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# PPOs – Informing the future

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# Agenda

- Background
- PPO models
  - Thinking outside the triangle
- Key assumptions
  - Inflation
  - Discounting
  - Mortality
- Conclusion

# Note

- The views and opinions expressed in this paper are those held by the authors individually and do not represent the views and opinions of their employers or the Institute and Faculty of Actuaries.
- Although we have used our best efforts, no warranty is given about the accuracy of the information and no liability can be accepted for anybody relying on the accuracy of the information or following the recommendations in this presentation.

These slides were presented at CIGI 2015. They represent views from the perspective of insurers, not reinsurers, although some of the same considerations apply.

If you have any questions, please contact Kimberly Hutton at the IFoA who will be able to put you in touch with the PPO Working Party members.



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# Background



# Periodical Payment Orders (PPOs)

A PPO is a contingent, deferred, whole-life, wage inflation linked, guaranteed, impaired annuity, where the identity of the annuitant and the size of the annual payments are unknown at inception.

Source: PPO Working Party internal communication

# 2015 Workstreams

Mortality – UK

Mortality – Australian

Reinsurance

Market Solution

Bodily injury almanac

**PPO Information Paper**

**Industry Survey**

Legal interviews

# PPO Information Paper

- A workstream in the Working Party is the production of a non-prescriptive paper giving information on key considerations for PPO valuation
- Look out for the forthcoming paper planned Summer 2015



# 2014 PPO Working Party Survey

- Survey taken as at 31 December 2013
  - 398 Motor PPOs, 45 Liability PPOs
  - Insurers surveyed cover >90% of PRA regulated market
- Can be used for:
  - Benchmarking
  - Observing industry trends
- Look out for full report to be published Spring 2015







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# PPO models

A focus on reserving

22 April 2015

# Actuaries ♥ Triangles

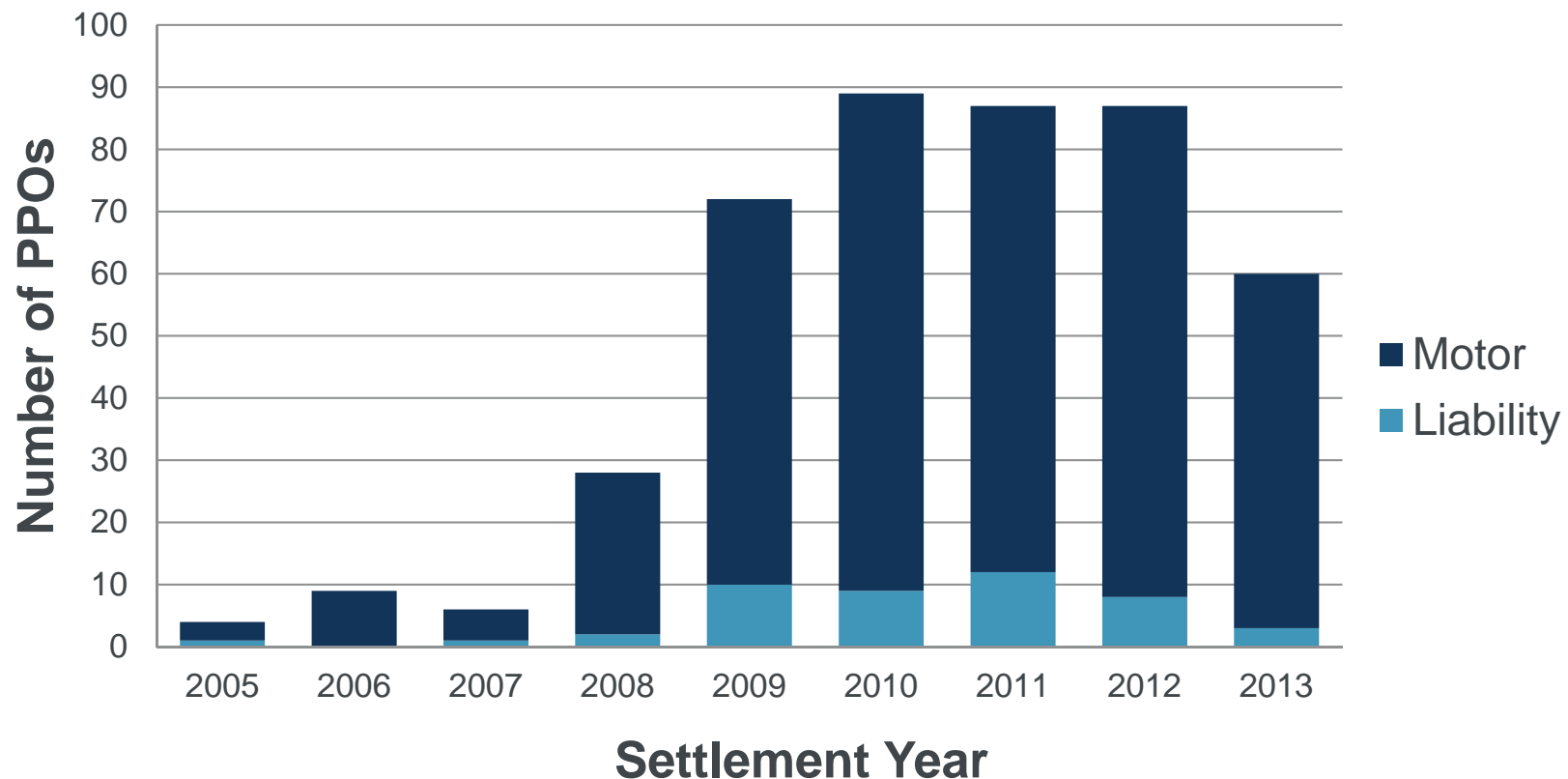


# Triangles fail us for PPO numbers

- Triangles can only work well, where the past pattern is a good estimate to the future
  - PPOs show calendar year effects, with limited numbers of structured settlements before the 2003 Courts Act introduced PPOs
  - Then they only really take off in 2009, after *Thompstone v Tameside* replaced RPI with ASHE and the economy entered its current state
  - They typically take over five years to settle
- So the whole industry's claims don't have a reliable pattern for numbers
- Then there's the question of scanty data in individual firms

# Changing PPO numbers over time

## Number of PPOs by Settlement Year



- Number of PPO settlements 32% lower in 2013 compared to 2012

# Triangles don't help for PPO amounts

- What would be projected in a triangle:
  - Inflation
  - Mortality
  - Steps in payment streams
  - Variation orders being activated
- For most of these the past will not be a good guide to the future for some time, if at all
- And, your triangle will end but the annuities will keep getting paid
  - Tail factor of death... (well maybe survival is more technically correct)

