

Swiss Re



Costing Reserving Linkage

An Approach to Formalize the Interaction Between Pricing and Reserving Actuaries



Agenda

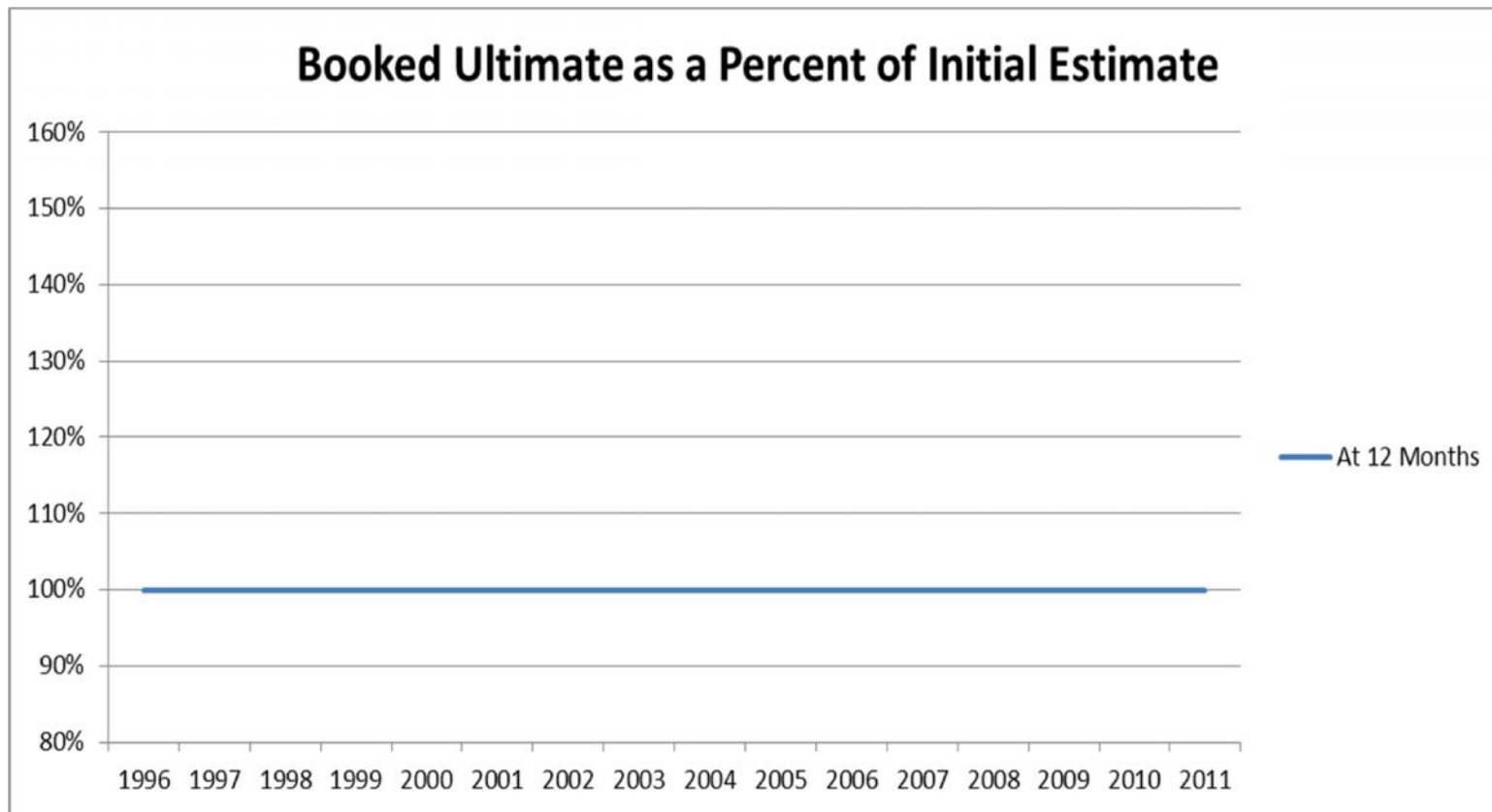
- Industry Data
- Approach Taken by Swiss Re to Formalize the Interaction
- The 'Discussion Guide'



