

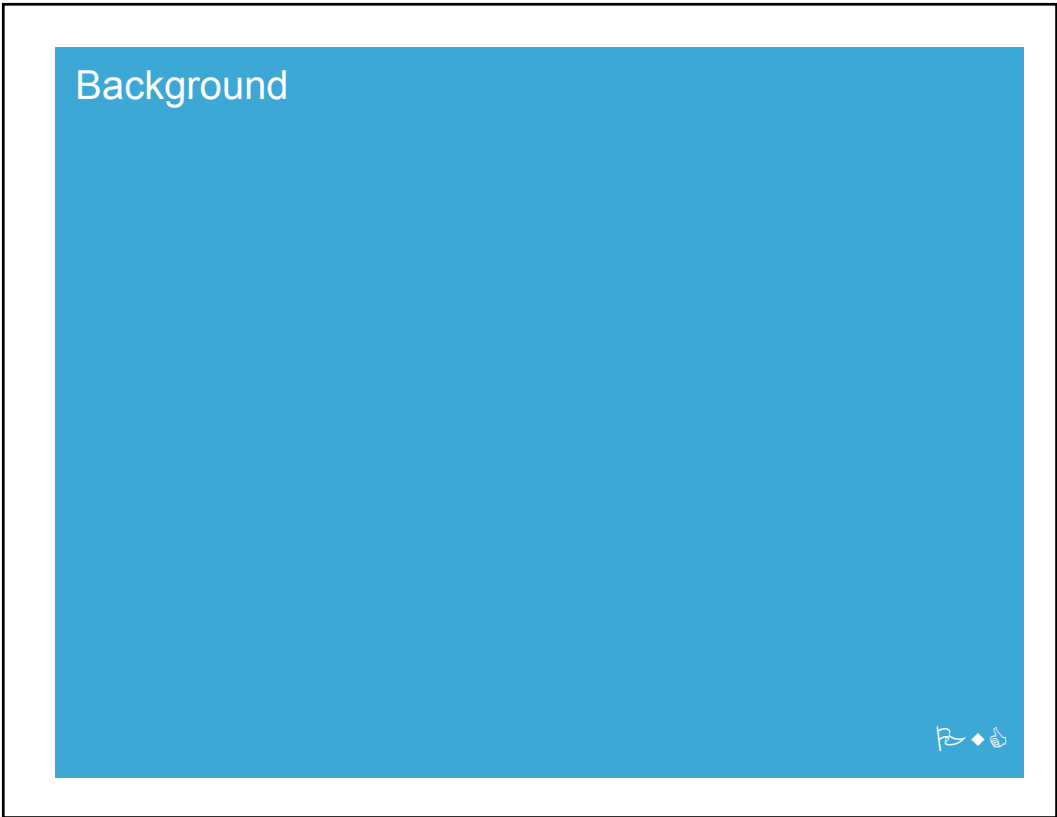
PricewaterhouseCoopers

Scenario Analysis: An Advanced Technique for Measuring Operational Risk

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Background

What is Scenario Analysis?

- Scenario Analysis is the structured process of collecting experts' assessments of the likelihood and impact of **plausible, significant, high impact operational risk loss events**
- It often leverages a workshop-based approach involving the expertise of senior business and risk managers
- It is a requirement for the Advanced Measurement Approach (AMA) under Basel II

Background

How does Scenario Analysis support effective operational risk measurement and management?

