



Institute  
and Faculty  
of Actuaries

## Current Issues In General Insurance

2 May 2013



01 May 2013



Institute  
and Faculty  
of Actuaries

## PPOs III

Antony Cloughton, DLG and Sarah  
MacDonnell, Towers Watson

ertise  
ponsorship  
Thought leadership  
Progress  
Community  
Sessional Meetings  
Education  
Working parties  
Volunteering  
Research  
Shaping the future  
Networking  
Professional support  
Enterprise and risk  
Learned society  
Opportunity  
International profile  
Journals  
Support

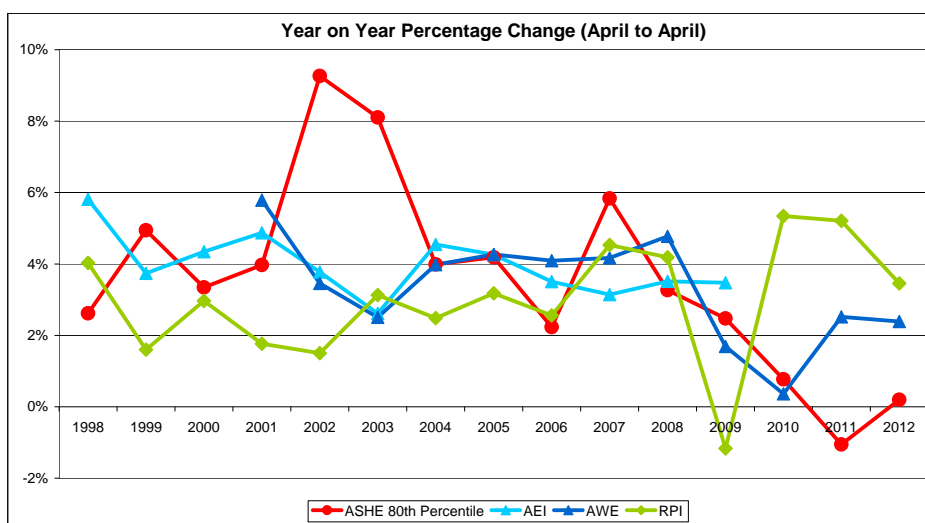
01 May 2013

## Agenda

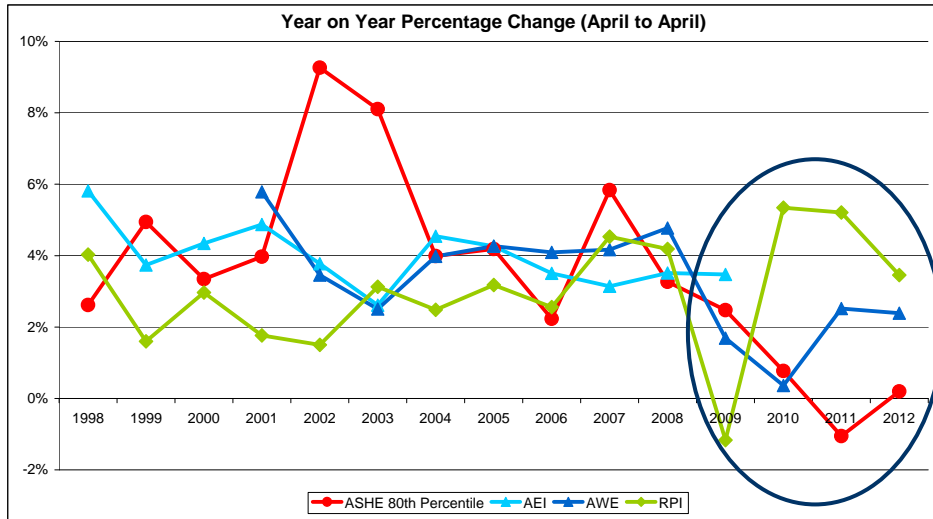
- Focus on ASHE
- Industry survey results



