Updating the Berquist Sherman Paper—Thirty Years Later

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Inspirational Thought for the Day

"He uses statistics like a drunk uses a

lamp post…..for support rather than for

illumination."

What inspired (??) the paper

- Near collapse of GEICO in early 1976.
- GEICO retained M&R to review loss reserves at yearend 1975.
- Had $500 million in surplus.
- Indicated reserve deficiency: $500 million

How It Happened

- Around 1971 the head of Claims became president of GEICO.
- His idea: Since performance of adjusters is measured by comparing the final settlement with case reserves, can save money by changing the standard for setting case reserves.
- Changed from "most likely" to "the least amount the claim can reasonably be settled for."

Tsunami Effects

- Result was major drop in adequacy of case reserves.
- Incurred development was very favorable.
- GEICO took no rate increases for 6 years, at a time when inflation was quite high.
- GEICO grew very, very rapidly in major Eastern states (e.g., New York, New Jersey) because it had extremely low rates.

A Hard Winter in DC in 1976

- GEICO estimated loss reserves only using incurred development.
- M&R also applied paid development and other methods, and reviewed key diagnostics: AY/DY triangles of average open reserve, claims disposed ratios.
- Indicated reserve deficiency = surplus.

The Rough Road to Recovery

- GEICO was too big to be allowed to fail.
- 28 auto insurers engaged in a rescue effort by reinsuring a sizeable portion of GEICO's very underpriced book of business.
- It took five years for GEICO to return to a solid financial position.

Actuaries Need to:

- Ask Claims, UW, etc. questions about significant operational changes before estimating loss reserves.
- Review diagnostic statistics.
- Apply a range of methods.
- Attempt to reconcile differences in the projections of different methods.

Evident Needs

- A paper including a checklist of questions for actuaries to ask key people in claims, UW, EDP, etc.
- Development of a method to adjust incurred projections for sizeable changes in the adequacy level of case reserves.
- Development of a method to adjust paid projections for sizeable shifts in the rate of settlement of claims.

Most Useful Parts of the Paper

- Favorite choice is Appendix B, the questions to ask department executives.
- Second are the claims disposed adjustments and the adjustments to incurred triangles for changes in the adequacy level of reserves.
- Review of "diagnostics" to detect "changes."
- Application of reasonableness tests to the implied pure premiums, loss ratios or severities of selected ultimates.

Least Used Parts of the Paper

- Incremental paid methods (e.g., incremental paid per ultimate reported claim)
- Adjusted growth rates based on weightings of individual column growth rates and overall growth rates.
- Comparisons of estimates of incremental amounts for each future AY-DY combination
- Ex-ante tests
- Search for explanations for the differences between the projections of alternative methods

Industry Changes Since 1977

- Increased volatility in claim sizes
- Dramatically increased data management capabilities
- Increased management sophistication regarding actuarial methodology

Industry Changes Since 1977

- Increased likelihood that an insurer will have an in-house actuarial reserving department
- Increased regulatory scrutiny of reserve levels, including requirements for a Statement of Actuarial Opinion and an Actuarial Opinion Summary for insurance companies
- A higher level of program complexity with respect to excess insurance provisions

Applications to Ratemaking

- Do you rely on one actuarial method for estimating ultimates for recent past AYs?
- Doing the work required for a thorough reserve analysis could make your rate indications more accurate.
- Ask Department Execs similar questions before conducting a rate analysis?

New CAS Text on Reserving

- Go to www.casact.org, click on Publications, and click on Estimating Unpaid Claims Using Basic Techniques, by Jacqueline Friedland, FCAS, FCIA. 416 pages long.

- Replaces papers by Adler/Kline, Berquist/ Sherman, Bornhuetter/Ferguson, Fisher/Lange, Fisher/Lester, Mack, Pinto/Gogol and Wiser/ Cockley/Gardner (Foundations of Casualty Actuarial Science text)

Expanded List of Questions

- BerqSher paper had 32 questions.
- 26 new questions presented at the 2007 CLRS were added, raising the total to 58 questions.
- Go to Chapter Four, Meeting with Management, page 44
- Questions are on pages 45-50.

