Reinsurance Optimisation

Weighing risk transfer with capital requirement and cost impact

Chris van der Merwe

NOVEMBER, 2024

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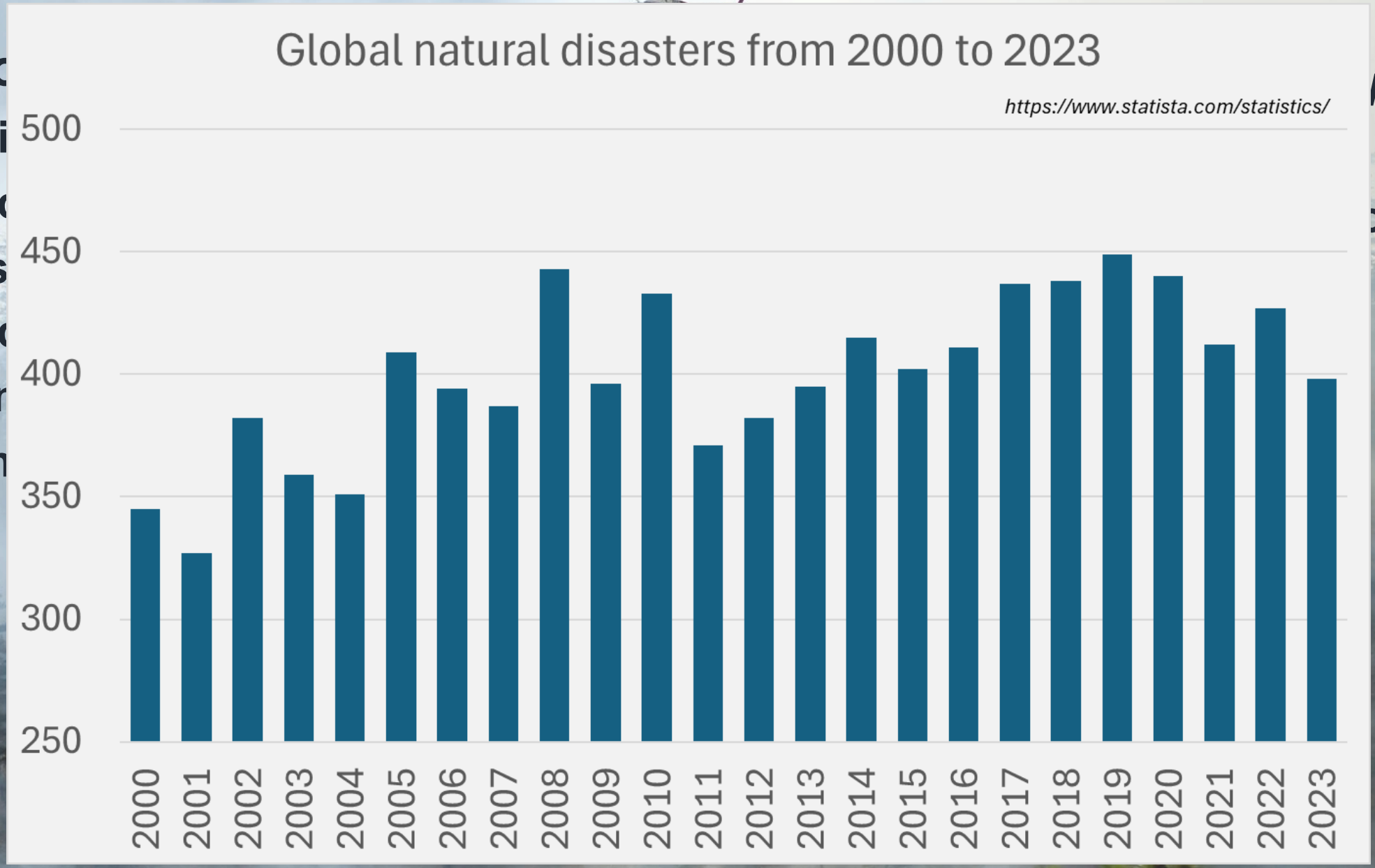

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Reinsurance softening slightly as Afric markets head to 1/1 renewals

Liz Booth 0 September 23, 2024 5:05 pm

Global Reinsurance Sector Outlook Revised to 'Neutral'

Thu 05 Sep, 2024 - 6:08 AM ET

FitchRatings

Related Content: Global Reinsurance Outlook 2025

Fitch Ratings-London-05 September 2024: Fitch Ratings has revised its global reinsurance sector outlook to 'neutral' from 'improving' as the pricing cycle has most likely passed its peak, the agency says in a new report. Nevertheless, profitability should remain very strong by historical standards in 2025.