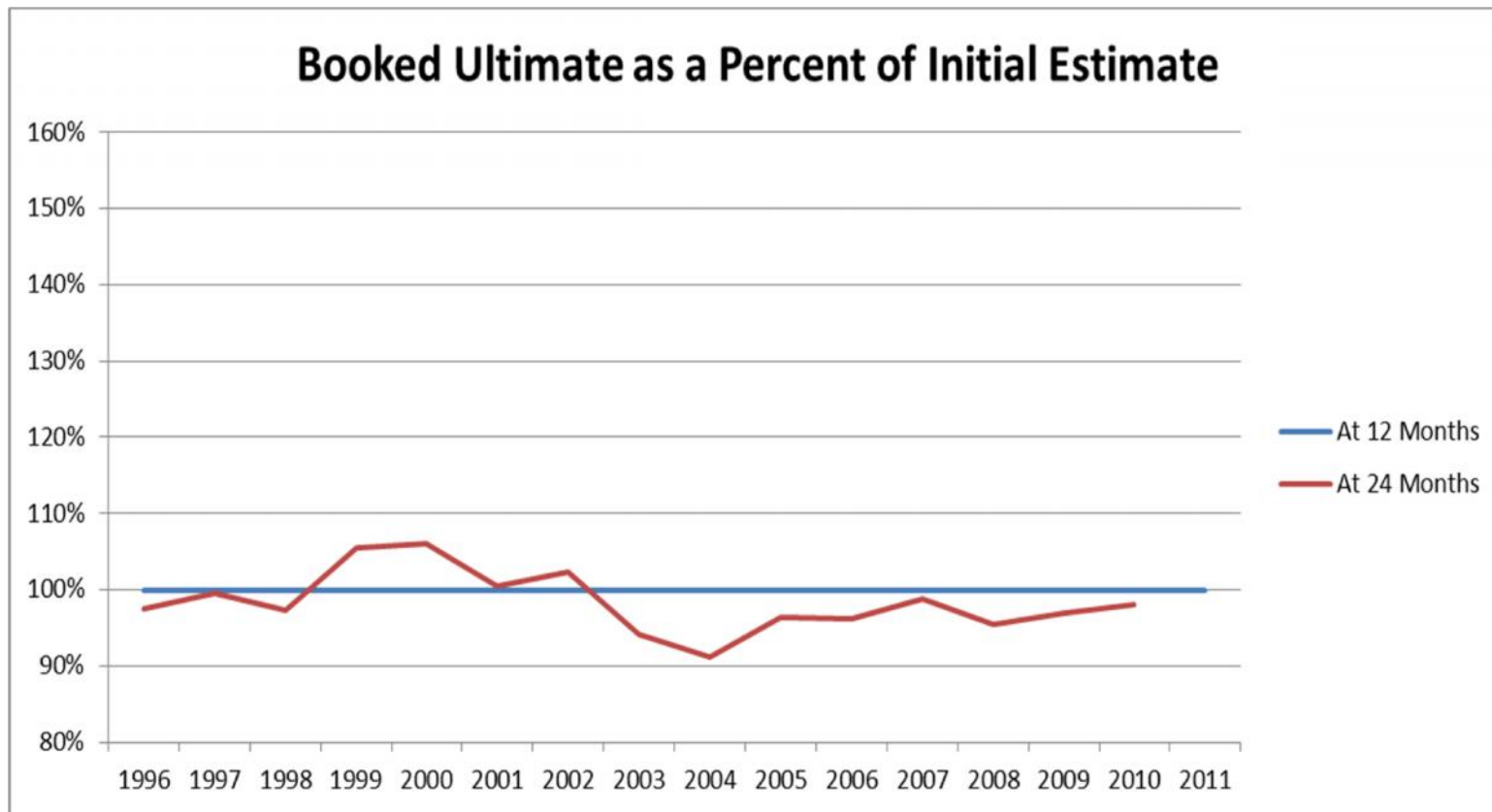
Industry Data

- Ultimate Loss Ratio Estimates and the Importance of the Initial Estimate

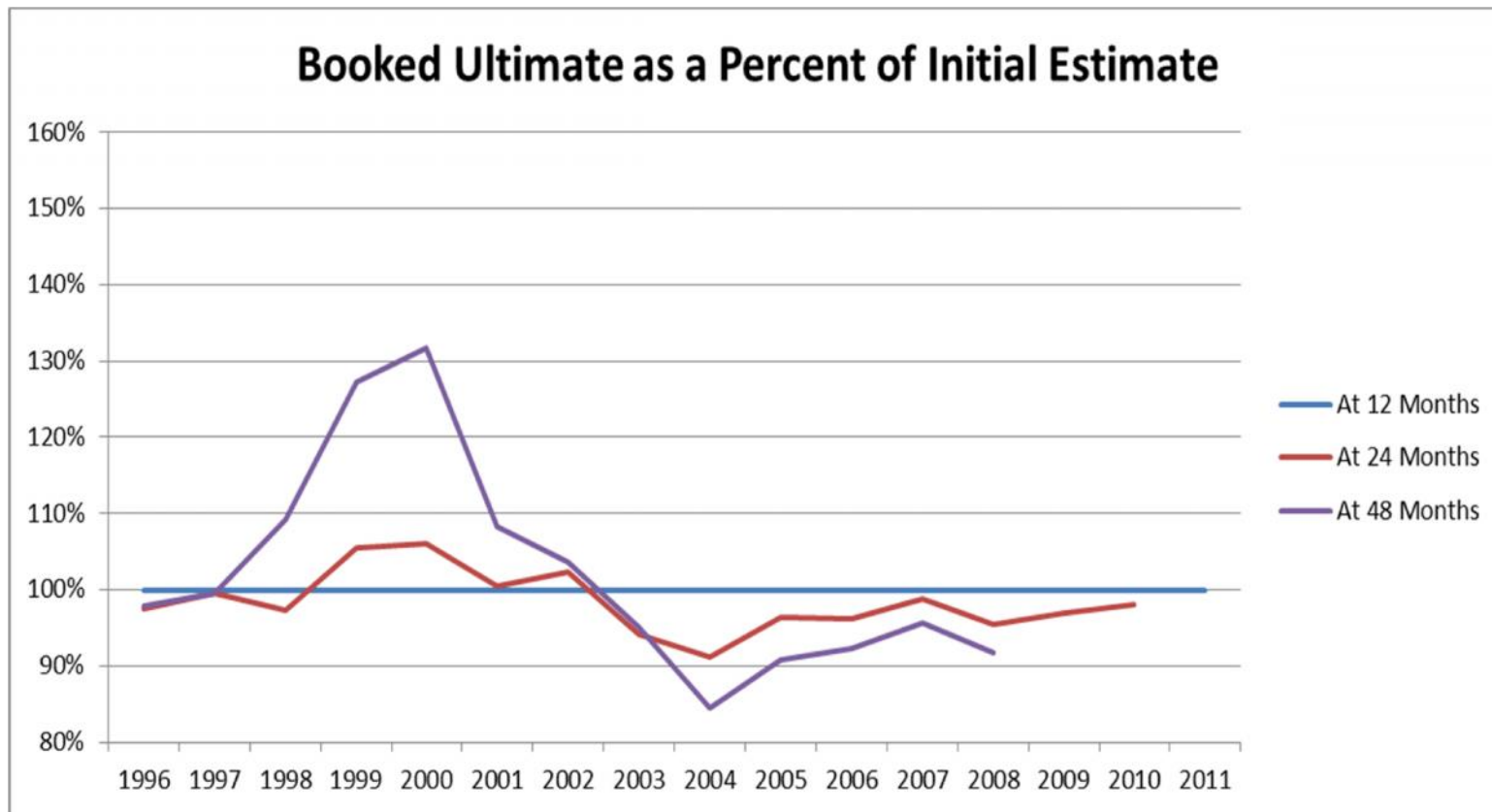
P&C Industry Data Other Liability Occurrence Schedule P Part 1 – Gross Data



