

Reserving from a Reinsurer's Perspective

Reserving Methods

Casualty Loss Reserve Seminar
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Agenda

- Traditional Methods
- Industry Loss Events / Emerging Risks
- Property Catastrophe Estimates
- Final Thoughts

Reserving Methods - Bornhuetter-Ferguson

- Essentially a blend of LDF method and Expected Loss method
- Restated ultimate loss estimate equals expected unreported IBNR plus actual reported losses

Bornhuetter-Ferguson Method – an Example

(1)	(2)	(3)	(4) (2) x (3)	(5)	(6) (4) x (5)	(7) (4) - (6)
Accident Year	Earned Premium	Initial Expected L/R	Initial Expected Loss	Expected Percent Reported	Expected Reported Loss	Expected Unreported Loss
2003	3,577	70.0%	2,504	67.2%	1,683	821
2004	4,161	73.5%	3,058	57.0%	1,743	1,315
2005	2,564	76.5%	1,961	42.8%	840	1,122
2006	2,769	78.8%	2,182	28.8%	628	1,553
2007	2,654	85.4%	2,267	12.2%	277	1,990
	15,725		11,972		5,170	6,802

Based on analysis of historical accident year results adjusted for changes in retention.
Expected percent reported based on excess loss development patterns.

Bornhuetter-Ferguson Method – an Example (Con't)

	(8)	(9)	(10)	(11) (9) - (10)	(12)	(13) (11) + (12)
Layer	Accident Year	Initial Expected Loss	Expected Reported Loss	Expected Unreported Loss	Actual Case Inc'd Loss	Ultimate Loss
800 xs 200	2003	2,504	1,683	821	1,255	2,076
800 xs 200	2004	3,058	1,743	1,315	1,988	3,303
750 xs 250	2005	1,961	840	1,121	1,868	2,989
750 xs 250	2006	2,182	628	1,554	863	2,417
700 xs 300	2007	2,267	277	1,990	0	1,990
Total		11,972	5,171	6,801	5,974	12,775

Bornhuetter-Ferguson Method - Advantages

- Allows for smoothing of results
- Incorporates changes in the environment
- Balances stability and actual loss emergence
- Estimates IBNR when loss activity is sparse
- Reflects potential information found in underwriting files

Bornhuetter-Ferguson Method - Disadvantages

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- Difficulty in Reporting pattern estimation
- Problems with Initial expected loss estimate
- Ultimate Premium estimate

Bornhuetter-Ferguson Method - Alternative Sources of Initial Expected Losses

- Loss Ratio Method (incorporates pricing indices)
- Underwriting estimate from pricing study
- Increased limits factors and direct premium
- Standard-Buhlman estimates
- Frequency/Severity estimates

Standard-Buhlman Estimate

- Essentially the Bornhuetter-Ferguson estimate with “on average” perfect information
- Uses actual loss ratio indices multiplied by average loss ratio
 - incorporating loss trend and pricing changes
- Balances the expected average loss ratio so that:
 - $\text{expected reported losses} = \text{actual reported losses}$

Standard-Buhlman - an Example (continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acc Year	Earned Premium	Average Ultimate L/R	Pricing Index	Adjusted Ultimate L/R (3 x 4)	Expected Ultimate Loss&ALAE (2 x 5)	Percent Reported	Expected Reported Loss&ALAE (6 x 7)	Actual Reported Loss&ALAE
2002	3,994	72.2%	0.95	68.6%	2,739	73.8%	2,022	1,543
2003	3,577	72.2%	1.00	72.2%	2,583	67.2%	1,736	1,255
2004	4,161	72.2%	1.05	75.8%	3,154	57.0%	1,798	1,988
2005	2,564	72.2%	1.17	84.4%	2,163	42.8%	926	1,868
2006	2,769	72.2%	1.23	88.9%	2,462	28.8%	709	863
2007	2,654	72.2%	1.39	100.3%	2,661	12.2%	325	0

Total	19,719				15,763		7,515	7,517
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Ratio of actual to expected: 1.000

Restated Loss Ratio: 72.2%

Solve for unadjusted IELR which makes Expected Reported = Actual Reported

Frequency Based Method - Basic Steps - Including Policy Limit Impact

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- Estimate the annual number of claims above the data limit
- Use size of loss curves to project the number of claims above the reinsurance retention
- Use size-of-loss curves to project average severity of claims in reinsurance layer
- Multiply the frequency and the severity projections to estimate the total ultimate losses
- Incorporate frequency/severity estimate into Bornhuetter-Ferguson method

