



The Actuarial Profession

making financial sense of the future

Getting to grips with operational risk

John Rowland

December 2005

Agenda

**Initial ICA
experience**

What worked –
what didn't

Calculating the
risk capital
requirement

Adding value –
linking to risk
management

The ICAS regime presents a dual challenge

Risk Measurement

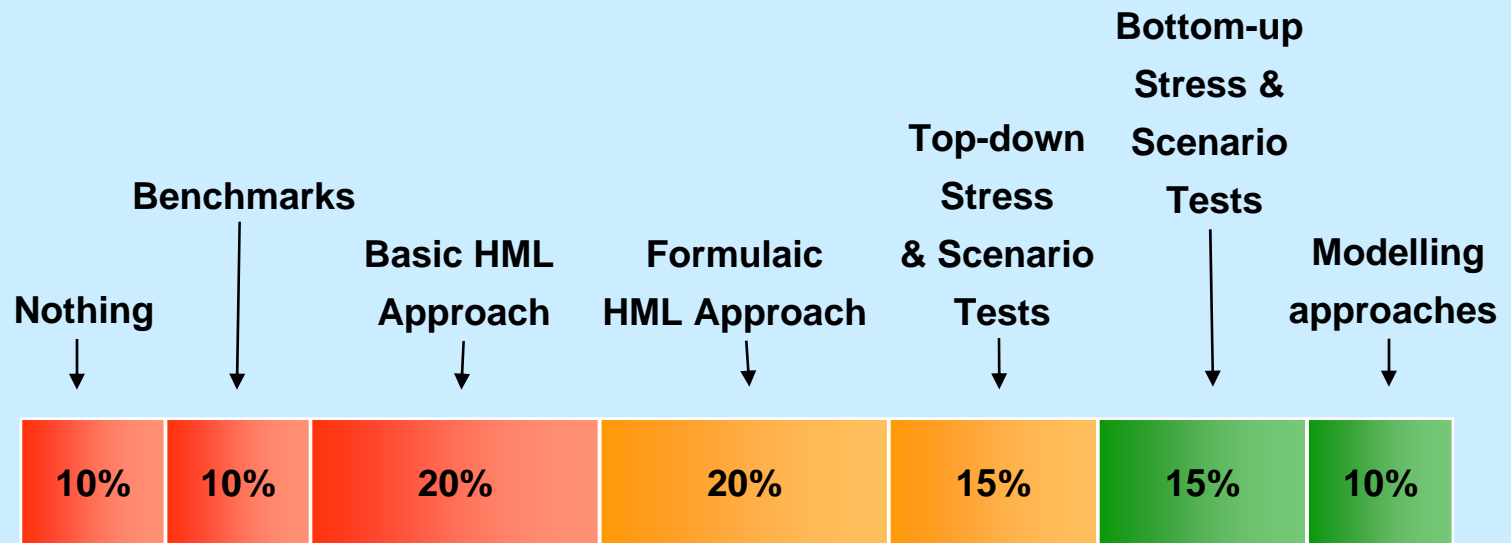
Firms need to calculate a capital requirement using stress tests and scenario analyses or economic models

Risk Management

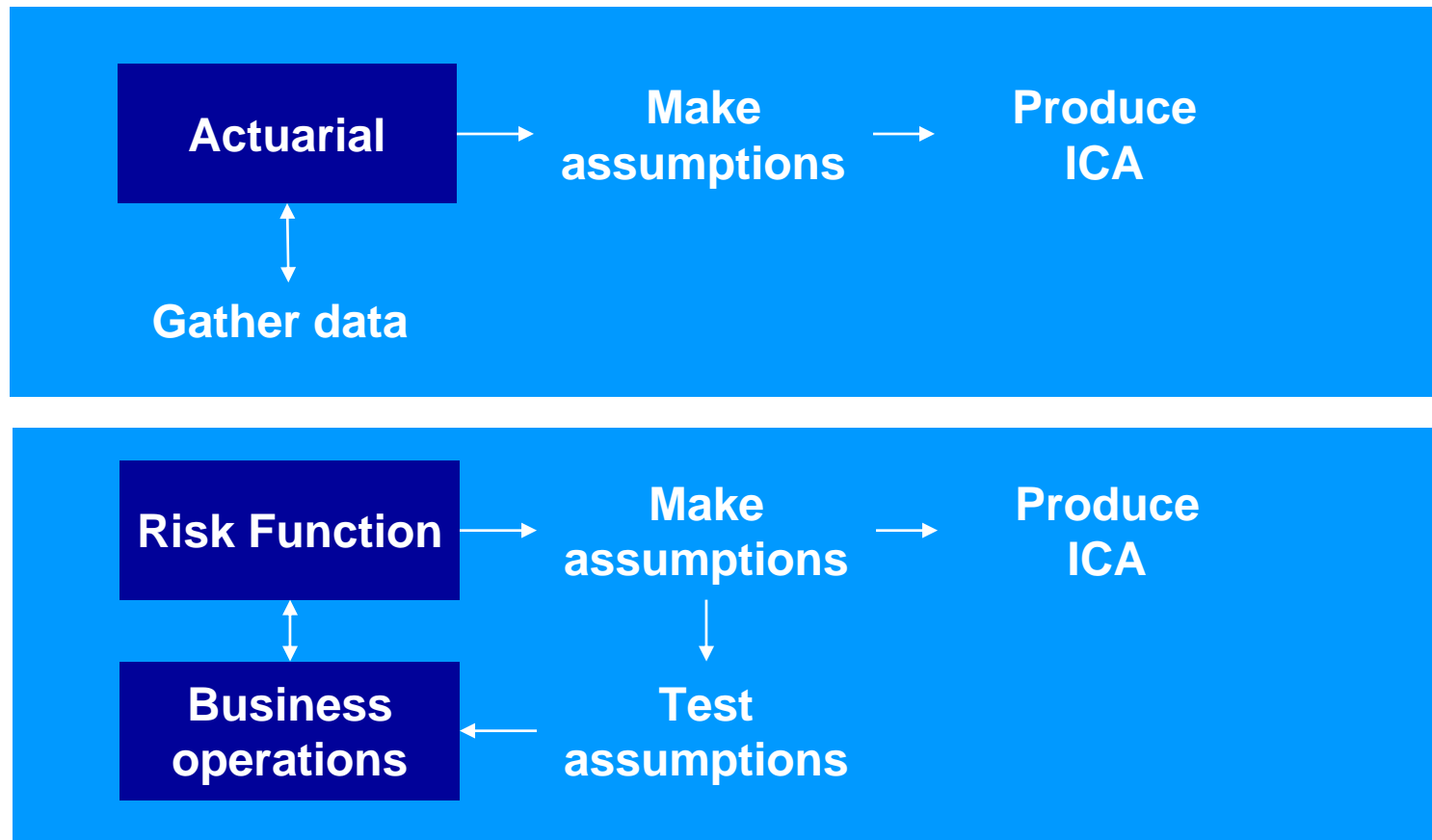
Firms need to ensure that they have a robust risk management framework in place and can demonstrate the existence of the framework

Operational risk approaches varied widely...

