

EMB Consultancy LLP



## Reserving for General Insurance Companies

*Jonathan Broughton FIA*

March 2006

### Programme



- Use of actuarial reserving techniques
- Data Issues
- Chain ladder projections: The core tool
- Bornhuetter Ferguson
- Example
- Potential problems of actuarial methods
- Other techniques
- Reinsurance issues



## Uses of Reserving

- Statutory Requirements
- Planning / Budgeting
- Management Information
- Pricing
- Reinsurance Issues
- Mergers and Acquisitions



## Uses of Reserving

- Crucial MIS tool
- Feedback to pricing
- Impact on underwriting decisions
- Better planning / Budgeting
- Accurate reserving increases company credibility



## Reserving: Big Picture

- Words: Reserves/Provisions/IBNR etc
- Vital number!
- Every extra £1 of tech. reserves
  - means £1 less free reserves, and
  - means £1 less profit this year
- In hindsight reserves *will* be “wrong”
- The purpose influences the approach



## Loss Reserves

- Place of Actuary in the team:
  - Underwriter(s)
  - Administrator(s)
  - Claims Manager(s)
  - Actuary / Statistician
  - Accountant(s)
  - Director / Manager
  - Lawyer(s)



## Reserving - The Basics



## Statistical Methods



- There are various actuarial / statistical loss reserving methods
- The methods I'll discuss, and demonstrate, are:
  - Chain Ladder / Development Factor
  - Bornhuetter-Ferguson
- Widely used, and well-matched pair



## Generic Issues

- Basic premise: history can guide as to future development
- Mix rigorous mathematical models with actuarial judgement (... flair!)
- Data integrity and organisation are absolutely vital!



## Generic Advantages

- Range of methods for different situations
- Statistical rigour - explicit, public methods, reproducible (!!)
- Can feed in judgement (!!)
- Can deal with vast volume of claims
- "Track record" usually good(!)



## Generic Disadvantages

- Extra work (preparing and doing)
- Can't use all available information
- Struggle with sparse data(?)
- Struggle with changing conditions(?)
- Poor for large, special claims(?)
- *Garbage in garbage (uncertainty) out*



## Data: Basics

- Paid and incurred claims
- Premiums
- Claim numbers
- Exposure Information
- Homogeneous Groups
- Accuracy
- History
- Claimant and policy databases



## Data Requirements



- Cumulative or incremental data amounts
- Accurate and detailed history vital
- MI systems and claimant databases

## Data: The triangle



- Crucial to use history “right”
- Origin / Development axes
- Define these various ways
- Fill with virtually any data, e.g.
  - cumulative paid claims
  - incurred claims
  - premiums (for funded account)



## BCL/DFM approach

- The basic chain ladder (BCL), or a variant, is also called several other things:
  - \* "chain ladder" \*
  - development factor modelling (ResQ)
  - grossing-factor approach
  - link ratio method
  - *any other candidates?*



## BCL/DFM approach

- Repeat this for each column in turn
- Then use set of factors to fill the gaps
- Go from the triangle to completed rectangle
- Then use a tail factor to project to ultimate (Simple BCL ignores this)





## BCL/DFM approach

- Factors near tail are least certain for lots of reasons
- And where's the tail factor from?
- Use curve fitting / benchmarking
- Easy to understand idea
- Not always easy in practice



## BCL/DFM approach

To make useful in practice, 3 stages:

- Select ratio averages
- Smooth & project tail factors
- Check model, rework if necessary



## BCL/DFM approach

Weaknesses in the pointy parts of triangle:

- Upper corner: curve fitting
  - Lower corner: try another method
- ... enter ... Bornhuetter and Ferguson

## Worked Examples

Switch to ResQ



## BF approach

Mix in prior knowledge too

- Let actual experience gradually emerge
- Future experience for given year is assumed “typical” experience, both in pattern and loss ratio

Bayes!!



## BF method

To use BF for a given origin year

- Take expected loss ratio
- and expected past/future split
- Use these to calculate expected position
- Compare with actual position
- Adjust prior ultimate as result





## BF: Selection of Prior Ultimate

- Rate movements
- Changes in terms and conditions
- Inflationary trends
- Historical results
- Underwriter estimates
- Business Plans
- Market Benchmarks



## Worked Examples

Switch to ResQ

## Reserving - Potential Problems



## Problems

- Mix of Business
- Large Claims / Catastrophes
- Claim type trends
- Tort reforms
- Inflationary trends
- Terms and conditions
- Changes in claims procedures etc





## Ways to get around problems

- Detailed data
- Capped and XS
- Freq and Severity
- By Peril
- Detailed diagnostics



## Other Reserving Methods

- Stochastic methods
- Cape Code
- Average cost
- Expected loss ratio
- Curve fitting







## Net Projections

- Use same technique as gross
- But
- Changing RI Retentions
- Changing inner aggregates
- Reinsurance exhaustion
- Inconsistencies with gross



## Netting Down for Reinsurance

- Use % Retained
- Quota Share - derive directly
- Excess of Loss - derive or estimate explicitly
- More detailed understanding of RI Programme
- Better Management information



## Problems?

- Selected % retained may be inappropriate
- Time consuming
- Long tail classes especially difficult to estimate ultimate recoveries
- Net modelling may be as accurate
- Commercial impact - key



## Benefits of Explicit Approach

- RI Programme a major asset
- Detailed knowledge essential
- RI Purchasing efficiency
- RI security reviews
- Bad Debt or commutations
- Pricing





## Summary

- Why and how to reserve in theory
- Things to watch out for
- Reinsurance issues
- Methods in practice.....

**About the Author:**

**Jonathan Broughton**

Jonathan joined the London Market team of EMB in April 2005 as a consultant actuary.

Jonathan read Physics at Birmingham University, graduating in 1992. Following graduation, he began his actuarial career in the pensions arena, working for a DSP, a small firm specialising in IT consultancy.

In early 1995 Jonathan joined The Corporation of Lloyd's to work on the Equitas Project. The actuarial team had a quality assurance role, working alongside and peer reviewing the work of the numerous actuarial firms and managing large teams of computer programmers. Jonathan was a member of the Reserving Group, a collection of Market leaders who oversaw all aspects of the Reserving process.

Equitas Limited was formed in October 1996 and Jonathan left Lloyd's to join the Reserving and Commutations team. Jonathan qualified as an actuary in 1998 and became Deputy Chief Actuary in 2001. Jonathan's roles at Equitas included:

- State of the art reserving for both direct and inwards reinsurance APH claims. Jonathan signed the annual actuarial report and presented this to the Board with the Chief Actuary.
- Managing, training and setting plans for the Reserving team of 20 people.
- Member of the executive strategy group.
- Providing commercial support to deal makers.
- Taking a lead role in a number of larger commutations.
- Managing various multi-disciplinary projects, often involving US-based contractors.

Jonathan has worked on a number of Institute of Actuaries Working parties, including an award-winning paper "The Cost of Compensation Culture". He is currently participating in the "Aviation Pricing" Working Party.