

REINSURANCE STRUCTURING & OPTIMIZATION

4th Capacity Building Seminar in General
Insurance – Institute of Actuaries of India

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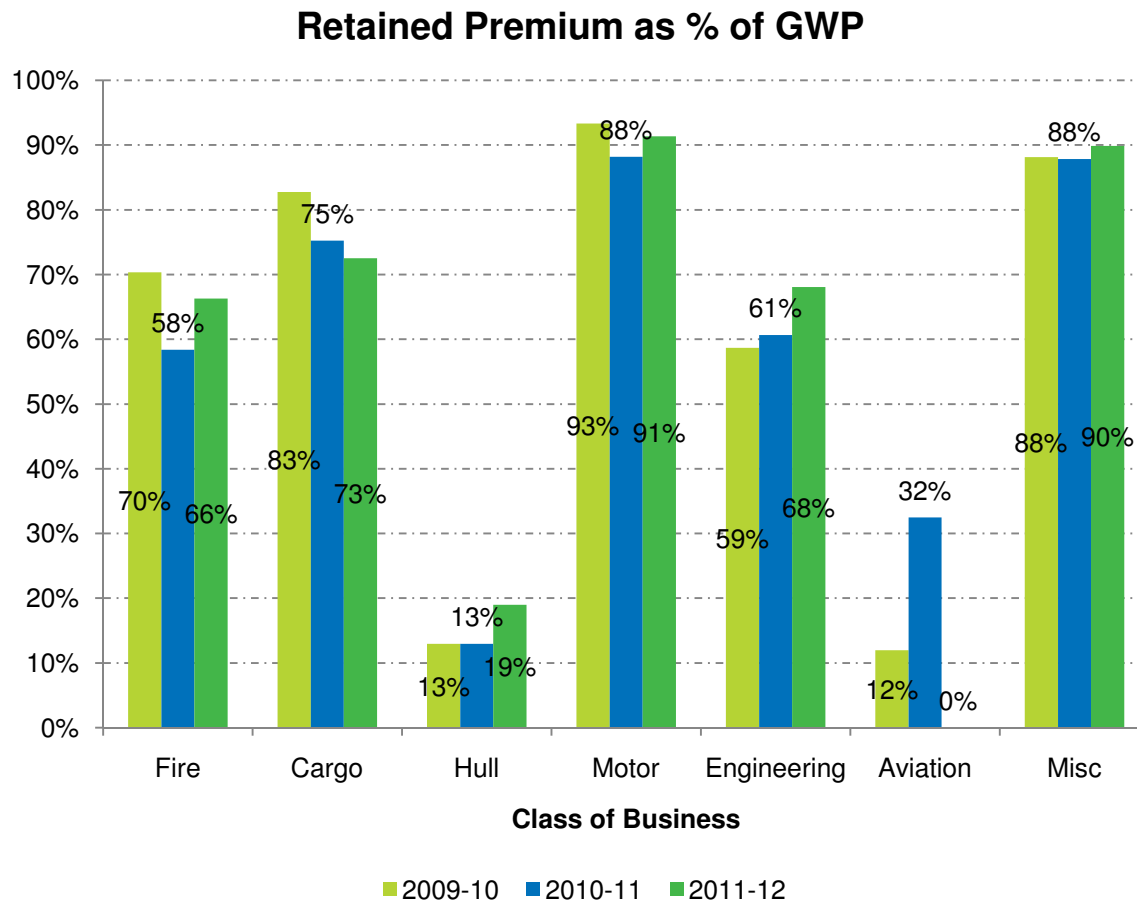
INDIAN REINSURANCE MARKET

