INTRODUCTION TO REINSURANCE RECONCILIATION OF ESTIMATES

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KEY ASSUMPTIONS

You are the underwriter/actuary of the assumed reinsurance division, what should you be thinking about:

- Hazard group selection
- Loss ratios
- Expense loadings
- Claim frequencies
- Tail factors
- Layer severities
- Credibility of experience
- Results of u/w audit
  - Claims review
  - Exposures changing? – predictive accuracy of historical information
  - Underlying business changing ??

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Reconciliation of Estimates

➢ Goal - determination of a final estimate

Recap of results	Ultimate Loss & ALAE	Excess Severity	Expected Counts
▪ Exposure Estimate	1.60	82.1	20
▪ Classical Burning Cost	0.70	68.4	10
▪ Freq/Severity-Industry	1.04	69.5	15
▪ Experience Estimate	0.87	67.7	12.5

➢ Wide range of results between experience and exposure
- Severity relatively flat
- Variation in expected counts/losses

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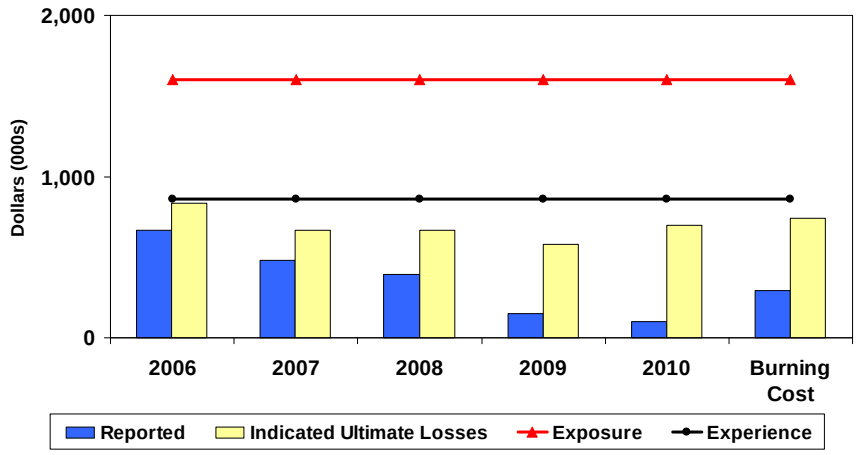
Experience Rating - Frequency Based Method

(1) Accident Year	(2) Detrended Data Limit 6.0%	(3) Actual #> Detrended Data Limit	(4) Frequency Trend @ 2%	(5) Claim Count Dev't Factors	(6) Adjustment for Growth in Premium	(7) Projected # of Claims >Data Limit [3x4x5x6]
2006	74,726	3.0	1.104	1.125	2.960	11.0
2007	79,209	6.0	1.082	1.238	2.162	17.4
2008	83,962	7.0	1.061	1.671	1.684	20.9
2009	89,000	3.0	1.040	2.506	1.509	11.8
2010	94,340	2.0	1.020	6.265	1.270	16.2
Total All yrs		21.0				77.3
Total 06-09		19.0				61.1
Rate Year 2011	100,000					15.00

RECAP OF ESTIMATES
Ultimate Losses



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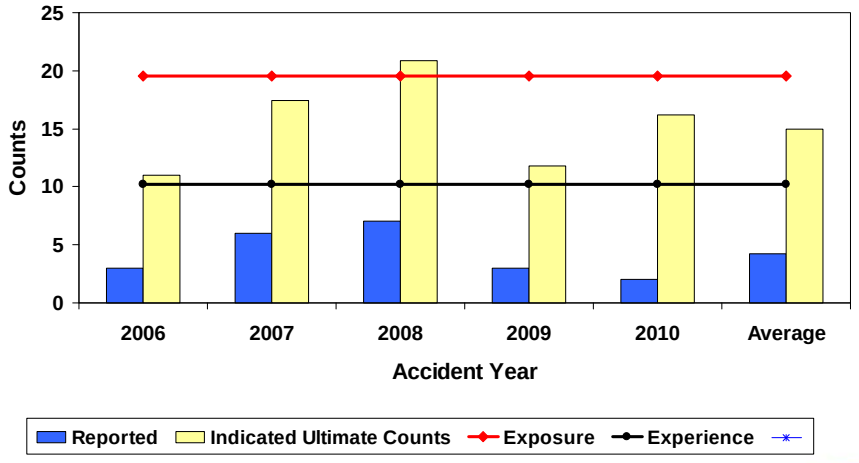
RECAP OF ESTIMATES
Expected Counts > $100k



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Reconciliation of Estimates

- Which method yields best estimate?
  - Experience estimates
    - Test at lower layers
      - Results for frequency/severity and burning cost should be consistent
    - Considerations
      - credibility of data - 20 XS claims?
      - loss development factors - reflecting claim audit?
      - load for ALAE (explicit/implicit?)
      - adjust for claim impact of premium growth - deterioration in U/W?
      - account for change in policy limits?

