Insurance of Earthquake Risk in Australia

Dr George Walker
Senior Risk Analyst
Aon Re Australia

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The Risk

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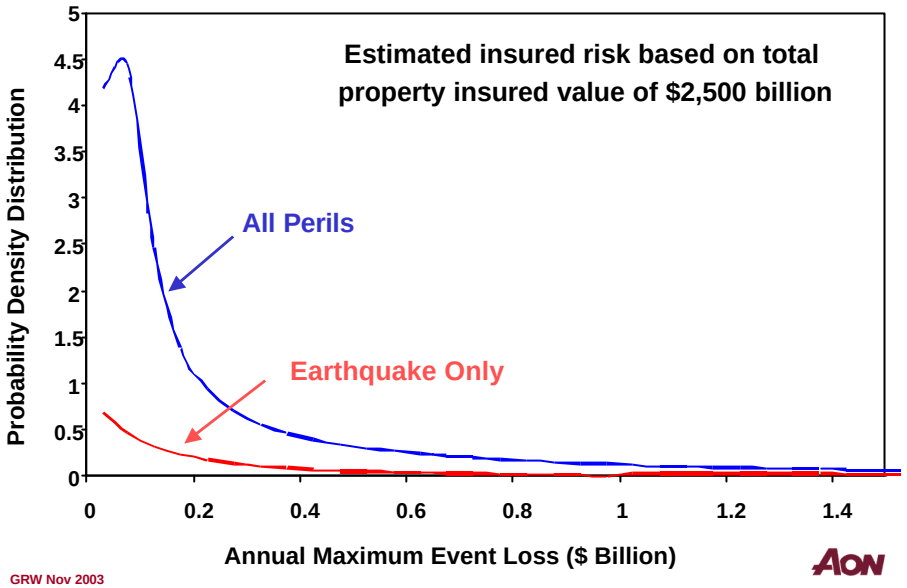
Australian Perils Property Insurance Loss Risk



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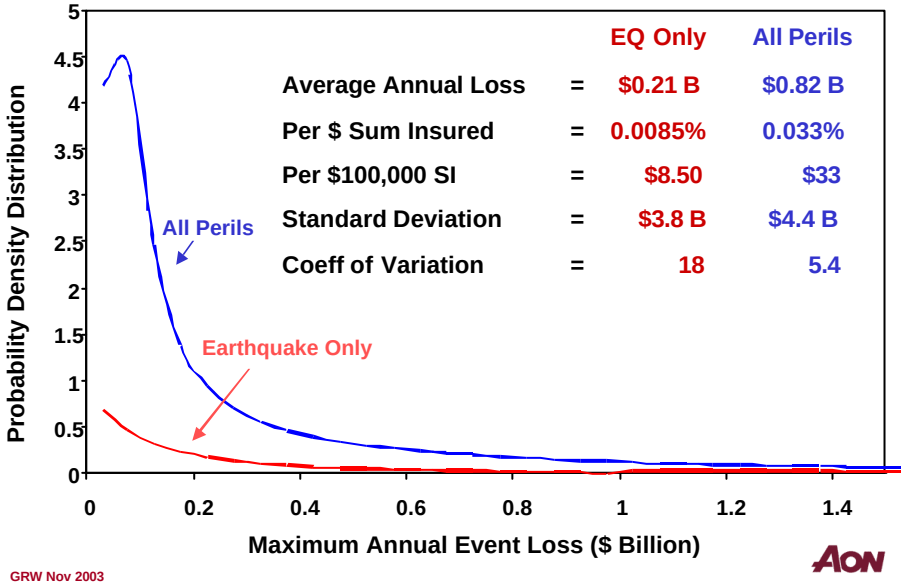
Australian Perils Property Insurance Loss Risk



