Enterprise Risk Management Seminar

Capturing the Upside

19 November 2014 • Hilton Sydney

Actuaries Institute

Stress & Scenario Testing Property and Casualty

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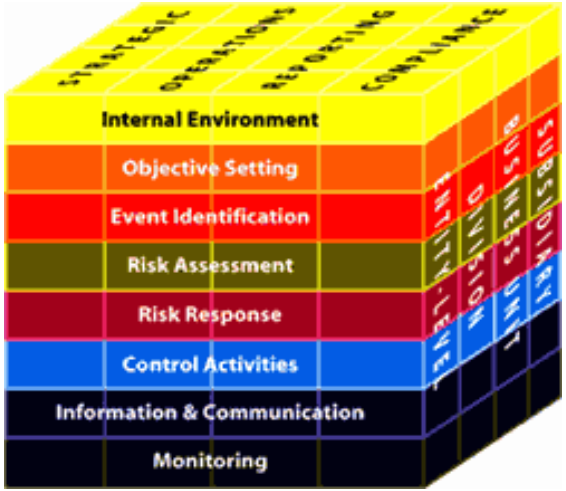
Agenda

- Enterprise Risk Management - perspective
- Dealing with Uncertainty in models
- Stress and Scenario Test - definition
- Feynman algorithm
- Lloyds
- Property - examples
- Casualty - examples
- Conclusion

Enterprise Risk Management

- 3 types
  - Prioritize and reduce (insurance COSO framework)
    - Identify
    - Assess & Prioritise
    - Etc…
  - Calculate and decide (investors & Insurers)
    - Probability Decision tree's
    - Risk vs reward
  - Anticipate and adapt (CEO's)
    - Assess work case
    - Acceptable or can it be made so?



Source: Committee of Sponsoring Organizations of the Treadway Commission (COSO)

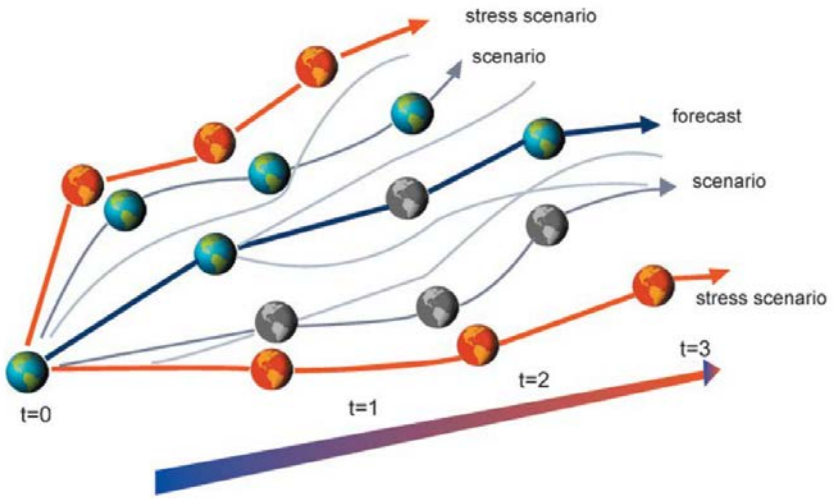
Dealing with Uncertainty in Models

- Recognise importance
- Identify sources
- Assess consequences
- Adjust or mitigate
- Alternative insights
- More than one model
- Scenarios
- Stress Testing
- Workshops
- Reverse Stress Testing

Management Action

Stress and Scenario Test - definition

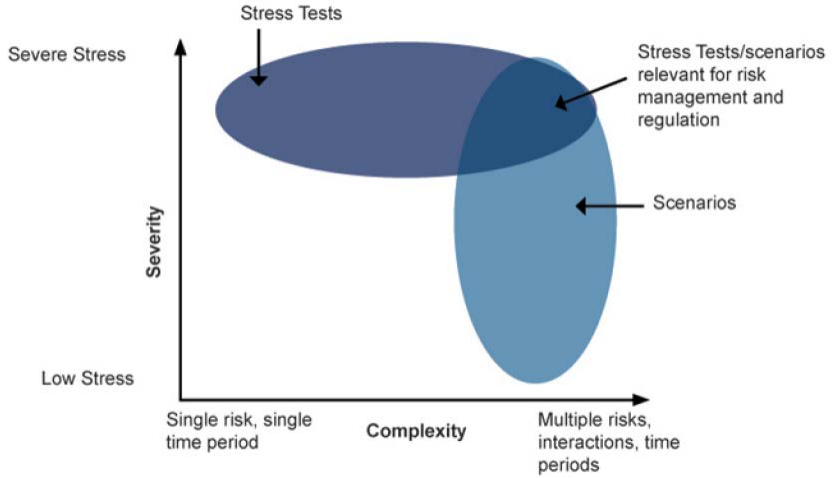
- A scenario describes a consistent future state of the world over time, resulting from a plausible and possibly adverse set of events or sequences of events.
- A stress test provides an assessment of an extreme scenario, usually with a severe impact on the firm, reflecting the inter-relations between its significant risks.



