The Actuarial Profession
making financial sense of the future

31st ANNUAL GIRO CONVENTION

12-15 October 2004, Hotel Europe, Killarney, Ireland

Doing an ICA

Some examples for those who are setting out

- Laurence Lee-Tsang-Tan
- Julian Leigh
- John Rowland

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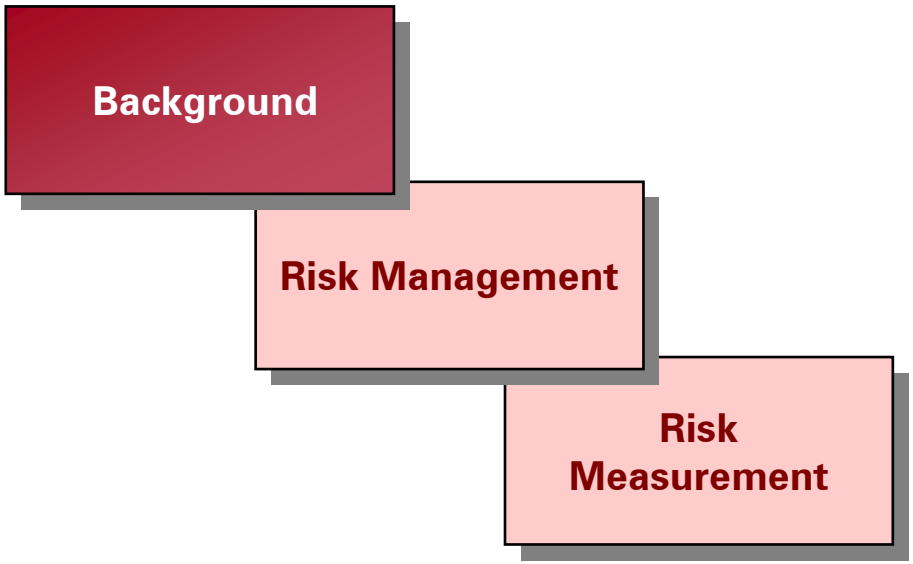

Recent corporate events have led to increased scrutiny of the management of risk

Governance

- Sarbanes – Oxley
- Greenbury
- Turnbull

Regulation

- Basel II
- CAD III
- Solvency II

Corporate transparency

- High-Tech IPO stock
- Split capital trusts
- Mutual Funds
- Pensions and life products

Corporate failures

- Barings
- Vie d'Or
- Equitable
- DMG
- Independent
- HIH
- Enron

The FSA Response

- Risk-based capital using ECR supplemented by ICAS
- ICAS: internal investigation to determine capital adequacy to a minimum standard
- The Prudential Sourcebook (PSB)
- FSA requirement:
  - all general-insurance companies
  - Lloyd's
  - part of annual submissions from year-end 2004
- ICA is described in FSA CP136, CP190, CP04/07 and PS04/16

High-level decisions

- Fully internal preparation
- Fully external preparation
- Hybrid: internal with external peer review or support
- In ***all*** cases
  - management must own and make submission
  - should be used to manage capital internally

The ICA presents two issues…

Risk Measurement	**Firms will need to calculate a capital requirement using stress tests and scenario analyses or economic models**
Risk Management	**Firms will need to ensure that they have a robust risk management framework in place and can demonstrate the existence of the framework**

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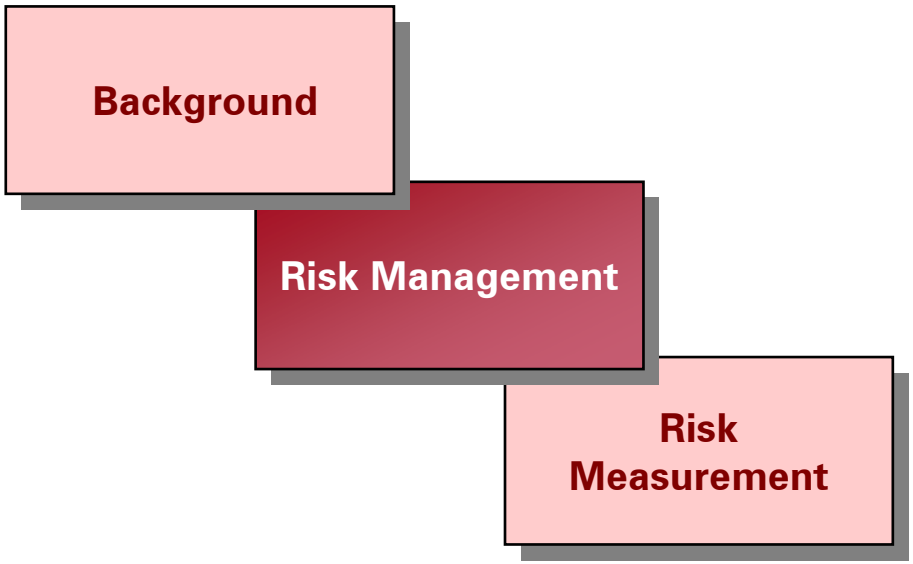