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Indian Reinsurance Market

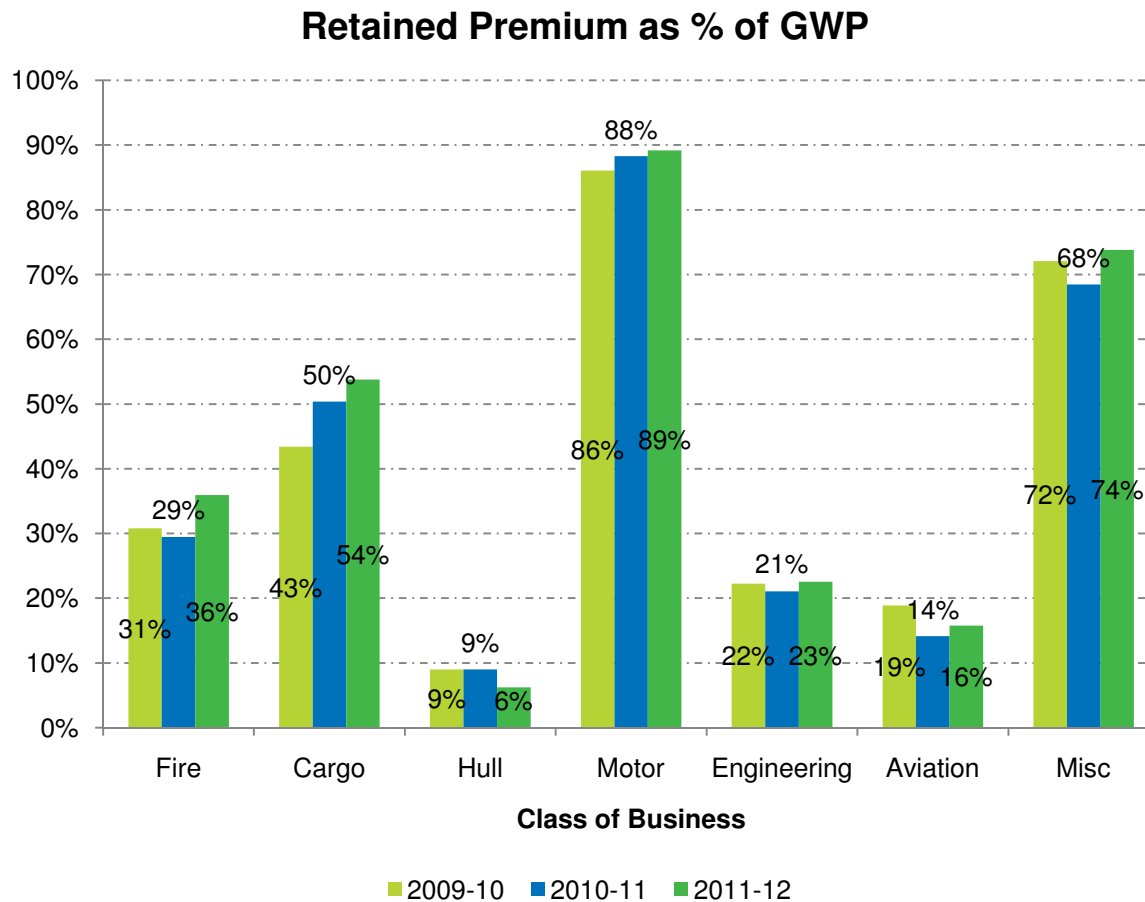
- Approx. INR 150bn – INR 180bn Premium expected to be ceded during 2013-14
- Treaty Reinsurance forms 25% - 30% of the total RI spend with the rest being Facultative
- Treaty RI business is split into Proportional and Non-Proportional in the ratio 3:1
- In terms of RI premiums, GIC Re is the leading reinsurer followed by Berkshire Hathway, SCOR and Swiss Re
- Fire and Engineering class mainly reinsured via Surplus, Risk XL and CAT XL treaties
- Motor and Marine class are mainly gross Risk and CAT XL.
- Broker involvement to liaise with Foreign Reinsurers

Retained Premiums – Public Sector Insurance Companies



- Public Insurance companies have ceded about 30%-35% of the total gross direct premiums (excl Obligatory) for Fire, Engineering and Marine Cargo classes.
- For the Motor class less than 10% of the premiums are ceded.
- Aviation and Hull business is reinsured mainly within the London market.

Retained Premiums – Private Insurance Companies



- Private Insurance companies comparatively retain a very small share of the total gross direct premiums (excl Obligatory) as compared to the Public Sector Insurance Companies.
- For the Motor class less than 10% of the premiums are ceded.