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Reinsurance capital to hit record high by year-end, says Best

Tony Dowding · August 27, 2024

Why use reinsurance?

Why use reinsurance?

Great Fellowship exam question

1. Access to underwriting, pricing and claims handling expertise
2. Access to valuation basis benchmarks
3. Skin-in-the-game independent confirmation of product and pricing
4. Provide liquidity / financing for upfront expenses
5. Decrease capital requirements / meet regulatory solvency
6. Decrease risk of failure / probability of ruin
7. Improve Return on Capital
8. Decrease volatility of earnings

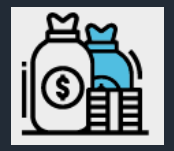
Different order of importance for different insurers

When to use reinsurance?

Framework for selecting capital management action to implement

Evaluating reinsurance strategies

Capital Requirements Considerations



Impact on required capital

Additional risk introduced

Renewals required

Profit and Loss (P&L) Considerations

Cost of reinsurance

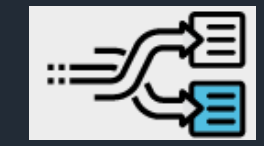
Capital generation

P&L volatility

Timing and dividends

Implementation & Approval of Cover

Time required to implement arrangement

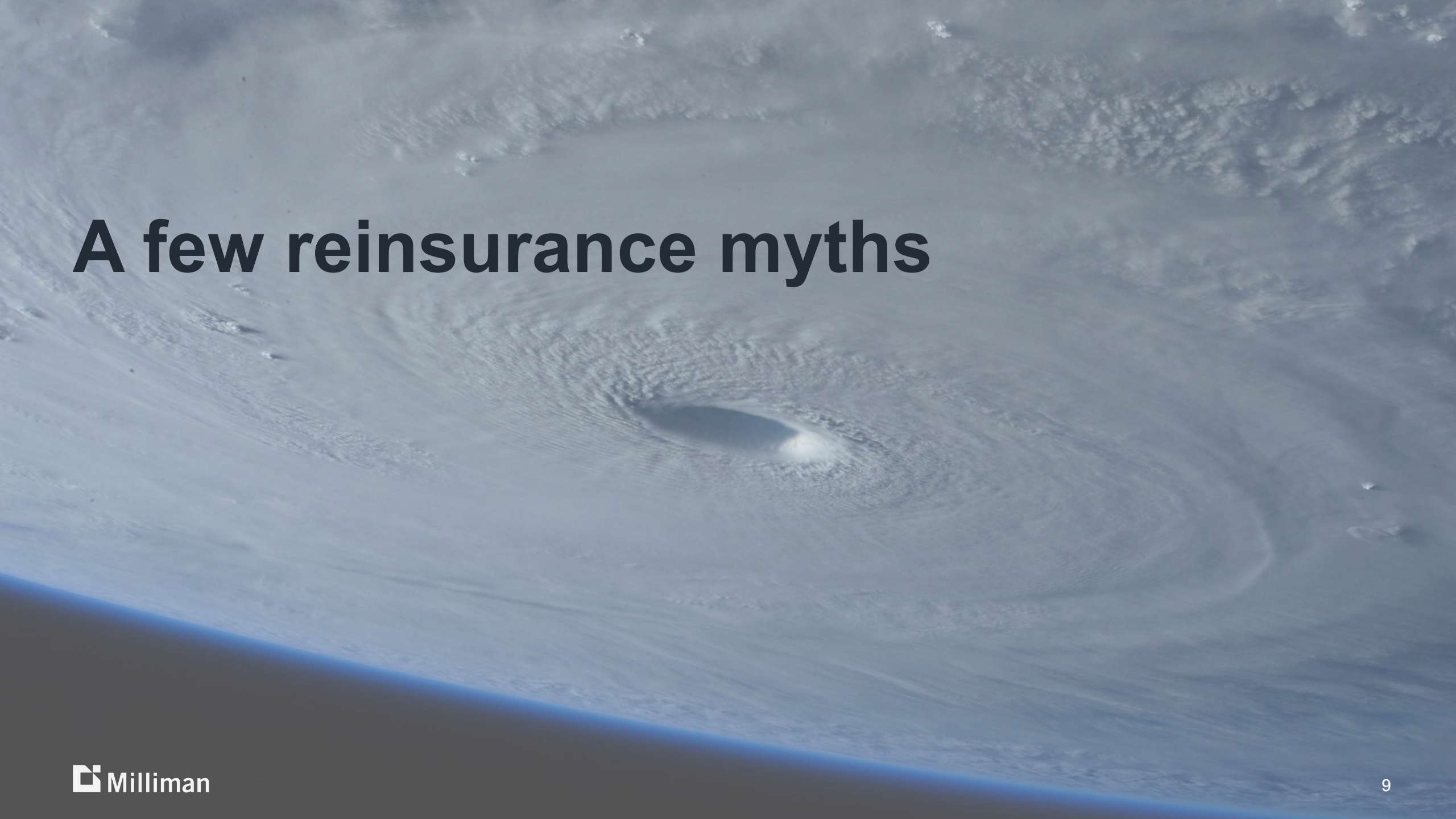


Flexibility of arrangement

Availability

Regulatory approval

A few reinsurance myths



Why use reinsurance?

Myth #1

I don't want to use reinsurance because I don't want to pay away my profits.

Reinsurance or return commission can compensate for high expected profit margins in a product.

Myth #2

Financial Reinsurance can dramatically improve solvency by increasing assets without increasing liabilities.

A net increase or decrease in NAV from FinRe is a red flag for inappropriate accounting or regulatory treatment.

Do not get accounting or regulatory advice from the person who is selling you a structure.

Myth #3

FinRe has no benefit under IFRS17 because you have to show a liability.

FinRe can provide significant financing / liquidity as well as risk transfer (lapse and/or claim risk resulting in decrease in capital requirement) and can be an appropriate tool.