The ICA presents two issues…

Risk Measurement	**Firms will need to calculate a capital requirement using stress tests and scenario analyses or economic models**
Risk Management	**While firms have recognised the need to estimate their regulatory capital for operational risk, few have realised the extent to which they need to demonstrate effective risk management**

Best practice definitions can found in a variety of regulatory documents

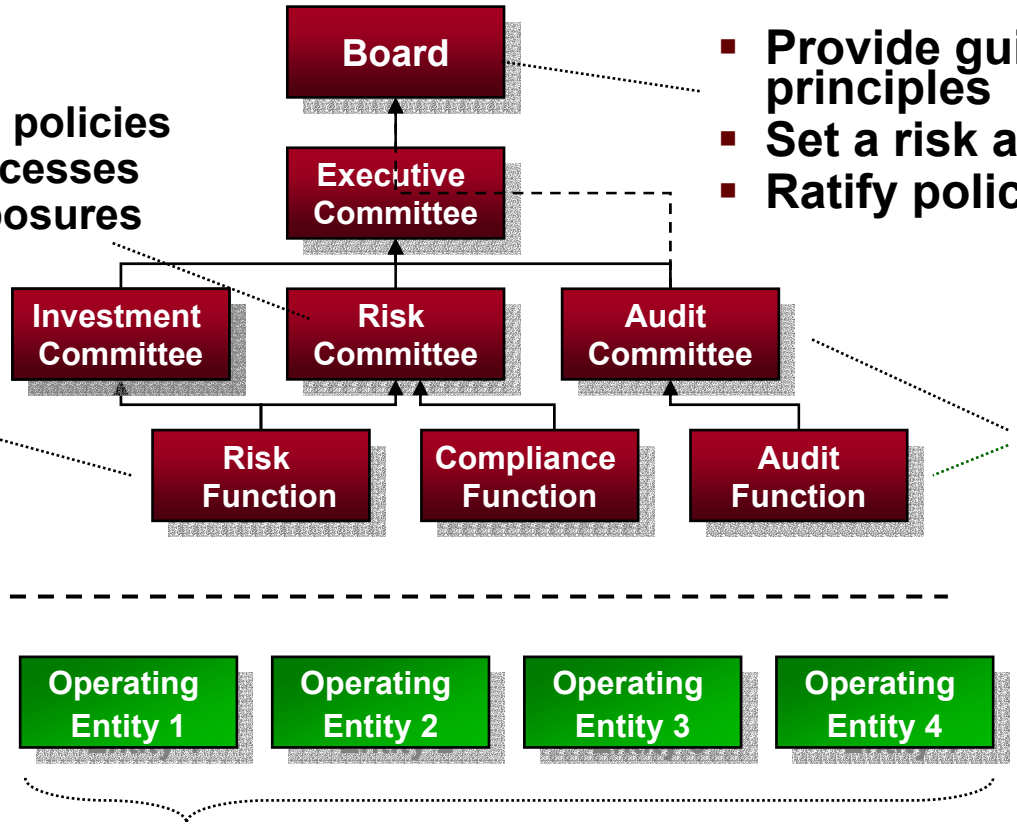
- We generally use either a Basel II or FSA PSB definition of best practice. The definitions are similar
- Sound Practices for the Management and Supervision of Operational Risk Basel Committee, Feb 2003:
  - Principles 1 to 3: Oversight of operational risk provided by the Board or management committee
  - Principles 4 to 7: Monitoring, measurement and active management of operational risk by operational line management
  - Principle 8: Degree of disclosure of operational risk
  - Principles 9-10: The role of supervisors

Key steps towards best practice

Step 1	▪ Understand regulatory requirements
Step 2	▪ Understand current approaches and activity ▪ Agree what constitutes ‘best practice’
Step 3	▪ Identify gaps in current policies and processes
Step 4	▪ Develop new / enhanced policies and processes ▪ Document policies and processes
Step 5	▪ Ensure that roles and responsibilities reflect new procedures

Operational Risk is part of the overall risk management activity

- Recommend policies
- Approve processes
- Approve exposures



- Provide guidance on principles
- Set a risk appetite
- Ratify policies

- Develop policies
- Develop processes / tools
- Monitor exposures

- Ensure compliance with policies and processes

- Adhere to group policies, understand specific local regulatory obligations
- Identify, assess, control and mitigate risks as they raise

Evaluation based on evidence

look for evidence:

- Compliance with the best practice principles
- Awareness of key industry risks
- Management of key industry risks
- Improvement over time in risk management documentation and data
- Appropriate governance arrangements
- Adequate management information

focus on effectiveness:

- The existence of a framework is not evidence of best practice
- The framework should be embedded in the operations – it should affect decisions
- The framework should be embedded in the operations – it should uncover problems
- Our industry specific risk maps identify key generic risks
- Our internal benchmarks show the relative levels of risk we would expect to see

