
Reserving for Homeowners – Pitfalls in the Short-Tailed Line

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Casualty Loss Reserve Seminar

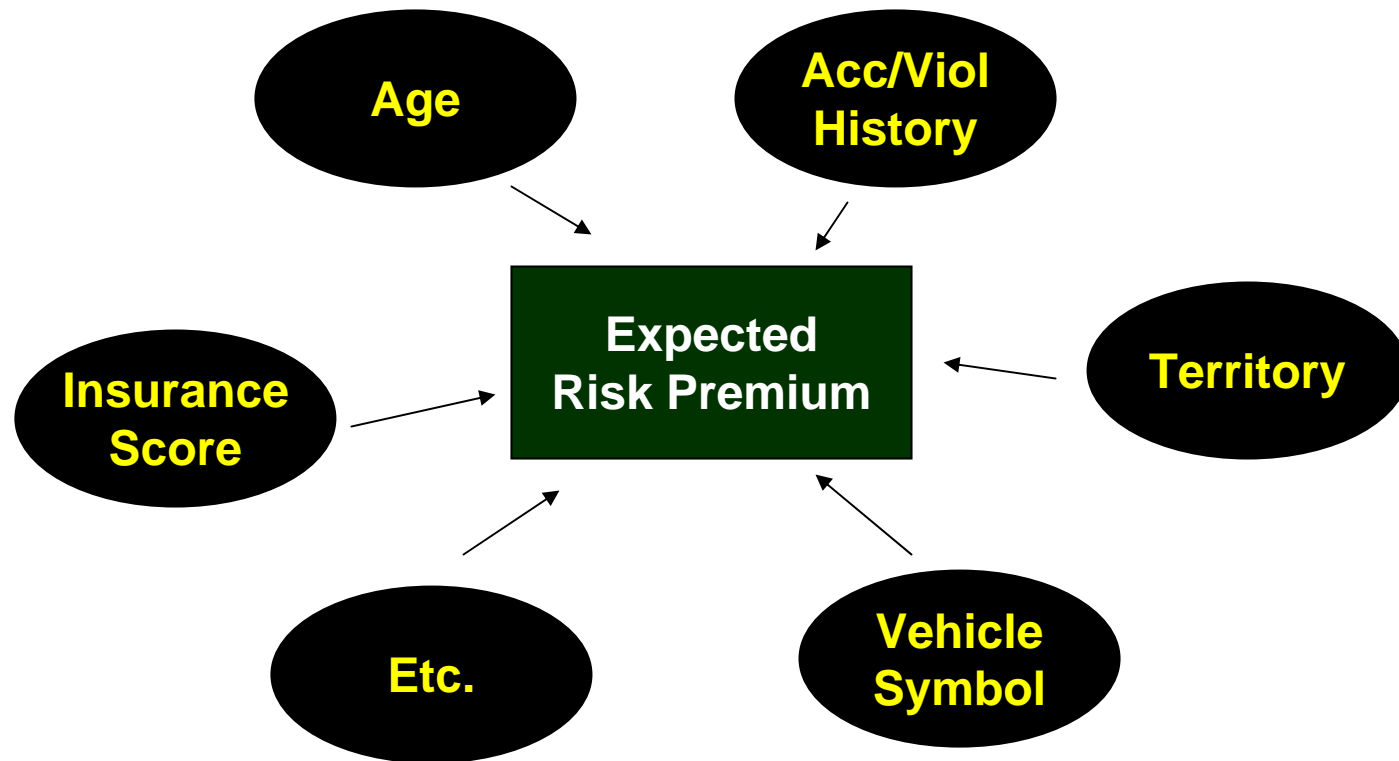
Boston, MA

September 13, 2005

Discussion Topics

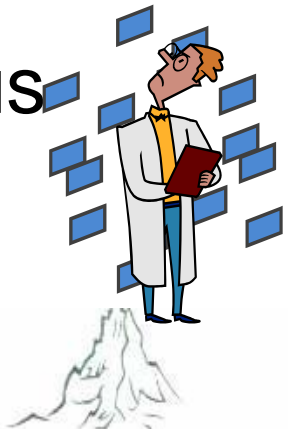
- Background
- Data
- Analysis & Application