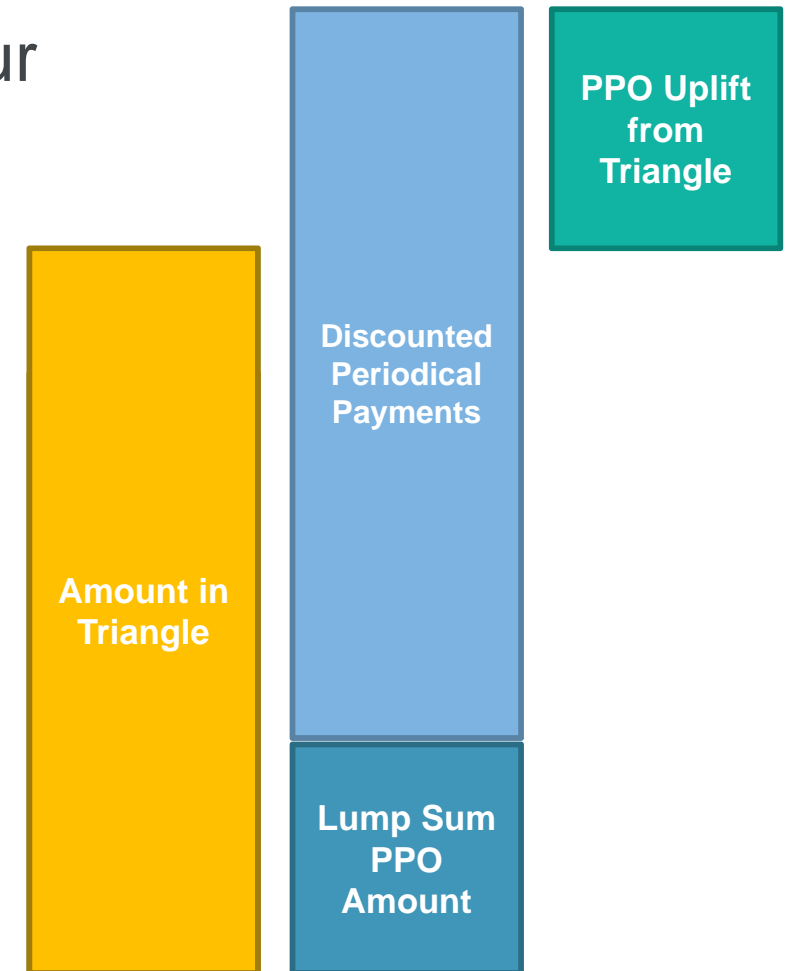


# Think outside the triangle

- One problem, many solutions
- Cash flow approach for settled PPOs
  - Solvency II requires the use of life techniques
  - No one uses stochastic elements for reserving settled claims
    - 8 Probabilistic
    - 5 Annuity-certain
- Variety of approaches to future IBNR PPOs and “pure IBNR” PPOs
  - Loadings
  - Frequency-severity method
  - Probability weighting of potential PPOs using cash flow approach

# An uplifting approach

- The difference between what is in your triangle and your PPO valuation.
- But how well do you know your triangle?
  - What exactly is in your incurred triangles?
    - Discount rate assumptions
  - How do PPOs impact your large claims projections?
  - How are you going to treat PPOs in your paid triangles?





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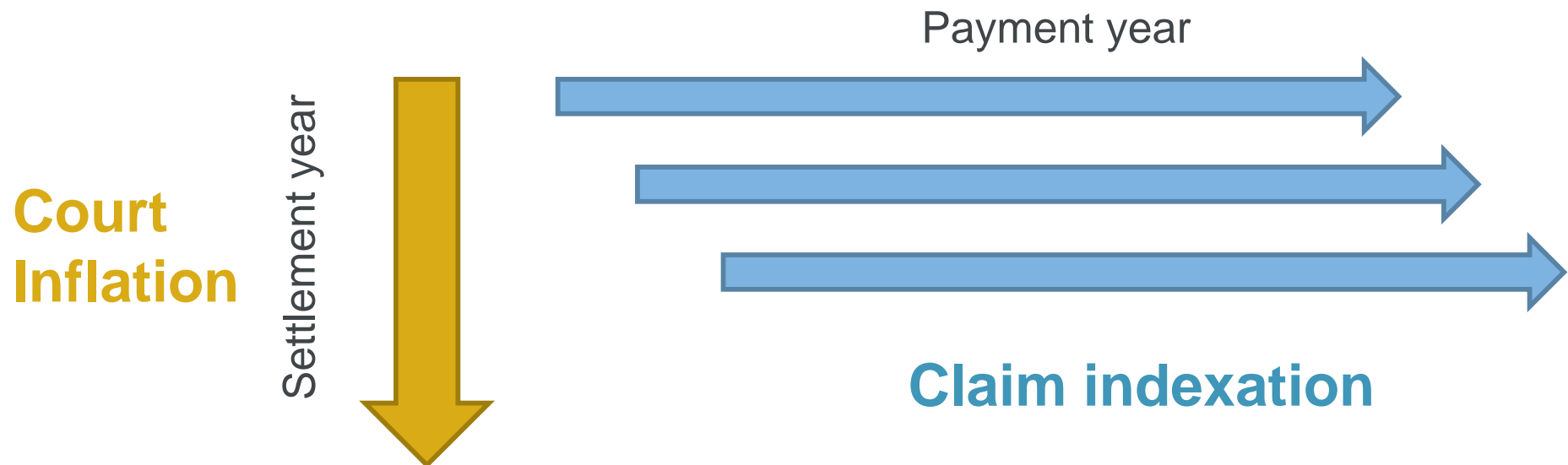
# Key assumptions

## Inflation and discounting



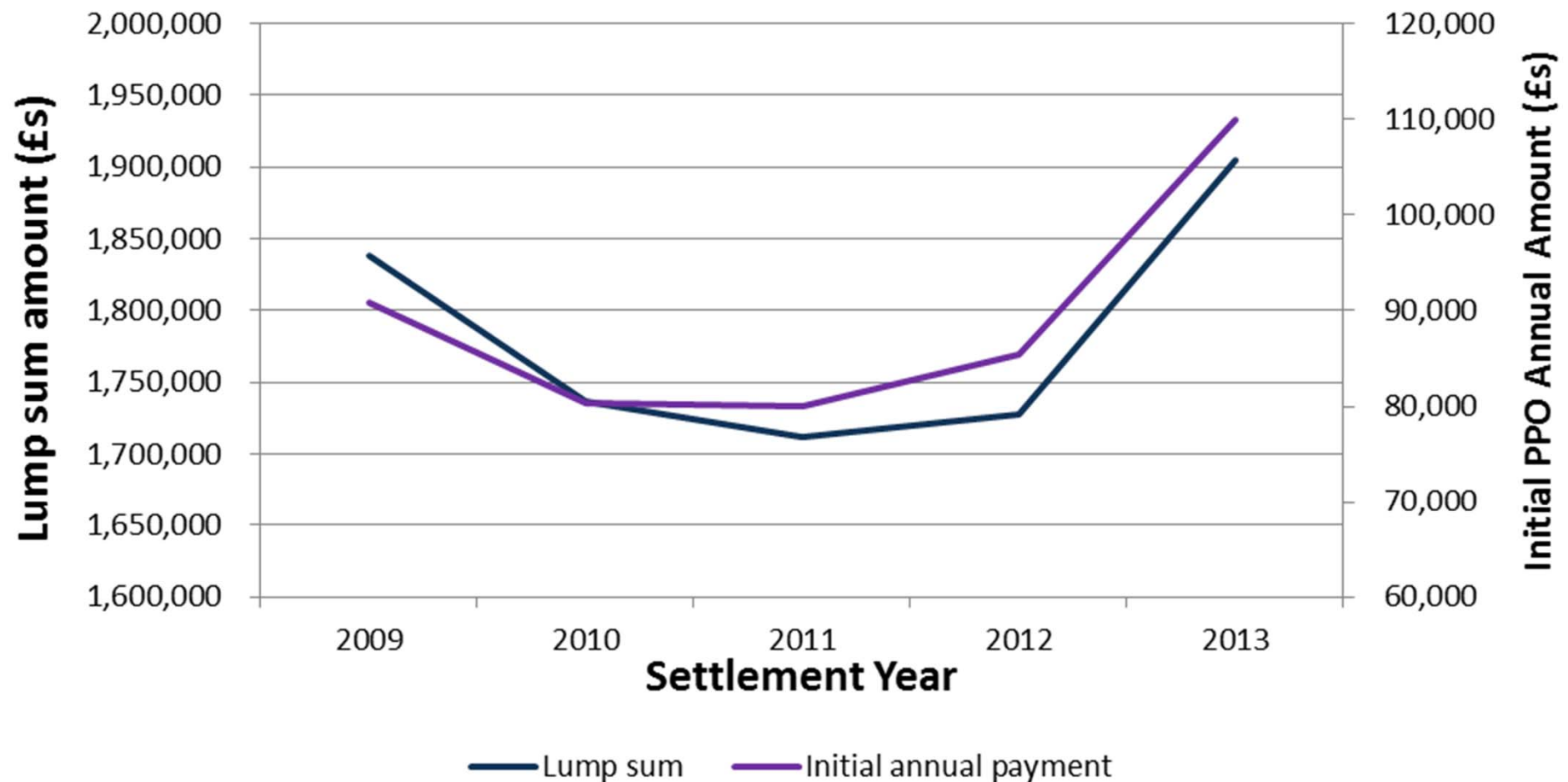
# What inflation is being modelled

- PPOs are subject to two key sources of inflation
  - Court inflation affecting the average size of the annual payment over time
  - The measure used to index the claim



