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Challenges in reviewing a capital model

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Agenda

- Background
- Syndicate Capital Reviews
- Areas for Discussion
- Questions

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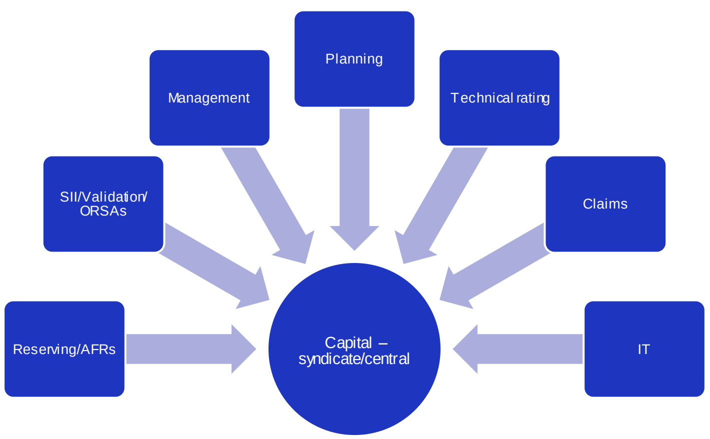
Background

Lloyd's Actuaries – Areas of Operation



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Strong and Flexible Capital Structure:

Lloyd's "Chain of Security"

1 All premiums received by a syndicate are held in its premium trust funds and are the first resource for paying policyholder claims from that syndicate.

2 Each member provides Capital to support its underwriting at Lloyd's. Each managing agent produces its own capital assessment in respect of each managed syndicate stating how much capital it considers is needed to cover its underlying business risks with a 99.5% confidence level.

3 The central assets are available at the discretion of the Council of Lloyd's to meet any valid claim that cannot be met by the resources of any member. It is funded by members' annual contributions and subordinated debt issued by the Society in 2007 & 2014.

1) Corporation net assets: Corporation Reserves, Associates Reserve, Revaluation Reserve, Translation Reserve; 2) Callable layer: Central Fund assets may be supplemented by a 'callable layer' of up to 3% of members' overall premium limits in any one calendar year. These funds would be drawn from premium trust funds.
Source: Lloyd's pro forma financial statements, 31 December 2016

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Our Objective

- Ensure syndicates' own capital assessments are appropriate and meet SII requirements, including validation. This is done in conjunction with planning and considering all market oversight activities.
  - Ensure that syndicate-level capital is allocated to members (where FAL is held - this is the opening capital in the system).
- Ensure the Central Fund level of capital is appropriate and meets SII requirements, including validation.
  - Consider the level of coverage of the Central Fund required capital that is appropriate based on risk appetite.

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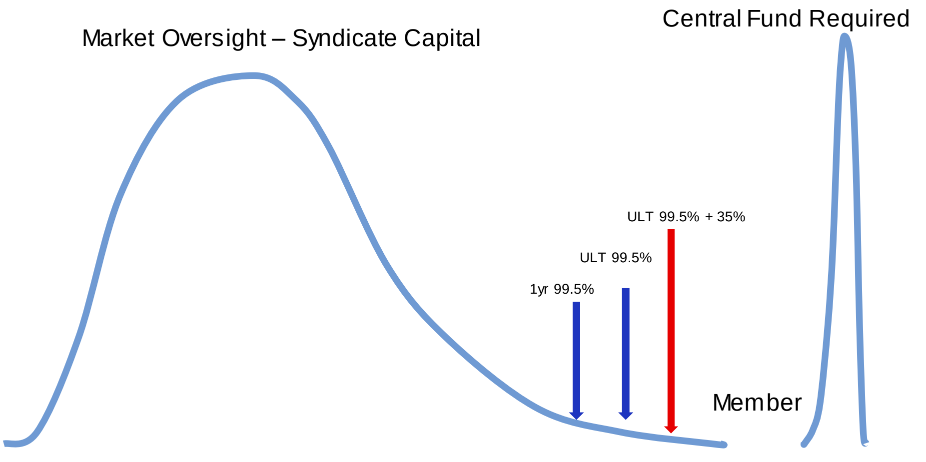
Risk Profile we are working with



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…and all starts from Solvency Capital Requirements (SCR)

- Syndicate's own assessment of the level of capital needed to support its risk profile based on:
  - one year new business with all risks to ultimate
  - 99.5% confidence level (1:200)
- Drives the determination of members' capital requirements and capital held by Lloyd's centrally