General Application of Predictive Modeling to Insurance

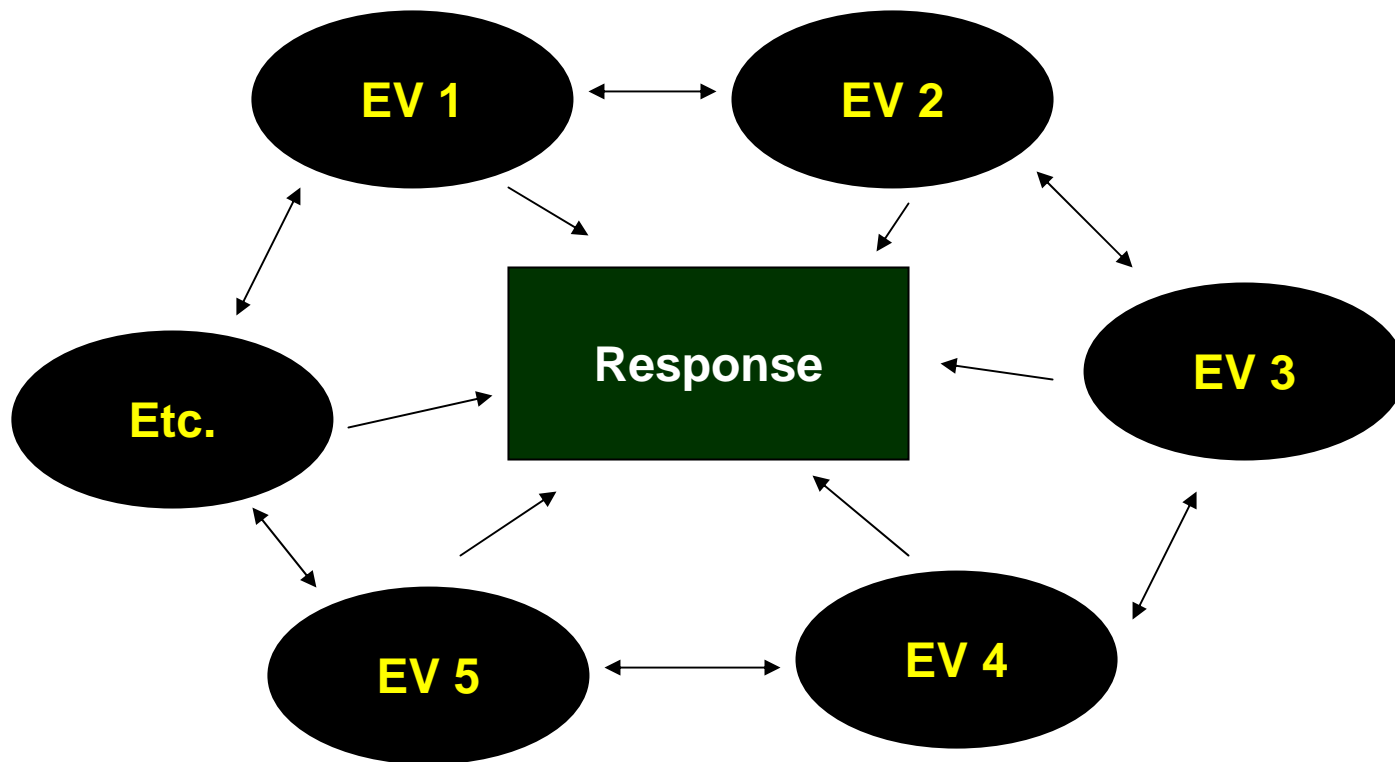


Why Use Multivariate Analysis

- Traditional Actuarial Approach:
Analyze each rating factor independent of all the other factors
- Inherent Assumption: Distribution of all other rating variables is constant
- Multivariate Analysis:
Analyze each factor simultaneously, thus removing the distributional bias



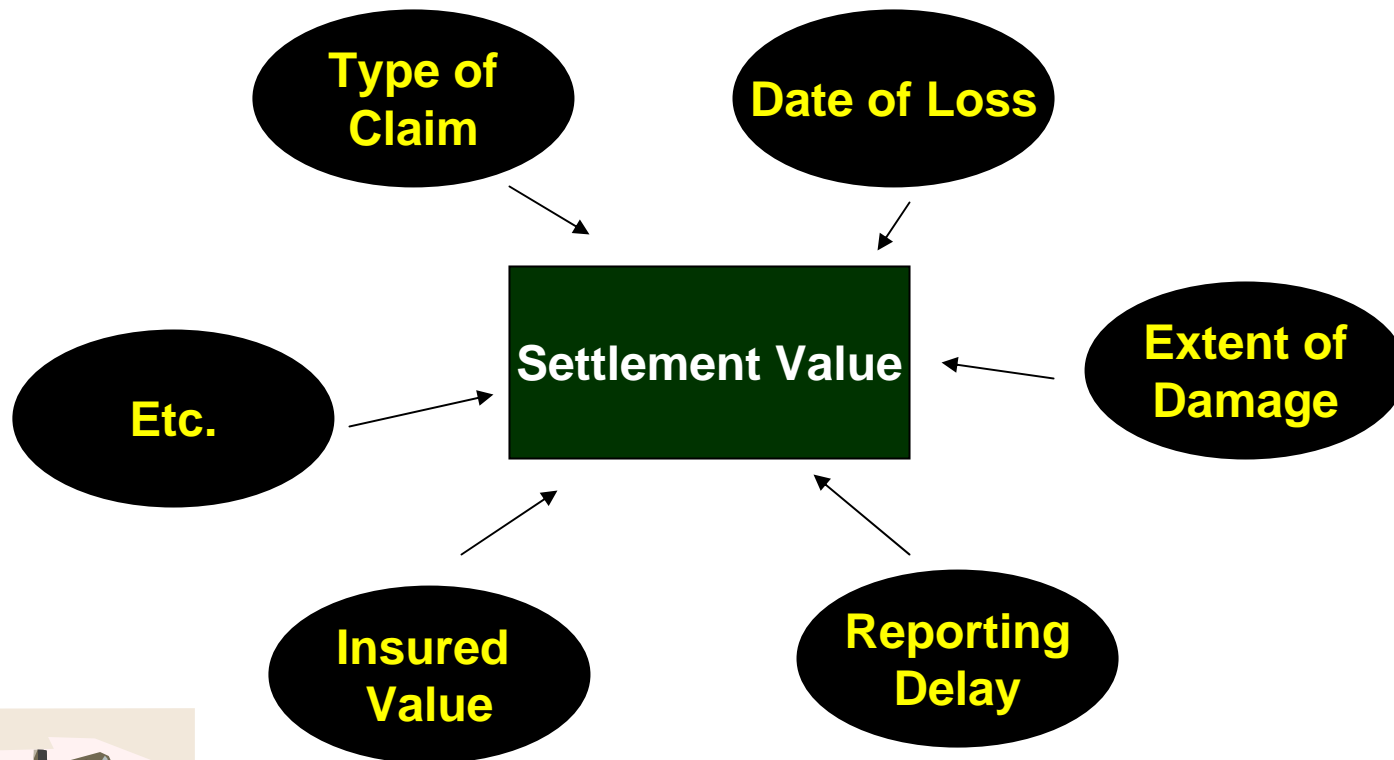
Why Stop There?



