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A Reserve Uncertainty Framework

from the GI ROC MUQ Working Party

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With special thanks to current and previous members of the MUQ Working Party

14 September 2018

Agenda

- Introducing the Reserve Uncertainty Framework
- Overlap with reserve-risk assessments?
- What's your opinion?
- Summary and questions

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Introducing the framework

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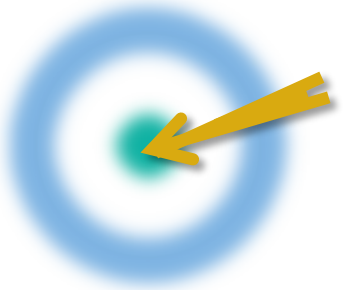
Percentiles – the uncertain uncertainty

- Reserving ultimates are estimates, and some reserving practitioners illustrate this point by adding percentiles to show the range
- **As you know, percentiles also have to be estimated**



- Percentiles are often more uncertain than the point estimate and frequently have no mention of their own accuracy
- In reserving, we recommend **thinking of the user** and **using qualitative methods** and not to relying solely on percentiles

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Framework aims

- Promoting **development of best practice** in measuring and communicating reserve uncertainty; by

- Supporting the generation of wider risk considerations
  - Breaking the problem down and structuring the thought process

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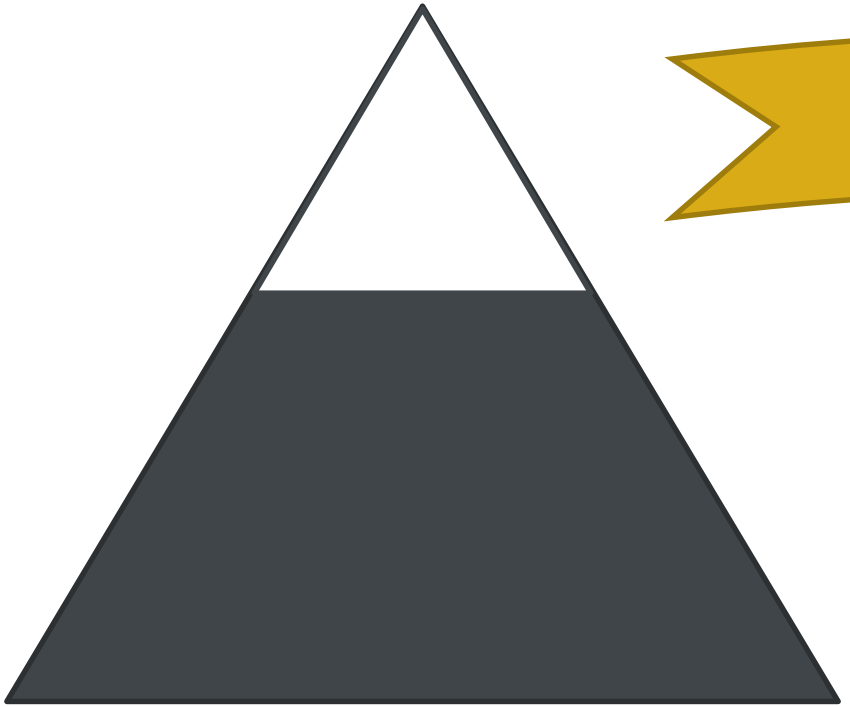
One framework, two levels

- A skilled actuary will undertake comprehensive analysis and then communicate the material elements



High level for user

Full basis for actuaries

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Framework uses

By the actuary

- **Base structure** for their own internal framework
  - Record of areas considered
  - Governance and validation
  - Consistency, with little change needed from year-to-year
- **Articulation tool**
  - For example, to support communication to stakeholders
- **Pooling knowledge** and developing best practice in the profession
- **Training tool**

By the user

- **Awareness** of areas of uncertainty
- Provides **inspiration** for users to ask their actuaries powerful questions