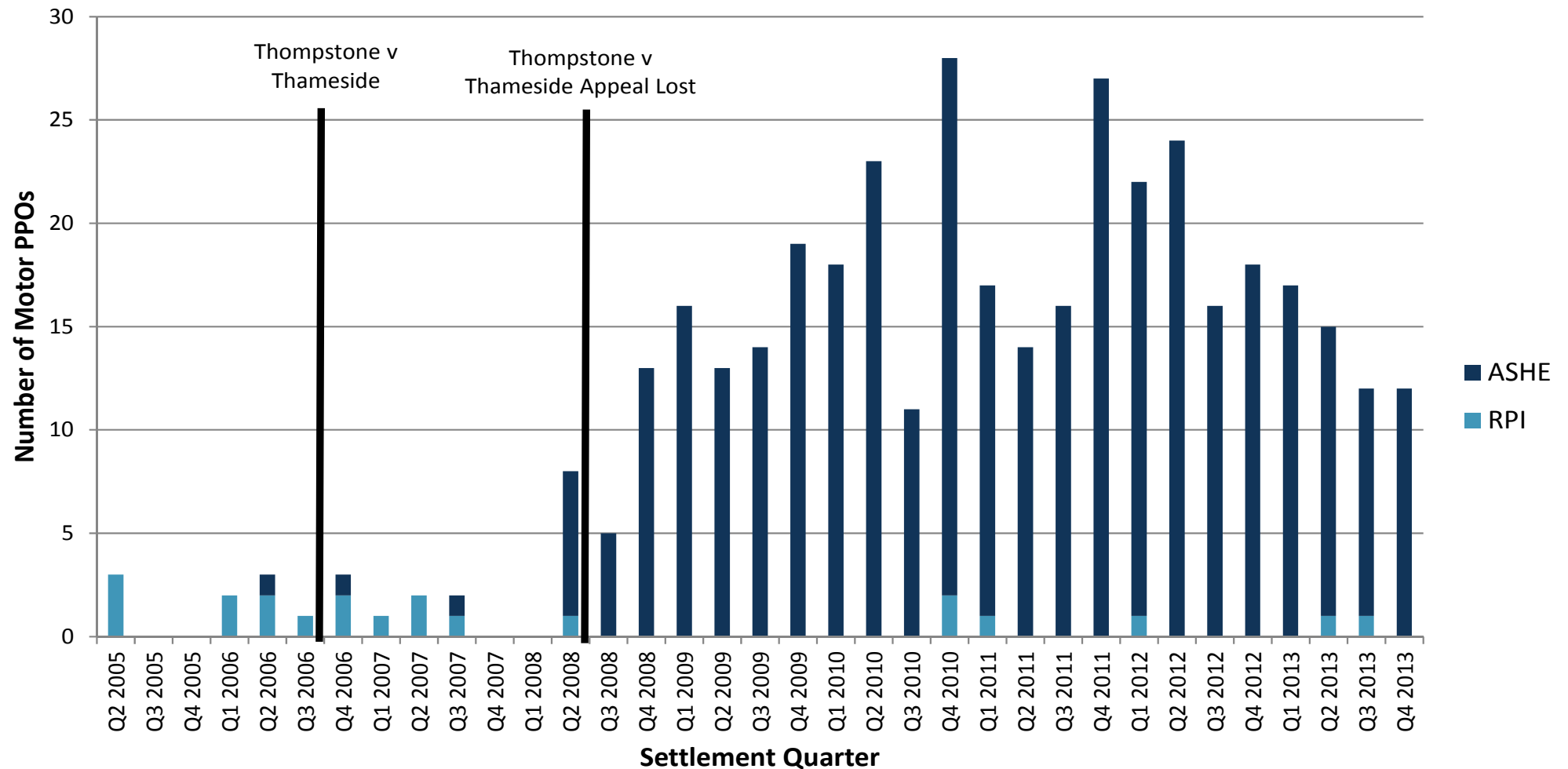
# Changing PPO amounts over time...

## Average Lump sum and Initial PPO amount



# Inflation of PPO payments: ASHE & RPI

## Number of Motor PPOs by Settlement Quarter split by Indexation



# Inflation of PPO payments: All indices

All Heads of Damage	ASHE 6115	ASHE Other	RPI	Not Indexed	Total
Care	357	1	0	17	375
Loss of Earnings	5	13	3	0	21
Case Management	0	0	1	0	1
Rent/Accommodation	0	0	1	0	1
Other	1	0	10	3	14
NA/Missing	17	0	2	2	21
<b>Total</b>	<b>380</b>	<b>14</b>	<b>17</b>	<b>22</b>	<b>433</b>

- The majority of PPOs in the market are linked to ASHE 6115
- Those that aren't tend to be in respect of heads of damage other than the cost of care

# What is ASHE 6115?

- Pre-2011: In Table 14.5a, before the split into codes 6145 and 6146

**Table 14.5a Hourly pay - Gross (£) - For all employee jobs<sup>a</sup>: United Kingdom, 2010**

Description	Code	Number of jobs <sup>b</sup> (thousand)	Annual percentage change		Annual percentage change		Percentiles										
			Median		Mean		10	20	25	30	40	60	70	75	80	90	
Personal service occupations	6	2,210	8.26	1.4	8.94	0.5	6.06	6.65	6.92	7.16	7.69	8.89	9.68	10.12	10.70	12.34	
Caring personal service occupations	61	1,792	8.28	1.3	8.81	1.1	6.14	6.72	6.98	7.20	7.73	8.88	9.63	10.06	10.57	12.06	
Healthcare And Related Personal Services	611	1,094	8.56	2.3	8.98	1.0	6.23	6.87	7.14	7.40	7.98	9.16	9.89	10.30	10.84	12.42	
Nursing auxiliaries and assistants	6111	263	9.39	3.6	9.68	3.0	7.35	7.98	8.20	8.50	8.87	9.90	10.54	10.91	11.33	12.44	
Ambulance staff (excluding paramedics)	6112	13	10.54	1.4	11.32	-0.1	7.70	8.57	8.81	9.11	9.70	11.73	13.25	13.84	14.13	x	
Dental nurses	6113	38	8.69	-0.7	8.82	-0.3	6.50	7.15	7.38	7.68	8.13	9.37	9.85	10.06	10.20	x	
Houseparents and residential wardens	6114	27	9.78	-2.8	10.37	-2.2	6.59	7.44	7.92	8.34	8.96	10.49	11.46	12.16	12.80	x	
Care assistants and home carers	6115	753	8.07	1.8	8.64	0.8	6.06	6.55	6.80	7.04	7.50	8.70	9.45	9.91	10.44	12.16	
Childcare And Related Personal Services	612	668	7.89	0.7	8.49	1.0	6.04	6.58	6.79	6.99	7.43	8.45	9.15	9.62	10.13	11.46	
Nursery nurses	6121	131	7.38	1.6	8.14	1.2	5.80	6.00	6.13	6.31	6.79	8.32	9.43	10.05	10.49	11.44	