Frequency/Severity - Estimate of claim counts above data limit

(1)	(2)	(3)	(4)	(5)
Accident Year	Detrended Data Limit	Act #> Detrended Data Limit	Claim Count Development Factors	Individual Total Excess Counts
	6.0%			(3 x 4)
2003	118,814	34	1.282	43.6
2004	125,943	25	1.408	35.2
2005	133,499	31	1.555	48.2
2006	141,509	22	1.927	42.4
2007	150,000	11	2.618	28.8
Total		123		198.2

Frequency/Severity - Estimate of claim counts above data limit (Con't)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acc. Year	Projected # of claims > Data Limit	Subject Earned Premium	On-Level SEP	Indicated Frequency (2 / 4)	Selected Frequency	Selected # of Excess Claims
2003	43.6	50,000	63,550	0.686		43.6
2004	35.2	55,000	63,525	0.554		35.2
2005	48.2	60,000	63,000	0.765		48.2
2006	42.4	55,000	55,000	0.771	0.750	41.3
2007	28.8	50,000	50,000	0.576	0.750	37.5
Total	198.2	270,000	295,075	0.672		205.8

Frequency/Severity - Estimation of excess losses using pareto distribution

(1)	(2)		(3)		(4)	(5)	(6)
Accident Year	Layer		Projected #		Average Severity in Layer	Ultimate Loss&ALAE in Layer (4 x 5)	
	Limit	XS Retention	> \$150,000	> Retention			
2003	800,000	200,000	43.6	14.8	178,667	2,644,272	
2004	800,000	200,000	35.2	13.7	178,724	2,455,668	
2005	750,000	250,000	48.2	16.6	206,971	3,433,649	
2006	750,000	250,000	41.3	14.2	207,030	2,942,194	
2007	700,000	300,000	37.5	11.3	239,751	2,720,579	
Total			205.8	70.7		14,196,361	

Notes: (4) from pareto size-of-loss curve frequency formula; $Nx[(DL+B)/(R+B)]^Q$

(5) from pareto size-of-loss curve severity formula; $[(R+B)/(Q-1)]x\{1-[(R+B)/(R+L+B)]^{(Q-1)}\}^Q$

Recap of Methods - Ultimate Loss and ALAE

Acc. Year	LDF	Loss Ratio	Bornhuetter Ferguson (w/ IELR)	Stanard- Buhlman	Frequency/ Severity	Bornhuetter Ferguson (w/ F/S)
2002	2,091	2,656	2,239	2,261	2,550	2,211
2003	1,868	2,504	2,076	2,102	2,644	2,122
2004	3,488	3,058	3,303	3,344	2,456	3,044
2005	4,364	1,961	2,989	3,105	3,434	3,832
2006	2,997	2,182	2,417	2,616	2,942	2,958
2007	0	2,267	1,990	2,336	2,721	2,389
Total	14,808	14,628	15,014	15,764	16,747	16,556

Industry Loss Events and Emerging Risks

- Traditional estimation techniques may not work for certain emerging risks and industry events (Mass Torts, WTC, Credit Crisis)

- Exposure Based Approaches can be useful
 - “Bottom Up” Review
 - “Top Down” Review
 - Often provides a reasonability check

Industry Loss Events and Emerging Risks (continued)

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- Considerations for reinsurance and loss reserving
 - Data provided to reinsurers has a time lag and may lack completeness
 - Has a claim been incurred as of financial statement date?
 - Is there already a provision for the loss in the pricing IELR?
 - Can loss ratios be split into “contagion” and “non-contagion” claims?

Property Catastrophes

➤ Techniques

- Model Output
- Underwriters Estimates
- Top down Methods
- Market share

Property Catastrophe – Model Technique

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➤ Approach

- Acquire footprint and event sets from model vendors
 - Typically are revised a few times
- Run event sets with your exposure data and policy profiles
- Produces estimated ultimate and exposed policies in footprint of storm/event

➤ However, be wary of :

- Data Issues
- Non Modeled Coverages
- Vulnerability

Property Catastrophe Underwriters Estimates

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➤ Approach

- Identify exposed risks/policies
- Produce listing of exposed policies with
 - Attachment points and limits
 - Model results
- Estimate potential exposure by client and contract
 - Work the phones – clients and brokers
 - Market discussions – incorporate claims group
- Vary results to create a range of potential outcomes

