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GI ROC
Effectiveness of Reserving Methods working party

GIRO Conference, Edinburgh
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Contents

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- What did we conclude?
- What will we do next?

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Acknowledgements

- David Payne
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- Chris Wiltshire
- Peter Stirling
- James Orr
- Derek Newton
- Mary-Frances Miller
- Chris Jelfs
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- CAS Loss Simulation Model Working Party

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What have we been doing?

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The Five Big Questions

1. For a wide variety of real-world circumstances, which reserving methods work best – or more importantly when do they not work well?
2. How much value does the actuary add by applying his/her understanding of the business?
3. How much value is added by combining different methods, and how does one assess how much weight to give to each method?
4. What diagnostics, method variants and other adjustments can be applied to improve the robustness and accuracy of the methods?
5. How volatile is the best estimate under different reserving methods, and how does this volatility interact with any measure of accuracy for the methods?

Working party mission

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

Testing approach

- Empirical testing
- Manual & mechanical testing
- Data:
  - 2008 – based on real data
  - 2009 – based on 'pseudo-data'
- Analysis of thousands of 'reserve errors'
- Identification of key themes/issues/questions

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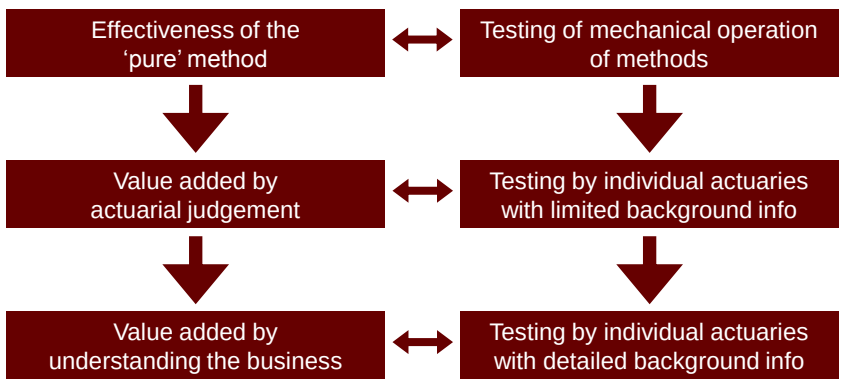
Separate testing streams



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Core reserving methods

- Chain ladder (PCL, ICL)
- Bornheutter-Ferguson (PBF, IBF)
- ACPC-based methods (APC, AIC, PPCI, PPCF)
- Case estimate-based methods (PCE)
- Operational time (OpTime)
- Probabilistic trend family (eg ICRFS)
- Method variations used for mechanical testing (averaging, tail factors, IEULRs, inflation)

Features modelled within pseudo-data

- Change in case reserving policy
- Bad contract(s) / large loss(es)
- Change in mix of business
- High volatility
- Step change in claim severity
- Unexpected collapse in profitability
- Redundant case estimates
- Claim processing backlog and catch-up

Caveats

- Artificiality of testing exercise
- Time available for testing
- Lack of peer review
- Simulated access to underwriters & claims staff
- Absence of market benchmark data
- Limitations of pseudo-data
- ‘Reserving error’ may reflect process variability

What did we conclude?

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Question 5

How volatile is the best estimate under different reserving methods, and how does this volatility interact with any measure of accuracy for the methods?

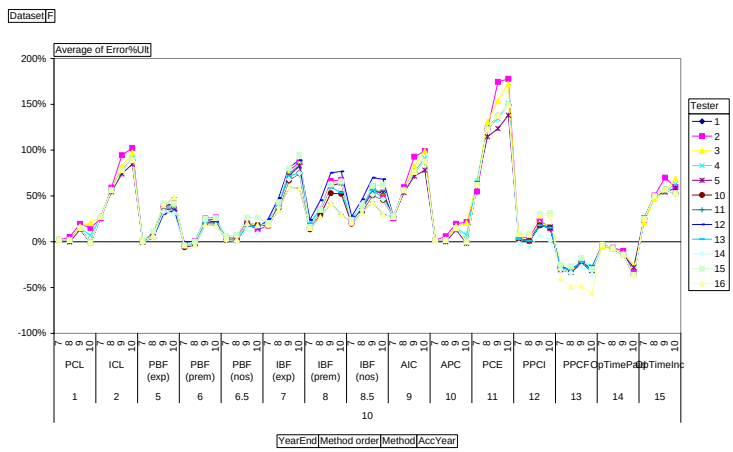
Volatility

- 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
- In our graphical analysis, we have focused on spread of ‘errors’, as well as average ‘errors’
- We have also developed a ‘method reliability index’
- Also beware process risk!

