RR-2: Risk Load/Cost of Capital for Property Cat: Reinsurer and Primary Insurer Perspectives

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The Primary Insurer Perspective: Agenda

- Catastrophe Risk Pricing
- Risk Load: A New Methodology
- Calculation and Implementation
- Interaction With Other Parts of the Ratemaking Process

Catastrophe Risk Pricing – Primary Insurer Perspective

- **Reinsurance**
  - Cost can be included in ratemaking process
  - Could be issues gaining regulatory approval
    - Profit provision included in reinsurance pricing not subject to same regulatory scrutiny as that of primary insurance
  - Covers some portion of catastrophe risk; does not address return on risk not covered by reinsurance
- **Profit Provision**
  - Traditional profit provision may not include appropriate return on all retained catastrophe losses

Catastrophe Risk Pricing – Primary Insurer Perspective

- **Risk Load**
  - To ensure reasonable and appropriate compensation for catastrophe risk retained by insurer
    - Develop profit provision using risk-adjusted target
    - Use catastrophe bond market to determine market-based return for different layers of catastrophe loss
- **Including an Appropriate Return in the Ratemaking Process**
  - Traditional underwriting profit – compensates insurer for non-catastrophe and some catastrophe risk
  - Reinsurance cost – includes market-based return for catastrophe risk covered by reinsurance
  - Risk load – compensates insurer for retained catastrophe risk not contemplated in traditional profit provision

Risk Load: A New Methodology

- New methodologies are often met with a certain amount of skepticism, regardless of their theoretical strength
  - An integral piece of the methodology – the Catastrophe bond market – is still relatively new
- Regulators may be unfamiliar with the methodology and may need a tutorial
- This methodology can result in large indicated increases in catastrophe-prone areas, which may prevent regulators in those areas from approving the methodology

Calculation and Implementation

- Data Questions
  - A company must be able to assess its retained catastrophe risk
    - Catastrophe loss modeling
    - Expected loss distributions
  - The interaction between expected losses and any reinsurance must be accounted for

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Calculation and Implementation

- Interaction With Reinsurance
  - The insurer and reinsurer may have different loss adjustment expense (LAE) assumptions.
  - Imagine a scenario where Company A had LAE represent 17% of catastrophe losses, but their contract with Reinsurer B for 95% of the layer from $100 to $1,000 assumed 15% LAE.
  - In this scenario, adjustments need to be made, as a $100 loss from Company A's perspective would only be a $98.29 loss (=$100*(1.15/1.17)) from the Reinsurer B's point of view.
  - In order to pierce the $100 contract threshold, Company A would need to incur a loss of $101.74.

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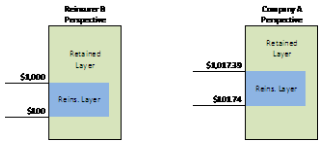
Calculation and Implementation

- Interaction With Reinsurance
  - Example continued:



  - This adjustment must be done correctly to ensure that the calculated amount of the retained loss is correct.

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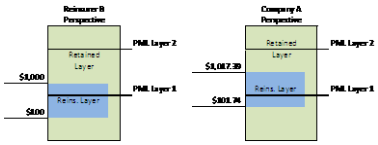
Calculation and Implementation

- Interaction With Reinsurance
  - Example continued:



  - In addition, the LAE adjustment is necessary in order to properly determine which PML layers retained losses fall in.

Calculation and Implementation

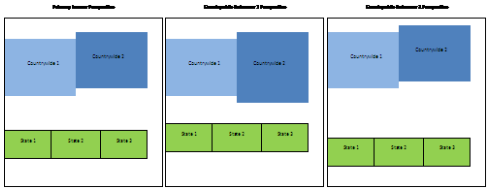
- Interaction With Reinsurance
  - Having multiple reinsurance contracts can add several complications:
    - Different contracts may have different LAE assumptions (all of which may vary from the primary insurer)
    - Inuring rules need to be sorted out
    - Some contracts may be annual-aggregate while others are event-based
    - Some contracts may cover a single state; others may cover an entire region or the whole country
    - Issued catastrophe bonds should be considered

Calculation and Implementation

- Interaction With Reinsurance
  - Real-world Example:
    - 23 state/regional contracts, 2 countrywide contracts, 2 catastrophe bonds
    - Different LAE assumptions for state/regional contracts, each countrywide contract, and primary insurer
    - LAE assumptions even varied by peril
    - Countrywide contracts were annual-aggregate; state/regional contracts were event-based
    - One state contract did not have inuring rules

Calculation and Implementation

- Example Continued:



Calculation and Implementation

- Diversification should be considered
  - Calculating PML layers on a by-state basis assumes the perspective of a stand-alone insurer in that state
  - Calculating PML layers on a countrywide basis can result in much of the risk load being concentrated in a company's largest PML risks
  - Blended options are available
  - See example on the next page

Calculation and Implementation

- Diversification example:

	1-in-100	1-in-250	By-State Risk Load Calculation	Countrywide Risk Load Calculation	By-State Distribution	Countrywide Distribution
State A	100,000	500,000	150,000	5,000	0.0%	0.0%
State B	600,000,000	1,000,000,000	100,000,000	20,000,000	30.8%	11.8%
State C	1,200,000,000	2,300,000,000	225,000,000	150,000,000	69.2%	88.2%
		Total:	325,150,000	170,005,000		

	Blended Option	Blended Distribution
State A	85,438	0.0%
State B	52,285,989	30.8%
State C	117,648,473	69.2%
Total	170,005,900	

- The blended option can be calculated by applying the by-state distribution to the countrywide total

Interaction With Other Parts of the Ratemaking Process

- The insurer should consider interaction between a risk load and the insurer's profit provision
  - Profit provisions and risk loads are both used to cover the cost of capital (or a portion of it)
  - Depending on how the profit provision was determined, an adjustment may be needed to account for income earned through a risk load
  - Risk loads and contingency provisions serve different purposes and do not overlap

Interaction With Other Parts of the Ratemaking Process

- There are multiple ways of implementing the risk load in the rates:
  - Vary by amount of insurance
  - Vary by rating characteristic: construction type, deductible, presence of loss mitigation
  - Vary by premium
  - Flat rate by state
  - Insurer may want to vary the provision geographically within a state
    - Existing territorial definitions
    - New groupings based on expected catastrophe losses
  - The level of segmentation will depend on the level of event detail that is available for analysis

Questions?

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