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GI ROC
Effectiveness of Reserving Methods working party

Steven Fisher & Derek Newton
GIRO, 23-26 September 2008

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  - What have we been doing?
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- Prize draw!

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Thank you to… without whom none of this would have been possible

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Working party members

- Gary Yeates
- Chris Wiltshire
- Shreyas Shah
- David Payne
- James Orr
- Derek Newton
- Mary-Frances Miller
- Chris Marinan
- Chris Jelfs
- Andrew Gray
- Steven Fisher (chair)
- Rob Barritt

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Insurers providing data

- Company A
- Company B
- Company C
- Company D
- Company E
- Company F
- Company G
- Company H

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Testing exercise volunteers

- Aditya Tibrewala
- Alex Panayi
- Andrew Gray
- Andy White
- Antony Claughton
- Ben Qin
- Brian Gravelsons
- Caroline Symonds
- Chlose Paillot
- Clare Edler
- Colin Kerley
- Colum D'Auria
- Conor Dolan
- Craig Martindale
- Dale Lee
- Daniel Smith
- David Halse
- Debarshi Chatterjee
- Derek Newton
- Gary Yeates
- Geoff Morley
- Graham Robertson
- Ian Thomas
- Isobel Prowen
- James Wackrow
- Jenny Wong
- Jonathan Broughton
- Julian Leigh
- Julie Evans
- Julie Sims
- Jürgen Wielandts
- Keith Taylor
- Kerryn Ferris
- Lis Gibson
- Marian Keane
- Mark Wylie
- Matthew Brown
- Matthew Myring-McCullagh
- Matthew Spedding
- Oliver Bettis
- Patrick Crellin
- Paul Goodenough
- Philip Archer-Lock
- Rebecca Christie
- Richard Winter
- Scott Yin
- Shane O'Dea
- Shreyas Shah
- Silvana Sarabia
- Stuart Yates
- Suzanne Patten
- Thomas Cordier
- Tim Jordan
- Vincent Robert
- Yew Khuen-Yoon

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Research funding

- Gratefully received from the Actuarial Profession
- Used to set up prize fund as incentive for testing volunteers
- Results of prize draw later…

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What have we been doing?

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"The 5 big questions"

- How accurate are the reserving methods?
  - Which reserving methods work best for which classes (or in which circumstances) – or more importantly when do they not work well?
  - How much value does the actuary add?
  - How much value does understanding the business add (i.e., from additional information), and what additional information is required for each method?
- How much value is added by combining different methods, and how does one assess how much weight to give to each method?
- What real world circumstances impact the robustness of the reserving methods?
- What diagnostics, method variants and other adjustments can be applied to improve the robustness and accuracy of the methods?
- How volatile is the best estimate under different reserving methods, and how does this volatility interact with any measure of accuracy for the methods?

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"The 5 big questions"

- **How accurate are the reserving methods?**
  - **Which reserving methods work best for which classes (or in which circumstances) – or more importantly when do they not work well?**
  - **How much value does the actuary add?**
  - How much value does understanding the business add (i.e., from additional information), and what additional information is required for each method?
- **How much value is added by combining different methods**, and how does one assess how much weight to give to each method?
- What real world circumstances impact the robustness of the reserving methods?
- What diagnostics, method variants and other adjustments can be applied to improve the robustness and accuracy of the methods?
- **How volatile is the best estimate under different reserving methods, and how does this volatility interact with any measure of accuracy for the methods?**

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Testing approach

- Empirical testing
- Based on real data
- Manual & mechanical testing
- Analysis of thousands of "reserve errors"
- Identification of key themes/issues/questions

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Objectives of working party

- We want 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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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

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What are our results so far?

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Caveats…

- Artificiality of testing exercise
- Absence of real business information
- No access to underwriters & claims staff
- Absence of market benchmark data
- “True” ultimate not known
- Time available for testing
- Lack of peer review

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Important!

- We focus today on questions, not conclusions
- Still much work to be done…

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Results overview

- 44,203 individual estimates to analyse
- Possible evidence to suggest tendency to be conservative amongst testers (but not universal)
- Wide divergence in testers' estimates – testers suffered from lack of real business information
- Premium better estimator than claims in early years; claims better than premium in later years
- No evidence observed from this exercise that final selected estimates were "better" than ICL/IBF
- Fewer outliers from non-CL/BF techniques
- Beware of misleading patterns

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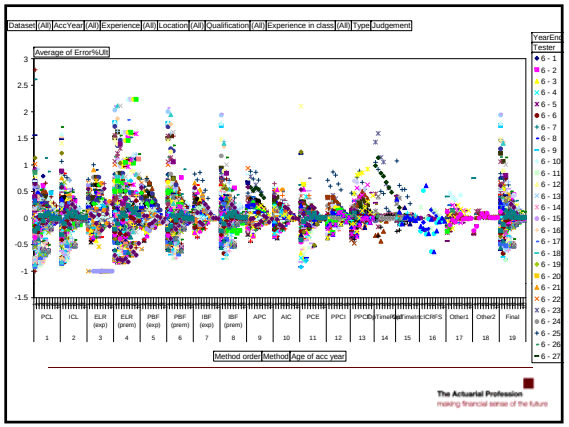