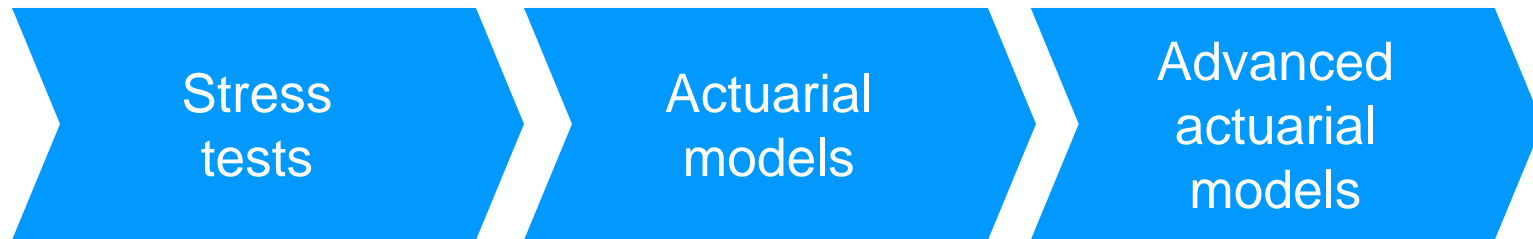
Operational risk assessment approaches used in 2004



...as did the initial ICA 'project' process



Companies expect methods will evolve



Other
Options?

What is the future of operational risk modelling?

- Frequency severity and risk simulation models?
- Building off loss databases?
- Incorporating extreme value theory estimates of the tail?

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The FSA has set clear expectations ...

- Senior management will be able to identify and articulate a firm's risk appetite and understand the implications of stress events within this context;
- Senior management will take an active part in identifying potential stress scenarios;
- Outputs from stress testing will be communicated to senior management in a comprehensible format;
- Senior management will have an overview of firm-wide risks and stresses and a concept of total risk even where precise aggregation is not possible;
- Senior management will consider formally the implications of stress testing for a firm's strategy or business profile; and
- IT systems, resources and procedures will allow senior management to identify, quantify and manage efficiently the stresses that affect a group.

many of these 'must haves' are often missing

- No statement of risk appetite leading to a confusion over which types of risk to assess
- Failure to consider a comprehensive set of risks or attempts to analyse too many risks
- A complex approach built on very high level analysis
- Failure to use 'sensible' analytical techniques
- Poor documentation
- No supporting references to existing risk management practices and management information
- Lack of evidence of internal sign-off or ownership by the Board

The FSA wants evidence of risk management

- “... we want to understand the extent to which risk measurement is embedded within your approach to risk management”
- “lack of engagement of senior management”
- “ICA calculation ... for day-to-day management purposes”
- “ICA calculation ... influence risk management strategy and priorities”
- “An add-on (in the ICG) to reflect lack of integrated management ”
- “an (extra) supervisory visit ”

Source: FSA feedback shared with Tillinghast by companies

Operational managers are not always engaged

- “ It’s just guesswork ”
- “ The business had no influence over the numbers ”
- “ It doesn’t mean anything ... it isn’t sensitive to actions ”
- “ We don’t understand/agree with the calculation ”
- “ There is no audit trail ”
- “ We don’t understand the process for updating the analysis ”
- “ This is something actuarial owned. We don’t feel it adds value“

Source: FSA feedback shared with Tillinghast by companies

Can frequency severity models using loss databases deliver better risk measurement?

- Are loss databases a useful risk measurement tool?
 - Is another company's data useful in evaluating your own risks?
 - How do you add loss data with different systems and controls?
- Is history a useful guide?
 - Market risk and credit risk constant - you cannot stop financial markets falling or recessions occurring
 - If an operational failure occurs, controls will be reviewed

Loss databases are good for risk management, benchmarking,
for identifying areas of concern and regulators

BUT whether they enable better modelling is unclear

Academics are challenging typical modelling approaches

- 200 observations over the 90th percentile are needed to obtain estimates of the targeted accuracy
- In most cases one will observe structural changes in operational risk data as time evolves
- The crux pertains the non-repetitive non-stationary losses ... which jeopardize the existence of financial institutions
- Risk estimates ... complemented by stress testing and scenario analysis can never be viewed as a standalone risk management tool
- The only way to gain control over operational risk is to improve the quality of control over the sources of operational losses

*Source: 'Quantifying regularity capital for operational risk',
Embrechts, Furrer and Kaufmann*

So, companies still have a lot to do

Risk Measurement

More robust and justifiable and better risk measurement is required

Risk Management

Few firms have realised the extent to which they need to demonstrate effective risk management

‘The quantification of capital for operational risk [is] one of the most difficult challenges that firms [are] facing in the ICAS process... for risk and capital management to be properly integrated, the firms’ assessments of this must improve... we are very interested in hearing how firms plan to develop their processes in this area.’

