Introduction to Experience Rating

Seminar on Reinsurance
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Introduction to Experience Rating

Agenda

- Basic experience rating methodology
  - Steps in experience rating
  - Review of contract terms
  - Comparison of accounting periods
  - ALAE treatment
  - Other considerations
- Diagnostics: telling the story

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Introduction to Experience Rating

Basic Experience Rating Methodology

Steps in Experience Rating:

1. Compile historical premium and loss data
   - Exclude catastrophe and shock losses and price separately
2. Adjust subject premium to future level
3. Adjust historical losses to future price and treaty coverage levels
4. Develop adjusted layer losses to ultimate
5. Select the non-cat / non-shock experience (loss cost) rate
6. Load for catastrophe/shock losses

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Basic Experience Rating Methodology

1. Compile historical experience

- Review contract or placement slip if possible:
  - What is the treaty term?
  - What is the exposure basis?
  - What is the definition of a risk?
  - What is the definition of ultimate net loss?
    - ALAE pro-rata or included?
    - ECO/XPL?
  - If multiline, is there a basket retention?

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Basic Experience Rating Methodology

1. Compile historical experience

- Need historical premiums and losses on same basis

$$\text{Experience Rate (Loss Cost)} = \frac{\text{Trended Ultimate Layer Losses}}{\text{Trended On-Level Subject Premium}}$$

- Treaty accounting period may be
  - Policy Year
    - "Risks Attaching"
    - "Losses Occurring on Risks Attaching"
  - Accident Year
    - "Losses Occurring"
    - "Losses Occurring During"

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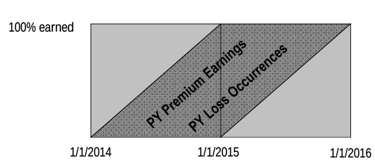
Basic Experience Rating Methodology

- PY WP = Written Premium on policies issued during the year
- PY Loss = (Paid + OS) on all claims attaching to policies issued during the year



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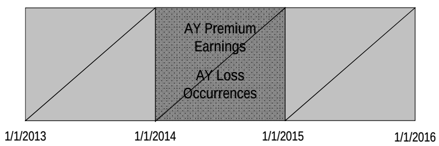
Basic Experience Rating Methodology

- AY EP = WP – UEPR ending + UEPR prior
  = (WP) – (Increase in UEPR)

- AY Inc. Loss = (Paid + OS) on all claims occurring during the year



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Basic Experience Rating Methodology

1. Compile historical experience

- Get all the details on historical losses
  - Include all historical losses that would trend into the layer (rule of thumb: get all losses > half of your attachment point)
  - Split out ALAE for each loss
  - Include historical policy limits (and SIR if applicable)
  - Confirm that losses are assembled by occurrence, not by claimant
  - Include line of business detail
  - Include catastrophe/clash indicator, if applicable

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Basic Experience Rating Methodology

- Other data considerations
  - Portfolio has changed over time
    - Ceding company has exited contractors class
    - Minimum deductibles have been increased from 5k to 10k
  - ALAE Treatment
    - ALAE Excluded
    - ALAE Included
    - ALAE Pro Rata

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2. Adjust subject premium to future level

- Filed (manual) rate changes
- Price-level changes
  - Schedule-rating, company tiers, etc.
  - Also include "soft" changes such as terms & conditions, changes in underwriting standards, etc.
- Exposure trend
  - For inflation-sensitive exposure bases

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2. Adjust subject premium to future level

- Goal is to adjust historical premium to a level "as if" it has been written during the future period.
  - The split between "rate" and "price" is not always obvious (e.g. where are LCM's or package factors included?)
  - Often times ceding company provides renewal price changes, which include rate and other price-level changes
    - How are limit and deductible changes accounted for?
    - How has exposure change been factored in?
    - If claims made, how have prior acts factors been accounted for?

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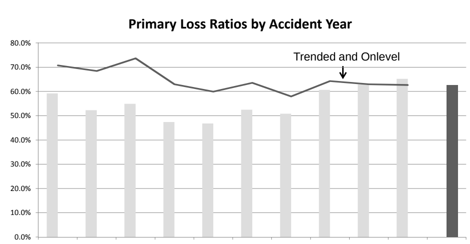
2. Adjust subject premium to future level



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Basic Experience Rating Methodology

2. Adjust subject premium to future level

- Note to actuaries coming from a primary rate-filing background:
  - In a rate filing, you typically adjust premium to the **current** rate level.
  - In reinsurance pricing, you want to adjust premium to the **average** rate level in the future period.
- CAS papers on this topic:

  Burt D. Jones's An Introduction to Premium Trend; CAS Exam Study Note, 2002

  Trent Vaughn's Commercial Lines Price Monitoring; CAS Forum Fall 2004

  Ira Robbin's paper Monitoring Renewal Rate Change on Cat-Exposed Excess Property Business; CAS E-Forum 2009 Winter

  Neil Bodoff's Measuring Rate Change; CAS E-Forum, Winter 2009

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3. Adjust historical losses to future price and treaty coverage levels

- Need to adjust historical losses up to the midpoint of the treaty period
- Typically we apply trend to the ground-up loss then cap the trended loss at the historical policy limit
  - Need to understand how ALAE treated in primary policy. Included within policy limit or in addition to?
- Trended and capped losses are then layered

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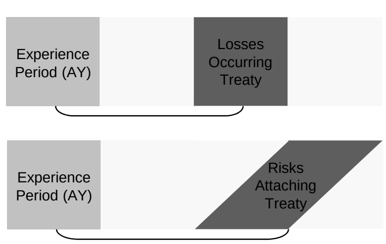
3. Adjust historical losses to future price and treaty coverage levels

- Trend period depends on the treaty basis



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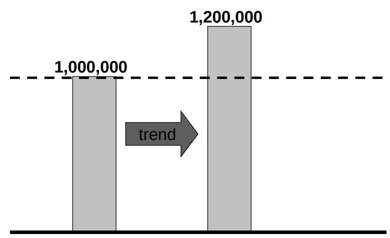
3. Adjust historical losses to future price and treaty coverage levels

- Leveraged effect of trend on excess layers



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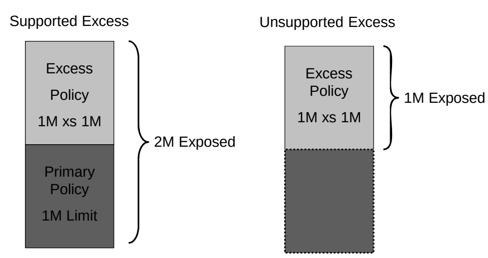
3. Adjust historical losses to future price and treaty coverage levels

- Inclusion of excess policies



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3. Adjust historical losses to future price and treaty coverage levels

- Proper application of inflation trend on excess losses
  - Add underlying loss or SIR to excess loss amount before trending

    or
  - Use a higher trend percent to reflect “leverage”

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Basic Experience Rating Methodology

4. Develop losses to ultimate

- Factors depend on layer of reinsurance being priced
  - We apply LDFs to trended layer losses so that all years are on the same basis
- Development is an aggregate loss concept
  - Includes new claims (true IBNR), development on known claims, reopening of closed claims, etc.

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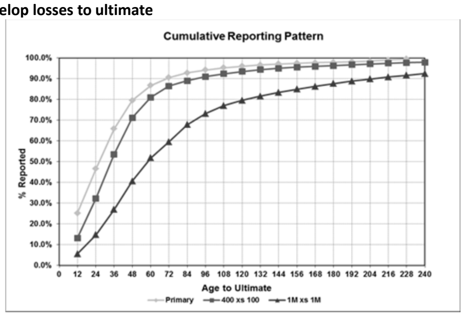
4. Develop losses to ultimate



A numbers are for illustration only, and not for use in pricing

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4. Develop losses to ultimate

- Note on loss development:
  - Most recent periods are very green and may have zero losses reported to date. Should these years be included?
  - If there are losses, then they are hit with a huge LDF.
- Alternative methods:
  - ELR
  - Bornhuetter-Ferguson (B-F)
  - Cape Cod

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4. Develop losses to ultimate

- LDF Method:
  - Ultimate = Reported loss x LDF
- B-F method:
  - Ultimate = Reported loss + premium x ELR x (1-1/LDF)

But what ELR do we use?

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4. Develop losses to ultimate

- Average of prior year ultimate loss ratios:

$$\text{ELR} = \frac{\sum \text{Ultimate Loss}}{\sum \text{Subject Premium}}$$

- Cape Cod ELR:

$$\text{ELR} = \frac{\sum \text{Reported Loss}}{\sum \text{Premium / LDF}}$$

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4. Develop losses to ultimate / 5. Select loss cost

ABC Insurance Company
General Liability
500,000 excess of 500,000 - Loss plus ALAE included