## ASHE to date

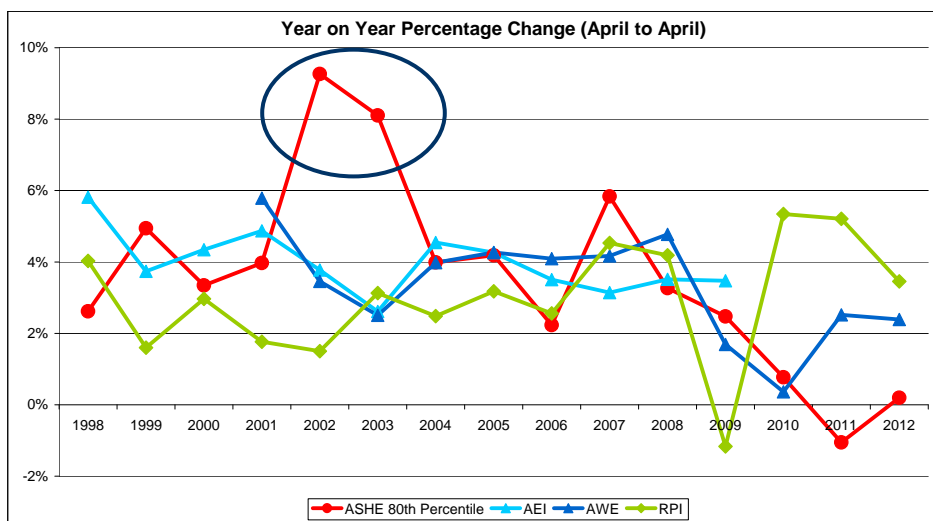


### ASHE to date



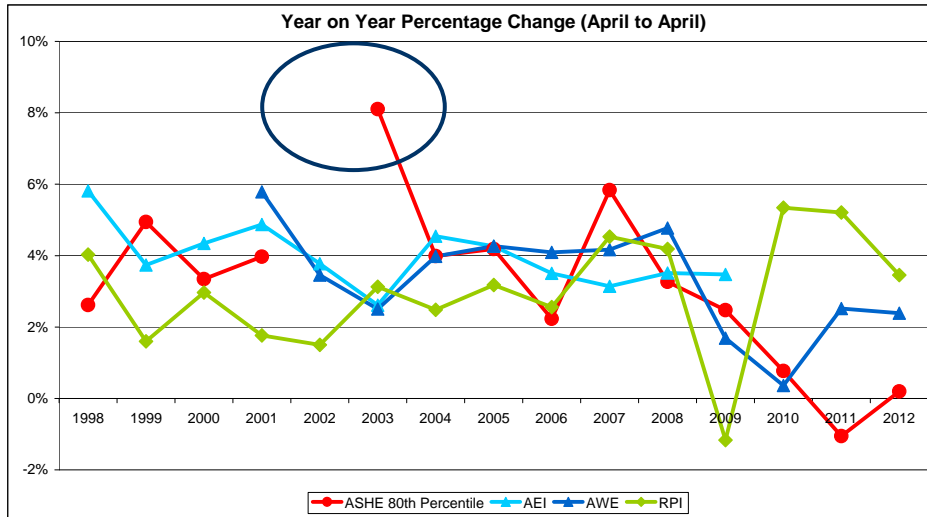
5

### ASHE to date



6

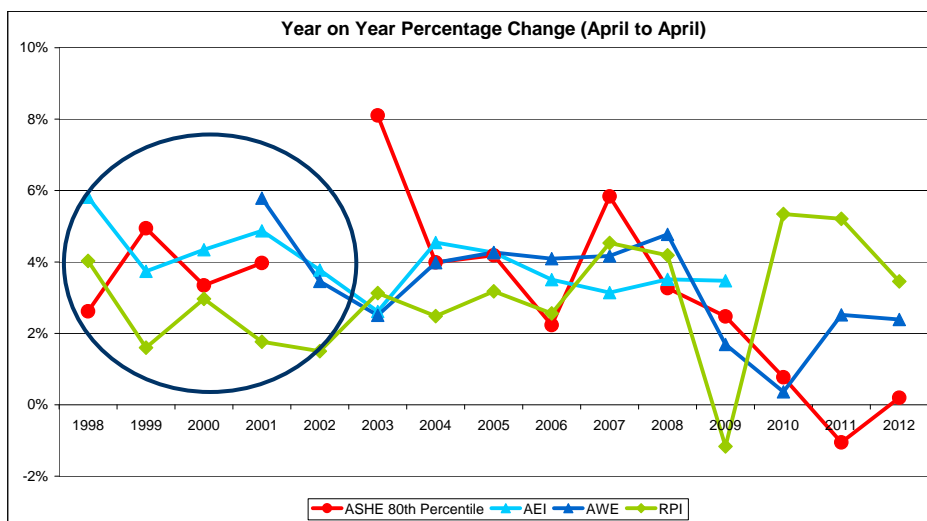
## ASHE to date



© 2011 The Actuarial Profession • www.actuaries.org.uk

7

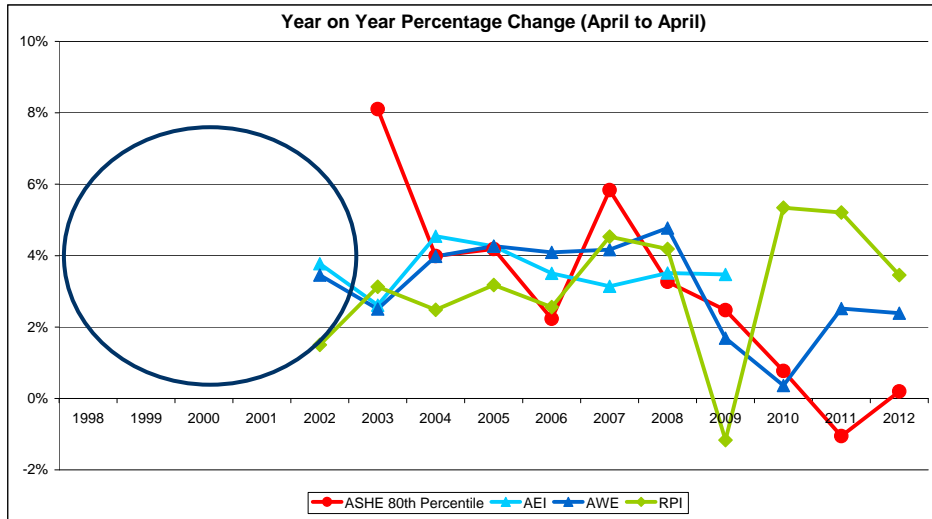
## ASHE to date



© 2011 The Actuarial Profession • www.actuaries.org.uk

8

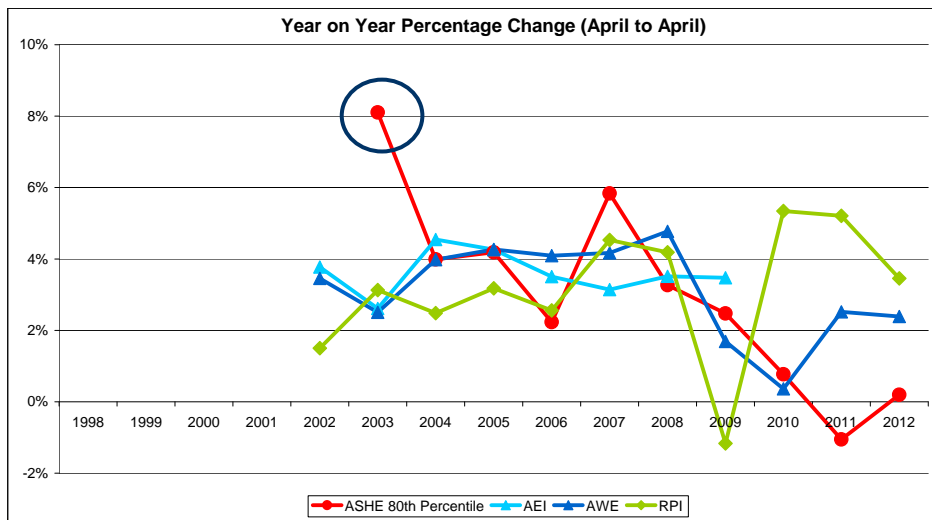
## ASHE to date



© 2011 The Actuarial Profession • www.actuaries.org.uk

9

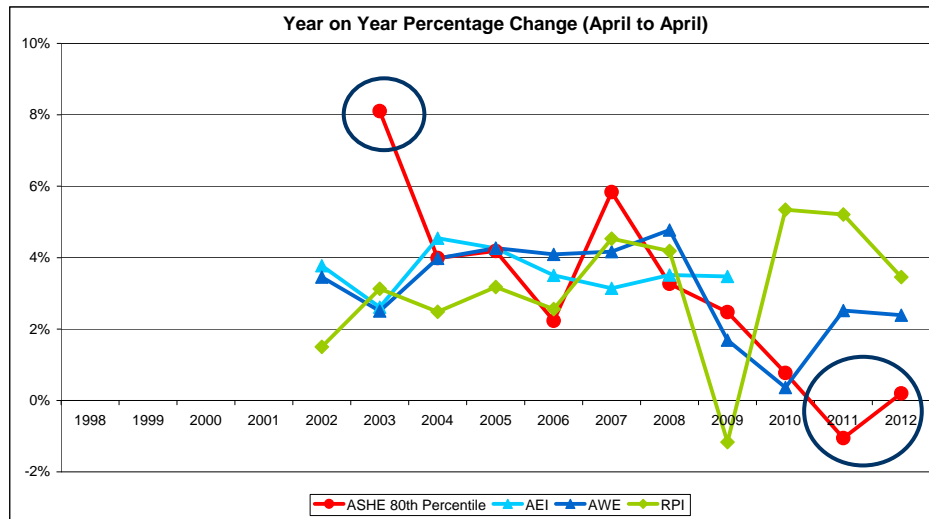
## ASHE to date



© 2011 The Actuarial Profession • www.actuaries.org.uk

10

## ASHE to date



© 2011 The Actuarial Profession • www.actuaries.org.uk

11

## Average inflation

Inflation period and ASHE indices	ASHE 80 <sup>th</sup> percentile	Combined wage inflation*	RPI
644 + 6115	3.6%	3.6%	3.0%
644 + 6115 Exc. 2002	3.2%	3.6%	3.1%
6115 Only	3.0%	3.1%	3.3%
6115 Exc. 2003	2.4%	3.1%	3.3%
6115 2004 → 2009	3.7%	3.8%	2.6%

- Selection period for ASHE can change inflation rates by >1.0%
- It also changes relationship to wage and price inflation. The gap varies from -0.7% to 0.0% for wages and -0.9% to 1.0% for RPI
- Periods with highest ASHE/wage inflation have lowest price inflation and vice versa

\* Wages are AEI and then AWE from 2000 onwards



© 2011 The Actuarial Profession • www.actuaries.org.uk

12

## ASHE Changes

- Every ten years the ASHE sub-categories are revised in line with the census.
  - Hence in 2002 the 644 “care assistants and attendants” category was replaced with 6115 “assistants and home carers”
  - In 2012 6115 was replaced by two categories – however, the ONS have said they will continue to produce 6115 for the “foreseeable future”
  - However, in 2012 there were issues between 2011’s provisional and revised versions due to weighting changes
- This creates question marks over the switch each decade and about how long 6115 will be supported.



