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Roughly Right

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A proverb, often incorrectly attributed to Keynes, states that it is better to be roughly right than to be exactly wrong. Whether or not we've heard the concept stated so explicitly, we've all put its wisdom into practice. When my daughter asks me about the weather, I'll summarize the hourly forecast that I read online ("74 degrees with 20 percent humidity and a 10 percent chance of rain starting at 4 p.m.") as, "It's going to be perfect." She didn't need to project the path of a tropical storm—she just wanted to know whether she needed to wear a jacket to school.

Much like with weather, we are working in an era marked by tremendous amounts of data and by sufficient computing power to analyze those data. There is a huge temptation to build models that take advantage of these factors without great regard to what is really necessary to answer the question at hand. Most actuaries enjoy working with detailed data—that's what drew many of us in to the profession. It's critically important to remember, to torture another idiom, while we may love the trees, our stakeholders generally only want to see the forest. The depth of available data increases the risk that we will focus on the details of a problem rather than on the broader principles.

I'm not suggesting that there isn't a place for complex, data-rich models in the actuarial world. In fact, I believe that judicious use of emerging modeling approaches can set actuaries apart from our analytical peers from other disciplines, potentially even from within the same organizations. To that end, I am suggesting five key practices that will allow actuaries to continue using highly complex models to answer business questions without losing our audience along the way.

First, complex models should be supported and explained through the use of corroborating simple models. As fascinating as you may find neural networks, genetic algorithms, or negative binomial regressions, you were hired because your client (using this term loosely) would rather not know about these things. Corroborating models can be as simple as a graph that places a projected value in its historical context. This graph would be accompanied by an explanation of why the projected value is different from what might be suggested by extrapolating recent history. We should steer clear of explanations such as "this is what the data indicate" or "this is what our model says." These platitudes are generally indicative of shortcuts around finding the real-world cause behind changes in the data and models. Supporting models can also be simpler approaches or methods more familiar to the stakeholder that point in the general direction of a result from a more sophisticated approach.

Second, modeling approaches should be back tested and the results publicized. Comments referring to actuarial "black boxes" are rarely complimentary. However, the blackness of the box is certainly in the eye of the beholder. What is science to some will appear as voodoo to the uninitiated. In order to prevent this from becoming a barrier to our work being perceived as trustworthy, we must either train or reassure. In many cases, training our stakeholders in the ways of our models is not practical or desirable to either party. However, we can reassure others by demonstrating the historical accuracy of the same models that are producing our future forecasts. This must be done in a concise and understandable manner—lest we introduce additional black boxes—but is a critical step in gaining trust in our methodologies.

Third, be aware that precision implies confidence. This truth is often used to the advantage of marketers or attorneys who wish for their audience to believe something. For example, requested damages in lawsuits are often developed to much greater accuracy than necessary just to lead the jury to believe more fully in the arguments supporting the judgment. We must be very careful to not fall into this trap as well. While point estimates are often required (you have to book a specific dollar amount in reserve and file a specific premium), there are many cases where ranges of estimates are more appropriate. While statistical techniques can sometimes be used to generate precise confidence intervals, sometimes statistical rigor is not possible or even necessary. By discussing a range of estimates, actuaries can provide more value to their stakeholders by painting a more complete picture of the potential impacts of a decision.

Fourth, the a priori assumptions of both the actuary and the

stakeholder should be considered when building models and communicating results. On the front end, there is a temptation to dive full steam into the model building without first considering our expectations. If we are, as the Ruskin quote goes, in the business of substituting "facts for appearance and demonstrations for impressions," we must first consider the appearances and impressions. When the facts and demonstrations become evident, the degree to which they deviate from the initial assumptions will guide the degree of rigor necessary to test and explain the models. On the back end, the explanations of our results should be compiled with the a priori assumptions of the stakeholders in mind. If we are simply validating what they already thought they knew, then there is far less need for a detailed validation of our methods. However, if our models suggest a dramatic change in direction, then more care should be taken to manage the inevitable and reasonable scrutiny that will come our way.

Finally, we must ensure that the information being provided from our work points stakeholders to the more fundamental questions at hand. Sure, there's a premium to establish. But the individuals running the company don't really care what the actual premium is—they need to know the likely impacts of that premium on the business. From a financial perspective, running with this example, don't just say you've priced for a certain margin—that exact margin is, in the end, going to be exactly wrong! Explain the range of possible outcomes and the impacts of each.

This is an exciting and dangerous time for the modeling actuary. The proliferation of data and analytical techniques has opened up doors to solve problems we have been previously unable to tackle, but the same advances have brought analytical professionals from other disciplines into spaces traditionally led by actuaries. As we develop models and prepare results in this environment, I will close with three key questions that I believe ought to be asked whenever complex actuarial modeling results are shared with others:

- Am I conveying an appropriate level of confidence in my results and not leading stakeholders to trust them more than I do myself?
- Am I trying to help others develop a deeper understanding of the business or to make myself and my work sound impressive?
- Are my results helpful in expanding beyond narrow analytical questions toward addressing more fundamental issues? ▼

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