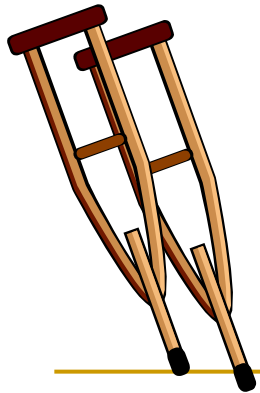
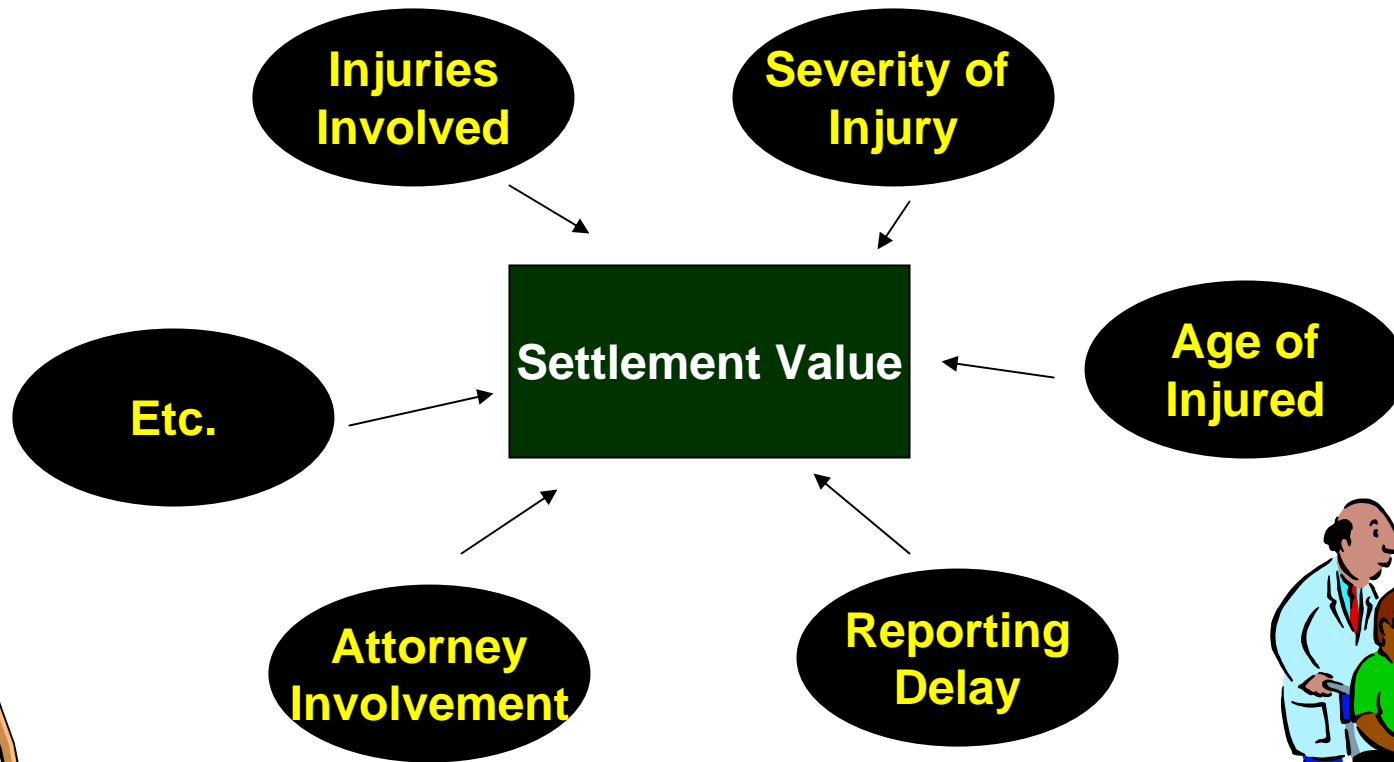
Why Stop There?

- Predictive modeling is simply the application of more sophisticated statistical techniques to insurance processes
- The most immediate application has been ratemaking
- Has been expanded to other areas

Claim Settlement Value Modeling – Property



Claim Settlement Value Modeling – Homeowner Liability



Data



Data

- Closed Claim Settlement Amounts
 - Paid loss
 - Loss adjustment expense
- Claim Characteristics
- Insured Rating and Underwriting Characteristics
- External Information

Claim Characteristics

- Insured person (age, gender, marital status, etc.)
- Type of claim (water, theft, fire, liability, etc.)
- Coverage characteristics (AOI, replacement cost)
- Date of loss
- Liability characteristics (age of injured, type of injury)
- Rating & underwriting characteristics (length of time insured, location)
- Catastrophe indicator
- Derived characteristics
 - Contact lag
 - Report lag
 - Settlement lag
 - Loss state different from insured state

Data (cont'd)

■ External Data

- ❑ Property characteristics
- ❑ Price inflation data
- ❑ Medical/wage inflation data
- ❑ Housing market information