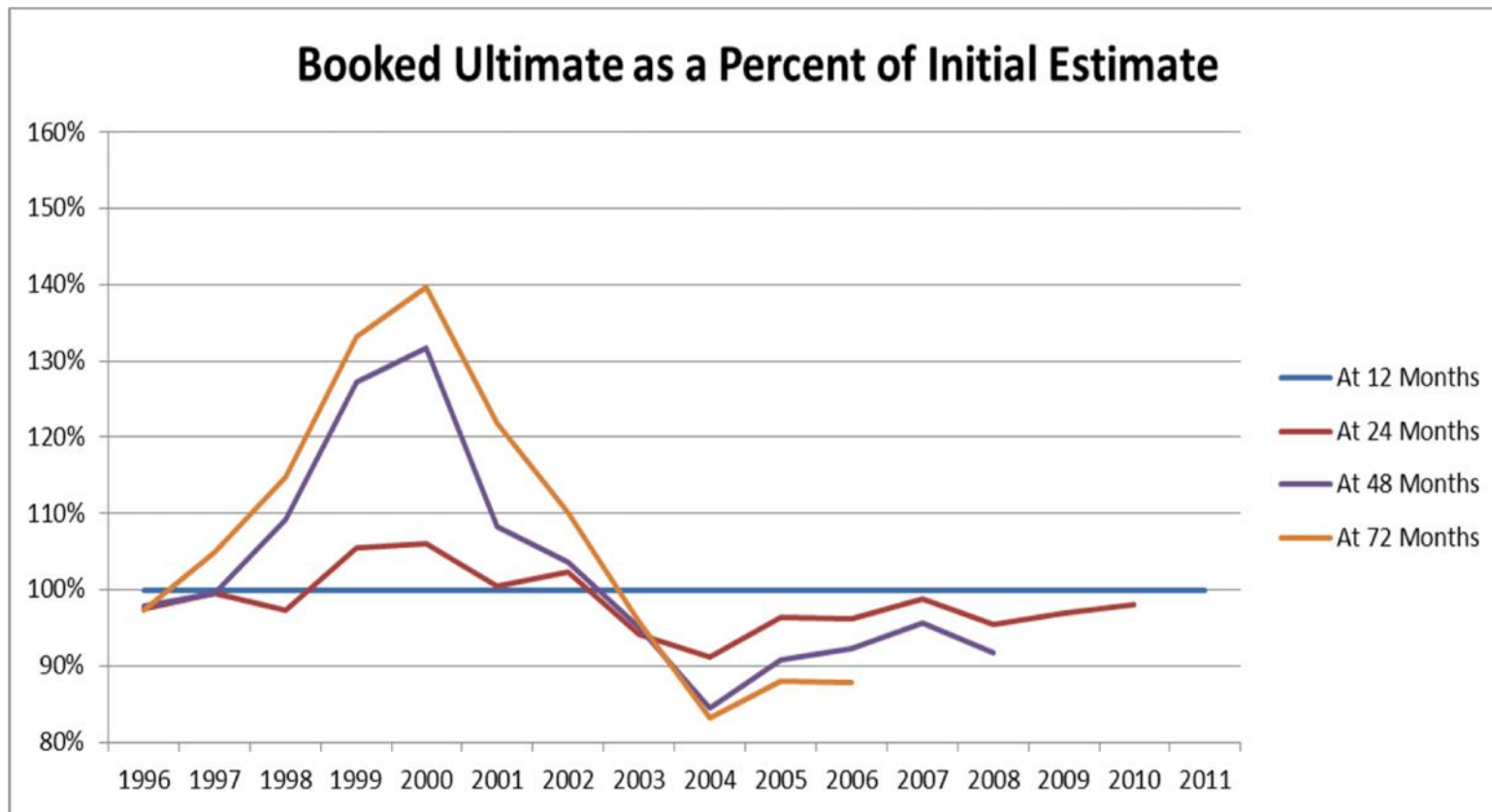
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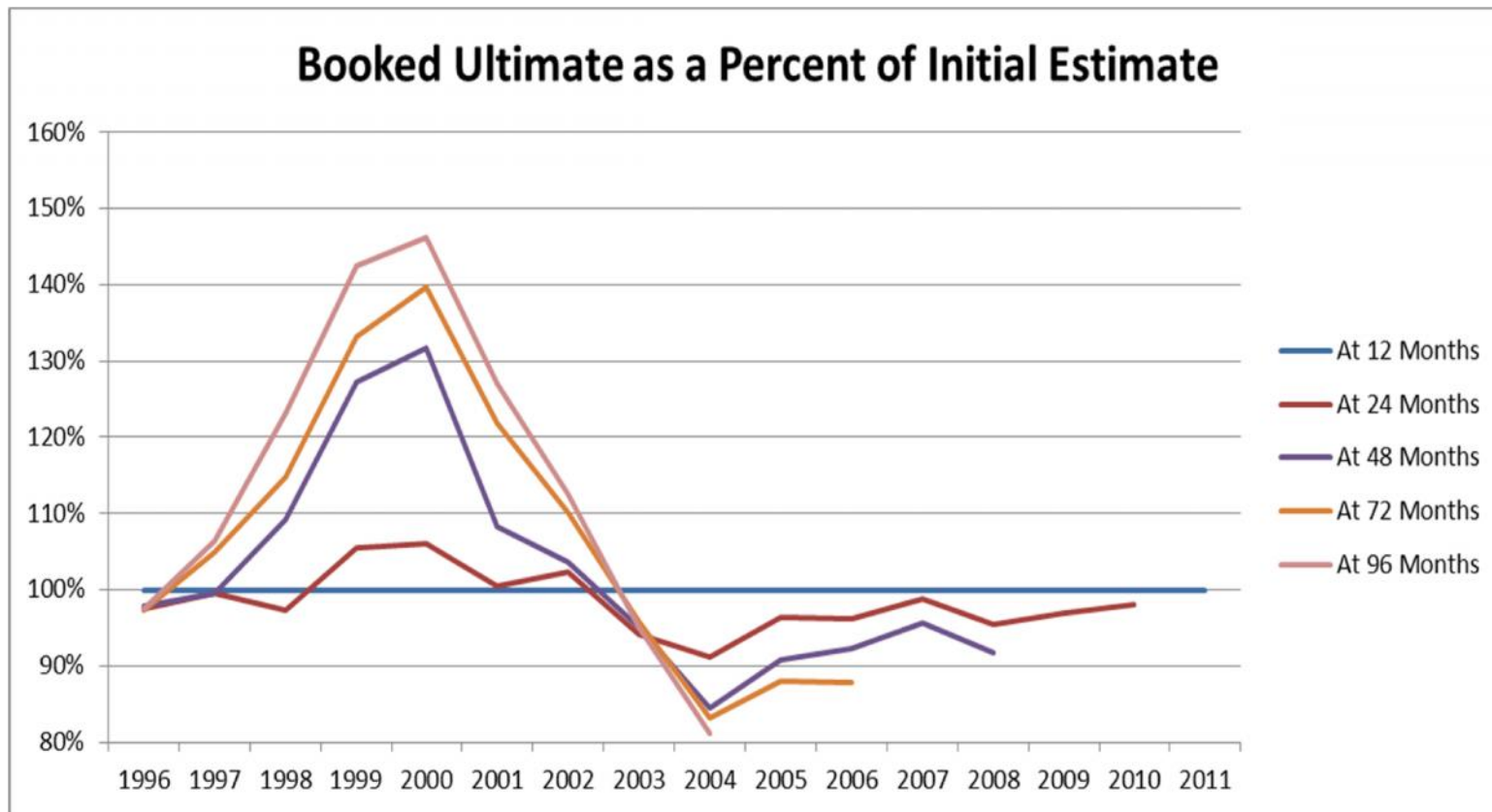
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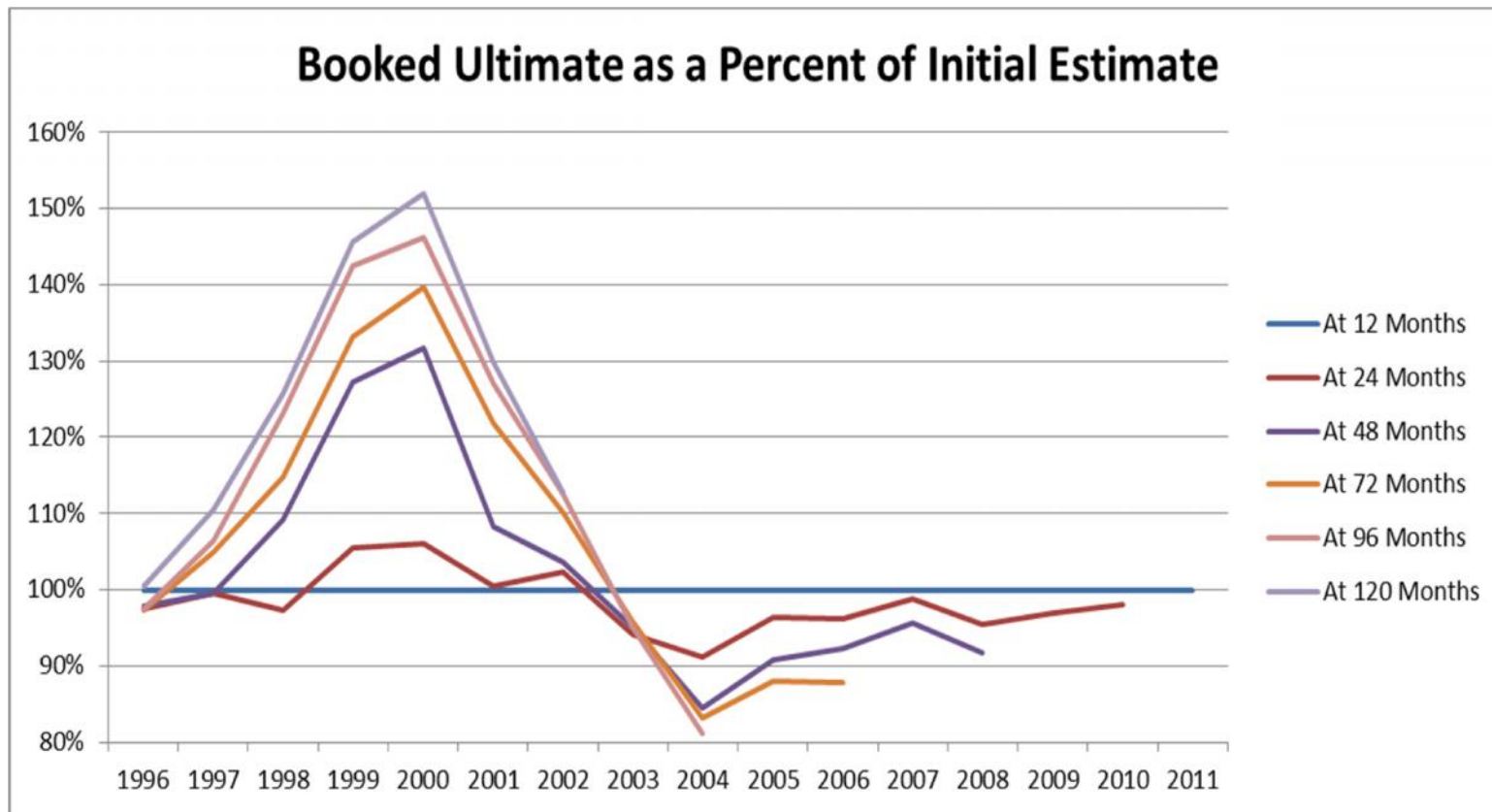
P&C Industry Data Other Liability Occurrence Schedule P Part 1 – Gross Data