Question 1

For a wide variety of
real-world circumstances,
which reserving methods work best
– or, more importantly,
when do they not work well?

Paid data sometimes gives better results than incurred…



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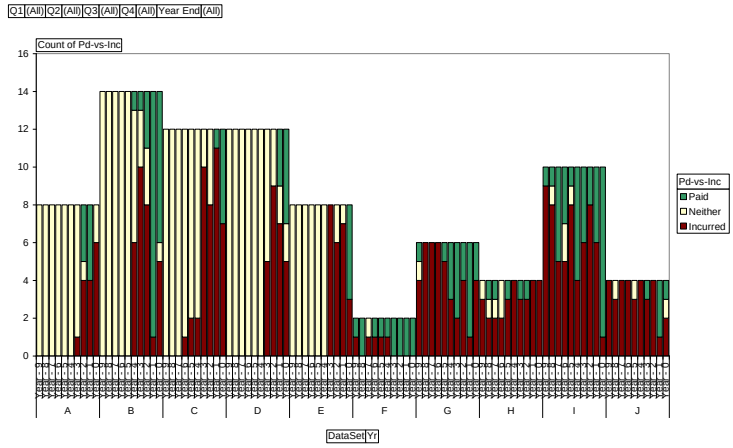
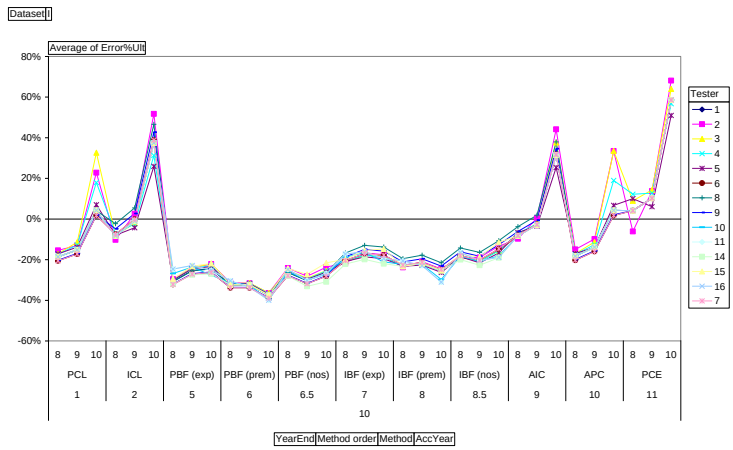
Paid data sometimes gives better results than incurred…



For recent years, a traditional BF isn't always the most reliable method



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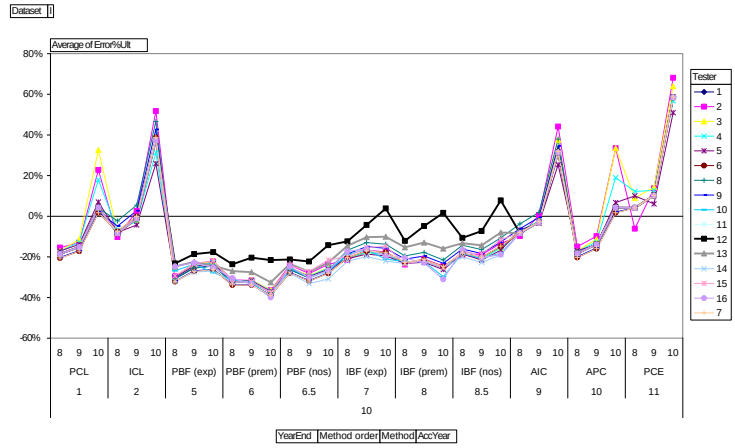
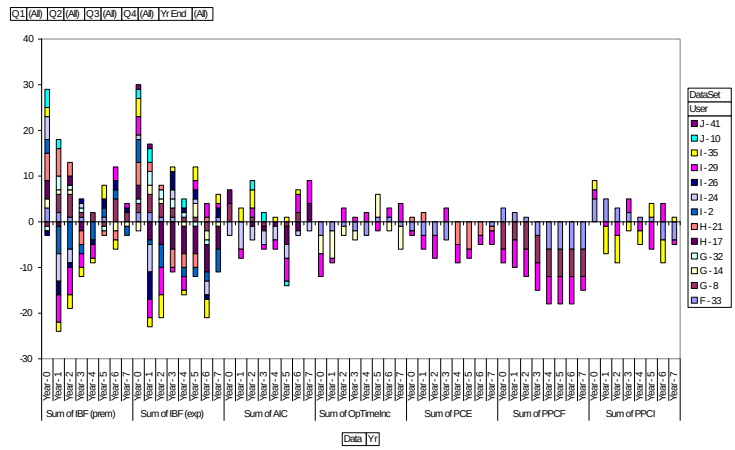
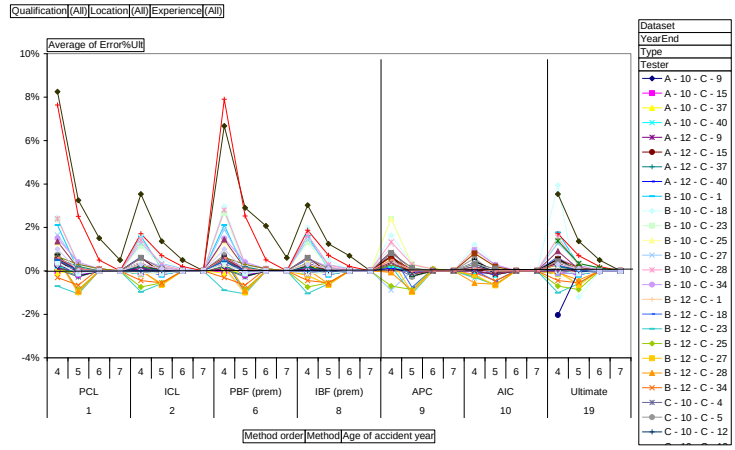