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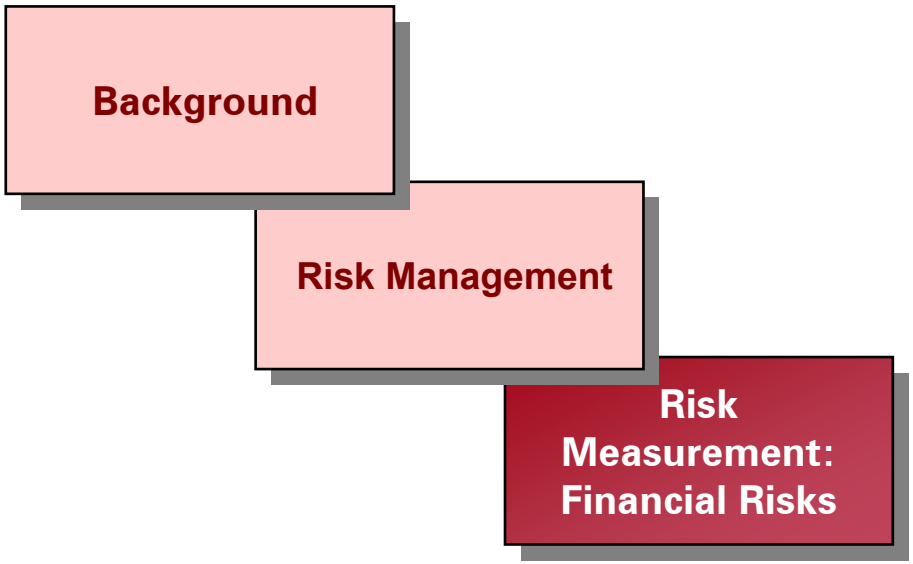

Background
Risk Management
Risk Measurement: Financial Risks

Examples of modelling decisions

- Stress & scenario testing vs stochastic modelling…
  - …the two options are not entirely distinct
- Length of period to test
- Capital-adequacy standard
  - regulatory
  - management

Essential tests

- The ICA has to cover the company's exposure to the following types of risk:
  - Insurance
  - Credit
  - Market
  - Liquidity
  - Operational

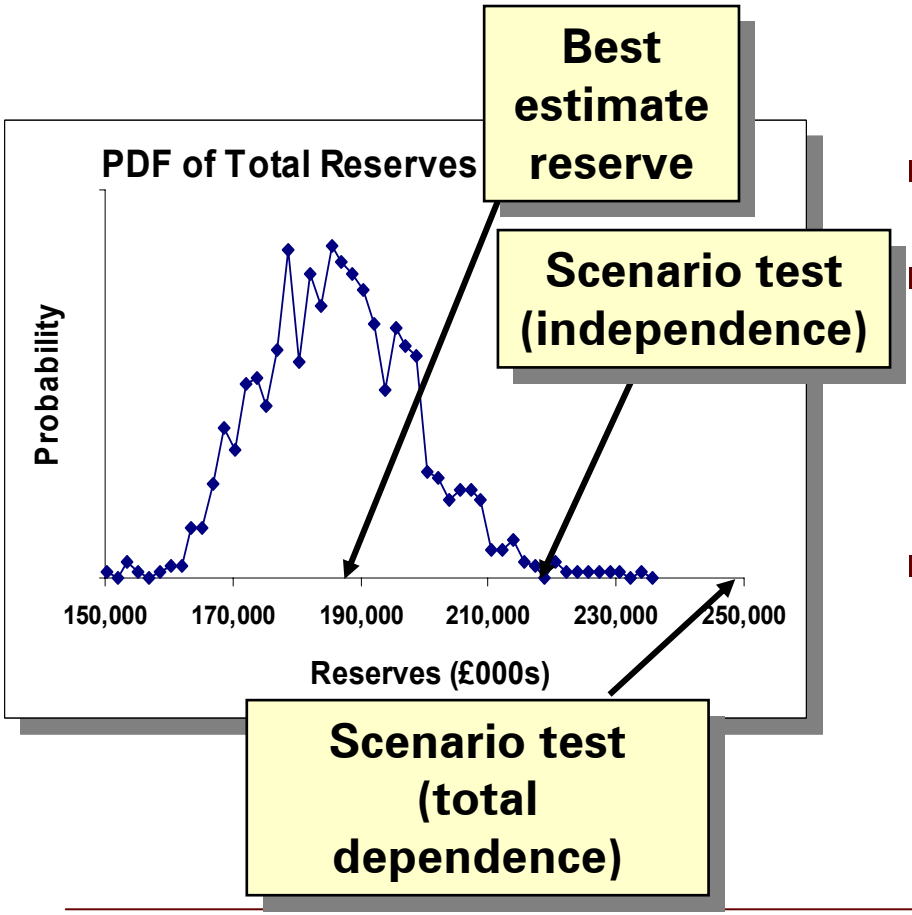
Insurance Risk: Underwriting

- How much can the loss ratio vary from year to year?
  - underwriting cycle
  - pricing error
  - random fluctuations
- Examples
  - For a new line of business sample market loss ratios and adjust for individual company volatility
  - For an established line of business examine past loss ratios

