

Reserve Uncertainty Framework: Linking Reserving and Reserve Risk

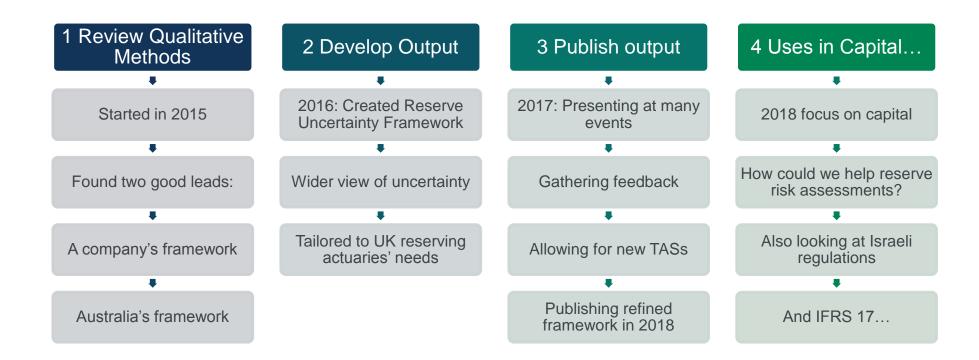
IFoA MUQ Working Party, presented by

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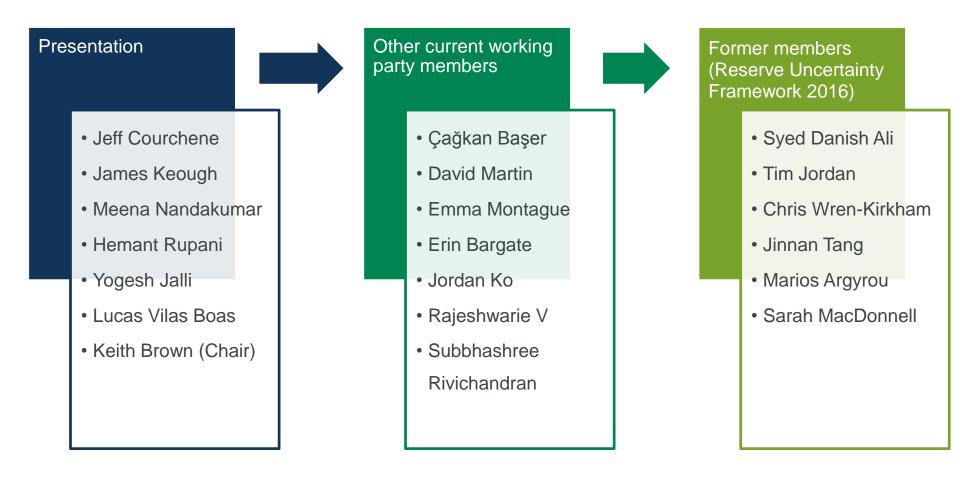
Special thanks to Meena Nandakumar, and MUQ is a GIROC working party

MUQ Working Party outputs to date

We are now looking to see what value we can add to reserve-risk assessments after developing a Reserve Uncertainty Framework aimed at reserving rather than capital actuaries. We haven't arrived here overnight...



Thank you



Contact us: speak to the Chair or email <u>professional.communities@actuaries.org.uk</u>

28 September 2018



Reserve Uncertainty Framework

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

Reserve Uncertainty Framework

Measuring Uncertainty Qualitatively (MUQ) Working Party 2018



May 2018

Reserve Uncertainty Framework MUQ working party 2018

The aim of the framework is to encourage broader thinking around reserve uncertainty, to help structure the actuarial thought process

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 intersects. We suggest highlighting the main drivers of uncertainty, within may be three to five areas, supported by quantitative illustrations where feasible. The transversit would have been used during the process to help the actuary identify what the most significant reserve uncertainty determits 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 arrive a checklist administer will develop their own framework and way of uning it. We intend to begin proving and updating the financework. Penase send feedback to practice never height storage on the province of the pr

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.

