How Do Cyber Insurers View the World

• Matt Prevost
  • Cyber Product Manager, Chubb
Adam Smith, The Wealth of Nations, 1776

“...the chance of loss is frequently undervalued, and scarce ever valued more than it is worth, we may learn from a very moderate profit of insurers...”

“in order to make insurance...a trade at all...the common premium must be sufficient to compensate for losses, to pay the expenses of management and to afford such a profit as might

“the person who pays no more than this evidently pays no more than the real value of the risk, or the lowest price at which he can reasonably expect to insure it.”

“many people despise the risk too much to pay for it...”

“sea risk is more alarming to the greater part of people, and the proportion of ships insured to those not insured is much greater...

“many fail however, at all seasons, and even in time of war, without insurance”...
Combined Ratio

\[
\text{Combined Ratio} = \frac{\text{Incurred Losses}}{\text{Earned Premiums}} + \frac{\text{Expenses}}{\text{Earned Premiums}}
\]

A combined ratio of less than 100% is good, over 100% is bad.
‘Underwriting’ was working...and ships had smooth sailing...
Until American ships didn’t have protection in late 1770s....
Insurance History 101 (Lessons Learned)

- **Fire Insurance**
  - **“New Factors” Phase**
    - **1837**: First industry classification and new factors were required. Mutuals and those that focused on ‘knowledge, inspection and improvements’
    - **1853**: Proofs of loss established
  - Many mistakes were made in this period, because there was little cooperation, but still there was a gradual approach toward better conditions and a larger and more comprehensive development.

- **“Cooperations” phase**
  (post civil war, Chicago/Boston fires)
  - Conditions were very unsatisfactory; rates were low, and prosperity for the companies was not very apparent. Special agent has scope change beyond that of just handling losses.
  - Fire insurance had been going through an evolution, and step by step, the scope had become broader and better calculated to assist the business development of the country.

- **Cyber Insurance**
  - What can we learn?

*Historical Study of Fire Insurance in the United States F. C. Oviatt (Sep., 1905)*
### Historical Study of Fire Insurance in the United States

F. C. Oviatt (Sep., 1905)

<table>
<thead>
<tr>
<th>Category</th>
<th>Property (last century)</th>
<th>Cyber (today)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market GWP (2018 Dollars)</td>
<td>$40M</td>
<td>$4B</td>
</tr>
<tr>
<td>Predominant Loss Driver</td>
<td>Fire</td>
<td>Data Breaches &amp; Business Int.</td>
</tr>
<tr>
<td>Other Perils Insured</td>
<td>Quake, Many More</td>
<td>Interruptions, Cyber Extortion</td>
</tr>
<tr>
<td>Cat Perils Excluded/Controlled?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cat Event</td>
<td>1906 San Francisco Earthquake</td>
<td>2017 examples…</td>
</tr>
<tr>
<td>Geography</td>
<td>San Francisco Area</td>
<td>Global.</td>
</tr>
<tr>
<td>Affected Insureds (Claims)</td>
<td>100,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Loss (2018 Dollars)</td>
<td>$4B (100x GWP)</td>
<td>TBD</td>
</tr>
<tr>
<td>Insolvencies</td>
<td>14+</td>
<td>TBD</td>
</tr>
<tr>
<td>Percent of Insured Losses Paid</td>
<td>76%</td>
<td>TBD</td>
</tr>
<tr>
<td>Prior Years’ Profits Erased</td>
<td>47 Years</td>
<td>TBD</td>
</tr>
</tbody>
</table>

*Historical Study of Fire Insurance in the United States F. C. Oviatt (Sep., 1905)
...but a cyber insurance underwriter’s algorithm is too new... right?

Combined Ratio

\[
\text{Combined Ratio} = \frac{\text{Incurred Losses}}{\text{Earned Premiums}} + \text{Expenses}
\]

- **<100%** (green thumbs up): A combined ratio of less than 100% is good.
- **>100%** (red thumbs down): A combined ratio of over 100% is bad.