P&C Industry Data Other Liability Occurrence Schedule P Part 1 – Gross Data



P&C Industry Data Other Liability Occurrence Schedule P Part 1 – Gross Data



Importance of Interaction Between Pricing, Reserving, and Claims Departments

- Reserving is dependent on initial costing estimates from pricing actuaries / underwriters
- Claims departments can notify actuaries of trends not yet seen in the data
- Costing adequacy and unbiased reserving are critical to intelligent cycle management
- By reconciling the views of the different teams regarding projected profitability of the more recent underwriting years, companies are better equipped to proactively deal with the cycle, make effective strategic decisions, and set accurate reserves



Approach Taken by Swiss Re to Formalize the Interaction

Approach Taken by Swiss Re

- Swiss Re designed a formal, global process to **validate and optimize the adequacy of initial costing estimates**
- A document called 'The Discussion Guide' serves to consolidate data for a given portfolio from the various functions into one document
 - It is not intended to be evaluated in isolation
 - As its name indicates, it serves as the basis for discussions among those who are involved
 - It is where documentation of discussions, outcomes, action items are retained

Goals

- **Primary goal of the process is to validate or modify the current two underwriting year's costing loss ratio**
- Other discussion points could include
 - Costing model structure or utilization
 - Identification of possible conservatism or optimism in costing practices, including years other than the most recent two
 - Identification of possible improvements to current reserving and costing practices



The 'Discussion Guide'

What Data is Needed?

Data Elements / Qualitative Information

- Costing / Client Markets / Products
 - Original costing estimates of premium and losses for historic and current periods
 - Brief historical view of the portfolio
 - Type of business
 - Classes written
 - Average account size
 - An explanation of recent changes in mix or other drivers that impact the portfolio

Data Elements / Qualitative Information

- Reserving
 - Latest ultimate premium estimates
 - Current reported losses
 - Latest ultimate loss estimates for historic and current periods

Data Elements / Qualitative Information

- Parameter Task Forces
 - Severity trends
 - Frequency trends
 - Primary rate changes
 - Reinsurance rate changes
 - Model changes and impacts of those changes
 - Etc.

Data Elements / Qualitative Information

■ Claims Department

- Is the line of business stable in terms of claim frequency and severity?
- What changes have you seen in the line in the last few years?
- What new kinds of claims have you seen or expect to see?
- Is there any significant legislation or reforms that might impact the line of business being analyzed?
- Any changes in social inflation or claims consciousness anticipated?
- Any changes in the average size of claims and/or changes in the number of claims reported?