➤ Sensitivity test results

Property Catastrophe Chain Ladder

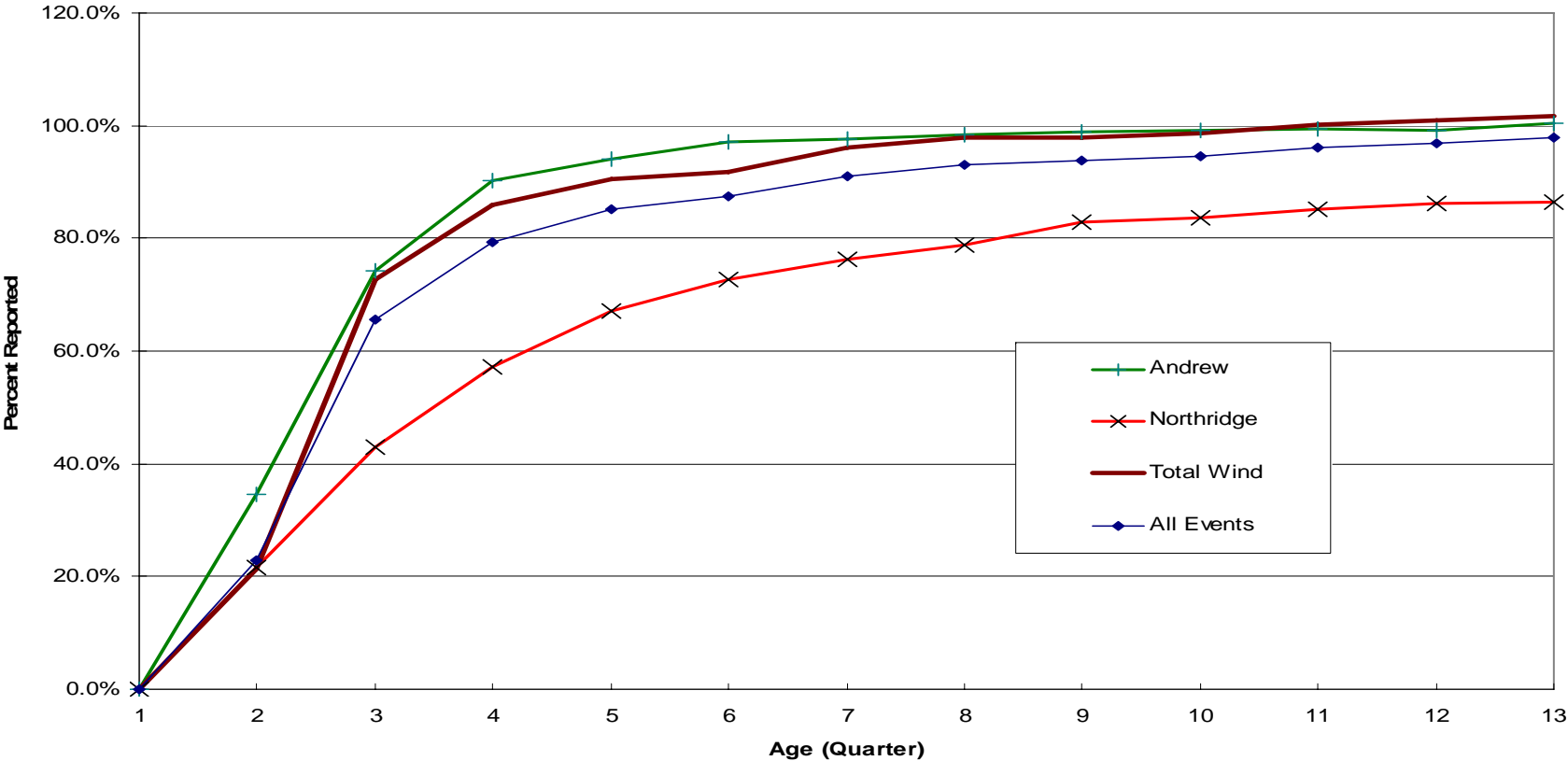
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- Chain ladder techniques (purely mechanical)
 - Segment losses into categories
 - Apply reporting patterns/LDFs to case incurred losses
 - Seek input from underwriters / claims
- Historical cat event reporting patterns vary