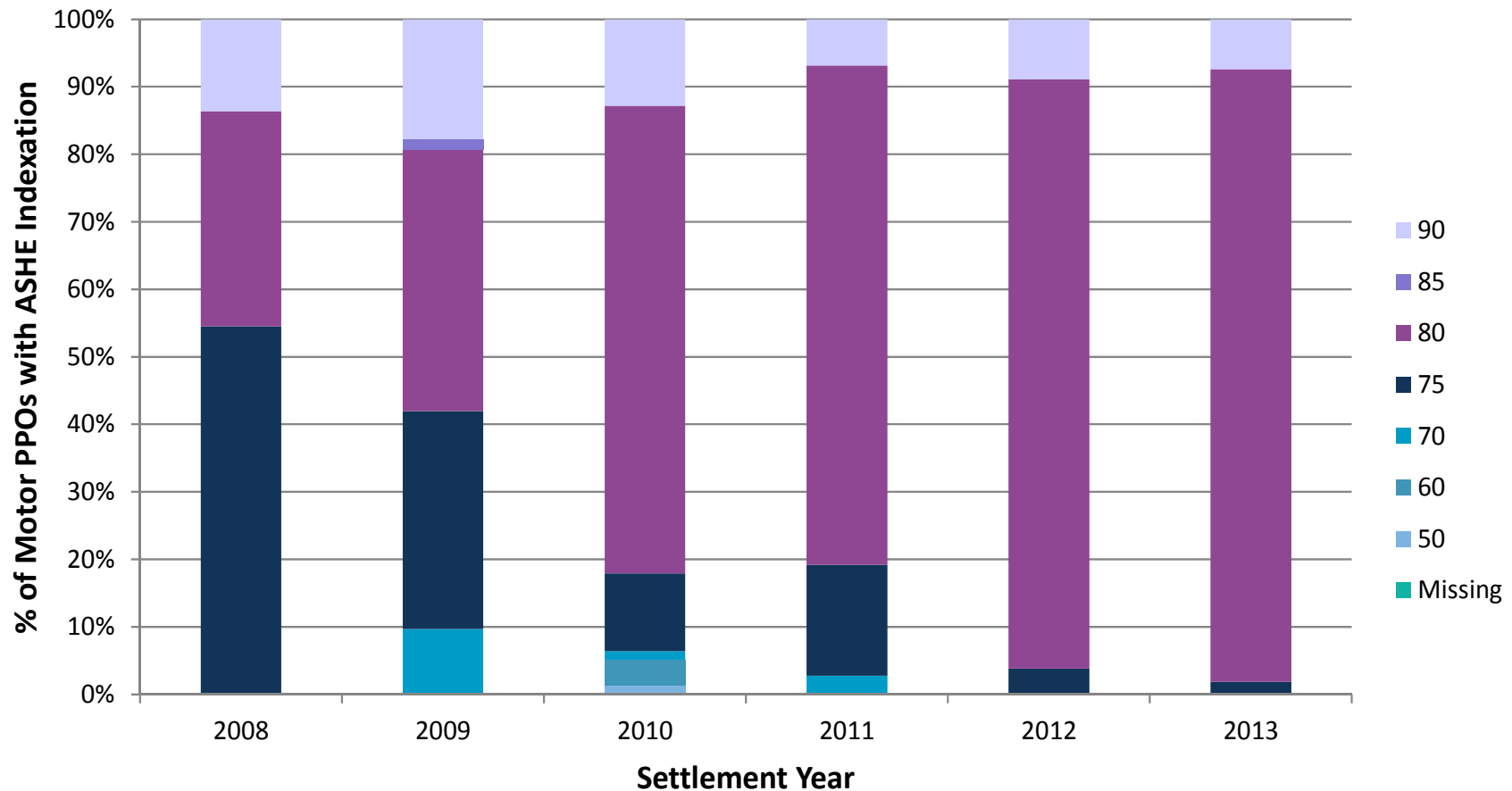
- Post-2011: 6115 equivalency continuing to be produced by the ONS under Table 26.5a

**Table 26.5a Hourly pay - Gross (£) - For all employee jobs<sup>a</sup>: United Kingdom, 2013**

Description	Code	Number of jobs <sup>b</sup> (thousand)	Annual percentage change		Annual percentage change		Percentiles										
			Median	Mean	10	20	25	30	40	60	70	75	80	90			
Care workers, home carers and senior care workers		748	7.91	0.0	8.58	0.1	6.30	6.61	6.80	7.00	7.40	8.50	9.22	9.73	10.29	12.02	

# ASHE to ASHE

**Distribution of ASHE 6115 Percentiles by Settlement Year**



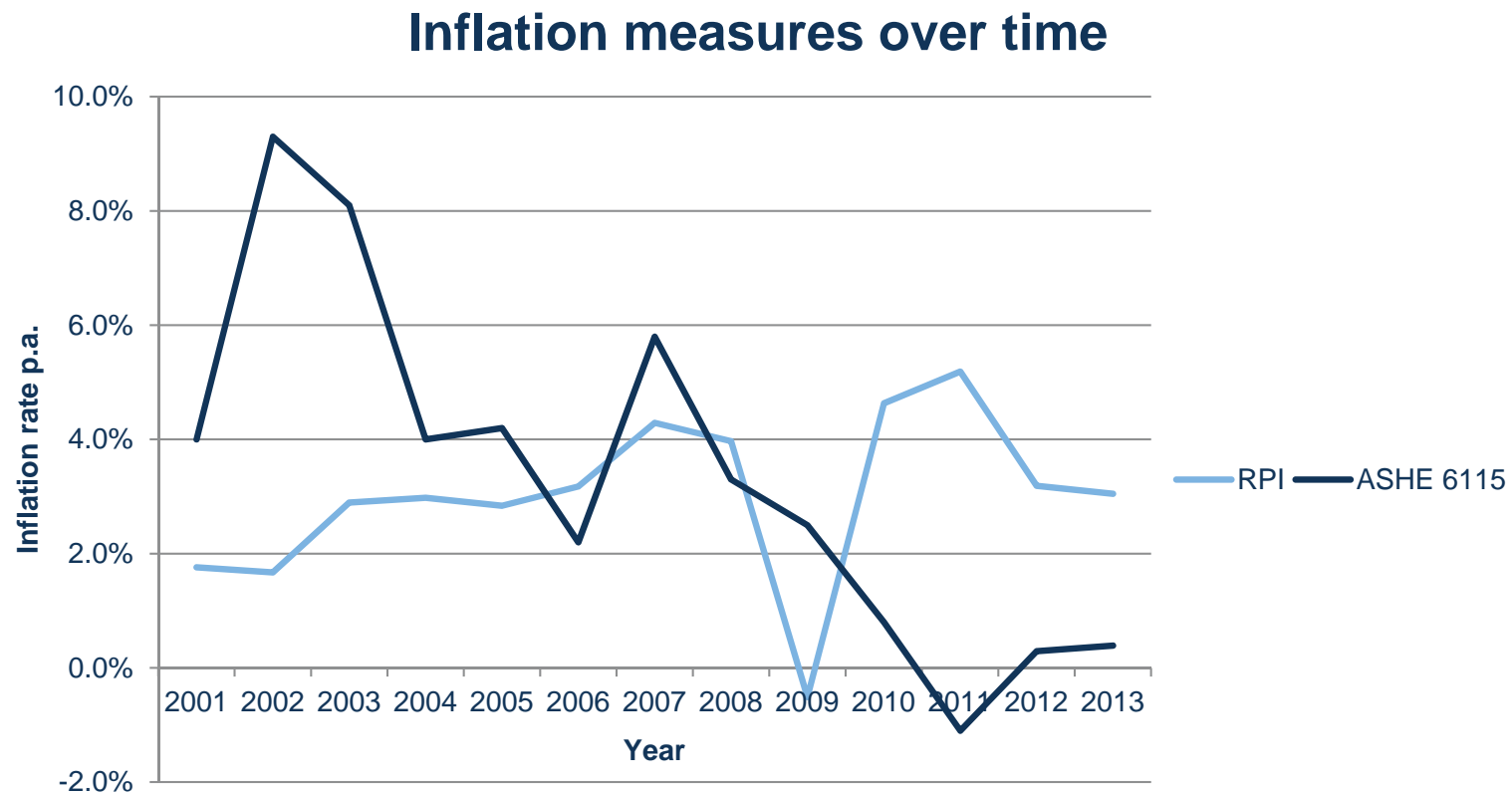
- The majority of recently settled PPOs are linked to the 80<sup>th</sup> percentile of ASHE 6115