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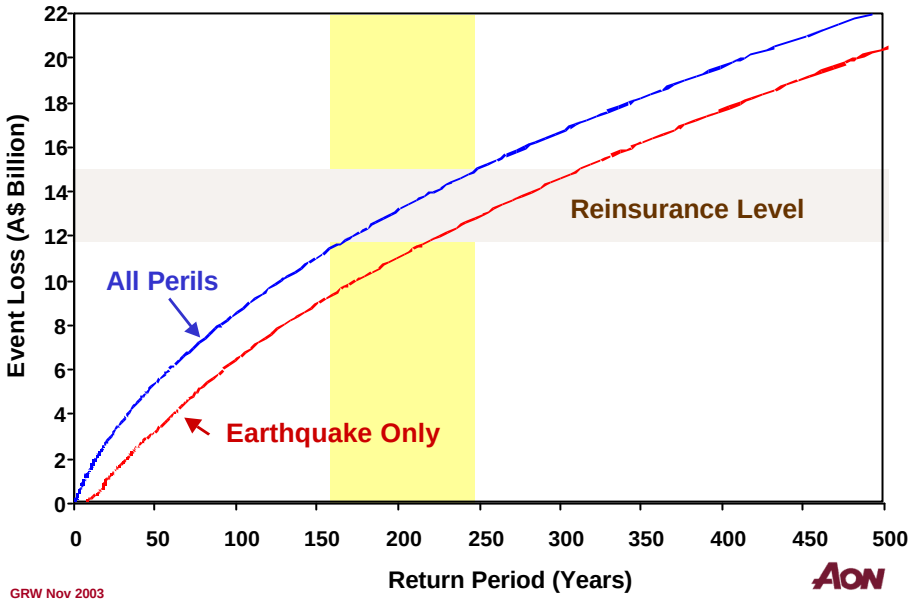

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Cost of Risk - ie Premiums

	EQ Only	All Perils
Assume reinsure $0.2 billion - $14 billion		
Estimated reinsurance cost	$400 million	$750 million
Cost of providing layer 0 – $0.2 billion	$10 million	$300 million
Total charge to consumers	$410 million	$1050 million
Price per $ sum insured	0.0185%	0.042%
Average premium per $100,000 sum insured	$16.50	$42
Cf Average risk per $100,000 sum insured)	$8.50	$33
Increase	$8	$9

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Forms of Reinsurance

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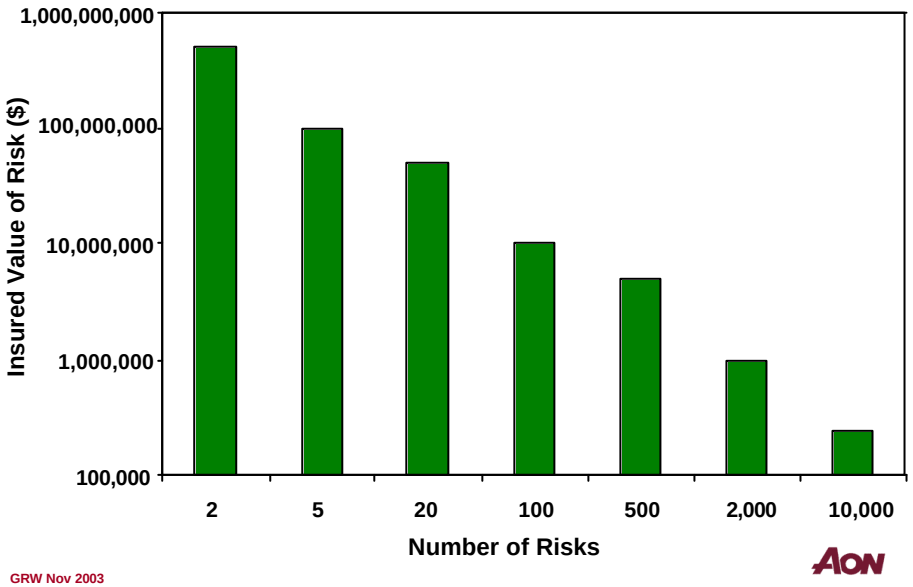
Insurance Company's Distribution of Risks