Why use reinsurance?

Myth #4

Reinsurance can "smooth" earnings between periods.

Reinsurance can decrease the volatility of earnings but generally cannot smooth earnings between years by mis-allocating premiums/claims between periods.

Myth #5

My claims basis was set with input from reinsurers. It must be appropriate.

Getting input on basis from a reinsurer is generally useful.

Significant adjustments required in first few years due to insurer specific experience

Myth #6

Profit share / profit commission / sliding-scale commission can get me significant capital benefits at low cost.

Profit commission has a place when insurer and reinsurer cannot agree on expected experience.

However, serious care is required to make sure the structure doesn't overstate the actual risk transfer and impact on decreasing volatility of earnings or regulatory / economic capital requirements.

Impact on capital requirements

Sliding scale reinsurance commission

50% Quota Share

60% Claims ratio

- *Fixed reinsurance commission:*
  - *20% (of ceded premium)*
- *Insurer expenses:*
  - *15%*
- *Reinsurer expenses:*
  - *10% (of ceded premium)*

	Insurer	Reinsurer
Premium received	100	50
Premium Ceded	(50)	-
Claims incurred	(60)	(30)
Claims ceded	30	-
RI commission	10	(10)
Expenses	(15)	(5)
Net result	**15**	**5**

Impact on capital requirements

Sliding scale reinsurance commission

Sliding Scale Commission

- *Percentage of premium ceded*
- *Varies linearly in line with, but opposite to, emerging claims ratio*
- *Both upside and downside potential*

Claims Ratio	Commission Rate
50%	**30%**
…	…
58%	22%
59%	21%
60%	20%
61%	19%
62%	18%
…	…
70%	**10%**

Impact on capital requirements

Sliding scale reinsurance commission

- *Insurer A*
  - *Fixed 20%*
- *Insurer B*
  - *Sliding Scale*

	60% CR					
	A	B				
Premium received	100	100				
Premium Ceded	(50)	(50)				
Claims incurred	(60)	(60)				
Claims ceded	30	30				
RI commission	10	10				
Expenses	(15)	(15)				
Net result	**15**	**15**				

