SOCIETY OF ACTUARIES®

Article from

CompAct

October 2018
Issue 58

Loss Reserving in the Future: Innovation in a Rapidly Changing World

By Chris Nyce and Drew Golfin

Editor's note: Copyright © 2018 KPMG LLP. Reprinted with permission.

Insurers who see the promise of technology can modernize their reserving approach to realize insights and efficiencies, making it a true asset to business leadership.

The insurance world is changing rapidly. Call centers are being automated. Insurance pricing, underwriting, and claims triage have been revolutionized by predictive analytics. Cars are driving themselves on our roadways today and, together with new ridesharing apps, are changing the automobile liability regime and insurance structure. Detailed analytics around catastrophe modeling have led to a strongly competitive property insurance market even in areas that are hurricane and earthquake zones.

Yet if you examine loss-reserving techniques commonly used today, they are very similar to those described in a seminal paper in 1972, over 44 years ago.[1] Ironically, in that paper the authors observed that reserve methods at that time were mainly described in a 1934 paper, and the authors concluded it was "a serious indictment…that those particular skills have not been sharpened in almost 40 years." Forty-four years later, we could draw the same conclusion. Since 1972, the main advance in reserving techniques has been that the methods described back then have been adopted to software packages to automate what used to be done on paper spreadsheets.

A lot has happened in recent decades that change the potential reserving landscape. Detailed data is readily available to replace the aggregate "triangles" widely used today. Insurers have used analytic models in other processes predicting individual outcomes, such as claim frequency for individual personal autos, severities by individual claims, and even the likelihood a life insurance policyholder will borrow against a policy when interest rates change. Using modern computing, statistics, and data capabilities, a whole new field of data analytics methods, such as machine learning techniques, has been created that was simply not possible 25 years ago. But the use of these advanced techniques in property and casualty reserve processes is minimal in today's world.

THE PROMISE OF NEW TECHNOLOGY

Against the backdrop of methods invented in a computing power environment of 50 years ago is the promise of computing power and advanced analytics methods of today. The fields of machine learning techniques, powerful computing, and robotic process automation create enormous potential to achieve leaps in effectiveness and accuracy, efficiency, frequency of review, and greater control over the reporting environment. And visualization tools give us the power to quickly assimilate and act on the advances.

STEPPING STONES

Practical approaches to an improved and modern reserving process can be achieved by using established technologies of today. The goal is to take maximum advantage of existing technologies that are used already in most organizations, without creating impractical or unwieldy projects. These tools include:

1. **Advanced analytics tools**—These include machine learning techniques, statistical methods, and other advanced analytics. Many techniques are available in common software packages used today, such as SAS, Python, and R. In fact, reserving analysts may already use these tools for data manipulation.

2. **Data warehouses and data lakes**—The quintessential challenge with advanced analytics is often data. However, this can be overcome through sharing data with other analytics projects, being careful not to over-specify the data need, in combination with using innovative structures such as data lakes to streamline the acquisition of data. These can be accomplished consistent, of course, with sound financial control processes.

3. **Robotic process automation**—Using widely available, yet innovative tools for systems integration, instances of "bots" can replicate the repetitive tasks of human users. For example "bots" can get the data, run the update, display the results, and feed downstream systems with the outcomes, allowing human analysts to review and validate outcomes and selections and then to interpret and communicate the insights.

4. **Data visualization**—Claim and policy and coverage-level reserving techniques can produce detailed data files including IBNR that are ready-made to be analyzed for insights immediately using visualization tools. This analysis can start with probing the root causes for reserve changes and be rapidly adapted to profitability analysis across any dimension without further steps.

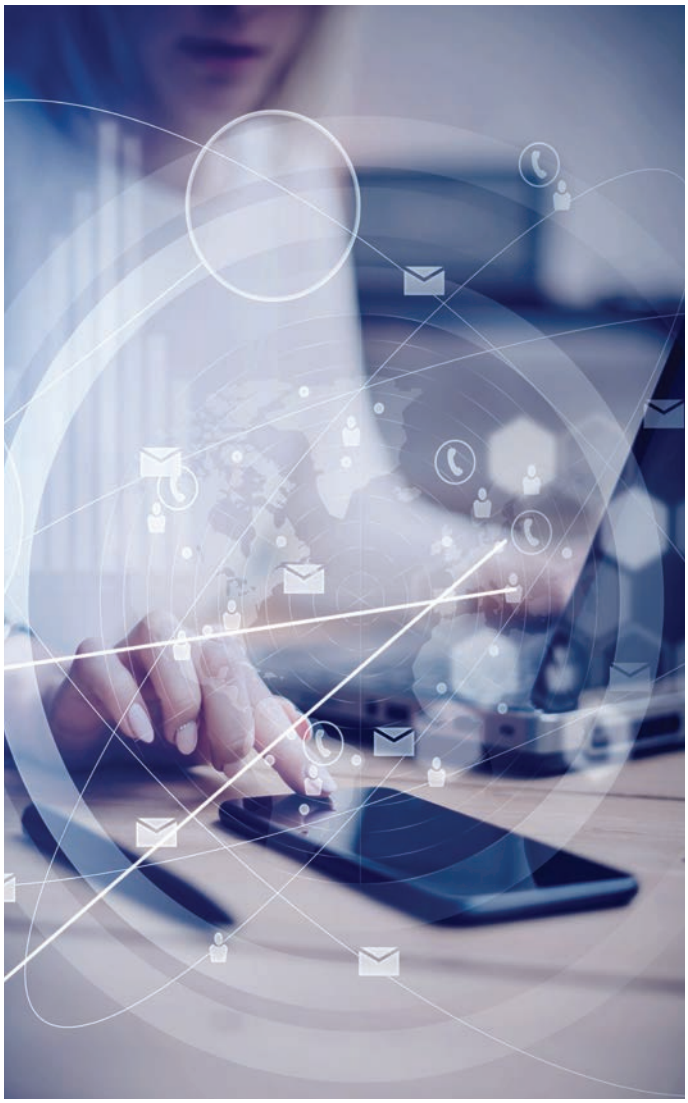
It takes only a little imagination to envision a modern reserving process that includes these elements. Modern analytics techniques, like machine learning techniques, can be used to update reserving models and run them to produce reserve outputs with whatever frequency management wishes to digest them. Robotic process automation can help to make this smooth and efficient. Data can be drawn from data lakes or other such structures that are routinely reconciled and available frequently or in real time, again assisted by robotics. The results can be provided to users in easily accessible files, with significant movements in the outputs already identified. The users can quickly access and analyze the data with a visualization tool and act quickly on the information. All this innovation is within grasp using existing technologies. It simply awaits the vision to make it real.