More Qs for the Claims Exec

- Obtain copies of recent claims audits?
- For WC case reserves for permanently disabled claimants, what mortality table was used (year and general population or disabled lives table?)
- For large open claims, has there been any revision in the reserve since the latest evaluation date of the loss experience?
- Are case reserves set at an expected level, the most likely settlement amount or the minimum possible amount (or some other standard)?

More Qs for the UW Exec

- For how many different programs or types of risk are premium and loss experience tracked and compiled into loss ratio runs?
- Any summary available of the details of excess policies, such as attachment points, exclusions, per occurrence(?), sunset clauses, aggregate caps, etc.?
- Frequency of availability of such experience summaries? How far back are these available?
- How are new programs priced? If you are relying on another insurer's filings, how similar are the underlying books of business?

More Qs for the EDP or Accounting Executive

- How far back can the loss data be actively re-compiled by various key criteria?
- What data elements are available for each claim? For each risk?
- By what key criteria could the historical loss data be freshly compiled?
- Example criteria: size of loss breakdowns, type of claim breakdowns (e.g., liability vs. property for CMP or HMP), separate compilations by policy limit or deductible or type of claim, or state.
- Can data be compiled either by claimant or occurrence, if multiple claims are established for one occurrence?

Go Back and Populate Triangles Not Regularly Available

- Suppose the data base is such that one can go back in time for 10 prior year end evaluation dates for all key data elements.
- Can unearth helpful triangles that would otherwise not have been available.
- Examples: Net amounts at different retentions. Suppose retention jumps from 250K to 5M. Get a revised incurred triangle at 5M retention rather than at lower, historical retentions.

More Qs for Ratemaking Actuaries

- Obtain copies of recent rate filings.
- Were there any changes in statutes, court decisions, extent of coverage that necessitated some reflection in the rate analysis?
- How are new programs priced? If you are relying on another insurer's filings, how similar are the underlying books of business?

Qs for In House Actuaries

- Request copies of any and all actuarial studies done by consultants, auditors or internal actuaries.
- What areas of disagreement are there between these different studies?
- What specific background information did you take into account in making your selections?

Who is More Knowledgeable & Less Biased?

- Are Department Executives or their Managers or Middle Level staff the best ones to interview?
- Who is more likely to be the most knowledgeable and the least biased?

Beware of Quick, Slick Answers

- Be on the lookout for answers that are designed to bias your analysis in a specific direction.
- This is more likely if they have quick, slick answers for you.
- Does the respondent just seem to be trying to make themselves and their department/ company look better?
- If the respondent has to pause to consider their answer, it may well be a more honest, accurate response.

Claims Disposed Adjustment

- Fit the exponential curve, $Y=ae^{bX}$, to Y (cumulative paid losses) and X (cumulative closed claims) for an older AY.
- Select the claims disposed ratios along the latest diagonal as representative for each DY column of the triangle.

Claims Disposed Ratios – Closed Claims/Reported Claims

AY/Age	12 Mos.	24 Mos.	36 Mos.	48 Mos.
2006	.48	.86	.93	.96
2007	.46	.83	.89	
2008	.42	.77		
2009	.37			

Claims Disposed Ratios – Closed Claims/Reported Claims

AY/CDR	.37	.77	.89	.96
2006	.37/.48	.77/.86	.89/.93	.96/.96
2007	.37/.46	.77/.83	.89/.89	
2008	.37/.42	.77/.77		
2009	.37/.37			

Claims Disposed Ratios – Average Case Reserve

AY/Age	12 Mos.	24 Mos.	36 Mos.	48 Mos.
2006	4,800	8,600	9,300	9,600
2007	4,600	8,300	8,900	
2008	4,200	7,700		
2009	3,700			

Insights Based on Service as an Expert Witness

- Just because BerqSher adjusted triangles represent a more sophisticated approach than simply using the standard triangles doesn't make their indications inherently more appropriate.
- The larger the adjustments, the greater the need to make sure the count data is solid and consistent.