David Strachan 14 October 2004

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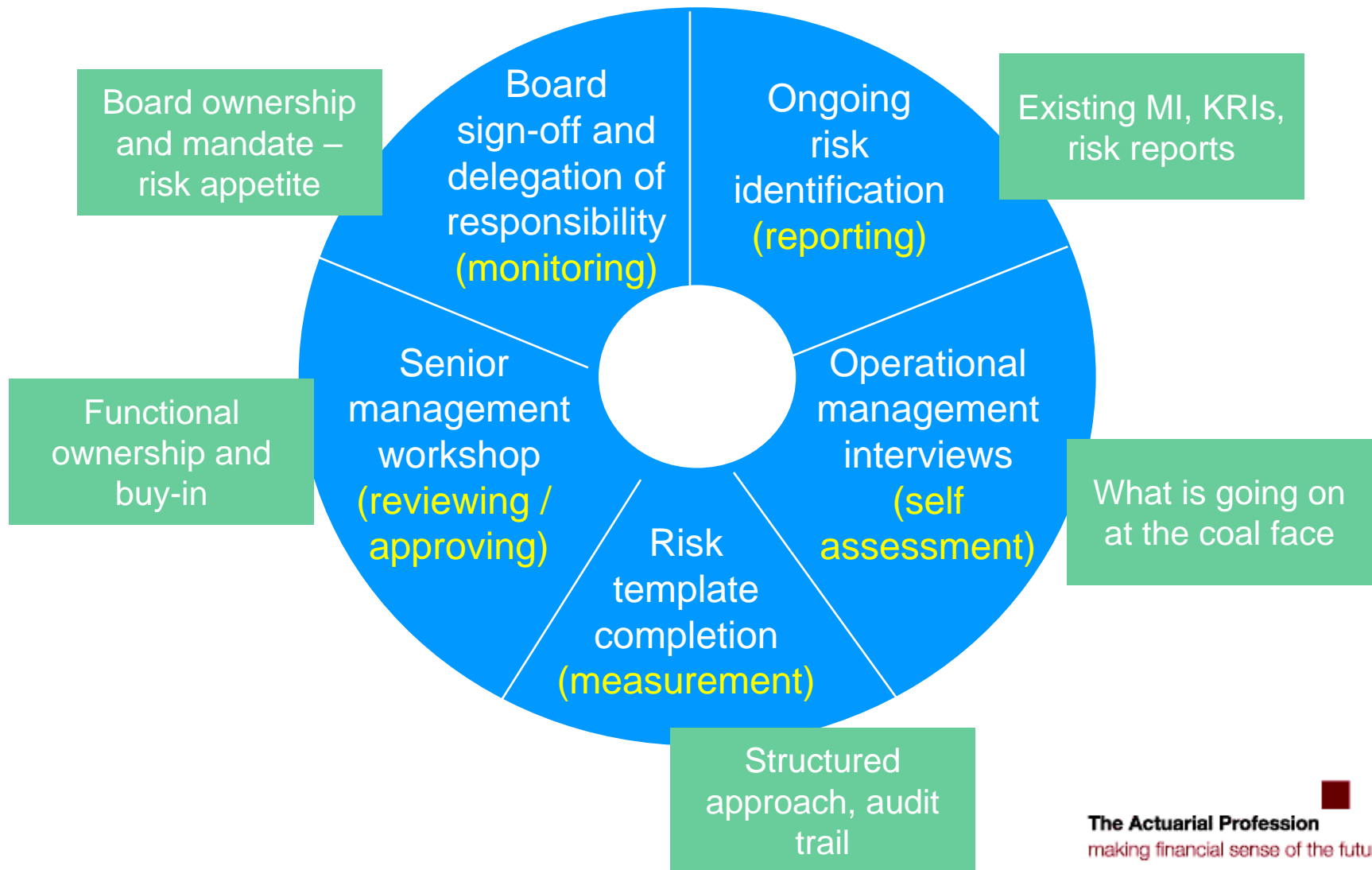
**Calculating the
risk capital
requirement**

Adding value –
linking to risk
management

What are stress and scenario tests?

- Get the language right
 - “Reasonably foreseeable adverse event” (FSA)
 - “Plausible adverse scenario” (Canada)
- Tell a story that captures how the risk affects the organization
 - What happens – the story
 - What controls fail?
 - What controls detect the event?
 - What type of costs are incurred?
 - Are there any mitigants?
 - Are the assumptions embedded in your reality?

An integrated approach should add value, not just ensure compliance ...



... companies need a practical approach that is easy to embed and well documented

1) Risk no. 1	2) Page 1	3) Assessed by: Name Date: 01/01/01	4) Reviewed by: Name Date: 01/01/01	5) Version 1
6) Risk owner A N Other		7) Business Unit ABC	8) Business area Administration	
9) Risk description: Administration errors		10) Risk categorisation: Data administration / Systems		
11) Controls designed to prevent the risk occurring: A team of skilled systems / administration experts is maintained Administration policies and procedures are in place and documented Additional care is taken when administering complex products Documentation of product terms is kept on file Systems are documented where possible		14) Causes of loss: (please describe any sources of loss data in section 23) (1) Legal costs and/or fines <input type="checkbox"/> (2) Costs incurred due to loss of recourse <input checked="" type="checkbox"/> (3) Regulatory or government fines and/or penalties <input checked="" type="checkbox"/> (4) Costs incurred due to loss of or damage to assets <input checked="" type="checkbox"/> (5) Direct cost of restitution <input checked="" type="checkbox"/> (6) One-off corrective costs (ex. 4 and 5) <input type="checkbox"/> (7) Asset write-downs / liability write-ups <input type="checkbox"/> (8) Reputational damage <input type="checkbox"/> (9) Other (specify)		
12) Controls designed to detect risk events: Spot checks on actual administration practice relative to product terms are undertaken Internal and external audit reviews check that processes are followed		15) Key factors driving the size of any loss: Number of policies on the system that cannot be administered properly Time taken to identify the problem		
13) Known control weaknesses: There is a lack of corporate memory regarding old systems developed internally that are still in use There is a lack of documentation for some internal systems		16) Potential management actions and/or structural hedges: None		

Reviewed by: Name Date: 01/01/01		Version 1
20) Reduction in gross loss due to management actions / structural hedges: (please describe assumptions in section 25) (1) Legal costs and/or fines (2) Costs incurred due to loss of recourse (3) Regulatory or government fines and/or penalties (4) Costs incurred due to loss of or damage to assets (5) Direct cost of restitution (6) One-off corrective costs (ex. 4 and 5) (7) Asset write-downs / liability write-ups (8) Reputational damage (not to be included in ICA assessment) (9) Other		
21) Net standalone loss: Probability of occurrence within the next 10 years Yes Gross Loss 195,000 Allowance for management actions and structural hedges 0 Net Loss 195,000		
22) Possible correlations: (1) List any operational risks that this risk may be correlated to: Systems failure risks, key person risks (2) List any financial risks that this risk may be correlated to:		

Reviewed by: Name Date: 01/01/01		Version 1
25) Description of assumptions for losses / management actions: (1) Legal costs and/or fines (2) Costs incurred due to loss of recourse (3) Regulatory or government fines and/or penalties (4) Costs incurred due to loss of or damage to assets (5) Direct cost of restitution (6) One-off corrective costs (ex. 4 and 5) (7) Asset write-downs / liability write-ups (8) Reputational damage (not to be included in ICA assessment) (9) Other		
26) Action plans: Document key systems that will be kept in use for the foreseeable future Develop parallel models to check key systems that cannot be documented		

(9) Other	
Total Gross Loss	195,000

Our recommended stress and scenario testing approach is built around these 5 key areas using standardised templates to capture data/assumptions and maintain an audit trail

and passes the ‘use test’ ...