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Reconciliation of Estimates

- Exposure estimates
  - Allocation of premium consistent with company's
  - Historical comparison of XS premium to losses
    - suggest different loss ratio for layer?
  - Considerations
    - appropriateness of size of loss curve
      - test with claim emergence at different attachment points
      - calculate implied claim counts to company experience
      - compare industry curve to company fitted curve
      - fitting curve is not trivial (development on individual claims)
    - adequacy of loss ratio
      - reflect claim audit findings
      - adjust for implication on growing business
      - account for differences in excess layer vs. primary layer

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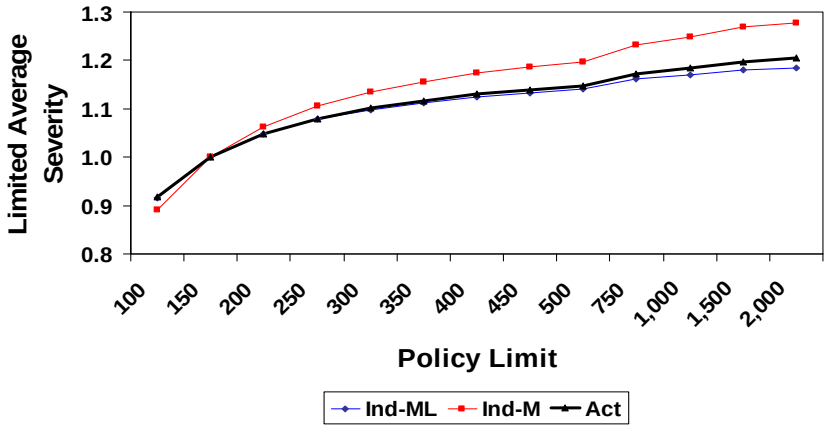
Reconciliation of Estimates



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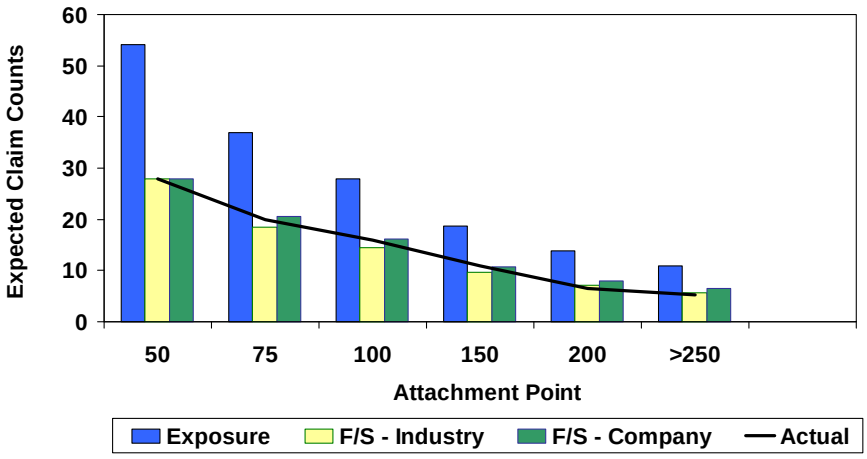
Reconciliation of Estimates



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Reconciliation of Estimates

Recap of Results

	Ultimate Loss & ALAE	Exp Counts >100k	ALAE Load	Implied XS L/R
Exposure	1.60	20	21%	50.0%
Burning Cost	0.70	10	8.5%	21.9%
Frequency/Severity (Industry)	1.04	15	7.5%	32.6%
Experience	0.87	12.5	8.0%	27.2%

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Reconciliation of Estimates

- Experience Indications (burning cost)
  - Selected 700 1.85%
  - Alternate Sel. 925 Years Wtd
  - ALAE Differences 103 20% vs 8%
  - Revised Selection 1,028 2.55 %
- Experience Indications (Frq/ Sev)
  - Selected 1,040 2.6%
  - Alter Selection 1,020 Yrs Wtd
  - ALAE Differences 119 20% vs 7.5%
  - Revised Selection 1,139 2.85%
- Final Selection 1,100 2.75%

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Reconciliation of Estimates

- Goal - Move expected ultimate losses to similar base
- Exposure Indications

▪ Selected	1,568	3.9%
▪ Alter Selection Table 1	1,086	higher %
▪ ALAE Differences	(26)	20% v. 23%
▪ Revised Selection	1,060	2.65%

- Experience Indications (Selected)

▪ Revised Selection	1,100	2.75%
– implied loss ratio for layer	33.1%	

- Are these assumptions appropriate ?
  - ▪ Are you fooling yourself ? / Does this make sense?
- Don't fall into the trap of using experience rating to lower answer !!
  - ▪ Rating Limbo

Reconciliation of Estimates Scenario Testing

- Move away from point estimate of methods and look at a range of possible outcomes
  - ▪ Exposure
    - – size of loss table/loss ratio
    - – what assumptions would get result to experience rate
      - □ 20% loss ratio, lower hazard curve, less ALAE loading, combination of all three
  - ▪ Experience
    - – LDF's, claim counts, size of loss curve (industry or company)
    - – what assumptions get result to exposure rate
      - □ 54 claims above 50k, heavier tail factor (1.238 @ 60 months to 2.2)
- Assign weights to various outcomes and determine a new expected loss estimate
  - ▪ Consider credibility of data

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Reconciliation of Estimates

- Leads to stochastic applications
  - Need to assign probabilities to various assumptions/scenarios
  - Think about independence of variable
  - Address parameter/process risk
- Results in better pricing for AAD considerations, swing plans, stop loss treaties, etc.

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Forecasting Accidental Losses and Risk Financing Needs

- Forecasting – Probable Variation from Expected Losses
  - Frequency Distribution – number of losses
    - Law of averages and expected value
  - Severity Distribution – size of a loss when it happens
    - Black swans and losses not in historical data
  - Total Loss Distribution – resulting distribution
    - Extreme events, look at the tail
- Issues
  - Data accuracy
  - Biases
  - Lack of sufficient historical data
  - Model risk
  - Reconcile to original forecast
    - Works as a good diagnostic or "sense check"

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