The 'Discussion Guide'

Excerpts and Examples

Discussion Guide Exhibits

1. Historical Loss Ratios
2. On-leveled Loss Ratios
3. Backward-Walked Loss Ratios
4. Trended / Fitted Loss Ratios

Discussion Guide Exhibits Historical Loss Ratios

- Compare
 - ✓ Original costing estimates
 - ✓ Reserving ultimate estimates
 - Total book of business
 - Renewed business
 - New business
- No on-leveling
- Provides nice side-by-side comparison of Expected to latest Best Estimate

Discussion Guide Extract

Historical Loss Ratios



Loss Ratios Before Any Adjustments

UY	RESERVING					COSTING	Implied Percent Reported
	Gross Ultimate Premium Earned	Rptd LR	Ultimate LR on All business	Ultimate LR on Renewed from prior year	Ultimate LR on New Business written during year	ELR	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(3)/(4)
2001	365,000	87.5%	95.7%			83.0%	91.5%
2002	617,000	49.6%	56.2%			72.0%	88.3%
2003	633,000	38.9%	45.9%			67.0%	84.7%
2004	723,000	35.8%	45.0%			65.0%	79.4%
2005	785,000	32.8%	48.8%	51.9%	38.6%	68.1%	67.2%
2006	676,000	33.6%	55.9%	55.0%	59.8%	65.0%	60.0%
2007	572,000	29.2%	61.9%	62.4%	59.6%	71.3%	47.2%
2008	444,000	22.9%	62.8%	65.5%	49.2%	73.4%	36.4%
2009	432,000	16.6%	63.7%	66.6%	38.6%	68.6%	26.0%
2010	441,000	6.2%	67.0%	66.6%	68.9%	68.2%	9.3%
2011	455,000	0.8%	71.5%	71.6%	70.9%	68.2%	1.1%
2012	420,000	0.0%	74.0%	62.7%	77.2%	74.0%	

Discussion Guide Extract

Historical Loss Ratios



Discussion Guide Exhibits On-Leveled Loss Ratios

- Bring Ultimate Estimates forward
 - ✓ Total book of business - selected estimates
 - ✓ Total book of business - chain ladder estimates
 - ✓ Estimates of new / renewed business only
- Key feature is that all loss ratios are put on a single common level, which allows us to either compare them simultaneously or to average them together in a meaningful way
- On-leveling process also has its shortcomings, most notably that the on-level factors can be quite sensitive to the selected loss trend and rate change parameters, which are only estimates

Discussion Guide Extract

On-Levelled Loss Ratios

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UY	POLICY GROUP	Gross EP	Rptd LR	Current ULT LR	RESERVING SELECTED ULTIMATE LOSS RATIO							ELR
					ON-LEVELLED FROM							
					2005	2006	2007	2008	2009	2010	2011	
2009	TOTAL RENEWED	388,000	17.3%	66.6%	59.0%	64.7%	64.6%	66.2%				69.5%
	NEW BUS IN 2009	44,000	10.6%	38.6%								60.4%
	ALL	432,000	16.6%	63.7%	56.9%	62.0%	61.9%	63.4%	63.7%			68.6%
	NOT RENEWED IN 2010	50,000	7.0%	52.3%								65.0%
	RENEWED IN 2010	382,000	12.2%	60.2%	53.7%	58.6%	58.4%	59.9%	60.2%			69.3%
2009-2011	Reinsurance LR Trend				1.059	1.059	1.059	1.059	1.059			
2010	TOTAL RENEWED	366,000	6.7%	66.6%	56.9%	62.0%	61.9%	63.4%	63.7%			67.6%
	NEW BUS IN 2010	75,000	3.9%	68.9%								71.4%
	ALL	441,000	6.2%	67.0%	59.0%	63.2%	63.1%	64.4%	64.6%	67.0%		68.2%
	NOT RENEWED IN 2011	60,000	7.6%	62.2%								60.8%
	RENEWED IN 2011	381,000	6.0%	70.4%	62.0%	66.4%	66.3%	67.6%	67.9%	70.4%		69.5%
2010-2011	Reinsurance LR Trend				1.057	1.057	1.057	1.057	1.057	1.057		
2011	TOTAL RENEWED	388,000	0.9%	71.6%	65.5%	70.2%	70.1%	71.5%	71.7%	74.4%		68.1%
	NEW BUS IN 2011	67,000	0.5%	70.9%								68.9%
	ALL	455,000	0.8%	71.5%	66.3%	70.3%	70.2%	71.4%	71.6%	73.9%	71.5%	68.2%
2011-2012	Reinsurance LR Trend				1.052	1.052	1.052	1.052	1.052	1.052	1.052	
2012	PROJECTED FOR YEAR	420,000		74.0%	69.7%	73.9%	73.8%	75.1%	75.3%	77.7%	75.2%	74.0%

Discussion Guide Extract

On-Levelled Loss Ratios



UY	POLICY GROUP	Gross ULT EP	Rptd LR	Current ULT LR	RESERVING							ELR
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2009-2010	Reinsurance LR Trend	↓			1.059	1.059	1.059	1.059	1.059			
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2010-2011	Reinsurance LR Trend				1.057	1.057	1.057	1.057	1.057	1.057		

Discussion Guide Extract

On-Levelled Loss Ratios

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UY	POLICY GROUP	Gross ULT EP	Rptd LR	Current ULT LR	RESERVING							ELR
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									↓			
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Discussion Guide Extract

On-Levelled Loss Ratios



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	RENEWED IN 2011	381,000	6.0%	70.4%	62.0%	66.4%	66.3%	67.6%	67.9%	70.4%		69.5%
2010-2011	Reinsurance LR Trend	Premium Weighted LR = [366 x 63.7% + 75 x 68.9%] / 441							1.057	1.057		

Discussion Guide Extract

On-Levelled Loss Ratios



UY	POLICY GROUP	Gross ULT EP	Rptd LR	Current ULT LR	RESERVING							ELR
					ON LEVEL LR FROM							
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2010-2011	Reinsurance LR Trend								1.057	1.057		
		Premium Weighted LR = $[366 \times 63.7\% + 75 \times 68.9\%] / 441$										
		$67.9\% = [64.6\% / 67.0\%] * 70.4\%$										