# Choosing an inflation assumption

- ASHE based securities are currently very rare
  - Consequently a standard market-consistent curve of inflation for ASHE cannot be produced, though there is still a need in models for an assumption of future inflation
- Could consider three frames of reference
  - What has happened historically?
  - What's the current outlook for RPI (which has a market view) and how does ASHE link to it?
  - Future outlook, is there constraints such as inflation targets or structural changes in the economy expected?
- **A failure to treat investment return and inflation consistently will seriously jeopardise the robustness of any model output**

# Historical inflation

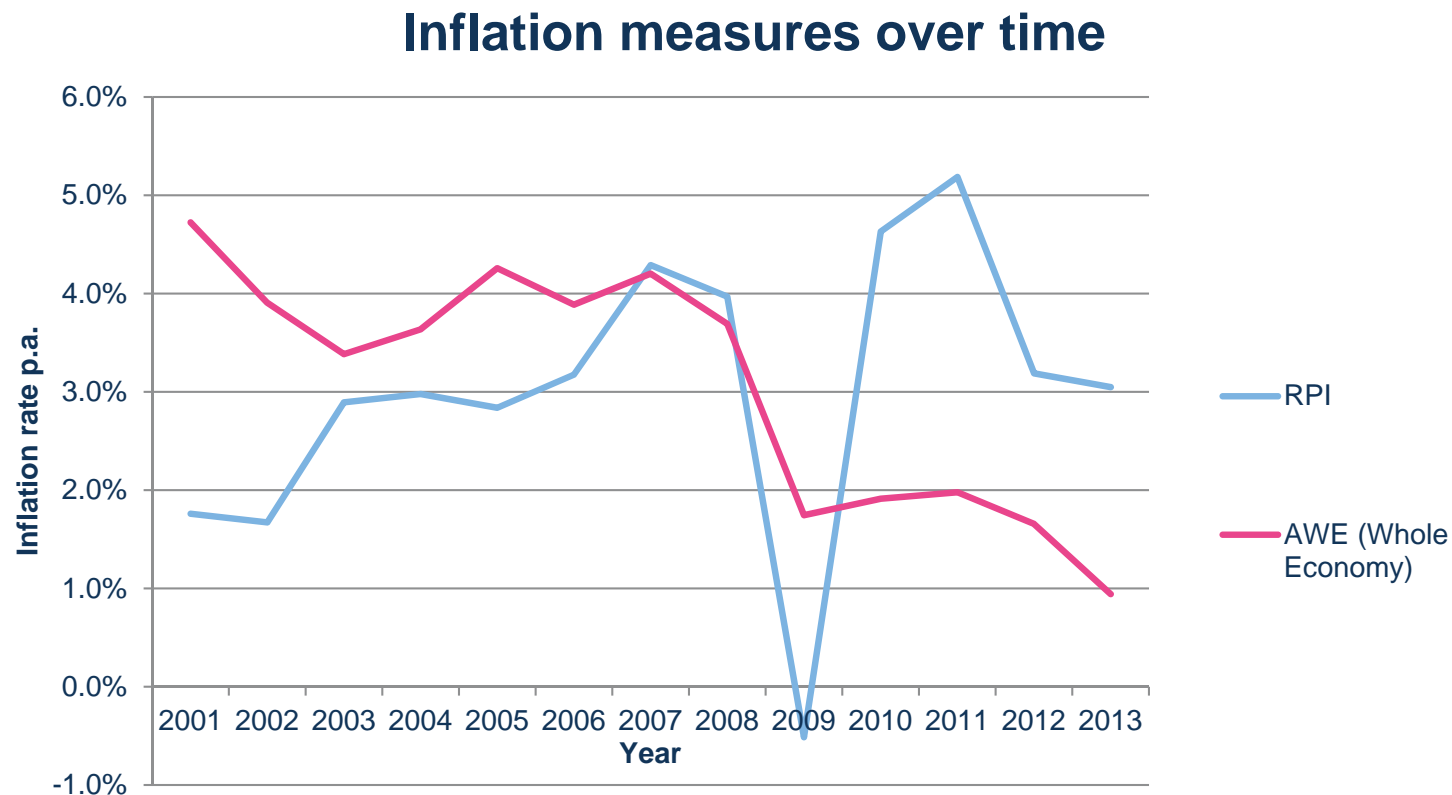
- Link between ASHE 6115 and RPI difficult to see unless broken down into steps
- Even then this is challenging as the history is short and changing environment