REINSURANCE STRUCTURE CONSIDERATIONS

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Reinsurance Structure Considerations

- What are the Company's Goals?
 - Preserve/Create Surplus i.e. Risk Policy and Tolerance
 - Reduce Exposure and Manage Volatility
 - Maintain/Support Capital
 - Business Objective
- Peer Comparison
- Reinsurance Pricing

REINSURANCE STRUCTURING

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Proportional Treaty

- **Quota Share**

- Reinsurer loss experience mirrors that of the cedant. So historical experience of the gross book is important
- Reinsurer might prescribe underwriting and claims management philosophy for the cedant

- **Surplus**

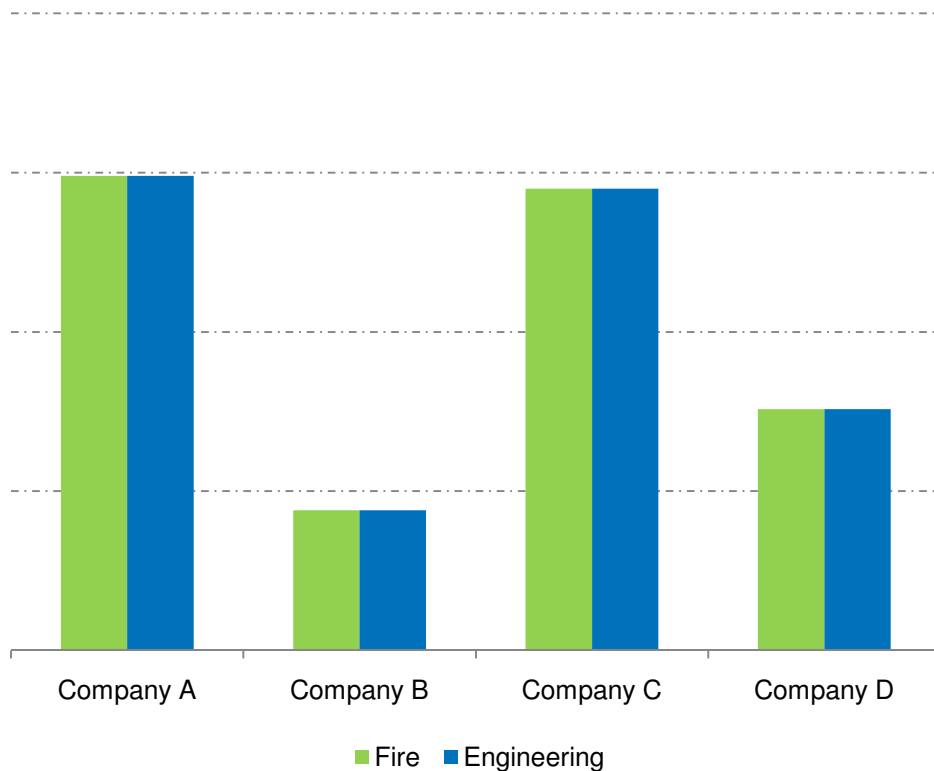
- Risk Retention i.e. How much to retain per risk?

- Commission terms i.e. Ceding commission (Flat Commission or Sliding Scale) and Profit commission