Discussion Guide Extract

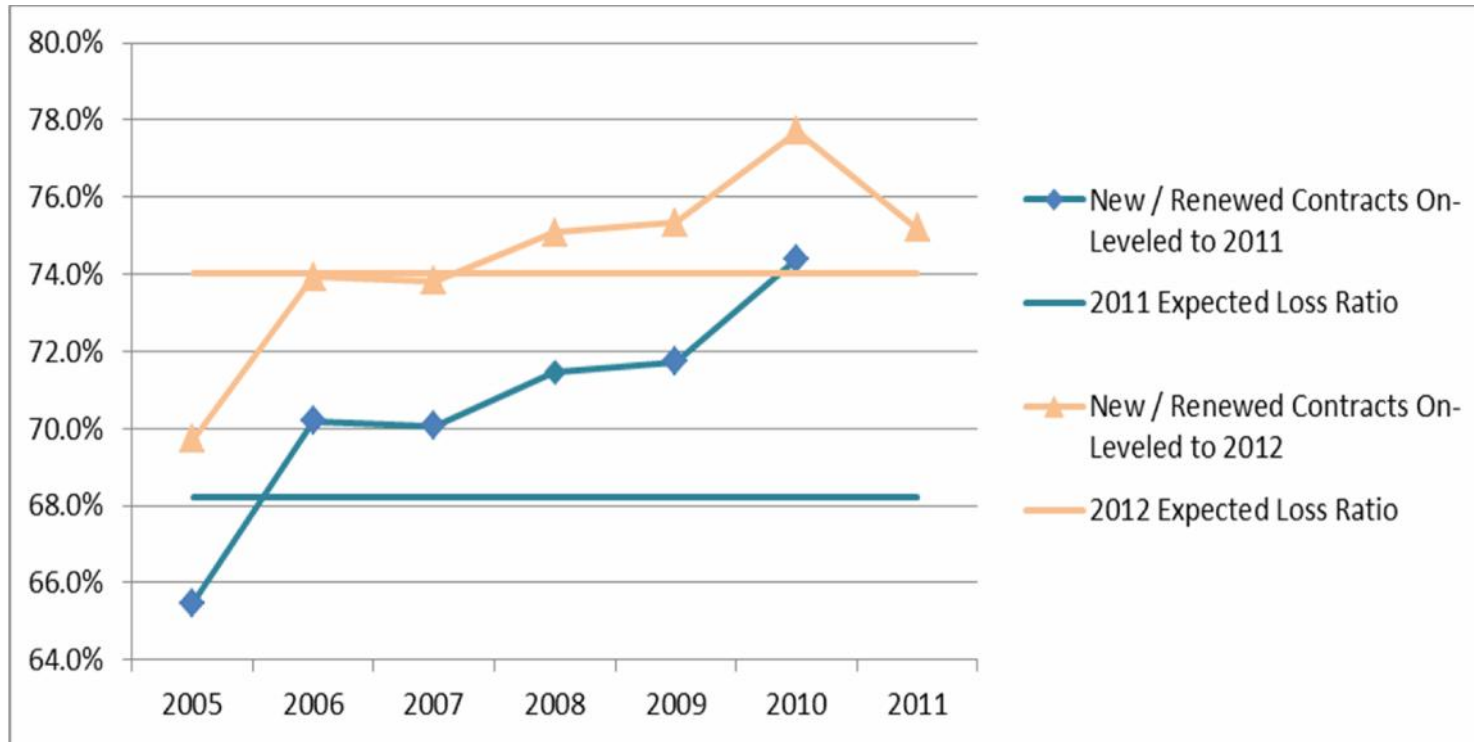
On-Levelled Loss Ratios



UY	RESERVING			COSTING ELR	On-levelled loss ratios based on Reserving selected				
	Gross Ultimate Premium Earned	Rptd LR	Ultimate LR Estimate		Renewals		All		
					Current Ult LR at '11 Level	Current Ult LR at '12 Level	Current Ult LR at '11 Level	Current Ult LR at '12 Level	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
2000	260,000	144.4%	153.5%						
2001	365,000	87.5%	95.7%						
2002	617,000	49.6%	56.2%						
2003	633,000	38.9%	45.9%						
2004	723,000	35.8%	45.0%						
2005	785,000	32.8%	48.8%	68.1%	66.3%	69.7%	67.9%	71.4%	
2006	676,000	33.6%	55.9%	65.0%	70.3%	73.9%	76.8%	80.8%	
2007	572,000	29.2%	61.9%	71.3%	70.2%	73.8%	80.3%	84.5%	
2008	444,000	22.9%	62.8%	73.4%	71.4%	75.1%	73.8%	77.6%	
2009	432,000	16.6%	63.7%	68.6%	71.6%	75.3%	71.4%	75.1%	
2010	441,000	6.2%	67.0%	68.2%	73.9%	77.7%	70.8%	74.5%	
2011	455,000	0.8%	71.5%	68.2%		75.2%		75.2%	
2012	420,000	0.0%	74.0%	74.0%					
Straight Averages						70.6%	74.4%	73.5%	77.0%