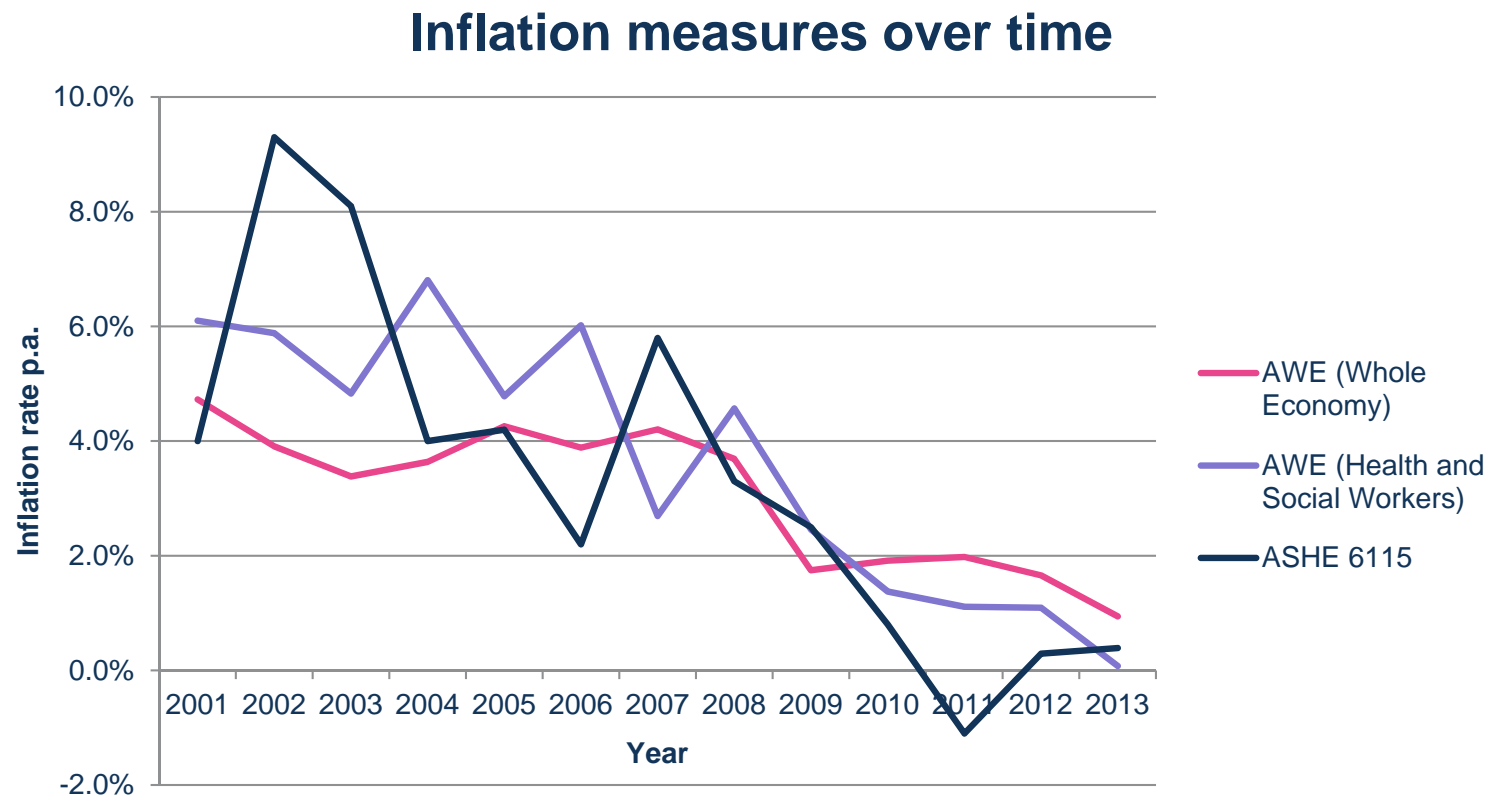
# Historical inflation

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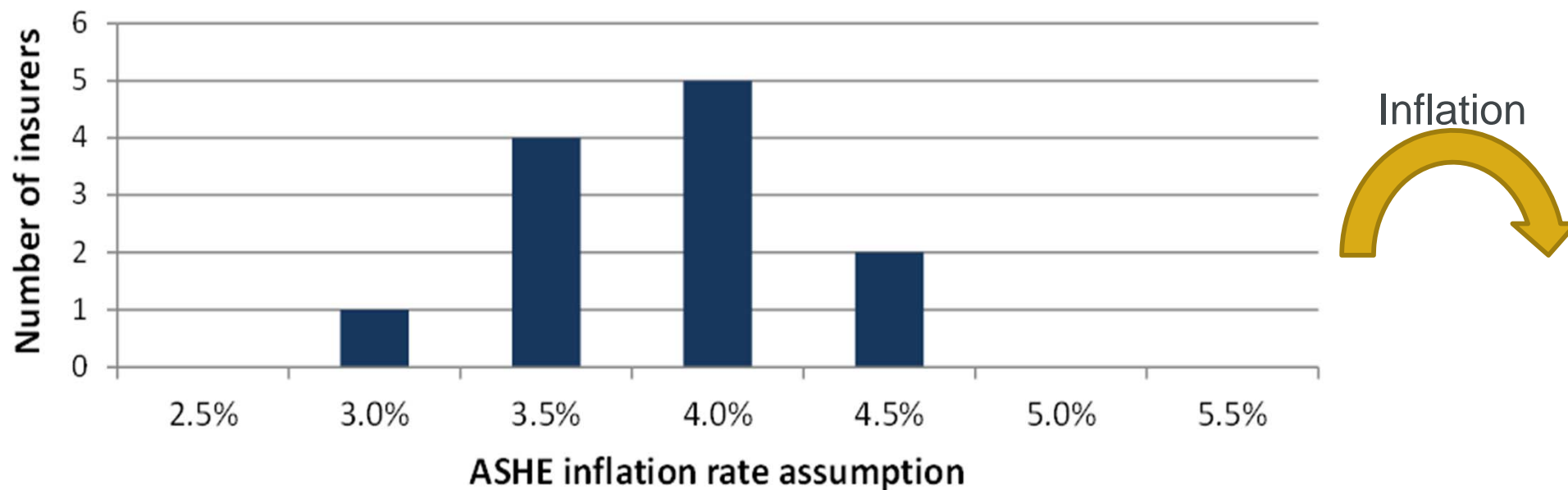
# Historical inflation

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# Inflation (ASHE) assumptions

- Insurers surveyed used a used long term ASHE assumption for discounting PPO reserve cash flows of between 3% and 4.5%
- The most commonly used assumption was 4%

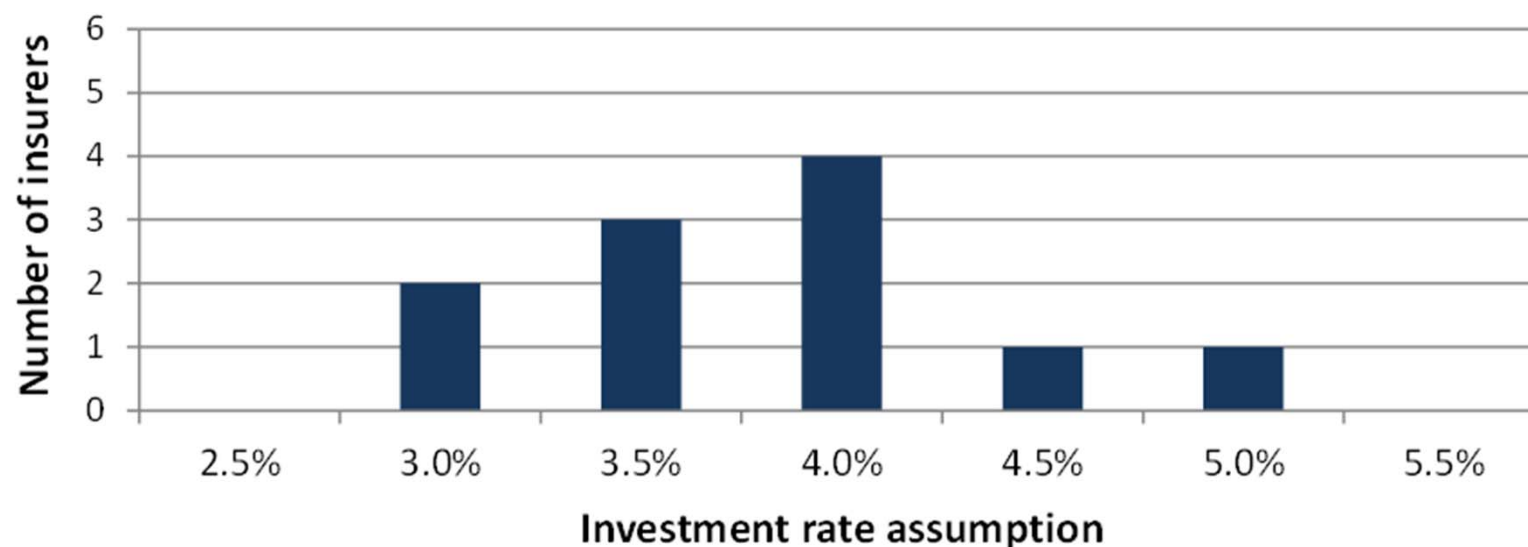


# Choosing investment return rates

- You may be constrained by the reporting basis, and it's a good idea to research these (Solvency II doesn't supersede all of them)
- For economic rates, again one could consider three frames of reference
  - What are past rates of long-dated government bonds and assets of similar nature to PPOs?
  - What is the current market-based yield curves for assets backing the liabilities?
  - What a future long-term expectations for assets backing the PPOs?
- **Again to avoid a misleading outcome – the investment return and inflation should be set considering each other**

