Value-Added Loss Reserving for General Insurance

-- Loss Reserving Actuaries in the New Epoch

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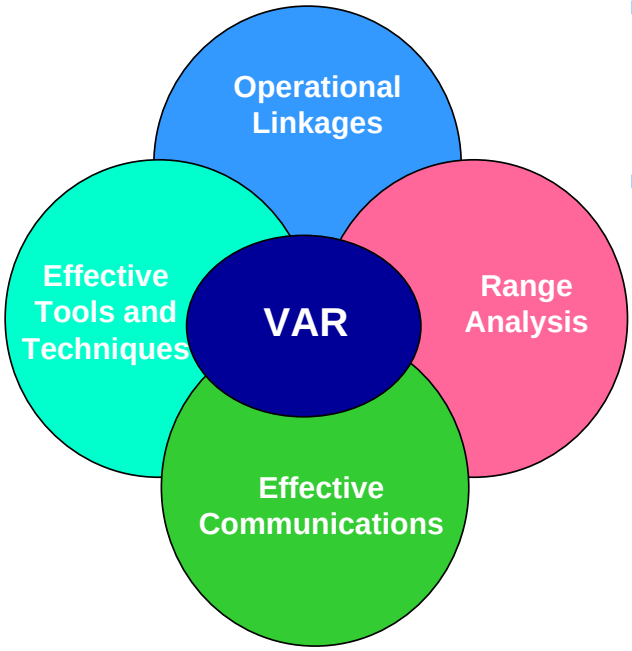
Value-Added Loss Reserving Discussion Topics

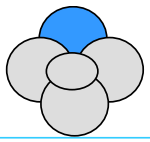
- A Different Approach to Loss Reserving
  - What?
  - Why?
  - Who?
  - When?
  - How?
- Deliverables

Different Approach: What?
The Pillars of Value-Added Reserving (VAR)



- Traditional:
  - Data → Actuarial Methods → Loss Reserve Indication
- The Pillars of Value-Added Reserving
  - Significant, two-way operational focus
  - The best tools and techniques
    - Actuarial methods
    - Benchmarking
  - Evaluation and quantification of reserve uncertainty
  - Communication of findings and implications

Different Approach: What?
Operational Linkage



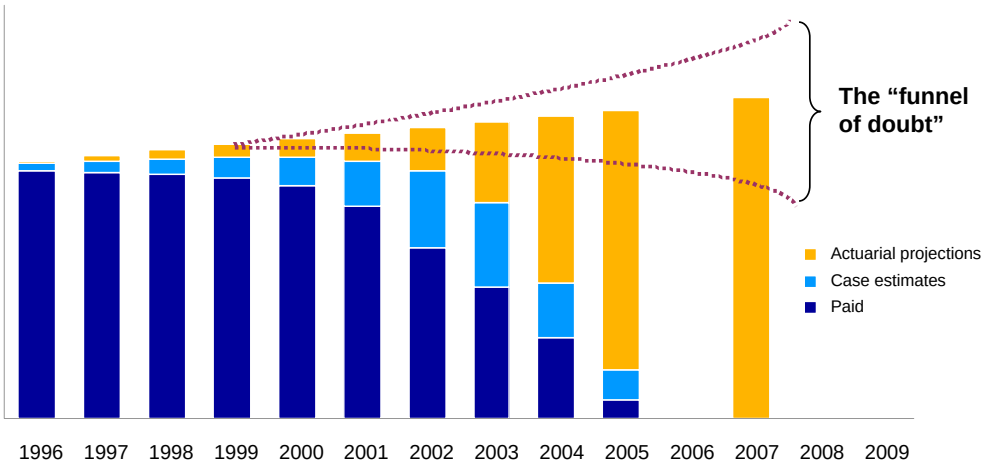
- Value-Added Reserving uses input from all of a company's functional areas

Different Approach: What?
Best Tools and Techniques

- Proven effectiveness
- Historical track record; hindsight testing
- Responsiveness to environmental and operational circumstances and changes
- Operational information guides the choice of methods, adjustments to historical data, parameters, weights
- Benchmarks

Different Approach: What?
Range Analysis

Actuarial Pricing and Reserving Problem



- Reserving analysis is not just about looking backwards!