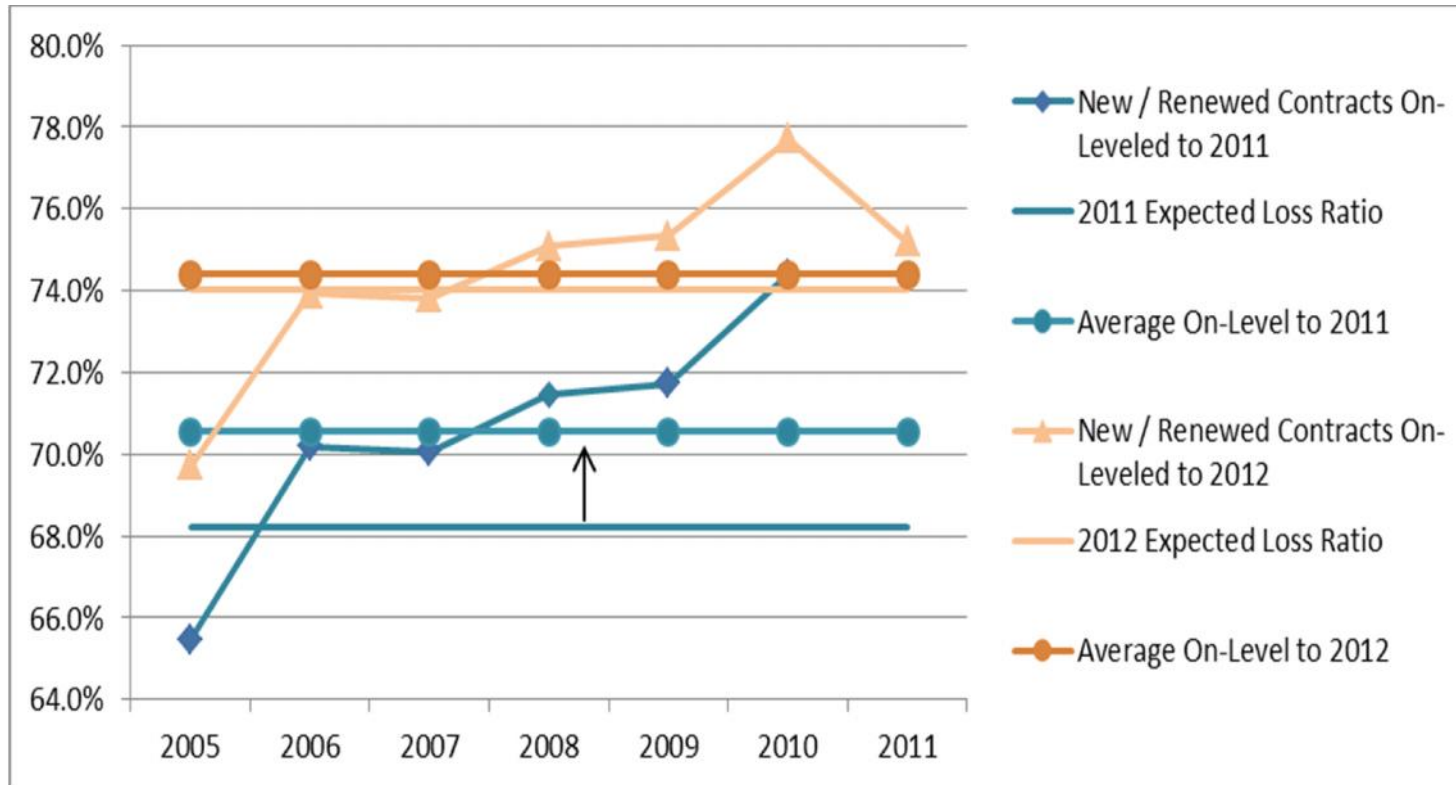
Discussion Guide Exhibits

On-Levelled Loss Ratios



Discussion Guide Exhibits

On-Levelled Loss Ratios



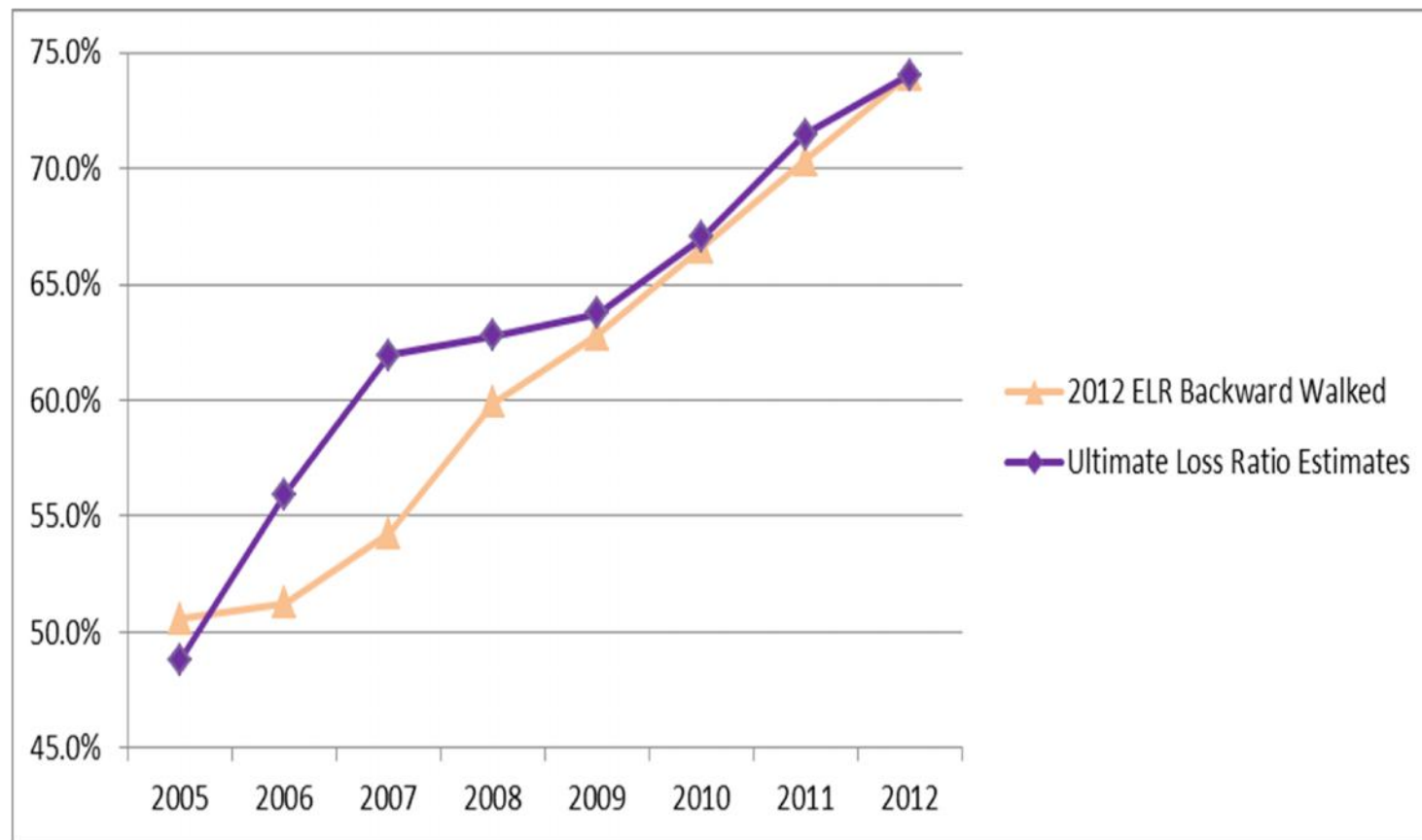
Discussion Guide Exhibits

Backward-Walked Loss Ratio

- Walk the latest Costing ELR backward
- Useful if we believe that we have more accurate and complete information in our current year's Costing estimates than in the older years' estimates
- Useful as a double-check on the current year's Costing estimate
- If the backward-walked ELR falls nicely in line with historical ultimate estimates, we can have confidence that the latest Costing ELR and the trend factors are reasonable

Discussion Guide Exhibits

Backward-Walked Loss Ratio



Discussion Guide Exhibits **Trended / Fitted Loss Ratios**

- Use the trend patterns implied in the historical loss ratio ultimate estimates to predict ultimates for the latest 2 years
- Fit historical ultimate estimates using linear and exponential patterns
- The annual trend from the exponential pattern can be compared to the loss ratio trend computed using the on-leveling parameters
- Provides another check on Costing's ELRs

