An Enhanced Understanding of Using the RAA Excess Casualty Loss Development Study For Reserve Analysis

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SCOR

Contents

Defining The Problem

The RAA STUDY

- RAA publishes bi-annual Historical Loss Development Study
- 4 Casualty Lines: Auto, GL, Workers Comp and Med Mal
- 5 Attachment Point Ranges (0, 210K, 500k, 2M, 5.5M)
- Treaty and Facultative Triangles
- Paid and Incurred AY Triangles

Using the RAA STUDY

- Casualty Lines, especially high attachment point lines, don't always have enough credible data
- RAA data used as a benchmark, especially for determining the tail
- By incorporating the RAA studies, the actuary can come to a more reasonable conclusion in selecting an ultimate loss
- The assumption is that a new RAA study will not produce significantly different results than the prior study

However Is This True ???

The Problem

- Significant changes in these benchmarks may lead to significant changes in the reserve indications for reasons which are external to the reserve portfolio.
- Credibility of the actuaries compromised in the eyes of end users of actuarial indications such as company management.
- Understanding why the RAA data has changed can go a long way in minimizing the concerns of management.
- If the newer study does give different results than the prior study, and the actuary does not update his projections, the reserves could wind up being either deficient or redundant.
- Understanding what differences exist, and why they exist, will help the actuary decide when it is appropriate to use the RAA benchmarks and what assumptions should be made in using them.

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Methodology

Methodology

- RAA Studies 2005, 2007, 2009 and 2012
- Auto Liability
  - For simplicity only looked at Auto.
  - Quick review indicated WC and GL similar to Auto
  - Study of WC and GL would be interesting and instructive.
- Incurred Loss Triangles
  - Looked at each attachment point available (Ranges 1-3)
- Calculated LDF of each triangle using same procedure
  - Eliminate bias due to judgmental factor selection
  - All Year Wghtd Avg, Assume high/low outliers balance out
  - Where Cumulative Reptd @ 100%, and 5 yrs experience, then no curve fitting
  - If curve fitting, fit to highest R^2

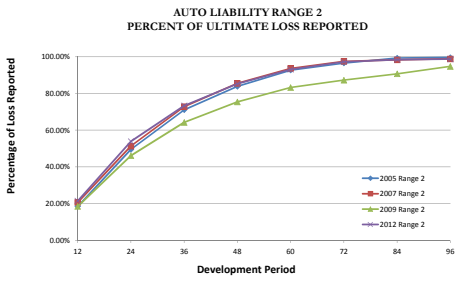
RAA Ranges

Range Name	Attachment Point Range
Range 1	1 to 210,000
Range 2	210,001 to 500,000
Range 3	500,001 to 2,050,000
Range 4	2,050,001 to 5,500,000
Range 5	5,500,001 and greater

For Auto Liability, Range 4 data was only published in the 2005 and 2012 study. Therefore, this paper only focuses on Ranges 1, 2 and 3.

Results

Auto Liability Incurred: Range 2; 210K-500K



Auto Liability Incurred: Range 2; 210K-500K

	12	24	36	48	60	72	84
2007	20.7%	51.4%	72.9%	85.6%	93.7%	97.6%	98.3%
2009	18.6%	46.2%	64.3%	75.5%	83.3%	87.3%	90.8%
% difference	-10.4%	-10.2%	-11.8%	-11.8%	-11.1%	-10.5%	-7.7%

	12	24	36	48	60	72	84
2009	18.6%	46.2%	64.3%	75.5%	83.3%	87.3%	90.8%
2012	21.5%	53.9%	73.4%	85.3%	93.2%	97.3%	98.4%
% difference	16.1%	16.8%	14.1%	13.0%	11.9%	11.4%	8.4%

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Possible Theories

- UW Year Cycle
- Volume Weighted Averages vs Simple Averages
- Commutation Effect
- Data Availability
- Number of Companies Reporting Data

UW YEAR CYCLE

UW Year Cycle

"An underwriting cycle is the cyclical manner in which profits within the sector tend to rise and fall over a period of time."

Is there a connection between the UW Year Cycle and the Reserving Cycle?

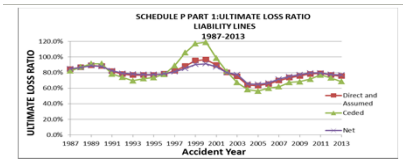
In the Working Party Paper "The Cycle Survival Kit, An investigation into the reserving cycle and other issues" the authors point out that the soft market years appeared to develop more slowly than the hard market years.

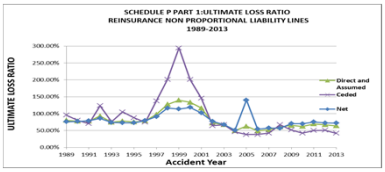
UW Year Cycle

If the soft market years develop more slowly than the hard market years then we could argue that this is driving the difference in the benchmarks.