Insurance Risk: Catastrophic Losses

- Need to examine exposures
- Assess plausible extreme events
- Adequacy of reinsurance programme
- Examine and test tail dependencies

Insurance Risk: Reserving Runoff



- Volatility varies by class of business
- High/low selections
- Model stochastically and assess extreme percentiles
- Include a stress test

Credit Risk

- Reinsurers
  - investigate concentration exposure under extreme scenarios
  - dependence
- Premium Debtors
- Security issuers
- Other contract-specific exposures

Market Risk

- Market value volatility
  - can affect both income and realisation value of assets
  - linked to stock market, interest rates and exchange rates
  - use an economic scenario generator
- Mismatches
  - by currency, terms, type

Liquidity Risk

- Risk that there are insufficient liquid assets to meet liabilities as they fall due resulting in unanticipated losses
- This is unlikely to be a significant risk for most general insurers
- Example
  - Look at the amount of money held in non-liquid assets, assumed a delay in realising them and set a capital requirement of the interest required to borrow this amount

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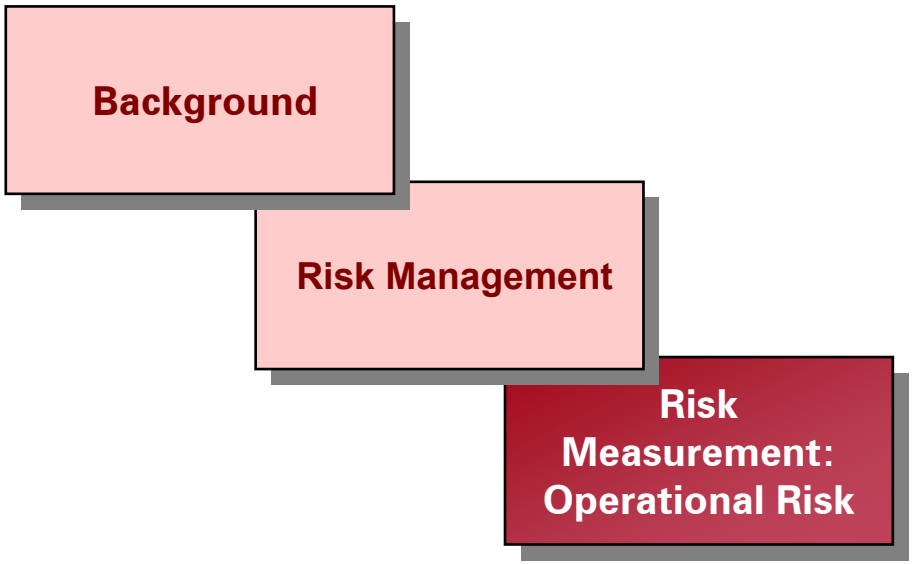

