Severe Weather Ratemaking

1

Antitrust Notice

• The Casualty Actuarial Society is committed to adhering strictly to the letter and spirit of the antitrust laws. Seminars conducted under the auspices of the CAS are designed solely to provide a forum for the expression of various points of view on topics described in the programs or agendas for such meetings.

• Under no circumstances shall CAS seminars be used as a means for competing companies or firms to reach any understanding – expressed or implied – that restricts competition or in any way impairs the ability of members to exercise independent business judgment regarding matters affecting competition.

• It is the responsibility of all seminar participants to be aware of antitrust regulations, to prevent any written or verbal discussions that appear to violate these laws, and to adhere in every respect to the CAS antitrust compliance policy.

Outline

- Overview of Change
- Catastrophe Threshold
- Peril Mix
- Severity Analysis
- Frequency Analysis
- Summary

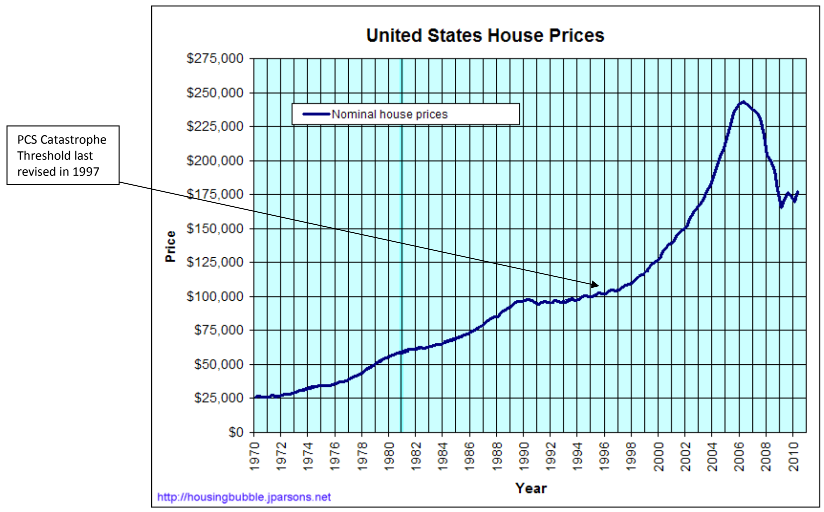
3

Overview of Change

- Recent severe weather activity has put pressure on the profitability of the property lines of business across the insurance industry
- In order to understand the drivers of this recent experience, it is necessary to break down the losses:
  - Is a fixed dollar or claim count catastrophe threshold an appropriate definition of extreme events for ratemaking purposes?
  - Is the rise in severe weather losses caused by an increase in frequency, severity, or both?

4

Catastrophe Threshold



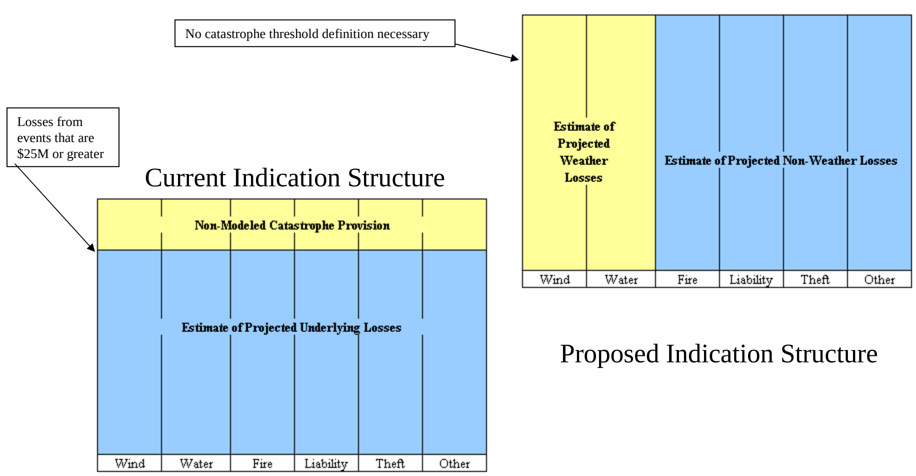
Catastrophe Threshold

- Not revised since January 1, 1997
- More and more losses are being defined as a catastrophe
- Catastrophe is a business-defined definition
- Instead of categorizing losses as catastrophe vs. non-catastrophe, is there a way we can look at losses that is more homogenous and give us an accurate answer?