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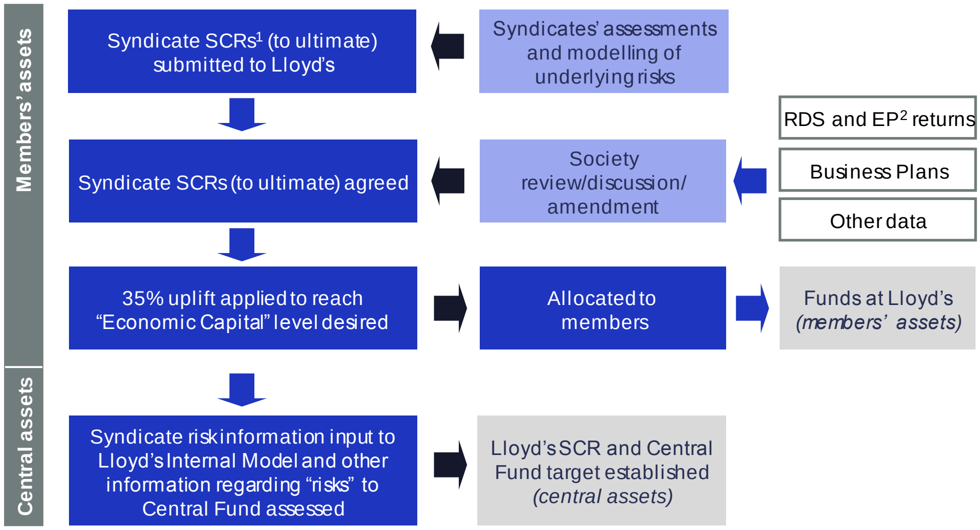
Capital setting is based on a sophisticated understanding of risks and market conditions



Note: 1) SCR: Solvency Capital Requirement; 2) RDS: Realistic Disaster Scenario; EP: Exceedance Probability distributions
Source: Offering Prospectus 2017

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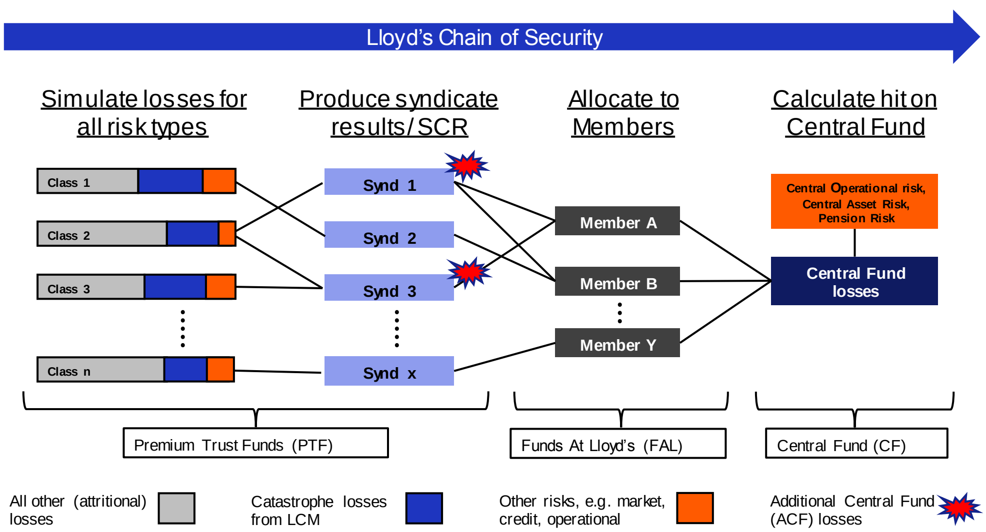
Lloyd's Internal Model - Lloyd's Chain of Security

Risks are quantified at a syndicate level before being aggregated to establish risk to Lloyd's centrally



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Syndicate Capital Reviews

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Capital Reviews

Objective

- Capital adequacy
  - Ensure syndicates are adequately capitalised
- Regulatory compliance
  - Syndicate models should meet minimum standards
  - Major model changes require approval
  - Model output should be consistent with approved plan
- Lloyd's market
  - Capital adequacy is essential to continued success of the market
  - Maintains Regulatory compliance of the Corporation
  - Reaffirms confidence of the rating agents

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Capital Reviews

Data quality assurance

- Data reconciliation checks
  - Previous submission
  - Compare capital returns to other submissions e.g. SBF
- Data validation
  - Check for correct FX rate
  - One year vs. ultimate
  - Data format
  - No missing fields
- Documentation
  - Check documentation has been submitted
- Create market benchmarks
- Review built-in data warning