While not widely used in the reserving process, the use of these technologies is not unknown in the insurance industry. Predictive modeling has revolutionized pricing and underwriting in personal lines starting 20 years ago, and the revolution in commercial and specialty lines is well underway today. Claim prioritization models are in use in many claims departments. In fact, the promise of using existing underwriting and claims severity models as stepping- stones to the broader reserving model holds great promise to bring synergies in all the disciplines.

CHALLENGES

That the use of these technologies has not become well rooted in reserve-setting processes perhaps lies in the need to overcome challenges that are unique to reserving, including:

1. **Control environments**—Financial reporting considerations such that well-controlled and repeated processes may actually hinder innovation.
2. **Efficiency challenges**—As organizations are challenged to increase efficiency, investment in reserving infrastructure is difficult to prioritize.
3. **Lack of vision**—The failure to articulate the benefits of the insights that new approaches can achieve lead to underinvestment in innovation.
4. **Difficulty in acceptance**—A more precise reserve-setting process has potential to disrupt an organization. As valuable insights are discovered that might shift organizations to de-emphasize or increase emphasis on business segments, constructive business decisions can create winners and losers.
5. **Transition**—Moving in a well-controlled environment from static approaches through an innovation cycle creates challenges in keeping constituents, management, investors, and auditors comfortable with the change. Both a focus on testing and a period of parallel process are key to addressing the challenge.



THE POTENTIAL BENEFITS OF ACTION

But a focus on the challenges takes away from the promise of what innovation can bring to the reserving process. These include:

1. **Increased insights**—A more precise reserve- setting process holds the promise to dramatically increase the business insights from that process. Imagine a process that sets reserves based on detailed characteristics of innate risk and claims characteristics. "Allocation" of the reserves is no longer an issue, as reserves are calculated ground up and actually reflect the detailed risks.

2. **Faster reaction**—Management is able to realize changes in the environment more quickly and react. For example, many companies blame the slow recognition of the deteriorating auto environment starting earlier in the decade on slowly adapting "triangle" approaches. Imagine reserving techniques that respond as claims are reported and are reparameterized regularly using machine learning techniques.

3. **Frequency of review**—Once the models are parameterized, they can be run with any valuation date for which data is available. For example, an analysis could easily be run a few weeks before close, allowing that extra time to digest projected changes in ultimate losses and reserves and to prepare discussion for earnings calls as an example.

4. **Increased efficiency**—Robotic process automation can be introduced, leading to increased speed to close, as repetitive processes can be replaced by "bots". And as machine learning techniques can quickly identify trends and the root causes behind them, actuaries are freed up from routine tasks to digest the trends and communicate them to the organization for timely actions.

5. **Coordinated communication**—A by-product of a modern reserving process is an output ready-made for deriving insights using visualization tools. It is simple to mine the output and save views to communicate to constituents. Others can be given views of the data appropriate to their access requirements to derive their own insights for their business segments.

CONCLUSIONS

A leap forward in reserving and reporting processes is achievable with reasonable effort, existing technologies, and moderate cost without long-term or large projects. With proper design, this innovation can be implemented within well-controlled financial reporting processes. Not only can these innovations provide significantly more insight, but can do so within more efficient cost structures. A company acting on these more timely insights holds significant competitive advantage while peers who are left behind strive to catch up to the innovation.

It is likely that if the authors of the 1972 paper discussed previously were starting their careers today, they would be on the forefront of these innovations and once again assert the time is ripe to cast aside the approaches of the last century and modernize the reserving process. ■

Chris Nyce is a principal, Actuarial and Insurance Risk for KPMG. He can be contacted at *gnyce@kpmg.com.*

Drew Golfin is managing director, Actuarial and Insurance Risk for KPMG. He can be contacted at *drewgolfin@kpmg.com.*

ENDNOTE

1 "The Actuary and IBNR," by Ron Ferguson, and Ron Bornhuetter. Casualty Actuarial Society Proceedings, 1972.