Key observations:

- The approach used to develop the stress tests leads to management insight and buy-in to the risks in the business
- Four or five significant immediate action points typically arise
- The analysis is easy to embed for risk management
- The stress tests remain a subjective assessment

Business and FSA challenges:

- “it’s just guesswork” x
- “No influence over the numbers” ✓
- “Adds no value / doesn’t mean anything” ✓
- “We can’t use the assessment” ✓
- “The assessment isn’t sensitive to actions” x
- “Poor mathematics” ✓
- “Lack of audit trail” ✓
- “No process for updating” ✓

...but may still seem subjective

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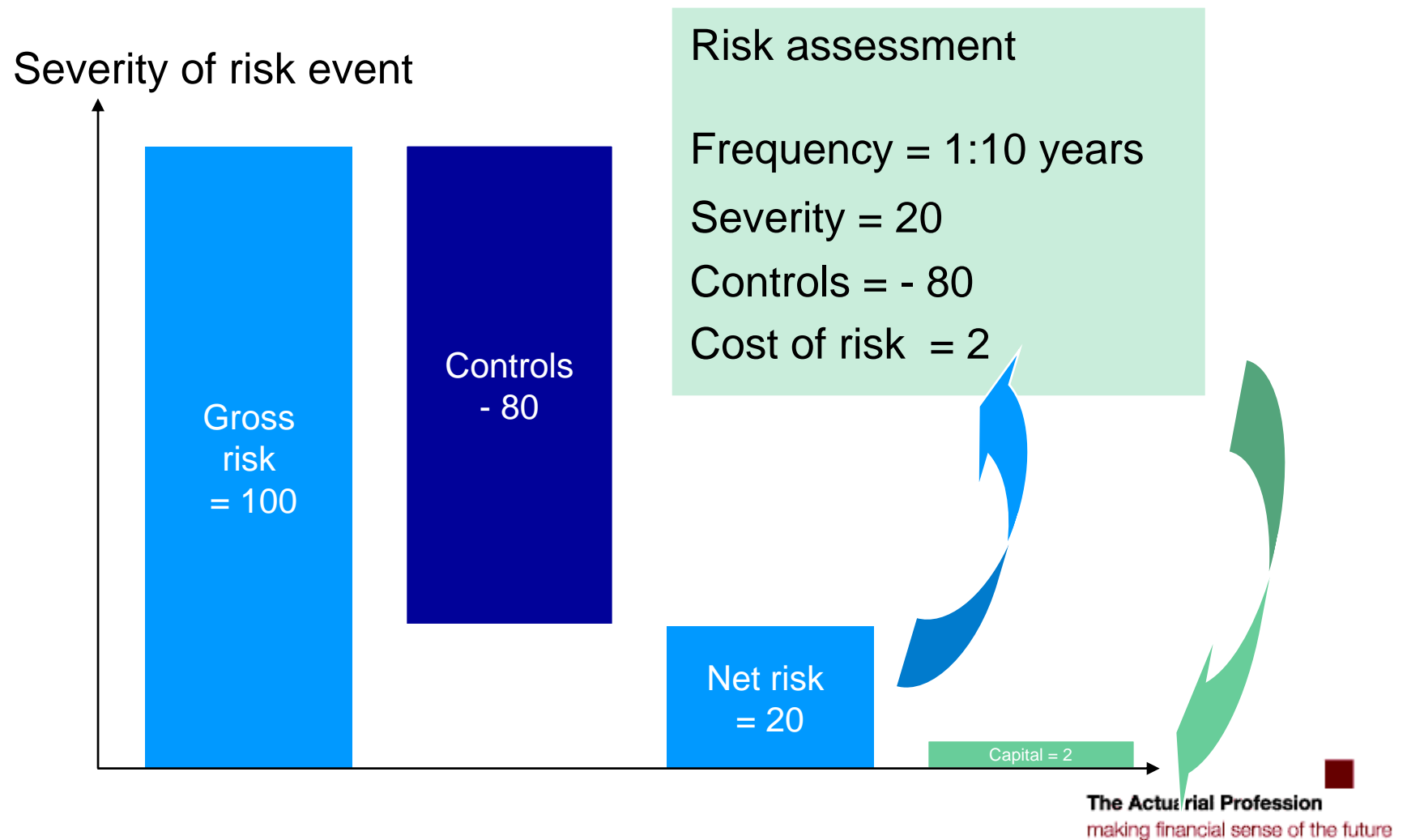
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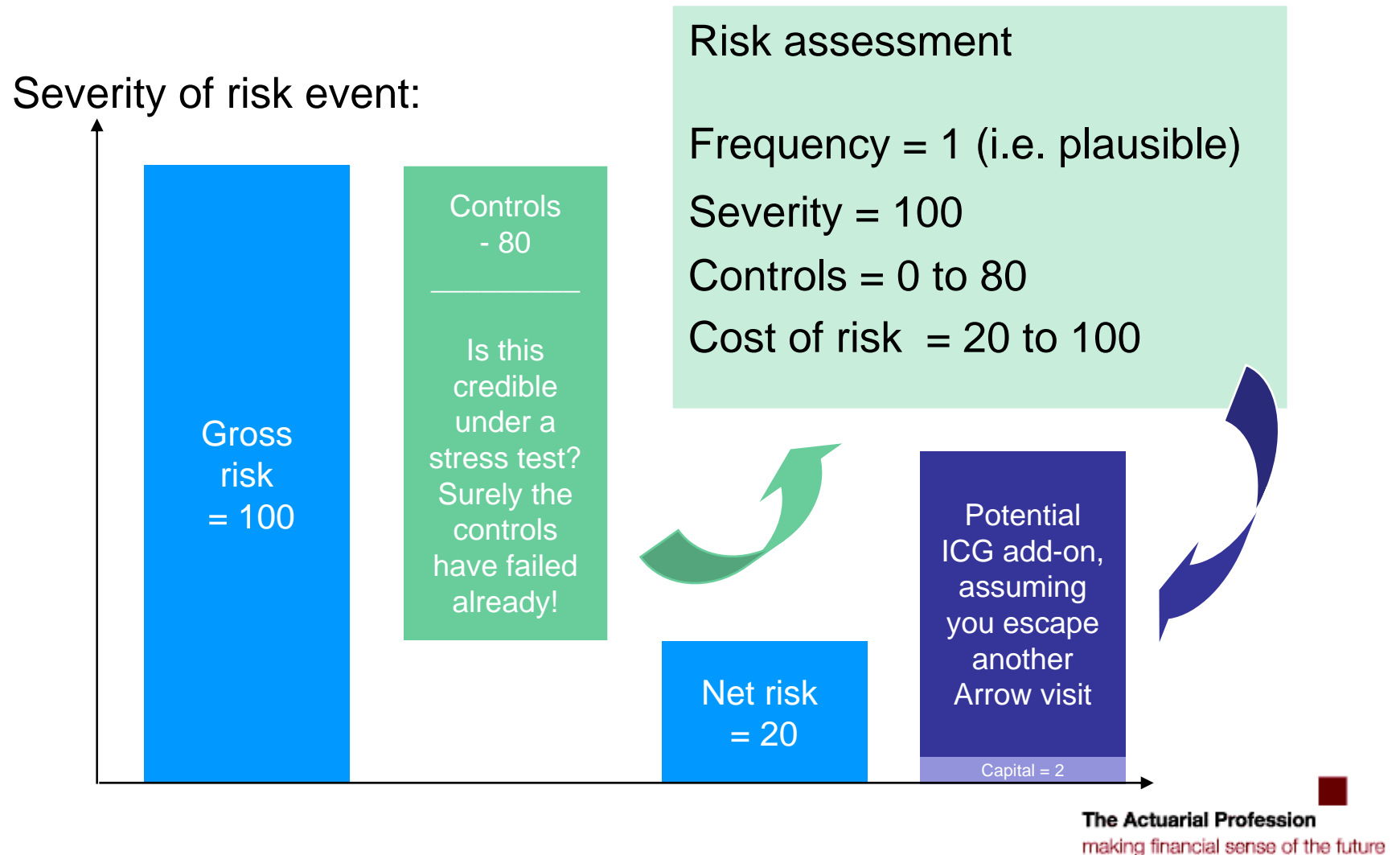
Bottom-up stress
and scenario
tests