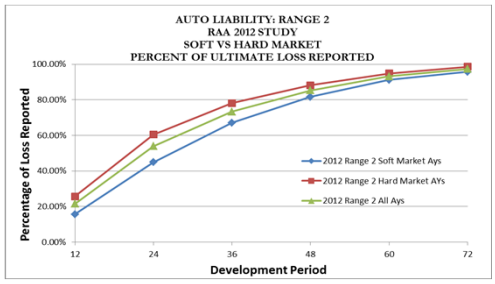
To the extent that a soft market year is given more weight in the average, it would stand to reason that the overall weighted average will be slower. Conversely, if the hard market years are given more weight, then the overall average for a particular period will be faster.

UW Year Cycle: Industry Results

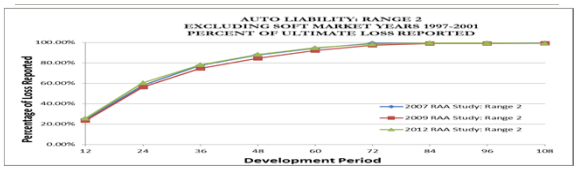


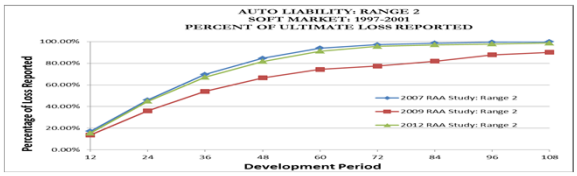


UW Year Cycle: Soft vs Hard, Range 2



UW Year Cycle: Comparison of RAA Studies, Range 2





UW Year Cycle: Impact on the Tail

RAA 2009 Study: Auto Range 2

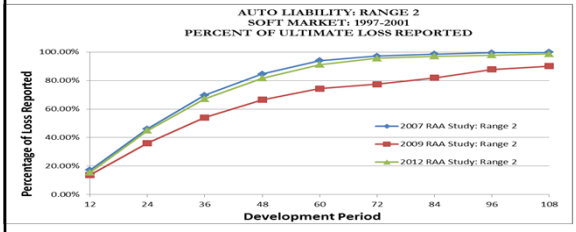
Origin Period	12	24	36	48	60	72	84	96	108	120	132
1997	2.660	1.571	1.313	1.118	1.072	1.012	1.017	1.001	0.998	1.013	1.007
1998	3.093	1.474	1.276	1.107	1.028	1.045	0.999	1.002	0.999	1.020	
1999	2.964	1.473	1.263	1.100	1.013	1.000	1.014	1.016	1.068		
2000	2.690	1.481	1.219	1.160	1.076	1.004	1.167	1.074			
2001	2.039	1.533	1.114	1.108	1.038	1.217	1.143				

RAA 2007 Study: Auto Range 2

Origin Period	12	24	36	48	60	72	84	96	108	120	132
1997	2.691	1.550	1.278	1.109	1.063	1.019	1.011	0.990	0.999		
1998	3.157	1.495	1.267	1.098	1.027	1.037	1.004	0.999			
1999	3.019	1.537	1.234	1.100	1.012	0.998	1.015				
2000	2.548	1.462	1.200	1.149	1.059	1.004					
2001	2.077	1.530	1.103	1.099	1.030						

Volume Weighted vs Simple Averages

Volume Weighted Average: The 2012 Study



Why is the RAA 2012 study not affected by the UW YR Cycle?

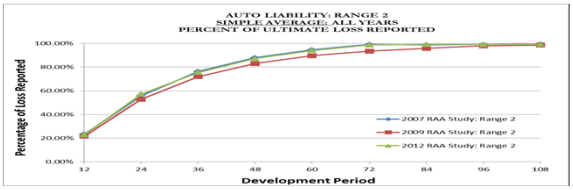
Volume Weighted Average: The 2012 Study

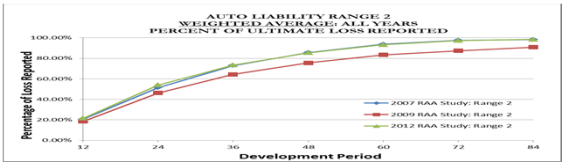
For the 2012 study, the RAA scaled individual company data and adjusted the data volume by applying a certain percentage to the entire triangle.

Although the magnitude of the actual development factors is not affected, the volume of losses is affected.

Given that the patterns were calculated using volume weighted averages, it is quite possible that the volume of data in the 2012 study has been artificially changed, resulting in a different reporting pattern than would otherwise have been calculated.