Thorne Discussion (1978 PCAS)

If significant shifts in the size of loss distribution have occurred, adjusting cumulative paid losses for changes in the claims disposed ratio could magnify the error in the projected reserves.

Claims Disposed Adjustments

- Only as reliable as the claim count data on which the adjustment is based.

- Case Study: Insurer changes definition of indemnity claims in WC from those where indemnity payments are fairly certain to also include medical only claims which merely have some potential to become indemnity claims.

Consequences

- Major increases in claims disposal rates occur.
- Indemnity claim severities trend downward.
- Insurer claims it is dramatically speeding up the settlement of claims and has instituted loss control measures that should result in declining severities.

Consultant's Reactions

- Applies BerqSher claims disposed adjustments, dramatically reducing the paid projections.
- Consultant's ultimate projections seem to be corroborated by the downward trends in paid and incurred severities.
- Result: Grossly understated ultimates.

Just Another Type of Model

- BerqSher adjustments only a model.
- Need to check out the underlying assumptions of that model.
- Need to assign a relative credibility to the indications from the adjusted triangles versus the credibility of other models.
- Need to review the reasonableness of the adjusted projections in terms of implied pure premiums, loss ratios & severities.

Going Out on a BerqSher Limb?

Problem: Adjusted triangle resulting from a BerqSher method produces strange progressions of incremental paids or incurreds.

Suggestion: Take only Y% of each indicated adjustment. Solve for the Y% that produces the most reasonable adjusted triangle. For example, Y = 60% or 130%.

Representations by Management

- Consider other possible explanations for patterns in data that appear to support the validity of management's representations.

- Explore ways to assess the possible validity of these alternative explanations, and query historical data to obtain key diagnostics.

Testing the Veracity of Representations by Management

- Obtain new cuts of data from several past diagonals of loss experience.
- Obstacles: Added costs to the insurer, delays in obtaining the results, and a more costly, extensive actuarial analysis.
- The actuary needs to be persuasive and persistent regarding the value of the extra data, in spite of its additional cost and effort.

Subsequent Reviews/Papers

- Joseph Thorne (1978 PCAS Discussion)
- Fleming Mayer (1988 Discussion Paper)
- Richard Duvall (1992 PCAS)
- Thomas Ghezzi (2001 Forum)
- Halpert/Weinstein/Gonwa (2001 Forum)
- Actuarial Review Roundtable Discussion (Nov. 2002)

Thorne Discussion (1978 PCAS)

- No mention of the tail in BerqSher. Just selecting a constant tail is often inaccurate. Could be distorted by major changes in retention, frequency of lump sum settlements, shifts in the types of claims.

