

**9th Capacity Building Seminar on General Insurance
Mumbai
11 January 2019**

**Reinsurance Evaluation : Technical Pricing and
Reinsurance Optimization
Jyoti Majumdar & Manish Singh**

Willis Towers Watson



Agenda



Going to talk about three main ideas

Need for reinsurance

Reinsurance program / contract evaluation

Evolution of reinsurance program

Need for Reinsurance



Reduced uncertainty of results

Balance risk vs profit

Better utilization of capital

Technical Expertise / new products & markets

Peace of mind

Pretexts / Excuse

Resistance to Change

- Reinsurance worked historically
- Hassle factor
- Broker does the modelling

Skepticism

- Soundness of technical analysis
- Model is “wrong” anyway
- It ends up being a management

Need for Reinsurance Evaluation / Analysis



Spend can be significant

Key asset for many businesses

Can be very complex

Costs versus potential benefits

Reinsurance Evaluation : Decisions



Buy Less Reinsurance ?

- Surplus of capital
- Retain more premium
- Reduce transaction costs
- Why share profits

Buy More Reinsurance?

- Regulatory pressure
- Share losses with reinsurers
- Safe from any catastrophic events
- “The safe the better”

Which form / Type of Reinsurance ?

- Size and structure of portfolio
- Frequency and size of losses
- Management and underwriting capability

Choosing the right reinsurance programme is not easy!!

Reinsurance Evaluation: Technical Pricing



- Inputs
- Considerations
- Approach

Technical Pricing : Inputs



- LOBs : planned exposure & premium, payment patterns, premium & claims related expenses
- Claim type parameters : distribution parameters by LOBs
- Claims Dependencies if any
- RI program & contract parameters

Technical Pricing : Considerations



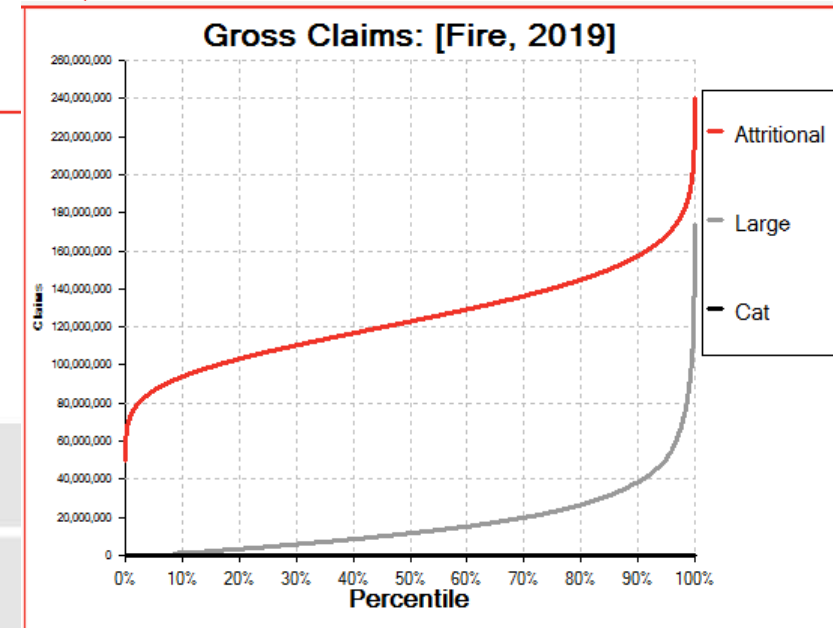
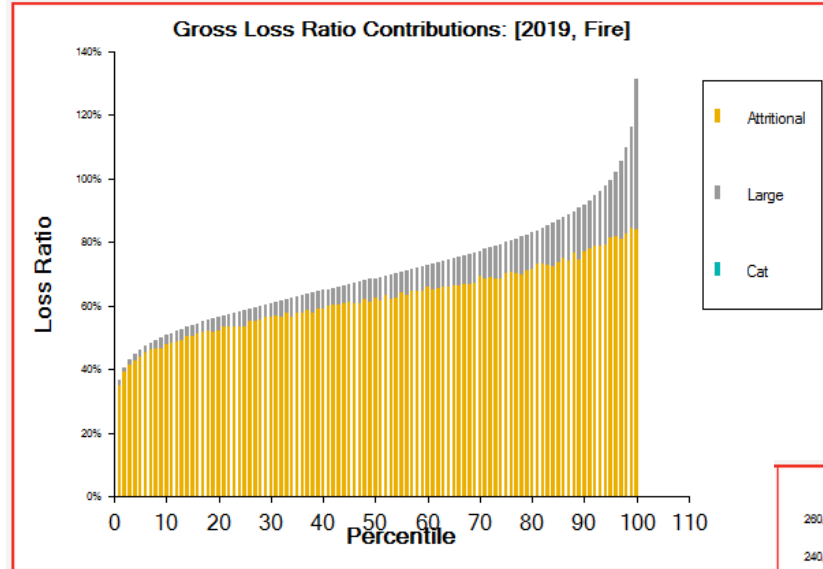
- Business mix
- Past claims experience / expected loss types
- Risk appetite and tolerance