Impact on capital requirements

Sliding scale reinsurance commission

- *Insurer A*
  - *Fixed 20%*
- *Insurer B*
  - *Sliding Scale*

	60% CR		50% CR		70% CR	
	A	B	A	B	A	B
Premium received	100	100	100	100	100	100
Premium Ceded	(50)	(50)	(50)	(50)	(50)	(50)
Claims incurred	(60)	(60)	(50)	(50)	(70)	(70)
Claims ceded	30	30	25	25	35	35
RI commission	10	10	10	15	10	5
Expenses	(15)	(15)	(15)	(15)	(15)	(15)
Net result	**15**	**15**	**20**	**25**	**10**	**5**

Why use reinsurance?

Myth #7

No matter how bad climate change gets, we could always cede the additional risk to the reinsurers, and pass on the costs to the policyholders

International reinsurance capacity is limited. Examples of reinsurers exiting the market in California and Florida.

Pricing Reinsurance Structures

Reinsurance optimisation with simulation software

Frequency and Severity modelling

- Portfolio
- Class of business
- Reinsurance cover
- Claims inflation
- Book growth
- Currency movements
- Claim size
- Frequency: Monthly or Annual

Frequency

- Poisson
- Neg Binom
- *Normal*

Severity

- Gamma
- Lognormal
- Weibull

Simulations

Reinsurance optimisation with simulation software

Measures used to compare reinsurance performance

- Mean
- 1-in-4 year earnings variability
- 1-in-20 year severe earnings shock
- 1-in-200 year capital requirement

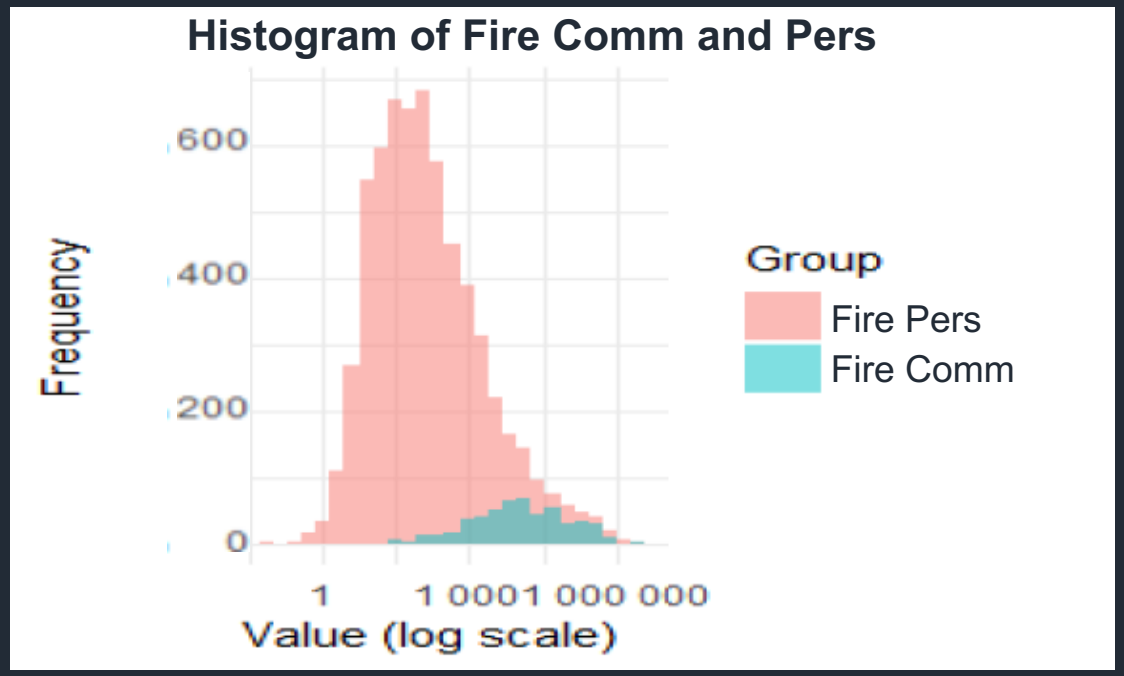
Percentiles based on Gross and Net of reinsurance