**Adding value –
linking to risk
management**

A 'typical' stress test methodology relies on assumptions to mitigate risk ...

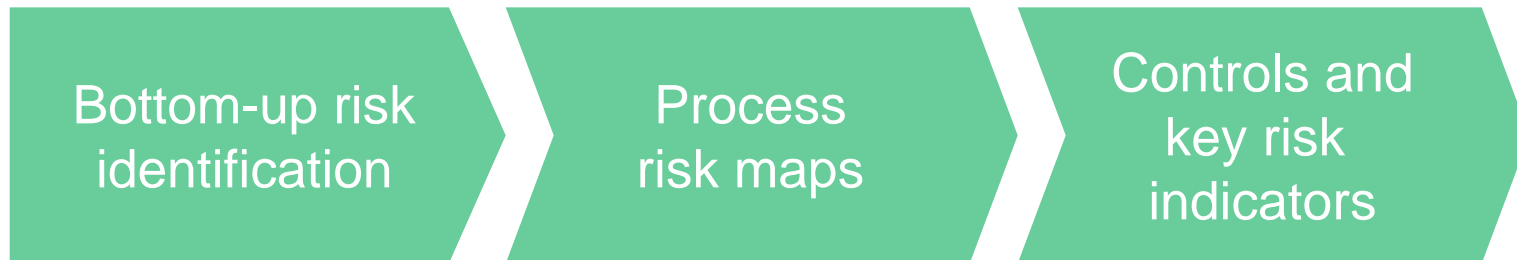


... but using less optimistic assumptions can materially change the answer

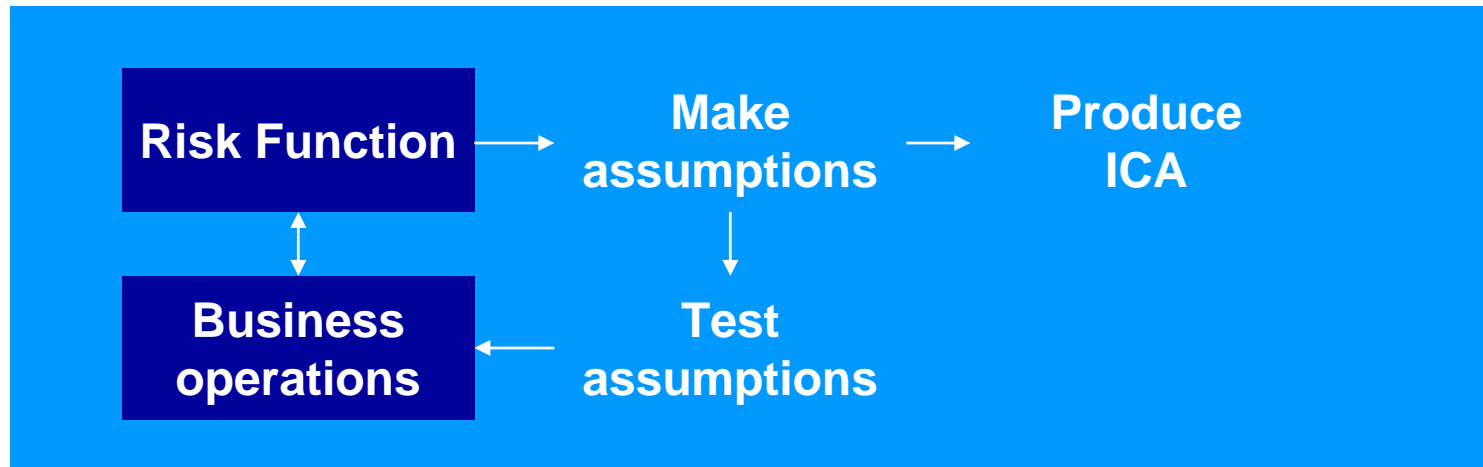


How can the initial assumptions be justified?