Source: Stress Testing and Scenario Analysis IAA (2014)

FEYNMAN PROBLEM SOLVING ALGORITHM

1. Write down the problem.
2. Think very hard.
3. Write down the solution



Source: Stress Testing and Scenario Analysis IAA (2014)

Stress and Scenarios can help us explore "2"

LLOYDS

- 14 Compulsory
- Industry loss provided
- Detail and factors provided in some cases

RDS		Industry Loss	Lloyd's damage-factors provided?	Lloyd's property distribution tables provided?	Scenario ID
Two events – North-East windstorm		USD 78bn	Yes	No	41
Two events – South Carolina windstorm		USD 36bn	Yes	No	42
Florida Windstorm – Miami-Dade		USD 125bn	Yes	No	2
Florida Windstorm – Pinellas		USD 125bn	Yes	No	3
Gulf of Mexico Windstorm	Onshore	USD 107bn	Yes	No	12
	Offshore	USD 4.5bn	No	n/a	
European Windstorm		€ 23bn	Yes	Yes	8
Japanese Typhoon		¥ 1.5trn	Yes	Yes	13
California Earthquake – Los Angeles		USD 78bn	Yes	Yes	4
California Earthquake – San Francisco		USD 78bn	Yes	Yes	5
New Madrid Earthquake		USD 47bn	Yes	Yes	6
Japanese Earthquake		¥ 5trn	Yes	Yes	9
UK Flood		GBP 6.2bn	No	No	51
Terrorism – Rockefeller Center		n/a	No	No	43
Terrorism – Exchange Place		n/a	No	No	44

Realistic Disaster Scenarios -Property

Cyclone

Earthquake

Bushfire

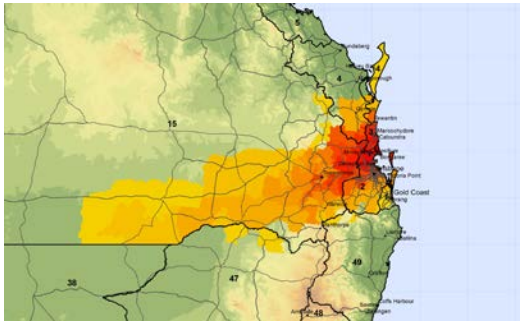
Flood

Storm

Hail

Event Details

Peril	Location		RDS ID
Cyclone	Brisbane		1
Postcode at Centre	Longditude	Latitude	Magnitude
4507	153.14	-26.99	Category 3
Event Description			
Central Pressure 947hPa, South Westerly direction			
Event Similar to			
Cyclone Daisy (1972, 965hPa)			



Loss Details

Industry Loss	XYZ Gross Loss	Most costly CRESTA ID
$13.743 Bn	$351,977,876	2
XYZ Market share of Loss	XYZ Reinsurance Recoveries	Most costly CRESTA Name
2.561%	$ -	Brisbane
XYZ Market share of Exposure	XYZ Net Loss	Most costly CRESTA Gross Loss
1.922%	$351,977,876	$173,653,234

- **1 In 200 PML not an event**
  - What events of this scale are plausible
- ***RDS (used at Lloyds since June 1994)***
- **Easy to Understand**
  - Board and investor-friendly
- **Qualitative and Quantitative Testing**
  - Reinsurance arrangements
  - Capital impact
- **Satisfies APRA stress and scenario test**
  - Vertical Requirement
  - Horizontal Requirement

Actual Casualty – Catastrophe's

Physical event (GL, WC, Motor, Architects, Engineers, Others)

- WTC (2001) ~$14bn, AusNet bushfires (2009) ~$500m, Mont Blanc Fire (1999) ~$500m, ETC…

Financial collapse of a single entity (DO, EO)

- HIH (2001), ABC learning, Enron (2001)~$7bn

Systemic Financial event (DO, E&O, BBB etc…)

- Westpoint (2006) ~ $300m, Pensions mis-selling (1988 – 1994) (UK) ~17b

Systemic Products Loss (Products Liability)

- James Hardie Asbestos

Typically Black Swan – small probability high impact

LLOYDS Liability Scenarios

Professional lines

- Mis-selling
- Failure of a major coporation
- Failure of a merger
- Failure of a construction project
- Recession related losses

Non Professional lines

- Industrial / Transport incident
- Multiple Public/Products losses

Conclusion

- Stress and scenario can complement other approaches
- Enhance understanding of why exposed to tail risk, due to detail in event
- Easily understood and *communicated*, increasing likelihood of action
- Can highlight “inconvenient truths”
- A useful weapon in a risk officers armoury