Institute  
and Faculty  
of Actuaries

## Future ASHE

- There is no forward ASHE projection in the market – so how do you estimate the future rate?
  - For both the short and long term
- Traditionally link to another index
- RPI, wages, or investment return make the most sense



Institute  
and Faculty  
of Actuaries

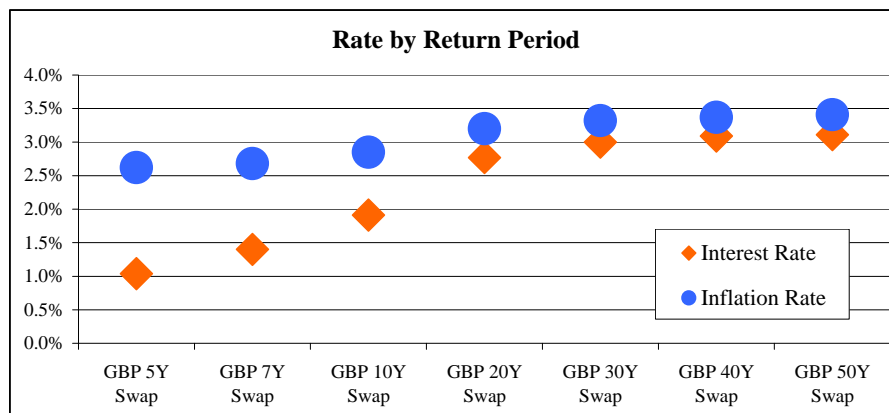
## Linking to RPI

- RPI has the advantage that the market explicitly prices it – by comparing the yield of indexed linked gilts to standard gilts
- However, in the very limited pool of ASHE inflation points either a weak or negative correlation is observed with RPI
  - This may be due to the fact both RPI and wages generally increase, leading to weak correlation, but not always to the same degree in the same period
  - It may also be due to a small sample size
  - Where the future assumption has any short term matching implications, RPI could have a problem
- From 1990 to 2012 the RPI inflation has been 3.2%



## Linking to RPI

- Additionally, due to the recession and bank of England actions, the real return over the RPI curve is currently a little *odd*



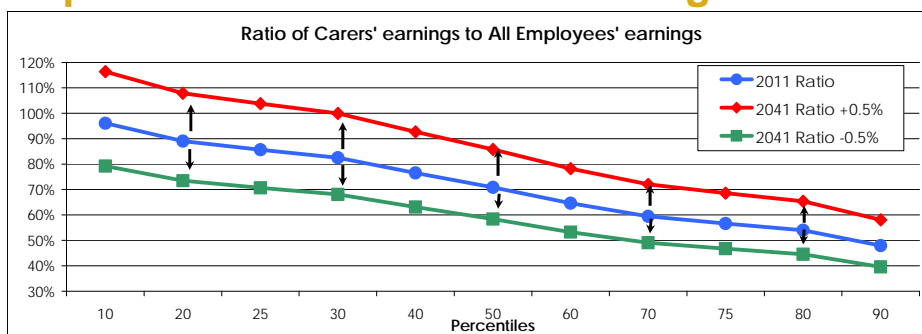


## Linking to Wages

- Wages correlation with ASHE varies, but against the 6115 period (80<sup>th</sup> percentile) gets as high as 62% when 2003 is excluded (~30% otherwise)
- Obvious issue – there is no market agreed forecast of wage inflation
- The analysis of wages vs. ASHE indicates gaps of differing amounts. However, adopting a gap is implicitly making an assumption about changes in the economy
- From 1990 to 2012 the wage inflation has been ~4.0%



## Implications of a difference to wage inflation



- A 0.5% gap over 40 years moves carers' wages either up 10% to 20% or down -8% to -17% in comparison to the all workers
- To accept this shift obviously a number of assumptions must be made – which may not have truly been intended from adopting a gap between wage inflation and carers' inflation

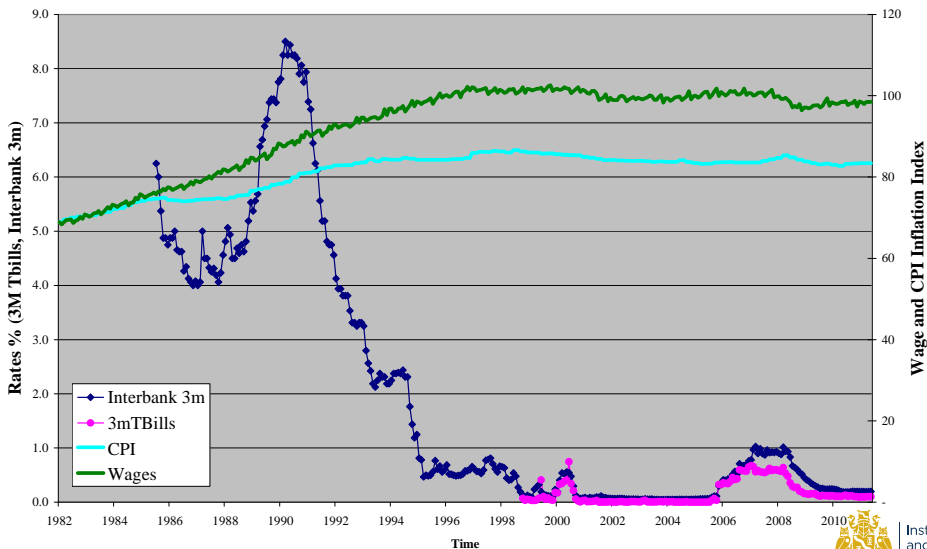


## Linking to Investment Return

- Performing some high level analysis of historical investment return and wage experience is very interesting
- Quarterly wages inflation and the quarterly two year swap rate are correlated at 79% over Q1 1991 to Q3 2011.
  - The two year swap rate is 99% correlated with the one year rate, and was used as more data was available
- Analysis indicates a gap between wages and the investment return that has varied from 0.5% to 1.0%, depending on the period and the wage index used. This might be argued down to zero given low investment returns
  - Would a long term gap assumption make sense with the current very low yields in the short term?
  - It is justifiable based on other experience?