Technical Pricing : Approach

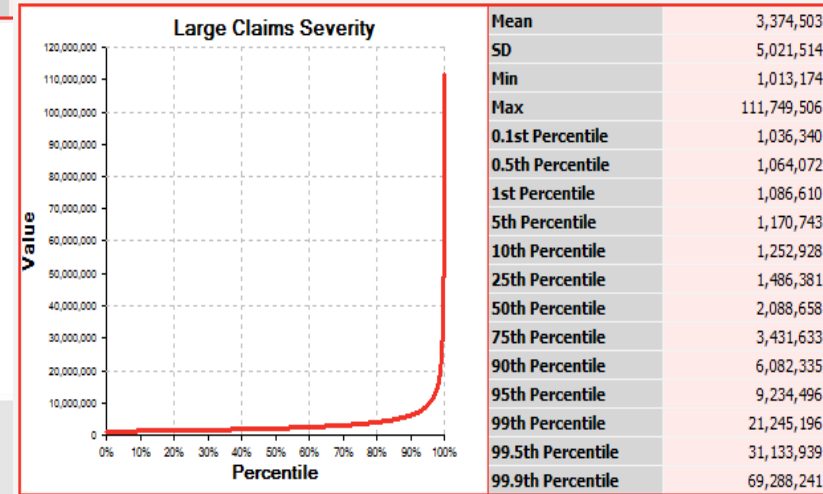
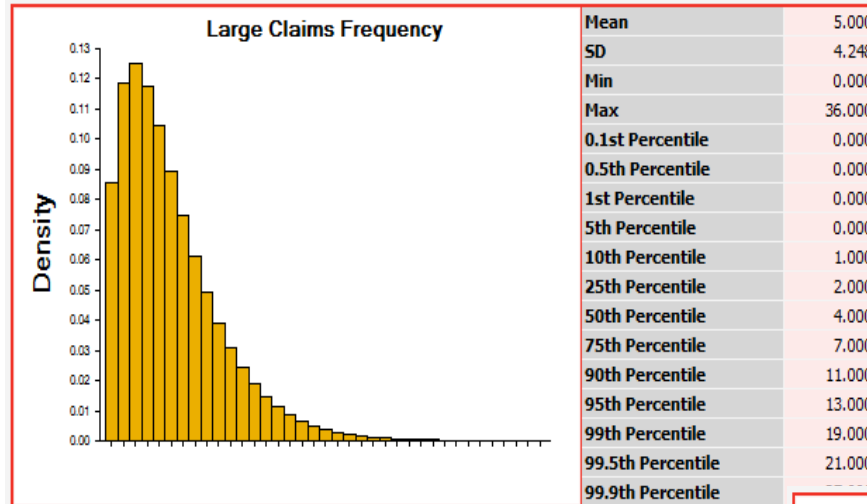


- Simulate gross loss experience by LOBs
- Arrange /consolidate simulated losses by applying desired dependencies
- Pass gross losses through RI programs / contracts
- Investigate gross loss and reinsurance recovery outputs