Risk management inputs are often missing in the current process:

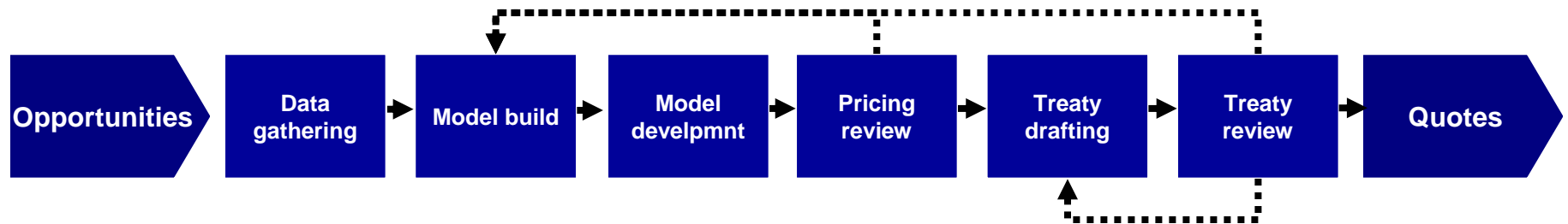


The business needs to be more involved:



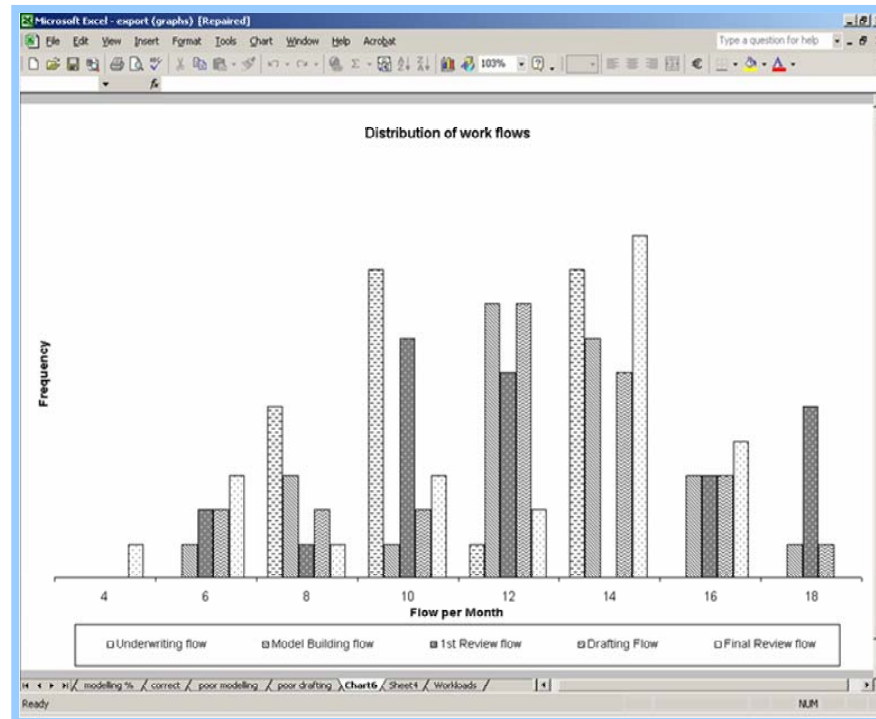
Process models – model control effectiveness

Pricing process model:



The model is built in a process modelling software package. The model's structure is based on process maps and it is populated using process data and information from risk/controls gap analysis. It is calibrated to replicate the process performance.

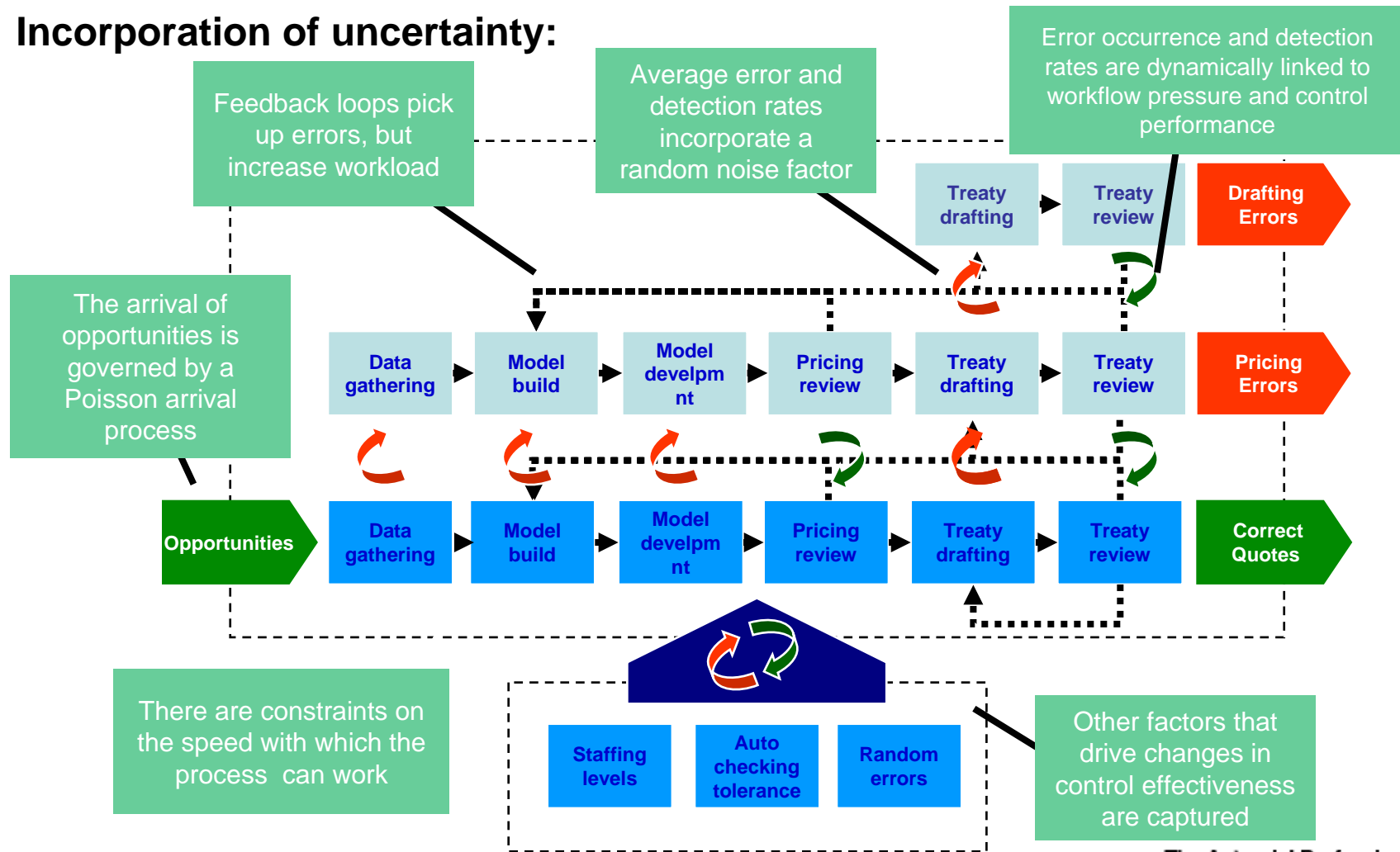
Calibrated using actual performance data



