Towards the Optimal Reserving Process
Neil Bruce, Katherine Laidlar, Gregory Overton

10 October 2013

Agenda

1. Background to the working party

2. Scope of the reserving process and some key issues we believe need to be addressed/discussed in future

3. Actual vs. Expected
1. Background

Focus of the working party

- Produced by the “Towards the Optimal Reserving Process” (TORP) working party
- TORP considers:
  - Governance and design of reserving processes
  - Reserving methods and their strengths / weaknesses
  - Best practice in documentation / housekeeping
- Long term aim is to identify how to make the reserving process more efficient
- Working party mission is to suggest best practice for reserving
- Aim to assist actuaries explain to stakeholders the benefits of re-engineering the reserving process

1. Background

Practical approach

- The working party has noted the extremely broad potential scope of the “reserving process”
- Idea is to focus on particular areas in series, whilst also having an eye on efficiencies to be gained in the wider process
- Feedback suggested AvE is an area many people are thinking of as a step towards optimal reserving
1. Background
TORP members

- Alastair Lauder
- Alexander Crosby
- Anthony Wright
- Cameron Heath
- Camilla Bennett
- Gregory Overton
- Jinita Shah
- Joe Ryan
- Katherine Laidlar
- Keith Taylor
- Marios Argyrou
- Neil Bruce (Chair)
- Sylvie LeDelliou
- Tim Jenkins

2. Scope and issues
The Reserving Process (not so simple)
2. Scope and issues
Features of the Optimal Process

• There are many! Particularly key are:
  – Consistent understanding of **reserving philosophy** and policy
  – **Data** accurate, complete, timely and at an appropriate level of detail
  – Process automated wherever possible – allowing resource to be focussed on judgement not routine tasks
  – **Diagnostics embedded** to help target resources effectively and identify where previous assumptions may not be appropriate
  – **Detailed and summary documentation** tailored to various audiences and populated directly from working papers

• Will never reach the ideal process, but useful to have in mind

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### The Reserving Process (simple)

<table>
<thead>
<tr>
<th>Governance &amp; Controls</th>
<th>IT &amp; Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>Output</td>
</tr>
<tr>
<td>Assumptions and Expert Judgement</td>
<td>Allocation / Aggregation</td>
</tr>
<tr>
<td>Projection Methodology</td>
<td>Reporting</td>
</tr>
</tbody>
</table>

Documentation
2. Scope and issues
The Reserving Process (simple)
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The Reserving Process (simple)

- Data
  - Projection Methodology
  - Assumptions and Expert Judgement
- Output
- Allocation / Aggregation
- Reporting
- Governance & Controls
- IT & Systems
- Documentation

Institute and Faculty of Actuaries
2. Scope and issues
The Reserving Process (simple)
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The Reserving Process (simple)

3. A vs E
Main conclusions

- Main benefit is to allow more time for value added analyses
  - Use in early-close, fast-close or risk-based reserving approaches
- May require a cultural shift for actuaries and others
  - Being more open about assumptions and when they aren't fulfilled
- AvE should be used at all stages of the reserving process
  - Interim monitoring as well as just before and during the analysis
- Stating expectations in advance can help embedding
  - Also can assist in generating understanding of volatility
- Materiality thresholds and other pre-agreed criteria can help prevent misunderstandings or “scope creep”
  - This can be key if introducing AvE for the first time
3. A vs E

Quick survey:

- Do you think you know what AvE is?
- Do you use one or more types of AvE within your reserving process?
- If so, are they used as a direct input into the setting of reserves at any point?
- Is it a mechanical process (rather than judgement being applied)?

