ROC
The implications of the underwriting and reserving cycles for reserving

Presented by:
Ian Hilder
Mark Rothwell
James Toller

Agenda
- Introduction
- Rate Monitoring
- Tail Length
- Management Pressures
- Dealing with the Issues
- The Next Steps
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Introduction

Participants:
- Ian Hilder (Chair)
- Tom Rivers
- Mark Rothwell
- Simon Sheaf
- James Toller

PROBLEM
The underwriting cycle gives rise to features which may not be sufficiently recognised by standard approaches:
- Lengthening of claim development pattern in soft markets
- Rate indices failing to capture degree of rate softening

This can result in the “perfect storm” of a disaster:
- Worsening experience hidden by longer tail
- Initial expected loss ratios inadequate
- Expected ultimate loss ratios deteriorate over time as actual experience emerges
- Reserving process fails to detect underlying trend
Introduction

Terms of Reference
- Review previous work on this topic and identify areas for further research
- Investigate further the effect of the underwriting cycle on traditional reserving methods and how to compensate for this
- Undertake/commission research to:
  - Enhance understanding of drivers of the reserving cycle
  - Develop actuarial methods for dealing with the underwriting cycle (e.g. cycle invariant curve fitting)
  - Consider whether actuarial guidance on this topic would be beneficial

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Rate Monitoring
- Limits and Deductibles
- Terms and Conditions
- Renewal v New Business
- New Business v Lapsed Business
- Compounding of Estimation
- Winner’s Curse
- Oversight Bias
- Risk Management within Insureds
- Ostriches
Consequences for Prior Loss Ratios

<table>
<thead>
<tr>
<th>Soft Market</th>
<th>Hard Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under-estimation of Rate Reduction</td>
<td>Under-estimation of Rate Reduction</td>
</tr>
<tr>
<td>Over-estimation of Price Adequacy</td>
<td>Over-estimation of Price Adequacy</td>
</tr>
<tr>
<td>Under-estimate Prior Loss Ratio</td>
<td>Over-estimate Prior Loss Ratio</td>
</tr>
<tr>
<td>Under-reserve when using Prior Loss Ratios</td>
<td>Over-reserve when using Prior Loss Ratios</td>
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</tbody>
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**Tail Length**

- Reliance in reserving on consistent development profiles across different origin years
- Reasons for differences:
  - Change to policy structure in hard/soft markets...
  - Financial situation may change attitude to settlement/dispute and case reserving policies
Tail Length

Source: Cycle Survival Kit Paper, GIRO 2003

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Management Pressures

- Management decisions may lead to booked reserves differing from actuarial estimates
- Two scenarios
  - Differ from initial actuarial estimates
  - Differ from final actuarial estimates
- Tendency to be more prudent in hard market conditions than in soft market conditions
Management Pressures

- Complicates analysis of an observed reserving cycle
  - due to actuarial reserving process?
  - due to management decisions?
  - due to a combination of the two?
- Impossible to tell without inside knowledge
- Use of alternative methodologies to eliminate actuarial reserving cycle may not eliminate cycle in booked reserves

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Dealing with the Issues

- Dealing with Rate Monitoring Issues
- Dealing with Tail Length
Dealing with the Issues

Components of Solutions:
- Awareness of issues is first step
  - At least this will lead the actuary to think harder
- Possible changes to existing methodologies
- Alternative approaches
- Getting buy-in; whatever you do, you’ll need it

Dealing with Rate Monitoring Issues

Long Term Improvements to Rate Monitoring
- Capture impact of changes in terms & conditions and limits & deductibles
  - Explicit rating adjustments
  - Application of appropriate
  - Logging changes
- Explicit capture of rate differentials between new, renewal and lapse
  - Benchmark rates, etc...
- Reducing oversight bias by increasing scope of rate monitoring exercises

Dealing with Rate Monitoring Issues

Short Term Improvements
- Explicit assumptions on impact of each issue associated with rate monitoring.

Avoiding the Issues
- Test reserves against alternative benchmarks that use alternative exposure measures (e.g. frequency/severity models)
Dealing with Tail Length

- Considered alternative approaches to allowing for varying tail length in the reserving method
  - Detailed models
    - E.g. If due to longer term policies, build underwriting year development patterns from accident year patterns and assumed exposure profile.
  - High level models.
    - Build patterns from observed differences in past patterns as the cycle has varied.
  - Modelled the impact of using the high level methods on the held reserves.

Varying the tail length method

- Subjective. Either
  - Select hard and soft curves individually
  - Fit a single curve (e.g. Craighead shown below) and then shift the Time parameter.

![Graph of y(t) = A(1 - e^{(-C)T})](image)

- T = Time
- C = Slope

Example of Varying Tail Length

- Modelled random triangles with varying tail lengths through the cycle.
- Modelled three different approaches to each of the chain ladder and BF methods:
  - Standard approach with no recognition of the varying tail length.
  - Defining two separate development patterns for hard/soft market conditions.
  - Interpolating different patterns for each year depending on position in cycle.
Example of Varying Tail Length

<table>
<thead>
<tr>
<th></th>
<th>No allowance for varying tail</th>
<th>Two separate patterns</th>
<th>Interpolated pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of cycle</td>
<td>None required</td>
<td>Need to allocate each cohort as hard or soft</td>
<td>Need to estimate exact point in cycle</td>
</tr>
<tr>
<td>Volume of data required</td>
<td>Less</td>
<td>More</td>
<td>More</td>
</tr>
<tr>
<td>Accuracy: Soft Years</td>
<td>Tend to under-reserve</td>
<td>Depends on how soft</td>
<td>Most accurate</td>
</tr>
<tr>
<td>Accuracy: Hard Years</td>
<td>Tend to over-reserve</td>
<td>Depends on how hard</td>
<td>Most accurate</td>
</tr>
<tr>
<td>Accuracy: Overall</td>
<td>Depends on position in cycle, number of historic years available and mix of hard/soft years in reserves</td>
<td></td>
<td></td>
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</tbody>
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The Next Steps

- Obtain initial feedback
- Complete Investigations, for example:
  - More detailed survey of literature
  - Impact of other cycles such as economic cycle effects on claim frequency
- Discuss whether guidance needed