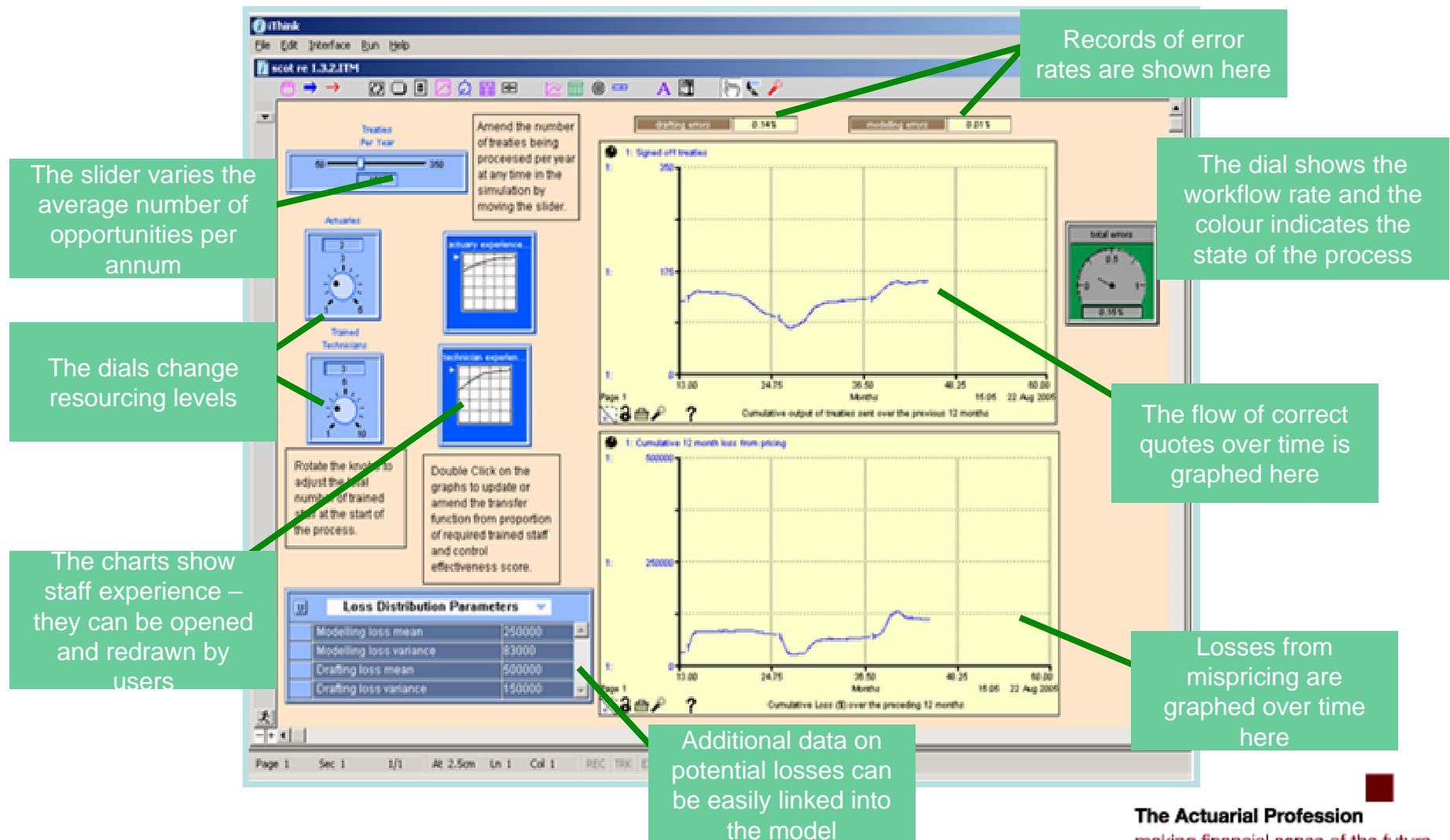
Companies typically have far more data available and find it far easier to make defensible assumptions when considering process level risks and controls

... capturing the non-linear risk exposures

Incorporation of uncertainty:

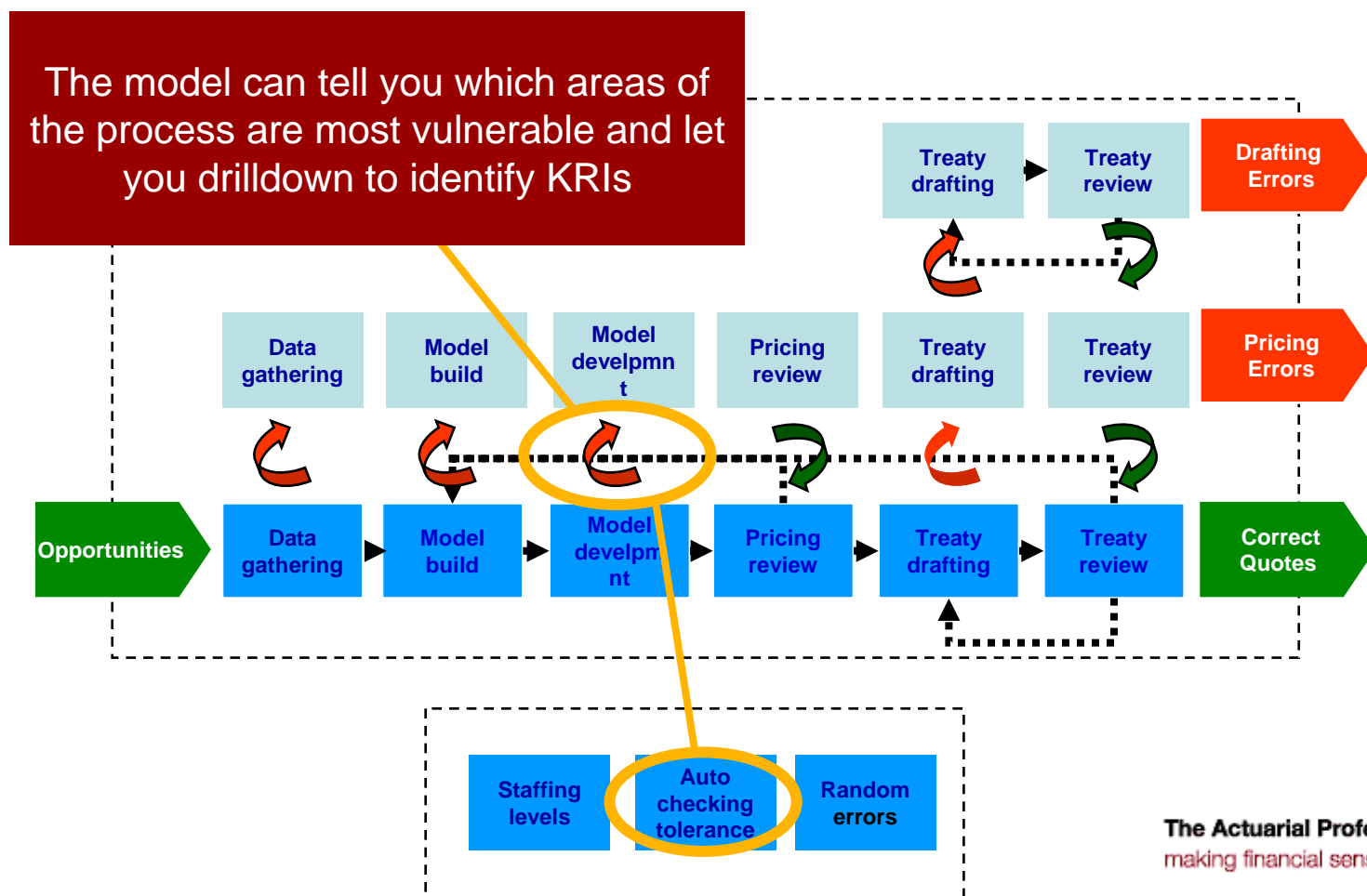


Controlled in a user-friendly way



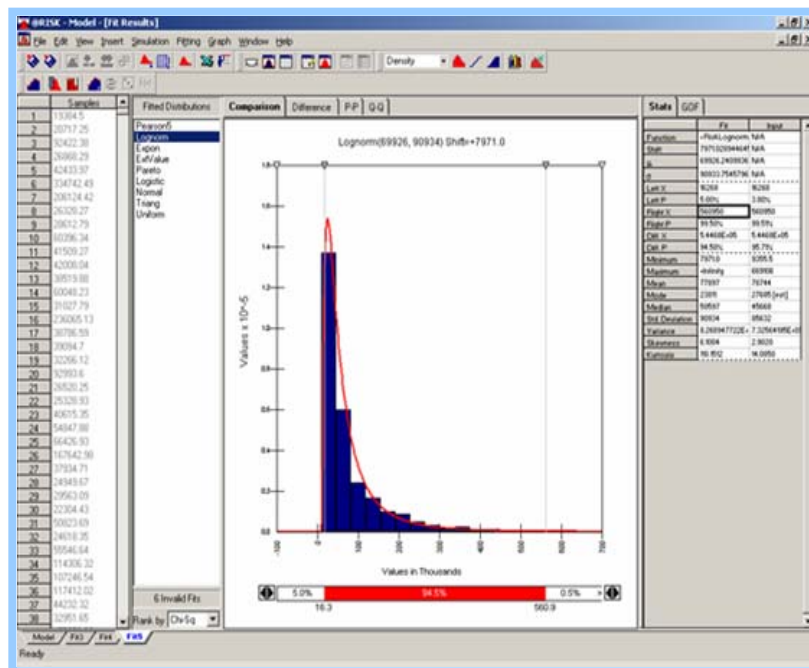
They tell you which KRIs really are *key risk indicators*

Risk management applications – KRIs:

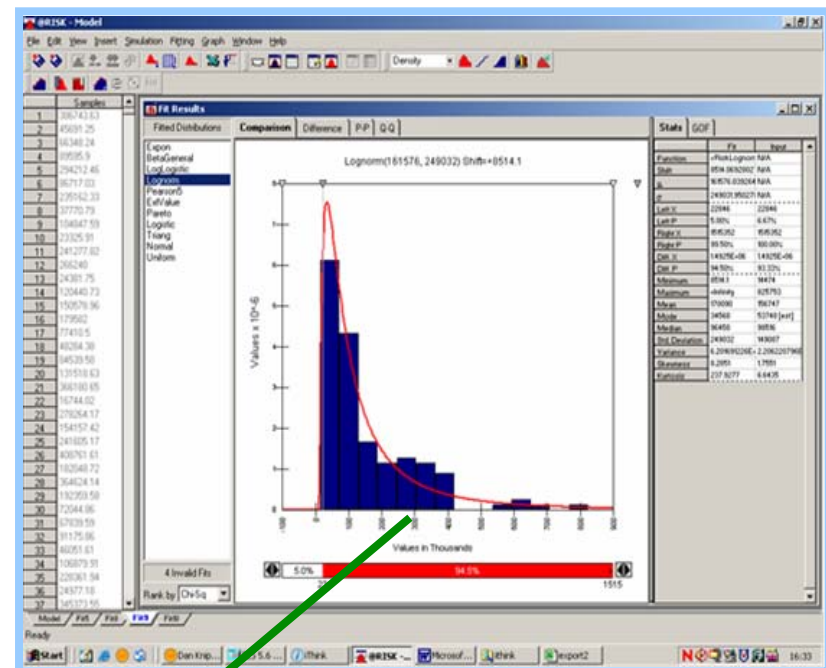


Example output: Calculating required economic capital

A one year view



A long-term view



The mean and variance of losses are higher using a run-off approach. Although, it is important to note that this approach does not allow tinkering with the process

Process modelling approaches link risk measurement and management

Risk measurement applications:

Understanding likely
error rates

Calculating required
operational risk capital

Core risk measurement outputs include:

- Frequency of errors
- Required economic capital
- Sensitivity analysis

Risk management applications:

Testing long-term
process stability

Testing the effectiveness
of specific controls

Identifying key risk
indicators

Running stress tests and
assessing mitigation strategies

- The model also provides a robust platform to:
 - Test the effectiveness of controls
 - Identify KRIs
 - Run realistic stress tests (e.g. the impact of growth)
 - Develop risk mitigation strategies
- In addition, the model can test the long-term stability of a process

Contact details



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