## Japanese experience



## Summary

- There is limited ASHE 6115 data available, and many points might be considered outliers in a larger set
  - This creates uncertainty in identifying the true behaviour and questions over putting reliance on any observations
  - There is also a risk it may be discontinued – but all ASHE percentiles face this risk. ASHE pre 2003 is not the same as ASHE 6115
- Adopting a gap to wages implies changing relationship between carers and the total population.
- There are potential issues with linking ASHE to price inflation – it may be worth investigating linking it to investment returns.



Institute  
and Faculty  
of Actuaries

## Agenda

- Focus on ASHE
- Industry survey results



Institute  
and Faculty  
of Actuaries

## Disclaimer

- These slides have been produced solely to support this specific presentation and may be misleading if read in isolation.
- Do not rely on any of the information contained herein without reference to the accompanying GIRO paper “Periodical Payment Orders working party update – GIRO 2012”



## Data basics

- Third year of the survey
  - 2011: 12 companies
  - 2012: 16 companies
- Comprehensive view of the UK motor market
  - 9 out of the top 10 insurers (as defined by FSA returns)
  - > 94% of market (as defined by FSA returns)
- Cannot directly compare data from year to year
  - change in mix of companies
  - complete refresh of data each year
- Be aware of use of settlement year



## Contributors

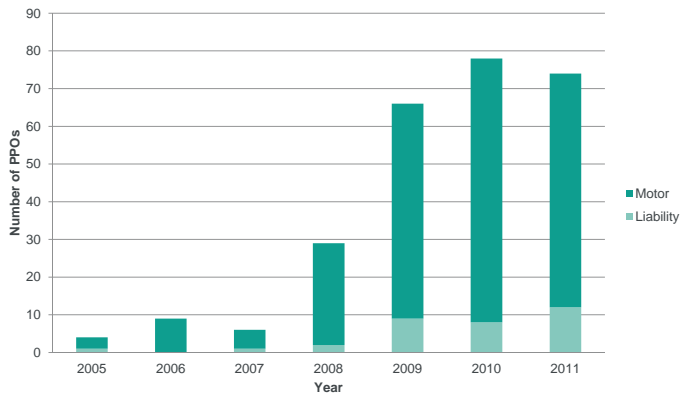


## 2012 PPO survey

- Propensity
- Mortality
- Industry Practice
- Reserves held
- Industry Opinion
- Looking ahead

