Questions & Answers

Karen Clark is president and CEO of Karen Clark & Co., a Boston consultant specializing in catastrophe risk assessment and model evaluation. Ms. Clark developed the first hurricane catastrophe model and in 1987 founded the first catastrophe modeling company, Applied Insurance Research, now AIR Worldwide Corp. She discussed catastrophe modeling issues with Business Insurance Senior Editor Mark A. Hofmann.

Modeling rests on data

Q: What's the biggest challenge for modelers?

The biggest challenge for the modelers is to better inform the model users on the real uncertainty around the underlying science and, therefore, the catastrophe model loss results. The catastrophe models have certainly been refined over the past 20 years, but more detail does not mean more accuracy. And the models will always be inherently limited by limitations in our scientific information and knowledge. So model users need more transparency around this uncertainty, and they can incorporate this scientific un-knowledge into their decision making. There are many vivid examples of this lack of accurate scientific information. Take, for example, Hurricane Andrew. In 2002, 10 years after this storm occurred, the National Hurricane Center upgraded it from a category four hurricane to a category five storm, and they determined that the peak winds were actually 165 miles per hour rather than 145 miles per hour as they originally estimated in 1992. And that's a 20-mile per hour difference which is pretty significant. And what's more interesting is that there is still scientific debate about this with some meteorologists still sticking to the original wind speed estimates. With respect to earthquakes, USGF scientists frequently revise their estimates of earthquake magnitudes and return periods. For example, they recently reduced their estimate of the magnitude of the 1811-12 New Madrid events to 7.5 from magnitude eight. And they lowered the return period estimate from 1,000 to 500 years. Now, these changes have dramatic impacts on the catastrophe model loss estimates. Yet the fact of the matter is that scientists just don't know many things about hurricanes and earthquakes including the return periods for large magnitude events, events that drive the PML estimates for most companies. So using point estimates from an EP curve subjects business strategies and financial decisions to significant disruption when the models are updated and the EP curves change which they frequently do. Most of the modelers do provide some information on uncertainty but it's limited and doesn't convey the complete picture.

Q: What are the biggest concerns about data quality?

There are two problems with respect to the data being used to assess catastrophe risk. One is insurance companies are not collecting the right data and, two, the data they are collecting is frequently inaccurate. Most of the data collection and processing systems used in the insurance industry today were built to capture information relevant to fire risk. These legacy systems and company internal processes were never designed to collect the building specific information important for quantifying catastrophe risk. Over the past few decades fire losses per capita have been decreasing while catastrophe losses per capita continue to increase as we build more bigger and more expensive properties in hazard prone areas. And even though the catastrophe models are able to utilize detailed building specific information very few companies are collecting this information. The data quality improvements we hear about since Hurricane Andrew have focused on obtaining geo-coded street address information for the property locations. Most companies can tell you today what percentage of their properties are accurately geo-coded but most cannot tell you what percentage do not have adequate replacement values or have inaccurate construction or occupancy information. And many companies have significant data deficiencies in these areas and that further undermines the credibility of their catastrophe model results. Unfortunately, there's no quick fix to the data quality problem because each company has their own unique data challenges and there are no standard measures of data quality that are consistent

across companies. And what this means is that today the companies that do have high quality data are not able to fully distinguish themselves in the market. And, in fact, trying to collect better information can put a company in an uncompetitive position given current market dynamics. And we need to change those dynamics and we believe that there are ways to do that. One is the recently introduced I-Mark data score which provides a consistent measure of exposure data quality that external stake holders can use.

Q: What should—or can—end users do to vet the quality of the information they get from the models?

Most model users do not have the technical expertise to fully understand all of the scientific details in the catastrophe model black boxes, but that's okay because it's more important that model users thoroughly vet the quality and credibility of the model output, the loss estimates generated by the models. These are the numbers companies are using to make very important financial decisions so these numbers should be benchmarked and tested using other credible information. As you probably know, Mark, different model results can differ by more than a factor of two. And a model update can change portfolio level results by more than 100 percent. The average annual loss estimates by location that many companies are using for portfolio optimization are subject to even greater uncertainty and volatility. So given this high degree of uncertainty, additional information and analyses are required to develop robust risk management strategies. So some additional information, for example, includes recast losses from historical events and additional analyses include detailed examination of the location level model results and the model output by specific type of business. It's here that model anomalies can usually be detected. And this is another area in which we're helping insurance companies develop better internal processes around the use of the model. Many companies have already identified model results that aren't credible but the problem is they use the results anyway because they don't have other defensible processes in place. So this is what we're working on developing.

Q: Where do you see modeling five or 10 years from now?

Right now the industry is challenged with garbage in/gospel out. And obviously this needs to change over the next five to ten years. Catastrophe risk is the risk of the future and we believe the successful companies of the future will learn how to underwrite and manage this risk much more effectively. More companies need to start thinking outside the black box. Catastrophe models are a useful tool but they are just that, a tool and a tool that needs to be used in conjunction with other important information. As you know, catastrophe models are very general guides to the risk. They do not capture the nuances of specific types of business, specific properties and policyholders, and that's where underwriting expertise comes in. In 20 years, it's very interesting we've gone from no models, all underwriter judgment to all models, no underwriter judgment. And obviously neither extreme is optimal. And over the next five to ten years we need to develop better processes for incorporating all sources of information into underwriting and risk management decisions. And this will also make business strategies more robust and less subject to abrupt changes every time a model changes. The — as I see it, the focus of the last 20 years has been on the modelers and the model enhancements and the focus of the next 20 will be on the model users and how companies are enhancing their internal processes around the use of the models including their underwriting and their data collection processes.

A portion of this interview appeared in the August 4, 2008 issue of Business Insurance newsmagazine. The full content of this interview appeared online at BusinessInsurance.com.