Great expectations

Eqecat CEO BILL KEOGH says that cat models have evolved greatly – but people are still not sure what to expect from them.

Cat modelling was unheard of in the industry when Reactions magazine started 30 years ago: how did we manage without it?

I've spent equal parts of my career in underwriting and in modeling. I started my career in the industry as an underwriter in the days before cat models. The best practice in those days before models was at least trying to collect all the exposure data or aggregates – in different parts of the world, by zone, by country. We relied on Cresta zones and people would apply factors or percentages. They would say a probable maximum loss for this zone in Italy is 25%.

It was a model in a way: it looked at exposure and the hazard and came up with an estimate. It was crude and it was deterministic and it wasn't a range.

One of the important things that was missed in those days was correlation. People looked at the zone in isolation and assumed the zones would be respected by windstorms!

Hurricane risk was a problem. I was an underwriter in the Caribbean for a while and understanding the correlation between Trinidad, Jamaica and Puerto Rico was extremely challenging. But we gave it a try.

Other times insurers simply looked back in time and asked, 'Well how much money did we lose from that event in this region?' and then used that as a proxy for how much risk there was there.

But that method ignored the fact that exposure and values were often increasing. A loss event 10 years ago that cost $50m doesn't tell you anything if you have got a portfolio that might have doubled or tripled in size over that 10 year period.

So these were models you could really build on the back of a napkin – versus the incredible complexity you see today, which is just so rigorous in comparison.

Also early models were limited by the amount of computational power that was available: the models have grown in complexity as the computational power has become more affordable. Nowadays the model complexity is appropriate to the risk and also for the uncertainty that goes with extreme events.

People are often critical of how their models worked after an event. Is that fair?

If you look at what happened in Japan, for example, it was a loss that was outside everyone's expectations – the scientific community and the modellers and the insurance industry. It was a bigger event than people expected you could have in that region. Plus the carry on effect due to the tsunami was beyond what was thought possible.

People then say 'You didn't model that outcome: wasn't that a failure of modeling?' Because the models are so complex it produces what I call delusional certitude among users.

In reality there are many more things that we don't know than things we do know. Despite the fact that we have so much information and so much data – it is still limited. What we don't know, on the other hand, is unlimited.

Getting comfortable with what you don't know is a big challenge. These are the things that will put your enterprise at risk: the things you don't know.

What about the accuracy of post event loss forecasts?

At Eqecat the feedback we get concerning our post event forecasts from our clients is that they are pleased with the guidance we give them and the numbers they get for their portfolios, for 'normal' hurricanes.

We'll produce a public insured loss estimate for the actual event after a very intense analysis of all the factors to do with building stock and coverages for example. Separately we also provide clients with a means of producing a loss estimate for their own portfolio.

Remember cat models are not built for post-event loss reporting. They are built to provide a probabilistic framework for thinking about events in advance. Post event reporting is a different task.

What improvements to cat models can users reasonably expect in the future?

Making cat models as easy to use as we possibly can is very important. Our benchmark competitor for 'useability' is not another cat model, it's Google. People familiar with software like Google have an expectation that you can always acquire information extremely quickly and easily.

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>
> *Bill Keogh, CEO, Eqecat*

Scaleability is something that we have invested a lot in as well and last summer we released a new process that's shown a 20x improvement in run times for our models. *Project Apollo* is a re-architecture project we will complete in the next 12 months that will produce big gains in both useability and scaleability.

In terms of improving accuracy, that's a bit more complicated. When you look at the intellectual capital that goes into building these highly complex models, it would be reasonable to expect them to be accurate.

We look at it differently because the underlying analysis of extreme events is fraught with uncertainty.

I'm talking about uncertainties like, 'what is the actual return period for a Cat 5 hurricane in Florida?' We don't really know that for certain; so our models capture a wide variety of the uncertainty that we know and that uncertainty is expressed in the model output.

Models shouldn't be judged on whether they are right or wrong they should be judged on whether they are helping you gain rational expectations around the risk. A cat model is an uncertainty platform; it should help you manage all the uncertainties together in one platform to gain an understanding about the risk.

Climate change means greater uncertainty: how do cat models reflect that uncertainty?

When we are characterising risk for US hurricane and US windstorm or Asia typhoon, the parameters are very well established in terms of maximum intensity, where the events will go, or return periods for extreme events and so on.

When you get into the realm of climate change and the various theories that are related to increases in temperatures and their causes, the amount of uncertainty makes those theories inappropriate in the domain of catastrophe risk modeling. The amount of uncertainty introduced goes way beyond an acceptable tolerance level for us.

We employ climatologists at Eqecat – but we don't think it is appropriate to incorporate climate change into our risk models.

In the US we have identified short term cycles of different sea surface temperatures that influence hurricane intensity and frequency. We make a modest adjustment accordingly when we are in a warm or cold cycle. I don't that call climate change; that's natural variability.

What changes in the industry will drive re/insurer demand for cat modeling capability in the near term?

We engage very closely with clients over how we can help them adapt to new regulatory requirements. Solvency 2 is having some positive effects – and some less positive. A less positive effect is that the compliance process is time consuming and expensive.

On the positive side we see that clients now have straightforward guidelines related to materiality of models and model changes. Because the changes are material it means that the changes can go to board level for sign off. That's exciting because we really want to discuss the challenges surrounding models and the rational expectations of our models with the CEOs of our clients.

So Solvency 2 has raised the profile of cat models in the C-suite and that is a positive thing.

How are the emerging markets of Asia-Pacific served by cat models?

Last summer we introduced a West Pacific Asia typhoon model that covers a geography of 12 million square miles including China and Japan. It was an enormous project which we undertook because we saw how the level of insured building stock was growing. Today insurers really need to understand how their risk in Japan correlates with their risk in China, for example.

This holistic view of risk is important everywhere. Because typhoon risk is not just about wind. There are two other important components: flooding and storm surge around the coastline.

Insurance linked securities are fast becoming part of the industry's toolkit: how will models reflect the growth of the ILS market?

We have a platform called eCat that provides a quantitative perspective on any public offering related to cat risk. We also provide rich executive commentaries with qualitative information about the risk in the region and how we parameterised the analysis.

We also do analysis work for issuers that they can disclose to investors in the offering.

So if we are not working on the actual deal we will always provide shadow analysis for the market.