Accident Year	Historical Subject Earned Premium (1)	Rate/Price OnLevel Factor (2)	Exposure Trend (3)	Adjusted Subject Premium (4)=(1)*(2)*(3)	LDF (5)	Adj. Subject Premium / LDF (6)=(4)/(5)	Layered Loss+ALAE Evaluated 12/31/2013 (7)	Trended Layered Loss+ALAE (8)	LDF Ult. Loss Rate (9)=(8)/(6)	Trended Ultimate Layered Loss+ALAE* (10)	Trended Ultimate Loss Rate (11)=(10)/(4)
2004	19,215,561	0.691	1.219	16,176,938	1.195	13,532,395	9,300	604,779	4.47%	752,178	4.65%
2005	18,273,944	0.735	1.195	16,069,453	1.228	13,081,418	122,259	942,986	7.21%	1,108,973	6.91%
2006	16,676,622	0.779	1.172	15,229,051	1.269	12,005,080	0	5,671	0.05%	185,366	1.22%
2007	14,924,410	0.875	1.149	15,001,576	1.326	11,314,894	609,711	1,096,962	9.69%	1,302,447	8.68%
2008	16,628,500	0.982	1.126	18,386,006	1.420	12,943,645	142,331	529,773	4.09%	833,115	4.53%
2009	17,458,606	1.043	1.104	20,104,714	1.576	12,760,472	475,081	1,213,582	9.51%	1,622,930	8.07%
2010	19,810,337	1.114	1.082	23,889,228	1.885	12,675,375	1,052,224	1,210,428	9.55%	1,835,457	7.68%
2011	22,121,506	1.118	1.061	26,235,180	2.618	10,021,219	18,209	171,122	1.71%	1,074,843	4.10%
2012	24,142,794	1.069	1.040	26,850,450	4.503	5,962,528	0	37,923	0.64%	1,202,158	4.48%
2013	25,714,864	1.029	1.020	26,986,136	12.466	2,164,843	0	0	0.00%	1,383,470	5.13%
Total	194,967,144			204,918,731		106,461,868	2,429,115	5,813,226	5.46%	11,300,938	5.51%
04-12	169,252,280			177,932,596		104,297,025	2,429,115	5,813,226	5.57%	9,917,468	5.57%
Prospective Premium:		27,000,000								1,489,006	5.51%

(6) = "Exposed Premium"

* "Cape Cod" Calculation: (10) = (8)+(4)*Total(9)*[1-1/(5)]

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Basic Experience Rating Methodology

- ALAE Treatment

Layer: $300K xs $200K

Gross Loss & ALAE ($K)			Reinsurance Recovery ($K)				
			ALAE Excluded	ALAE Pro Rata			ALAE Included
Loss	ALAE	Loss + ALAE	Loss	Loss	ALAE	Loss + ALAE	Loss + ALAE
300	150	450					
500	100	600					

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Basic Experience Rating Methodology

Layer: $300K xs $200K

Gross Loss & ALAE ($K)			Reinsurance Recovery ($K)				
			ALAE Excluded	ALAE Pro Rata			ALAE Included
Loss	ALAE	Loss + ALAE	Loss	Loss	ALAE	Loss + ALAE	Loss + ALAE
300	150	450	100	100	50	150	250
500	100	600	300	300	60	360	300

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Diagnostics: telling the story

- Simple test of actual versus expected:

Actual versus Expected Analysis

Accident Year	Evaluated 12/31/2012	LDF	Evaluated 12/31/2013	LDF	Expected Link Ratio	Expected Development	Actual Development
2004	571,093	1.103	599,683	1.077	1.024	13,787	28,590
2005	492,265	1.141	559,165	1.103	1.034	16,959	66,900
2006	319,707	1.195	219,653	1.141	1.047	15,131	-100,054
2007	1,762,534	1.277	1,831,330	1.195	1.069	120,944	68,796
2008	250,563	1.407	285,397	1.277	1.102	25,508	34,834
2009	577,569	1.633	969,391	1.407	1.161	92,772	391,822
2010	362,216	2.087	854,699	1.633	1.278	100,702	492,483
2011	333,336	3.376	712,321	2.087	1.618	205,879	378,985
2012	110,169	14.169	408,968	3.376	4.197	352,208	298,799
Total	4,779,452		6,440,607			943,890	1,661,155

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Diagnostics: telling the story

- Considerations when reconciling with prior rating or exposure rating:
  - Is the experience rating distorted by large losses?
  - Accuracy of claim cost trend factors
  - Accuracy of excess loss development factors
  - Accuracy of subject premium on-level factors
  - Stability of excess loss cost
  - How has the business changed? Is the experience even relevant?
  - Changes in underlying exposure or policy limits over time

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Questions?

Thank you for your attention.

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