- Estimates produced through Scenario Analysis are an input into an institution's operational risk capital model by:
 - Helping to overcome internal data shortages
 - Providing a forward-looking component as compared to loss event data, which is by definition historical
- It supports business performance and effective risk management by:
 - Improving management's understanding of internal and external business environment factors, gaps in the control environment, and resulting exposures
 - Providing insights on existing and possible mitigation strategies

Background

The focus of Scenario Analysis is on plausible, significant, high impact operational risk events

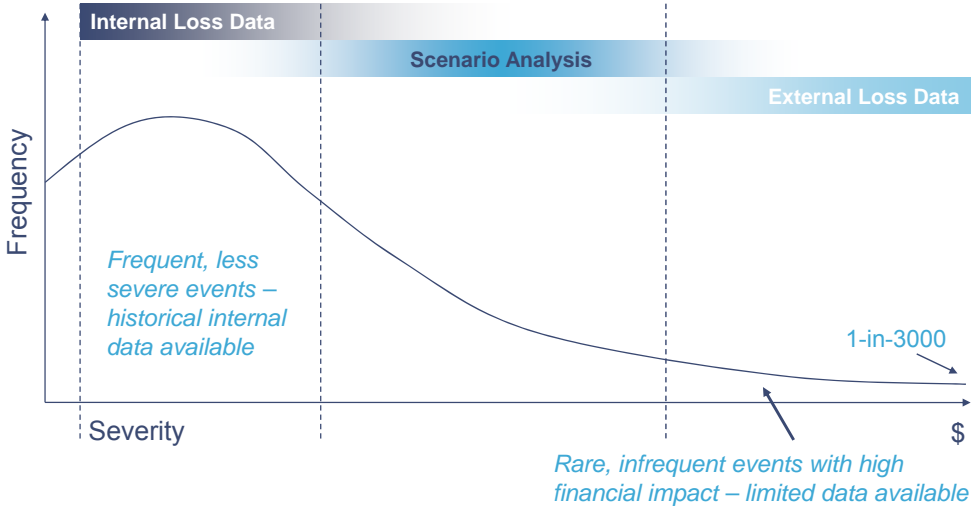
Frequency and Severity of Operational Risk Events:

Frequency	Higher	<ul style="list-style-type: none">• Many internal data-points• Small/moderate impact on the business• Limited external visibility• Example: Small/contained processing errors, minor NAV corrections, etc.	Likely implausible
	Lower	Likely immaterial	<ul style="list-style-type: none">• Few internal data-points• Big impact on the business• Events that could hit the papers• Example: broad-scaled corporate action errors or investment guideline violations, terrorist attacks, etc.
		Lower	Higher

Severity

Background

Scenario Analysis has typically been used to obtain data that aids in the measurement of operational risk events



Background

Yet, Scenario Analysis may be used in the management of all types of risks, including “emerging risks”

What are emerging risks?

- Large-scale events or circumstances that arise from global trends, also sometimes called global risks
- Hard-to-predict, rare events beyond the realm of normal expectations, also referred to as "black swans"
- Beyond any sole party's capacity to control
- Transcending geographic borders, industries, and/or sectors
- With an impact difficult to imagine today

How can they be identified? Consider...

- What are key strategic and business objectives?
- What are the sources of risk, e.g.,
 - Technological
 - Geopolitical
 - Societal
 - Environmental
 - Economic
- What risks are **known** to your institution today?
- What risks are **unknown**?
- What risks are **unknowable**?

Approach



The image shows a large blue rectangular area, likely a placeholder for content. The word "Approach" is written in white text in the top-left corner. In the bottom-right corner of the blue area, there is a small white icon consisting of a square with a diagonal line, a diamond, and a circle.

Approach

A Scenario Analysis approach is workshop-based and supported by planning and review phases

Planning	Workshop	Review
<ul style="list-style-type: none">• Pre-read packages that summarize internal loss data history, external loss events, and self-assessment data• Training that describes the workshop approach	<ul style="list-style-type: none">• Subject matter expertise on the business environment and internal controls• Identify/confirm significant operational risk exposures• Estimate relative to the frequency and severity of risk events	<ul style="list-style-type: none">• Workshop data and detailed meeting minutes• Final validation of workshop output