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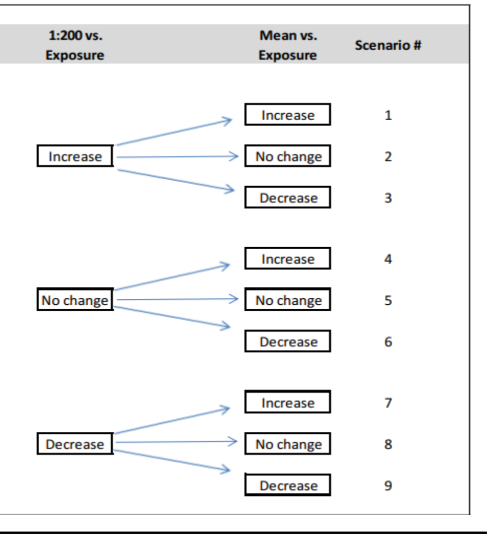
Capital Reviews

Top down approach – step 1

- **Analysis of change**
  - Changes causing a movement: Risk profile, parameterisation, model structure, FX
  - Movement in risk relative to exposure helps negate impact of FX change
  - Compare movement in 1:200 and the mean for consistency direction and magnitude
  - Understand nature of change
  - **Identify areas for detailed review**



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Capital Reviews

Top down approach – step 2 and 3

Quantitative deep dive

- Review more granular information (e.g. class level)
- Compare to market ratios
- Assess relationship with other risk categories
- Refer to tests (e.g. stress test, ST-2) to understand impact of assumption
- **Form a view**

Qualitative deep dive

- Refer to the methodology document for details of risk
- Understand rationale behind parameterisation
- Review validation tests
- Discussion with agent and underwriting performance
- **Form a view**

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Class Name	Net Premium	Mean Net Claims	CAT Exposed?	ULRs including Catastrophe					
				Mean	50th	75th	90th	95th	99.5th
A	45.5	32.1	Yes	71%	70%	75%	80%	83%	92%
B	18.1	12.3	Yes	68%	66%	75%	83%	89%	107%
C	25.1	19.2	Yes	77%	76%	83%	89%	93%	106%
D	53.3	39.4	No	74%	74%	77%	80%	82%	88%
E	29.2	22.5	No	77%	77%	82%	87%	90%	100%
F	1.1	0.8	Yes	69%	53%	79%	117%	135%	216%
G	18.6	13.0	No	70%	69%	77%	85%	90%	106%
H	19.3	15.0	No	78%	78%	81%	84%	86%	92%
I	5.8	3.6	No	62%	59%	71%	84%	93%	122%
J	19.3	15.6	Yes	81%	80%	86%	92%	95%	107%
K	25.8	18.7	No	73%	72%	78%	83%	86%	97%
		16.3	No	73%	72%	79%	86%	90%	102%
		0.0	No	76%	61%	64%	66%	68%	926%
All other									
Total	318.8	202.1	Yes	63%	63%	66%	68%	70%	77%

Mean = Median
Is the distribution symmetric?

Loss @ 99.5th less than 100%. Is it making profit at the 1:200?

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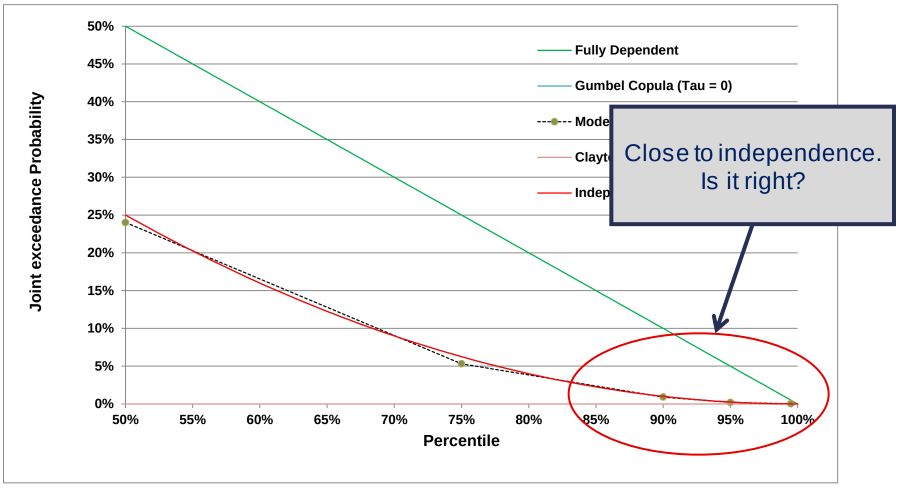

