



Institute of Actuaries of Australia

# ACCIDENT COMPENSATION SEMINAR

CHANGING TIMES – CONTINUING NEEDS 20 – 22 NOVEMBER 2011 • SOFITEL BRISBANE



## Superimposed Inflation – An elusive concept

**Alex Gould & Kwame Atsu**



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## Outline

- Background
- Basic definition
- Complications
- Drivers
- Measuring it
- Case study



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*A critical assumption in reserving is the assumed level of superimposed inflation. HIH almost certainly did not adequately identify, quantify or assess the superimposed inflation in its own long-tail lines of business for many years. Underestimation of superimposed inflation leads to chronic under-reserving, under-pricing and ultimate ruin.*

-Zehnwirth, B., FAI a red herring, not Trojan horse, in HIH disaster.  
Australian Financial Review 10<sup>th</sup> May 2002”



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## Why we wrote this paper

1

### Non-Actuarial understanding

- Lawyers, politicians, policyholders, management
- Layman's definition would be useful

2

### Actuarial understanding

- “Tale of two definitions”
- Lack of examples on measuring it
- Documented to varying degrees

3

### Actuarial judgement

- Long term flat vs. Short term tactical
- Role of quantitative analyses
- Many qualitative issues



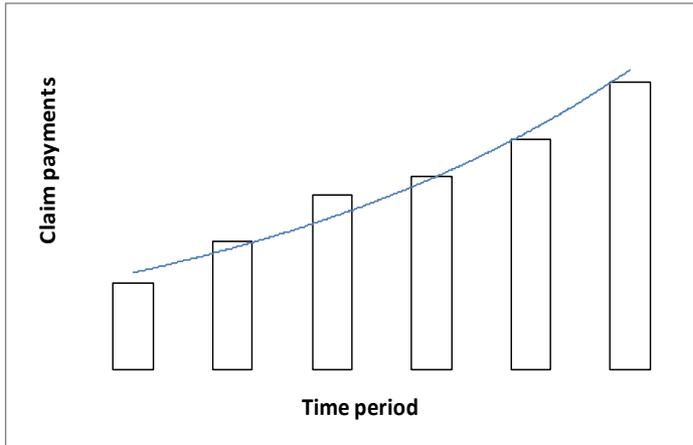
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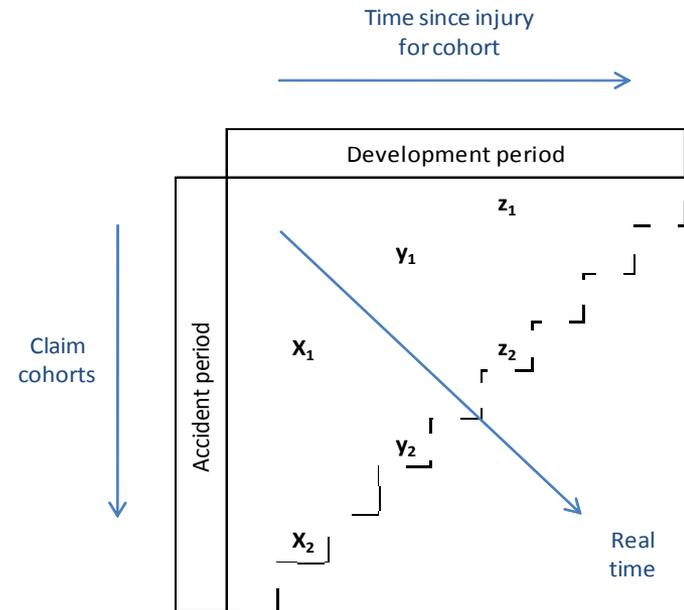


## The basic definition

### Trends in claim payments



### Actuarial triangle





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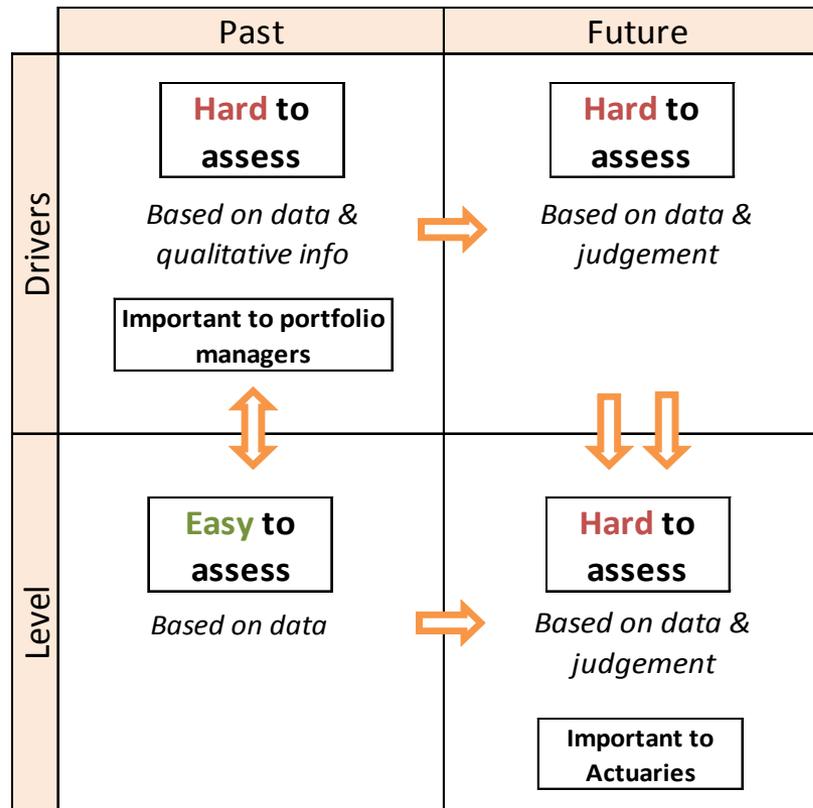