Background
Risk Management
Risk Measurement: Operational Risk

Consider the key causes of failure for PC companies

Reinsurance failure

Under pricing

Outsourcing

Unforeseen catastrophes

Unforeseen claims

Under reserving

False reporting

Investment failure

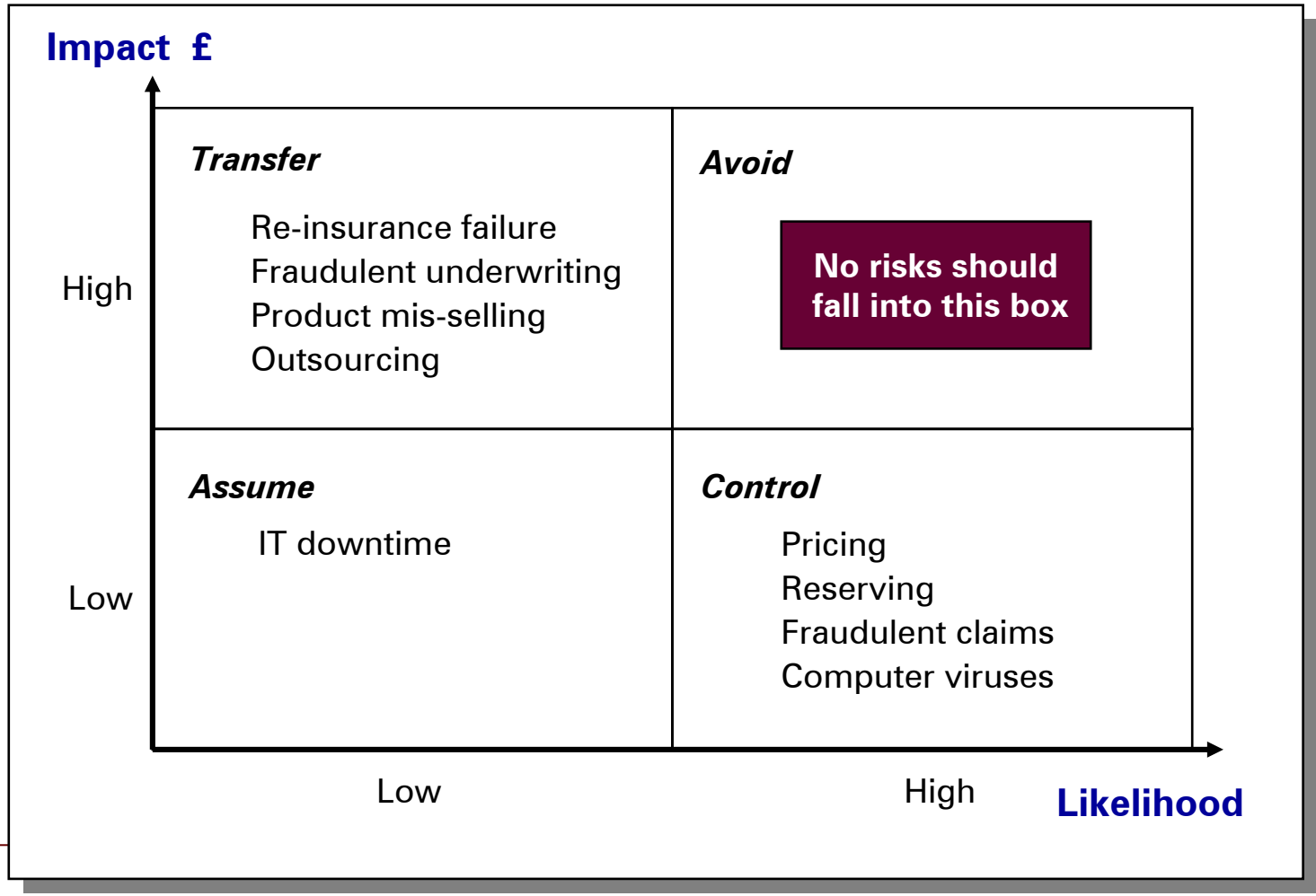
Fraud and greed

Gross incompetence

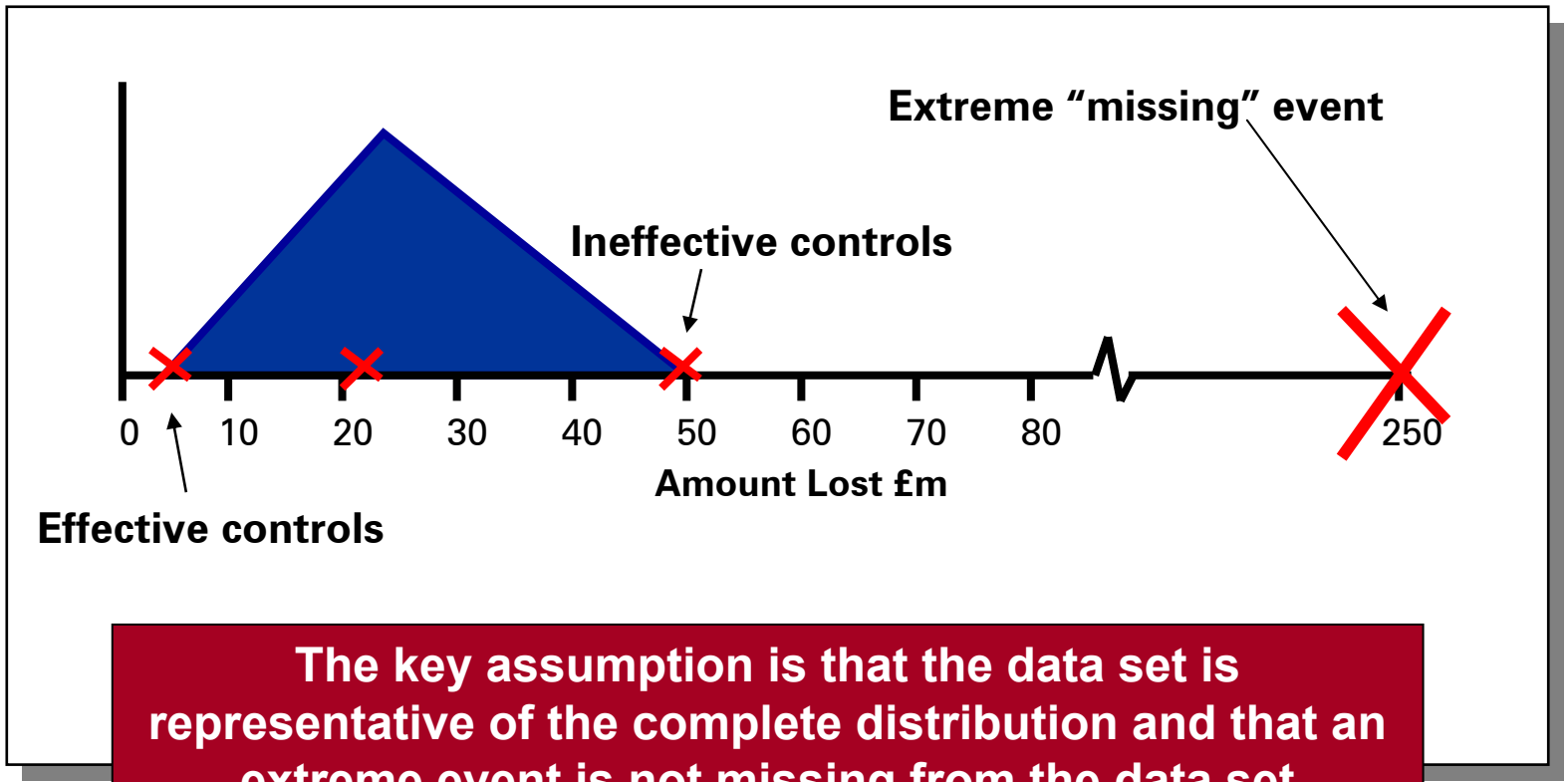
Rapid expansion

Expansion into new areas

Use a risk matrix to assess key risks



If data exists build models



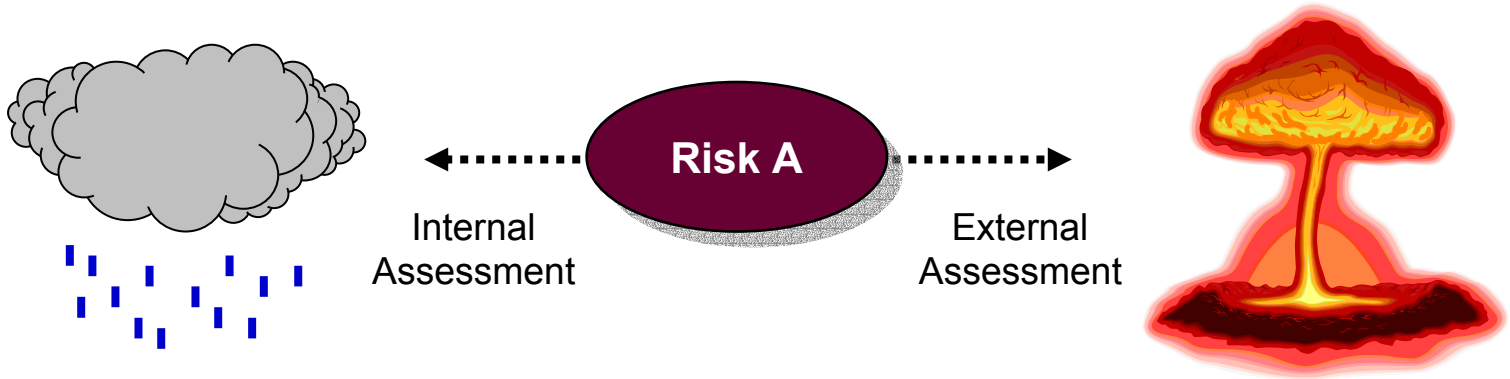
The key assumption is that the data set is representative of the complete distribution and that an extreme event is not missing from the data set

Develop stress and scenario tests

- Scenarios and stress tests should cover ‘reasonably foreseeable adverse events’ (FSA)
- Examples of prescribed regulatory stress and scenario tests can be found in the UK, Canada and Australia
- Stress tests are typically calibrated by:
  - Assuming that an event has occurred
  - Assessing the worst case impact at a chosen confidence level
  - Implicitly allowing for the effectiveness or failure of controls
- Industry benchmarks can be used to validate tests