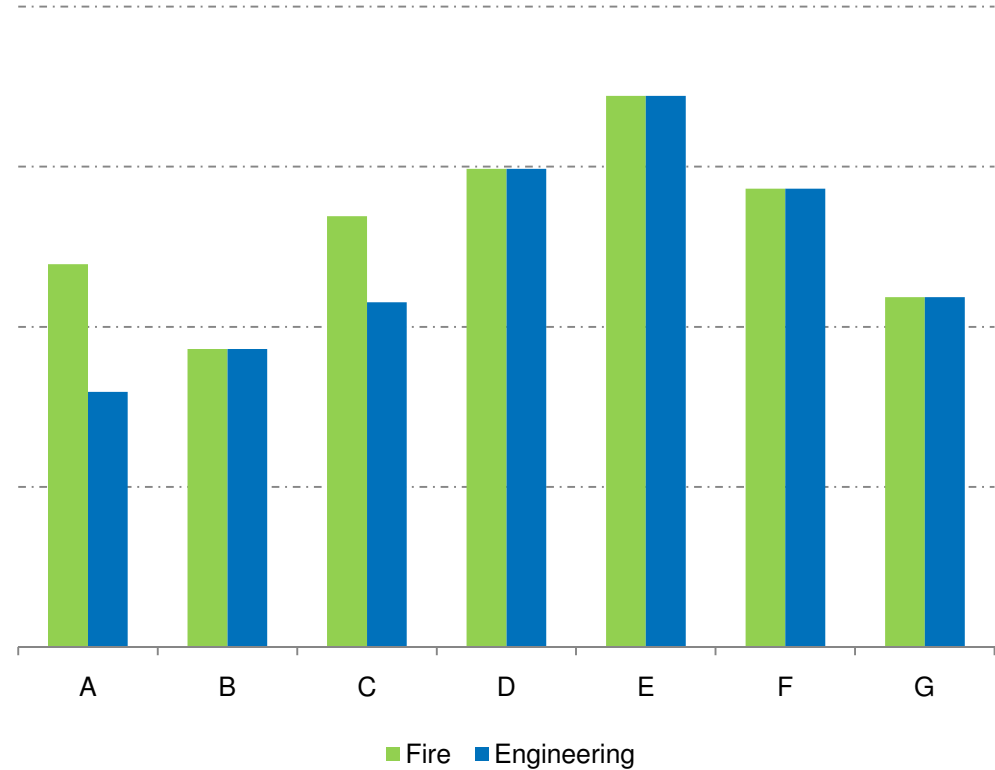
- Loss Corridors features

Risk Retention – Indian Insurance Companies

Retention as % Company Net Worth



Private - Retention as % Company Net Worth



The graph above shows the Risk Retention for Fire and Engineering class of business as a percentage of company's net worth for the top 10 Indian non-life insurance companies.

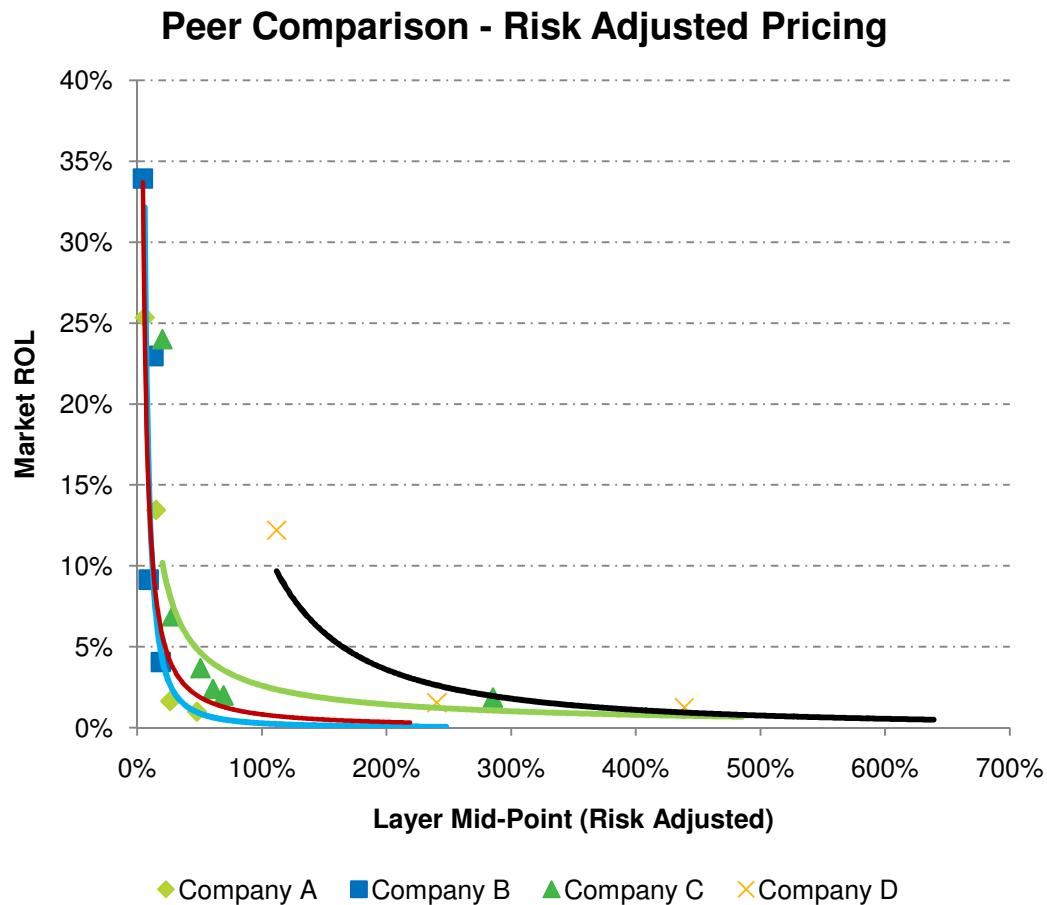
Factors Affecting Risk Retention

- Financial Strength
- Insurer's willingness to take on risks
- Reinsurance Market
- Solvency Regulations
- Underwriting Capacity
- Tradition and Market Practice
- Mix of Business i.e. diversification