Other Approaches - Catastrophes

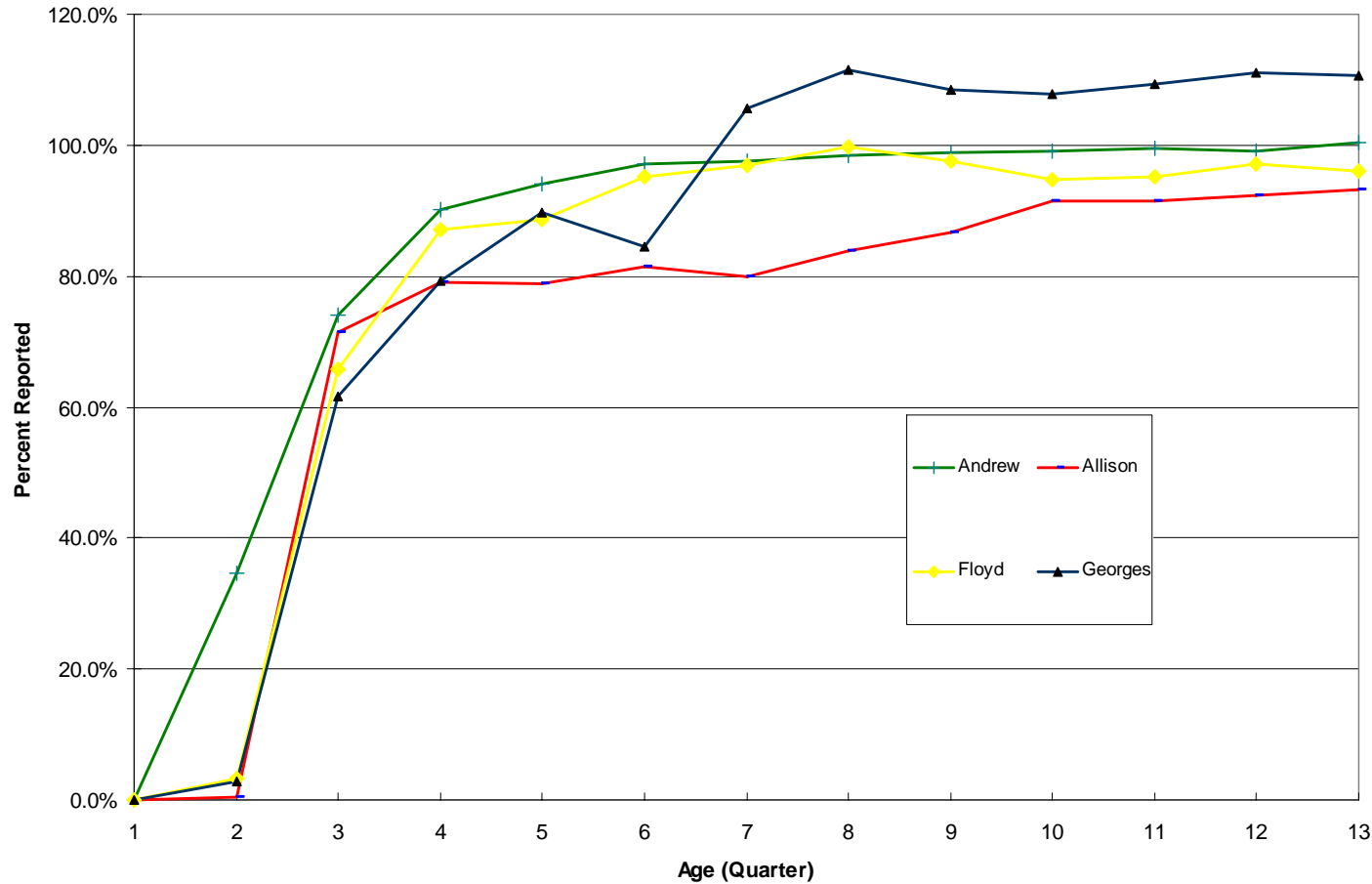
2006 RAA Study - Wind versus All Events

RAA Loss Development Study Catastrophes October, 2006



Other Approaches - Catastrophes 2006 RAA Study

RAA Loss Development Study Catastrophes October, 2006



Property Catastrophe Market Estimates

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➤ Approach

- Estimate percentage of market for a given event
- Apply market percentage to industry sized loss

➤ Items to note:

- Extraordinary amount of leverage
- Model results are better at an aggregate level than granular

Final Thoughts

- Move away from mechanical process
- Reconcile with other knowledge
- Incorporate rate change and loss trend into study
- Look for trends, stability, shocks
- Do you feel comfortable with the underlying exposures
- Communicate with the underwriting and claims departments
- Gather knowledge on reserving philosophy (level of ACRs)