Peril Mix

- Current perils accounted for in a typical property indication:
  - Wind, Water, Fire, Liability, Theft, Other
- Most companies combine all perils for their underlying indication and incorporate a catastrophe provision for higher layered loss events
  - Catastrophe provision may be separated into modeled and non-modeled components; this presentation deals strictly with non-modeled catastrophe pricing
- If homogeneity of data is a key goal, all losses attributable to weather should be combined

Peril Mix

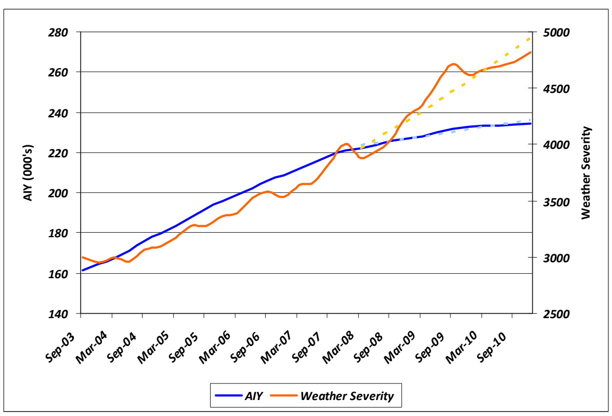


Peril Mix

- Catastrophe losses for Non-Weather perils make up less than 1% of total losses
- Examples:
  - Wildfire
  - Sinkhole Collapse
  - Mine Subsidence
- Two ways to mitigate the effects of adding these losses to the underlying non-weather losses:
  - Excess Loss Factor
    - Would help to stabilize trends and removes effects of shock losses
    - Requires definition of shock losses
  - Revise the credibility standards such that more years of data are used when necessary
    - Will not protect states from large fluctuations caused by losses that occur less than once every five years (assuming five years is used in the indication)

Severity Analysis

- Many non-modeled catastrophe ratemaking methodologies rely on a relationship between loss and AIY's over a long period of time
- Unless this relationship is carefully developed, it can add more distortion than accuracy into the projected catastrophe loss



Severity Analysis

- The severity of weather claims appears to be relatively stable across different event sizes (excluding hurricanes/earthquakes/flooding)
- Ideal approach is to use as few years as possible to calculate an appropriate estimate for severity
  - Increases responsiveness to new trends in the prices of housing materials
  - Estimate will be less dependent on and leveraged by the trend selection

11

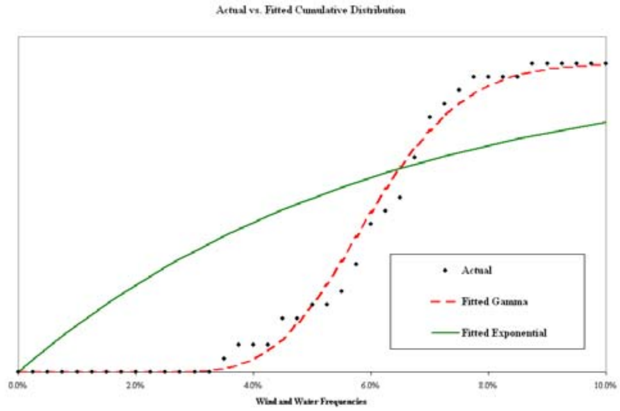
Frequency Analysis

- Since severity is generally stable from year to year, the main driver of the severity of weather events in total is frequency
- First step was to fit historical data to a frequency distribution
- Weather claims are **not** independent and therefore can not be fit to any of the most commonly used discrete frequency distributions
- However, if the average frequency is independent from year to year, we can fit this to a continuous distribution using each year's frequency as a sample data point