Different Approach: What?
Effective Communications

- Traditional Reserve Analysis:
  - Lack of adequate communication with non-actuarial functions
  - Sometimes viewed as a mysterious process
  - Reserving results and implications not fully understood by the management team → might miss some significant business issues and opportunities

Myth:
Actuary = Fortune Teller?

Different Approach: Why?
Higher Expectations – Internal Audiences

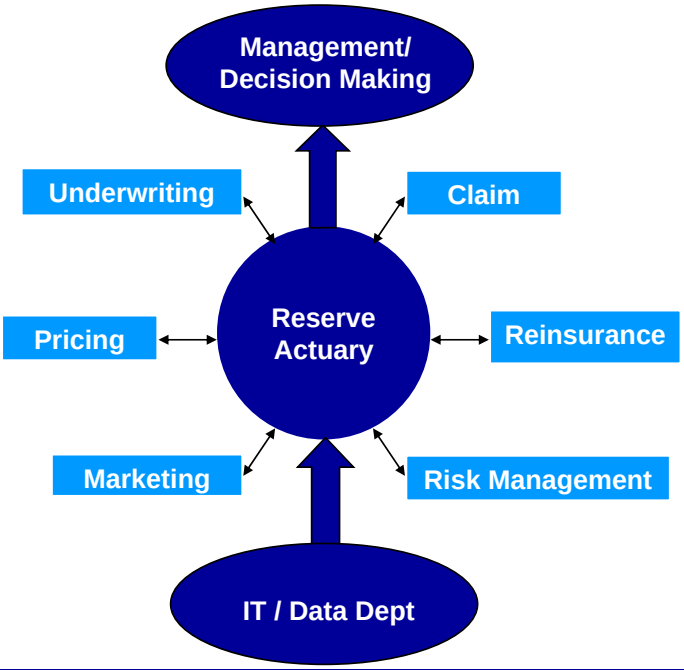
- Management decision requires more quantifiable information from reserving actuaries
- Environmental and operational changes created new challenges to the traditional actuarial reserving methods
- New tools are needed to satisfy more complex and competitive business environment
- Peer pressure from key competitors
- Need to understand uncertainty

Different Approach: Why?
Higher Expectations – External Audiences

Regulators	■ Asian Example: Malaysia Insurance Regulator (BNM) recently introduced new RBC requirement, which requires the company to estimate the reserve liability at 75% percentile confidence level
SEC	■ Require public companies to discuss reserve uncertainty in 10-K filings
Rating Agencies	■ Capital adequacy analyses reflect reserve shortfalls and reserve risks ■ Prudent management is expected to consider more than just the best estimate
Investor	■ Management is expected to demonstrate understanding and effective control of risks
Actuarial Profession	■ Raising the performance bar – especially regarding ranges and communications

Different Approach: Who will get involved?

- Value-Added Reserving
  - Adequate communications with **operational functions** are emphasized in VAR
  - Reserving function should provide key input to **senior management's** decision making process



Different Approach: When?

Traditional Reserving	Value-Added Reserving
■ Regularly (annual or quarter) to fulfill the need of financial statements	■ Regularly (annual or quarter) to fulfill the need of financial statements ■ Supplemental information and insights to enrich the basic actuarial results ■ Ongoing monitoring of results vs expectations ■ Ad hoc analysis to support requirements of management's decision making

Different Approach: How?
Document Operational Changes: Claim Log

Claim Log

Nature of change	Dates initiated and completed	Reason for change	Details of change	Target effect and actuarial impact	Observed effects	Lines of business affected	Percentage of business affected

■ The types of changes to track include:

Claim	
■ New markets/exposures/types of claims/limits ■ Case reserving ■ Express claim settlement initiative ■ Settlement authority ■ Problems (e.g., claim handling backlog)	■ Claim department organization and procedures ■ Management/staffing/vendor selection or process ■ Legal environment or processes ■ IT changes