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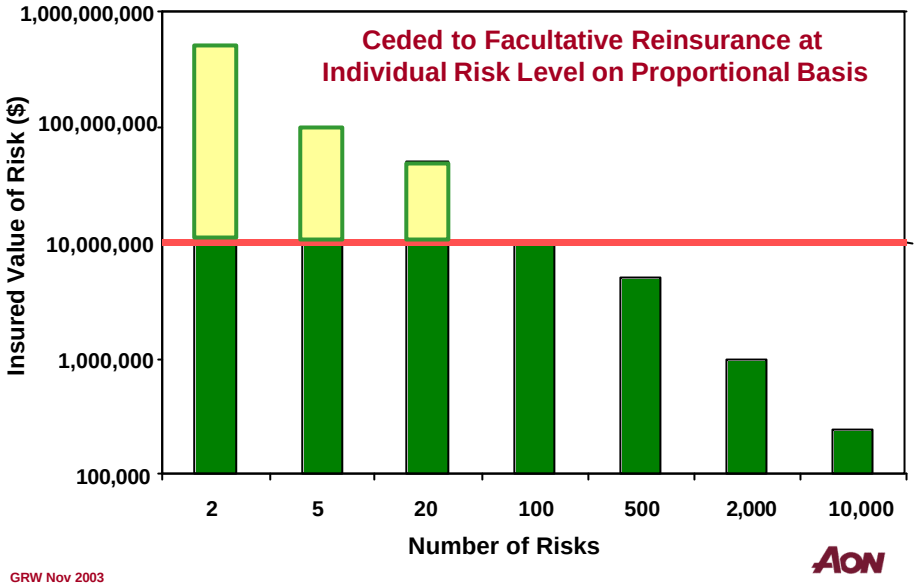
Facultative Reinsurance



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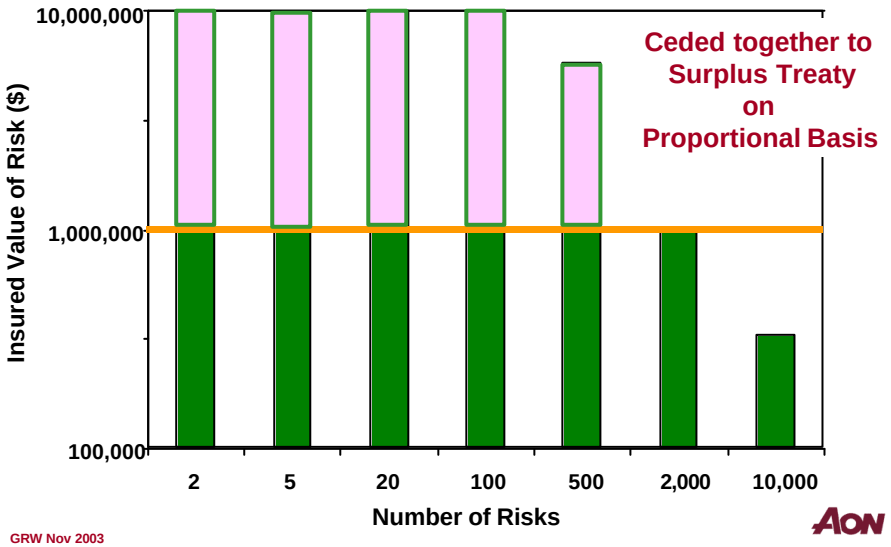
Surplus Reinsurance



