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**To Be or Not to Be  
(Traditional)? – That is  
the Question**

# Data Segmentation in Reserving

CAS 2011 CLRS Reinsurance Reserving Session

Reinsurance Reserving: Top-Down vs. Bottom-Up

Panel:

- Mark Littmann - PricewaterhouseCoopers
- Gary Blumsohn – Arch Reinsurance
- Arlie Proctor – Munich Reinsurance America

I'll review some relevant highlights and add some observations

# Data Segmentation in Reserving

## Key statistical criteria for determining segments

- homogeneity
- credibility

## The nature of these criteria differ between major industry sectors

- personal lines primary
- commercial lines primary
- reinsurance

# Data Segmentation in Reserving

<b>INDUSTRY SECTOR</b>	<b>HOMOGENEITY Characteristics</b>
<b>Personal Lines</b>	Policies are numerous and homogeneous, thus suitable for significant aggregation
<b>Commercial Lines</b>	Policies range from relatively numerous and homogeneous to relatively few large, complex policies with customized terms
<b>Reinsurance</b>	Treaties are generally not numerous, particularly when segmented into similar types; differences in terms among others reduce homogeneity

# Data Segmentation in Reserving

<b>INDUSTRY SECTOR</b>	<b>CREDIBILITY Characteristics</b>
<b>Personal Lines</b>	Individual policy data lack sufficient credibility to develop individual IBNR reserves and prices
<b>Commercial Lines</b>	With a few exceptions, the vast majority of individual policy data lack sufficient credibility to develop individual IBNR reserves and prices
<b>Reinsurance</b>	Many treaties have sufficient credibility to develop individual IBNR reserves and prices

# Pricing of Reinsurance Treaties

- most reinsurance treaties require an individual actuarial pricing analysis to reflect unique loss layers and contract terms
- the actuarial pricing analysis for an individual reinsurance treaty provides important data for an IBNR reserving analysis
- these would be applicable to some large commercial primary policies as well

# Data Segmentation in Reinsurance Reserving

- most reinsurers reserve IBNR for at least some treaties individually
- the largest reinsurers emphasize significant aggregation of treaties, with individual reserving and supplemental monitoring for special cases
- reinsurers have the option of reversing this emphasis, at least for some lines of business



# Bottom-Up Reinsurance Reserving

**We emphasize IBNR reserving for individual treaties:**

- typically our 30 largest treaties comprise about 75% of our annual premium
- our 30 largest are not the same treaties each year
- these treaties have inconsistent inception dates and terms
- we aggregate IBNR reserving for some segments with larger numbers of small treaties (e.g., property cat, casualty clash, WC cat)
  - homogeneity, credibility, and accuracy still questionable

# Bottom-Up Reinsurance Reserving

## Our individual treaty IBNR reserving process summary:

- generate a concise quarterly report for each treaty
  - original and historical ER and LR (paid/reptd/ultimate) by qtr
  - historical and expected paid and reported losses by quarter
  - historical indicated paid and incurred CL loss ratios by qtr
  - historical indicated paid and incurred BF loss ratios by qtr
- meet to review each quarterly report and full triangle analysis previously decided for special cases
- decide treaty IBNR%, whether to do future full triangle review, concise review, or automated IBNR takedown

# Bottom-Up Reinsurance Reserving

DISADVANTAGES	ADVANTAGES
<p>long meetings with many people to discuss individual treaty details</p> <p>insufficient volume and credibility for most sophisticated statistical methods</p> <p>long tail generates accumulation of large numbers of casualty contracts to review</p>	<p>the granularity facilitates adjustments, testing, financial reporting, planning</p> <p>actuaries, underwriters, executive Mgt focus on individual treaty profitability</p> <p>effective feedback loop for decision making</p> <p>avoids late triangle adjustments to address distortion from individual treaties</p> <p>unusual or complex treaties already separated for analysis of unique terms</p>

# D&O IBNR Reserving

## Key D&O Policy Data Characteristics:

- **claims-made**
- **single limit without reinstatement**
- **layered towers of coverage**
- **multiple insurer participation across tower**
- **individual insurers often ventilated**

# D&O IBNR Reserving

## Key D&O Reins Treaty Data Characteristics:

- variable layer attachments, limits, corridors
- can combine different coverages (Side A, Sections B-C)
- multiple classes of business (e.g., public, FI, non-profit)
- often combined with other professional E&O coverage
- results in different business mix and layering by treaty
- thus, D&O a good LOB for bottom-up IBNR reserving

# D&O IBNR Reserving

## Key D&O Claim Characteristics:

- “cat” events generate a large percentage of total loss
- many highly correlated claims across multiple insureds
- class action suits commonly result from such events
- D&O severity often modeled using a lognormal curve
  - thus smaller claims less probable than the average claim size
- significant “cat” losses and lower incidence of small claims generate greater volatility than other casualty lines

# Claim Tracking of Known D&O Cat Event

Treaty	UY	Treaty Attmt	Treaty Limit	Reins share	Insured Attmt	Insured Limit	Reins Expos	Claim	Prob Total Limit	Est Reins Loss
A	2005	0	15M	10%	10M	15M	1.5M	C1	50%	.75M
A	2005	0	15M	10%	50M	10M	1.0M	C2	25%	.25M
B	2006	10M	10M	15%	20M	10M	1.5M	C1	100%	1.5M
B	2006	10M	10M	15%	30M	10M	1.0M	C2	75%	.75M
				...						

# Claim Tracking of Known D&O Cat Events

## Next Steps and Aggregation:

- actual paid and case activity added to each row
- ultimates and actual incurred aggregated by treaty
- multiple cat amounts aggregated by treaty and totaled
- case incurred subtracted from estimated ultimates
  - generates estimated future development on known claims
- can apply approach to new events prior to actual claims
  - treaty aggregates based on single limit
  - generates estimated future development on known events



# Aggregation of Known D&O Cat Events

Treaty	UY	Est Ult Mutual Fund Loss	Est Ult Stock Option Loss	Est Ult Credit Crisis Loss	Est Ult Madoff Loss	Total Cat Loss	Paid Loss	Case O/S Loss	Case Inc Loss	Est Future Devpt
A	2005	1.5M	1.0M	0	0	2.5M	.5M	.25M	.75M	1.75M
B	2006	0	2.0M	5.5M	0	7.5M	1.5M	1.0M	2.5M	5.0M
C	2007	0	0	2.5M	.5M	3.0M	1.0M	.5M	1.5M	1.5M
				...						
Total		5M	8M	38M	5M	56M	20M	9M	29M	27M

# D&O IBNR Reserving

## Integrate Known Event Development with IBNR:

- the individual treaty IBNR method is applied
- indicated future cat loss development provides a test for the adequacy of indicated IBNR
- ideally pricing would provide an explicit cat load
  - our D&O pricing process is evolving in this area
- estimated known event development would eventually replace the cat load in the original LR
- but “non-cat” LR doesn’t have the stability of other lines