

Why provide a range?

- Uncertainty in unpaid claims estimate
- Management information and financial reporting
- Provide bounds for reasonable central estimates

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Why provide a range?

- Current Environment
- Impetus for Change

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Basic Range considerations

- Nature of the coverages, type of policy, changes in underwriting philosophy, changes in payment patterns, changes in loss costs due to external factors such as legal interpretations or medical costs, trends in inflation, expected reporting patterns, the credibility of the data, changes in underlying practices and processes, correlation among lines, variability, and inherent risks of the particular estimate.

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ASOPs

- **ASOP 20** - Discounting of Property/Casualty Unpaid Claim Estimates
 - *"The actuary should consider the uncertainty in the discounted unpaid claim estimate when determining a range of estimates. The actuary should recognize that the uncertainty inherent in discounted unpaid claim estimates generally is different from the uncertainty inherent in undiscounted unpaid claim estimates."*
- **ASOP 38** - Using Models Outside the Actuary's Area of Expertise (Property and Casualty)
 - *"...the actuary should consider the adequacy of the historical data in representing the range of reasonably expected outcomes consistent with current knowledge about the phenomena being analyzed."*

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ASOPs

- **ASOP 36**- Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves
 - *"The actuary should consider a reserve to be reasonable if it is within a range of estimates that could be produced by an unpaid claim estimate analysis..."*
 - *"When developing unpaid claim estimates to evaluate the reasonableness of a reserve, the actuary may develop a point estimate, a range of estimates, or both."*

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ASOPs

- **ASOP 43 - Property/Casualty Unpaid Claim Estimates**
 - *"In the case when the actuary specifies a range of estimates, the actuary should disclose the basis of the range provided, for example, a range of estimates of the intended measure (each of such estimates considered to be a reasonable estimate on a stand-alone basis); a range representing a confidence interval within the range of outcomes produced by a particular model or models; or a range representing a confidence interval reflecting certain risks, such as process risk and parameter risk."*

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ASOPs

- **ASOP 43 - Property/Casualty Unpaid Claim Estimates**
 - **Actuarial Central Estimate**
 - *"An estimate that represents an expected value over the range of reasonably possible outcomes."*
 - *"conceptual mean" rather than a "statistical mean... the subcommittee felt that requiring that the entire range of all possible outcomes be considered in the estimation of the mean is unrealistic."*
 - *"...range of reasonably possible outcomes may not include all conceivable outcomes, as, for example, it would not include conceivable extreme events where the contribution of such events to an expected value is not reliably estimable."*

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ASOPs

- **ASOP 43 - Property/Casualty Unpaid Claim Estimates**
 - *"...when measuring the variability of an unpaid claim estimate covering multiple components, consideration should be given to whether the components are independent of each other or whether they are correlated"*

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Statement of Actuarial Opinion

- Reasonable, inadequate, excessive, qualified or no opinion
- RMAD
 - Regulatory Guidance for 2014 includes the following: "When considering significant risks and concluding if RMAD exists, the Appointed Actuary should consider the materiality standard in relation to the range of reasonable estimates and the carried reserves. For example, RMAD should likely exist when the sum of the materiality standard plus the carried reserves is within the range of reasonable estimates."
- NAIC instructions and COPLFR
 - NAIC - "An exhibit or appendix showing the change in the Actuary's estimates from the prior actuarial report..."
 - COPLFR suggests - "Exhibit(s) and discussion related to material changes in the range of estimates from the prior year (if a range is included in the Actuarial Report), if meaningful and practical, including discussion of any material expansion or contraction of the range relative to the prior year."

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Actuarial Opinion Summary

- COPLFR states
 - Items 5 (A) through 5 (D) in the Instructions clarify that there is no requirement to produce both a range and a point estimate. However, the reserve estimates presented in the AOS must follow the actuary's analysis (i.e., if an actuary prepares both a point estimate and a range in the analysis, then both the point estimate and the range must be disclosed in the AOS).

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Thank you...

Topic 2 – Reserve Ranges – Audiences and Deterministic Approaches


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Background — uses for reserve ranges

- ▶ Insurance company management — may aid in decision of what reserve to book
- ▶ Statement of actuarial opinion and actuarial opinion summary
- ▶ SEC filings — reliability of current earnings
- ▶ Risk management and capital modeling — scenario-testing and worst-case scenarios
- ▶ Mergers and acquisitions — reliability of current earnings, profitability, ranges of future outcomes
- ▶ Audits and statutory examinations — testing of management's best estimate
- ▶ Rating agencies — assess reserve variability


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Discussion Question


When have you used a reserve range in your line of work, who was the audience, and what purpose did it serve?