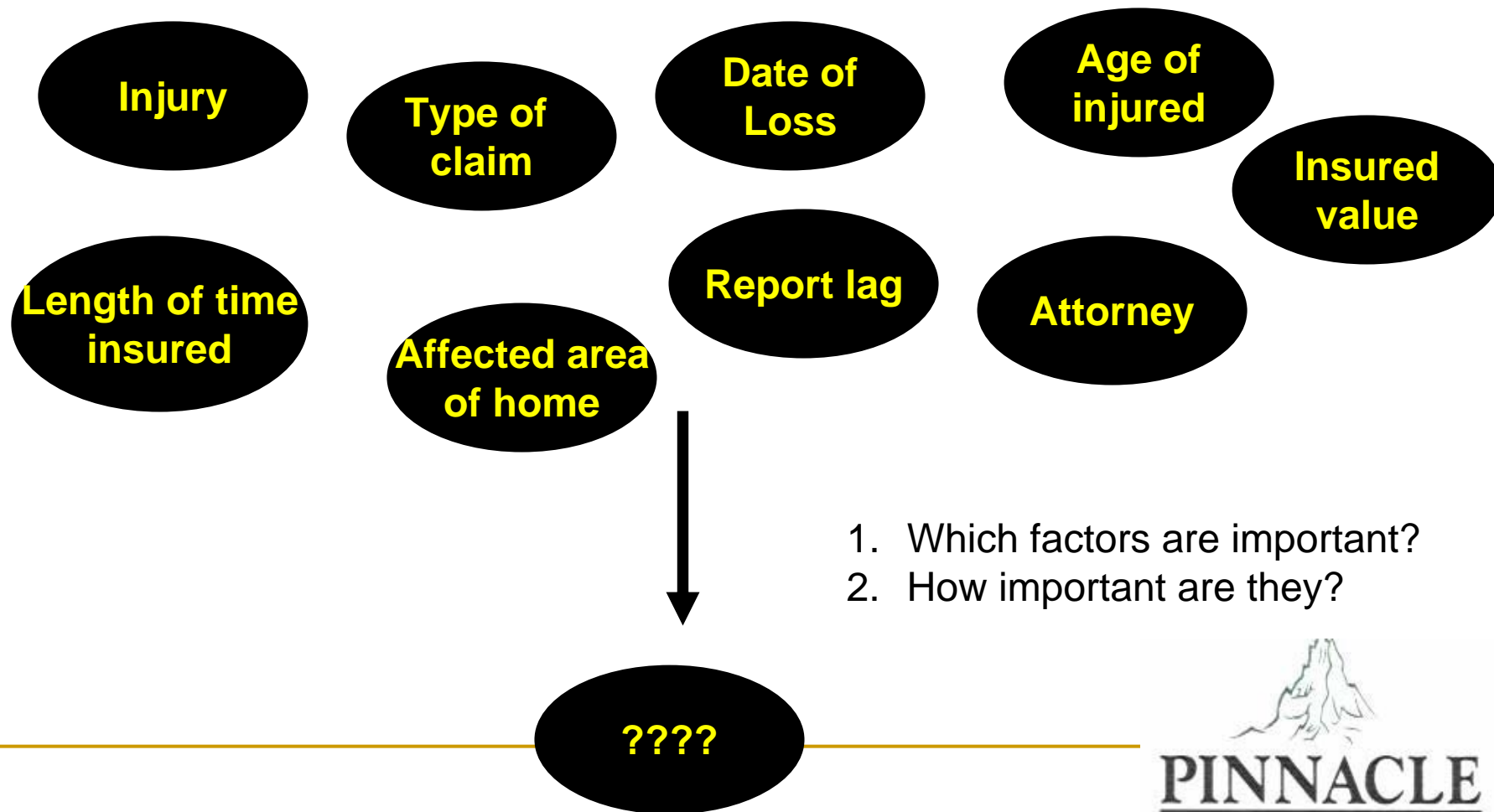
■ Considerations

- ❑ Credibility
- ❑ Availability of company data
- ❑ Claims closed without payment
- ❑ Natural catastrophe



Analysis & Application

Purpose of Predictive Modeling



Which Factors Are Important?

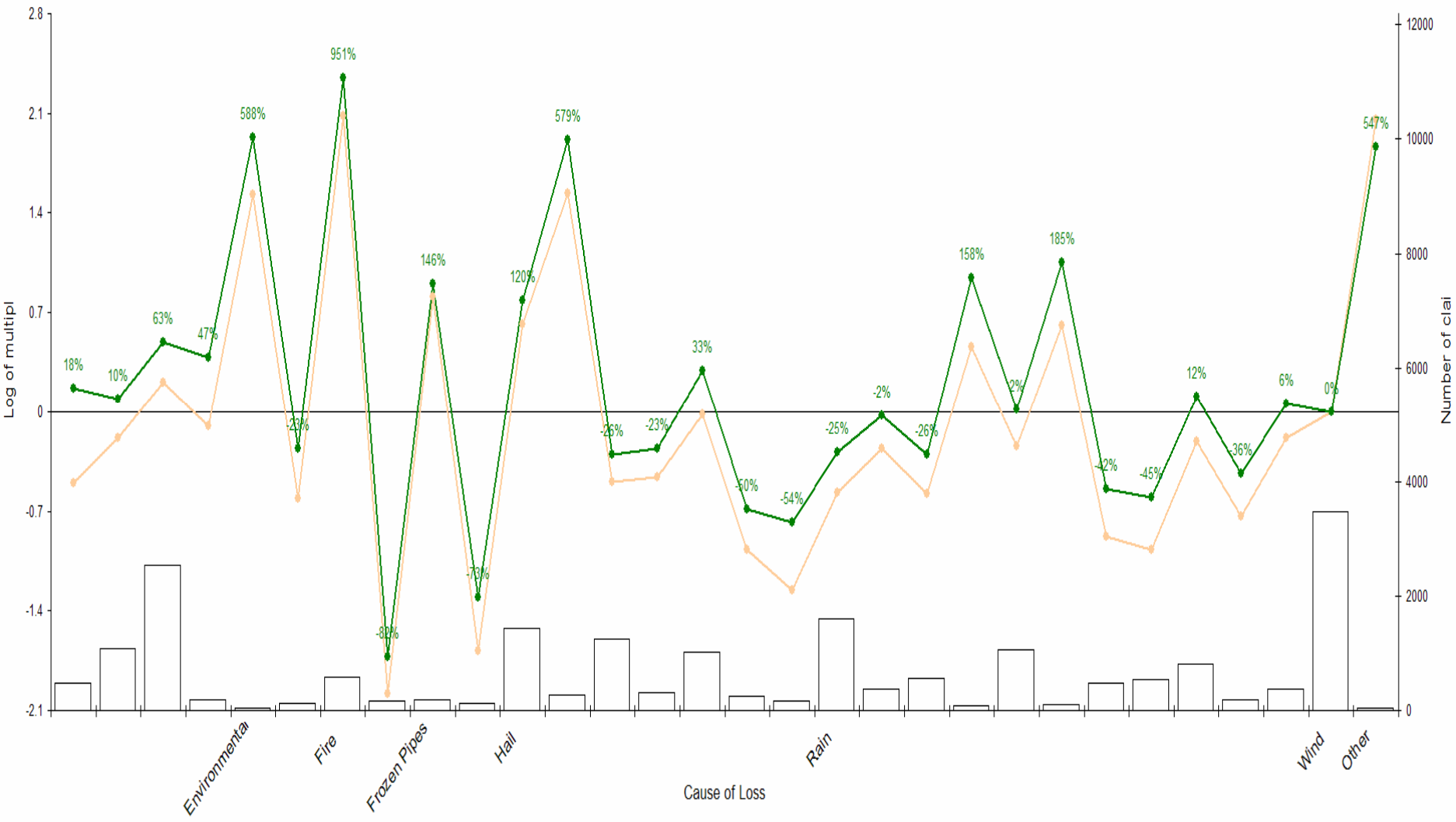
- Normal method
 - Include all factors in the analysis
 - Review diagnostics to remove insignificant factors
- Automated methods
 - Use when there are a large number of factors
 - Stepwise approach