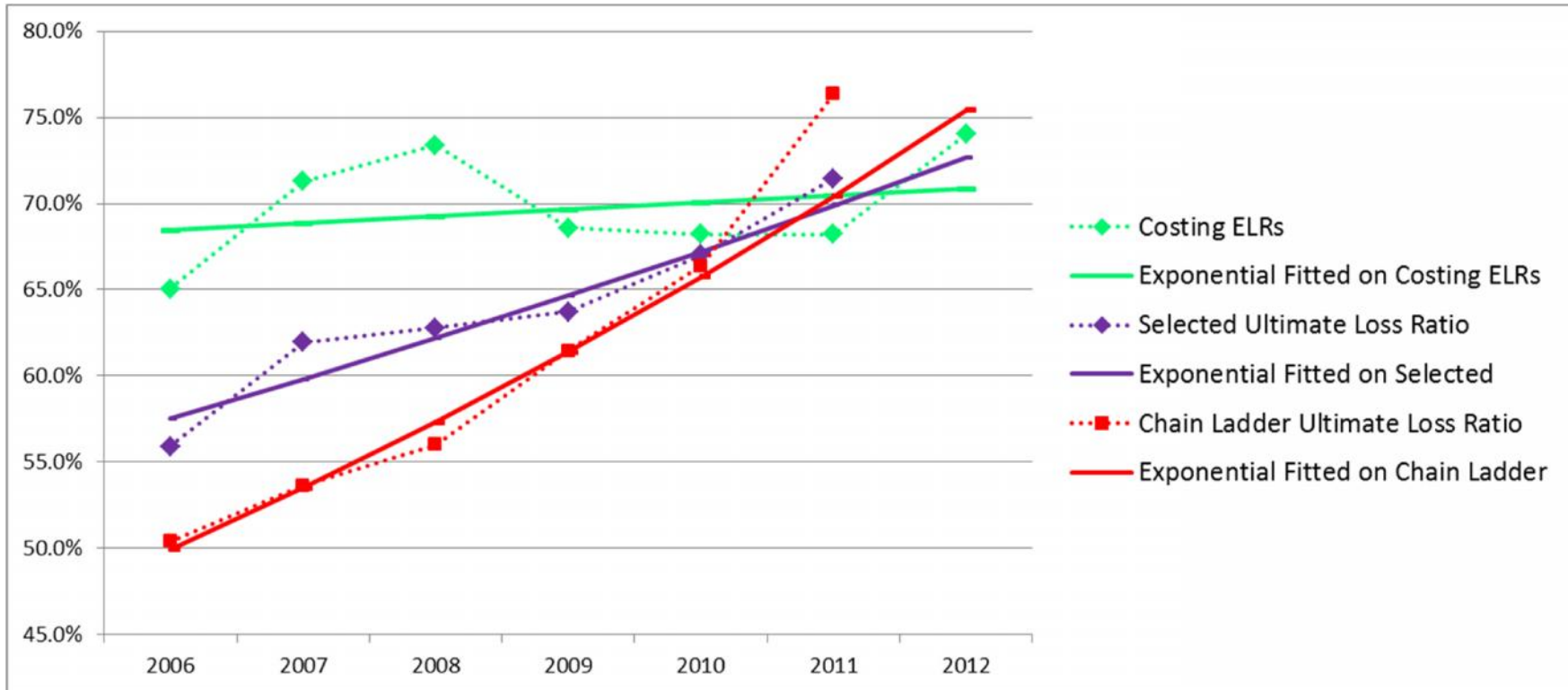
Discussion Guide Exhibits

Trended / Fitted Loss Ratios



UY	Actual			Exponential Fitted			Linear Fitted		
	Costing ELR	Selected Ultimate LR Estimate	Chain Ladder Ultimate LR Estimate	Costing ELR	Selected Ultimate LR Estimate	Chain Ladder Ultimate LR Estimate	Costing ELR	Selected Ultimate LR Estimate	Chain Ladder Ultimate LR Estimate
2006	65.0%	55.9%	50.4%	68.5%	57.5%	50.0%	68.6%	57.5%	49.6%
2007	71.3%	61.9%	53.7%	68.9%	59.8%	53.5%	68.9%	59.9%	53.6%
2008	73.4%	62.8%	56.0%	69.2%	62.2%	57.3%	69.3%	62.3%	57.6%
2009	68.6%	63.7%	61.5%	69.6%	64.6%	61.4%	69.7%	64.7%	61.6%
2010	68.2%	67.0%	66.4%	70.0%	67.2%	65.7%	70.0%	67.1%	65.5%
2011	68.2%	71.5%	76.4%	70.4%	69.9%	70.4%	70.4%	69.5%	69.5%
2012	74.0%			70.8%	72.7%	75.4%	70.8%	71.9%	73.5%
Average Annual Change				0.6%	4.0%	7.1%	0.5%	3.4%	5.7%

Discussion Guide Exhibits Trended / Fitted Loss Ratios



Suggested Discussion Points

1. Do the loss trends look reasonable?
2. The loss ratios trends (the composite of loss and premium trends) that are used to on-level the loss ratios:

Are they what you expected, given the cycle and your knowledge of our book?

Are the Costing loss ratio movements from one year to the next consistent with these loss ratio trend parameters?

3. Do the primary company rate changes look reasonable?
4. Consider the source of the reinsurance rate change estimates. Is this what you expected to see?

Suggested Discussion Points

5. Have the original premium estimates, usually provided by the cedents, been close to the actuals, implying that the cedents tended to get the volume and rate change estimates approximately right? Are any trends apparent?

6. Look at the average reinsurance limits and retentions by program.

Have they been relatively stable?

Were any directional movements what you expected?

7. Where do the current estimates fall in the range of the on-leveled estimates?

Look at the volatility in the estimates.

Do the loss ratios seem to follow the cycle, directionally and/or in magnitude?

Actual Outcomes at Swiss Re

- Actions resulting in financial impacts
 - The current year aggregate ELR was increased/decreased for reserving purposes
 - A more conservative approach was taken in reserving the most recent underwriting years
- Improvements made to some pricing models
- Lag patterns and tails used by Reserving in determining the ultimate loss ratio estimates were revisited
- Segmentation revised for reserving purposes

Benefits

- Improved expected loss ratios for reserving actuaries
- Improved parameter trends for pricing actuaries
- More effective negotiation of the cycle
- Reconciliation of different functional views will facilitate effective strategic decisions
- Provides feedback into underwriting, planning, parameter task forces, portfolio steering, etc.
- Establishment of formal channel for dialogue between costing and reserving actuaries

Challenges

- Changes in contract terms / conditions are not accounted for
- Reinsurance rate changes are very difficult to capture / measure and are probably not properly reflected
- Relevant changes in models and assumptions are difficult to measure and are not explicitly reflected in the data

Swiss Re



Thank you

SWISS RE
150
YEARS

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