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E9: Capital modelling - what you can learn from other professions

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Institute
and Faculty
of Actuaries

Presenters



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Agenda



Introduction

Other professions

- Accountants
- Software engineers
- Chief Risk Officers / Risk Managers
- Underwriters
- Apollo astronauts

Lessons to learn

- Things to think about
- Immediate next steps



Questions

How many people have ... ?



- looked at the results of a capital model
- run a capital model
- designed a capital model
- built a capital model
- built more than one capital model
- built a capital model on more than one platform
- modified a capital model to answer a question that it wasn't quite designed for
- recalculated the results of a capital model to get a variable that wasn't planned for
- changed someone else's capital model
- validated or reviewed a capital model
- some formal training in Finance, IT, Underwriting or Risk Management
- an interest in communicating complex ideas

What might an actuary miss?

Mind the gap

- Actuaries will know
 - The projection and fitting techniques
 - The data involved
 - Current reporting requirements
 - Current and historic business written
- Actuaries may not know
 - Future reporting requirements
 - Potential new business plans
 - What shareholders and investors are asking about
 - How best to build in flexibility to deal with all the above



Accountants

Accountants

What do they do all day?

- Handle large amounts of financial data in the general ledger
- Reconcile data from one source to another
- Provide reports on that data both internally and externally
- Internal reports may change through growth or acquisition
- External reports may change through change in regulation



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Accountants

War story

Solvency II classes
vs management accounting classes

- Have separate models for each
 - Have to reconcile the two models
- Model at subclass level
- Model in Solvency II classes
 - Have to reclassify and reconcile back to the business classes
- Model in business classes
 - Have to reclassify and reconcile back to the Solvency II classes

Other cases

- Using “net premium” as a proxy for exposure from two different sources – which weren’t consistent.
- Reclassification of business lines

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Accountants

What can we learn?

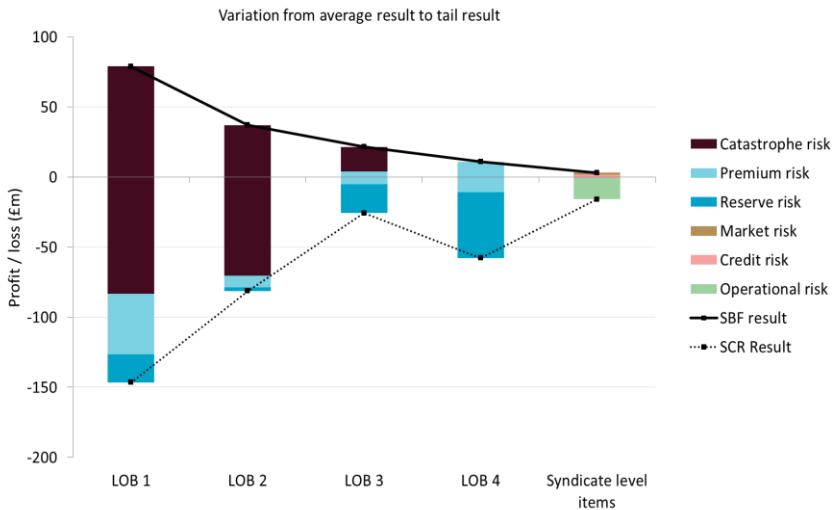
- Any model should be defined based on the output requirements (current and future) rather than the available inputs. Unavailable inputs should be approximated at first but, if material, actively sought out.
- Reclassifications are a time sink and should be avoided where possible
- Definitions and naming are critical – see net premium



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Accountants

Presentation style



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Software engineers

Software engineers

What do they do all day?

- Design and build software
- Test changes
- Track bugs and improvements
- Version control software
- IT resource planning
- Ensuring procedures and documentation are adequate



Software engineers

A capital model is a piece of software

Solvency II encourages

- Version control of the model
- Documentation of changes
- Testing of changes

Experience from a software engineer would encourage

- All the above (as a bare minimum!)
- Use of symmetry
- Naming conventions
- Architecture
- Resource planning
- Estimating the complexity (and scalability) of a calculation before you start