3. A vs E

Definition

- We think AvE is:
  - Develop a (series of) expectations of the behaviour of an observable quantity over a period of time in the future based on assumptions at a particular point in time
  - Compare observed experience during that period against those expectations
  - Use the results to complete a task and/or come to a conclusion

- Do you agree?
3. A vs E

**Why use AvE and who is interested in it?**

- Risk
  - Interim periods
  - Monitor emerging experience
  - Leading indicators
- Chief actuary
  - AFH
  - CFO/ other Board
- Peer reviewer
- Reserving actuary
- Head of reserving

**Start of regular reserve review**
- Identify areas of concern
- Identify inappropriate assumptions

**End of regular review**
- Analysis of surplus
- Fast close process
- Set future expectations

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### 3. A vs E

#### Benefits
- **Quick** indication of where previous assumptions hold (or not)
- Can be produced **automatically**
- Can use various levels to allow fast drill-down
- Good start for **discussions** of reserving movements
- Use for many observables/ statistics

#### Difficulties
- Will need **interpretation**
- Smaller buckets are subject to greater volatility
- May not spot **offsetting trends**
- May need to split out large/cat events
- Can be difficult to determine expectation and effect of deviation when using a **mix of reserving methods**
- Conflicting indications from different stats
3. A vs E
What methods and which data?

- Extremely long list possible but 2 overarching types:
  - Comparing *movements* in development data in a period
    - Expected paid in the period vs actual paid in the period
    - Eyeballing graphically
  - Comparing previous *ultimate* to a new ultimate
    - Re-apply previous models to fresh data
    - Apply pre-selected models to fresh data
- Can be applied to *any data type* where a development assumption is used (paid incurred, premium, frequency, average cost etc)
- Can be done monthly, quarterly, annually
- E should be created/communicated at the point the ultimate is set
- Use of estimated *ranges/percentiles* can enhance interpretation

3. A vs E
How can AvE be displayed?

- The presentation of the results can assist or hinder the interpretation
- Many display options are possible
- Different exhibits are suited to different analyses
- Multiple exhibits are likely to be needed for a particular “use”
- Good ones can assist in interpretation, bad ones can make results impossible to understand
3. A vs E
Features to look for in exhibits

• Clear interpretation
• Not too crowded
• Appropriate level of granularity (class/claim type etc)
• Showing both actual and expected
• Volatility indicators and historical ultimates are helpful
• Numerical indicators to assist in assessing materiality

– Not all exhibits need all these features depending on the users and purpose
– Speed and other operational factors may also be important
– Consistency with different reserving/reporting bases may also be an issue

Conclusion

• We think AvE is a powerful tool to assist in making reserving more risk-responsive and efficient
• Did this work meet your needs on AvE?
• The WP is looking for next area of focus – either new issues, or ongoing problems
• Current ideas
  – Timing of reserving exercises, in particular “fast close”
  – Transforming ultimates – different reporting bases
  – Interpretation and comparison of reserve uncertainties
• Any suggestions?
## Tables - Amounts of both A and E

<table>
<thead>
<tr>
<th>Reserving class</th>
<th>Actual incurred move</th>
<th>Expected incurred move</th>
<th>Delta Inc'd</th>
<th>Previous ultimate</th>
<th>Updated mechanical ultimate</th>
<th>Delta Calc Ult</th>
<th>Revised movement</th>
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<tr>
<td>Class 1</td>
<td>2011</td>
<td>1,032</td>
<td>965</td>
<td>67</td>
<td>14,692</td>
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<td>(137)</td>
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<td>(4,368)</td>
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<td>n/a</td>
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Worse experience

Held IBNER realised

Recent cat claim
Tables - Loss Ratios or Proportions of reserves

<table>
<thead>
<tr>
<th>Attritional</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<table>
<thead>
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<th>Catastrophe/LL</th>
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<th>2009</th>
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<tr>
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<td>32.4%</td>
<td>83.4%</td>
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<table>
<thead>
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<th>Total</th>
<th>2008</th>
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<td>70.1%</td>
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<td>0.6%</td>
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<td>0.0%</td>
<td>14.3%</td>
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Graph – Actual only: single stat/ multi year

- Plot of incurred development as a percentage of last selected ultimate claims (dotted line = 100%)
- Looking for signs of obvious over/under reserving to assist in targeting resources
- Requires some prior knowledge for efficient interpretation
Graph – AvE: single stat/ single year/ historical

Graph – AvE: single stat/ multi year
Graph – AvE: multi stat/ single year/ historical

Graph – AvE: multi stat/ single year/ range
Graph – AvE: single stat/ single year/ historical/ range

Format derived by Lloyd's of London as way to feed back development for each class against expectations.