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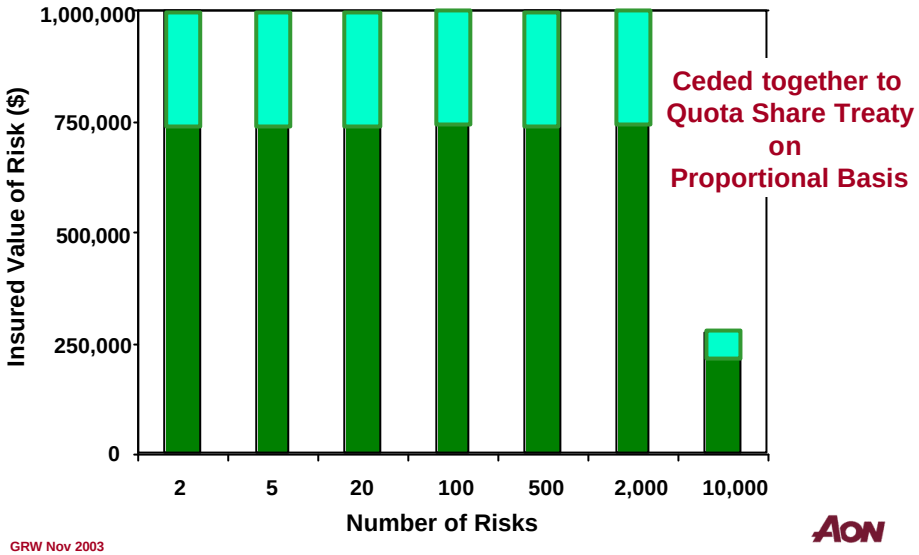
Quota Share Reinsurance



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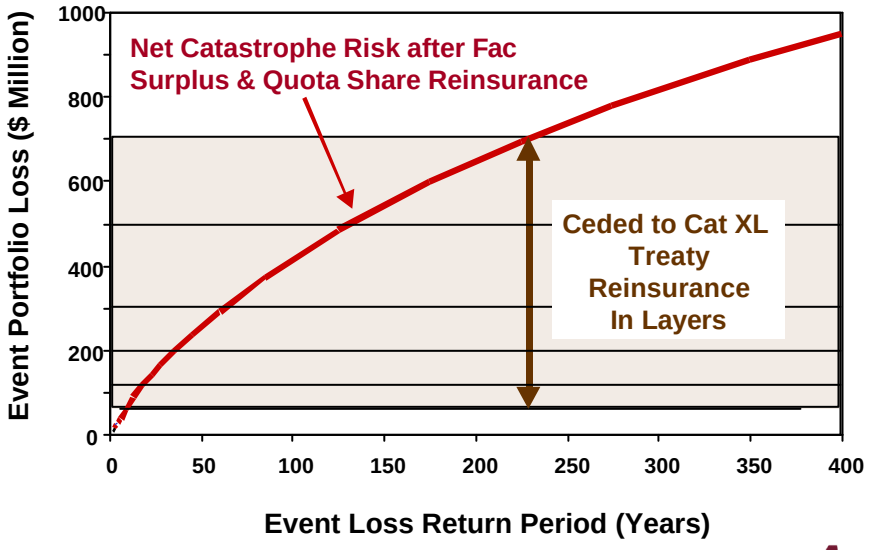
Cat XL Treaty Reinsurance



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Consequence

Most of the Catastrophe Risk is
Transferred to the Reinsurance Market

Reinsurers Mix it with Catastrophe Risks
from Rest of the World (ie Spread the Risk)

Reason
To Reduce Coefficient of Variation of Risk
(or Volatility)

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Pricing Theory

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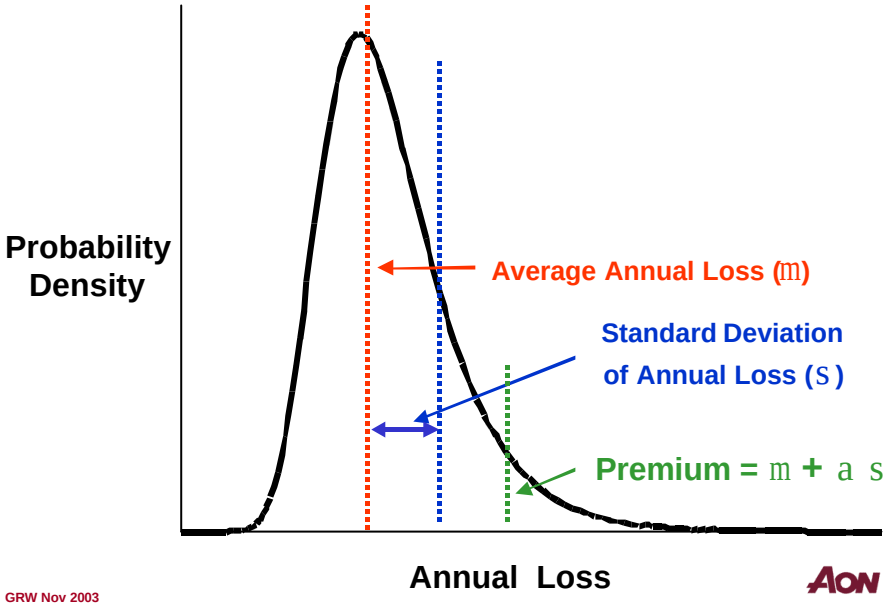
Theory of Risk Pricing