For the user of the actuarial work

What questions to ask

· Awareness of areas of uncertainty

Uses of the fr

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
- For example, to support communication to stakeholders
- Pooling knowledge and developing best practice in the profession
- Training tool

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 actuates are all doing this in different wayer within one be containing for statishnickers, is addition the use of percentiles, whist popular, can have the potential to be (at worst) misleading for statishnickers where there is a mismatch between expectations and what information they provide the provided of the prov

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:

- Actuarial curiosity is at the heart of reserving remember to "look out of the window". That is, 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? To 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?
- one or the most enfective ways for numaris to communicate is by felling 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 date of the traineeurs came from earts that has been cone by actuaries in Australia. After being required to report reservies at PSB precentifie, it was widely recognised that scharlast before being reconstant the freserve uncertainty distribution. A detailed framework and process to adjust stochastic results was developed. See the MUC website for more information.

Exposures

Underwriting Rick

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 area
 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
- 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 hydrogen?

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.

Priolog Rick

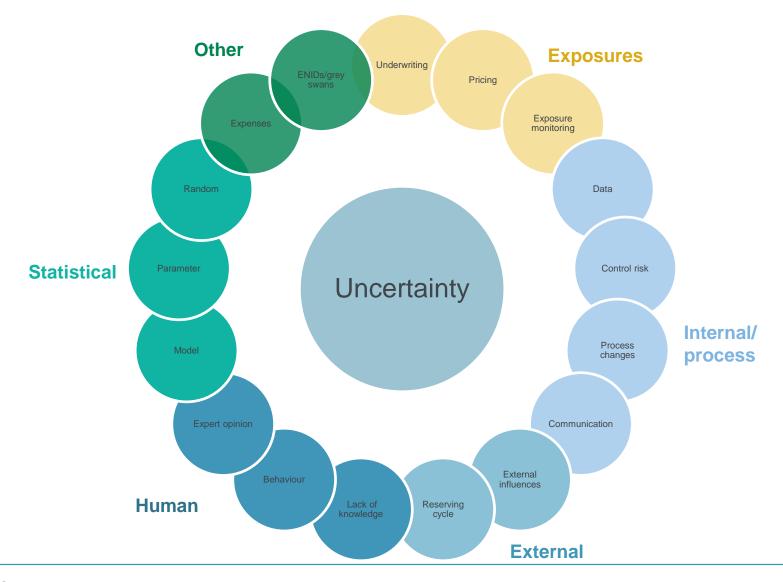
How has the pricing basis changed over time?

- Have the pricing models been adequately parameterised and when were they last updated? How much have the underwriters deviated from the
- How much have the underwriters devilated from the technical price? Has this been influenced by level of competition in the market or specific business strategy? Level of cross-autosidies?
- 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 ovcie, 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'
- 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
 - 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. Bomhuetter-Ferguson (BF)
 - 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?

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.

Reserve Uncertainty Framework categories



Extending the framework to reserve-risk assessment

We are looking to extend the use of the framework from the reserving process to the reserve risk estimation process. (We present ideas in the slides that follow, intending to give inspiration. These ideas and methods need to be checked to see if they are appropriate for the purpose they are being used and may not be the optimal solution even when they are appropriate.)

Get ready to suspend (some) disbelief

For the purpose of the presentation, we envisage in the slides that follow, that reserve risk is estimated using one of a number of bootstrapping techniques, from paid or incurred loss triangles.

We also imagine that you are looking to allow for known risk that may not be evident in the data (although here we mean foreseeable risk, and not one-off events). And furthermore, we suggest this is a professional thing to do.

Where we speak of coefficients of variation (CoV) we assume for simplicity of discussion that the bootstrapping results have been back fitted to a distribution (for example, a lognormal distribution), available by origin period, and in total.

We assume each model gives a similar level of risk, unless otherwise stated.

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Exposure influences

Underwriting, pricing, exposure monitoring

Example 1 – Moving into new territory

Two years ago underwriters started to write a product in a new area: the Democratic Republic of Another Territory (DRAT). You are determining the reserve risk parameters and have been asked to ensure you have allowed for this.

Possible adaptation – change to the Coefficient of Variation (CoV)

 There are industry figures for DRAT for the specific product. Could we use the existing internal CoV for the product line combined with the industry benchmark? We could weight them using the reserves outstanding in each territory; by origin period?