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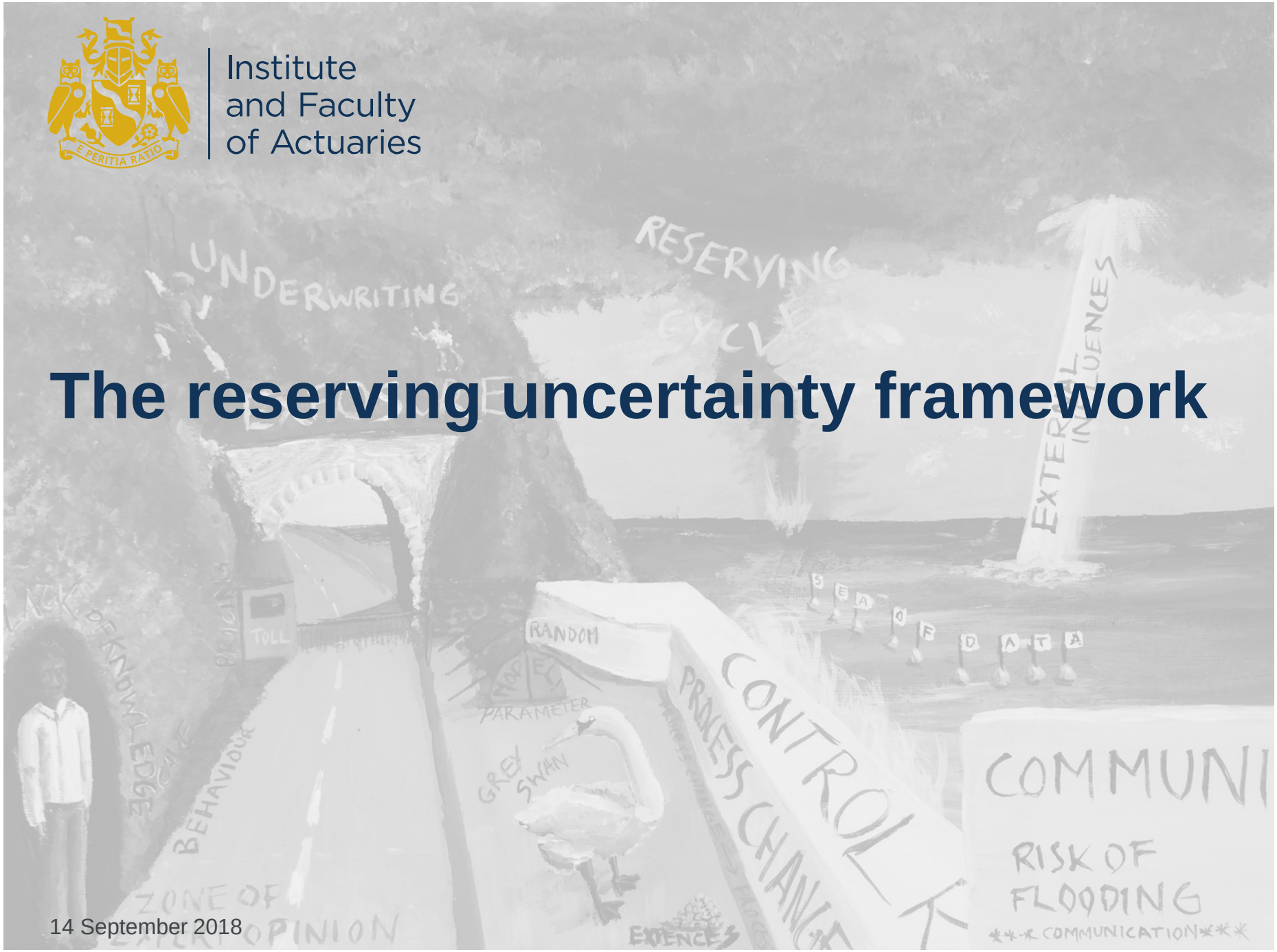