## Propensity

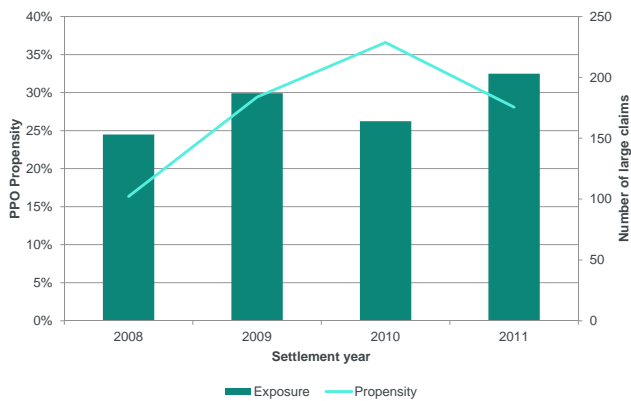
### Number of claims settled



Institute and Faculty of Actuaries

## Propensity

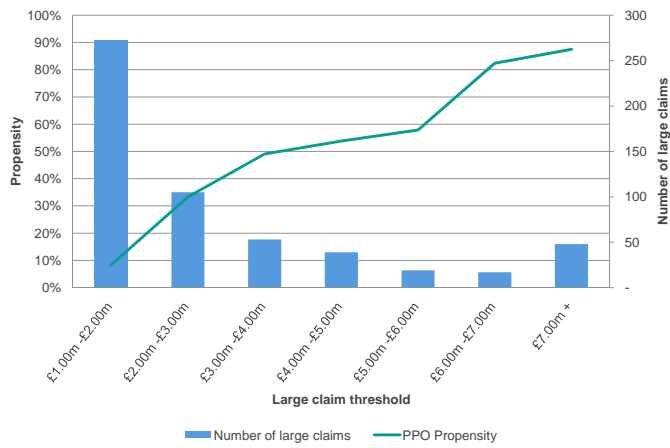
### Propensity – large claims



Institute and Faculty of Actuaries

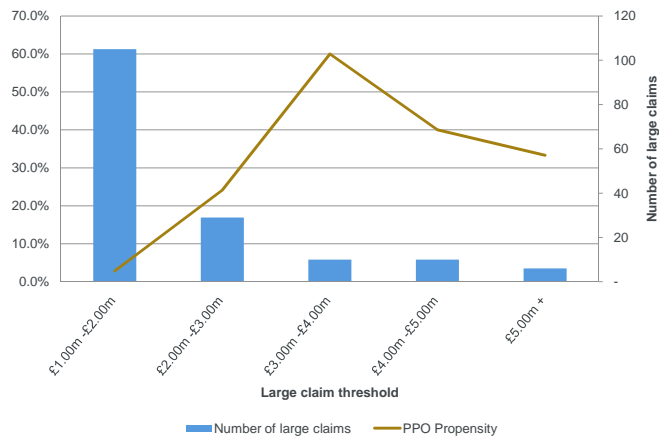
## Propensity Motor

### Propensity by large claim threshold



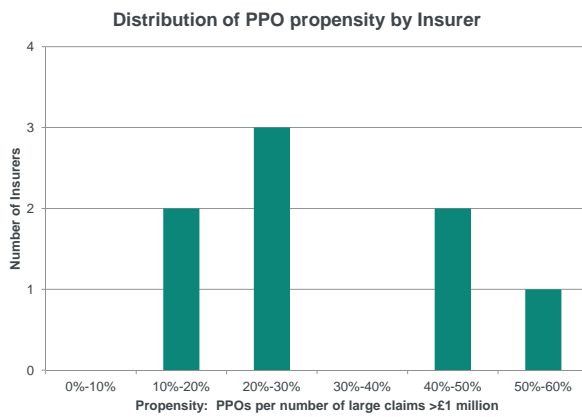
## Propensity Liability

### Propensity by large claim threshold



## Propensity

### Variation by insurer



## 2012 PPO survey

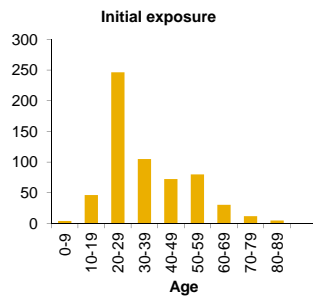
- Propensity
- Mortality
- Industry Practice
- Reserves held
- Industry Opinion
- Looking ahead



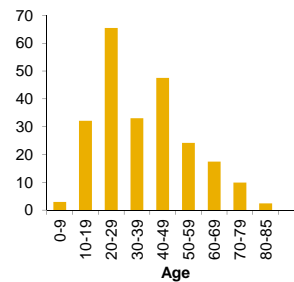
## Mortality Industry analysis

- 835 person years (600 male, 235 female)
  - MIB data included to increase credibility

Males

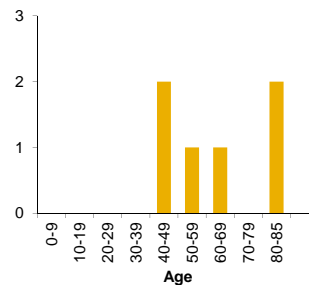
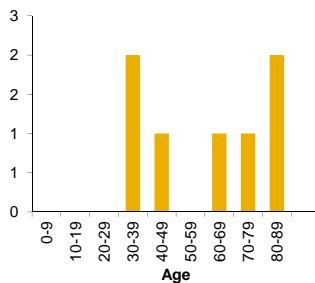


Females



## Mortality Industry analysis

- 835 person years (600 male, 235 female)
- 13 deaths (7 male, 6 female)

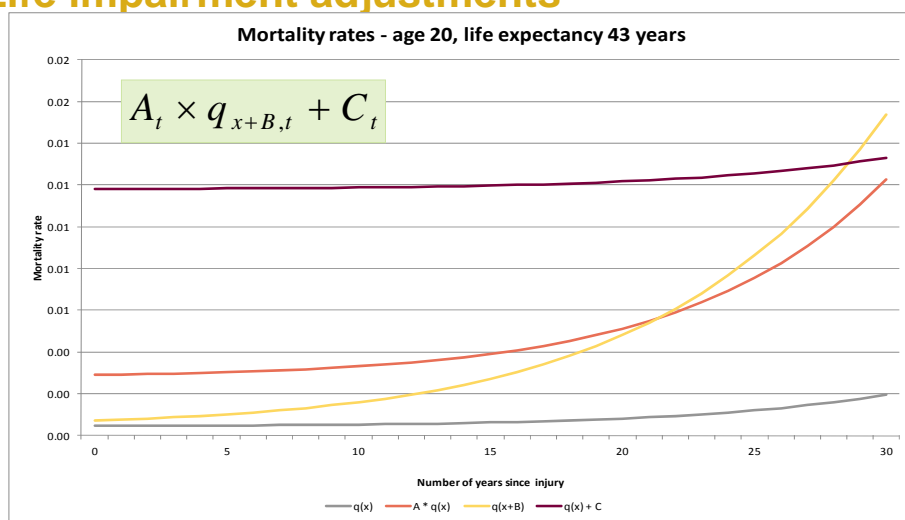


## Mortality Industry analysis - qualifiers

- Credibility
  - data from 2006 to 2011 only
- Model error
  - assumption of a homogeneous cohort
  - assumption of impairment adjustment
    - constant multiplier to  $q_x$



## Mortality Life impairment adjustments



## Mortality Industry analysis - qualifiers

- Credibility
  - data from 2006 to 2011 only
- Model error
  - assumption of homogeneous lives
  - assumption of impairment adjustment
    - constant multiplier to  $q_x$
    - mortality will often be higher in the period after the accident
    - data in early stages of development



## Mortality Industry analysis - results

- Males 3 times  $q_x$
- Females 8 times  $q_x$

Percentile	Males	Females
5 <sup>th</sup>	575%	1550%
25 <sup>th</sup>	398%	1043%
50 <sup>th</sup>	309%	792%
75 <sup>th</sup>	239%	601%
90 <sup>th</sup>	190%	469%
95 <sup>th</sup>	166%	405%