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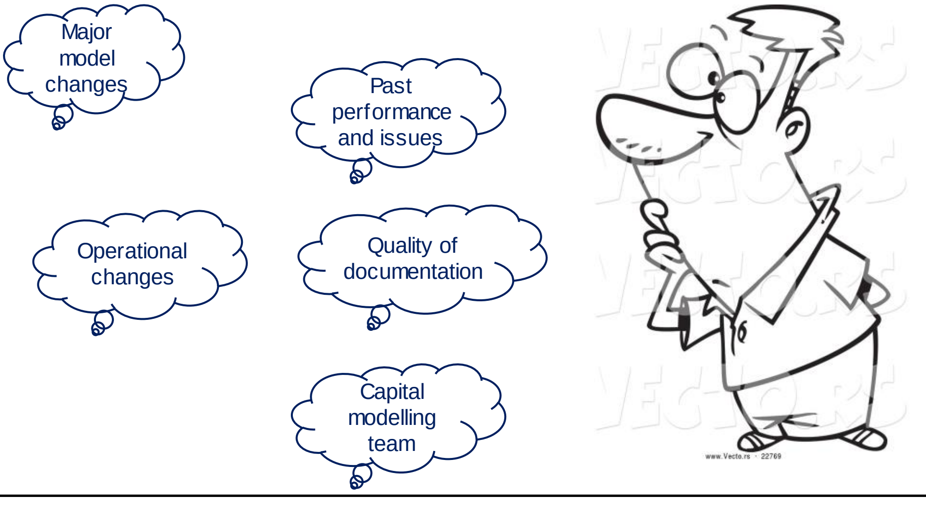
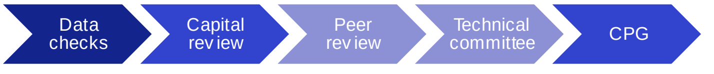
Other considerations



Capital Reviews

Forming a view …

- ...involves answering some questions:
  - Is the model capturing material risks?
    - Validation tests are often useful to evidence that
  - What alternative assumptions could have been used? What would the impact be on overall capital?
    - Again validation tests can inform the reviewers
  - Are the special characteristics of the risk sufficient to explain lower/higher risk at the tail?
  - Should Lloyd’s carry out additional work – e.g. on site model walkthrough
- Peer reviews carried out
- Franchise board (FB) guidelines, feedback from other teams, impact on market-wide risk appetite taken into account
- Reviewed by multiple panels before coming to a final decision.



Considerations

Key is to focus on the material issues (to a syndicate and Lloyd’s) and non-compliance with SII:

- Sheer volume of SCRs and the tight timescales
- A syndicate spends a year say doing the work and we take 1-3 weeks reviewing it
- The intricacies of capital modelling can be complex
- Time consuming to find the exact cause of an anomaly
- Emerging risks needs to be considered

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Considerations

To reiterate

In doing this work we have to also consider;

- What information is reasonable to request given all the returns/ information requested already
- Skill and experience of a syndicate's team and management
- Our own professional duties e.g. peer review, reports, audit trail
- Current market trends in underwriting, reserving, pricing, planning
- Quality, clarity and standardisation of information including explanations provided
- What the FB and Lloyd's Risk Committee and internal audit will expect us to challenge
- What the PRA may expect us to challenge/ do
- Rating agency views

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Considerations

Some saving points

- **Key is to focus on the material issues (to a syndicate and Lloyd's) and non-compliance with SII as**
  - Improvements are continually being made so we are moving forward
  - Market actuaries are helpful even when they are getting frustrated by the questioning
  - A lot of consistency of personnel within syndicate teams and Lloyd's improving
  - Planning, reserving, capital, claims, …. Are much better linked up
- Feedback and suggestions are always welcome

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Areas for Discussion

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Considerations

Risk beyond the 99.5^{th}

- Regulatory capital focusses on the 99.5th percentile
- Economic capital put up at Lloyd's adds additional uplift of 35%.
- Central Fund; which is for every member in the market, supports risk beyond that