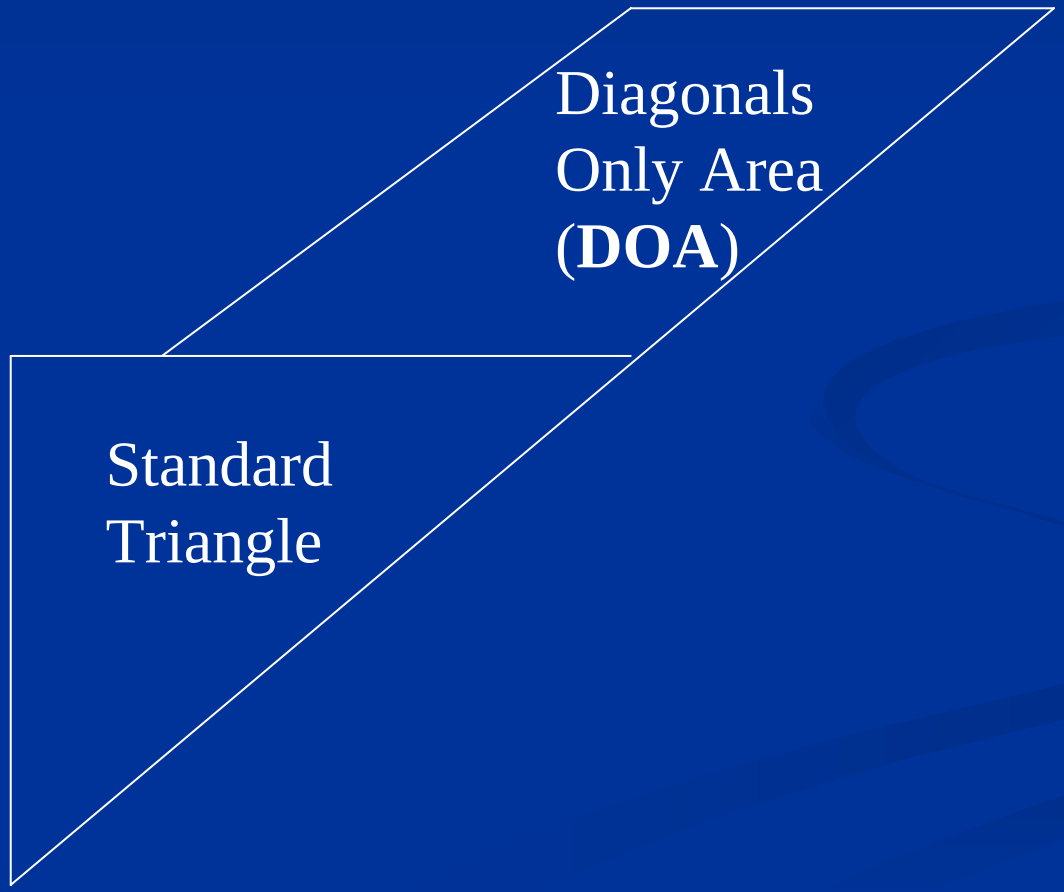
- Hindsight outstanding loss estimates distorted by subsequent appearance of true IBNR claims.

Can Actuarial Judgment Overcome Low Credibility?

Problem: Credibility of LDFs drops rapidly for the most mature DYs. Culminates in reliance on only one LDF at the tip of the triangle.

Suggestion: Apply structural methods that pull in incremental data prior to the triangle to raise the credibility of the LDFs at or near the tip.
Examples: Adler/Kline, Fisher/Lange & Sherman/Diss.

Dead on Arrival (DOA) Data



Kirk Fleming / Jeffrey Mayer (1988 Discussion Paper)

- **Adjusting Incurred Losses for Simultaneous Shifts in Payment Patterns and Case Reserve Adequacy Levels.**
- How changes in payment patterns affect both the incurred and the paid projections.
- How changes in payment patterns can mask or falsely imply changes in case reserve adequacy.
- How to test, analyze and correct for these changes.

Richard Duvall (1992 PCAS)

- **Testing for Shifts in Reserve Adequacy**
- Presents regression models for testing the effects of changes in reserving practices.
- Models include terms for exposure, trend and loss development. An incurred triangle is used to estimate the regression parameters.
- Dummy variables are introduced into the LDF terms to test for shifts and trends in the LDF parameters.

Thomas Ghezzi (2001 Forum)

- Loss Reserving Without Loss Development Patterns—Beyond Berquist Sherman
- Ghezzi restates the current diagonal to the level implied by the older years' estimates.
- Restatement done on an implied ultimate basis, eliminating the need to apply loss development patterns to the less mature years.

Halpert / Weinstein / Gonwa (2001 Forum)

- **Evaluating Reserves in a Changing Claims Environment**
- "Best practices" require the actuary to identify and measure the emerging effects of Claims Department initiatives.
- Adjustments to actuarial methodologies & potential metrics to measure the impact of these initiatives are presented.

Actuarial Review Roundtable (November 2002 Actuarial Review)

- Authored by Arthur J. Schwartz
- Participants were Berquist, Sherman, Thorne and Mayer
- Covers a wide range of key issues