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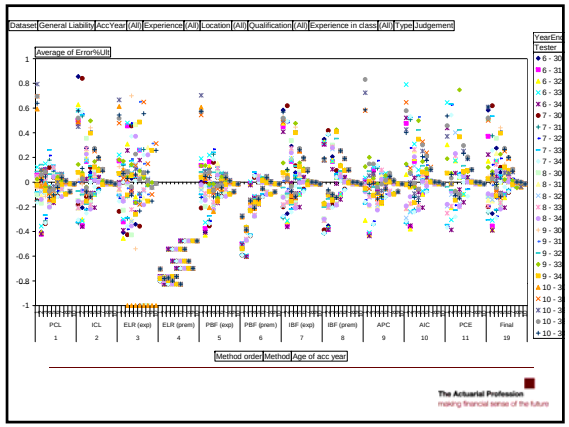

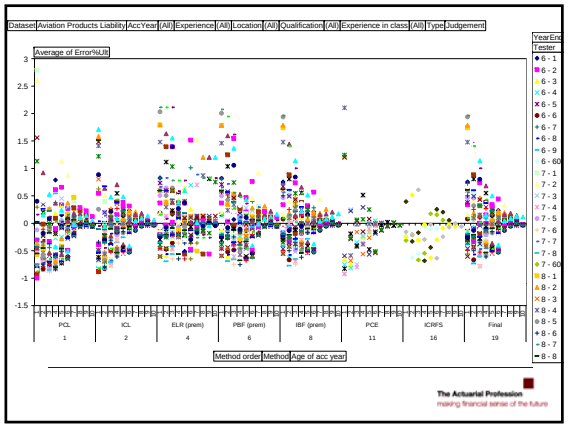

Paid vs incurred data

- Is incurred data always “better” than paid data?
- Is choice of method more important than choice of data?
- How did testers respond to case estimate redundancies?
- Important to use both datasets?

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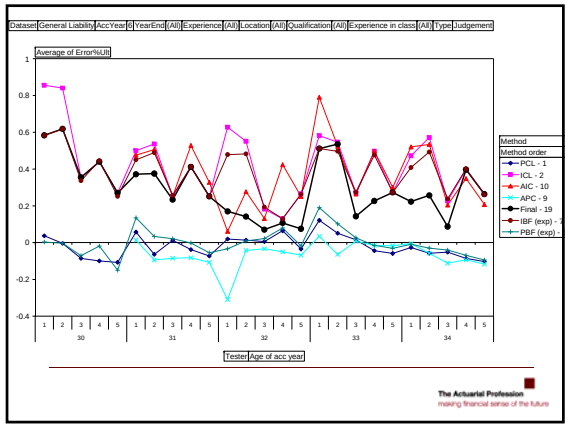

BF exposure basis

- Traditional basis for BF method is premium as exposure measure
- How does this compare with other exposure measures (eg vehicle-years, wageroll), where available?

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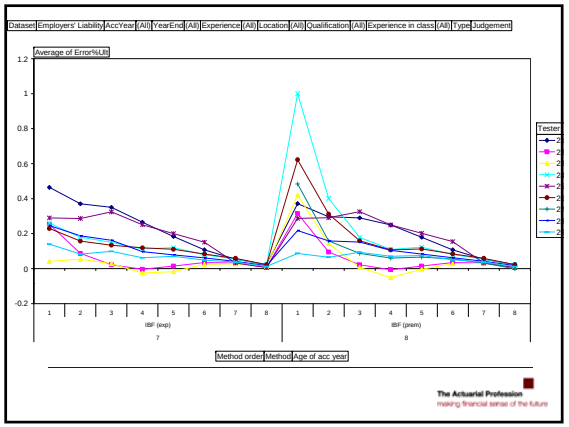
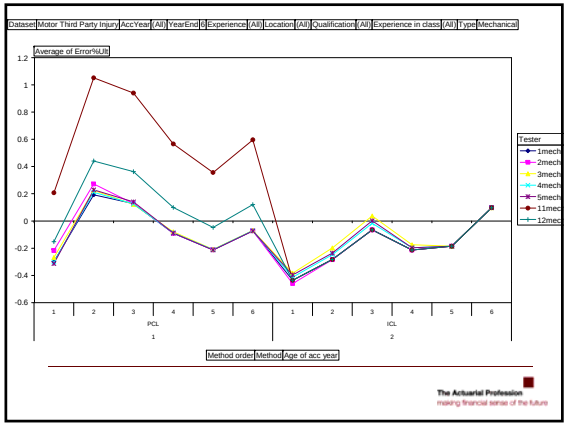


Sensitivity to development factors and tail factors

- How big a difference does the development factor averaging basis make?
- How big a difference does the tail factor extrapolation basis make?
- How do these compare to the impact of randomness?



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Questions for further investigation

- Do methods based on “extra” data bring added value?
- Is premium the best exposure measure?
- How do we resolve divergent messages from paid and incurred data?
- Can we reduce tail factor uncertainty?

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What plans for the year ahead?

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Next steps

- Feedback to testing volunteers
- Further analysis of testing results
- Delve deeper into questions raised today
- “Controlled” testing using pseudo-data
- Investigation of impact of understanding the business
- Another testing exercise?

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Prize Draw!

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Prizes

- A Nintendo Wii games console
- A bottle of Chateau Mouton Rothschild 2001
- A helicopter tour of London
- Dinner for two at Gordon Ramsay at Claridge's
- An iPod Touch

- Many thanks to the Actuarial Profession for providing research funds

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And the winners are…

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Coming up after the break…

- More detail on testing methodology
- In depth discussion of issues raised
- Pseudo-data
- Mechanical testing
- Tail factors
- How to measure “effectiveness”
- Some surprising conclusions…

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