Understanding CAT risk in captives

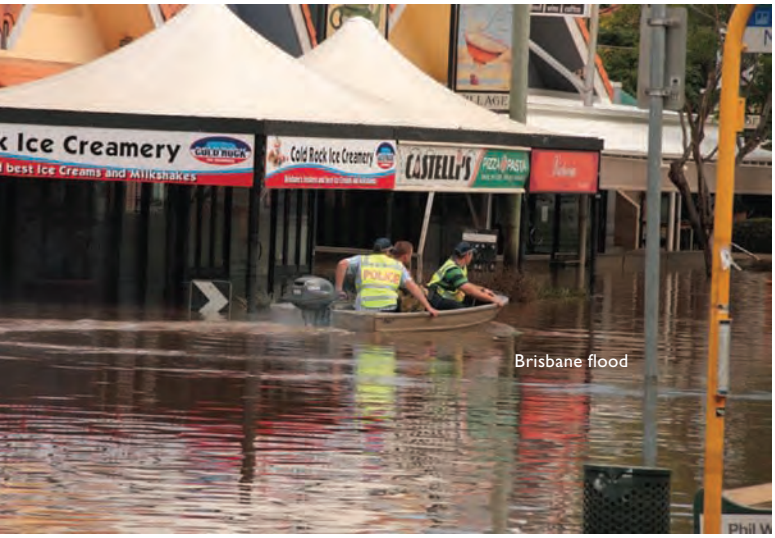
Catastrophes affect companies, captives or otherwise. While **Mr Rade Musulin** of **Aon Benfield Analytics Asia Pacific** cautions against over-reliance on catastrophe modeling tools, companies, insurers, captives and all stakeholders must still invest in it despite their apparent imperfections in being absolutely accurate.

Recent earthquakes in New Zealand; floods, bushfires, hailstorms, and cyclones in Australia; and the earthquake and tsunami in Japan once again illustrate the significant risk natural disasters pose in the Asia Pacific region. The Japan event, in particular, also illustrated significant derivative effects of such disasters, with problems in the electrical supply triggering secondary losses from supply chain disruption.

A number of major corporations have reported significant losses from recent events, either through directly incurred losses or from retentions in captives. Further, evolving regulatory requirements such as Solvency II will increase pressure on captives to better quantify exposure to natural disasters more than ever before. The capital efficiency currently offered to groups through use of an internal captive may also need reviewing under Solvency II proposed regulation. While captives usually retain a limited exposure both per event and in the aggregate after external covers are placed, the overall exposure of their parent organisations to losses from natural disasters can be significant.

Transferring risk but not understanding or mitigating it

For many large corporations natural disasters represent a major expense and source of business risk. Corporate risk managers use insurance and/or their captives to manage this risk, but many spend most of their energy on transferring, as opposed to understanding and mitigating, the risk. In many cases modest investments in better data and analysis tools can lead to significant returns, while at the same time helping to verify that retained risk is within the firm's stated tolerance.



Brisbane flood

Catastrophe modeling technology has been widely applied by insurers and reinsurers for many years. It has become an integral part of pricing, underwriting, claims, and financial operations. Rating agencies and regulators rely on it for solvency monitoring. However, its utilisation in corporations and their captives, particularly in Asia Pacific, has lagged behind. Recent events are likely to spur many to rethink their strategy on this, which will affect captive management.

Investment

In the past several decades there have been significant advances in catastrophe modeling technology. Modeling tools are available from several vendors for many key perils and their models can be licensed directly or run by intermediaries. Deploying modeling technology involves a significant investment in collecting data, software, and expertise.

Understanding a corporation's exposure starts with collecting quality data in a format compatible with today's models. Simply handing an asset schedule and engineering reports to a modeler is not optimal, as that person will have to translate the information into the data format required by the model, opening the door to errors of interpretation. It is better for firms to code data on property assets in a form suitable for modeling directly. This can usually be done fairly simply when IT systems are being developed. Most intermediaries can help coach a corporation through this process.