Non-Proportional Treaty

- Deductible and Limits for the treaty
 - Too low deductible might result in just dollar swap
 - Too high deductible might mean its not effective
 - Impact of increasing/reducing deductible/limit
- No. Of Reinstatements
 - What is the chance that the treaty is completely exhausted?
- Alternative Layering suitable i.e. Price advantage
- Should I drop my Surplus/QS and go pure XL?
- Peer/Market Benchmarking

Risk Adjusted Pricing



- Graph plots the Rate on Line charged against the Risk-adjusted layer mid-point for various XL layers
- Can be used to determine changes in Reinsurance rates year-on-year
- Can also be used to benchmark Risk XL pricing across the different companies in a given year

REINSURANCE OPTIMIZATION

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Proportional Reinsurance Optimization – Classic Method



Stage 1: Gross Loss Modeling

- Determine the gross underwriting result distribution for the class of business or Portfolio
- Risk Profile based modeling can allow for change in Risk Retention appropriately

Stage 2: Model existing RI Structure

- Model the existing RI structure and determine the appropriate risk metrics e.g. Expected Net Profit, Economic Capital or Return on risk adjusted capital
- Determine pricing factors

Stage 3: Model alternate Risk Retentions

- Model the alternative RI structure with increase/reduce Risk retention
- Determine the risk metrics
- In case of XL structures, adjust technical rates to determine market rates

Stage 4: Compare Results

- Compare the risk metrics across different structures to select the Risk retention that optimizes the Risk metric

Impact on Profitability and Capital at Risk

Impact on Profitability and Capital at Risk						
Expected Profit and Loss Account						
	Gross	2012	Alt 1	Alt 2	Alt 3	Alt 4
Gross Premium	10,014,000,000	10,014,000,000	10,014,000,000	10,014,000,000	10,014,000,000	10,014,000,000
Reinsurance Premium						
- Base Premium	0	194,805,000	187,200,000	180,350,000	191,850,000	175,700,000
- Reinstatement Premium	0	24,114,595	26,237,981	26,244,456	26,469,860	26,012,577
Net Premium	10,014,000,000	9,795,080,405	9,800,562,019	9,807,405,544	9,795,680,140	9,812,287,423
Net Retained Losses	6,631,790,786	6,495,658,785	6,491,741,878	6,491,282,227	6,489,186,641	6,493,837,464
Expenses	2,793,906,000	2,793,906,000	2,793,906,000	2,793,906,000	2,793,906,000	2,793,906,000
Underwriting Result (A)	588,303,214	505,515,620	514,914,142	522,217,316	512,587,499	524,543,959
Capital at Risk						
VaR (1 in 200 years)	2,551,318,548	1,690,152,729	1,662,540,556	1,678,434,836	1,666,767,176	1,673,784,836
Cost of Capital (B)	255,131,855	169,015,273	166,254,056	167,843,484	166,676,718	167,378,484
Economic Result (A-B)	333,171,360	336,500,347	348,660,086	354,373,833	345,910,781	357,165,475

Value at Risk = 1 in 200 "bad" underwriting result, i.e. the capital a client would need to hold to be sure of meeting its liabilities in a bad year

Cost of Capital = charge applied to represent costs associated with maintaining or raising that amount of capital

Economic result = Underwriting Result less Cost of Capital

- Normal for gross underwriting result to be better than net – this is an average result so takes into account good years as well as bad
- If net is better than gross – could mean reinsurance programme is very cheap – normally reinsurers price for a profit!
- However, when cost of capital is taken into account, net after reinsurance should be much better
- The greater the cost of capital applied the bigger the difference from gross
- The optimal structure will have the highest economic result