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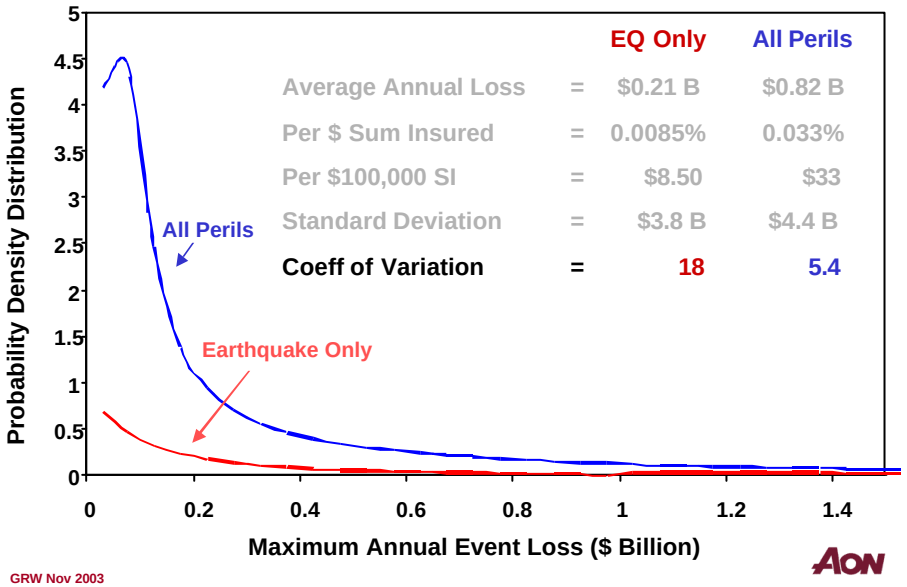
Australian Perils Property Insurance Loss Risk



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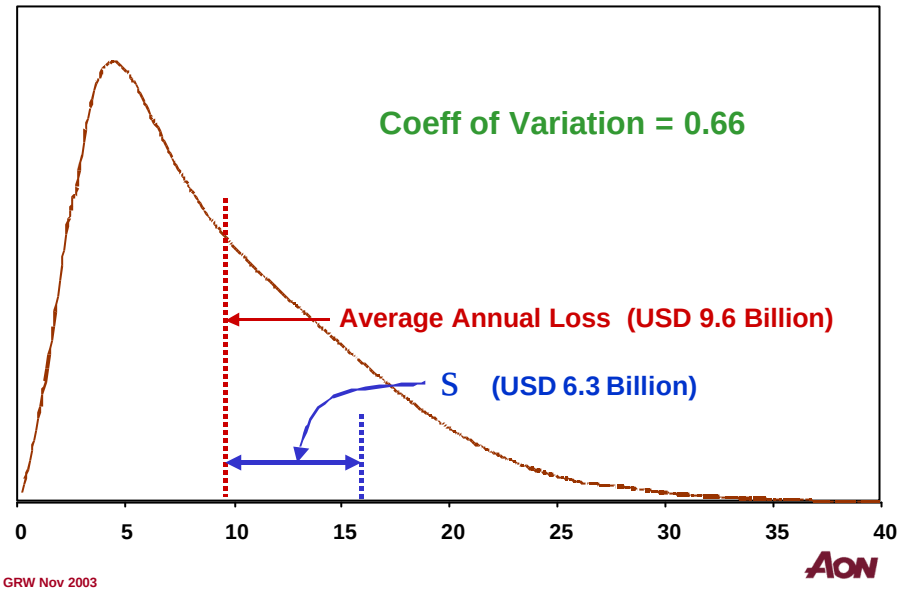
Annual Aggregate World Natural Catastrophe Insurance Loss Events >USD 0.2 Billion & < USD 10 Billion (Australian Range)