The challenge with stress tests is ensuring that the results are realistic

- Stress tests should be plausible and adverse



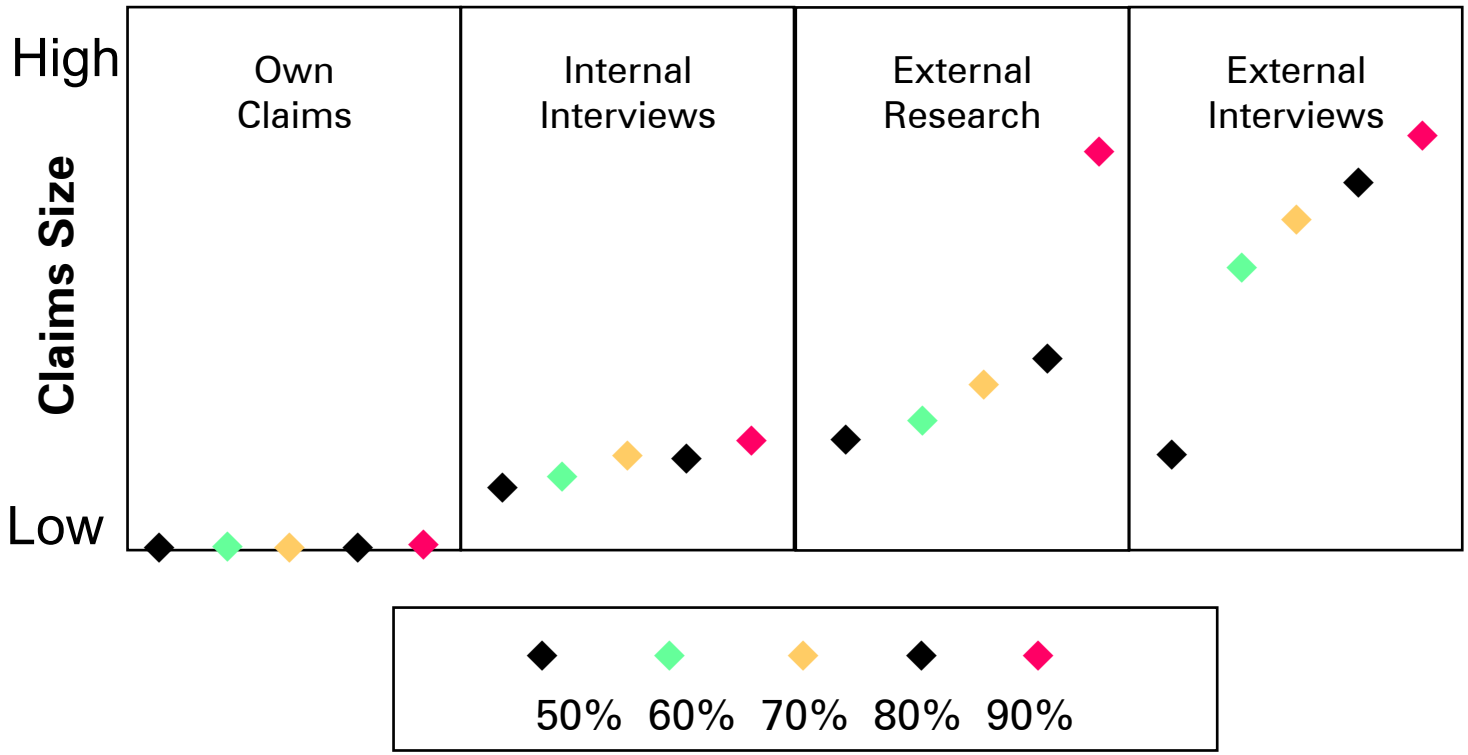
Developing stress tests is relatively simple

- Stress test / scenario:
  - Fraudulent broker: A broker acts fraudulently, writing un-authorized business and undetected for 6 months
  - Each year a percentage of claims are fraudulent and could be rejected on that basis. A file review indicates that up to 5% of claims can be regarded as fraudulent.
- Assessment:
  - £10m unexpected claims arise from this business
  - In a worst case we assume that the incidence and case size of fraudulent claims doubles, resulting in a capital requirement of 20% reserves.

… they need to be documented / researched to ensure that they are reasonable given actual experience

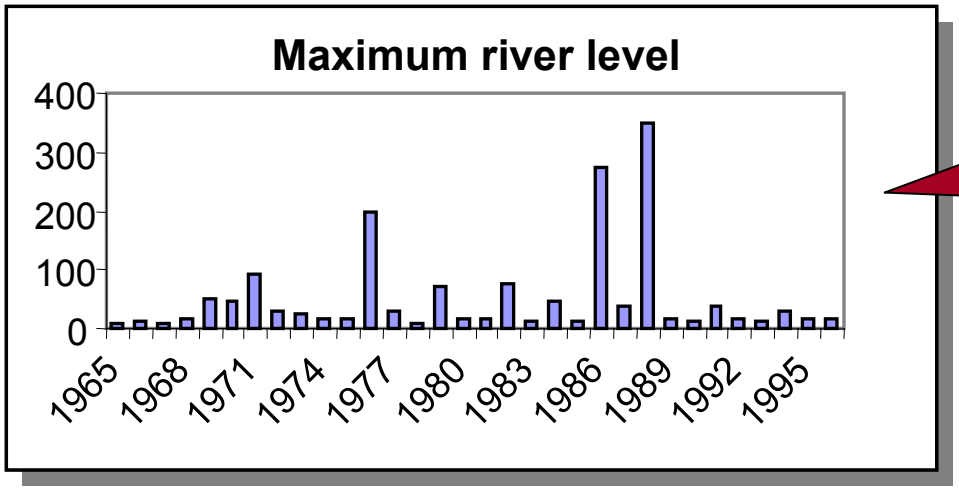
External data and views should be incorporated

Loss Estimates



Best practice modelling draws on other industries

- For example, EVT approach estimating the target height for flood defences from river level



Fit GPD severity distribution …
95th percentile: 600cm
99th percentile: 850cm

And also draws upon advanced actuarial techniques …

- Assessing asbestos and tobacco liabilities
- Pricing catastrophe insurance
- Assessing the impact of catastrophe claims - e.g. hurricanes, floods, September 11
- Designing alternative risk transfer products for the capital and insurance markets
- Assessing flood risk
- Pricing financial reinsurance transactions

