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- The contents of this presentation do not reflect the views or opinions of Guy Carpenter, MMC, or anyone other than myself.

- Any numeric values contained in this presentation are for demonstration purposes only, and do not represent the results of actual analysis. As such they are not suitable for purposes of any actual rating exercise.
Truth About Exposure Curves
AGENDA

- Exposure Rating Overview
- Where Do Curves Come From?
- Benefits and Limitations of Exposure Curves
- Curve Selection
Exposure Rating Overview
Exposure Rating Overview

- We always start with the subject premium
- The loss ratio determines the expected ground-up loss
- Exposure Rating simply tells us how much of the expected loss will fall into a given layer
- Once we have expected loss to the layer, we can break it up into its component frequency and severity
- The mechanics of how we do this is different depending on the form of the curve(s) used
Where Do Curves Come From?
Where do Curves come from?

- Workers Comp - NCCI
- Liability – ISO Increased Limits Factor Studies
- Property
  - ISO PSOLD (Property Size-of-Loss Distributions)
  - First-Loss Scales
    Ruth Salzman: 1960 INA Homeowners data
    Stephen Ludwig (Hartford data 1984-1988)
    “small commercial property book of business”
Where do Curves come from?

• Other First-Loss Scales
Benefits and Limitations of Exposure Curves
Benefits and Limitations of Exposure Rating in General

- For many (especially larger) accounts:
  - Lower layers based on credible experience
    - (many years of few or no claims should be granted credibility)
  - Upper layers may be based on return on capital or minimum ROL
  - Layers in between are priced as a walk-up from one to the other
- BUT!
  - The benefit of exposure rating is that we don’t always have experience.
- NCCI, ISO Liability ILF’s, PSOLD: the main benefit is that we have them at all!
  - What if we didn’t? What would we do? Are we doing those things anyway?
    - Should we?
  - Current
  - Relevant
    - (As opposed to using Homeowners to rate Commercial property)
  - Large data sample
  - More granular than they were several years ago.
Benefits and Limitations of Exposure Curves

- BIGGEST LIMITATION: We don’t have enough of them!
- Other than WC, GL/CA and Property, what is there?

- NCCI Worker’s Comp Curves: I’ll let Mike discuss these.
- ISO ILF Liability Curves:
  - Commonly applied to layers far beyond their intended use.
  - ALAE is assumed constant (ILF’s vs LAS M.E. equations).
  - We treat them as severity curves.
**Limitations: What do we do about that?**

- **ISO ILF Liability Curves:**
  - Commonly applied to layers far beyond their intended use.

  - **What do we do about that?**
    - Keep things in perspective.
      - Pricing of high layers may be more a function of return than $E(\text{Loss})$.

    - Defer to expert judgment
      - These are tools, meant to *inform*, *augment* and *assist* expertise and judgment. They were never intended to *replace* it.
Limitations: What do we do about that?

• ISO ILF Liability Curves:
  - ALAE is assumed constant.

  What do we do about that?
  - ISO Variable ALAE model
  - Can we try to model ALAE as an independent variable?
  - Study in-house data. Are there factors that can be applied to the ISO average ALAE value?
  - Judgment? In-house expert?
Limitations: What do we do about that?

- ISO ILF Liability Curves:
  - We treat them as severity curves.
    - What does that mean?
      - When thinking about the appropriateness of a severity curve, we may often ask "are the average severities of these risks in line with those in the curves?" However, we really need to ask if the average severities relative to each other across limit sizes are in line.
  - Class 1 and Class 2 go into the same ILF Table

What do we do about that?

- Be thoughtful when disaggregating into frequency vs severity.
  - May be appropriate to apply a simple scalar to the means of the distribution.
Limitations: What do we do about that?

- ISO PSOLD Curves:
  - Only available data sets are Building+Contents or Building+Contents+BI
    - No curves for Contents or Contents+BI

  What do we do about that?
  - Voice opinions at ISO Reinsurance Panel meetings
  - Contact ISO directly
Limitations: What do we do about that?

- ISO PSOLD Curves:
  - U.S. Data only – not necessarily applicable to non-US exposures

- What do we do about that?
  - Use International Construction Cost Index
  - Use proprietary information to adjust the PSOLD curves
Limitations: What do we do about that?

- Published by Faithful+Gould, Atlanta, GA
- Last update was dated 2Q 2009
- Feb 2010: published limited analysis covering US, Canada, Mexico, UK, China, Singapore, US
Limitations: What do we do about that?

• ISO PSOLD Curves:
  ➢ When you move into the realm of large limits, the curves go flat
    ❖ Free cover dilemma

❖ What do we do about that?
  ➢ Keep perspective
  ➢ Translate PSOLD curve into a First-Loss Scale
  ➢ Use an alternative First-Loss Scale
Which First-Loss Scale Do You Choose?

- Lloyds
- Reinsurer Curves (Swiss Re, Munich Re, etc)
- Salzmann (1960 INA Homeowners data)
The Big Question – How Do I Know Which Curve to Use?

- Compare Experience vs Exposure Frequency and Severity by band – Narrow Bands force Severity match
- One would expect to see similarity in frequency relativities at the low end where experience is credible
- Expect to see divergence at the top end when experience is less credible
- If there are several curves that match on the lower end, judgment may be required in determining which tail is more appropriate

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<th>Per Risk Layer</th>
<th>Projected (Undev.)</th>
<th>Loss</th>
<th>Projected</th>
<th>Loss</th>
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<td>Sev</td>
<td>Cost</td>
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Final Thoughts

- Actuaries need to understand what is behind the curves so that they can make informed decisions about their usage.

- Actuaries cannot assume that, as the complement of credibility to experience, exposure curves are in fact credible for a particular deal.

- Actuaries need to understand the drivers of loss for an insured so that they can apply informed judgment in modifying results. For example, if there is a statute that eliminates all losses excess of 500k, are the exposure curves appropriate for a 500k xs 500k layer?

- Perhaps actuaries can look at historical experience and ask, “If my exposure curves are credible, what is the probability that I would have this experience?”
Thank You
Kevin Hilferty