The reserving uncertainty framework

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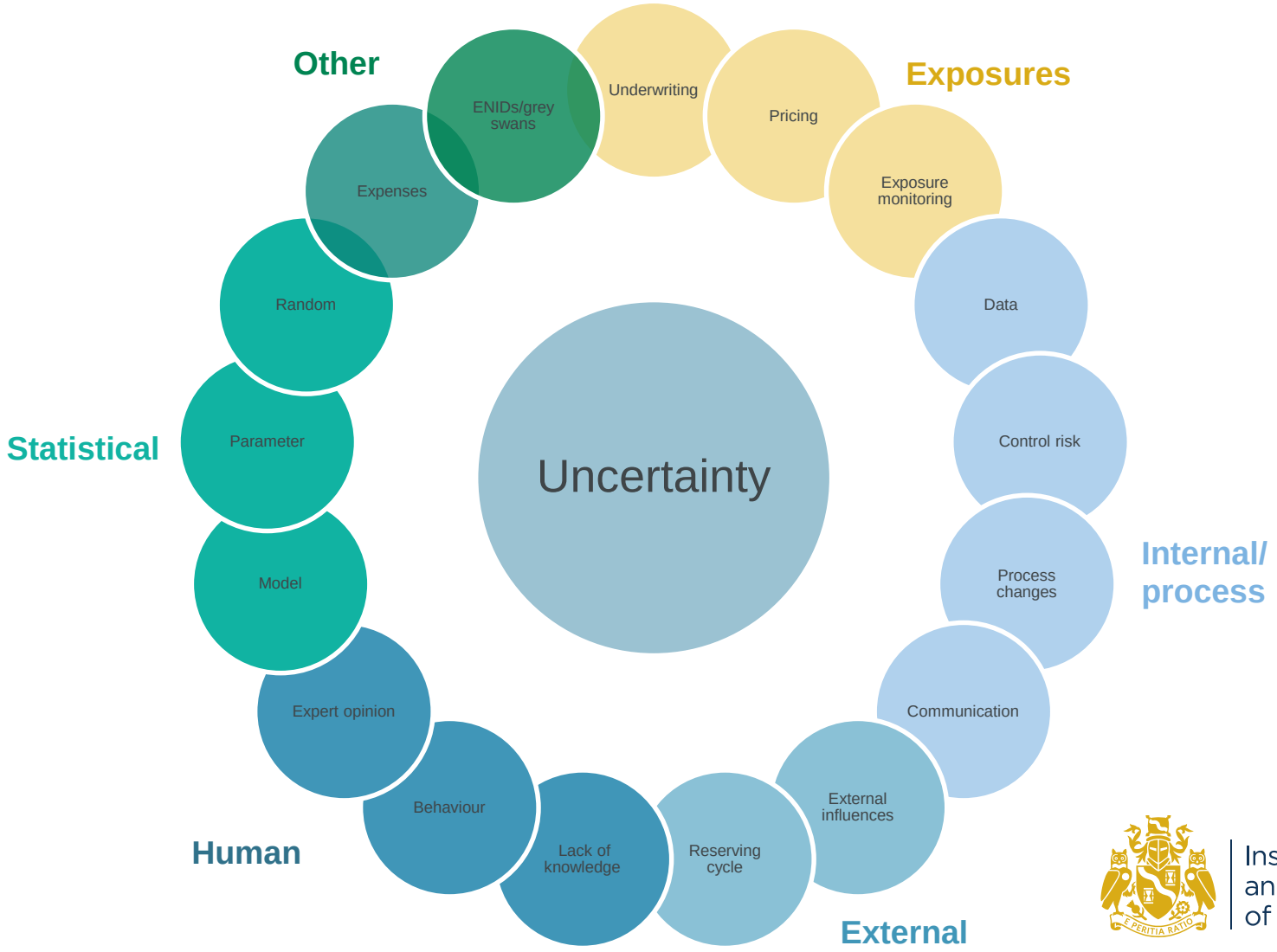
Reserve Uncertainty Framework



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The framework document

Reserve Uncertainty Framework

Measuring Uncertainty Qualitatively (MUQ) Working Party 2018

January 2018

Reserve Uncertainty Framework

MUQ working party 2018

Aim of the framework

The aim of the framework is to encourage broader thinking around reserve uncertainty, to help structure the actuarial thought process and to kick-start idea generation.

When presenting reserve uncertainty to users of the reserving actuary's work (e.g. senior management or the board), we do not recommend presenting the detailed framework. We suggest highlighting the main drivers of uncertainty, which may be three to five areas, supported by quantitative illustrations where feasible. The framework would have been used during the process to help the actuary identify what the most significant reserve uncertainty elements were.

We have chosen to describe what we mean by each framework element very simply by listing examples of uncertainty that may be encountered.

This is not intended to be an exhaustive list and ***we actively discourage use of the framework as a checklist.*** We have suggested some ways the framework may be used below, and we anticipate individual actuaries will develop their own framework and way of using it. We intend to keep improving and updating the framework. Please send feedback to practice.executive@actuaries.org.uk.

For more information, including additional reading, resources on individual framework elements and ideas on how to deal with specific elements of uncertainty, please see the working party's website.