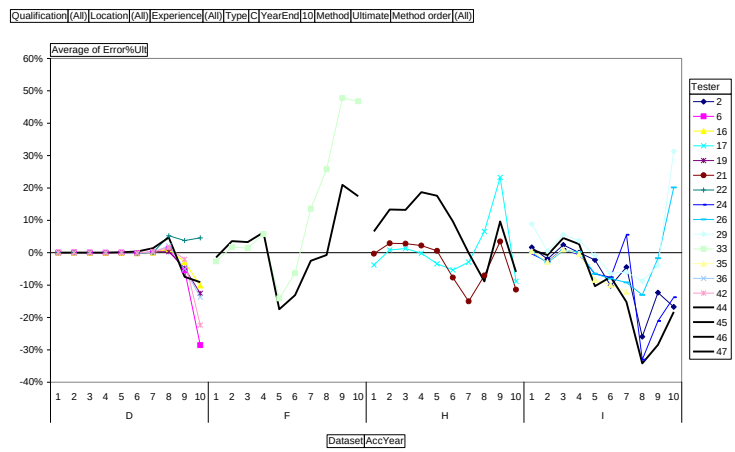
Keep it simple? (ICL vs the rest)



Use of less traditional methods (ie not the CL or BF)



More complex methods (eg ICRFS)



An ideal method?

- There is no ‘perfect’ method!
- Traditional preferences (for incurred data over paid, and the Bornhuetter-Ferguson over the chain ladder for recent accident years) are not always successful
- Sophisticated diagnosis of historical data patterns must be combined with understanding of the business for sound judgements about the future…
- ie a good method can only take you so far

Question 2

How much value does the actuary add by applying his/her understanding of the business?

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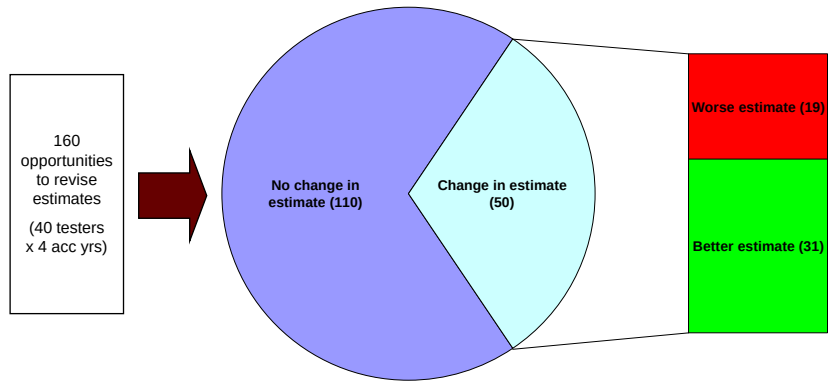
What happened when we provided background information to testers?



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What happened when we provided background information to testers?

- More information aids judgement
- In a minority of cases (12%), more information skewed judgement in the wrong direction
- Why did most not change their selections?
  - Assumed change would not be material?
  - Already implicitly allowed for?
  - Did not have a way of allowing for more information?
  - Other – time constraints, did not believe the information…?