Impact on Profitability – Return on Capital

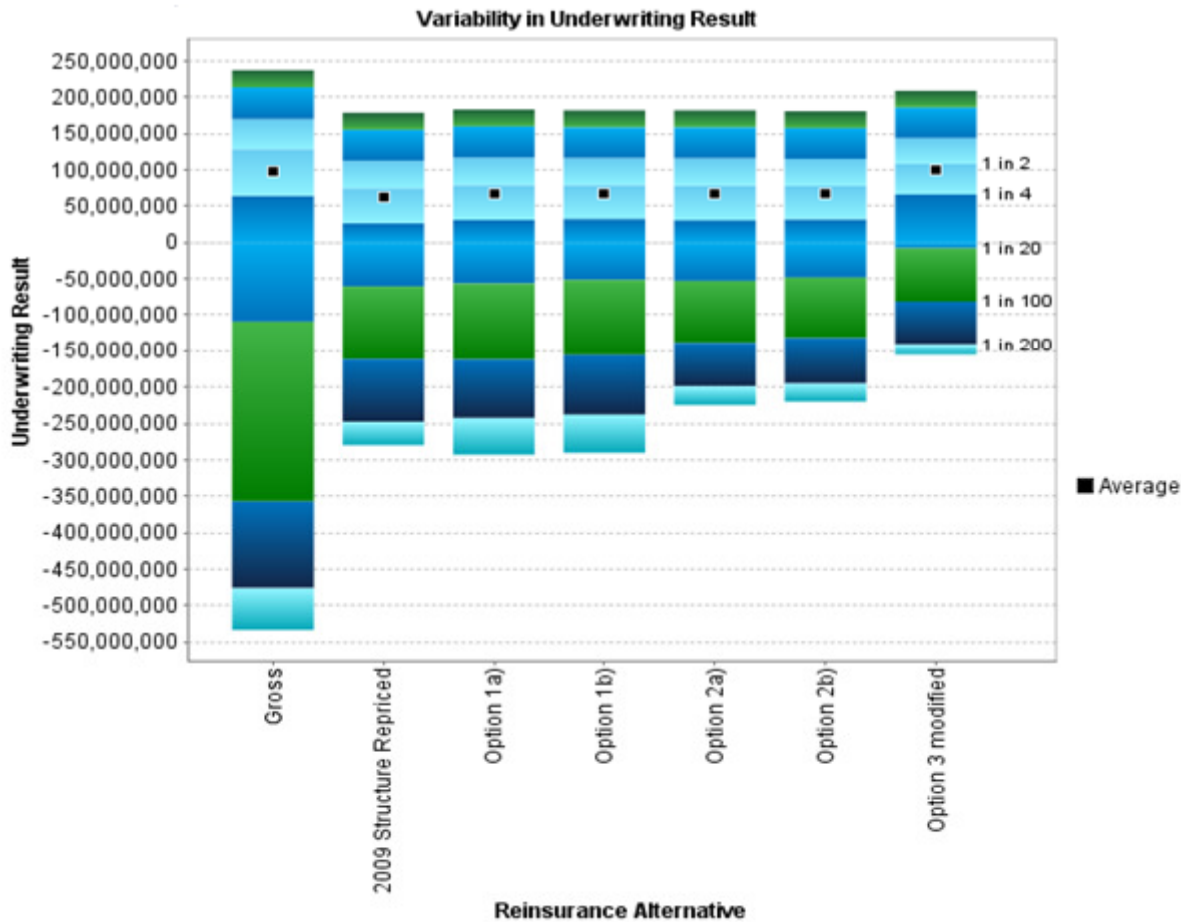
Impact on Profitability - Return on Capital Expected Profit and Loss Account

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Economic Return on Capital	23.059%	29.909%	30.972%	31.113%	30.753%	31.339%

Variation of previous report
Adds line showing Return on Capital = Underwriting Result / Value at Risk