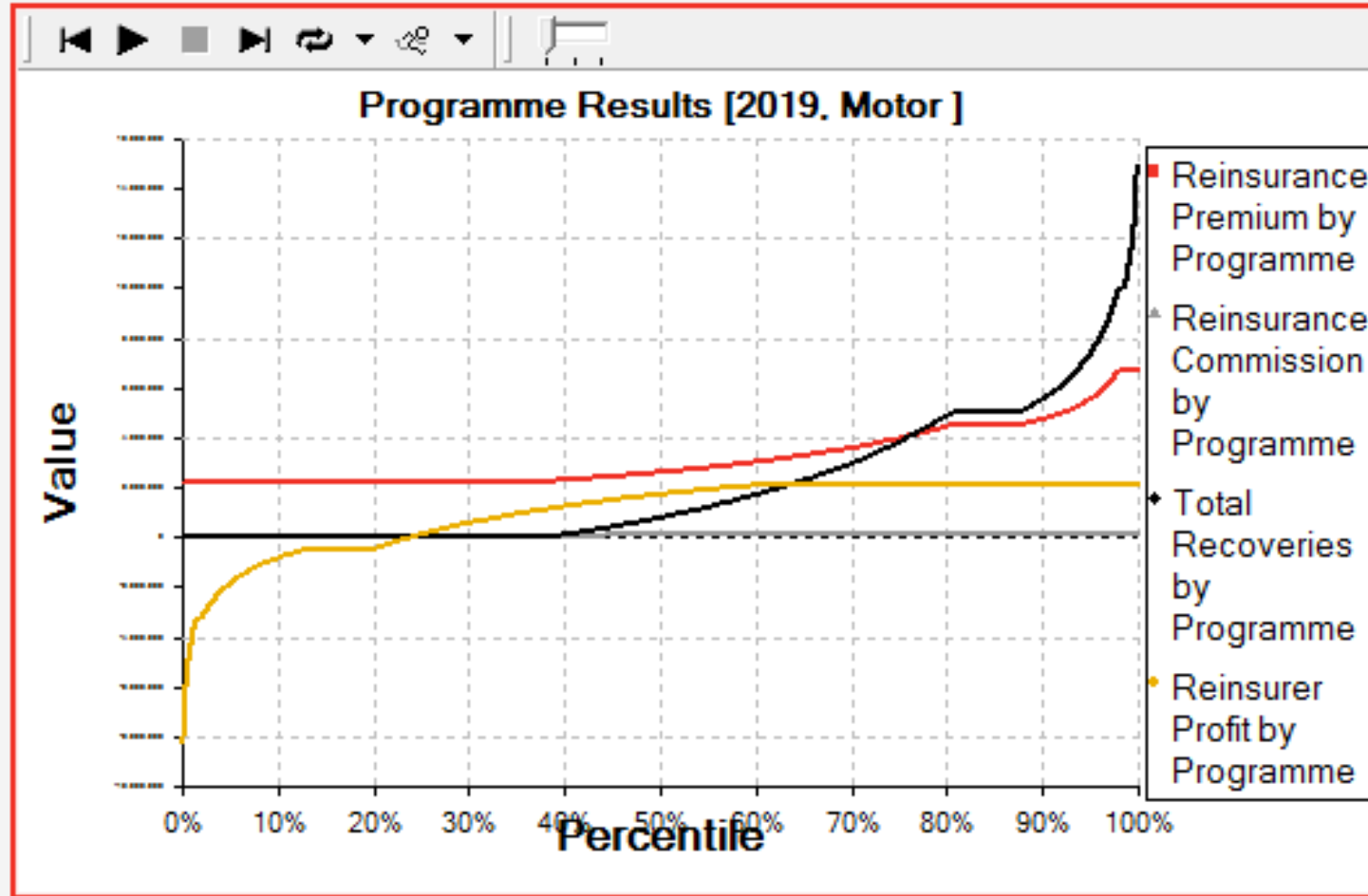
Technical Pricing : Inputs



Technical Pricing : Inputs



Technical Pricing : Approach

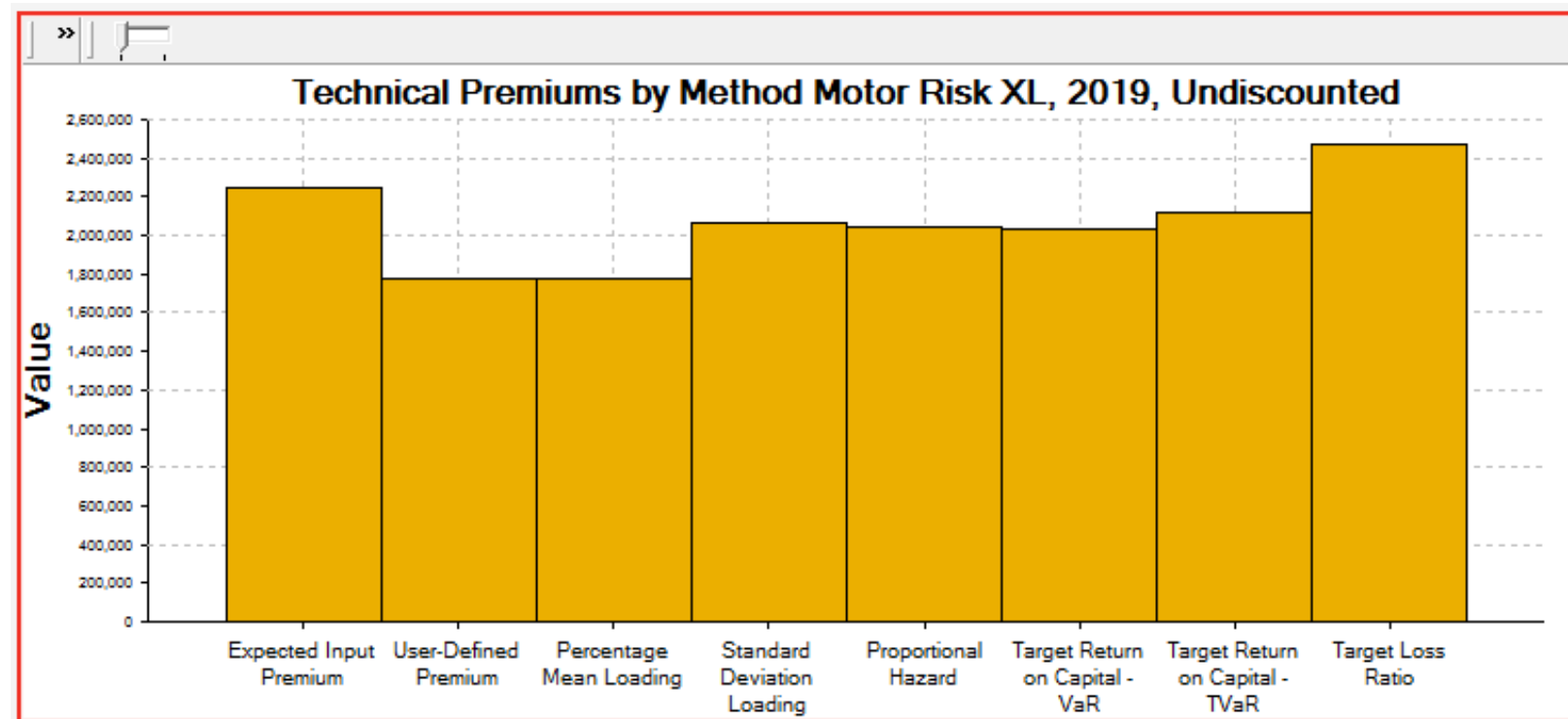


Technical Pricing : Methods



- Mean loading
- Standard deviation loading
- Target loss ratio
- Proportional hazards transformation
- Return on standalone VaR / TVaR

Technical Pricing : Outputs



Reinsurance Optimization: Case Study



Background

A simple business plan for a company writing one class of business

Expected losses typically split down into attritional/large (below/above a threshold) :

