Modeling: An Actuarial Student's Perspective

By Justin Serebro

T he purpose of this article is to share some important modeling lessons that I have learned and to offer some advice for pre-ASA and new ASA actuaries doing modeling work. I am an ASA with a total of four years' experience and still study for FSA exams while working full time. Therefore, I consider myself an actuarial student.

Entering my first actuarial internship, I knew that actuaries did a lot of modeling but I did not fully understand what modeling was. It turns out that actuarial modeling is very different from the mainstream depiction in "Zoolander." As Derek Zoolander has his signature "blue steel," core actuarial modeling relies on Excel. In this article, I would like to share answers to common questions about modeling such as:

- What kind of modeling do actuaries do?
- How do actuaries know if their model is right?
- How do you become "good" at modeling?
- What is the most important skill for effective modeling?

WHAT KIND OF MODELING DO ACTUARIES DO?

The wonderful (and scary) part of life is that there is always risk involved. This risk may result from a decision that must be made, or it may be inevitable. Risk occurs because we do not know what the outcomes will be ahead of time (if you do, then please feel free to skip the rest of this article). Modeling allows actuaries to quantify risks and determine whether these risks are within the company's risk tolerance. Depending on the practice area and the product being modeled, actuaries may be more concerned with certain risks. It is important to be able to model these material risks properly. For example, a life actuary pricing a yearly renewable term life product will be more concerned about mortality risk than interest rate risk, due to the short-term nature of the product and the significant financial losses that will occur if actual mortality is higher than the pricing assumption.
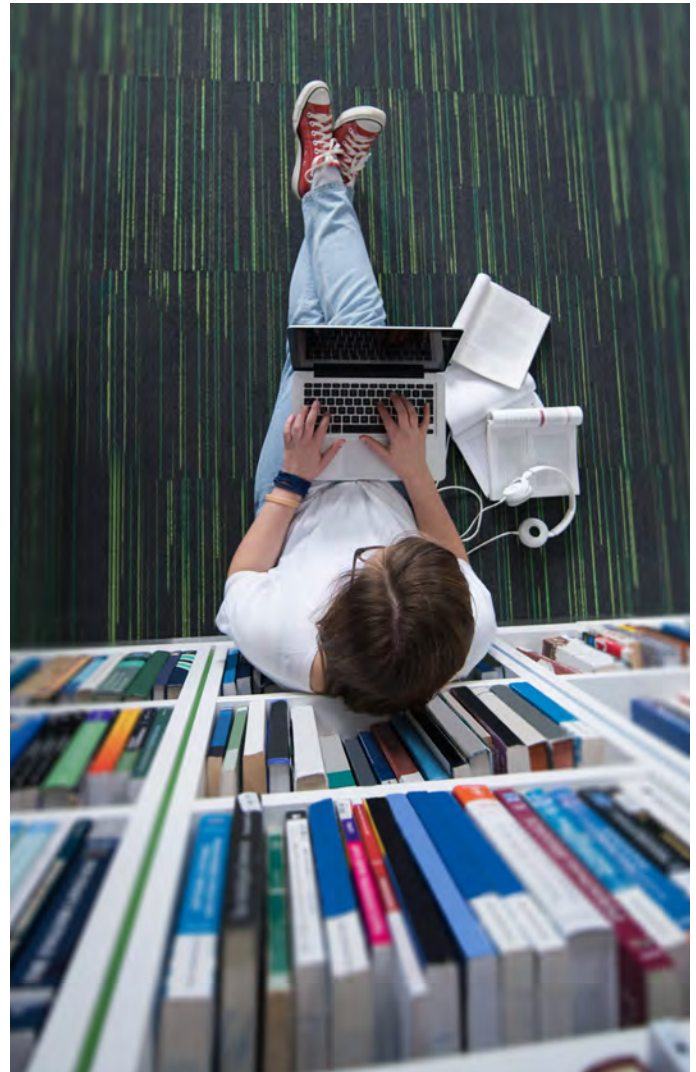
HOW DO ACTUARIES KNOW IF THEIR MODEL IS RIGHT?

The scary and ubiquitous truth is that no model is perfect. All models are simplified versions of reality. Again, if every outcome and its timing were already known with certainty, then there would be no need for models. Actuaries regularly adjust and fine-tune models as changes in regulations, economic environment and technology occur. The key is to make sure you understand any limitations, approximations and weaknesses of the model so decision makers can take these into account. Conducting sensitivity testing, developing ranges around estimates, and comparing model results with actual outcomes can be useful tools to get more comfortable with the results produced by models.

HOW CAN YOU BECOME "GOOD" AT MODELING?

Like any discipline, modeling takes time, practice and dedication. Through studying for the FSA exams and experience on the job, you will get more exposure to best practices for actuarial modeling. Nearly every form of actuarial work involves using a model or interpreting model results to advise management regarding business decisions. Therefore, as an actuary supporting your organization's decision-making processes, you need to understand how your model works and its intended purpose. I have found it useful to try to replicate model calculations using Excel. Validation exercises are also done within many modeling platforms. Additionally, detailed documentation regarding calculations performed in the model can be a valuable starting point in building your simplified model. It may not be reasonable to expect an entry-level actuarial student to replicate the model under every scenario or throughout all time periods; however, the idea is to try to understand the fundamental calculations that are going on in your model.

WHAT IS THE MOST IMPORTANT SKILL FOR EFFECTIVE MODELING?

Clear communication is essential if you want to become an effective modeler. However, communication might be the most overlooked aspect of modeling. Anytime you are assigned work, it is important to understand why you are doing that task and clearly confirm what it is that others need you to do. This is a very important consideration because the model's use needs to be aligned with its intended purpose. Also, understanding why you are doing the work can provide insight into management's concerns. When you receive a request, try to create a visual representation of your interpretation of the assignment. This could be a simplified Excel workbook or drawing that illustrates your understanding. By conveying to others how you interpret their request, you give them the chance to agree or disagree with your version. If there has been some misinterpretation, then you need to set up a meeting to get everyone on the same page.

I hope these insights are helpful and that you can apply some of them to your work. ■

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