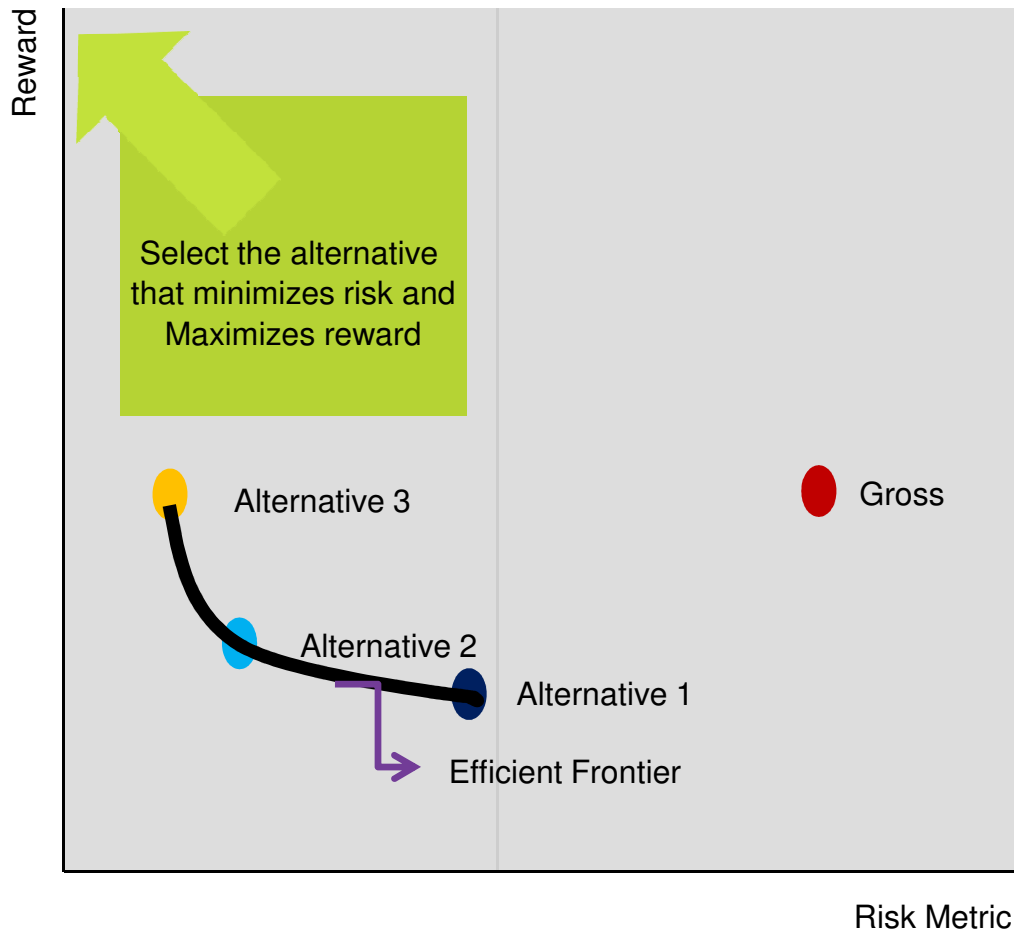


Variability in Results - Boxplots



- Illustrates how reinsurance reduces volatility in underwriting result and which structure is most effective in doing this

Risk – Reward Plots Efficient Frontier



- Plot the Risk-Reward for gross and each of the alternative structures on the graph
- Best retention option should have best return for least amount of capital at risk and appear in the top left corner

XOL Technical Rates

Risk XL - Comparison of Technical Rates v/s Market Rates

Component	Technical ROL	Estimated Market ROL	Technical ROL Standard Deviation	Loading Rate	Risk Factor
Layer 1	17.300%	25.194%	36.003%	1.456	21.926%
Layer 2	8.548%	13.376%	25.421%	1.565	18.990%
Layer 3	2.628%	1.635%	14.536%	0.622	(6.827)%
Layer 4	0.804%	0.994%	7.759%	1.237	2.452%

- Tech ROL Standard Deviation is the volatility around the Technical ROL and is an indicator of risk – higher for lower more loss affected layers
- But Co-efficient of variation (standard dev / tech ROL) will be higher for upper layers since these are more volatile even if lower risk overall
- Loading Rate = Market ROL/Tech ROL – doesn't take into account volatility of result and just loads the "mean" (tech ROL)
- Risk Factor is the % of the Tech ROL Standard Dev. applied to the Tech ROL to get to the Market ROL. This is a volatility neutral load and so is directly comparable between layers. Can also be described as the Standard Deviation Load

Classic Method Limitations

- Limited number of options to choose form
- Inability to consider multiple goals or constraints at the same time
- Subjectively limited to initially selected choice of structures

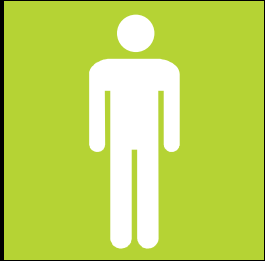
Proportional Reinsurance Optimization – Numerical Method

- Risk Retention can be optimized using any one of the following criterias:
 - de Finetti criterion i.e. minimize the variance of the retained loss under the constraint that the expected gain is fixed
 - RORAC criterion i.e. maximize the return on risk adjusted capital of the retained risk
- RORAC is the ratio of Net Profit to the Required Solvency level less retained premium

Final Words

- Reinsurance should be based on the underwriting strategy and not vice-versa
- Reinsurance structuring requires technical knowledge and Appointed Actuary should be involved in the decision making process
- Tap the resources of Reinsurance Brokers

THANK YOU!!!



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