Item	Amounts in \$m
Gross Premium	40.0
Attritional Losses	20.0
Large Losses	14.0
Total Losses	34.0
Attritional LR	50%
Large LR	35%
Total LR	85%
Profit	6.0

Reinsurance Optimization: Case Study



Background Continued...

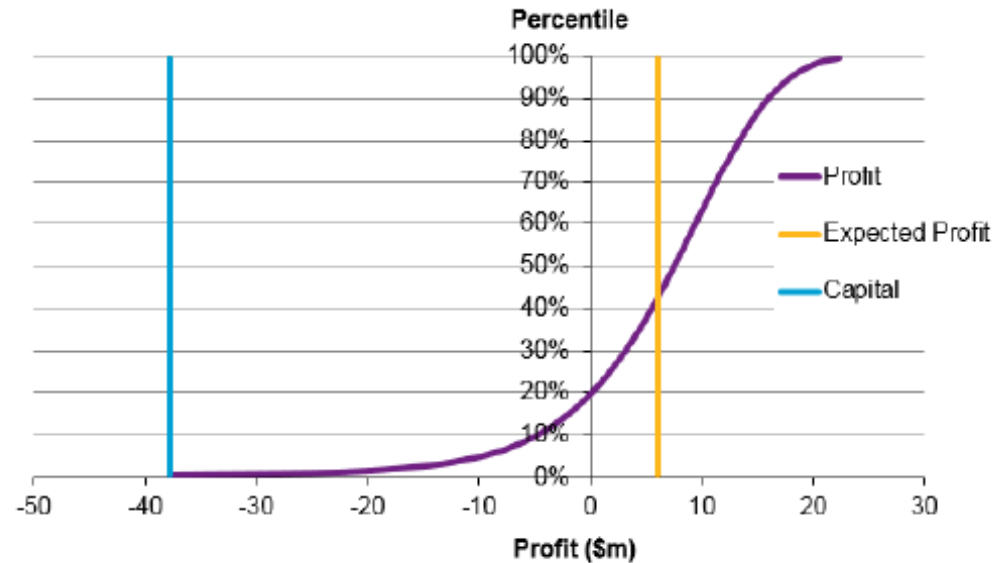
- Consider Some Differing Reinsurance Options
 - Unlimited excess of loss (XOL) above \$5m
 - One limited XOL layer of \$8m xs \$2m
 - A quota share arranged to cede 30%
 - A stop loss reinsuring 90% of losses when loss ratio is 100%-150%
- Company required to hold capital to remain solvent at 1 in 200 level