- Deterministic capital calculations (SII/ECAP)
- Accurate net underwriting performance range

Optimising Fire Portfolio | Line of Business and Current Reinsurance

- Personal and Commercial Business (80/20 Split)
- Budgeted Premiums 2025: 750mil
- Budgeted Claims Ratio 2025: 55%
- Two reinsurance treaties
  - Catastrophe Excess of Loss
  - 50% Commercial Quota Share

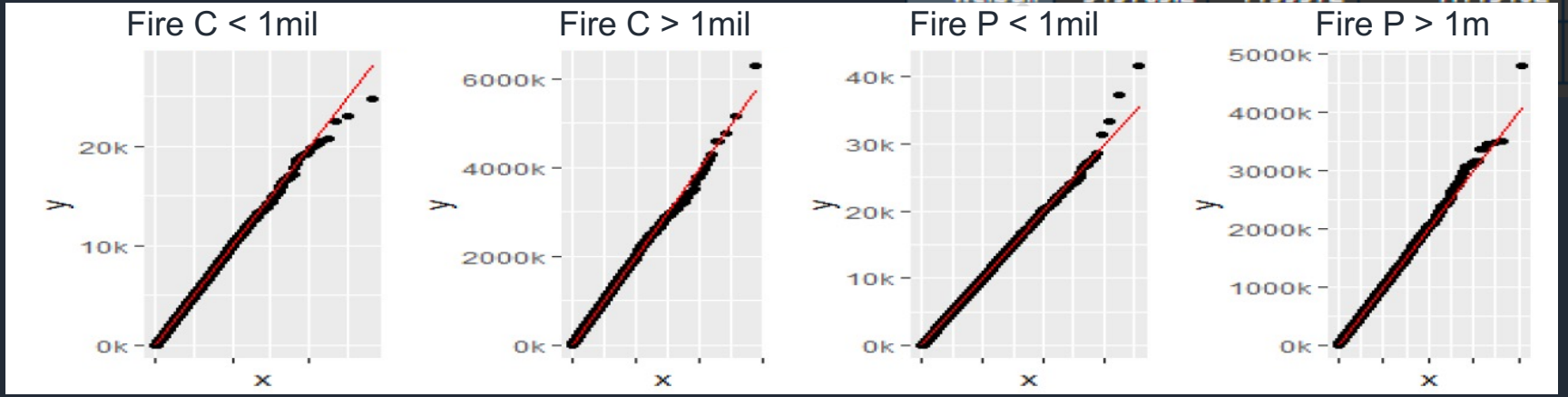
Optimising Fire Portfolio | Distribution fitting




```
> gofstat(list(lnorm_fit, weibull_fit, gamma_fit))
Goodness-of-fit statistics
                             1-mle-lnorm 2-mle-weibull 3-mme-gamma
Kolmogorov-Smirnov statistic  0.04310253    0.07424306   0.2706101
Cramer-von Mises statistic    2.27581055   15.88445700 143.3490359
Anderson-Darling statistic   32.67594060   91.56310426 740.9700014

Goodness-of-fit criteria
                                1-mle-lnorm 2-mle-weibull 3-mme-gamma
Akaike's Information Criterion    215897.5      215745.2     219352.8
Bayesian Information Criterion    215911.5      215759.2     219366.8
> |
```

	Mean	Std Dev	Skewness	Kurtosis
Observed	553958.7	1315571	3.990074	20.81414
lnrom	1208695.2	17432781	179.377020	48983.57886
weibull	519783.2	1199372	7.113102	105.69558
				38.02822



Optimising Fire Portfolio | Simulation

- For each of 50k simulations
  - For Fire Personal
    - Simulate number of claims from Fire_Personal_Freq distribution
    - Simulate severity of each claim from Fire_Personal_Sev distribution
  - For Fire Commercial
    - Simulate number of claims from Fire_Commercial_Freq distribution
    - Simulate severity of each claim from Fire_Commercial_Sev distribution
- Each row represents one month