Volume Weighted Average: Volume vs Simple Avg, Range 2





Volume Weighted Average: Volume vs Simple Avg, Range 2

Range 2, Simple Average

	12	24	36	48	60	72	84
2007	23.3%	55.8%	76.4%	88.0%	94.6%	99.1%	98.8%
2009	21.7%	52.9%	72.0%	83.0%	89.7%	93.5%	95.8%
% difference	-6.8%	-5.1%	-5.8%	-5.6%	-5.2%	-5.6%	-3.0%

	12	24	36	48	60	72	84
2009	21.7%	52.9%	72.0%	83.0%	89.7%	93.5%	95.8%
2012	22.8%	57.3%	75.6%	87.3%	94.0%	98.6%	99.2%
% difference	5.0%	8.3%	5.0%	5.1%	4.8%	5.5%	3.5%

Range 2, Volume Weighted Average

	12	24	36	48	60	72	84
2007	20.7%	51.4%	72.9%	85.6%	93.7%	97.6%	98.3%
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2012	21.5%	53.9%	73.4%	85.3%	93.2%	97.3%	98.4%
% difference	11.7%	11.4%	13.3%	13.4%	12.5%	11.7%	8.3%

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Practical Applications

Practical Applications: Relativity Adjustment

Adjusting the tail based on the relativity to RAA data

	(1) Range 3 Age-to-Age	(2) Range 4 Age-to-Age	(1)/(2) Relativity
12	2.25126	2.42411	92.9%
24	1.27361	1.26709	100.5%
36	1.24862	1.14338	109.2%
48	1.14113	1.23178	92.6%
60	1.13399	1.12219	101.1%
72	1.09131	1.04160	104.8%
84	1.07609	1.16705	92.2%
96	1.04185	1.13838	91.5%

Relativity Excluding Soft Market

	(1) Range 3 Age-to- Age	(2) Range 4 Age-to-Age	(1)/(2) Relativity
12	1.85240	2.43082	76.2%
24	1.18198	1.25624	94.1%
36	1.17540	1.13989	103.1%
48	1.11454	1.22035	91.3%
60	1.10902	1.13657	97.6%
72	1.11861	0.98295	113.8%
84	1.07652	1.21306	88.7%
96	1.04258	1.17257	88.9%

Practical Applications: Relativity Adjustment

Conclusion ….

1997-2014 All Year Avg. Including Soft Market

(1) 12-24	(2) 24-36	(3) 36-48	(4) 48-60	(5) 60-72
4.358	4.355	2.154	1.365	1.109

1997-2014 All Year Avg. Excluding Soft Market

(1) 12-24	(2) 24-36	(3) 36-48	(4) 48-60	(5) 60-72
4.246	3.814	1.890	1.239	1.019

The underwriting cycle effect does impact this procedure.

Practical Applications: Tail Factor Adjustment

Adjusting the tail based on the relativity to RAA data

	(1)	(2)= (1)-1	(3)	(4)= (3)-1	(5)=(2)/(4)
Maturity	Experience Age to Age	Development Portion	Benchmark Age to Age	Development Portion	Relativity
12	3.906	2.906	3.960	2.960	98.2%
24	1.837	0.837	1.988	0.988	84.7%
36	1.325	0.325	1.408	0.408	79.6%
48	1.238	0.238	1.256	0.256	93.0%
60	1.191	0.191	1.188	0.188	101.5%
72	1.130	0.130	1.128	0.128	102.0%
84	1.081	0.081	1.064	0.064	126.1%
96	1.073	0.073	1.077	0.077	94.1%
108	1.053	0.053	1.067	0.067	80.3%
120	1.044	0.044	1.041	0.041	108.8%
132	1.029	0.029	1.033	0.033	88.1%
144	1.017	0.017	1.021	0.021	80.0%
156	1.021	0.021	1.034	0.034	63.0%
				Average (last 6 periods)	85.7%
				Tail	1.287
				Adjusted Tail	1.246

Practical Applications: Tail Factor Adjustment

Removing the effect of the Soft Market

Maturity	Experience Age to Age	Development Portion	Benchmark Age to Age	Development Portion	Relativity
12	3.906	2.906	3.869	2.869	101.3%
24	1.837	0.837	1.731	0.731	114.6%
36	1.325	0.325	1.257	0.257	126.3%
48	1.238	0.238	1.222	0.222	107.3%
60	1.191	0.191	1.193	0.193	98.6%
72	1.130	0.130	1.132	0.132	98.3%
84	1.081	0.081	1.097	0.097	83.9%
96	1.073	0.073	1.068	0.068	105.9%
108	1.053	0.053	1.042	0.042	128.5%
120	1.044	0.044	1.048	0.048	93.0%
132	1.029	0.029	1.025	0.025	114.2%
144	1.017	0.017	1.013	0.013	130.1%
156	1.021	0.021	1.010	0.010	221.5%
				Average	122.2%

Practical Applications: Tail Factor Adjustment

Conclusion ….

The underwriting cycle effect does NOT impact this procedure.

This makes sense:

1. We are comparing the RAA benchmark to the experience and applying the adjustment factor to the RAA tail.
2. In scenario 2, the higher adjustment factor is cancelled out by the lower tail.

Practical Applications: Volume Weighted Average

As shown earlier, volume weighted averages might be artificially distorted.

It might be prudent to use simple averages when calculating benchmarks from RAA triangles.

Comments and Feedback ?