Reinsurance Optimization: Case Study

Gross Profile

Profit Distribution

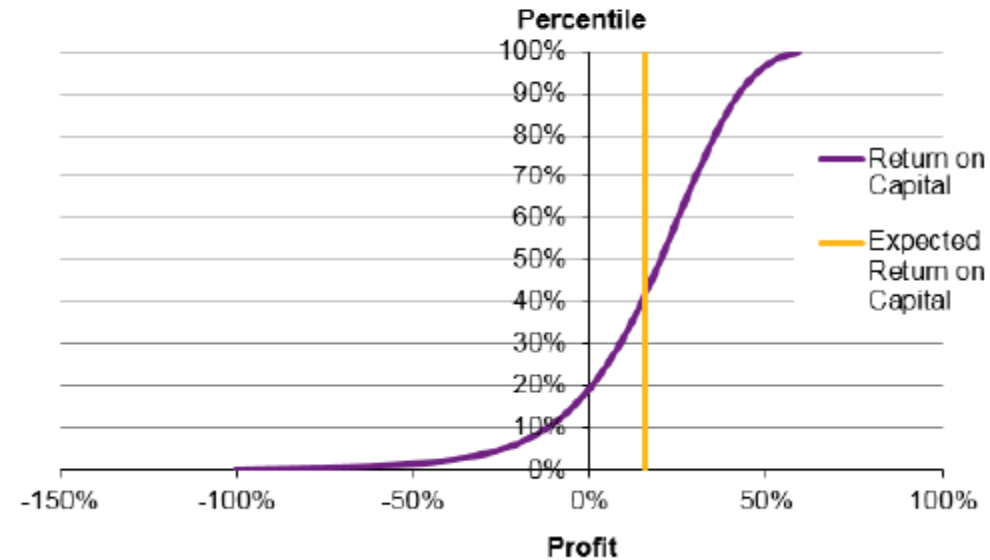
Profit Sm	Mean	P0.5	P5	P25	P50	P75	P95	P99.5
	6.0	(37.8)	(9.7)	1.8	7.6	12.3	18.0	22.3



Reinsurance Optimization: Case Study

Return on Capital Distribution

Return on Capital	Mean	P0.5	P5	P25	P50	P75	P95	P99.5
	0.2	(1.0)	(0.3)	0.0	0.2	0.3	0.5	0.6



Reinsurance Optimization: Case Study



Summary of Different Reinsurance Options

- Table shows key items for 4 different reinsurance options:

	Premium	Expected Losses	Expected LR	Expected Profit	Capital: 0.5th % Profit	Expected ROC	Expected Profit Reduction	Capital Reduction	Expected ROC Uplift
Gross	40.0	34.0	85%	6.0	-37.8	16%			
1. Net of Unlimited XOL	37.1	33.1	89%	4.0	-19.8	20%	2.0	-18.0	4%
2. Net of Limited XOL	38.3	32.9	86%	5.4	-29.8	18%	0.6	-7.9	2%
3. Net of Quota Share	28.0	23.8	85%	4.2	-26.4	16%	1.8	-11.3	0%
4. Net of Stop Loss	37.9	32.8	86%	5.1	-21.8	24%	0.9	-15.9	8%

Largest capital reduction
 Smallest expected profit reduction
 Largest expected ROC uplift
 Amounts in \$m

- Which is most important for the company?

Reinsurance Optimization: Practical Considerations



Business Considerations

- Loss experience
- Business objective & risk appetite
- Cost of capital differential

Modeling Considerations

- Should fit into broad capital model
- Correlations
- Reinsurance layer technical pricing
- Modeling features of the RI program

Conclusion



Reinsurance purchase decision is critical:

- Too much or inappropriate reinsurance spend suppresses profitability
- Too little or ineffective reinsurance can expose the venture to excessive risk

More diverse and complex reinsurance options

To evaluate the best reinsurance structure:

- Analytical review of the business under each reinsurance scenario
- Combined with an understanding of the company's risk appetite and success measures



Thank You !!