Approach

Most institutions employ one of two methods to estimate frequency and severity

1. Estimate Frequency by Severity bucket (e.g., \$10-200K)

Level 1 Cat: Clients, products and business practices				
Suitability, disclosure and fiduciary	Improper business or market practices	Product flaws	Selection, sponsorship and	Advisory activities
	Risk factors	Loss range (\$)	Freq. (annual)	Stress factors
	[Assessed drivers underlying the quantitative assessments]	10k – 200k	20	* [Factors to be used for modelling stress scenarios]
		100k – 1m	5	
		1m – 10m	0.4	
		10m – 100m	0.01	
		Max single loss (\$)	100	

Illustrative Scenario Analysis Output Template

2. Estimate Severity by Frequency bucket (e.g., 1-in-5 years, 1-in-50 years)

Approach

To estimate the severity of low frequency events:
New York Yankees example

- A game in which the Yankees score 20 runs or more occurs once every five years, on average.
- A game in which they score 24 runs or more occurs once every fifty years, on average.
- A game in which they score 21 runs or more occurs once every ten years, on average.
- A game in which they score 22 runs or more occurs once every twenty five years, on average.



Approach

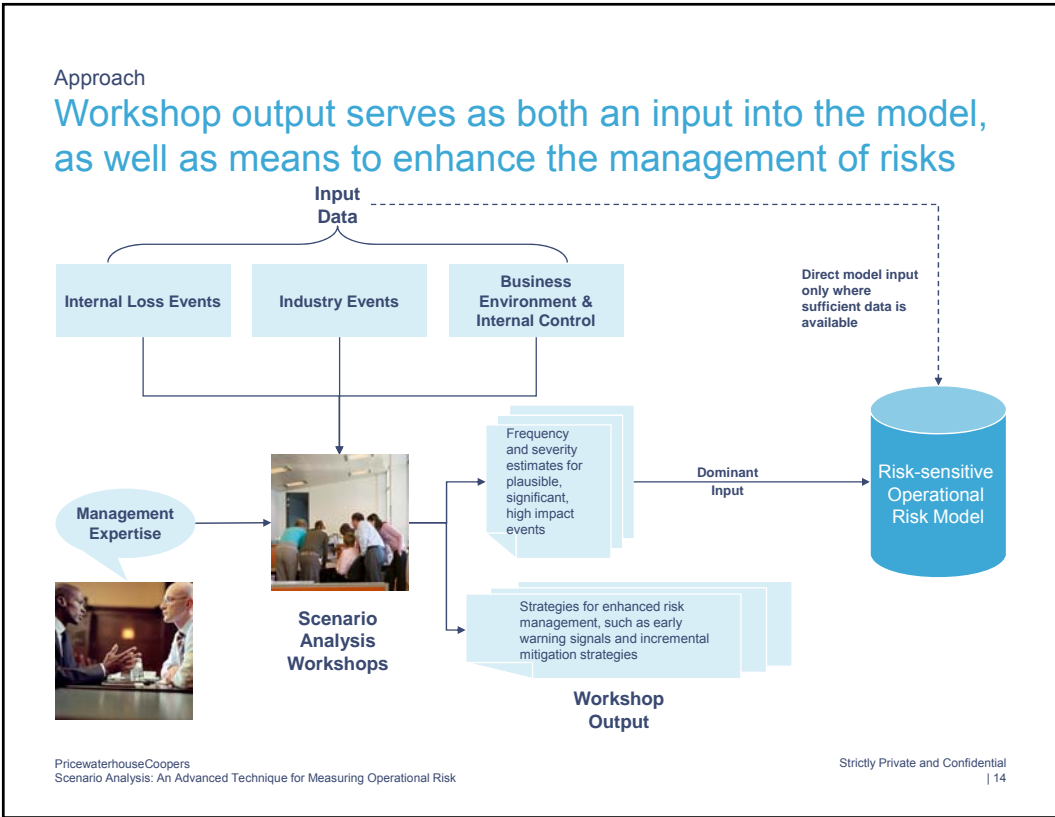
A structured workshop approach is a proven means to help mitigate relevant estimation biases