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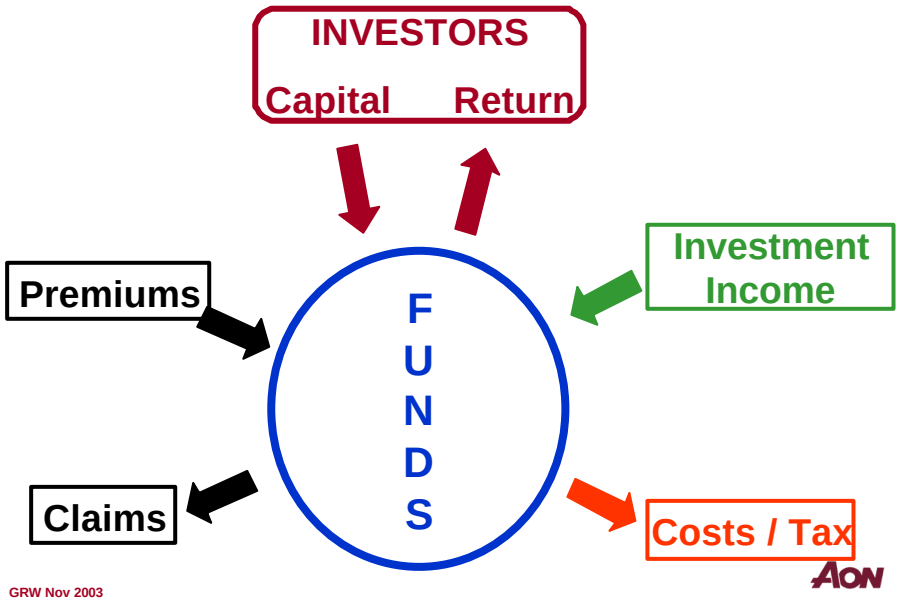
Principal Flow of Money – Primary Reinsurance Company



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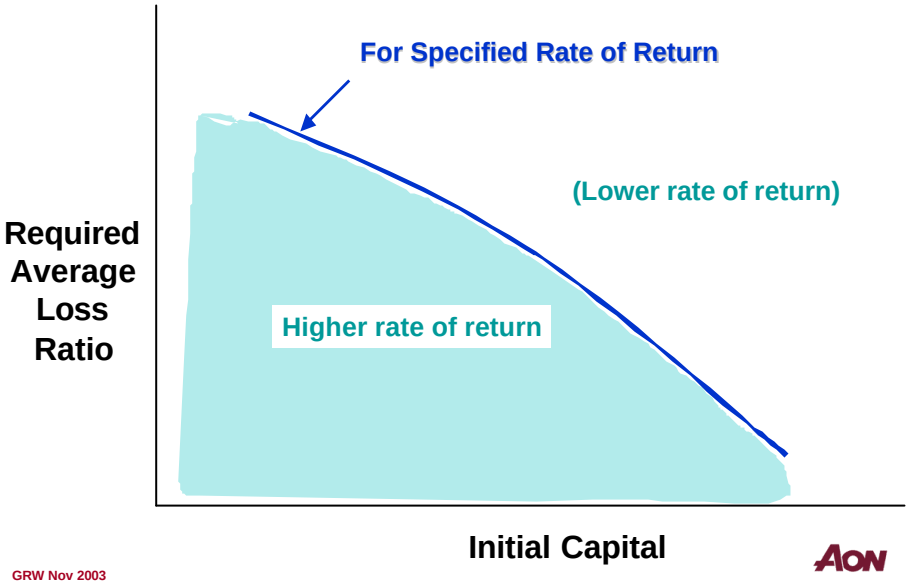
Loss Ratio, Capital and Return on Capital