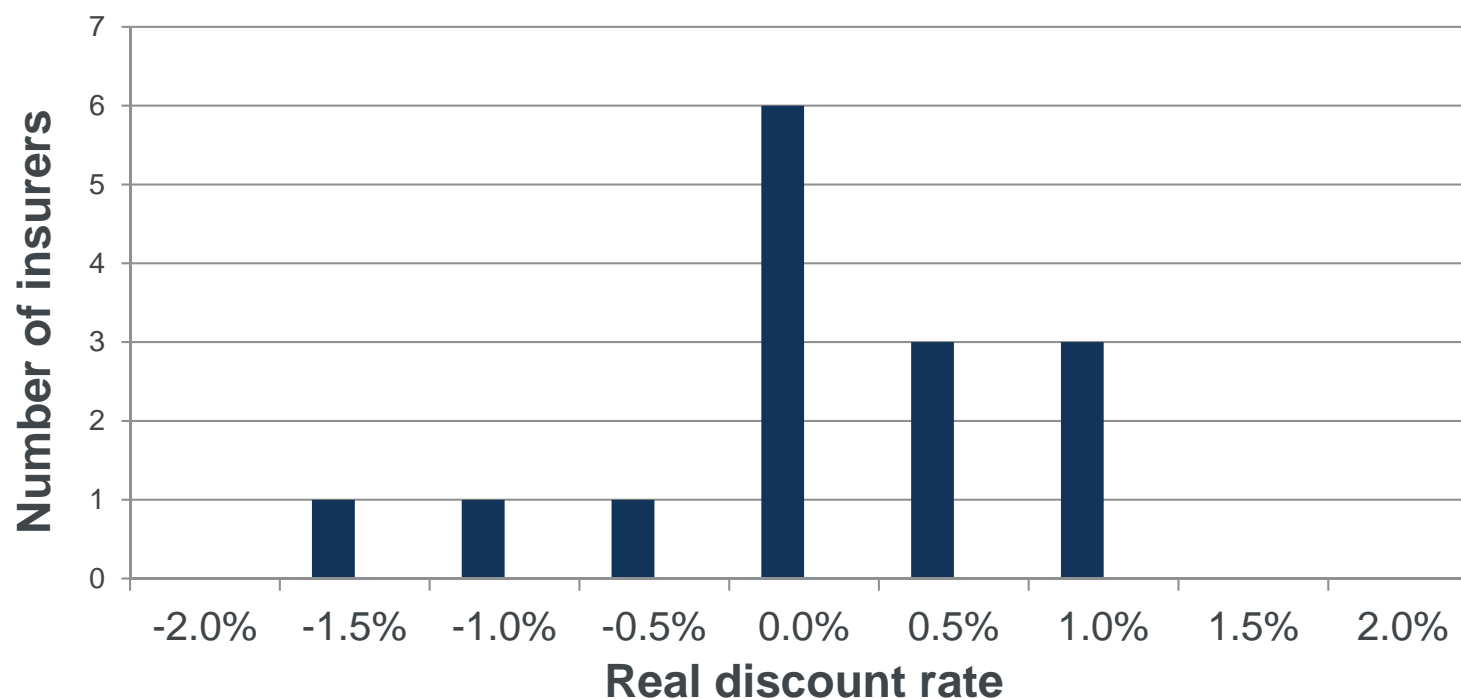
# Investment return assumptions

- The investment return assumed by the surveyed insurers for discounting their PPO reserves varied between 3% and 5.5%
- Appropriate rates depend on the insurers' investment strategies
  - Matching duration of assets to PPO liabilities
  - Holding specific assets to back PPO liabilities



# Real discount rate assumptions

## Real discount rate used by insurers

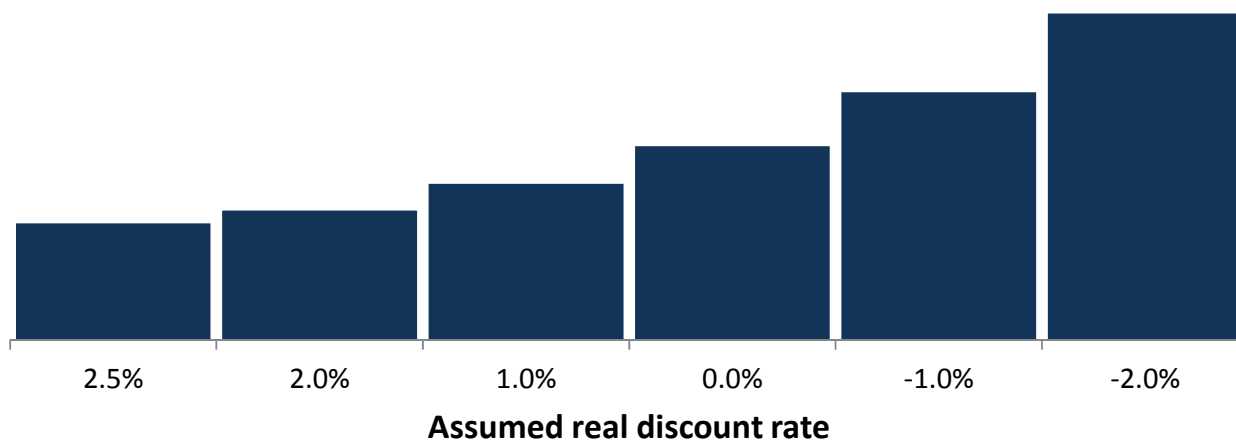


- Most set investment discount rate assumption and ASHE inflation assumptions explicitly
  - But check the implied net position of the real discount rate is appropriate

# Impact of real discount rate

- The real discount rate assumption has a large impact on the size of the discounted PPO reserves and total cost.
- This is what makes the expected cost of a PPO greater than the cost of a Ogden-based settlement at the current 2.5% discount rate

Size of PPO Reserves at different Real Discount Rates



Real Discount Rate	PPO Total Cost Multiplier compared to 2.5% real discount
-2.0%	2.02
-1.0%	1.64
0.0%	1.38
1.0%	1.19
2.0%	1.06
2.5%	1.00