Similarly, document issues and changes in other operational units

Different Approach: How?
Best Tools and Techniques

Actuarial Methods	Reflect Operational Insights	Benchmarking

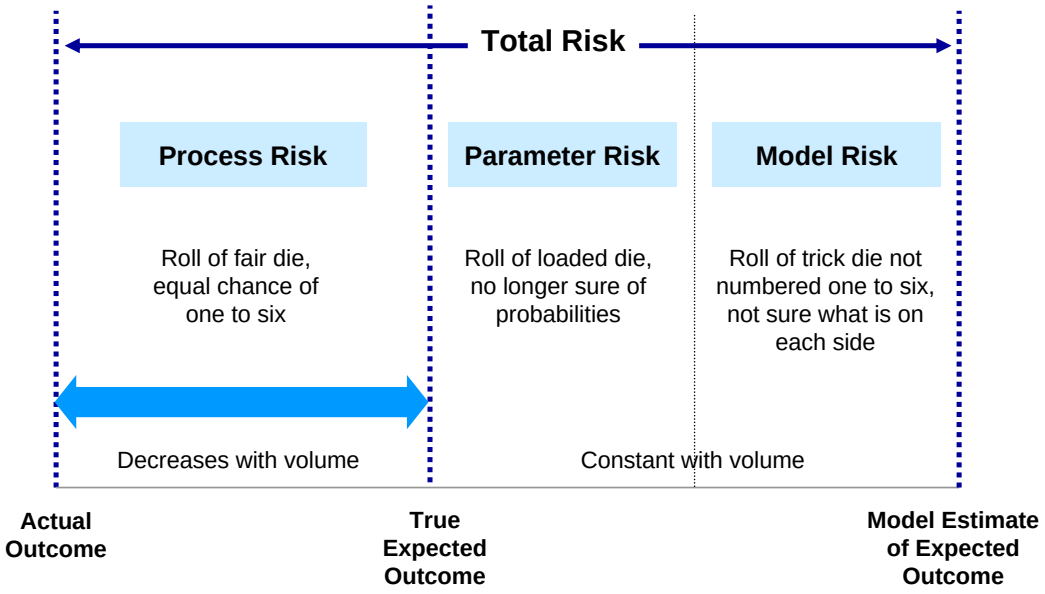
■ Subject the methods used to "hindsight" testing
  ■ Keep the more accurate methods
  ■ Discard or adjust the less accurate ones
  ■ Introduce new methods
  ■ Continuous improvement
■ Diagnostic analyses of the data
  ■ Test for key trends and shifts
■ Use efficient approaches for interim (e.g., monthly or quarterly) updates
	■ Choice of actuarial methods
	■ Interpretation/adjustment of historical data
	■ Choice of parameters
		■ Most actuarial analyses benefit from having robust benchmarking data
		  ■ Rate/price monitoring
		  ■ Loss ratios
		  ■ Trend rates
		  ■ Reporting and payment patterns
		  ■ Other
		■ Multiple levels can be used
		  ■ Industry
		  ■ Peer companies
		  ■ Economic data

Peer Review

Different Approach: How?
Range Analysis

- Define "Range"
  - Range of best estimates
  - Range of normal variance around a mean
  - Range of most likely outcomes
  - Range of possible outcomes
- Analysis methods
  - Compare results of the various deterministic methods
  - Scenario testing: e.g. alternative medical inflation rates
  - Hindcast testing: historical performance of consistently-applied method
  - Stochastic methods that are calibrated based on observed variability in your historical data
  - Industry-based benchmarks regarding inherent variability
- Link potential environmental, operational, or behavioral factors to their effects

Different Approach: How?
Distinct Types of Risk



Different Approach: How?
Claim Variability Analysis

Common stochastic reserving methods

Mack Method	Produces a measure of the variability of the projected unpaid claims by examining the variability of the historical loss development factors
Bootstrapping Method	Produces a distribution of unpaid claims by simulation; differences between actual historical loss development and idealized development based on selected loss development factors are treated as sampling errors
Practical Method	Incorporates judgments about loss development factors and ultimate loss ratios; produces a distribution of claim liabilities via simulation
Christofides Method	Fits regression model to incremental loss development triangle; regression equation has both accident year and development year parameters

Value-Added Loss Reserving
Discussion Topics

- A Different Approach to Loss Reserving
- Deliverables
  - Loss reserve indications
  - Claim variability
  - Standard of materiality
  - Loss reserve implications
  - Operational insights
  - Input to the Enterprise Risk Management process

