Claim simulations & liability estimation methods

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HIH losses

“The deficiency of several billion dollars has arisen because claims arising from insured events in previous years were far greater than the company had provided for”

(report HIH Royal Commission, xvii)

Likely future litigation

“actuaries are most likely to be sued over relatively small jobs”

Greg Taylor 2/4/03

APRA risk margins

• “the new role of appointed actuaries ... is not yet supported by adequate actuarial science”
• “I do not like the Mack method (of estimating risk margins)”
• “I hope a prospective method can be found”

Geoff Atkins, IAA Convention 20/5/03
Claim simulations

- Using a claim model, simulate many future years of claims
- Using an actuarial estimation method, estimate the liabilities each year
- Compare the estimated and true liabilities
- Obtain the bias, prediction error and prediction distribution for the method

A sample claims model

- Randomly varying claim numbers around a stable mean
- Defined proportion of claims non-zero
- Defined size distribution for non-zero claims
- Report delay pattern
- Closure pattern (slower for larger claims)
- Defined case estimate distributions for zero and non-zero claims

Modelling process

- Simulate claims
- Value claims
- Report results

Database uses

- Store individual claims
- Store valuations using different methods for many years
- Sort valuation errors by size
- Check calculations
Initial conclusions

- Margins reduce as claims increase
- At very high numbers, all methods converge to non-zero error
- Payment chain ladder least reliable
- Assumed reliability of case estimates important for ICL & PCE
75% risk margins for CTP claims – ICL method

75% margins for CTP claims – 1000 claims pa

CTP 75% risk margins from Collings & White

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• Parameters need to reflect practice
• Data needs are heavy for realism
• Premium & claim liability margins

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• Claim simulations are feasible (just)
• Parameters need to reflect practice
• Data needs are heavy for realism
• Premium & claim liability margins
• Best method can be chosen
• Good case estimates best base

Further work

• Further work is needed on many issues
• We would be happy to collaborate

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