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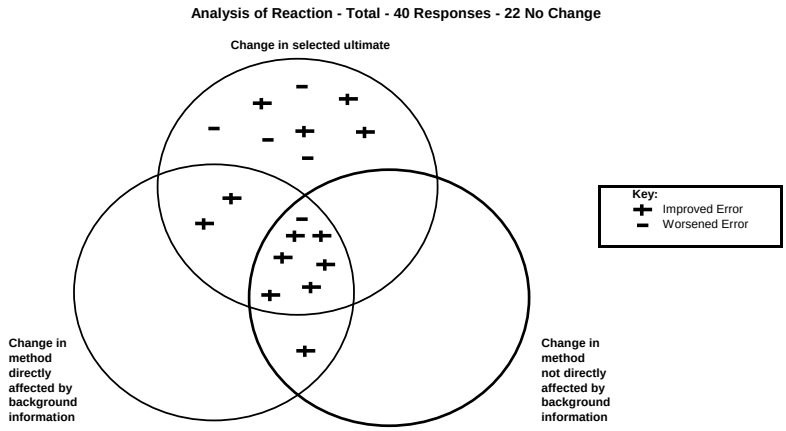
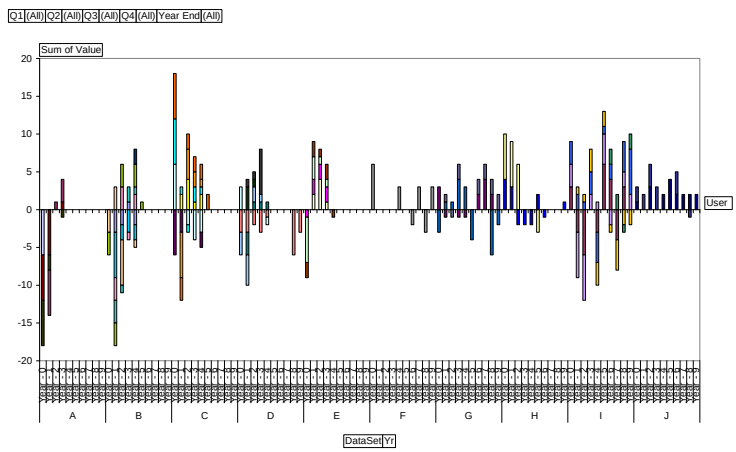
What happened when we provided background information to testers?



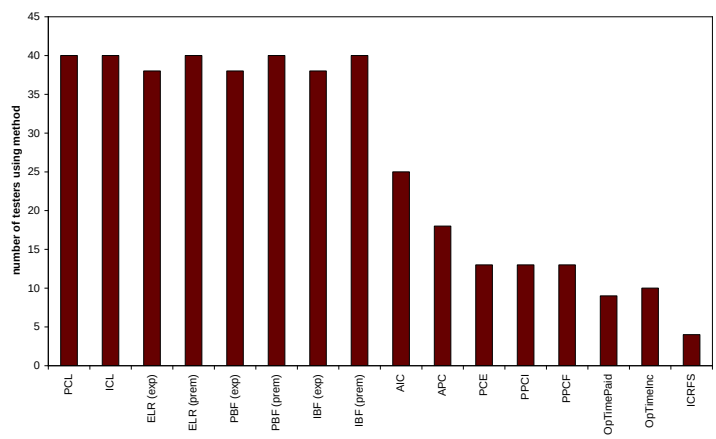
What about actuaries' intervention more generally?



Question 3

How much value is added
by combining different methods,
and how does one assess
how much weight to give
to each method?

Some methods are more popular than others!



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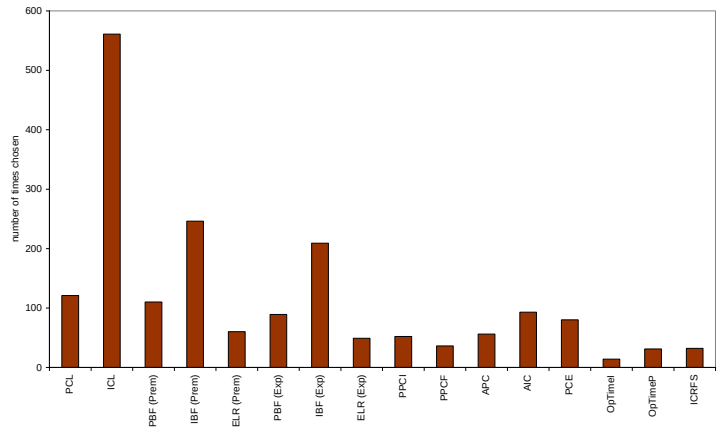
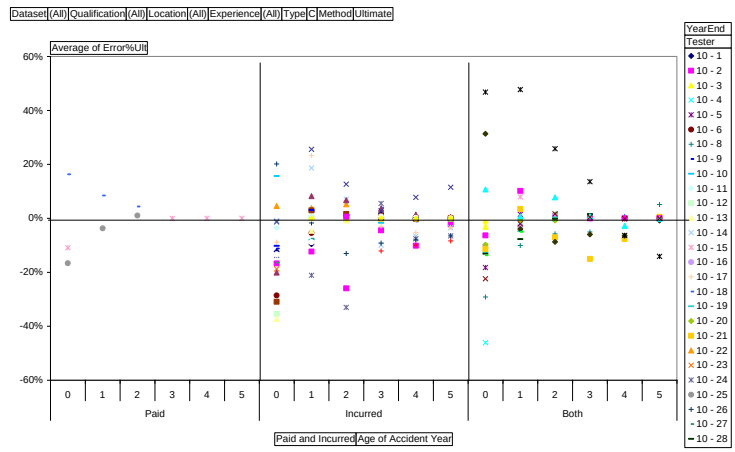
Some methods are more popular than others!