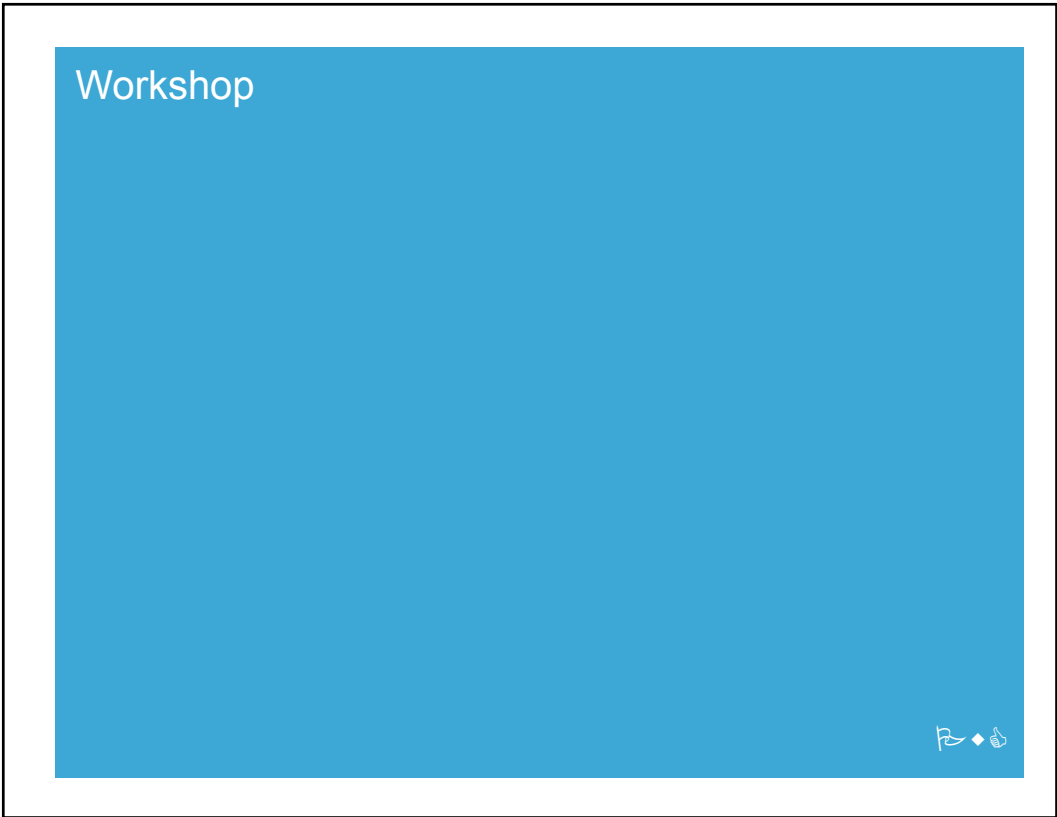
- The process of estimating high impact, low frequency events can introduce biases due to the following:
 - Imperfect/incomplete information
 - Group dynamics
 - Facilitator influence
- Design of this approach attempts to reduce the impact of such potential biases