## Things which make it complicated

- Portfolio age / mix by delay
- Variability in claims experience
- Different growth in early vs. late delays
- Multiple payment types
- Multiple metrics (e.g. average claim size vs. number of claims)



## Drivers of superimposed inflation





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## Drivers of superimposed inflation

Driver	Modelled	Systemic
Change in exposure	✓	×
Change in propensity to claim	✓	×
Increased utilisation of heads of damage	?	✓
Access to new heads of damage	×	✓
Increased duration on periodic benefits	?	✓
Fluctuations in finalisation or payment patterns	×	×
Increases in average cost of lump sums	×	✓
Limited experience for a portfolio or environment	✓	×
Volume of large claims	✓	✓
Imperfect inflation indices	×	✓
Claims management practices	×	×
Legal precedents	×	✓
Legal practices	×	✓



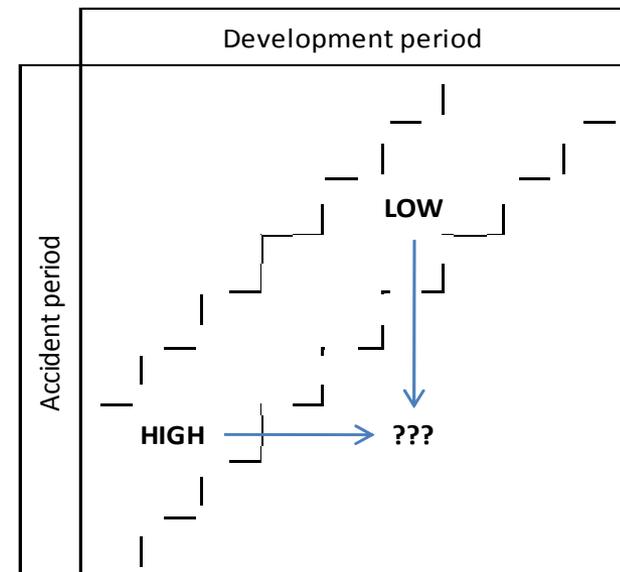
## Measuring superimposed inflation

- Quantitative

- Trend lines
- GLMs
- Multiple GLMs
- Comparable claims

- Qualitative

- Delays in identifying trends
- Delays in responding to trends
- Delays in assessing response
- Honeymoon periods





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## Case study outline

- Background
- Methodology
- Results & proposal



## Case study background

- To increase understanding of SI within MAA
- SI definition used - “*growth in claim payments in excess of normal inflation*”
- Measurement tool (*not a predictive model*)
- Compare measured SI with SI in rate filings



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## Case study method

- **Data** – *Claims (NSW CTP); AWE (ABS)*
- **Tools** – *SAS, EXCEL*
- **Process**
  - *Claims (payment types, capping, Inflation adjustment)*
  - *Trend lines (types, smoothing, adherence, fitted values)*
  - *Growth rates (payment types, weights)*
  - *Shortcomings (refinements, projections)*