## Mortality

### Comparison to rates recorded by insurers

#### Survey experience

Percentile	Males	Females
5 <sup>th</sup>	575%	1550%
25 <sup>th</sup>	398%	1043%
50 <sup>th</sup>	309%	792%
75 <sup>th</sup>	239%	601%
90 <sup>th</sup>	190%	469%
95 <sup>th</sup>	166%	405%

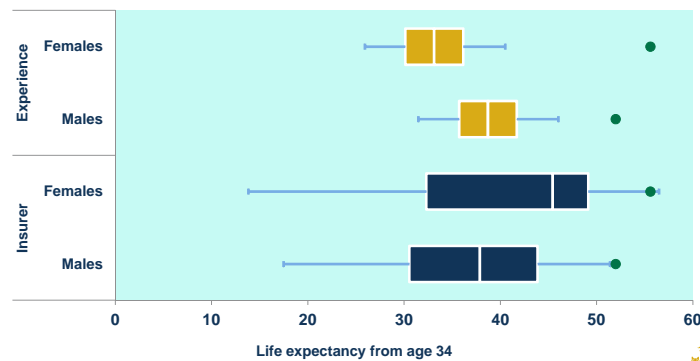
#### Company estimates

Percentile	Males	Females
5 <sup>th</sup>	2176%	5776%
25 <sup>th</sup>	624%	853%
50 <sup>th</sup>	331%	258%
75 <sup>th</sup>	199%	183%
90 <sup>th</sup>	130%	107%
95 <sup>th</sup>	105%	92%



## Mortality

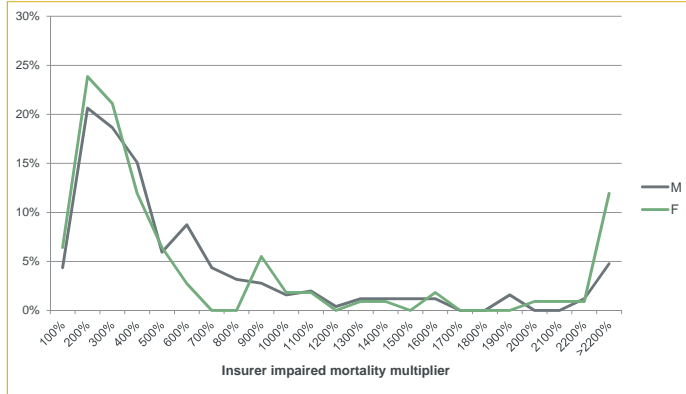
### Comparison to rates recorded by insurers



## Mortality

### Industry recorded rates

- Note the tail



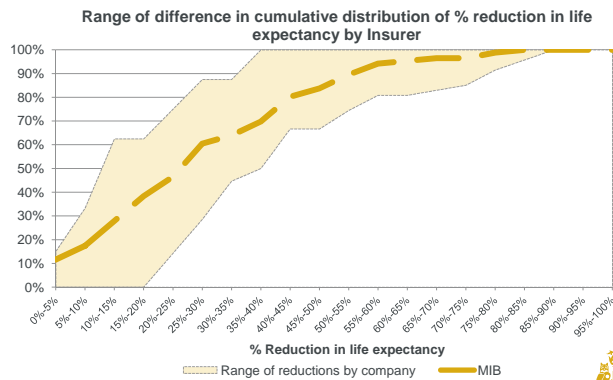
- Industry estimates will reflect differences in base health between individuals



## Mortality

### Industry recorded rates

- Evidence of inconsistencies in the market



will have direct impact on reserve estimate



## 2012 PPO survey

- Propensity
- Mortality
- Industry Practice
- Reserves held
- Industry Opinion
- Looking ahead

## Industry practice and opinion

### Qualitative survey

- Typically 1 hour telephone interview with senior actuaries
- Largest 10 contributors (bar one) all took part

## Industry practice Reserving

- All companies monitor individual large claims for the potential of them becoming PPOs
  - Typically undertaken by claims team
  - Inconsistencies in triggers used
    - Size of care costs
    - Injury type
- Almost no companies were monitoring the success of these predictions
  - Views on accuracy varied, most did not know



Institute  
and Faculty  
of Actuaries

## Industry practice Reserving – known PPOs

- Cashflow approach used by virtually all respondents
- Mortality methodology varied
  - fewer using annuity certain approach than a year ago
  - variety of degrees of sophistication of using  $q_x$ s
    - most using simplest age adjusted method
    - Ogden 7 tables commonly cited
    - longevity adjustments more common



Institute  
and Faculty  
of Actuaries

## Industry practice Reserving – IBNER/IBNYR PPOs

- Variety of approaches and levels of sophistication
  - Overall lump sum to cover all large claims
  - For IBNER:
    - Cashflow modelling of individual large claims with probability of becoming a PPO applied
    - Very common approach
    - Lack of certainty over the selected probability parameters
  - For IBNYR or total (IBNR):
    - Numbers and averages approach
    - Methodology for deriving the average varies
  - Stochastic model



Institute  
and Faculty  
of Actuaries

## Industry practice Stochastic models

- Invaluable process to develop understanding of risk
- Wide ranging applications
  - Reserve uncertainty
  - Cost of capital
  - RI structure and negotiation
- Helps with communicating and quantifying of risk
- Very few insurers have developed stochastic models