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Software engineers

War story

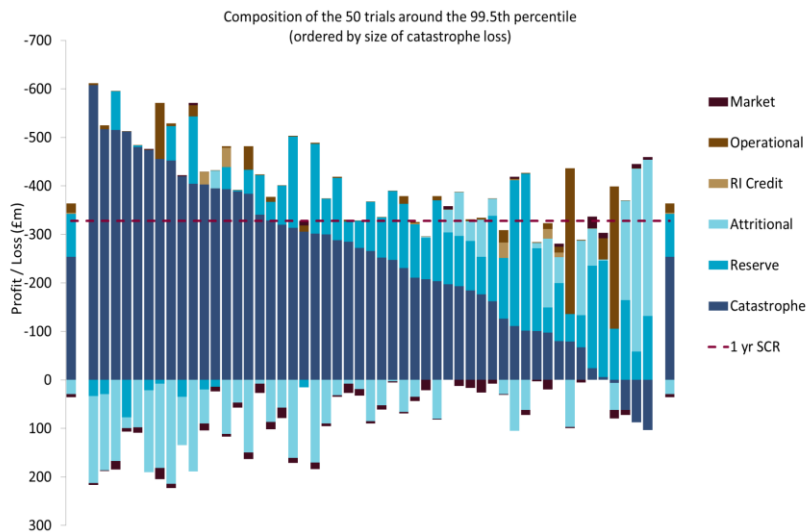
- Using a more structured tool to prevent the capital modelling team being able to circumvent
- A junior actuary writing an ESG trying to save 1.8 billion lines of data in an excel spreadsheet
- A capital modelling team filling up the entire free space on the file server within a day
- “Game save” breaking versions
- Structure is important



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Software engineer

Presentation style



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Software engineers

What can we learn?

- Structure is important and changes the way you think
- Identify the requirements, and consider explicitly the need for flexibility
- Consider the complexity of the model
- Version control is even more important than you think



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Underwriters

Underwriters

What do they do all day?

- Understand the risks being presented to them
- Take decisions as to which risks to accept and for how much
- Balance the portfolios of risks accepted
- Make as much money as they can



Underwriters

What can we learn?

- Many options available to the underwriter, and they need to be able to compare them
- Timescales are often short
- A model is about evaluating differences between options, which is not easy
- Convergence issues with stochastic models make assessing differences particularly hard

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Underwriters

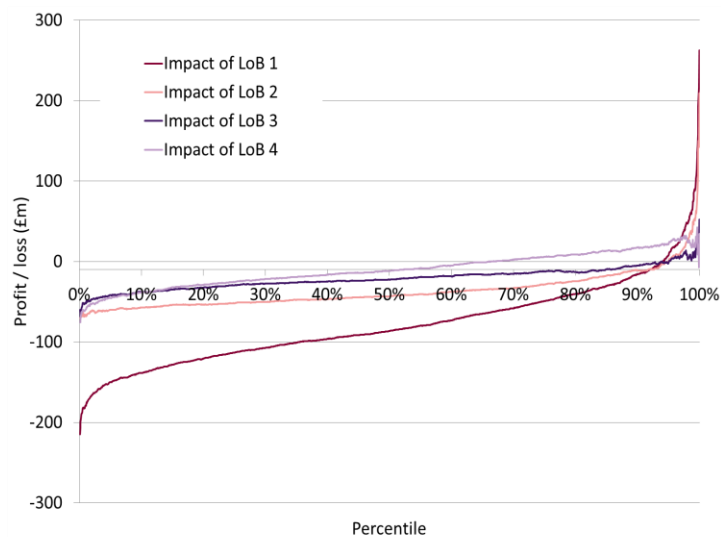
War story

- Acquisition of a book of business, catastrophe exposed, but not peak peril – does it affect the capital at all, a bit or a lot?
- Reinsurance evaluation



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Underwriters
Presentation style



Chief Risk Officers / Risk Managers

Chief Risk Officers / Risk Managers

What do they do all day?

