

The Actuarial Profession
making financial sense of the future

Managing and measuring operational risk in an
insurance company
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General Insurance Spring Seminar

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Scarman House

Agenda

- What is operational risk?
- Management and control frameworks
- A stress and scenario testing approach to manage operational risk
- Advanced insurance modelling techniques

Why is operational risk important?

- | | |
|------------------------|---------|
| ■ Pensions mis-selling | ~£15bn |
| ■ MIG | ~£5bn |
| ■ LMX spiral | ~£5bn |
| ■ Equitable Life | ~£1.5bn |
| ■ Barings | ~£900m |
| ■ NatWest | ~£90m |

... through better management of operational
risk each of these risk events could have been
avoided

What is operational risk ...

Basel 2 / EU CAD 3 definition:

direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events

Financial Services Authority ICAS:

- + Residual risk - potential risk mitigation failures
- + Strategic risk - strategic and operational uncertainty
- + Legal and litigation risks - risks arising from normal operations

and to assess the amount of capital add-on that is required for any identified weaknesses in systems and controls

Systems and control risk: the FSA's approach

Self certification of the effectiveness of systems and controls across the following dimensions:

- | | |
|--------------------------------------|--|
| ■ Group structure; | ■ Outsourcing / third party providers; |
| ■ Risk management; | ■ Business continuity; |
| ■ Policies, procedures and controls; | ■ Corporate governance; |
| ■ Management information; | ■ Management responsibilities; |
| ■ Information technology; | ■ Human resources. |
| ■ Compliance; | |
| ■ Internal audit; | |

A effective starting point is to assess the key causes of failure for insurance companies



Agenda

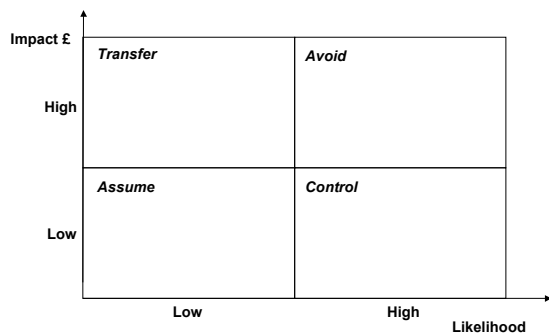
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Regulatory risk management best practice

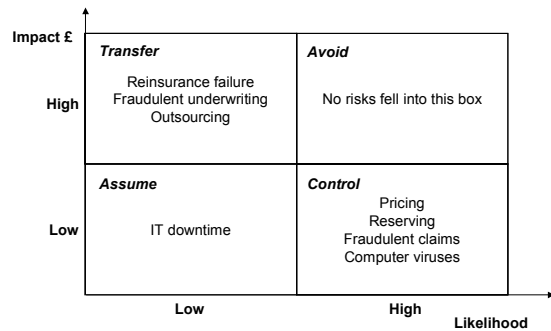
- **Principles 1-3**
 - Oversight of operational risk provided by the Board or management committee
- **Principles 4-7**
 - Monitoring, measurement and active management of operational risk by operational line management
- **Principle 8:**
 - Degree of disclosure of operational risk

Source: Basel Committee, Sound practices for the management of operational risk, Feb 2003

Risk prioritization framework

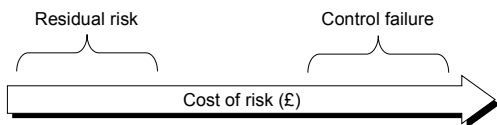


For example, for a typical General Insurer



Assessing the effectiveness of controls

- It is not cost effective to completely eliminate risk
- Residual risk is accepted
- Regulators are concerned about the effectiveness of the controls ...
- ... and the cost of either a partial or a full control failure



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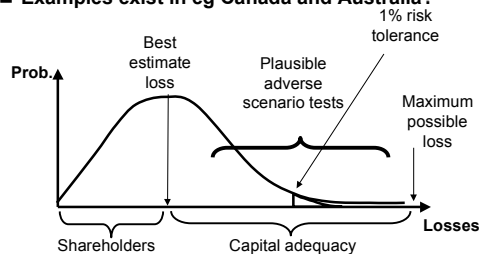
How should we select appropriate tests?

- FSA prescribed stress and scenario tests
- Actual versus expected experience
- Industry benchmarks
- Worst case / thinking the impossible
 - internal experts
 - external experts

But - how plausible are they?
How adverse are they?

"Plausible adverse" scenarios ...

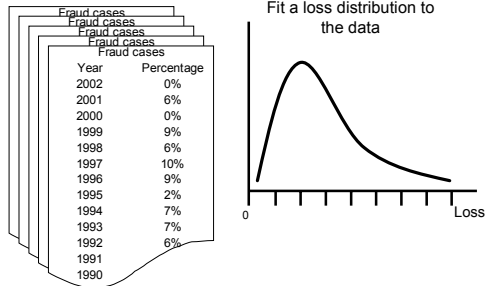
- Examples exist in eg Canada and Australia?



Stress scenarios were considered for each risk - for example:

- | | |
|--|---|
| <p>Stress test / scenario:</p> <ul style="list-style-type: none"> ■ Fraudulent claims: Double the expected level of fraudulent claims arise. ■ Fraudulent underwriting: A broker acts fraudulently, writing business and collecting premiums undetected for 6 months. ■ Reinsurance failure: The legal documentation defining a re-insurance arrangement is found to be flawed | <p>Assessment:</p> <ul style="list-style-type: none"> ■ A capital add-on of 20% of future claims is required. A doubling is plausible - use as a stress scenario, but double the capital add-on due to the complexity of the required information required from underwriters. Reasonable to assume that no agent could operate undetected for more than 6 months. ■ No capital add-on required ■ A capital add-on of 10m due to expected claims wording of the arrangement. The legal opinion is that they are watertight |
|--|---|

Fraudulent claims:
A high likelihood low impact data rich risk event

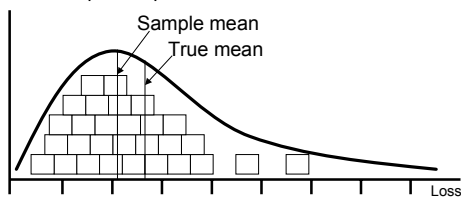


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Modelling high impact low probability events is more complex

- These risks are fat tailed
- You may have some observations, but the tail won't have been observed
 - You will not have an estimate of the tail and hence the capital required

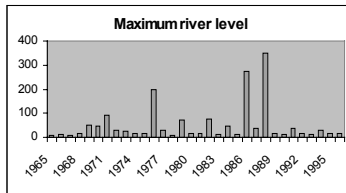


The key is to think out of the box

- Assessing asbestos and tobacco liabilities
- Pricing catastrophe insurance
- Designing alternative risk transfer products for the capital and insurance markets
- Assessing flood risk or nuclear waste sites
- Structuring and pricing financial reinsurance transactions

Novel approaches are required for operational risks

An engineering example ...
using extreme value theory models



From the extreme value model we find the following percentiles:
95th: 600cm
99th: 850cm

For other risks there may not be any realistic internal data or industry benchmarks



- Identify the risk factors that trigger the event
- Assess the effectiveness of the risk factor controls
- Assess the likelihood of a control failure
- Estimate the severity assuming
 - effective controls
 - partial control failure
 - complete control failure

Review

- Risk management and risk measurement are equally important
- Risk management best practice
- Risk management framework
- Stress and scenario tests
- Approaches to modelling
