricing loss ratio by individual treaty and use as reserving starting point**.
Underwriting / Pricing Audits		• This is internal audit within the reinsurer not of ceding companies. • To insure integrity of pricing loss ratio recorded. • Look for "drift" in pricing parameters and assumptions • Reserving actuaries should be involved.
Roll-Forward of Historical Loss Ratios to Current Year	• Basically equivalent to a ratemaking exercise at current year levels •Should check that pricing and reserving data shows consistent results – reconcile if views are different.	• More complex because of less accurate information on rate changes and excess trend. • A double check for the current year pricing loss ratio

Reserving Outward Reinsurance

- Preferred way to reserve outward reinsurance:
  - quota share: Do gross (subject to qs), then ceded and derive net.
  - excess of loss: **Do net, then ceded, and derive assumed.**
  - aggregate stop-loss, nat cat: Do assumed, then ceded and derive net

Reserving Outward Reinsurance Excess of Loss

Swiss Re

- Considerations:
  - Extremely helpful if the ceding company does its own pricing of the excess of loss treaty. Can be a source of:
    - APLR for BF indications
    - Development factors
  - May want different development factors by treaty year if retention changes
  - What to do if data is organized by accident year but treaty applies on underwriting year basis?
  - Consider a “Cape-Cod” approach to APLR’s

Sample Cape Cod Calculation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			= (2) x Mult	= (3) x (1)		= (1) - (5)		= (4) x (5)	
Year	Earned Premium	Pricing Loss Ratio	Initial Expected Loss Ratio	Initial Expected Losses	Expected % Reported	Expected % Unreported	Actual Reported Loss	Expected Reported Loss	Indicated IBNR
2003	10,000	80.0%	69.8%	6,979	60.0%	40.0%	6,000	4,188	2,792
2004	10,500	70.0%	61.1%	6,412	50.0%	50.0%	1,000	3,206	3,206
2005	11,000	70.0%	61.1%	6,718	40.0%	60.0%	1,000	2,687	4,031
2006	11,500	80.0%	69.8%	8,026	30.0%	70.0%	4,000	2,408	5,618
2007	12,000	85.0%	74.2%	8,899	20.0%	80.0%	3,000	1,780	7,119
2008	12,500	90.0%	78.5%	9,815	10.0%	90.0%	250	981	8,833
	67,500			46,849			15,250	15,250	31,599

Loss Ratio Multiplier 87.24%

$$Multiplier = \frac{\sum ARL_t}{\sum EP_t \cdot PLR_t \cdot Exp\% Rptd_t}$$

Is There A Correlation Between Cycle and Loss Development Factors?

Swiss Re

- Answer: Not clear
- Two UK studies on this
  - Cycle Survival Kit
    - "The results were not significant enough to confirm or refute our hypothesis beyond doubt. However, when investigating own company data and discussing the issue of development patterns we came up with the following points that are food for thought.
    - Paid and incurred chain ladder projections assume future development patterns will match the past.
    - Incurred patterns are reliant on consistent case reserve setting. In a hard market companies may encourage conservative case setting because they can afford to, and to create cushions for the future. Soft years may produce the opposite effect. Paid patterns may be unaffected."
  - General Insurance Reserving Issues Task Force (GRIT) – A Change Agenda for Reserving
    - "We have investigated the link between the incurred loss ratio at a particular development point and the development factor to ultimate required at that point. This would give a way to use the experience to date to indicate whether an adjustment needs to be made to the historical average development factors. We found little sign of a strong correlation in the Lloyd's statistics, possibly due to distorting large losses early in the development. Again, this is something which actuaries could investigate in their own data."