- Understand the risk appetite of investors and other stakeholders
- Identify and prioritise areas of risk
- Evaluate risk mitigation strategies
- Communicate current risk exposures



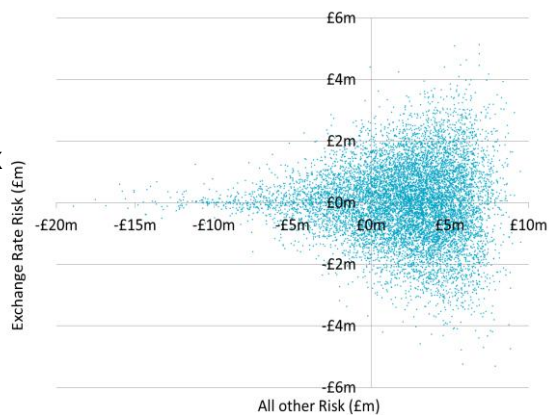
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Chief Risk Officers / Risk Managers

War story

FX risk – 2 options

- Match US assets with USD liabilities?
 - But then suffer additional FX risk in a capital event (requiring additional capital)
- Hold extra USD capital
 - But then report additional FX risk most of the time



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Chief Risk Officers / Risk Managers

What can we learn?

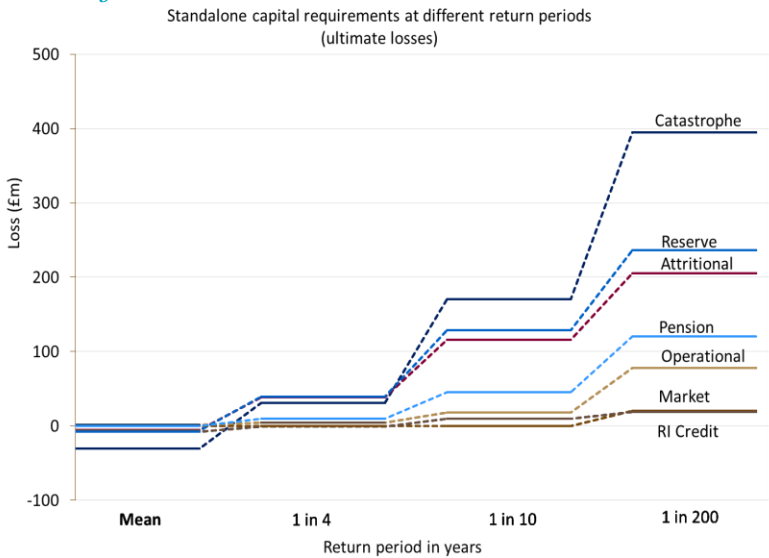
- A good model is about more than the capital number. More common risks may be more interesting because they happen more often. Also they may be easier to work with
- However they may require different reporting, and may highlight different issues
- Aggregation and dependency is very hard to spot and to model well



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Chief Risk Officers / Risk Managers

Presentation style



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Apollo Astronauts

Apollo Astronauts

What did they do all day?

- Experienced people from other fields (military test pilots)
- Exciting
- Lots and lots of simulator testing
- Doing something that had never been done before
- Used equipment that was built at speed to meet a deadline
- Reliance on experienced people to make things work

Apollo Astronauts

What do they have to do with capital modelling?

It worked and was amazing, but...



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Apollo Astronauts

What do they have to do with capital modelling?

Next phase was mostly reusable...



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Apollo Astronauts

What do they have to do with capital modelling?

And some plan to use existing aeronautics for the take off...



Applications and final questions

Long term planning

What might the future look like?

- What would it take for:
 - modelling to give our underwriters a competitive edge?
 - the CEO to be happy to talk about the model to investors?
 - the model to feature prominently in the report and accounts?
 - a typical insurer to have a 5-year model development plan?
 - the business to invest in data systems now to enable better modelling in many years' time?



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Short term action

What could you achieve in the next 12 months?

- Identify a suite of typical requests that the model could service and streamline these?
- Eliminate areas of the model requiring manual reconciliation or reclassification after it is run
- Critically review the calibration of the model at the 1-in-5 to 1-in-10 level, compared to the view of the business
- Identify changes that would help make the model more future-proof



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Other professions

Other professions

What can we learn

- Bank Quants – Don't follow the model blindly
- Graphic designer – A single picture can communicate a huge amount
- Architect – The material you choose to build with should have an effect on the design.
- Catastrophe modeller – Final results are affected by the quality of data used many steps ago in the process
- Bomb disposal expert – Know what you are getting into, and follow the wiring diagram carefully
- Quantum Physicist – If you think you understand what is going on – you probably have misunderstood the question.

Scope

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