Claim Settlement Value Modeling

- Begin with closed claim history
- Include ultimate settlement amount and characteristics of claim
- Develop predictive model to determine impact of claim characteristics on ultimate settlement value
- If needed, split model development between limited and excess amounts
- If data is sufficient, develop models by type of loss

Homeowner Loss Reserve Analysis

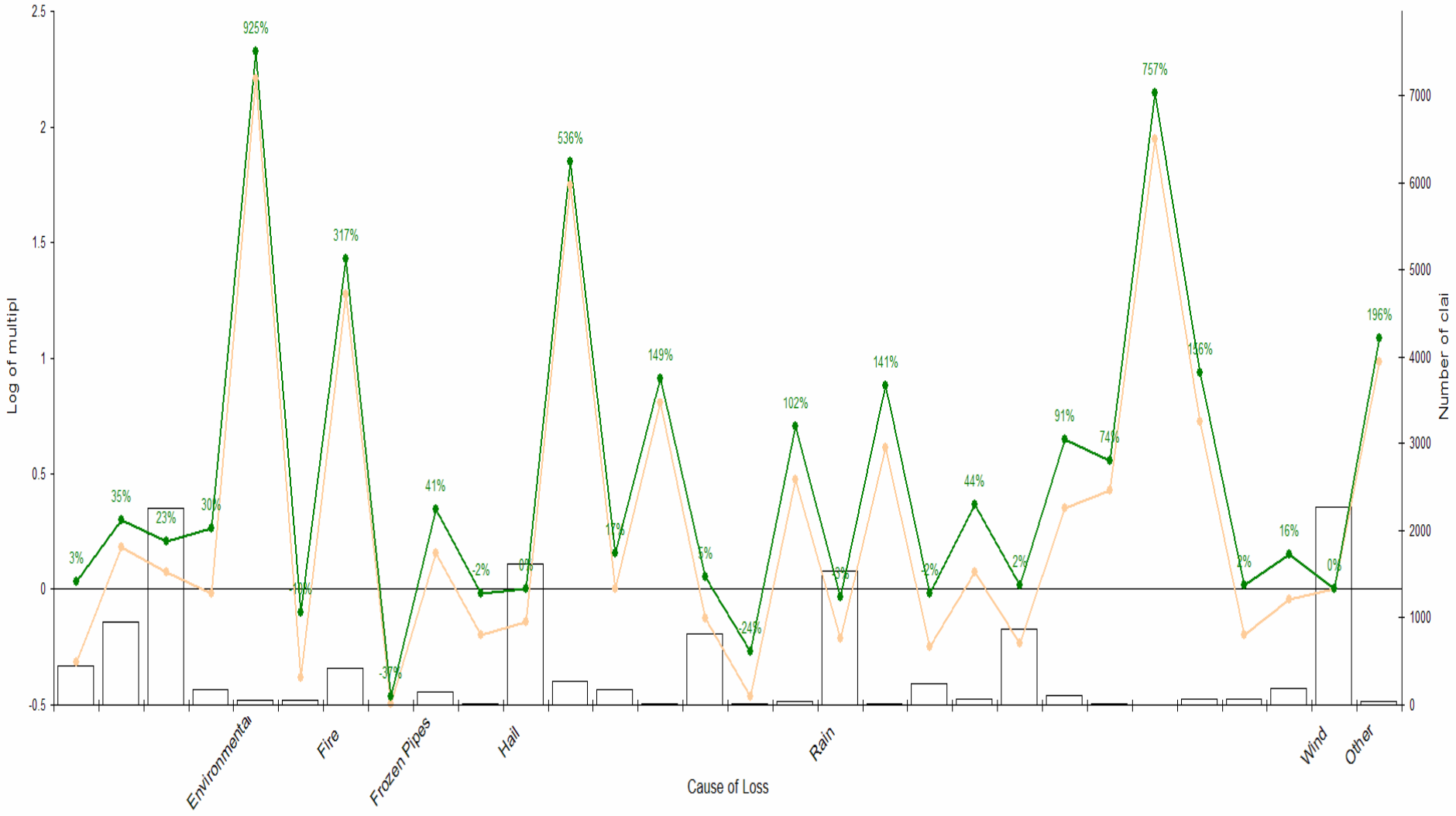
Run 1 Model 1 - Paid Loss Analysis - Paid Loss Initial Model