The type of information that needs to be captured includes the property's location, value, construction type, age, height and primary use. Catastrophe modelers use this information in models to yield estimates of the likely catastrophe losses from a portfolio with a given probability. Significantly, models are most effective on large numbers of similar risks; their utility on single risks or highly unusual types of property is more limited. For example, a model will yield relatively less certain results when estimating the likelihood of loss to a single industrial facility than to 10,000 apartments spread over a large area. This means that care must be exercised in using modeling tools on the type of risks often placed in captives.

Benefits

Catastrophe modeling can inform a number of decisions, including:

- Determining how much risk can be retained and how much insurance to buy.
- Understanding what the indicated long-term cost of funding disasters is.
- Measuring how much benefit can be expected from various risk mitigation strategies.

- Quantifying how risk from natural disasters compares to other risks facing the organization, such as from currency exchange rates or commodity prices.
- Allocating cost of insurance protection or retained losses to division or location.
- Allowing for more accurate "real time" loss estimates to help with recovery planning.

Overall, better understanding of risk can help risk managers better control costs and recover more quickly following events.

Accuracy

Many people complain about models being "wrong" after events. In fact, models are almost always "wrong" in the sense that they cannot predict the future. However, by helping risk managers understand the range of likely outcomes from many types of disasters they can facilitate preparing for the future. Sometimes, even knowing the relative likelihood of events of varying magnitudes can be very useful, as that can help make decisions on where to deploy scarce funds to mitigate loss.

Major events usually reveal some aspect of risk that was incompletely understood previously. Some recent examples include:

- In New Zealand, surprising levels of liquefaction (a phenomenon where soil loses its firmness during shaking, leading to significant damage). This led to greater than anticipated losses given the magnitude of the earthquake, plus loss from land and damaged infrastructure (such as underground pipes).
- In Australia, significant failure of garage doors in Cyclone Yasi. Australian building codes are strong with regard to wind, but do not adequately cover protecting garage doors from failure.
- In Japan, unexpectedly large tsunami losses. This triggered significant secondary effects due to the difficulties with power generation following the nuclear incident.

These examples do not indicate that an exercise in modeling is a waste of time simply because a perfect answer is unavailable. Instead, they reinforce the point that models must be used and their results interpreted by people with sufficient expertise to understand and explain their limitations.

Calibration

Models are constantly evolving to incorporate new information. In the case of earthquakes, fault catalogs and soil maps undergo regular revision. In the case of tropical cyclones, each year adds new events to the historical record, and model vendors make small adjustments to the frequency, severity, and likely track of storms where possible.

After severe events modeling firms send out damage assessment teams to conduct site surveys. The teams carefully survey damage, noting causes of building failure and unusual triggers of loss. The photo provides an example from a survey of damage undertaken by Aon Benfield in Christchurch, New Zealand, after the recent earthquake. The scene provides useful information on the susceptibility of the area to landslides.

Modeling firms will incorporate this type of new information into their models after a study period of many months or even years. Usually, the adjustments to the models are incremental, but in some cases they can be significant. When major changes do occur, users of models must transition the results into operations with care to avoid undue disruption.

Landslide damage in Christchurch, New Zealand, following the Lyttleton earthquake.

Avoiding over-reliance on models

Because models are tools which provide an imperfect view of possible extreme events, it is important for risk managers who use models to clearly understand their strengths and weaknesses or rely on experts who do. Models provide a great deal of valuable information, but sometimes the picture of loss is incomplete. For example, commercial models in Japan generally did not account for tsunami damage, and in many parts of Asia the ability to model flood is very limited. Results can also be subject to greater uncertainty on a specialty book of business which is typical of a captive.

The existence of these limitations does not mean that models are of no value; to the contrary they are an essential part of understanding risk. However, as was shown in Japan, their output must often be supplemented by scenario based approaches, expert opinion, or financial modeling tools to develop a complete picture of risk.

Concluding thoughts

Given recent catastrophe losses in parts of Asia Pacific, all tools that can inform decisions about what to buy and how to buy it are generating interest and it is likely that catastrophe modeling technology will become more widely deployed in captives in coming years.

This will be driven by many factors, including new regulatory requirements and stronger ERM frameworks in parent companies. Catastrophe models can help captive managers better quantify risk and measure its relative contribution to overall corporate volatility.

Successfully implementing modeling technology will require an investment in exposure data, software, and expertise over a period of years. For captives exposed to natural disasters, implementing modeling technology can help improve operations and the bottom line.

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