Uses of the framework

For the **actuary**

- **Idea generation**
- **Base structure** for own internal framework
  - Record of areas considered
  - Governance and validation
  - Likely not to need to change much from year to year
- **Articulation tool**
  - For example, to support communication to stakeholders
- **Pooling knowledge**/developing best practice in the profession
- **Training tool**

For the **user** of the actuarial work

- **Awareness** of areas of uncertainty
- What **questions** to ask

Background

The GIROC survey of 2014 recommended that more focus should be directed by the profession towards reserve uncertainty. The survey concluded that on the whole there was a positive feeling about how reserving was being conducted in the UK.

> "However, there was one significant area where improvement is still needed. i.e. uncertainty - both in measurement and communication. Reserving actuaries are all doing this in different ways which can be confusing for stakeholders. In addition the use of percentiles, whilst popular, can have the potential to be (at worst) misleading for stakeholders where there is a mismatch between expectations and what information they provide."

The MUQ working party was formed in the wake of this finding. Our collective view on how to approach reserve uncertainty can be summed up as:

1. **Actuarial curiosity** is at the heart of reserving – remember to "**look out of the window**". i.e., an actuary should understand how numbers in the triangles relate to what is happening in the real world. They should also investigate, drill down, and challenge - ask questions of the wider business.
2. The MUQ working party **cautions the use of percentiles** in communicating uncertainty.
   - If providing a reserve estimate at, e.g., the 75th percentile, what is the person receiving the advice going to conclude from this? Do they understand the degree of uncertainty in the shape and size of the distribution, and the key assumptions that have gone into deriving it?
   - Could the way the percentiles have been presented be conceived as over-promising the accuracy of the level of uncertainty, or could they even be misleading?
3. One of the most effective ways for humans to communicate is by **telling a story**. Explain what the **key drivers of uncertainty** are and support this with quantitative illustrations (scenarios or sensitivity tests) where feasible. Consider the exercise from the user's point of view.
4. The skill of the actuary is in identifying what these key drivers of uncertainty are. Much complex and detailed actuarial work and judgement will underlie a simplified and targeted message.

The idea of the framework came from work that has been done by actuaries in Australia. After being required to report reserves at the 75th percentile, it was widely recognised that stochastic techniques could understate the reserve uncertainty distribution. A detailed framework and process to adjust stochastic results was developed. See the MUQ website for more information.

Exposures

Underwriting Risk

How has the level of cover changed?

Have any of the following changed?

- Terms and conditions
- Sums insured
- Limits
- Types of risk written, e.g.:
  - Country or geographical area
  - Industry
  - Specialism
  - Type of individual
  - Catastrophe- or non-catastrophe-prone areas
- Mix of business
- Personnel changes – have the underwriters themselves changed? What is the anticipated impact of this?
- Delegated authority strategy
- New accounts within the reserving line or new intermediaries

Has a record been kept of changes, so it is easy to refer to in future years and the knowledge built up each year?

Exposure

Is the underlying exposure and any changes over time understood?

Have you considered the following?

- Accumulations of risk
- Changing business volumes
- Changes in mix of business - by distribution channel, geography, industry, cover level and so on
- New sources of business with particular concentrations
- Changes in underwriting limits leading to a different sum insured profile or mix
- Changes in legislation or rules
- Changes in economic factors – e.g. inflation-linking or negative equity in Mortgage Indemnity Guarantee business
- Changing competitive environment driving appetite in particular sectors
- Impacts of reinsurance and coinsurance

Is the understanding of exposure and any changes over time clearly documented and understood and agreed across the business?

Have areas where the underlying exposure is not clear been identified and documented? Can the potential impact on reserving estimates be quantified? What improvements can be made going forward?

Have new risks evolving with unknown frequency, severity or development patterns, been considered? e.g., cyber risk and risks associated with driverless cars.

Pricing Risk

How has the pricing basis changed over time?