—○— Oneway relatives —○— Unsmoothed estimate —●— Smoothed estimate

Homeowner Loss Reserve Analysis

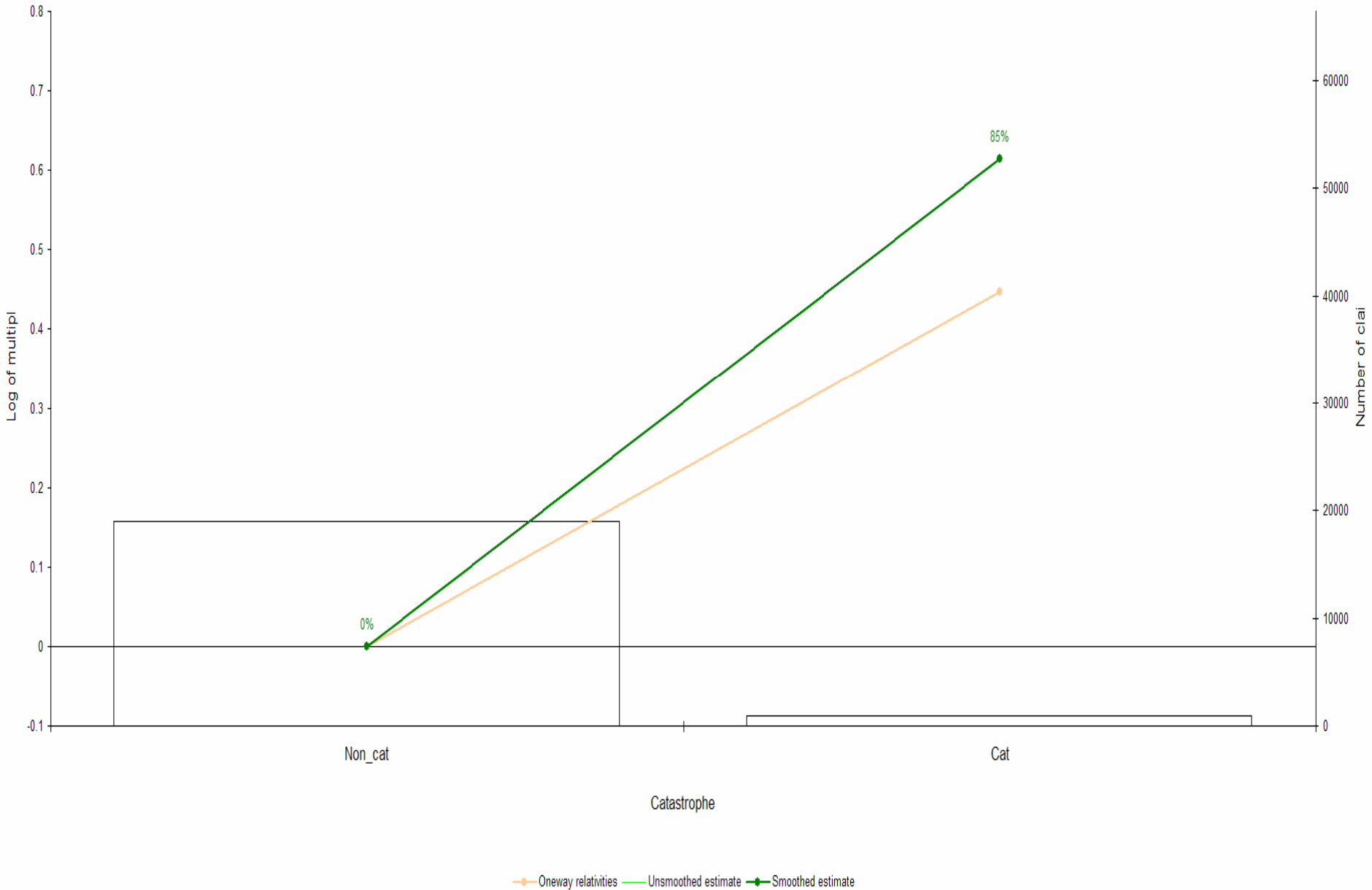
Run 1 Model 2 - Paid Loss & LAE Analysis - Paid ALAE Initial Model