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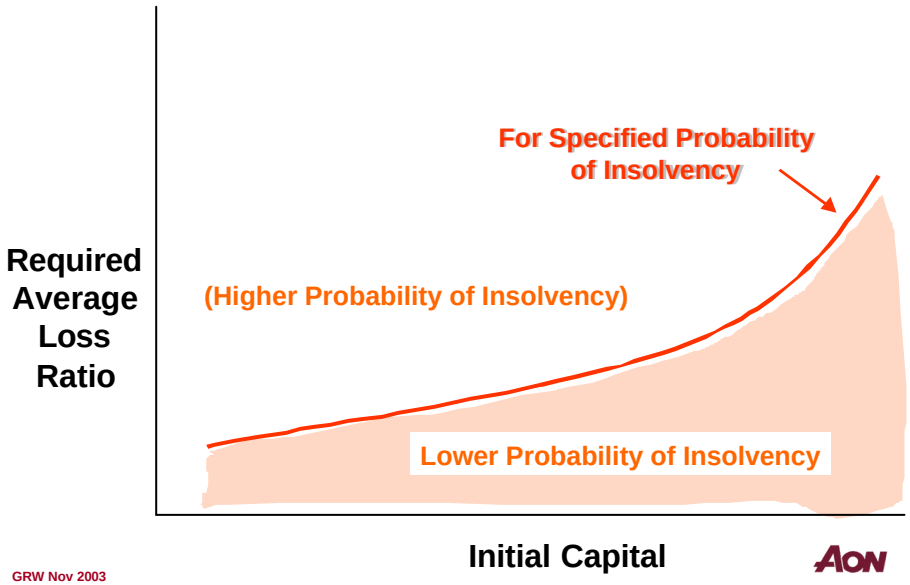
Loss Ratio, Capital and Insolvency



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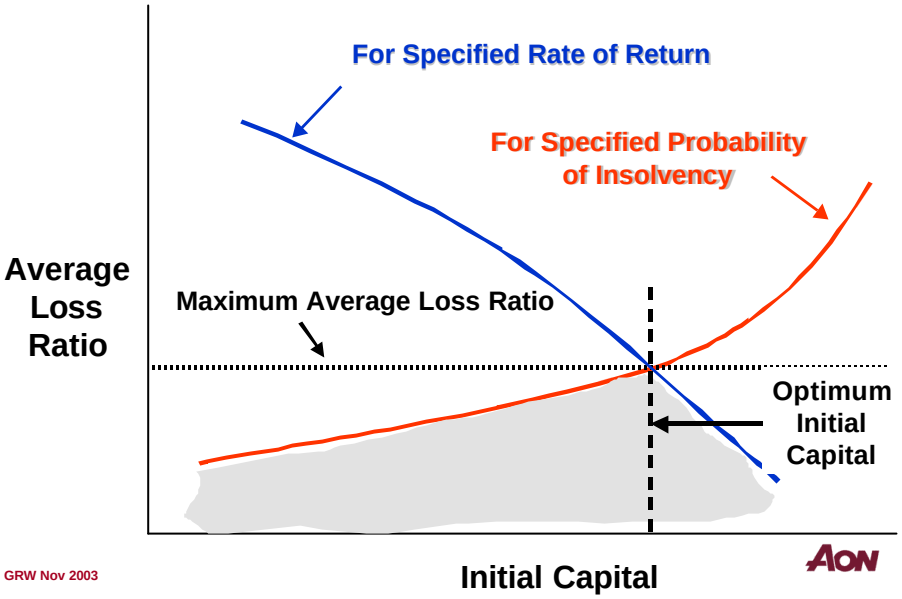
Optimisation of Premium and Capital Requirements