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Deterministic approaches to setting reserve ranges

- ▶ Standard percentage
- ▶ Range formed via a variety of methods
- ▶ Range formed by varying assumptions

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Standard percentage

- ▶ Examples:
 - ▶ Personal auto, homeowners +/-5%
 - ▶ Commercial auto, workers' compensation +/-7.5%
 - ▶ General liability +/-10%
 - ▶ Products liability, medical malpractice +/-15%
 - ▶ Construction defect, asbestos and environmental exposures +/-25%
- ▶ A judgmental selection potentially based on:
 - ▶ The credibility of the loss volume
 - ▶ Variability of the historical results
 - ▶ Projected Incurred But Not Reported (IBNR)/case ratio for recent years (higher ratio — wider range)
 - ▶ Size of loss reserve relative to the company's surplus
- ▶ May be tested using diagnostics — aiding in the disclosure requirement

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Range formed via a variety of methods

- ▶ Use a variety of projection methods such as the paid and incurred loss development methods, paid and incurred Bornhuetter-Ferguson (B-F) methods, IBNR/case development method, frequency-severity methods, etc.
- ▶ Judgmentally select a high and low estimate for each year based on the indications from each method
- ▶ Use diagnostics as a sanity check
 - ▶ Does the low estimate imply negative IBNR?
 - ▶ For older years, is the percentage width of the range wider while the dollar width is narrower?
 - ▶ Does the high estimate yield IBNR-to-case ratios that seem unreasonably high?
 - ▶ Do the resulting high and low loss rates make sense?

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Range formed by varying assumptions

- ▶ Range formed by varying assumptions
 - ▶ Loss Development Factors (LDF) selections, in particular tail assumptions
 - ▶ B-F initial expected loss ratio
- ▶ Risk of a compounding effect of extreme assumptions
- ▶ Could be time consuming

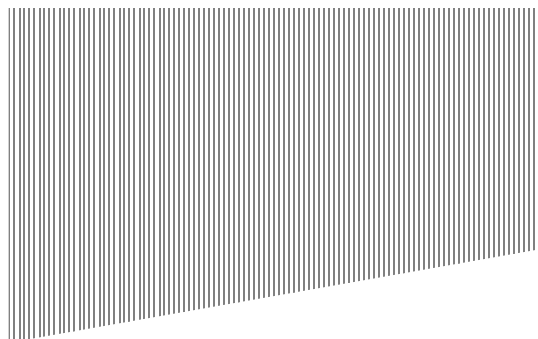
Discussion Questions

What methods have you used in your line of work?

For those who have used a standard percentage, what did you base your decision on?

Approaches to setting reserve ranges

Illustrative example



Example — choosing high and low initial loss cost selections for B-F method

Bornhuetter-Ferguson methods — varying assumptions

Accident year ending 12/31/XXXX	Preliminary loss cost	2.0% trend to 12/31/12	Trended loss cost	Selected loss cost	% unprpd	Ult loss based on rprd B-F	High loss cost	High % unprpd	High ult loss based on rprd B-F
2004	0.472	1.195	0.564	0.547	2%	327,769	0.594	3%	332,160
2005	0.448	1.172	0.525	0.558	4%	361,506	0.605	5%	369,216
2006	0.384	1.149	0.442	0.569	6%	305,950	0.617	7%	315,899
2007	0.459	1.126	0.517	0.580	9%	276,889	0.630	11%	287,290
2008	0.572	1.104	0.632	0.592	11%	307,223	0.642	13%	317,994
2009	0.590	1.082	0.639	0.604	19%	292,447	0.655	23%	309,195
2010	0.661	1.061	0.702	0.616	31%	261,822	0.668	35%	280,027
2011	0.683	1.040	0.710	0.628	45%	224,838	0.682	49%	243,294
2012	0.707	1.020	0.721	0.641	61%	213,264	0.695	64%	230,897
2013	0.706	1.000	0.706	0.653	77%	216,254	0.709	79%	235,675
Total						2,807,362			2,941,647
All Yr Wtd		0.587							
Avg ex Hi/Lo		0.624				1,769,108			1,769,108
4 Yr Wtd		0.709							
Selected		0.653				1,038,854			1,172,540
High select		0.709							12.9%

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Example — using diagnostics to assess compounded assumptions

Diagnostic assessment of selected high

Accident year ending 12/31/XXXX	Selected high ult loss	Case reserves	IBNR reserves	IBNR: case ratio	Upper range width	Range %	Selected loss rate	High loss rate
2004	332,160	42,249	12,758	0.30	4,392	8.7%	0.49	0.50
2005	369,216	41,465	24,766	0.60	7,710	13.2%	0.46	0.47
2006	315,899	27,819	35,980	1.29	9,950	18.5%	0.39	0.40
2007	287,290	19,070	43,375	2.27	10,401	20.0%	0.45	0.47
2008	317,994	30,697	48,545	1.55	10,770	15.7%	0.55	0.57
2009	309,195	53,866	75,491	1.40	16,749	14.9%	0.58	0.62
2010	280,027	60,771	97,253	1.60	18,205	13.0%	0.64	0.68
2011	243,294	40,070	120,924	3.02	18,456	12.9%	0.62	0.67
2012	230,897	37,149	146,347	3.94	17,832	10.6%	0.64	0.70
2013	235,675	27,944	186,000	6.66	19,421	10.0%	0.66	0.71

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