What would you do?

- How have you allowed for changes in exposure when quantifying reserve risk in your work?
- Do you have experience of other things, such as changes in the external claims environment (via legislation or rules), new class actions, process uncertainty, claims backlogs or sparse data?

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Internal and process influences



Example 2 – The claims manager changes

The claims manager of your line of business left a year or so ago, and the new guy isn't doing things in the same way. From previous reserve reviews, you believe his team effectively use a new claims handling philosophy and you are less confident with your estimated reserves. What to do in a reserve risk assessment?

Possible adaptation – use of paid versus incurred data for parameterisation

- The paid data could be fed into the different ways of modelling the reserve risk
- How do they compare with the incurred figures? Are they more logical? What else could you consider? Are either appropriate, or do both paid and incurred need an allowance for greater uncertainty?

What would you do?

- How have you allowed for personnel changes in quantifying reserve risk?
- Have you experience of other things such as sudden changes in case reserving, dealing with factor estimates or uncannily good claims reserving over short histories?



External influences

External influence, reserving cycle

Example 3 – Not-at-fault motor damage cost differences

You are performing a reserve-risk assessment on motor own damage. The line's reserving actuary informed you that the reserves depend on the level of recoveries. This changes over time. Repair labour rates have been charged for at a higher level for not-at-fault cases compared to its rates to repair a vehicle regardless of the liability position. The difference comes back as a recovery. This has changed over time due to the line tactically changing the differential, which is agreed with the repair networks.

Possible adaptation – use of data net and gross of the different rates

 Could the data be modelled gross of the changes (by fixing the differential) and then allowing for greater uncertainty should the process come under pressure?

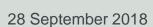
What would you do?

- How have you allowed for labour rate differentials that vary over time before in calibrating reserve risk?
- Have you experience of other things such as changes to reinsurance programmes, or changes in costs from supply contracts? What did you do?



Human influences

Expert opinion, behaviour, lack of knowledge



Example 4 – Writing a new type of insurance

Your insurance company wrote a new type of insurance not yet seen before in the market. A senior manager has told the reserving team and capital modelling team to lock themselves in a meeting room and not come out until they done their reserve-risk assessment. Apart from try to run, or at least make some hot drinks, what do you do?

Possible adaptation - scenarios

- You could work together to consider how the line has been reserved, and ask the reserving actuary to go through the claims processes and key areas of uncertainty; they might even want to use the Reserve Uncertainty Framework
- Then after listening to each others' ideas, once you've agreed the biggest risks you
 could work out some extreme scenarios. If you need a distribution you could fit one to
 the extreme scenario

What would you do?

- How would you cope with this situation? Have you done something similar already?
- Would finding an industry benchmark to a proxy be of use?



IFRS 17 Another thing to consider

IFRS 17 considerations

The International Accounting Standards Board (IASB) have said the Risk Adjustment should: "reflect the compensation that the entity requires for bearing the uncertainty about the amount and timing of the cash flows that arises from non-financial risk".

Methodology

- Unlike Solvency II, the IASB have not provided a prescribed methodology for the calculation of the Risk Adjustment
- Possible methods that can be used include Value at Risk, Tail Value at Risk or Cost of Capital

Disclosure and Communication

- Under IFRS 17, entities will be required to disclose the risk adjustment and the corresponding confidence interval it represents
- With the open interpretation for the calculation of the risk adjustment. How will you
 be able to explain differences in confidence intervals and levels of risk adjustment
 between competitors?

Summary

- The MUQ Working Party have developed a framework for reserve uncertainty: the <u>Reserve Uncertainty Framework</u>
- We suggest pragmatic choices and common sense are used in addition to statistical sophistication
 - it's more important to know what you don't know and communicate this professionally
- IFRS 17, with its investor focus, could be either a challenge for reserve uncertainty or an opportunity to develop thinking and practices beyond the percentile

Looking to the future

- We will be taking today's discussion to input into our work stream to make a difference to reserve-risk assessments
- Please feel free to get in contact with us to give your feedback on uses of the framework in reserve risk, IFRS 17 or in the reserving process

Questions Comments

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