What happens when paid & incurred methods are combined together?



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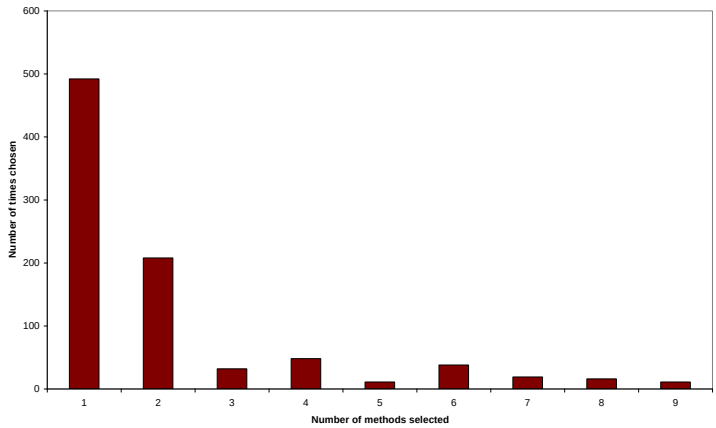
How many different methods did testers include in a weighted average?



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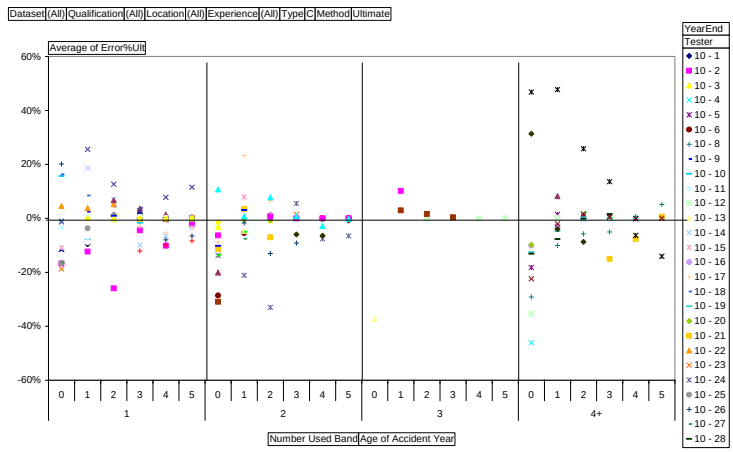
What was the impact of calculating a weighted average?



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Combining methods

- Weighted averages are not the answer
- Important to understand reasons underlying different methods and/or datasets producing different results
- Select the method and dataset that best reflects the underlying business situation

Question 4

What diagnostics, method variants and other adjustments can be applied to improve the robustness and accuracy of the methods?

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Diagnostics

- Important to identify features within data:
  - Trends, steps & blips
  - Rows, columns & diagonals
  - Counts, amounts, premiums, averages…
  - Many examples in GRIT paper
- Could use triangles of ratios (plus graphs)
- More sophisticated toolkits (eg ICRFS) also effective
- Challenge is to move from historical diagnosis to future estimation via business understanding

Method variants

- Cape Cod method
- Use of claim counts – including as alternative BF exposure measure
- Knowledge within profession of non-traditional methods

Key messages

- There is no ‘perfect’ method
- ICL/IBF not always successful combination
- Use of background info frequently critical
- Avoid weighted averages – pick the method that matches the circumstances
- Cape Cod, claim counts may be useful additions to the actuary’s toolkit

What will we do next?

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Next steps

- Our work is nearly complete
- Personalised feedback to testers
- Final paper to be released through GI ROC
- Paper will include greater detail on results
- Paper will also reflect discussion points today

Questions?

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