Was 2017 unusual, unlikely, or both?

TigerRisk's head of analytics Nathan Schwartz considers whether 2017 was an unusually busy year for catastrophes, or whether other factors simply made it seem more eventful than usual

What does it mean for a random outcome to be "unusual"?

We all have a sense that if the lottery came up with the numbers 01, 02, 03, 04, 05 and 06, then that would be fantastically unlikely. But at the same time, we all know that an orderly string of numbers is no more or less unlikely than the normal-looking 03, 11, 38, 44, 58 and 02 – the actual Powerball lottery outcome on 4 August 2018.

The US aggregate insured loss for 2017 had around a 20- or 30-year return period depending on how it is modelled. Most people would agree that it was more unusual than that. The question is why.

Was it because we've entered a new age of detailed media coverage? Or was there something different about the events of the year? Perhaps it was the mix of events? You don't have to play with the numbers much to conclude that 2017 was unusual. It was. But was it unlikely?

There are at least three lenses through which we measure likelihood: size of events, number of events and characteristics of events.

According to industry loss estimates, US insured losses in 2017 were around $100bn – an unremarkable number on its own. But how those losses came about, in a parade of moderate to large events, was what made 2017 stand out.

Adding to the eccentricity were the large losses stemming from California wildfire – a peril which has been slow to earn its catastrophe status and not well represented in the standard cat modelling frameworks. We can expect new models to be released soon, but in 2017 wildfire was a wildcard.

Current industry standard tools are not designed to predict the events of a single year across all perils, but when we start to look at the likelihood of the loss distribution of 2017, we can begin to quantify unlikeliness.

In 2017, the US experienced 12 $1bn+ events across the wildfire, hurricane and severe convective storm/winter storm perils. If we ignore the specific peril distribution of those events, the return time for all of those events occurring in a single year is around 60 to 150 years.

Not only did 2017 witness a dozen $1bn events, but there were also three $10bn events. The return period for this many or more $10bn events is 75 to 100 years. From this perspective, how the losses stacked up was much more unlikely than the size of the total loss. If it seemed like there was a constant barrage of catastrophes last year, it's because there was.

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Now that 2017 has passed, will we see another year like it? Since 2000, on an aggregate loss basis, only 2005 experienced slightly more losses, and no other year saw as many $1bn events.

Interestingly, there have been three occurrences of 10 or more $1bn events in a year, and they all occurred in the past seven years. Our speculation is that the distribution of property exposure is trending toward higher risk, whether it be driven by concentration, more coastal exposure or continued expansion into wildfire-prone areas.

With all this historical and modelled information at hand, it's no wonder that pinning down a specific return period for 2017 is challenging. Despite the wide range of values, we can be confident in saying that 2017 was indeed both unusual and unlikely, offering insurers and reinsurers a great learning opportunity.

Last year's events allow us to evaluate our clients' reinsurance programmes using more than just models. We know that in a high frequency year with many multi-billion-dollar events, a traditional reinsurance occurrence tower leaves many insurers with a lot more retention than desired.

Furthermore, if a programme does attach, limit on lower layers can quickly be exhausted. Even having reinstated layers could lead to a lot of retained losses if the frequency of 2017's events was repeated.

Insurers that purchased cascading or aggregate structures were well served in 2017 by coverage that became more effective after the first few events rather than less. Just 10 years ago, these coverages were either too expensive or non-existent, but the market (with some prodding) has grown to address these needs. Today a reinsurance programme should protect you in a cost-effective way against years with one loss or many.

As we are reminded all too frequently, catastrophe models aren't designed to replicate exact events, but to give us an understanding of possibilities. Those possibilities aren't immune to blind spots like 9/11, the Tohoku earthquake and tsunami, Hurricane Sandy, Harvey-related flooding and last year's Northern California fires.

Last year was without a doubt unusual and unlikely. Looking ahead will there be years that have even more perplexing characteristics? Absolutely. One thing we know for sure: insurers must be ready to face all possibilities.

Author bio

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