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Effectiveness of Reserving Methods working party

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What are we going to talk about today?


- Why hasn't this been done before?
- Some early conclusions
- Measuring effectiveness quantitatively
- Obtaining (or creating) sufficient data
- Designing the testing process



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Why hasn't this been done before?

- Because it is hard!



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Conclusion 1 – need lots of actuaries

- Testing the unadjusted operation of a calculation method is informative
- The obvious next question is whether, with the application of judgement, an experienced actuary can use information to get to a "better" answer
- To control the range of answers introduced by individual judgement will need a lot of actuaries to be involved

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Conclusion 2 – need to know what the answer is

- If very recent claims information is used, then there is no way of telling what the final answer actually is – so cannot assess the effectiveness of the method
- A more effective method is to take claims data that is fully run off, and to present actuaries with the year-end information they would have received over several years
- Using data this old means that limited knowledge of distortions caused by, say, changes/delays in claims handling will now be available

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Conclusion 3 – need to use lots of different datasets

- One aim of the working party is to show...
 - ...how effective a method is...
 - ...for a class of business...
 - ...at each stage of development
- To prove this, it is going to be necessary to demonstrate that effectiveness over many similar datasets, rather than just one or two

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Conclusion 4 – need an objective measure

- It is possible to illustrate a method's effectiveness simply (eg graphical representation)
- We believe that it will also be helpful to develop a quantitative measure of effectiveness to compare different methods
- This will need to measure the effectiveness at different stages of claims development and under different circumstances

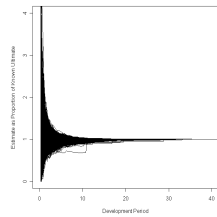
A philosophical question

- What do we mean by an "effective" method?
- Which is more "effective"?
 - A method that frequently differs widely from the eventual outcome but, on average over many trials, comes very close to the eventual outcome; or
 - A method that has less variability from the eventual outcome, but on average over many trials is not as close to the answer; or
 - A method that gives a good answer at an early stage of development, but the accuracy of that answer doesn't improve over time
- Different methods may be more effective in different circumstances
- Development of a "method reliability index" versus graphical analysis of estimates

Objective measure of effectiveness (1)

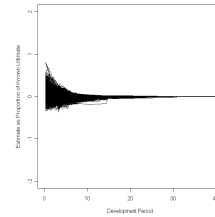
$$\frac{(\text{Estimated Ultimate at time } t) - (\text{True Ultimate})}{\text{True Ultimate}}$$

Incurred chain ladder



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Incurred BF to 70% development; Incurred CL thereafter



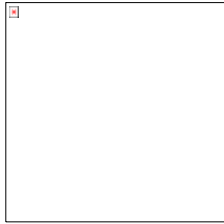
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Objective measure of effectiveness (2)

$$\frac{(\text{Estimated Ultimate at time } t) - (\text{True Ultimate})}{\text{True Ultimate} - \text{Paid to date}}$$

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Incurred BF to 70% development;
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A testing masterplan

- We need to test many different methods...
- Based on many different datasets...
- Covering many different classes...
- Run by many different actuaries...
- At many different year-ends!

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Begin at the beginning: Data

- Limited availability of real company data
- Need complete datasets to cover full spectrum of methods (paid, incurred, premium/exposure, rating indices, number of reported/settled/nil claims, etc)
- Also need extensive data history – in order to know actual outcome
- Donations of real data gratefully received – full anonymity guaranteed!

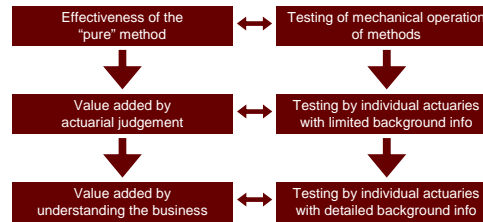
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Generating “pseudo-data”

- We believe that it is necessary to use “pseudo-data” as well as real data in order to handle some of the problems identified
- The method proposed to generate this models:
 - The probability of claims
 - Reporting delays
 - Settlement delays
 - Changes in case estimates
 - Payment accounts compared to case estimates
- Trying to reflect the way the real world operates

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More than just methods



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Separate testing streams

Mechanical testing	Manual testing
<ul style="list-style-type: none">▪ Macro-based▪ Use of pseudo-data▪ Multiple year-ends▪ Many methods and variations▪ Test effectiveness of each method in isolation	<ul style="list-style-type: none">▪ Individual actuaries▪ Use of real data▪ Multiple year-ends▪ Core methods▪ Test individual methods and overall selected results▪ 2 subgroups: limited/detailed background info

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Core methods for testing

- Paid and incurred chain-ladder
- Paid and incurred Bornhuetter-Ferguson
- ACPC-type methods: payments per claim incurred; payments per claim finalised
- Probabilistic trend family methods (eg ICRFS)
- Stochastic methods?
- Operational time method?
- Other methods?

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Variations on standard methods

Development factor selection basis

- volume-weighted
- time-weighted
- unweighted
- ex high/low
- last 3/5/all years
- tail factor extrapolation techniques

BF IEULR selection basis

- Cape Cod method
- use of rating index
- average of last few years
- use of benchmark ULRs

BF exposure measure

- premium
- vehicle-years (motor)
- wage-roll (EL)
- ultimate claim count

Other variations

- Inflation-adjusted chain ladder
- Incurred equivalents for ACPC techniques
- alternative parameterisation of standard techniques

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Calling all volunteers...

- 10-20 distinct classes, with mix of issues
- At least 5 successive year-ends
- 10-20 testers for each class
- Need lots of volunteers to test 1-2 classes each
- 100 volunteers from outside working party (half a day each)
- Working party members each to test all classes
- All volunteers to receive confidential individualised feedback on results

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Six simple steps

- STEP 1: Ready-to-use projection template will be provided, fully populated with data and diagnostic exhibits
- STEP 2: Select development factors and other parameters; initial selections will be automatically recorded
- STEP 3: Compare results of different methods; revisit selected assumptions if desired; updated selections will be automatically recorded
- STEP 4: Select your best estimate
- STEP 5: Repeat steps 1-4 at next four year-ends
- STEP 6: Do not adjust older projections in the light of the subsequent emerging experience; that would be cheating!

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Next steps

- Working party open to new joiners
- Search for data
- "Dry run" of testing methodology prior to roll-out
- Recruit legions of volunteers, and complete testing of methods
- Analyse the results and draw conclusions
- Other aspects of working party terms of reference:
 - Investigation of existing literature
 - Documentation of known strengths and weaknesses of main methods
 - Documentation of useful diagnostics
- Report back in Sorrento

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Questions

- To what extent would you trust results from the working party based on pseudo-data?
- Are there any critically important methods that we've missed?
- Would you be prepared to volunteer to participate in the main testing exercise? How much time?
- Are you able to provide real company data for use in testing? (We will help you to anonymise the data)

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