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# Key assumptions

## Mortality

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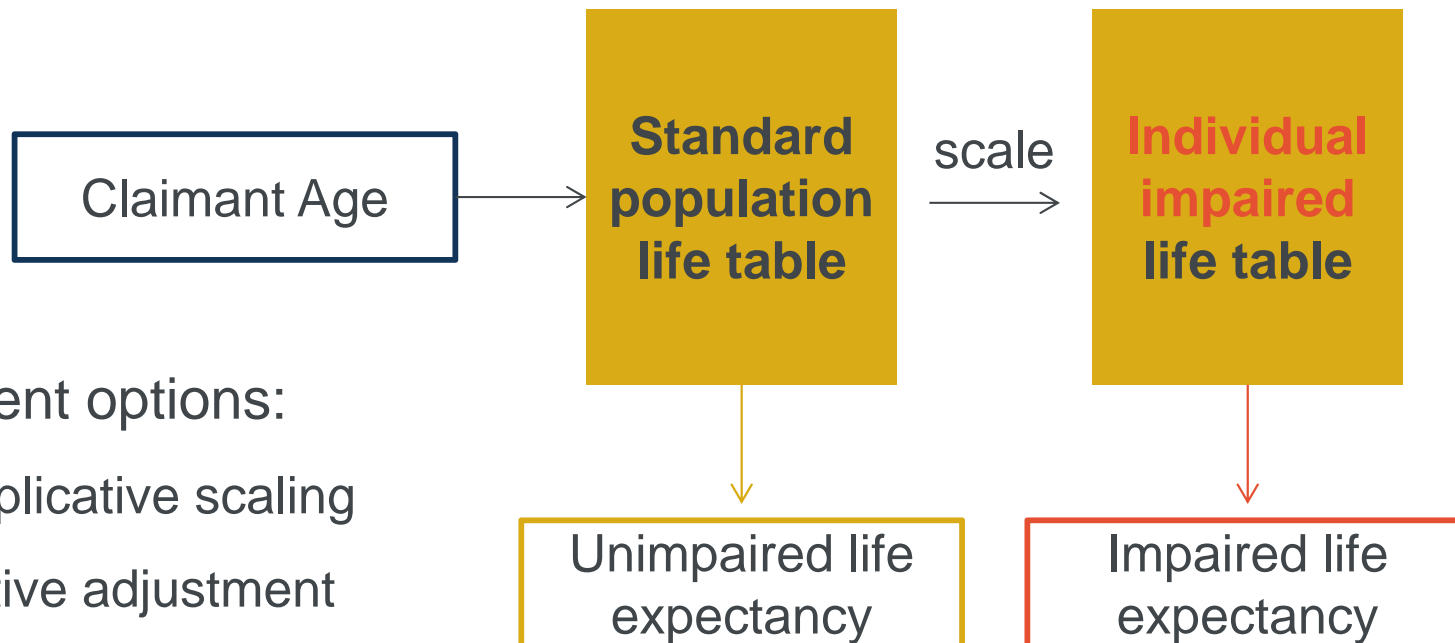


# Allowing for mortality

- There are not yet any available mortality tables that link to impaired lives of PPO claimants
- Could choose a single age of death (annuity certain) or adjust another life table
- Using life tables allows realistic cash flow projections that may be useful for Asset-Liability Modelling
- To adjust tables, the claimant's future life expectancy is needed and a suitable base table
- Life expectancy is often supplied during the course of exploring lump sum settlements by medical experts

# Adjusting for impairments

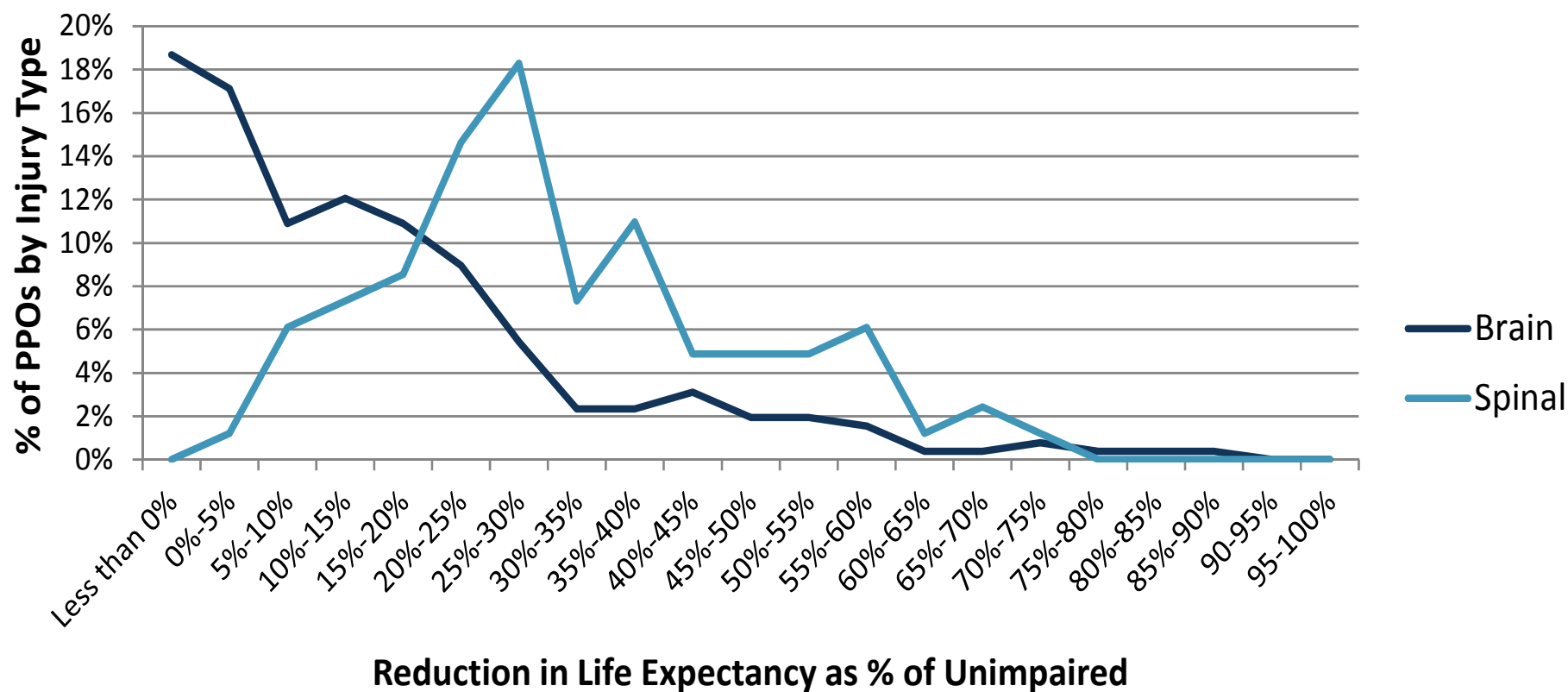
- For probabilistic cash flow approaches survival probabilities are required
  - Should consider impact of claimant's impairment on future life expectancy



- Adjustment options:
  - Multiplicative scaling
  - Additive adjustment
  - Aging

# The impact of impairment on mortality

## Distribution of Reduction in Life Expectancy by Injury Type



# Reserving assumptions – mortality

- Most insurers factor in medical expert opinions to set the life expectancy assumption of PPO claimants
  - To allow for impairment impact in individual circumstances
  - Longevity improvements?
- All use ONS tables, either Ogden 7 or underlying tables series
  - 6 Aging adjustment
  - 2 Multiplicative scaling adjustment



# Expecting the unexpected

- PPO valuations benefit greatly from stress and scenario testing as they are highly uncertain
- The basis for PPO mortality will be unknown for decades and its useful to explore the financial impacts of how wrong estimates can be
- Also, for PPO mortality there are scenarios that aggregate risk and are unique
- For example what is the impact of spinal injuries being repairable and life expectancy returning closer to standard lives
- What if brain injury treatment improved instead, or at the same time?

# New Working Party Injury Categorisation

- Two dimensional injury classification system identified with claims professionals last year
  - Brain, Spinal, Amputation and other injury codes
    - (B1-6, S1-S5, A1-A4 and O1)
  - Care codes
    - (C1-C8)
- We encourage their use to help future generations assess PPO liabilities and investigate impaired life mortality
- **Get involved:** framework and definitions found here
  - [www.actuaries.org.co.uk/practice-areas/pages/ppos](http://www.actuaries.org.co.uk/practice-areas/pages/ppos)



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# Conclusions

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# Conclusions

- **PPOs are an unusual liability which can't be projected well using triangles alone**
- **Long-term views are needed of investment returns and unusual inflation references, and these should be arrived at coherently**
- **Applying mortality assumptions is challenging since off-the-shelf mortality tables for the type of injuries PPO claimants sustain aren't available**
- **Look out for the information paper, latest survey reports and get involved by helping categorise injuries in a standard way soon**





**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 presenters.



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# Questions

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