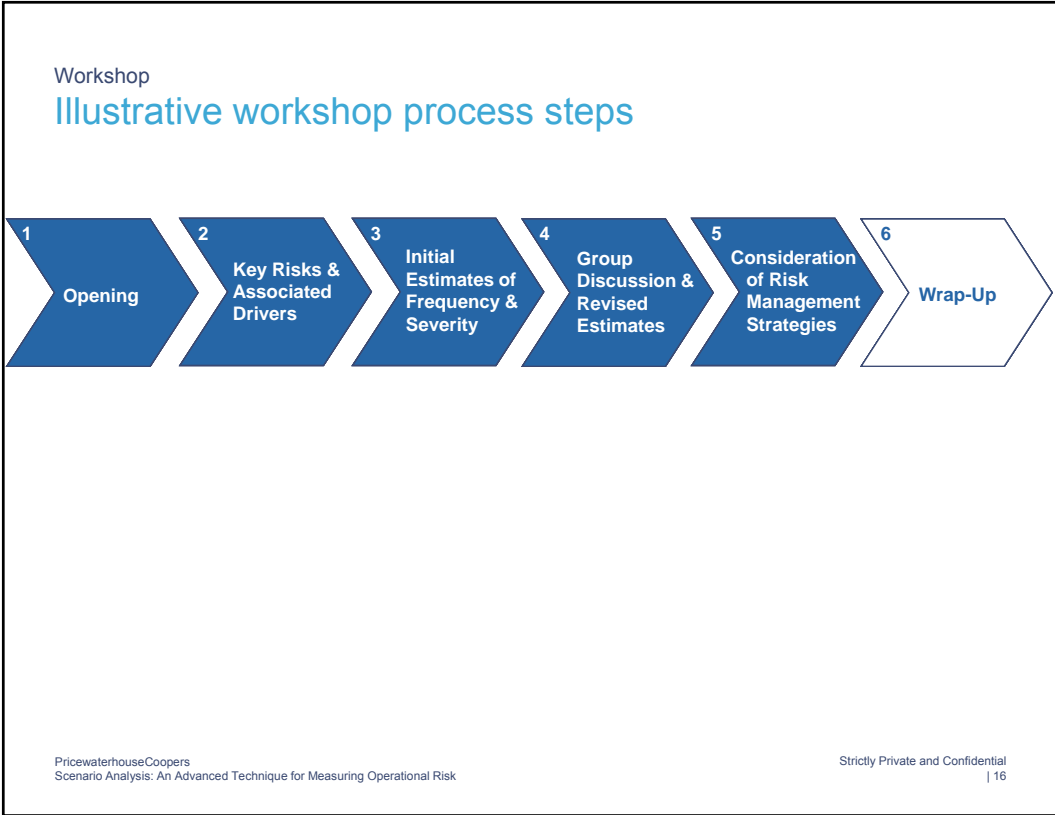
Approach

Below are examples of relevant biases to consider and the strategy that is employed to mitigate them

Bias	Description	Mitigation Strategy				
		Knowledgeable participants	Group discussion	Pre-read materials	Consider-the-opposite facilitation	Collection of estimates pre- & post-group discussion
Anchoring	Individuals anchor, or overly rely, on specific information or a specific value; usually once the anchor is set, there is a bias toward that value		√	√	√	
Availability	Individuals assess probability by the ease with which they can retrieve instances or otherwise imagine them		√	√		
Overconfidence	Overestimation of the accuracy of responses or the underestimation of the inaccuracy of responses	√				
Overestimation	Low frequency events are overestimated and high frequency events are underestimated (less relevant for scenario analysis)	√				
Overreaction	Individuals view small samples randomly drawn from a population as highly representative, that is, similar to the population in all essential characteristics (i.e., small sample fallacy)	√				
Representativeness	Tendency to assess the similarity of outcomes, instances, and categories on relatively salient and even superficial features, and then to use these assessments of similarity as a basis of judgment	√				
Herding	Behavior, although individually rational, produces group behavior that is, in a well-defined sense, irrational					√









Closing

Critical success factors for implementation of Scenario Analysis

1	Ensure that the whole management team is behind the project
2	Discuss the proposed approach with regulators
3	Be pragmatic – do not wait for perfection before implementation
4	Draw on the experience of others, for example, for new sources of external data
5	Keep up to date with the latest Scenario Analysis methods
6	Deliver continuing management education through training
7	Consider how often Scenario Analysis workshops should be conducted
8	Consider who should be in attendance (i.e., which level of management) at Scenario Analysis workshops
9	Be transparent about the methodology – internally and externally
10	Ensure the ongoing Scenario Analysis process that is integrated with other ORM programs

Closing
Questions?

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