- Have the pricing models been adequately parameterised and when were they last updated?
- How much have the underwriters deviated from the technical price? Has this been influenced by level of competition in the market or specific business strategy?
- Level of cross-subsidies?
- To what extent are the pricing loss ratios used as IELRs (initial expected loss ratios) for setting reserves? Do they look reasonable (e.g. can they be record breaking every year or at planned levels for every product)?
- Have changes in terms and conditions been adjusted for (i.e. where past claims were not reflective of the future)?
- Have policy features been allowed for correctly (e.g. aggregate limits and deductibles or reinstatement premiums)? Is it a hard or soft point in the underwriting cycle, and how is this affecting the price?
- What exposure measure has been used for pricing? If it is premiums, have historic rate changes been adjusted for appropriately? This also applies to use of IELR technique.
- For reinsurance covers, are exposure curves available, and if so, how reliable are they?
- What large losses have been allowed for in the price? Is this consistent with underwriters' and reserving actuaries' views?
- Is there a risk of anti-selection and how would this affect IELRs and claims development?
- Can a risk-mix index be used, which is popular in personal lines.
  - This is constructed from either the burning cost model or a measurable change in mix that correlates with changes in the projected KPIs.
  - It gives the relative level of frequency, severity and other KPIs which can be tested for fit to initial reserving projections and then used to guide assumptions for methods to project forward, e.g. Bornhuetter-Ferguson (BF) methods.
  - How much of the account is covered by the risk mix and has this been allowed for if it does not cover 100% of the risk profile?

3

We have chosen to describe what we mean by each element very simply - by just listing examples of the kinds of uncertainty that may be encountered. This is not intended to be an exhaustive list and ***we actively discourage use of the framework as a checklist.***

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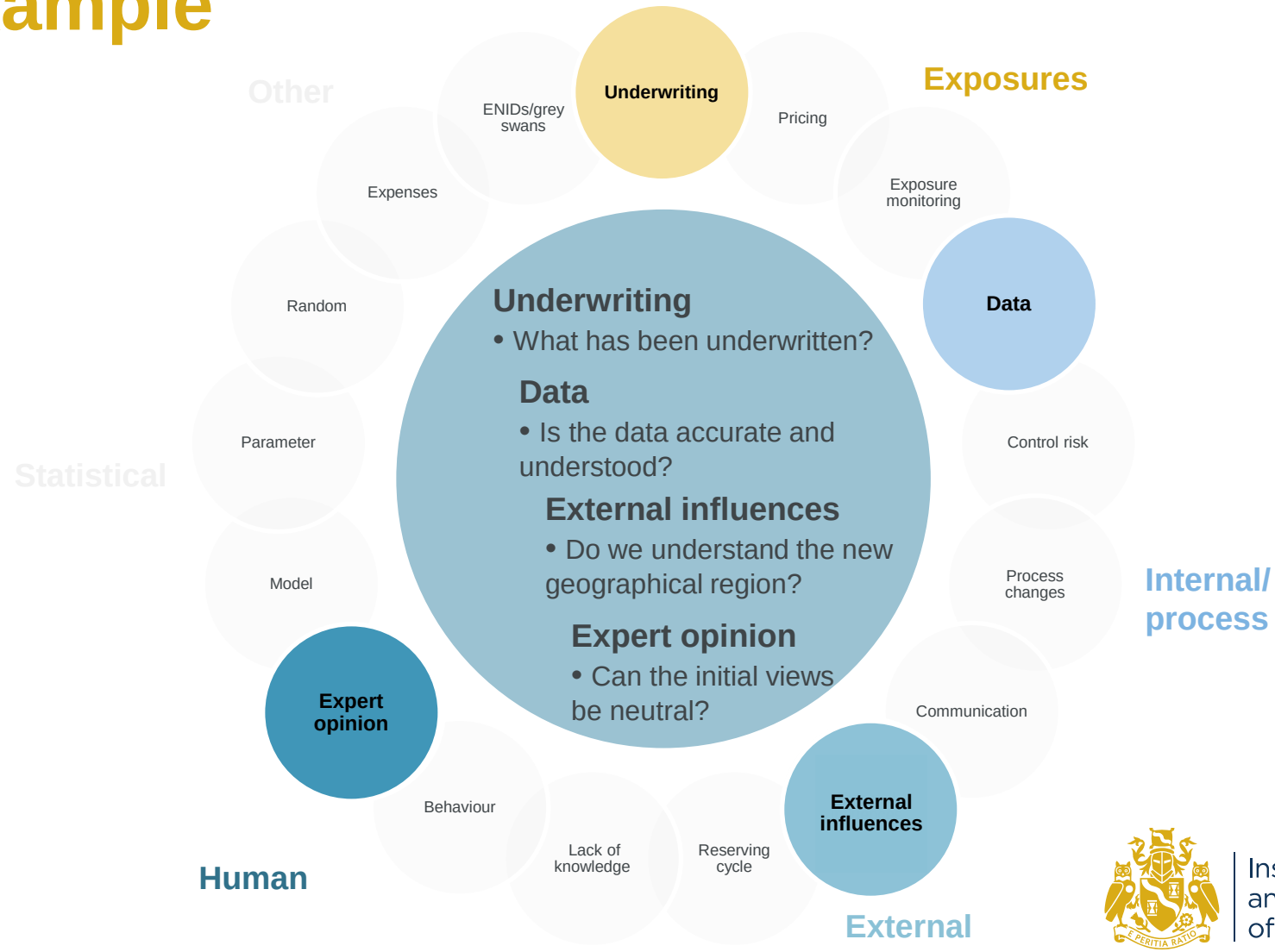
Example 1