Deliverables
Loss Reserve Indications

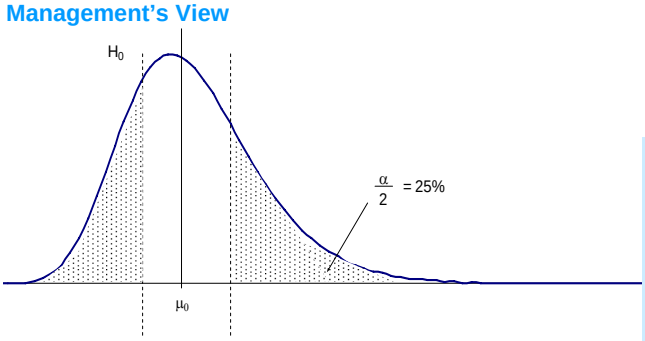
- Best estimate
- Comparison to other actuary's results
  - For example, internal actuary vs. external actuary
- Comparison to management's booked loss reserve
- Changes from last year's projections
  - And why?
- Gross and net of reinsurance
- Loss, Loss adjustment expenses
- Results by business segment, line of business, years

Deliverables
Claim Variability

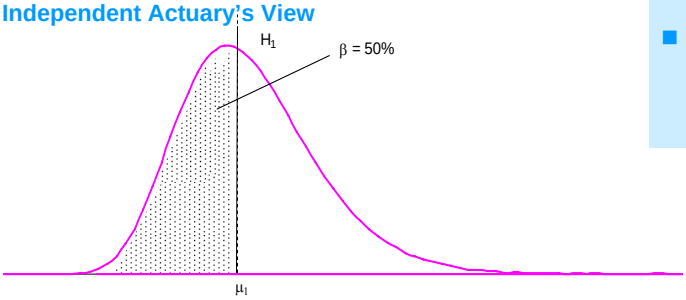
- Anticipating “negative surprises”
  - Rigorous range analysis allows assessment of the probability of “worse than expected” results
  - Identify circumstances likely to produce “surprises”
  - Allows for risk management interventions
- More effective results monitoring
  - Distinguish truly exceptional results from random noise
  - More effective early recognition of problem areas

Deliverables
Standard of Materiality

Management’s View

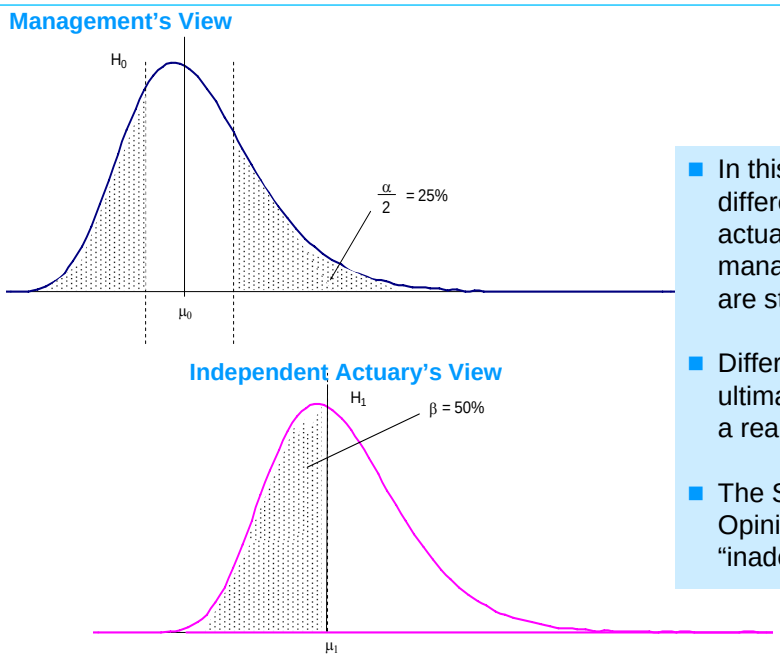


Independent Actuary’s View



- In this illustration, there is significant overlap between management’s view and the external actuary’s view of the underlying distribution
- Differences in estimates of ultimate liabilities are likely to represent “noise”

