31\textsuperscript{st} ANNUAL GIRO CONVENTION

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Doing an ICA

Some examples for those who are setting out

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Contents

- Background
- Risk Management
- Risk Measurement
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…

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

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

Background

Risk Management

Risk Measurement
The ICA presents two issues...

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

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 be 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

- Board
  - Recommend policies
  - Approve processes
  - Approve exposures
- Executive Committee
  - Provide guidance on principles
  - Set a risk appetite
  - Ratify policies
- Investment Committee
- Risk Committee
- Audit Committee
- Risk Function
- Compliance Function
- Audit Function
- Operating Units
  - Operating Entity 1
  - Operating Entity 2
  - Operating Entity 3
  - Operating Entity 4
- Operating Units
  - Adhere to group policies, understand specific local regulatory obligations
  - Identify, assess, control and mitigate risks as they raise

The Actuarial Profession
making financial sense of the future
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
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
Consider the key causes of failure for PC companies

- Under pricing
- Under reserving
- Unforeseen catastrophes
- Investment failure
- Gross incompetence
- Rapid expansion
- Reinsurance failure
- Outsourcing
- Unforeseen claims
- False reporting
- Fraud and greed
- Expansion into new areas
Use a risk matrix to assess key risks

- **Transfer**: High Impact
  - Re-insurance failure
  - Fraudulent underwriting
  - Product mis-selling
  - Outsourcing

- **Avoid**: No risks should fall into this box

- **Assume**: Low Impact
  - IT downtime

- **Control**: Low Impact
  - Pricing
  - Reserving
  - Fraudulent claims
  - Computer viruses

- **Control**: High Impact
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

<table>
<thead>
<tr>
<th>Claims Size</th>
<th>Own Claims</th>
<th>Internal Interviews</th>
<th>External Research</th>
<th>External Interviews</th>
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<tbody>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

- 50% - 60% - 70% - 80% - 90%
Best practice modelling draws on other industries

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

![Bar chart showing maximum river level from 1965 to 1995]

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
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

![Graph showing the exchange rate history from Jan-80 to Jan-04, with the number of Ruritanian Dubloons per Pound on the y-axis and dates on the x-axis. The graph demonstrates a steady increase in the exchange rate over time.]
Exchange-Rate Movements

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

Exchange Rate History

Ruritanian Dubloons per Pound (logarithmic scale)

Date

Jan-80  Jan-82  Jan-84  Jan-86  Jan-88  Jan-90  Jan-92  Jan-94  Jan-96  Jan-98  Jan-00  Jan-02  Jan-04
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

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
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<tbody>
<tr>
<td>Premium</td>
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<td>Costs</td>
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<td>112</td>
<td>216</td>
</tr>
<tr>
<td>Capital Requirement</td>
<td>16</td>
<td>40</td>
<td>84</td>
</tr>
</tbody>
</table>
Alternatives

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