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RISK MANAGEMENT AND THE POWER OF SIMPLICITY

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ACTUARIAL SCIENCE, like many other professions, has changed substantially with the introduction of sophisticated computer programs and greater access to more detailed data. This increased capability has contributed to the development of more sophisticated models that hold out the promise for more accurate models. In addition to increased accuracy, this computing power has the capability to increase efficiency

models. Although I still strongly believe in these tools, I also believe the effectiveness of these tools should be considered in relation to the costs of using them—particularly in light of new legislation that has made the underlying assumptions and historical data much less accurate in predicting the future. In addressing this question, I will discuss the costs of using more complex models and the blind spots that develop when managers

with My Old Dressing Gown.” In the essay, Diderot discussed how he had to constantly upgrade his furniture and decor to match his new dressing gown. At the end of his essay, Diderot complained that his entire life and financial position had been made worse and more complicated because he had to match his surroundings with his dressing gown. The term the “Diderot effect” was coined to describe the dynamic of upgrading your material positions to match a single purchase.

The problem with this narrative—and the focus of this article—is the very real risk management costs associated with the increased complexity, efficiency and overconfidence in the predictive power of models.

by eliminating “manual” inputs and other processes that require human engagement. These advances have led senior managers to put more and more trust in the models and their predictive power.

put too much importance on models. I will conclude by offering approaches that offer simple solutions to accomplishing our chief task of managing risk in a complex environment.

The effect can be seen in the development of actuarial models. As one adjustment prompts another similarly elaborate adjustment, a model can quickly become complicated and substantially more difficult to follow and review. Considering the variability of the underlying assumptions that drive the model, the model could be far too complicated for the required task when a minor change in an assumption could produce a dramatically different result.

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THE DIDEROT EFFECT AND THE BUILDING OF MORE COMPLEX MODELS

In the 18th century, French philosopher Denis Diderot wrote “Regrets on Parting

The chief problem is that this complexity is not considered in light of the enormous costs associated with the increased probability of error and the difficulty in creating an intuitive connection between an input and a result. Although one could argue the theoretical



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soundness of the model, the potential for a large systematic error that is not discovered increases greatly and is often not considered in the development of the model.

THE DRIVE FOR EFFICIENCY

With insurance organizations driving for increased efficiency, it is only natural that similar efficiency questions would be asked of actuarial and underwriting organizations. In general, the goal is to decrease manual work and replace repetitive human interaction with a model that can be easily automated. The classic example would be a comparison between an Excel-based rating model that allows the review of specific formulas and a “black box” model that eliminates human input and does not allow that same degree of review.

Although it is difficult to argue with the premise, this desire for increased efficiency often does not consider the systematic errors that can occur when a more manual approach is used. Instead of allowing the inherent checking or review that occurs in a manual process, a single error can be magnified and propagated through an entire block of business. Similar to the development of more complex models, this additional cost is often not considered.

OVERRELIANCE ON MODELS

People love the allure of models that promise to predict the future. By avoiding the inherent uncertainty and anxiety created by unknown future results, these models offer the promise of a more secure future. This narrative has been bolstered by books *Competing on Analytics* by Thomas Davenport and Jeanne Harris (is one) that romanticize people using sophisticated data systems to improve business decisions and better predict outcomes.

The problem is that this simple narrative often leads to overconfidence when managers put too much trust in these models—particularly when attempting to predict a complex system. Although several case studies could be used, the experiences with the hedge fund Long Term Capital Management and the inappropriate use of the Value at Risk metric during the 2008 financial crisis offer overwhelming examples of the hubris of putting too much confidence in financial models. Instead of soberly taking a holistic approach toward the accuracy of the financial models, the managers in these cases used the models as justification to unknowingly take more risk.

SOME SIMPLE APPROACHES

In many cases, the advances discussed here can be well worth the additional costs and should be used, but the added risks associated with complex models need to be considered. From a risk management perspective, these costs can contribute significantly to systematic error that may not be easily mitigated through an intuitive knowledge of the model. In addition, these complex models often lead to a false sense of security among senior managers.

Before developing more complex models, I would suggest considering some simple rules to determine whether the additional complexity can be justified from a risk management perspective.

- If the underlying assumptions have the potential for substantial variability, the added benefit of complexity is much less than a more mature system where the assumptions are more stable. In short, if a single assumption change can have a dramatic impact on the

result of a model, create a simpler model and focus your discussion on the key assumption.

- Even if complex models are used, a simpler model can still be used as an additional check to the overall reasonableness and accuracy of the model.
- We also need to consider decisions in light of the long-term viability of organizations that provide financial protection to people in the most vulnerable time of their lives. Unlike market researchers who analyze data to help to improve a company’s website sales, we need to consider not just the short-term probability of an event using sophisticated data analysis. We also need to consider the long-term financial health of the entire system.

Most importantly, I think that we need to exercise wisdom. While this may include the use of complex models, in some cases, this may also include using qualitative judgment and consideration of other factors that could impact a business. As actuaries, we should be offering something well beyond a technical opinion; we should be providing a holistic opinion that ensures the long-term viability of our own organization as well as the broader insurance system. **A**

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