Institute and Faculty of Actuaries

Longevity Catalysts

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Longevity Catalysts: Route map

- Background
- About us
- Delayed recognition
- Example Catalysts
- Increasingly difficult to ignore!
- Solvency II
- Heavy 2012 / 13
- Pre-cursors
- New catalysts added
- Anti-ageing

Background

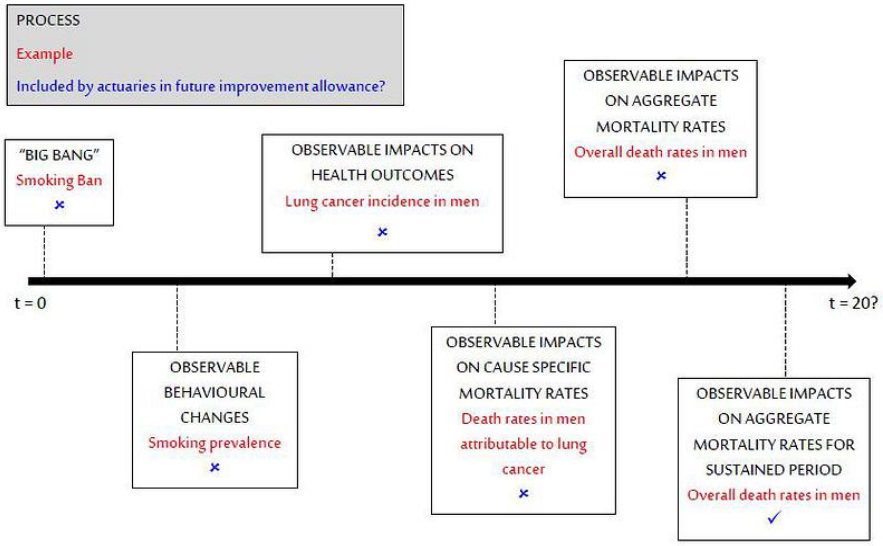
The Longevity Catalysts Working Party has been set up by the actuarial profession to answer one simple question:

"What future events are we aware of today whose occurrence is likely to be coupled with a significant impact on UK longevity?"

About us

- Longevity Catalysts Working Party
- Set up in 2012
- We have a website! www.longevitycatalysts.com
- What problems are we looking to solve?
  - Uniqueness of the past
  - Granularity
  - Not making use of all available information
  - Greater appreciation of “dormant risks”
  - Philosophy: imperfect but less so than status quo
  - Delayed recognition

Delayed Recognition



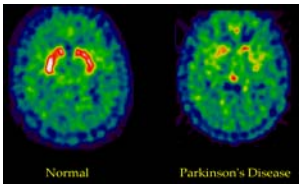
Example Catalysts

What future events are we aware of today whose occurrence will be coupled with a universal increase in expectations around mortality improvements?

Cardiovascular polypill

Universal Influenza vaccine

Bowel cancer screening



Stem cell therapy for Parkinson's

Genetic Screening

Increasingly difficult to ignore!

- Internal Model
  - One-year approach
  - Run-off approach
- Standard Formula
  - ORSA
  - Stress and scenario testing
- Collateral for longevity swaps
  - Basis review
- Business planning
- Greater appreciation of risks
- Different types of catalysts emerging
  - Defined benefit data sets
  - Updated projection methodologies
  - Granularity of trend

Solvency II

- One-year 99.5th percentile VaR framework
- Some internal model firms will choose an “n-year” approach at a lower percentile for longevity trend risk
- The PRA has suggested the choice of n-year percentile may be difficult to justify - no robust solution exists
- This may lead firms down a 1-year route
- Even if firms choose an n-year approach, they will have to demonstrate it is at least equivalent to a 1-year approach
- Standard formula firms will also need to think about their longevity risk in their ORSA

Solvency II – 1-year approach

- Two components of a 1-year VaR approach:
  - Impact of adverse experience over the next year, before assumption changes
  - Assumption changes in one year's time
- Direct experience variance impact is fairly small
- Sources of assumption changes are:
  - An extra year of emerging data, and
  - Emerging "new information" not yet reflected in the data

New information is a very significant component of trend risk capital

Solvency II – New information

- The scope of one year's new data to increase your reserves at t=1 is relatively small
- Without "new information" the calibration level is very low under a 1-year approach
- The PRA has its own model for benchmarking
- **What else could happen in the next year to cause you to strengthen your assumptions at t=1?**

- Answering this question will require consideration of "extreme" longevity catalysts
- Justification that a given catalyst is at the "1-in-200" level is usually difficult/impossible
- Expert judgement is key
- Explanatory models and boundary scenarios can help
- Older ages are difficult

Solvency II – Sources of "new information"

- Incidence rates (e.g. smoking prevalence, lifestyles)
- Survival rates:
  - Medical breakthroughs
  - Early diagnosis
- Anti-ageing research
- Other new information:
  - New cohort effect
  - More granular projections
  - Historical data revisions

The above can assist in formulating a scenario that is self-evidently extreme

Solvency II – Examples of new information – Base tables

Other types of longevity catalysts:

- New base tables released
- Errors discovered in existing base tables
- Release of industry performance data relative to base tables
- More granular base tables released

are all examples of new information not visible in data that could affect your base mortality assumptions at t=1

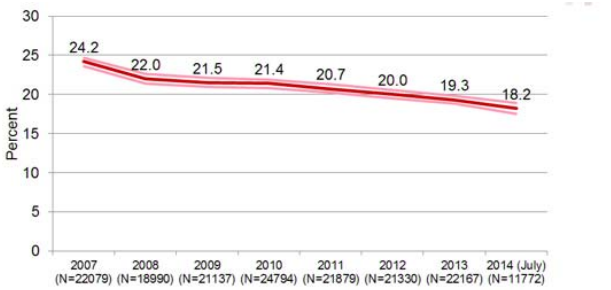
Rearranging the deckchairs on the Titanic?

Potential pitfalls of data-driven approach

- Subject to retrospective revision
- Assumptions and errors propagate through time
- Small swings in data-driven expectations are hotly debated
- Much greater uncertainties receive less scrutiny (because they are outside the traditional actuarial skillset?)

Pre-cursors

Smoking prevalence



Graph shows prevalence estimate and upper and lower 95% confidence intervals

Source: smokinginengland.info

While CMI model assumptions were being weakened based on a heavy 2012, smoking prevalence continued to fall

New catalysts added in 2014

- KRAS targeted cancer treatment
- Use of novel diagnostic biomarkers
- Introduction of plain cigarette packaging in the UK

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.