

Ratemaking and Product Management (RPM) Seminar

PL-2: Homeowners Catastrophe Ratemaking – Risk Load and Reinsurance Costs

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Allocation of Reinsurance Costs/Risk Load to Territory

Background

- Ratemaking done for individual states
- Cost of countrywide aggregate catastrophe reinsurance needs to be allocated to state
- Reinsurance costs/risk load needs to be allocated to territory
- Use a hypothetical example of allocating statewide reinsurance cost to territory
- For simplicity, example will have three territories
- Same methodology can be used to allocate the net cost of a countrywide or multiple state aggregate catastrophe cover to state

Allocation of Reinsurance Costs/Risk Load to Territory

Statewide Rate Level Indication

- Hypothetically constructed using the relationships in data from several Florida homeowner rate filings
- Reinsurance/risk load provision is 2.33 times the AAL hurricane loss
- AAL for hurricane loss is 1.5 times the expected non-hurricane loss

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Statewide Rate Level Indication Pure Premium Methodology

(1) Non-Hurricane Loss Provision	\$200
(2) Hurricane Loss Provision	\$300
(3) Reinsurance Cost/Risk Load	\$700
(4) Fixed Expense Provision	\$100
(5) Total	\$1,300
(6) Variable Expense Provision	20.0%
(7) Average Rate	\$1,625

$$(5) = (1) + (2) + (3) + (4)$$

$$(7) = (5) / (1 - (6))$$

Allocation of Reinsurance Costs/Risk Load to Territory

Methods of Allocating Reinsurance Costs to Territory

- Examined Florida rate filings
- Four methods:
 - Treated as a flat dollar amount per policy
 - Proportional to premium
 - Proportional to expected hurricane loss
 - Proportional to standard deviation of expected hurricane loss

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load As a Flat Dollar amount per Policy

	<u>Territory A</u>	<u>Territory B</u>	<u>Territory C</u>
(1) Non-Hurricane Loss Provision	\$200	\$200	\$200
(2) Hurricane Loss Provision	\$100	\$250	\$1,000
(3) Reinsurance Cost/Risk Load	\$700	\$700	\$700
(4) Fixed Expense Provision	\$100	\$100	\$100
(5) Total	\$1,100	\$1,250	\$2,000
(6) Variable Expense Provision	20.0%	20.0%	20.0%
(7) Average Rate	\$1,375	\$1,563	\$2,500

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load As a Percentage of Premium (Variable Expense)

	<u>Territory A</u>	<u>Territory B</u>	<u>Territory C</u>
(1) Non-Hurricane Loss Provision	\$200	\$200	\$200
(2) Hurricane Loss Provision	\$100	\$250	\$1,000
(3) Reinsurance Cost/Risk Load	\$0	\$0	\$0
(4) Fixed Expense Provision	\$100	\$100	\$100
(5) Total	\$400	\$550	\$1,300
(6) Variable Expense Provision	63.1%	63.1%	63.1%
(7) Average Rate	\$1,083	\$1,490	\$3,521

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load Proportion to Expected Hurricane Loss

	<u>Territory A</u>	<u>Territory B</u>	<u>Territory C</u>
(1) Non-Hurricane Loss Provision	\$200	\$200	\$200
(2) Hurricane Loss Provision	\$100	\$250	\$1,000
(3) Reinsurance Cost/Risk Load	\$233	\$583	\$2,333
(4) Fixed Expense Provision	\$100	\$100	\$100
(5) Total	\$633	\$1,133	\$3,633
(6) Variable Expense Provision	20.0%	20.0%	20.0%
(7) Average Rate	\$792	\$1,417	\$4,542

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations
Allocation of Reinsurance Cost/Risk Load
Proportional to Standard Deviation of Expected Hurricane Loss

	<u>Territory A</u>	<u>Territory B</u>	<u>Territory C</u>
(1) Non-Hurricane Loss Provision	\$200	\$200	\$200
(2) Hurricane Loss Provision	\$100	\$250	\$1,000
(3) Reinsurance Cost/Risk Load	\$102	\$319	\$3,334
(4) Fixed Expense Provision	\$100	\$100	\$100
(5) Total	\$502	\$869	\$4,634
(6) Variable Expense Provision	20.0%	20.0%	20.0%
(7) Average Rate	\$627	\$1,086	\$5,793

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load Summary of Methods - Average Rate

	<u>Territory A</u>	<u>Territory B</u>	<u>Territory C</u>
Flat Dollar Amount per Policy	\$1,375	\$1,563	\$2,500
Statewide Average Rate:	\$1,625		

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load Summary of Methods - Average Rate

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Flat Dollar Amount per Policy	\$1,375	\$1,563	\$2,500
Proportional to Premium	\$1,083	\$1,490	\$3,521
Statewide Average Rate:	\$1,625		

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load Summary of Methods - Average Rate

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Flat Dollar Amount per Policy	\$1,375	\$1,563	\$2,500
Proportional to Premium	\$1,083	\$1,490	\$3,521
Proportional to AAL	\$792	\$1,417	\$4,542
Statewide Average Rate:	\$1,625		

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load Summary of Methods - Average Rate

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Allocation of Reinsurance Costs/Risk Load to Territory

Choice of Allocation Method Important

- Significant variation in average rate for territory
- Allocation using expected hurricane losses can understate cost in territories with higher AAL
- Other alternatives:
 - Allocation using standard deviation
 - Allocation using the tail of the distribution (PML)
 - Use the Catastrophe Bond market profit multiples

Allocation of Reinsurance Costs/Risk Load to Territory

A New Alternative

- Use profit multiples from Catastrophe Bond market
- AAL available from catastrophe models by layer
- AAL in each layer can be split by territory
- Apply profit multiples from Catastrophe Bond market to AAL in each layer
- Sum each territory across the layers to produce an indicated risk load in each territory
- Allocate the statewide reinsurance cost/risk load using the indicated territory risk load

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load Using Cat Bond Multiples

	<u>Territory A</u>	<u>Territory B</u>	<u>Territory C</u>
(1) Non-Hurricane Loss Provision	\$200	\$200	\$200
(2) Hurricane Loss Provision	\$100	\$250	\$1,000
(3) Reinsurance Cost/Risk Load	\$116	\$368	\$3,179
(4) Fixed Expense Provision	\$100	\$100	\$100
(5) Total	\$516	\$918	\$4,479
(6) Variable Expense Provision	20.0%	20.0%	20.0%
(7) Average Rate	\$645	\$1,147	\$5,599

Allocation of Reinsurance Costs/Risk Load to Territory

Hypothetical Territory Rate Calculations Allocation of Reinsurance Cost/Risk Load Summary of Methods - Average Rate

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Proportional to AAL	\$792	\$1,417	\$4,542
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Cat Bond Multiples	\$645	\$1,147	\$5,599
Statewide Average Rate:	\$1,625		

Questions?