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In my view

Measuring up the metrics

The PML concept is a fundamentally flawed approach to catastrophe risk management, argues Karen Clark, pointing to a lack of scientific data and an inability to adapt to large, complex organisations. So what measure should be used to assess and monitor risk instead?

One of the most challenging problems with respect to catastrophe risk is determining metrics for monitoring and managing the risk.

Catastrophe models generate lots of numbers: average annual losses (AALs), probable maximum losses (PMLs), and worse-case scenarios. You can select point estimates from the exceedance probability (EP) or ranges such as TVaR (tail value at risk). You can slice and dice your losses in so many ways, that you can virtually drown in a sea of numbers.

You can't manage your business to all of these numbers, so which one(s) to choose? There is no 'right' answer, and company decisions are largely dictated by regulators and rating agencies. External stakeholders use specific metrics to compare one company to another, to assign financial strength ratings, and to regulate solvency.

AM Best and Standard & Poor's gravitated to PMLs derived from the model-generated EP curves. In particular, the 1-in-100 and 1-in-250 year PMLs have become key metrics. If you want to maintain a certain rating, you must keep your PMLs relative to capital within specified ranges.

Lloyd's took a different approach to catastrophe exposure management. Instead of relying on model-generated PMLs, Lloyd's developed a set of realistic disaster scenarios (RDS). These scenarios have evolved over the past several years, but they generally represent low probability, large loss scenarios in the peak catastrophe zones.

As a catastrophe modeller, I didn't give much credence to the RDS events because they are deterministic and do not cover the full spectrum of possible events and losses.



RDS events are static, have no associated probabilities, and you can underwrite your book around these events. You don't even need a catastrophe model to generate the RDS losses!

Now, after working more closely with company executives, I've come to realise just how flawed the PML concept is for catastrophe risk management. There are major problems with this metric, not least of which is a false sense of accuracy in estimating the probabilities of large event losses.

Probability estimates derived from the models are highly uncertain owing to the lack of scientific data. In the New Madrid Seismic Zone, for example, scientists don't

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know the probable maximum earthquake and currently assign it a magnitude range of 7.2 to 8.0. The return period range is from 500 to 1,500 years. In California, there are

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HAITI AND MOZAMBIQUE MOST VULNERABLE TO NAT CATS

Italy, Japan, China, USA, Spain and France rated 'high risk'
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unknown faults, and scientists frequently change the estimated magnitudes and return periods for even the most studied fault segments.

What data is available to estimate the probability of a category 3 or 4 hurricane in the north-eastern USA? Scientists don't know the overland wind speeds, or intensities, for any storm before Gloria in 1985. Given the paucity of scientific data, it's no wonder the models differ significantly and the loss estimates, particularly PMLs, can change dramatically when models are updated.

Managing a business to ever-changing PMLs simply doesn't work. Other problems with PMLs are that they are not transparent or additive across regions, perils and policies. PMLs are not intuitive or operational risk metrics, particularly in large, complex organisations because actions of one business unit can dramatically affect the PMLs of other business units.

Once you accept that we simply don't know the probabilities of the events underlying the PMLs, the RDS approach looks eminently more sensible. Why are we trying to pinpoint a number from the tails of distributions that are highly uncertain and volatile?

We can instead pick a set of events that we know can happen with probabilities of around 1% or lower, and manage to that set of events. A fixed set of events allows better comparisons across companies and more robust risk management strategies within companies.

The concept of fixed event sets has considerable merit. You can use the models to generate event sets for full coverage in your peak zones, but once you've created a credible and robust set of events, you can stick with these for risk monitoring and management. This is similar in concept to creating a very large set of RDS events, and Lloyd's has been on the right track all along. **GR**

Karen Clark is president and chief executive of Karen Clark & Company, independent experts in catastrophe risk, catastrophe models, and catastrophe risk management

Weblog



It has been a results extravaganza on the *Global Reinsurance* site over the last month as reinsurers' first-half numbers came flooding in.

It was the usual suspects that created the most powerful headlines, with Swiss Re, Munich Re and Berkshire Hathaway, to name but a few, all in profit.

Online readers also took a shine to AIG's results, as the US giant reported a staggering \$2.7bn Q2 loss.

Our story 'Tough half takes toll on reinsurers' results' was the most clicked on by our online readers during the last period. It was a round-up of results from some US-listed (re)insurers, highlighting the strains of the heavy losses that have hit the market since the beginning of the year.

Also attracting a host of clicks and sitting comfortably in the top five was the latest developments at

Bermuda-based reinsurer PartnerRe after its acquisition of French counterpart Paris Re last year, with job cuts at the Paris-based operation reaching a conclusion.

It's also worth noting that the latest people moves within the market are an area of close interest to our online readers, as proved by Miller's new reinsurance trio, which was the fifth most popular story.

Keep an eye out for the next edition of GRTV on the site, as well as coverage from the 2010 Monte Carlo Rendez-Vous this month.

If you're into social networking, you can also follow us on Twitter – @GlobalReins – and pick up the breaking news, share it with your followers or send us a tweet.

 To contribute to the website, email Danny Walkinshaw at danny.walkinshaw@globalreinsurance.com

 **Online top five**

TOUGH HALF TAKES TOLL ON RESULTS

But some reinsurers' profits improved

NEAL BILL 'VIOLATES TAX TREATY'

German ambassador slams attempts to close reinsurance tax loophole

PARTNERRE FINISHES PARIS RE STAFF CUTS

Post-merger staff integration complete

EQECAT, AON LAUNCH ASIA TYPHOON MODELS

Both models tackle multi-country exposures

MILLER HIRES THREE TO REINSURANCE UNIT

Broker poaches Guy Carp and Evolution execs

Up the ladder

How did you make it to where you are today?

Ambition, drive and hard work!

How has the industry changed since you first joined it?

Technology has completely changed our industry since I first joined. Although to some extent the London market is still dragging its feet in embracing new technology, there has been a total transformation in the way we communicate.

What would you say are the key challenges ahead for you and the industry?

The lack of growth in the market in general is a challenge for every business, given the economic conditions. This has led to a predominance of mergers and acquisitions in recent times.

What are the biggest opportunities?

Given the current inefficiencies in the market, there is always the opportunity to make our industry more efficient and generate better margins.

What advice would you give to someone starting out in reinsurance?

Provided they have a good social manner, are responsible and willing to work hard, and are responsive, they will do very well.

What is the biggest mistake you've made?

There have been a few, but I maintain that it's far better to look forward than backwards. You should always learn from your mistakes and then move on.

What comes to mind when you think of your friends and contemporaries in the market?

I have always found the insurance market generally to be occupied by fun, amiable people.

What do you do to relax?

I'm always relaxed, but I love all sports, both playing and watching.

Toby Esser is the chief executive of Cooper Gay