

***Applications of Reserve Ranges and Variability in Practice***

Casualty Actuarial Society  
Fall 2013 Meeting

Minneapolis, Minnesota

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***Ground-Rules for our Discussion***  
***Including disclaimers***

- This presentation is prepared and intended for general educational and discussion purposes only.
- It should not be used as a substitute for consultation with professional advisors.
- The views and opinions expressed by the panelists may or may not be reflective of their own personal views and opinions; the views and opinions are not expressions of position by their employers.
- Enjoy the exchange of information and ideas.
- Contribute.

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***The Authors (Your Panelists)***

- Christopher Walker, FCAS, MAAA
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- Mark Littmann, FCAS, MAAA
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***Outline for our Discussion***

- Business Applications
- Concepts in the Literature
- Approaches in Practice
- Illustrations
- Aggregate Ranges
- Take-Away's



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***Business Applications of Variability Concepts***

- **Statements of Actuarial Opinion and Actuarial Opinion Summary**  
Discussions of the business and its qualities that may introduce variability; assessment of RMAD; optional in AOS
- **Securities and Exchange Commission filings**  
Discussion of analysis that developed the carried reserve and variability in that estimate; recently expanded disclosure by registrants.
- **Financial Audits**  
Even for non-insurance entities, "how much of a difference is too much" is a constant question in assessing self-insurance estimates
- **Mergers and Acquisitions**  
May affect subsequent year "true ups" or the decision to purchase third-party reinsurance, and how much.
- **Internal Revenue Service Considerations**  
Supportable "reasonable ranges" may factor into on-going or future IRS actions.



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### ***Variability Concepts in the Literature***

- **Thomas Mack Method**  
“Distribution free” technique using loss development; no guidance on what constitutes “reasonable range”
- **Boot-Strapping**  
Simulation process with observed development being one “observation”
- **Sensitivity Testing**  
Not explicitly described in literature, though widely used reflecting alternative high/low assumptions



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### ***Approaches in Practice***

- **Judgment**  
Includes “rule of thumb”; lacks substantive analytical or qualitative evidence; increasingly ignored by regulators and other third parties
- **Sensitivity-Testing**  
Some commonalities, such as adjustment of tail factors; changes in severity assumptions; inflation; or inclusion/exclusive of large single events



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### ***Sensitivity Testing***

- Evaluate the dispersion of indications from one or more methods applied to one or more types of data. An actuary might elect to evaluate the dispersion of indications for all accident years combined, or for each accident year, or deviation from “actuarial central estimate.”
- Evaluate the effect of alternate judgments for the key elements of the methods as applied to the various sets of data, and generally keep the same judgment about relative preferences among the methods.

We consider the second approach to be preferred.



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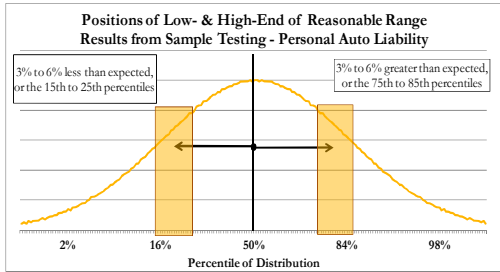
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### Sample Testing: Personal Auto Liability



See accompanying commentary on the sample testing in Section 5.3 of the paper.



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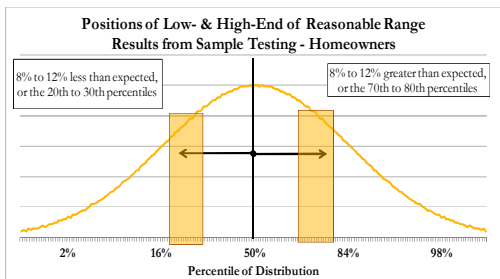
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### Sample Testing: Homeowners



See accompanying commentary on the sample testing in Section 5.3 of the paper.



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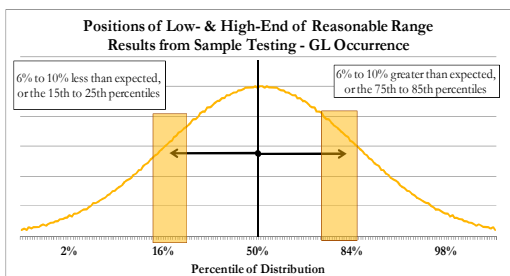
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### Sample Testing: GL Occurrence



See accompanying commentary on the sample testing in Section 5.3 of the paper.



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### ***Take-Away's***

- Applications of variability of unpaid claim estimates arise in a variety of business settings; the approach must reflect the situation with appropriate disclosure regarding the type of finding being expressed.
- We believe that the days of expressions of reasonable ranges based solely on judgment or rules of thumb are over, as stakeholders seek a more-reasoned response to questions regarding the basis of a stated range.
- We believe the framework described herein is practical and can be reasonably explained to the variety of stakeholders who seek insights and opinions from actuaries on point-estimates and the associated uncertainty.
- We identified an apparent relationship that the sample ranges of reasonable estimates for the three reviewed lines tended to align with portions of the distribution of outcomes that extend up to one standard deviation above and below the mean. This may be an area of further research.



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### ***Thank you***

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