12

Frequency Analysis

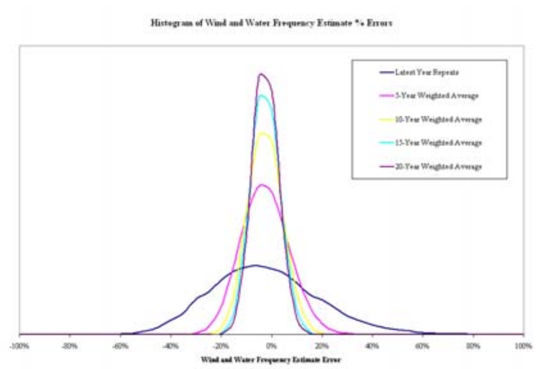
- The Gamma distribution appears to be a very close fit to the actual data, and the resulting Chi Square statistic indicates a p-value of 91.2%



13

Frequency Analysis

- Two tests were run to determine the optimal number of years to use:
  - Simulation of 30,000 trials assuming a Gamma distribution in order to graph a histogram of errors
  - Correlation testing

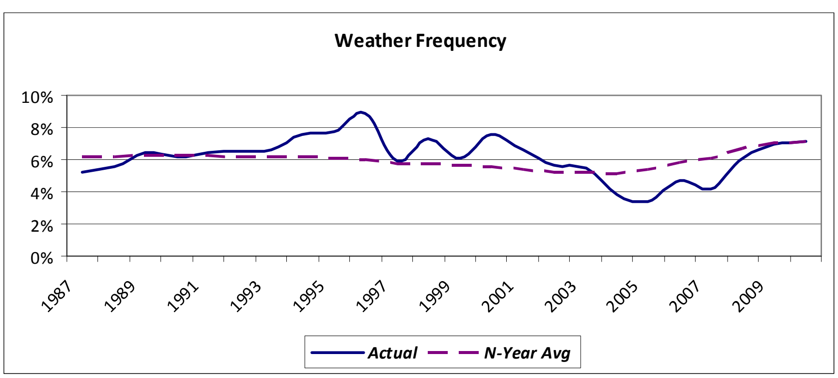


14

Frequency Analysis

- A correlation test takes pairs of years separated by a certain time interval and determines whether or not the experience in those two years are correlated
- The highest correlations appear to be between the pairs of years that are very close together or very far apart
- There are negative correlations between pairs of years that are neither close together nor far apart

Frequency Analysis



- Based on the graph, there is no indicator of a definite trend or cyclicality, but this does help to explain the results of the correlation test
- Given the combination of results from the simulation and correlation testing, using more years of data stabilizes the estimate around the true mean

Summary

- Separating property indications into Weather and Non-Weather components and eliminating the need for a provision for non-modeled catastrophes creates a more homogeneous data set
- Performing a weather severity analysis will account for shifts in replacement value
  - Severities are stable enough to use fewer years of data – even for weather events!
- Frequency analysis requires maximum number of years available in order to capture all historical events that may be possible in the future

17

Future Considerations

- Demand Surge
  - Separate quantification of frequency and severity assumes independence between these two statistics
- Catastrophic Wildfire Losses
  - Preliminary analysis reveals that wildfire experience is considerably different than that of weather experience
- Weather Frequency Trend
  - Can a rigorous statistical analysis solve the mystery of whether or not there is a trend in long-term weather frequencies?
- Modeled/Historical Loss Hybrid Method
  - Modeled losses can serve as a guide to determine the return time of a particular accident year weather frequency

18

Questions?

19

Allstate Insurance
Owners
State X

Development of Provision for Weather Loss and LAE
Total Weather Peril

Accident Year* Ending	(1) Accident Year * Ultimate Severity	(2) Ultimate Severity incl. LAE	(3) Severity Trend Factor	(4) Projected Ultimate Severity incl. LAE	(7) Experience Year Weights
3/31/2007	$3,624.34	$4,204.23	1.265	$5,318.35	20%
3/31/2008	$4,589.96	$5,324.35	1.217	6,479.73	20%
3/31/2009	$4,656.01	$5,400.97	1.170	6,319.13	20%
3/31/2010	$4,747.20	$5,506.75	1.125	6,195.09	20%
3/31/2011	$4,418.77	$5,125.77	1.082	5,546.08	20%