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Simple Example

Assume	
Required average annual return on capital	15%
Maximum risk of insolvency in next 10 years	0.4%
Average annual growth in insured values	4%
Average return on invested funds	5%
Expenses including tax / premium income	30%

Optimum solution for reinsurer with average worldwide spread of Australian range of loss

Premium income	= 1.75 x Average Annual Loss
Initial Capital	= 1.5 x Average Annual Loss

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Australian Reinsurance Premium

$$\frac{\text{Australia Average Annual Loss}}{\text{World Average Annual Loss}} = 3\,\%$$

Required Premium from Australia

= 0.03 x 9.6 x 1.75

= USD 0.5 Billion

= AUD 0.75 Billion

= AUD 0.45 + 0.30 Billion

= μ(Aus) + 0.2 σ(Aus)

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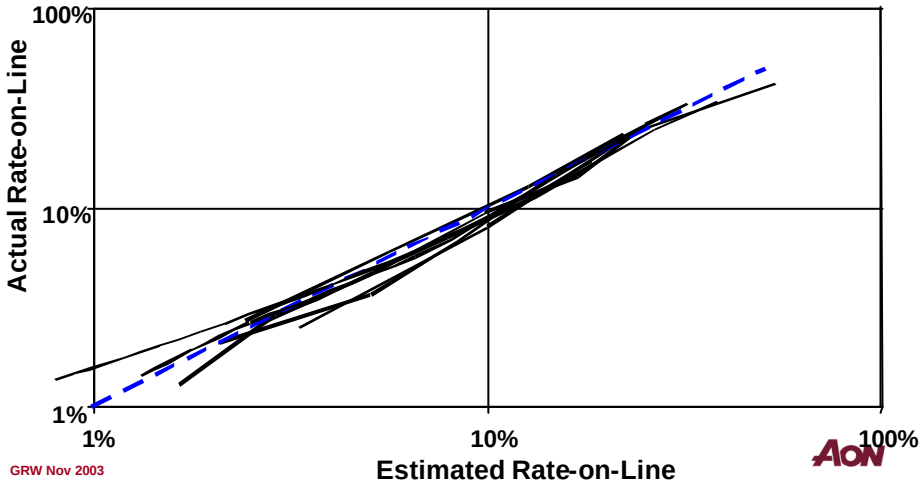
Comparison of Actual & Estimated Australian Reinsurance Prices

Estimated RoL = Average ALEL + 0.2 x Standard Deviation of ALEL
ALEL = Annual Layer Event Loss



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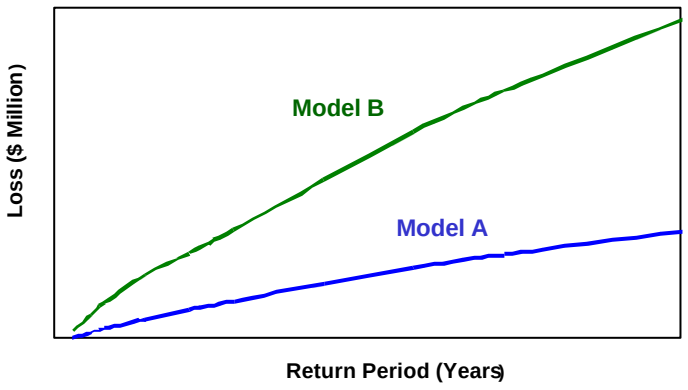
Reliability

Loss Models Not Very Reliable



Differences obtained in using 2 Australian commercial earthquake loss models

Note: These are worst case examples – depends on portfolios and sophistication of data

Underlying Issue

Cost of Developing & Maintaining Models

Need large amount of local knowledge

Not commercially viable for many countries

Suggested Solution

National collaborative research program to develop national consensus models for vulnerability and hazard risk which would be freely available to all catastrophe loss models

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Beneficiaries

Emergency Management

Insurance Industry

Building Code Regulators

Government Economic Planners

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Thank You