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Case Study

Foreign Exchange Risk

Case Study: Foreign Exchange Risk

- New personal-lines company
- Stress and scenario testing
- Detailed business plan
- Details have been changed

The Problem

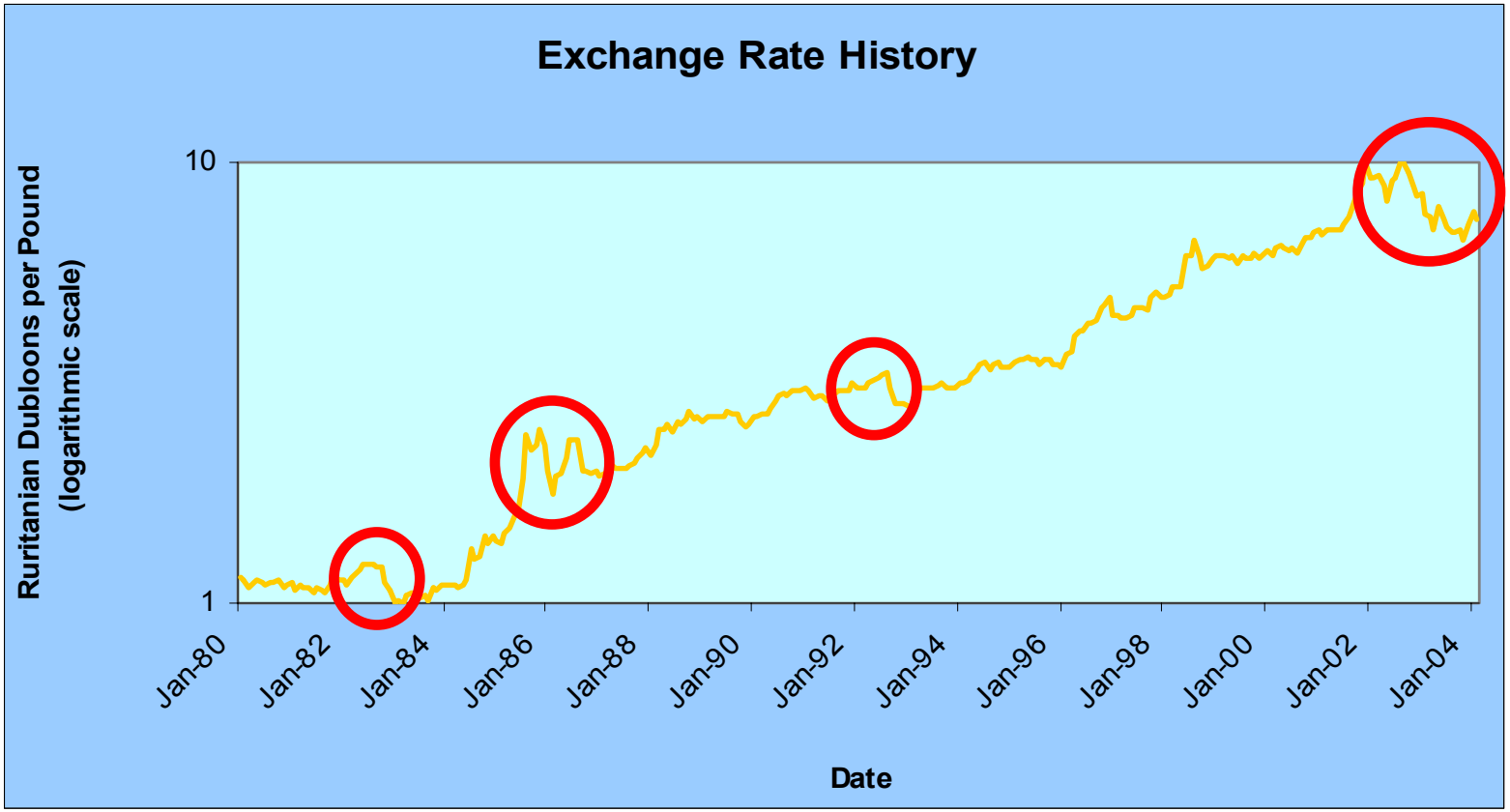
- Claims handled abroad
- Claims-handling fee fixed in foreign currency
- Income fixed in sterling
- Exposure to exchange rates

Exchange-Rate History

Exchange-Rate Movements

- 290-month history of rates
- Strongly in favour of sterling
- Therefore no risk?
- Wrong!

Exchange-Rate History



The Solution

- Find worst movements over
  - One month, two months, … twelve months
- Add together
- Total movement 428%
- Capital loading 428% of last month's expenses

The Result

Year	2005	2006	2007
Premium	1,000	2,250	3,700
Costs	50	112	216
Capital Requirement	16	40	84

Alternatives

- Buy currency futures
- Buy currency options
- Change the agreements

The End