Casualty and multiline business subject to diverse and changing drivers of relevant risk accumulation: scenarios to systematically capture, quantify, and standardize the obvious and the inconceivable alike.
Since asbestos was banned, do I need to be worried about products on the market today containing asbestos?
Liability cat *will meet* Nat cat

**Nat Cat today:**
All aspects fully in place

**L-Cat today:**
Focus on understanding exposure (rather top-down)

**With forward-looking modelling we will:**
- Quantify risk accumulation of liability books “bottom-up”
- Provide a portfolio steering tool for Casualty like in Nat cat
- Contribute to the creation of a sustainable Casualty cat market
Casualty and Multiline Accumulation
The Challenges
Casualty Accumulation Risk

Diversity of Concerns

**Classic Clash**
A variety of claims that follow a sudden event or occurrence, such as general liability, employer’s liability and professional indemnity claims arising from a building collapse.

- Deepwater Horizon
- Buncefield
- Piper Alpha

**Serial Aggregation**
A defect in the design or manufacture of a product that triggers multiple losses which are all linked to the initial defect.

- Thalidomide
- PIP breast implants

**Business Disaster**
Multiple losses occurring as a result of a single failure or the disclosure of incorrect/misleading advice/information.

- Enron
- Volkswagen

**Systemic Failure**
A repeatable process/procedure or industry/business practice resulting in a series of losses.

- PPI mis-selling
- Pensions mis-selling
- Abuse
## Casualty Accumulation – a Threat for (Re-)Insurance

### Diversity of Impacts

<table>
<thead>
<tr>
<th>Threat</th>
<th>Impact on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large reserve increase</td>
<td>Capital, Rating, Profit</td>
</tr>
<tr>
<td>Continuous reserve increases</td>
<td>Rating, Capital, Long-term earnings, Reputation, Profit</td>
</tr>
<tr>
<td>Large immediate payment</td>
<td>Liquidity</td>
</tr>
<tr>
<td>Headline loss, loss after which no hard market follows</td>
<td>Rating, Reputation</td>
</tr>
</tbody>
</table>

![Diagram showing reinsurance and claims as threats to reserves and impact on ratings, capital, and long-term earnings.](image)
Latent Liability Catastrophe Risk

... are we really covering everything ...
Latent Liability Catastrophe Risk

... are we really covering everything ...
Event: UK votes to leave the European Union

The “Brexit” has potentially an impact in the following areas

- Regulatory environment
- Legal environment
- Redistribution of activities
- Yield curves
- Exchange rates
- Consumer price index
- Medical costs
- Wages
- etc.

The impact for most of the changes can be modelled using LRD
A Framework to Estimate Casualty Accumulation

A good starting point and reference for comparison

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Engine</th>
<th>Output</th>
<th>Use Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

1. Casualty Accumulation Scenarios
2. BOA framework
3. Monitoring
4. Steering
Managing Casualty Accumulation with Forward-looking Modelling

Using Scenarios
A Refined Framework to Calculate Casualty Accumulation
From an *estimation* to an exposure-based *calculation* of Accumulation

Inputs | Engine | Output | Use Case
--- | --- | --- | ---
Casualty Accumulation Scenario |  |  | Monitoring
→ Interoperability |  |  | Understanding

Improved Exposure Information |  |  | Steering
→ Standardisation |  |  | Rational pricing

Interoperability

Standardisation

Monitoring

Understanding

Steering

Rational pricing
Why do we Need Forward-Looking Models?

*Risk of Change and Lack of Data*

---

**Risk of Change**

- **Anticipate impact of changes** adequately and consistently
- **Enter new markets** and **segments**
- **Understand sensitivity of losses to key factors to better manage our portfolios**

**Liability accumulation**

- **Identify liability catastrophes (L-cat)** early on in order to **understand impact** on market, clients’ and own portfolios, to **manage** risk accumulation and to **steer** risk appetite
Modelling Loss Events

*Casualty vs. Nat Cat*

**Cat event = laws of physics**

**Hazard** + **Vulnerability** + **Values** + **Conditions**

**Loss**

Earthquake

**Frequency**

**Liability event = rules of life**

**Macro environment**

**Social standards**

**Legal system**

**Conditions**

**Loss**

? Liability

? Frequency
Quantifying Tomorrow's Loss Potential by Assessing Changes in Today's Risk Landscape

Example:

- New products, emerging risks?
- Propensity to sue?
- Likelihood of mass litigation?
- Type of Products
- Cultural Background
- Liability Dynamics
- Geographical Spread
- Human Factor
- Terms & Conditions
- Economy
- Loss Prevention
- etc.

Swiss Re Liability Risk Drivers™ (LRD)

US Patent Granted 2014
Liability Risk Drivers for
Casualty Idiosyncratic Risk and Catastrophe Modelling

Liability cat events

Limited Liability Catastrophes (LLC)

Unlimited Liability Catastrophes (ULC)

"Classic Clash"

“Serial aggregation”
“Latency of effect”

“Interconnectedness of companies and industries”

External events
“Across-the-board impact”

Economic

Biometrics

Legal

LRD – a common framework based on scenarios and risk factors
Liability Risk Drivers Model

Expected Loss through contribution by Loss Scenarios

LRD is used by Swiss Re underwriting to cost Liability business
Examples

**L-Cat scenarios**
- Share the scenario landscape in LRD L-Cat
- Enhance understanding of scenarios impacting the balance sheet
- Work-in-progress: scenario description and historic loss examples

---

**Portfolio analysis**

**Scenario deep-dive**

**Strategy & benchmarking**

**Risk mitigation**
Developing Scenarios for Casualty and Multiline Risk
Types of Scenario

Scenarios in Swiss Re Liability Risk Drivers™

• Categorizing and estimating risk accumulation
  – Accumulation scenarios

• Modelling of loss processes → events
  – Loss scenarios
    – Unknown small loss
    – Known loss
    – Unknown large loss
  – Catastrophic loss scenarios
    – Limited catastrophe
    – Unlimited catastrophe

• Modelling of processes external to the loss → trends, sudden changes
  – Economic scenarios
  – Biometric scenarios
  – Legal, judicial, societal scenarios
Scenario Development

Practical Considerations

• How to proceed?
• What is the stage?
• Why is the scenario there?
• Bottom-up or top-down?
• Which granularity is right?
• Are available exposure data not specific and comprehensive enough?
• Is it only about “quantification”?
• Imagination, experts, or data?
Conclusions

- Diversity of drivers of risk
  \(\rightarrow\) one size does not fit all (one name neither)

- Purposes of scenarios
  \(\rightarrow\) aggregate / decompose risk landscape

- Not one set for all needs
  \(\rightarrow\) definition, interoperability, data standard
Appendix
Casualty risk versus Nat Cat

Asbestos
Total insurance industry loss getting close to 100 bn USD

Casualty
Nat Cat

Insurance loss scenarios (USD bn)

- Historic insured loss (indexed to 2012)
- Modelled 200 year insured loss
- FHCF: Florida Hurricane Catastrophe Fund
- JER: Japan Earthquake Reinsurance Scheme
- NFIP: National Flood Insurance Program

Earthquake Japan

85

Earthquake California

55

Earthquake US + Caribbean

200

Hurricane

10

Tohoku 2011

Floride 2005

45

Katrina

50

Northridge 1994

20

Insurance: 100 bns USD