Institute  
and Faculty  
of Actuaries



## Industry practice Stochastic models

### Not easy to parameterise a PPO model

- Need to take a view on some assumptions
  - Propensity
  - Investment returns
  - ASHE
  - Mortality
- Embed key decision makers in the process
- Correlations



Institute  
and Faculty  
of Actuaries

## Industry practice

- Lack of consistency in the market
  - Methodology
    - Reserving
    - Pricing
    - Capital modelling
  - Assumptions
    - Propensity
    - Mortality
    - Discount rate



Institute  
and Faculty  
of Actuaries

## Industry practice Discount rate

- Wide range
  - From risk free yield curve to 2.25%
- Based on:
  - Risk free yield curve
  - Long term real gilt yields
  - Advice from investment departments
    - consistent with the assets backing the PPOs

## 2012 PPO survey

- Propensity
- Mortality
- Industry Practice
- Reserves held
- Industry Opinion
- Looking ahead

## Industry practice Reserves held

- Calculated reserve for each PPO in the survey
  - same method applied to all
  - recalculated for different discount rates
  - life expectancy taken as that provided in the survey data
- Compared to reserves held in FSA returns
  - Known PPOs shown as a proportion of OS
  - PPO estimate including IBNR shown as a proportion of OS + IBNR
    - crude estimate of IBNR
  - Only compared results for companies listed in FSA returns



Institute  
and Faculty  
of Actuaries

## Industry practice Reserves held

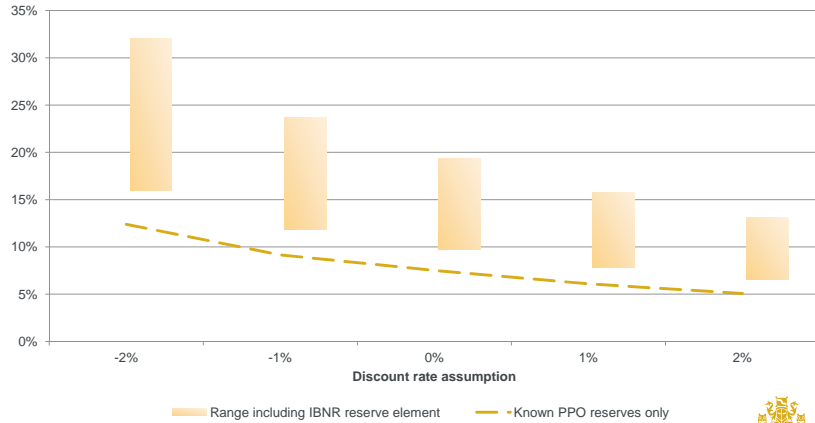
- Not a perfect analysis
  - some elements will not have been captured in the estimates such as multiple claimants and variation orders
  - figures will be slightly understated
    - not all PPOs in survey had complete data
    - 7% of PPOs excluded
- Take with a pinch of salt
  - intended to give a broad indication only
  - uncertainty, uncertainty, uncertainty



Institute  
and Faculty  
of Actuaries

## Industry practice Reserves held

### Motor PPO reserves as a proportion of reserves shown in FSA returns



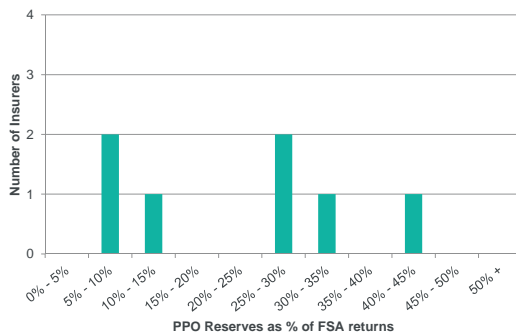
NB: IBNR PPO range estimated by assuming total PPO reserve is 2-4 times known PPO estimate



## Industry practice Difficult to compare motor insurance performance

### Motor PPO reserves as a proportion of reserves shown in FSA returns

— significant differences by company



Impacted by:

- Propensity
- Mortality
- Discount rate
- Reserving methodology
- Reserving philosophy
- Growth/contraction of business over time

NB: IBNR PPO element crudely estimated by assuming total PPO reserve is 3 times known PPO estimate



## 2012 PPO survey

- Propensity
- Mortality
- Industry Practice
- Reserves held
- Industry Opinion
- Looking ahead



## Industry opinion

- Lack of consensus
- Issues concerning insurers
  - Future propensity
  - Longevity
  - Reserve uncertainty
  - Reinsurance
- Emergence of a buyout vehicle/pooling solution
- Capitalisation clauses
- Trend emerging in clauses asking for update on medical condition



## 2012 PPO survey

- Propensity
- Mortality
- Industry Practice
- Reserves held
- Industry Opinion
- Looking ahead



Institute  
and Faculty  
of Actuaries

## Looking ahead

- Reinsurance market
- Growth of stochastic models
- Convergence of methodologies – best practice emerging
- Development of assumptions
  - Monitor success of propensity predictions
  - Increased understanding of mortality techniques
  - Investigations into impaired mortality
  - 4<sup>th</sup> industry survey!



Institute  
and Faculty  
of Actuaries

**Questions**

**Comments**

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

