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Introduction to Reinsurance Experience & Exposure Rating

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Course Description

No self-respecting ice cream shop is content to sell only plain vanilla ice cream. Buyers want choices, including buyers of reinsurance. Come to see an introduction to treaty pricing that goes slightly beyond the flat rated program and standard experience and exposure rating. We will start with some of the basics and then enter a world where the treaty deal is affected by contractual considerations such as sliding scale commissions, reinstatements, and even annual aggregate deductibles.

Agenda

- What is exposure and experience rating?
- A quick tour of the experience rating basics
- A similar view of the exposure rating methodology
- Bringing these views together – credibility weighting
- Transition to pricing for loss sensitive features

And doing all of this in 30 minutes or so…

What is exposure and experience rating?

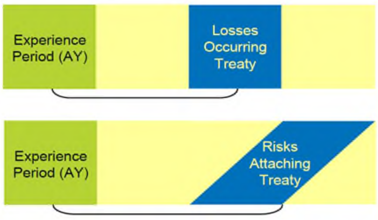
- Experience Rating – estimating a premium based on an Insured's own historical loss experience.
- Exposure Rating – estimating a premium based on some type of manual rating process that is applied to an exposure base (Sales, payroll or number of vehicles). Manual rates typically have some type of limit (Basic Limit) and policy limits above this amount are determined using an Increased Limits Factor (ILFs)

Experience rating steps

- Compile data
  - Historical premium and loss (Aggregate & Large/Shock)
  - Rate change and portfolio data (limits profile, class profile, etc.)
  - Loss development data
- Historical data adjustments - to the future reinsurance effective period
  - Adjust premium to <u>future</u> rate level
  - Adjust losses to <u>future</u> cost and coverage levels
  - Adjust losses to ultimate settlement value
  - How to handle large/shock losses?

Subtleties in the adjustment process

- Treaty period
  - Need to be consistent – PY vs. AY
  - "Risks Attaching" vs. "Losses Occurring"



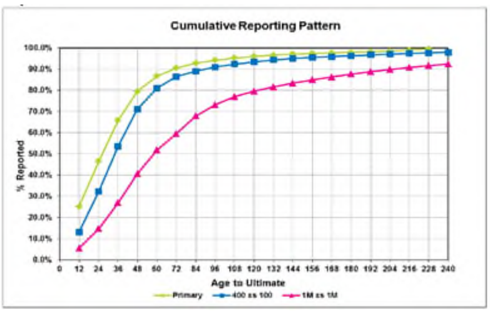
Subtleties in the adjustment process (continued)

- Premium adjustment considerations
  - Not to current rate level (i.e. rate filing), but future expected level intended to reflect
    - Future rate filings
    - Schedule Rating (reflecting market conditions)
    - Company Mix (if multiple companies)
    - Exposure trend
  - Other considerations
    - Changes in limits and deductibles
    - Changes in UW standards
    - Changes in terms and conditions

Subtleties in the adjustment process (continued)

- Adjustments to Losses
  - Loss trend - Quota share vs. XOL
  - Changes in limits and deductibles
  - Changes in UW standards or classes
  - ALAE – pro-rata vs. part of loss vs. excluded
  - Loss development - Quota share vs. XOL

Loss Development by Layer



Estimating Ultimate Losses – alternative methods

LDF Method:

- Ultimate = Reported loss x LDF
- Note on loss development: Most recent periods immature and may have zero losses reported to date. Should these years be included?
- If there are losses, then they are hit with a large LDF.

Bornhuetter-Ferguson (B-F) method:

- Ultimate = Reported loss + premium x ELR x (1-1/LDF)
- But what ELR do we use? Average of prior year ultimate loss ratios
- ELR = Σ Ultimate Loss / Σ Subject Premium

Cape Cod ELR as an alternative

- ELR = Σ Ultimate Loss / (Σ Subject Premium/LDF)