—○— Oneway relativities —○— Unsmoothed estimate —●— Smoothed estimate

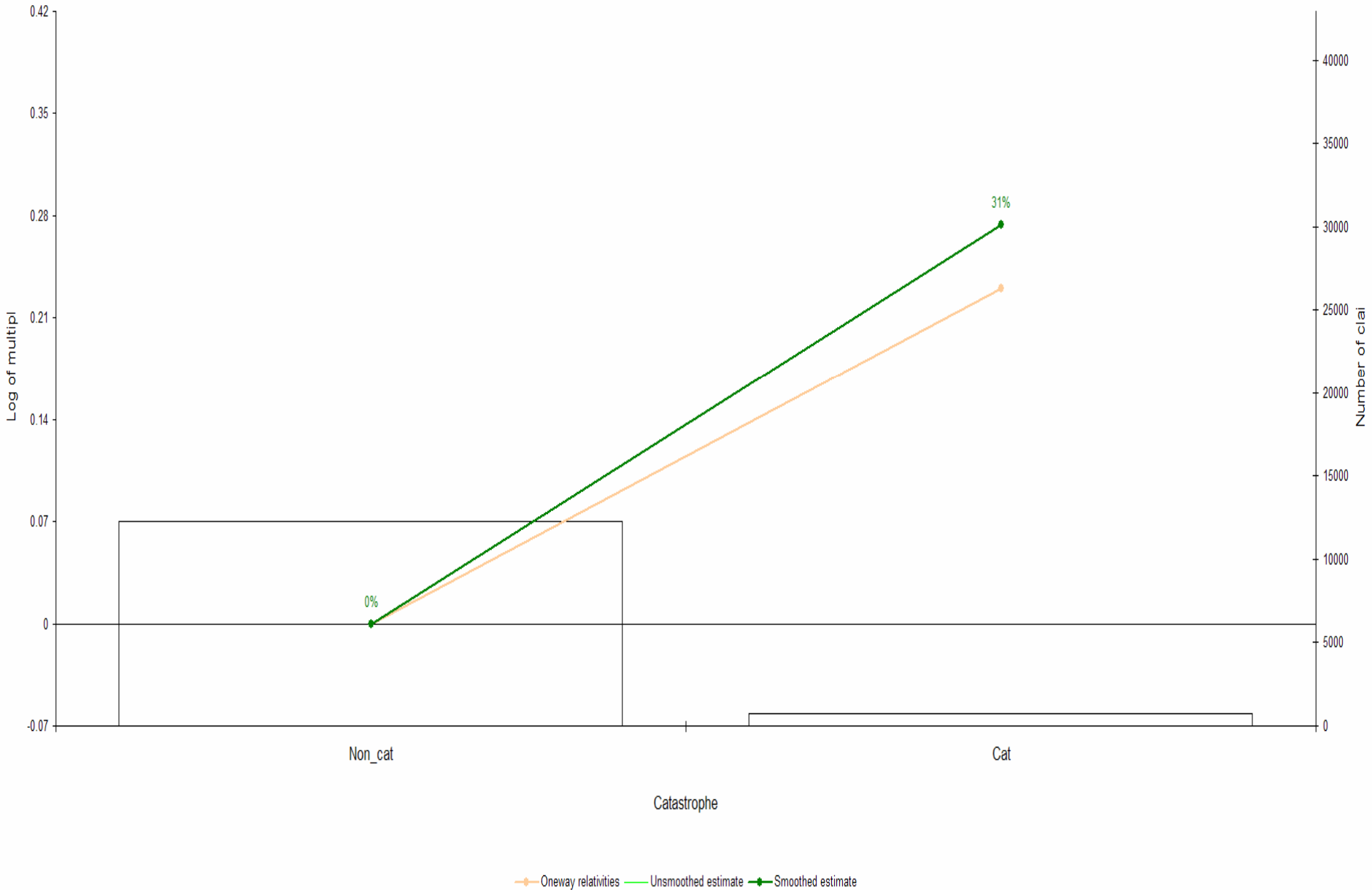
Homeowner Loss Reserve Analysis

Run 1 Model 1 - Paid Loss Analysis - Paid Loss Initial Model

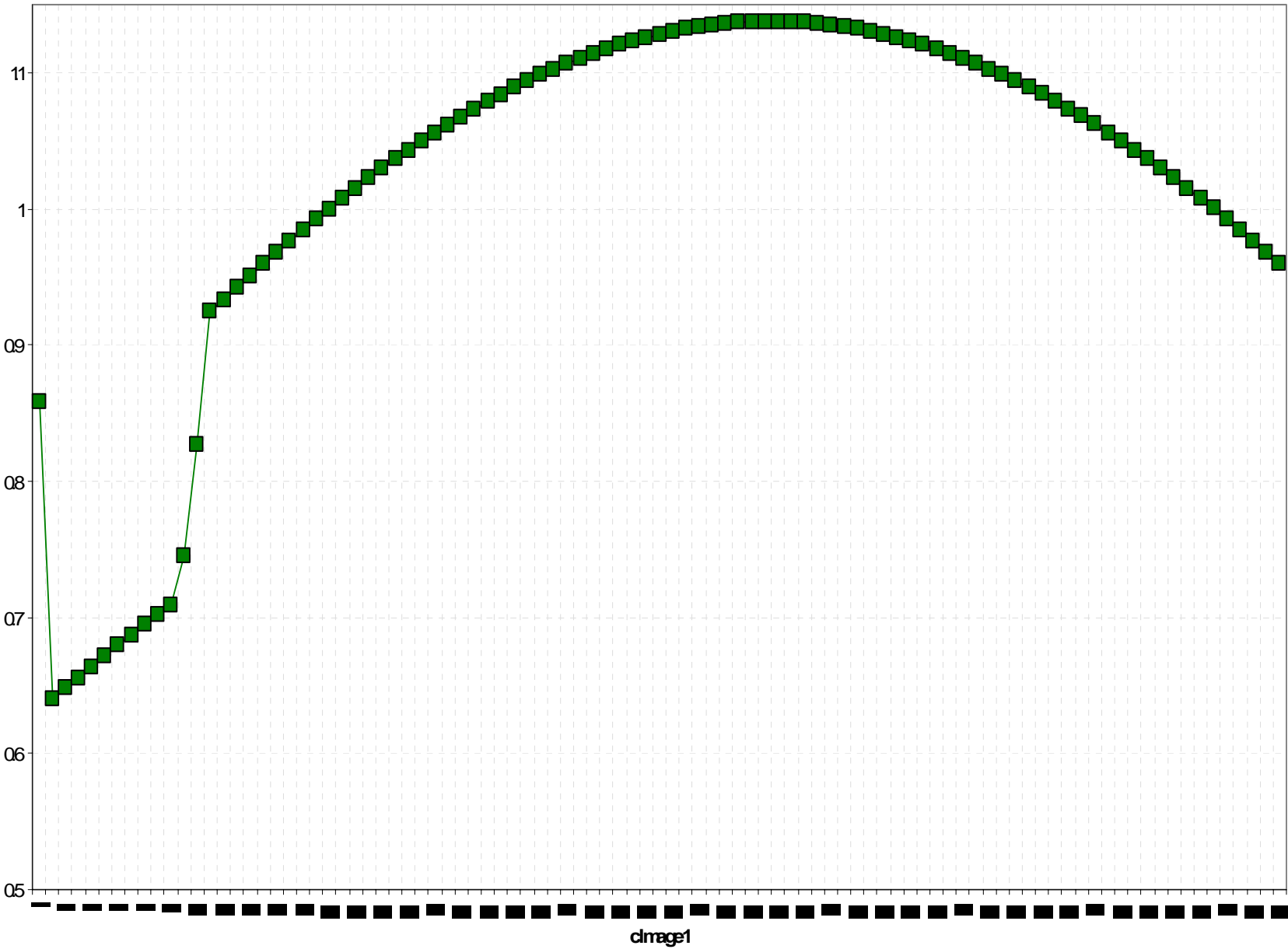


Homeowner Loss Reserve Analysis

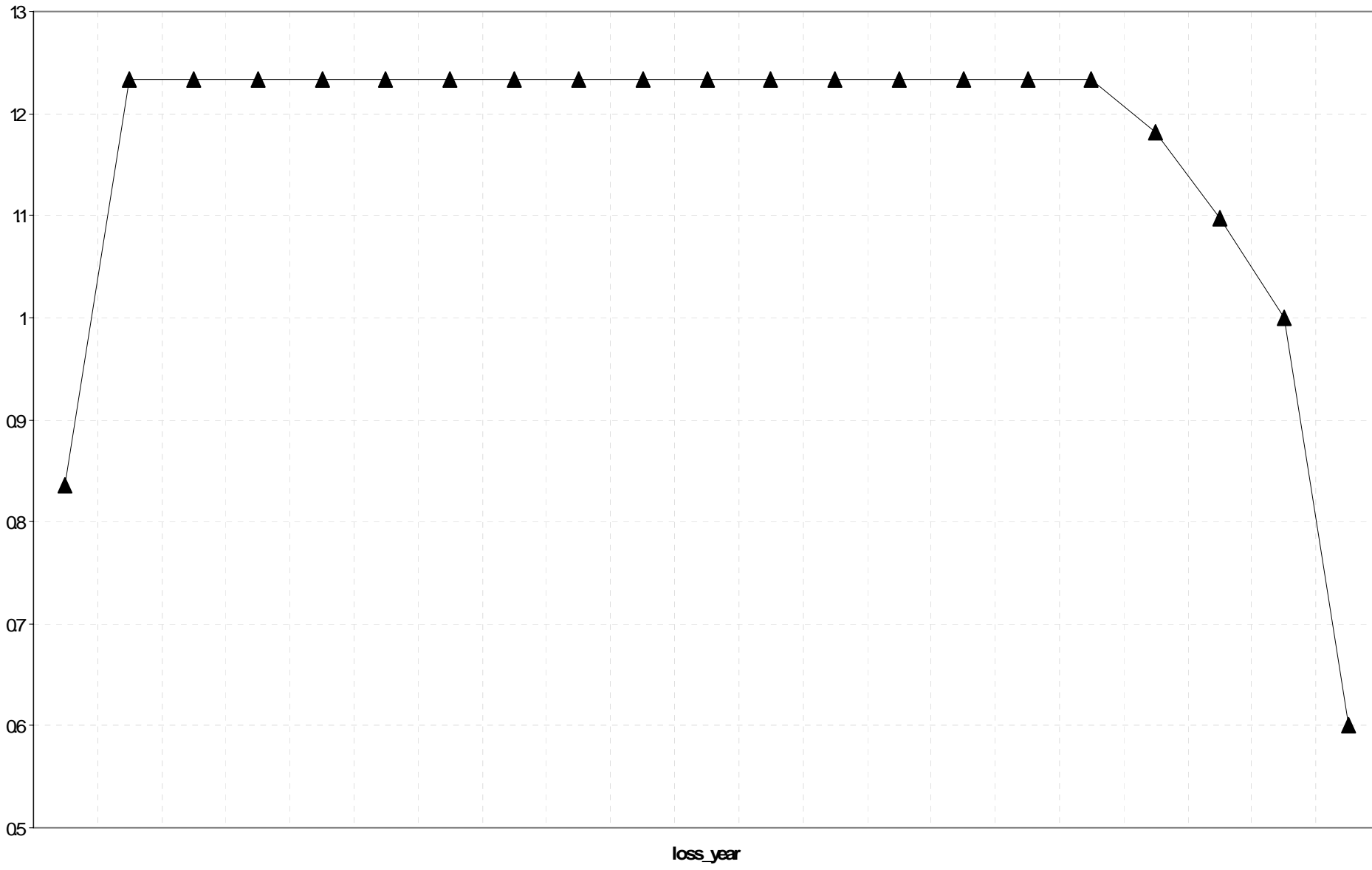
Run 1 Model 2 - Paid Loss & LAE Analysis - Paid ALAE Initial Model



Liability Loss by Injured Age



Estimated Loss Settlement Value Relativities



Excess Loss Analysis

- Need to reflect claim settlement amounts greater than cap
- Traditionally, load back equal proportion to all claims
- Does not reflect reality that different claims have different likelihood of reaching excess

Excess Loss Analysis

- Could analyze excess loss frequency and excess loss amount
- Severity portion volatile
- One approach
 - Logistic analysis – likelihood of claim piercing the excess threshold
 - Multiply by average excess severity to get expected excess amount



Direct Application

Base claim 9,500

Catastrophe

Yes 1.85

No 1.00

Tenure

0-13 1.00

14+ 0.90

Type of Loss

Wind 1.00

Theft 0.55

Fire 10.50

No Cat, 14 year tenure,
theft loss

$9500 \times 1.00 \times 0.90 \times .55$

Claim = 4,703