0% 400%
<table>
<thead>
<tr>
<th>Company</th>
<th>Industry Description</th>
<th>Impact of Petya Attack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merck</td>
<td>US Pharmaceutical Company</td>
<td>Halted production lines</td>
</tr>
<tr>
<td>Maersk</td>
<td>Global shipping and logistics</td>
<td>Reinstallation of 45,000 machines took 10 days. $450m loss.</td>
</tr>
<tr>
<td>Saint Gobain</td>
<td>French construction materials</td>
<td></td>
</tr>
<tr>
<td>FedEx TNT Express</td>
<td>Global parcel delivery company</td>
<td></td>
</tr>
<tr>
<td>Mondelz International</td>
<td>World's second-largest confectionery company</td>
<td></td>
</tr>
<tr>
<td>Reckitt Benckiser</td>
<td>British consumer goods maker</td>
<td>Halted production lines</td>
</tr>
<tr>
<td>Beiersdorf</td>
<td>German consumer product manufacturer</td>
<td>Product shipping and production delays, Nivea product line impacted</td>
</tr>
<tr>
<td>WPP</td>
<td>UK Ad Agency (Largest Ad agency in the world)</td>
<td>WPP agency network disabled</td>
</tr>
<tr>
<td>Nuance Communications</td>
<td>US Healthcare company</td>
<td>Healthcare data system disabled</td>
</tr>
<tr>
<td>Home Credit</td>
<td>Consumer lending</td>
<td>All Russian branches closed</td>
</tr>
<tr>
<td>Evraz</td>
<td>Steel manufacturing and mining company</td>
<td>Information systems affected</td>
</tr>
<tr>
<td>Oschadbank</td>
<td>Ukraine's state-owned bank</td>
<td></td>
</tr>
<tr>
<td>Rosneft</td>
<td>Russian state oil company</td>
<td></td>
</tr>
<tr>
<td>Deutsche Post DHL</td>
<td>Global parcel delivery company</td>
<td></td>
</tr>
<tr>
<td>Boryspil International Airport</td>
<td>Ukraine International Airport</td>
<td></td>
</tr>
<tr>
<td>UKRenergo</td>
<td>Ukrainian state power distributor</td>
<td>No impact on power supplies</td>
</tr>
<tr>
<td>Metro</td>
<td>German wholesaler</td>
<td></td>
</tr>
<tr>
<td>Chernobyl Radiation Monitoring</td>
<td>Ukrainian Nuclear Power Plant Safety</td>
<td>Ukrainian plants affected, automatic monitoring systems disabled, forcing switch to manual</td>
</tr>
<tr>
<td>DLA Piper</td>
<td>Multinational law firm</td>
<td>Internal systems and phones disabled</td>
</tr>
<tr>
<td>Ukrainian Supermarkets</td>
<td>Retail - multiple?</td>
<td>Point of Sale systems disabled</td>
</tr>
<tr>
<td>Heritage Valley Health Systems</td>
<td>US Hospitals and Healthcare, Pennsylvania</td>
<td>Systems disabled</td>
</tr>
<tr>
<td>Ukrainian Banks</td>
<td>Banks, possibly 5</td>
<td>Disruption to operations</td>
</tr>
<tr>
<td>Russian Banks</td>
<td>Banks, multiple</td>
<td>Disruption to operations</td>
</tr>
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</table>

**Rosneft:** 1% of devices on network infected. ICS systems unaffected. $5m loss
“Cyber insurance doesn’t pay claims” is to cyber insurance as “my cyber security tool didn’t work so none do” is to Cyber security.
But cyber insurance doesn't pay?
Back to Cyber Insurance…what do cyber underwriters think about?
September 2018

“It’s kind of crappy to be a Chief Security Officer.. It’s like being a Chief Financial Officer before accounting was invented.”

“When you take the job, you decide that you’re going to run the risk of having decisions made above you or issues created by tens of thousands of people making decisions that will be stapled to your resume.”

- Alex Stamos, Facebook’s former Chief Security Officer
How do cyber underwriters ‘view’ companies?
The Underwriting Presentation

• Introduction (individuals, roles)
• Operational Overview: What does the company do?
  – How does the company make money / who is the customer
  – PR opportunity
    
    **TIP:** underwriters want a sense of “crown jewels” – is it pii, phi, trade secrets
    
    **TIP:** underwriters will likely ask for a record count
• E&O – focus on contracts/legal; testing protocols
• Security Portion
• Privacy Portion
• Governance (optional)
• Litigation/Claims Activity
Security Presentation

- Overview of information security structure and how it fits into the rest of organization
- Vision/Strategy/Framework
- What are your current strategic initiatives?
- Network architecture (data centers, segmentation)
- Information Governance
- Data Protection (encryption, tokenization, segmentation, masking/separation)
- Identity Management – Active Directory; Privileged Access Management (incl behavioral)
- Incident Response: SOC, SIEM
- Vulnerability management (patching)
- Business Continuity/Disaster Recovery
- Vendor Compliance
- Security Awareness
- Active Defense
- Threat Intelligence
Privacy Presentation

- Overview of privacy organization, incl. entities & individuals who help serve function
- Vision/Strategy/Framework
  - What are the crown jewels?
- Information governance
- Classification scheme; technological protections (encryption) as well as procedural/HR
- Regulatory compliance, incl GDPR Readiness/Data Handling
  
  *Tip: explain the “how”*
- Sharing, selling with business associates and other third parties; contractual protections
- Involvement of key stakeholders (legal/compliance w/business units; audit function)
Why do insurers have to worry about Cyber Risk Aggregation?

