

The Actuarial Profession

making financial sense of the future

34TH ANNUAL GIRO CONVENTION

CELTIC MANOR RESORT, NEWPORT, WALES

Estimating the IBNR from Year of Account Projections

Robert Murray and Rob Warren

4

Agenda

- Accident year basis v. year of account ("YOA") reserving
- Lloyd's annual accounting
- Methods for deriving claims IBNR estimates from YOA projections
- Our proposed method
- Next steps

The Actuarial Profession

making financial sense of the future

Accident year reserving

Cumulative % Development of Reported Claims
Accident Year Basis

Month	% Development
0	0%
6	10%
12	40%
18	70%
24	85%
30	95%
36	100%

The Actuarial Profession

making financial sense of the future

Year of account reserving



So what's the problem?

- Lloyd's syndicates operate on a YOA basis
- But are now required to report on an annual accounting basis
- Not all syndicates perform actuarial projections on accident year data
- YOA projections may be used as a basis for determining annual accounting provisions
- Lack of agreed or consistent method for determining claims IBNR

The Actuarial Profession
making financial sense of the future

Why is this important?

Lloyd's Annual Report:

	2006	2005
Unearned premiums	7,024	6,829
Claims outstanding	30,377	37,719

Claims outstanding includes:

- Reported outstanding claims
- IBNR claims

Signing actuaries may rely on the Managing Agents' assessment of unearned premiums and reported outstanding claims.

So appropriate IBNR assessment is crucial, but how is this done?

The Actuarial Profession
making financial sense of the future

1. Actuarial judgement



The Actuarial Profession
making financial sense of the future

2. Earned loss ratio = unearned loss ratio

Ultimate Premiums:

Unearned Premiums = a% x Ultimate Premiums
Earned Premiums = (1 - a%) x Ultimate Premiums

Ultimate Claims:

Future Claims = a% x Ultimate Claims
Reported Incurred Claims + IBNR = (1 - a%) x Ultimate Claims

The Actuarial Profession
making financial sense of the future

2. Earned loss ratio = unearned loss ratio

$$\text{IBNR} = \frac{\text{Ultimate Claims} \times \text{Earned Premiums}}{\text{Ultimate Premiums}} - \text{Reported Incurred Claims}$$

$$\text{IBNR} = \text{Ultimate Loss Ratio} \times \text{Earned Premiums} - \text{Reported Incurred Claims}$$

$$\text{IBNR} = \text{Reported Incurred Claims} \times \frac{\text{Earned \%}^*}{\text{Reported \%}^{**}} - \text{Reported Incurred Claims}$$

* Earned % = Earned Premiums / Ultimate Premiums
** Reported % = Reported Incurred Claims / Ultimate Claims

The Actuarial Profession
making financial sense of the future

2. Earned loss ratio = unearned loss ratio

Pros:

- Very easy to apply

Cons:

- What happens in the event of large or catastrophic losses?
- Or when observed experience deviates from normal expectations?
 - Lower than normal reported incurred claims \Rightarrow higher than normal IBNR (and vice versa)
- Earnings may not be an appropriate measure of exposure
 - e.g. premium rate changes!
- Can generate wildly inappropriate IBNR claims
 - e.g. IBNR < 0 if
(reported claims / ultimate claims) > (earned premiums / ultimate premiums)
- Inconsistent with accident year projections in cases where the best model is known (i.e. simulated data)

3. IBNR to outstanding claims ratio

Pros:

- The IBNR is independent from the estimate of ultimate claims

Cons:

- Possible to derive IBNR claims which are inconsistent with the actuary's estimated ultimate
- Challenge of deriving the appropriate ratio
- Should IBNR be higher/lower just because reported outstanding claims are higher/lower than expected?
- Inconsistent with accident year projections in cases where the best model is known (i.e. simulated data)

4. Our proposed method

1. Assessment of an appropriate exposure development pattern
 - For claim numbers, consider the earned exposure over time
 - For claims amounts, the earned premiums should be adjusted for premium rate movements
2. Apply the following formula:

$$\text{IBNR} = \frac{\left(\frac{\text{Earned Exposure} - \text{Rep Inc DFM \% Dev}}{\text{Ultimate Exposure}} \right) \times \left(\text{Est Ult Claims} - \text{Reported Incurred Claims} \right)}{(1 - \text{Rep Inc DFM \% Dev})}$$

*"Rep Inc DFM % Dev" represents the expected percentage development for the year of account in question as at the analysis date and is usually derived from chain ladder modelling.
*Est Ult Claims" represents the actuary's selected estimate of ultimate claims after all methods have been considered

4. Our proposed method

Pros:

- Easy to apply
- Consistent with the selected model and estimated ultimate
- Focuses attention on the key issues:
 - Exposure
 - Development factor model
 - Initial expected loss forecast
- Replicates the IBNR from accident year models in cases where the best model is known (i.e. simulated data)
- An impossible estimate cannot be generated
 - unless an impossible model has been selected!

Cons:

- IBNR is dependent on the selected ultimate claims estimate
- Tricky to assess appropriate exposure?

The Actuarial Profession
making financial sense of the future

5. Other methods

- Assessment of number of IBNR claims x average cost per claim
- Performing two analyses: one on a YOA basis and one on an accident year basis
- Any others?

The Actuarial Profession
making financial sense of the future

Next steps

- Further tests against simulated and real data
- Please test and challenge our ideas
- Any other ideas in use in the market?

The Actuarial Profession
making financial sense of the future

34TH ANNUAL GIRO CONVENTION

CELTIC MANOR RESORT, NEWPORT, WALES

Estimating the IBNR from Year of Account Projections

Robert Murray and Rob Warren