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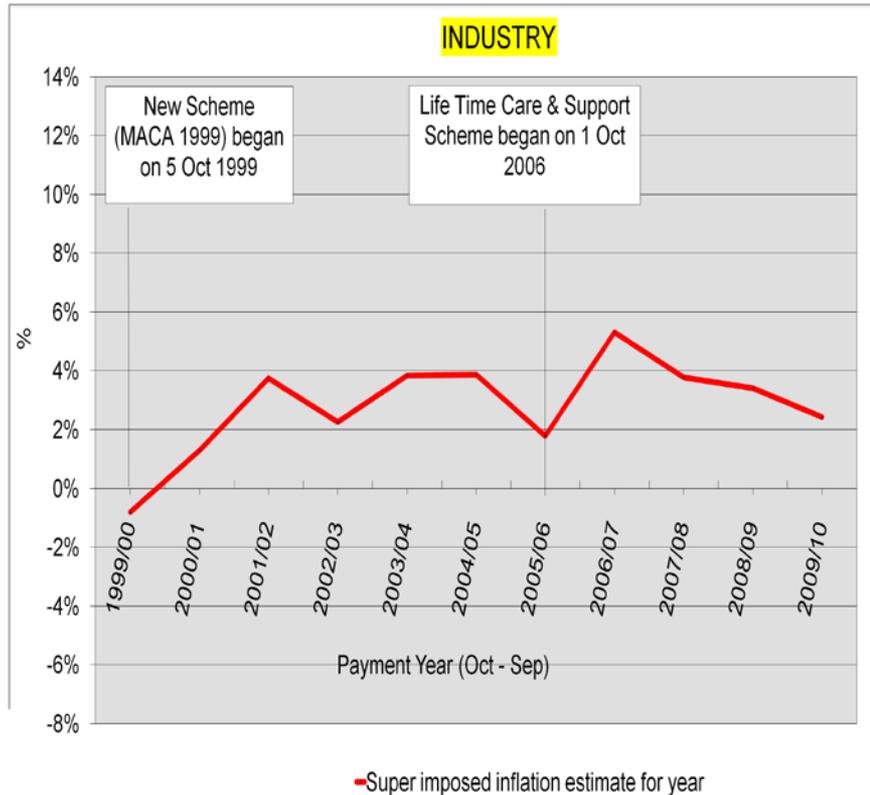
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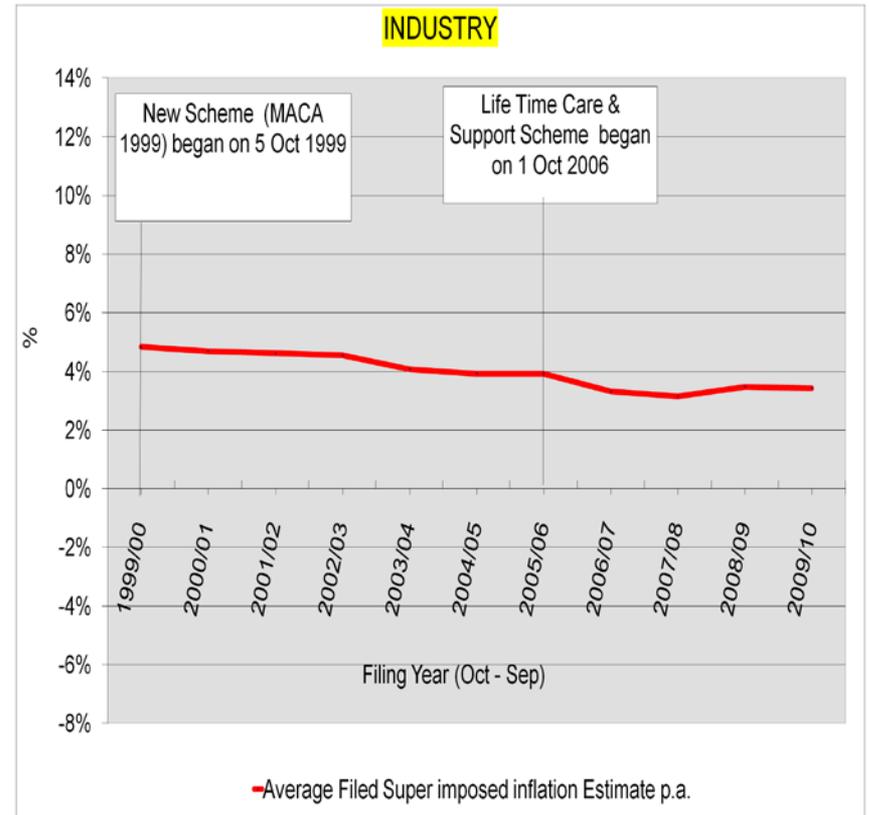


## Case study results & proposal

Annual **measured** superimposed inflation



Annual weighted average "**filed**" superimposed inflation



**Note: The annual measured superimposed inflation figure above has been revised since it was originally presented, following feedback at the seminar. Additional commentary is included in the paper.**



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## Case study methodology

- The use of trend lines based on the entire history means estimates are long-term
- The estimates for each payment year are derived using separate models, giving “point in time” estimates of what SI would have been when rate filings were made
- The specific methodology used is important in any benchmarking or comparisons – raw annual growth rates in the data are much more volatile (negative in some years and 15-20% in others, compared to the 0-6% shown on the previous slide)



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## Questions

*Should actuaries apply a rigorous framework like that proposed for risk margins?*

*Should SI assumptions be tactical or relatively fixed?*

*Do allowances for SI reduce the incentive for portfolio managers to manage costs?*

*Are actuaries being conservative in allowing for a long-term rate of SI?*

*Should SI assumptions apply to all future periods?*

*Could publishing historical rates of super imposed inflation (SI) for the industry and insurers, lead to better SI estimates in rate filings?*