Marine risks in a new geographical area example



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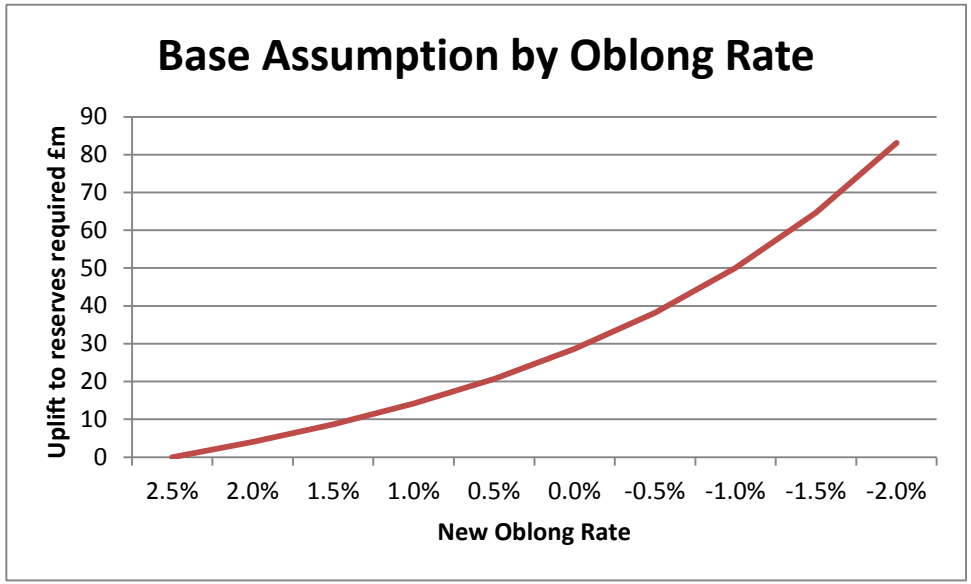
Example 2

“Oblong Rate” – an example response

Best Estimate of Uplift required is £34m



Build-up of £34m uplift

Contributor	Uplift required
Base Assumption of 0.0%	**£29.0m**
Allowance for issues in claims data	£2.5m
Allowance for change in speed of settlement	£2.5m

Key Points

1. Expert input from claims team suggests new rate highly likely to be 0.0%
2. Other insurers suggesting the same
3. Assumes new Oblong rate stays the same for the foreseeable future
4. Does not allow for minimal reinsurance recoveries
5. Includes small uplift for Household Liability

Key Areas of Uncertainty

- We do not know what the Oblong Rate will be when it is announced and the uplift is highly sensitive to this
- We do not know if it will affect claimant behaviour
- Some of the information on the base claims data looks incorrect, which we have attempted to allow for

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Using the framework with capital modelling

Looking at possible feedback between reserving and capital modelling

- We have just started work to look at how the Reserve Uncertainty Framework could be used in work on reserve-risk assessments for capital models and risk management
- We are working on several key themes
  - Can the framework be used to generate ideas for risk mitigation? – linking risk identification to management actions
  - How can the framework be used to help companies evidence thinking around reserve risk and what are regulators' opinions on this?
    - No plans to suggest new standards to work from!
- We also look to reach out to a comprehensive set of potential users for feedback, especially those below, to understand diverse views
  - Smaller actuarial departments
  - Developing markets
  - International members

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Use in reserve risk assessments

- The objective is to bring together reserving and capital modelling actuarial practitioners, so that organisations can better manage reserve risk
- We also think that there may be some clear links to regulatory reports, such as Own Risk and Solvency Assessments (ORSAs)
- We are not looking to suggest rules or standards, and may augment the Reserve Uncertainty Framework or produce separate examples of how the framework could be used in risk assessment and management
- We encourage your input, and plan to have the work complete by GIRO

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Why not get involved?