(8) Indicated Provision for Severity Including All LAE $5,971.68

(9) Indicated Provision for Frequency 6.97%

(10) Indicated Provision for Total Loss and LAE $416.23

* Evaluated at 12 months

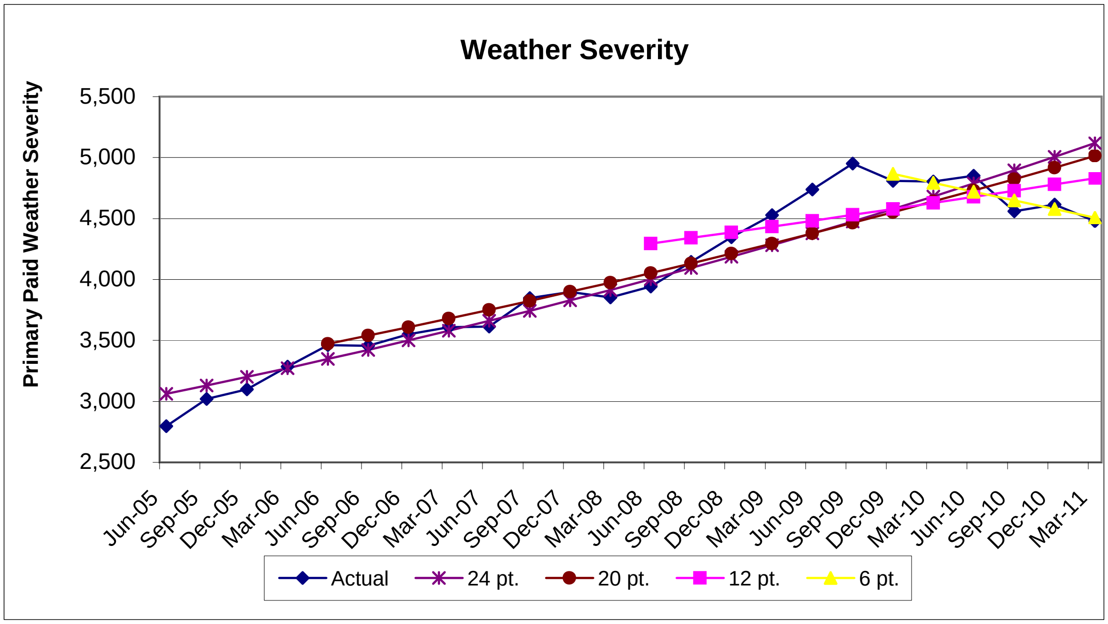
Allstate Insurance
Owners
State X

Provision for Weather Frequency

(1) Accident Year Ending	(2) Earned Exposures	(3) Accident Year * Paid Claims	(4) Accident Year Paid Frequency	(5) Accident Year Ultimate Paid Frequency
1987	152,846	6,803	4.45%	4.45%
1988	166,694	7,790	4.67%	4.67%
1989	177,109	12,091	6.83%	6.83%
1990	182,798	14,301	7.82%	7.82%
1991	183,899	12,445	6.77%	6.77%
1992	180,219	11,305	6.27%	6.27%
1993	175,971	15,530	8.83%	8.83%
1994	176,431	12,749	7.23%	7.23%
1995	179,834	11,396	6.34%	6.34%
1996	185,566	10,467	5.64%	5.64%
1997	191,689	11,700	6.10%	6.10%
1998	200,903	18,520	9.22%	9.22%
1999	210,287	12,705	6.04%	6.04%
2000	219,900	20,785	9.45%	9.45%
2001	227,401	11,570	5.09%	5.09%
2002	232,131	11,855	5.11%	5.11%
2003	232,761	10,415	4.47%	4.47%
2004	245,307	7,610	3.10%	3.10%
2005	270,171	14,975	5.54%	5.54%
2006	297,643	11,268	3.79%	3.79%
2007	323,486	13,595	4.20%	4.20%
2008	339,905	46,643	13.72%	13.74%
2009	352,129	71,014	20.17%	20.23%
2010	351,459	19,561	5.57%	6.25%
(6) Weather Frequency Provision				6.97%

* Evaluated at 12 months

Allstate Insurance
Owners
State X
Total Weather Peril



	24 pt.	20 pt.	12 pt.	6 pt.
Avg Annual Percent Change Based on Best Fit:	9.36%	8.04%	4.37%	-5.95%