Deliverables
Alternative scenario – "Not Reasonable" Opinion

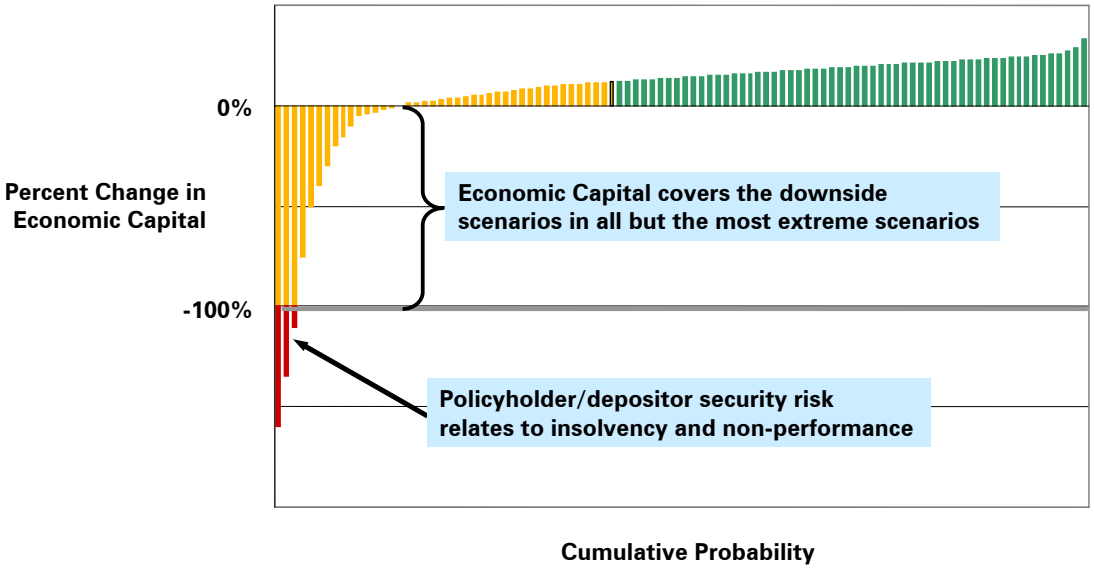


- In this illustration, differences between the actuary's estimate and management's estimate are statistically significant
- Differences in estimates of ultimate liabilities represent a real difference of opinion
- The Statement of Actuarial Opinion may need to be "inadequate"

Deliverables
Loss Reserve Implications

- Adequacy of booked provisions
- Profitability of various segments of business
- Trends
- Claim management effectiveness
- Areas for future refinement and more analysis
- Reinsurance effectiveness

Deliverables
Input to Enterprise Risk Management (ERM) Process



Deliverables
Operational Insights: Hypothetical Operational Summary

Area	Opportunity for Improvement	Comments/Observations

Claims	●	■ Case reserve strengthening appears to have occurred
		■ Average settlements also increased
		  ■ Appears to be more than severity trend
		■ May be related to recent changes in authority levels
		  ■ Higher case reserves driving higher settlements

Underwriting/ Pricing	◐	■ Recent years' loss ratios do not track with company expectations
		  ■ Estimates show higher loss ratios than expected
		  ■ Price monitoring system not capturing price cuts
		  ■ Quality/mix of business may have slipped
		  ■ Line of business X has high and volatile loss ratio

Reinsurance	○	■ Recent years' ceded ratios very favorable for two coverages (WC and GL), and improving ■ May be an opportunity to discuss possible revision in terms

○ Low ◐ Medium ● High

Suggested Readings

1. *Considerations Regarding Standards of Materiality in Estimates of Outstanding Liabilities*, Bardis E., Gwilliam C., Malhotra A.
   http://www.casact.org/pubs/forum/06fforum/5.pdf
2. *Measuring the Variability of Chain Ladder Reserve Estimates*, Mack T.
   http://www.casact.org/pubs/forum/94spforum/94spf101.pdf
3. *Analytic and Bootstrap Estimates of Prediction Errors in Claims Reserving*, England P. and Verrall R.
   http://www.sciencedirect.com/
4. *Value-added Reserving,* Ghezzi T.
   http://www.towersperrin.com/tp/getwebcachedoc?webc=TILL/USA/2005/200511/Ghezzi.pdf
5. *Statement of Actuarial Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves*
   http://www.casact.org/standards/princip/sppcloss.pdf

Thanks

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