- Want to help and **contribute to** thought leadership in extending our framework to **reserve risk** component of capital models?
  - There is a rolling vacancy open here
    - https://www.actuaries.org.uk/get-involved/volunteering-ifoa/volunteer-vacancies/giroc-measuring-uncertainty-qualitatively-working-party-members

- Need or want to **find out more about the reserving side**?
  - We have a rolling vacancy looking at wider areas such as IFRS 17 and other topics to help on allowing for reserve uncertainty using qualitative methods

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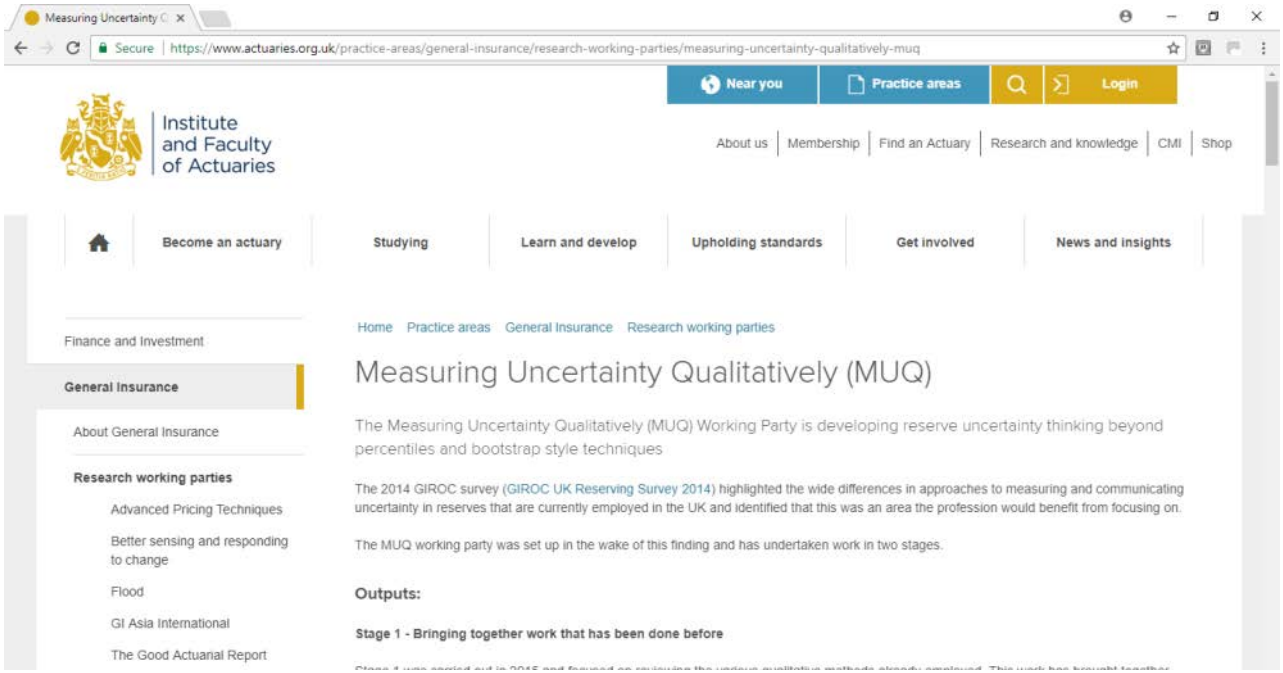
Our website

- The full framework to download
- References and our other work
- Past presentations

Type “MUQ” into the IFoA search bar



https://www.actuaries.org.uk/practice-areas/general-insurance/research-working-parties/measuring-uncertainty-qualitatively-muq

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Summary

- We have shown you our Reserve Uncertainty Framework
- We hope you find this useful for your future reserving work
- We are working on extending this for uses in risk assessment and management
- We need your help – please give us your view, or even better come and join our working party!

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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.

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