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"And What About Model Efficiency Governance?"

By Trevor Howes

No, the above headline is not a mistake! Although, it does reflect some indecision on my part while preparing to write this column. Should I talk about model governance, a topic attracting attention all around the world from regulators, auditors, chief risk officers, boards of directors as well as actuaries? Or should I look closely at another key focus point of the Modeling Section in 2016: model efficiency?

At first glance, these two primary interest areas of our section seem to apply to different stages of the modeling process and to be working in opposite directions. Model governance applies a framework of rules, validations and outside authority to the modeling function, slowing down the modeling process and adding expense. Model efficiency, on the other hand, considers the inner workings of the model and attempts to address the ever-increasing cost of running increasingly complex models. How best can we speed these models up, make them less expensive to run and consume fewer thousands of core hours?

Model governance and model efficiency may seem unrelated, yet there is an intersection of these two concepts that has received very little attention or discussion: how to properly govern the application of model efficiency techniques.

Model efficiency techniques are attracting increasing research dollars, newsletter articles and presentations at conferences, much of which our section is helping to organize and deliver. These techniques in general aim to address model performance by finding an alternative approach to the model calculations or a simplification of the model data or of the assumptions the model uses, so the adjusted model is quicker to run but still produces answers reasonably close to what the base model would provide. In other words, an approximation that is good enough for the purpose.

We all know a stochastic model using Monte Carlo techniques by definition provides estimates of the intended numeric result that involve some level of statistical error, which depends on the number of random trials. Mathematics tells us the standard error for a pure Monte Carlo simulation and that fewer trials increase that uncertainty. But is that standard error material or immaterial for a given purpose? And when we find innovative techniques to build smaller representative scenario sets or clustered samples of generated scenarios, how then does that error estimate change?

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Similarly, if we cluster model data into a condensed model, we know the reduced model will have different answers but usually we can only guess at the net impact of the technique, perhaps based on past experience. So model efficiency may come at the price of increased uncertainty and reduced confidence. This sounds like model risk; we are adding greater possibility that the results of the model may not be sufficiently accurate and may drive an inappropriate decision or strategy because the technique had greater distortion on the model results than anticipated.

How can we identify, quantify and disclose the nature of this model risk? Should it not be treated explicitly in the description of our work? And, most importantly, how can we mitigate this risk?

This leaves us with two important questions as we move forward with our exploration of these modeling topics:

1. What innovative model efficiency techniques can be developed to greatly reduce the computation load in the area of nested stochastics?
2. How can we manage and control the model risk introduced by our model efficiency techniques, and provide our stakeholders with a justifiable level of confidence in our modeling work?

In summary, how will we appropriately govern the increasing use of innovative efficiency techniques in our modeling? ■

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