Optimising Fire Portfolio | Simulation

- For each of 50k simulations
  - For each of 12 months
    - For Fire Personal
      - Simulate nr of claims from Fire_Personal_Freq distribution
      - Simulate severity of each claim from Fire_Personal_Sev distribution
    - For Fire Commercial
      - Simulate nr of claims from Fire_Commercial_Freq distribution
      - Simulate severity of each claim from Fire_Commercial_Sev distribution
- Each row represents one year

Optimising Fire Portfolio | Gross Modelled Results

Measure
1-in-4 (25th Percentile)
Mean
1-in-4 (75th Percentile)
1-in-20 (95th Percentile)
1-in-200 (99.5th Percentile)

Optimising Fire Portfolio | Gross Modelled Results

Measure	Earned Premiums	Claims	Claims Ratio
1-in-4 (25th Percentile)	750	(379)	51%
Mean	750	(432)	58%
1-in-4 (75th Percentile)	750	(498)	67%
1-in-20 (95th Percentile)	750	(595)	79%
1-in-200 (99.5th Percentile)	750	(694)	93%

Optimising Fire Portfolio | Net of Reinsurance

Measure	Gross Claims	Nr of Claims attaching to XoL	Claims Ceded to XoL	Claims ceded to Commercial QS
1-in-4 (25th)	(367)	-	-	36
Mean	(430)	1	9	42
1-in-4 (75th)	(479)	1	19	45
1-in-20 (95th)	(614)	2	34	58
1-in-200 (99.5th)	(706)	4	45	66

Optimising Fire Portfolio | Net of Reinsurance

Measure	Gross Claims	Nr of Claims attaching to XoL	Claims Ceded to XoL	Claims ceded to Commercial QS	Net Claims
1-in-4 (25th)	(367)	-	-	36	**(330)**
Mean	(430)	1	9	42	**(379)**
1-in-4 (75th)	(479)	1	19	45	**(413)**
1-in-20 (95th)	(614)	2	34	58	**(522)**
1-in-200 (99.5th)	(706)	4	45	66	**(595)**

Optimising Fire Portfolio | RI Premiums and RI Commission

Measure	Catastrophe XoL	Commercial Quota Share
1-in-4 (25th)		
Mean		
1-in-4 (75th)		
1-in-20 (95th)		
1-in-200 (99.5th)		

Optimising Fire Portfolio | RI Premiums and RI Commission

Measure	Catastrophe XoL			Commercial Quota Share
	XoL Premium	Reinstatement Premium	**Total XoL Premium**	
1-in-4 (25th)	(10)	0	**(10)**	
Mean	(10)	(1)	**(11)**	
1-in-4 (75th)	(10)	(2)	**(12)**	
1-in-20 (95th)	(10)	(3)	**(13)**	
1-in-200 (99.5th)	(10)	(4)	**(14)**	

Optimising Fire Portfolio | RI Premiums and RI Commission

Measure	Catastrophe XoL			Commercial Quota Share		
	XoL Premium	Reinstatement Premium	**Total XoL Premium**	Premium Ceded	Sliding Scale Commission	**Total QS Premium**
1-in-4 (25th)	(10)	0	**(10)**	(75)	26	**(48)**
Mean	(10)	(1)	**(11)**	(75)	21	**(53)**
1-in-4 (75th)	(10)	(2)	**(12)**	(75)	17	**(57)**
1-in-20 (95th)	(10)	(3)	**(13)**	(75)	11	**(63)**
1-in-200 (99.5th)	(10)	(4)	**(14)**	(75)	11	**(63)**

Optimising Fire Portfolio | Reinsurance Cost

Measure	Gross Premium	Gross Claims	Premiums less claims		
1-in-4 (25th)	750	(367)	**383**		
Mean	750	(431)	**319**		
1-in-4 (75th)	750	(479)	**271**		
1-in-20 (95th)	750	(614)	**136**		
1-in-200 (99.5th)	750	(707)	**43**		