Experience Rating Summary Page

250,000 Excess of 250,000 Layer with ALAE included on a Pro-Rata basis

	(1)	(2)	(3)	(4)	(5) = (1) x (2) x (3) x (4)	(6)	(7)	(8)	(9) = (7) / ((5) / (8))	(10)	(11) (10) / (5)
Accident Year	Historical Subject Premium	Rate Level Adjustment Factors	Exposure Adjustment Factors	Other Adjustment Factors	Adjusted Subject Premium	Layered Loss+ALAE @3/31/2019	Trended Layered Loss+ALAE @3/31/2019	LDF	LDF Layered Ult. Loss+ALAE Rate	Trended Layered Ultimate Loss+ALAE*	Layered Ultimate Loss+ALAE Rate
2009	19,216	0.712	1.219	1.000	16,678	9	605	1.195	4.33%	760	4.56%
2010	18,274	0.724	1.195	1.000	15,810	122	943	1.228	7.32%	1,110	7.02%
2011	16,677	0.764	1.172	1.000	14,933	-	6	1.269	0.05%	186	1.25%
2012	14,924	0.802	1.149	1.000	13,752	610	1,097	1.326	10.58%	1,290	9.38%
2013	16,629	0.884	1.126	1.000	16,552	142	530	1.420	4.55%	809	4.89%
2014	17,459	0.972	1.104	1.000	18,735	475	1,214	1.576	10.21%	1,604	8.56%
2015	19,810	1.021	1.082	1.000	21,885	1,052	1,210	1.885	10.42%	1,796	8.21%
2016	22,122	1.076	1.061	1.000	25,255	18	171	2.618	1.77%	1,061	4.20%
2017	24,143	1.079	1.040	1.000	27,092	-	38	4.503	0.63%	1,240	4.58%
2018	25,715	1.041	1.020	1.000	27,305	-	-	12.466	0.00%	1,432	5.24%
2009 - 2016	145,111				143,601	2,428	5,776		6.16%	8,617	5.94%
Total	194,969				197,998	2,428	5,814		5.70%	11,288	5.79%
Prospective	27,000									1,603	5.94%

* (10) = (7) + (9) Total * (5) * (1 - 1 / (8))

Exposure Rating Methods

- Exposure Rating – estimating a premium based on some type of manual rating process that is applied to an exposure base (Sales). Manual rates typically have some type of limit (Basic Limit) and policy limits above this amount are determined using an Increased Limits Factor (ILFs).
  - ILFs are created using industry or company insured loss data
  - Reinsurance exposure rating would be an allocation of premium/loss to various layers through the use ILFs or using other parameters.

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How to calculate an exposure rate?

- Insurance Company Auto Liability Rating Plan
  - Exposure base = # of vehicles = 3
  - Basic Limit = $100,000
  - Base Rate = $1,000 per car
  - ILF for $1,000,000 policy limit = 2.00

- How much does a $1,000,000 policy limit for 3 vehicles?
  - Premium = Base Rate x ILF x # Vehicles
  - Premium = $1,000 x 1.45 x 3
  - Premium = $4,350

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How to calculate a Reinsurance exposure rate for the 250,000 xs 250,000 Layer?

- Insurance Company Auto Liability Rating Plan
  - Exposure base = # of vehicles = 3
  - Basic Limit = $100,000
  - Base Rate = $1,000 per car
  - ILF for $1,000,000 policy limit = 1.450
  - Premium = Base Rate x ILF x # Vehicles
  - Premium = $1,000 x 1.450 x 3
  - Premium = $4,350

Limit	ILF
100,000	1.000
250,000	1.200
500,000	1.325
750,000	1.400
1,000,000	1.450

Premium for the 250,000 xs 250,000 Layer

$$\frac{\text{ILF (500K)} - \text{ILF (250K)}}{\text{ILF (1M)}} \times \text{Premium}$$

$$\frac{1.325 - 1.200}{1.450} \times \$4,350$$

$375 = 8.62%

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Why do exposure rating?

- New company – no experience
- Company has small amount of premium for certain lines
- Business covered is in a homogeneous market
- Portfolio changes – mix of classes or limit profiles

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Exposure rating considerations

- Expected Loss+ALAE Ratio
  - Calculated as discussed in the experience rating section
  - Is it "fully exposed"?
- Limitations of using ILFs
- Loss adjustment expenses
  - ALAE – pro-rata vs. part of loss vs. excluded

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Bringing these views together – credibility weighting

Layer	Experience Rating 250,000 xs 250,000	Experience Rating 250,000 xs 500,000	Exposure Rating	Credibility	Selected Rate
250,000 xs 250,000	5.94%		8.62%	60%	7.01%
250,000 xs 500,000		4.27%	5.17%	35%	4.86%
250,000 xs 750,000			3.45%		3.45%

Considerations in weighting experience vs. exposure rating?

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Transition to pricing for loss sensitive features

- How to create a loss distribution around the final selected loss cost?
  - Fit a lognormal distribution to historical data
  - Use the severity curve underlying the ILFs
  - Proxy using other company data

Thank you!