- A syndicate has a plan that results in the concentration of risk beyond 99.5th
  - This particular syndicate thus is a bigger risk to the Central Fund
  - Assume their plan is profitable
  - **Should their plan be rejected or should they be asked to mitigate the risk?**
  - **Should we measure risks to the Central Fund beyond the 1/200?**

- **If they agree to mitigate risk, how should this risk be measured?**

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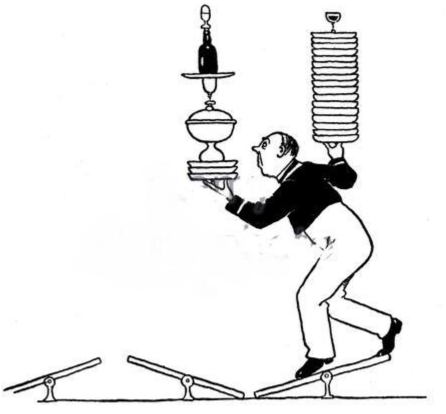
Considerations

Commercial vs Regulatory – challenges faced

- Business planning prioritises commercial objectives
  - Rates assumptions following an event could mirror commercial aspirations and belief
  - Increased rates lower planned loss ratio – maybe lower volatility given risks?
  - Impact on capital – more profit means less capital
  - Regulatory perspective – should credit be given for potential rate rises? No evidence yet
- It is important to strike a balance



TRAINING RESTAURANT CAR ATTENDANT TO CARRY ON DURING UNCERTAIN MOTION OF TRAIN

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Considerations

Commercial vs Regulatory

- Business planning is based on organisation strategy
  - A big organisation would aim to diversify; across geographical locations and line of business
  - Impact on capital – would result in higher diversification and lower capital ratio
  - Regulatory perspective – commercially reasonable, but should there be restriction to the diversification that can be claimed?

"Yes, our investments are diversified: 20% out the window, 65% down the drain, and 15% gone with the wind."

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Considerations

Commercial vs Regulatory

- Business strategy can have material impact on capital
  - An organisation might decide to mitigate risk through reinsurance (Lloyd's has a lot of reinsurance exposure)
  - Credit risk on outwards reinsurance with good security is low compared to exposure
  - Impact on capital – would result in lower profit but less volatility therefore lower capital
  - Regulatory perspective – net capital output might be theoretically right, but could there be liquidity risk or other issues?
- Comparison with Peers
  - Subscription market where majority write a small share of each risk
  - Similar risks yet market assumptions different?
  - How can everyone be below the average?

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Considerations

Do not forget the following

- What if the model.......
  - Appears to cover all of the risks within the business
  - Mathematics stacks up in terms of structure and code
  - Parameters based on data and pass validation, back testing and the like
  - Passes validation
  - Documentation looks good
  - Passes SII on the face of it
  - Team are convincing
- But the number feels low to you compared to the
  - Gross or Net Written Premium/ reserves/ other exposure measure and/or
  - Natural catastrophe exposure taken on and/or
  - Maximum line size and/or
  - Benchmarks available and/or
  - Lloyd's Internal Model output by syndicate and/or
  - Your experience
- A real problem for any model. For example, sometimes Net Assets held >> Economic Capital from a model – what is right? Is the model still credible?

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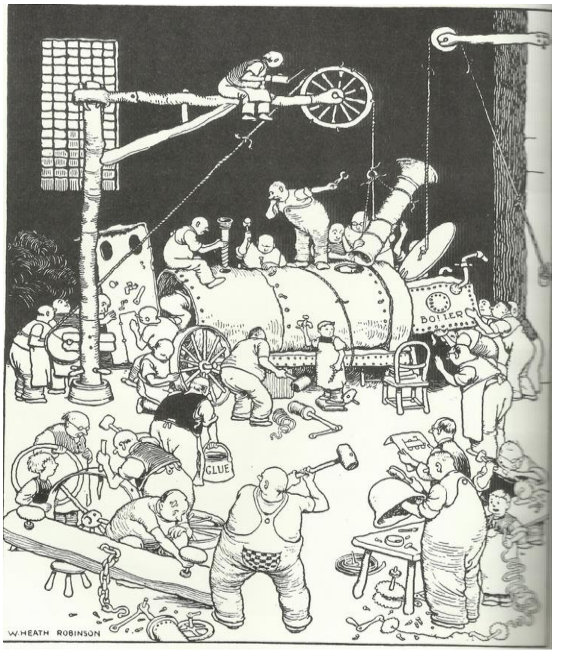
Just because the maths works…

…do not forget the bigger picture



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Questions?