Getting More from Your Actuarial Modeling

In recent years, actuarial modeling requirements have continued to expand to meet the ever-changing actuarial and business environment. A key driver for insurers updating their modeling frameworks has been the need to implement evolving regulations and standards such as IFRS 17. Also, they have increased their modeling capacity as the model runs necessary to meet these new regulatory requirements increase, while the timeframes for performing this modeling decrease. Further, internal requirements compound the demand for modeling as senior management looks to improve the quantity and quality of business information. Their aim is to understand the risks they are exposed to and support better business decision-making.

As modeling requirements grow and insurers’ models become more complex, there is a greater recognition of the operational risks involved in the actuarial modeling process. Insurers must put appropriate model controls and governance in place to reduce opportunities for errors in the modeling process.

Increasing demands on the actuarial function mean that modeling teams must review their processes to identify how best to meet both higher productivity and tighter controls. In this paper, we will look at some of the key areas actuarial functions are examining to help address these pressures and challenges. We will also explore some of the opportunities in these areas that can both add value to and increase efficiency of the actuarial modeling process.
Technology

Increases in actuarial modeling needs and complexity have caused increasing demand for a high-performance computing infrastructure on which insurers can run their models, and models that can effectively exploit new technology. The availability of cloud computing has changed the actuarial function, as its scalable calculation capacity has transformed how actuarial models can be deployed. The scalability has reduced actuarial model runtimes without the cost and ongoing support associated with traditional on-premises computing hardware.

In addition, the use of cloud technology has introduced more flexibility for actuarial functions. With traditional fixed hardware, calculation capacity must be set to a level that is sufficient to support an insurer’s peak modeling requirements during critical reporting periods. Adding further fixed capacity can be a costly process both in terms of the capital expenditure for extra hardware and the resources required to implement it.

Conversely, cloud users can easily add capacity by accessing resources in minutes without the upfront capital cost and IT effort associated with fixed hardware. Cloud users pay only for the resources they need, and typically benefit from the latest technology performance improvements. The on-demand capacity avoids the need to queue up modeling runs while awaiting available resources. Insurers can deploy extra resources quickly for each new modeling run and then deallocate them after the run is completed. The result is not only faster turnaround, but also greater predictability of runtimes and more capacity to cope with emergency reruns of critical steps.

Model control and automation

The rising complexity of actuarial models—combined with shorter timeframes in which to produce results—has increased the significance of modeling errors. Identified modeling errors mean that insurers must rerun the actuarial models. Undetected errors can lead to incorrect model outputs being used as the basis for management decisions or included in financial disclosures. Both actuaries and insurers’ senior management must focus on controls and strengthened model governance to reduce the risk of mistakes during the development, configuration, and running of actuarial models, and in the reporting of their results.

One significant way to improve model control is to automate the use of the actuarial models in production processes as much as possible. Automation not only lessens the risk associated with manual intervention in the process, but also ensures that the models run efficiently in the minimum runtimes. In an ideal situation, the automation implemented should:

- Allow the required model runs to be performed with the single click of a button (or even no clicks if scheduling is supported)
- Incorporate the preparation and configuration of model inputs (for example, policy data, economic scenarios, and assumptions)
- Perform all the runs required, including any adjustments required to perform stressed runs
- Produce all model results in required formats
- Generate control information useful to detect any anomalies vs. expected results

Open or closed?

With greater interest in improving model control and reducing operational risk, some insurers are revisiting the question whether to use open or closed systems. Open systems typically allow insurers more opportunities to implement their own code in their actuarial models. However, these systems present more scope for potential errors in the complex algorithms of modern actuarial models. Alternatively, closed systems provided by third parties may deliver more confidence through the rigorous model development and testing processes implemented by the system provider. If the system is used by multiple companies, then it also brings additional validation from its use by other insurers.

As insurers balance the strengths and weaknesses of the two system types, some are finding the optimum solution to be a compromise between the two. The core calculation engine may be delivered as a closed system, but with an architecture that allows a significant degree of customization. Such a system enables users to program formulas and custom logic in a way that does not compromise system integrity and performance. This may, depending on the system provider’s design philosophy, also ensure compatibility with future releases and enable easy upgrades. Finding the balance between the two is important. Choosing an open modeling system can give the actuarial modeling team access to more of the underlying system code. However, this
choice can be counterproductive. The extra user coding introduces a higher level of model risk for the insurer—making the implementation of appropriate model governance harder.

In addition, support, maintenance, and upgrading of modeling system code is a highly specialized function. It requires expert programming skills, including understanding of good programming practices, and advanced actuarial knowledge. Also, as previously discussed, implementing new technologies means that the infrastructure on which models run is rapidly changing. Thus, as an actuarial function takes on more coding responsibilities, the more they must bear the cost of these modeling experts, and any key man risks introduced. Modeling systems require maintenance and frequent enhancement either through a dedicated modeling team or by bringing in external expert resources. The more of the system that is maintained by an external professional software company, spreading the costs over multiple insurers using the same core system, the more cost-effective it can be for the insurer to outsource.

**Conclusion**

Actuarial modeling applications that rely on out-of-date technology and systems constrain the performance and cost-effectiveness of actuarial departments. These applications can contribute to unacceptable and often unknown levels of model risk for many companies. As insurers update their modeling frameworks to meet the changing actuarial environment, they look for opportunities to transform their actuarial processes to cope with emerging needs. They seek solutions that combine improved flexibility, lower model risk, better model performance, and reduced IT costs.

Actuaries must harness the capabilities offered by developments such as cloud computing for their modeling work and use functions with greater automation to improve model control and reduce their model risk. Thus, they may confidently face the aggressive challenges of new regulations and standards in a timely and effective way. It is also possible that this new modeling capability will help unlock new analytics, enhanced value, and transformational change.