Optimising Fire Portfolio | Reinsurance Cost

Measure	Gross Premium	Gross Claims	Premiums less claims	Premium Ceded	Claims Recovered	Commission Received	
1-in-4 (25th)	750	(367)	**383**	(85)	37	26	
Mean	750	(431)	**319**	(86)	52	22	
1-in-4 (75th)	750	(479)	**271**	(87)	66	18	
1-in-20 (95th)	750	(614)	**136**	(88)	92	11	
1-in-200 (99.5th)	750	(707)	**43**	(89)	111	11	

Optimising Fire Portfolio | Reinsurance Cost

Measure	Gross Premium	Gross Claims	Premiums less claims	Premium Ceded	Claims Recovered	Commission Received	Reinsurance Cost
1-in-4 (25th)	750	(367)	**383**	(85)	37	26	**(22)**
Mean	750	(431)	**319**	(86)	52	22	**(12)**
1-in-4 (75th)	750	(479)	**271**	(87)	66	18	**(3)**
1-in-20 (95th)	750	(614)	**136**	(88)	92	11	**16**
1-in-200 (99.5th)	750	(707)	**43**	(89)	111	11	**34**

Optimising Fire Portfolio | Capital Requirement and RI Reduction

Measure	Gross Claims	Net of Reinsurance
1-in-4 (25th)		
Mean		
1-in-4 (75th)		
1-in-20 (95th)		
1-in-200 (99.5th)		

Optimising Fire Portfolio | Capital Requirement and RI Reduction

Measure	Gross Claims			Net of Reinsurance
	Claims	Nominal diff to mean	% of NAV	
1-in-4 (25th)	(367)	64	6%	
Mean	(431)	0	0%	
1-in-4 (75th)	(479)	(48)	(4%)	
1-in-20 (95th)	(614)	(183)	(17%)	
1-in-200 (99.5th)	(707)	(276)	(25%)	

Optimising Fire Portfolio | Capital Requirement and RI Reduction

Measure	Gross Claims			Net of Reinsurance		
	Claims	Nominal diff to mean	% of NAV	Claims	Nominal diff to mean	% of NAV
1-in-4 (25th)	(367)	64	6%	(330)	49	4%
Mean	(431)	0	0%	(379)	0	0%
1-in-4 (75th)	(479)	(48)	(4%)	(414)	(35)	(3%)
1-in-20 (95th)	(614)	(183)	(17%)	(522)	(143)	(13%)
1-in-200 (99.5th)	(707)	(276)	(25%)	(595)	(216)	(20%)

60m Capital Requirement reduction

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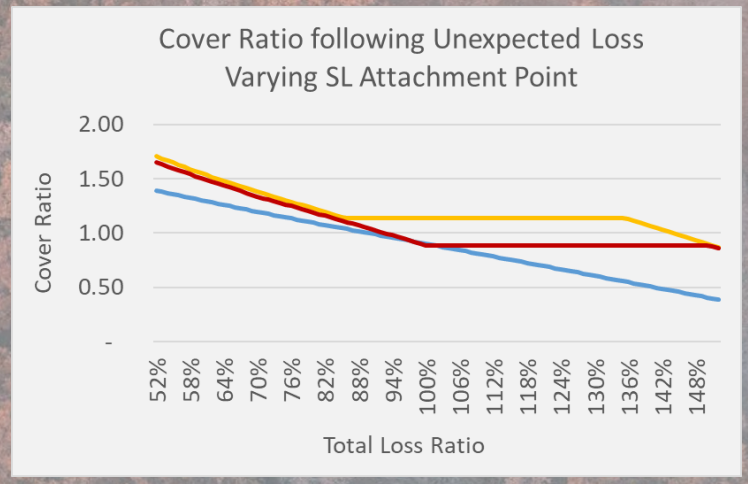
Optimising Fire Portfolio | Next Steps and Limitations

1. Rinse and repeat
2. Whole Account?
   → Combine All the Lines
3. Test different structures considered
   Allow for expected reinsurance rates
4. Special consideration of non-linear / discontinuous risk transfer (Stop Loss)

1. ***Independent and Identically Distributed (i.i.d)***
2. ***Events Not In Data (ENID)***
3. ***Major changes will require broker sourced quotes***



Thank you

Questions or Comments?

Chris van der Merwe
CHRIS.VANDERMERWE@MILLIMAN.COM

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