Not surprisingly, in recent months, Enterprise Risk and Underwriting have jointly received inquiries from key stakeholders on potential risk aggregation arising from cyber.

**Senior Management** and **Board of Directors**:

- What insurance coverages are triggered by cyber attacks?
- How many customers are potentially impacted by an event?
- How do we model cyber risks?
- What is our risk appetite for losses arising from cyber risks?
- Are we getting paid to cover cyber risks?
- What is the appropriate policy language to address cyber risks?
- What guidelines/authorities should we have in place to manage this risk across the organization?

**Regulators** and **Rating Agencies** are interested in controls in place to manage cyber risk aggregations to preserve long term solvency of the insurer.

- Is Cyber the next Asbestos or Long Term Care?
HURRICANE ANDREW 25 YEARS LATER ... CAT EVENT THAT CHANGED THE P/C (RE)INS INDUSTRY Catalyst For The Modern Day Cat Mkt With Modeling / Exposure Based Pricing. Bermuda Cat Re “Wave” Formed Uncapped QS Goes Away. Primary Carriers Withdraw From The Coasts While Wind Pools / FAIR Plans Expand

Hurricane Andrew struck South Florida (Homestead) 25 years ago today, making landfall on August 24, 1992 as a Category 5 hurricane (it was re-classified from Category 4 in 2002), causing $15.5B in insured losses (~$26B indexed to today’s $s). This single event exceeded the cumulative profit on all property lines beginning with biblical times. The loss remains the 2nd costliest natural disaster, after Hurricane Katrina (2005). Eleven property/casualty insurers became insolvent due to Hurricane Andrew and many others were financially impaired. Locking beyond the immediate impact of the event, Hurricane Andrew was a tremendously important event for the industry as a whole, bringing about significant changes that affect the (re)insurance market to this day. Among a number of other things (described in more detail below), Hurricane Andrew triggered the widespread use of catastrophe modeling / exposure quantification and prompted the launch of the Bermuda Class of 1993 (ReRe is the last independent company from this wave). On the 25th anniversary, we highlight what we view as the most significant changes for the (re)insurance industry as a result of Hurricane Andrew.

IBRN weekly (8/24/2017)
What information is required to build a catastrophe model for cyber risks?

Catastrophe models help insurers estimate losses under extreme events. In addition to contract terms like coverages, limits, deductibles, insurers would require the following data to properly aggregate risks:

<table>
<thead>
<tr>
<th>Cyber Catastrophe</th>
<th>Natural Catastrophe Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Type (Threat Actor, Threat Vector, Target)</td>
<td>Event Type (Hurricanes, Fire, Flood, Earthquakes, etc.)</td>
</tr>
<tr>
<td>Accounts potentially exposed to Target (Cyber eco-system)</td>
<td>Occupancy</td>
</tr>
<tr>
<td>Cyber Hygiene Score (outside-in view)</td>
<td>Location</td>
</tr>
<tr>
<td>Other security considerations (account level controls like data encryption, two-factor authentication)</td>
<td>Structural Engineering, Age</td>
</tr>
<tr>
<td>Other hazard considerations (motivation of bad actors to attack target)</td>
<td>Other hazard information (proximity to coast line, proximity to bedrock, etc.)</td>
</tr>
</tbody>
</table>

The insurance industry is working with a number of vendors to develop cyber catastrophe models; however we have yet to achieve a level of risk aggregation maturity consistent with Natural Catastrophe Risks impacting the Property product line.
Evolution within cyber underwriting

- Actual strategies proving successful and unsuccessful
- More ‘tools’ at our disposal
  - Aggregation
  - Account specific
- More insights into events themselves across the market
  - Attritional Losses (the everyday risks)
- Importance of Education
- Services to mitigate risk
- Advancing transparency of claims and underwriting process itself
- Back-casting seemingly systemic events
  - NotPetya
  - WannaCry
  - Third party distributed