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Stress Testing

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Stress testing is a suite of tools that actuaries use for a variety of purposes. The tools help companies evaluate the what-ifs and more efficiently weight risk and opportunity. There are many applications of stress testing, but all ultimately lead to more informed decision making. Stress testing can also support the Own Risk and Solvency Assessment (ORSA) regulatory requirement by using the tools to demonstrate an insurer's "assessment of risk exposures" and "prospective solvency assessment." There are different ways to categorize stress testing, but I like to group them into three distinct tools: sensitivity testing, scenario testing and reverse stress testing. The following three sections define and further explain each stress testing tool, including recommendations on improving and getting the most applications out of your stress-testing tool kit.

SENSITIVITY TESTING

Sensitivity testing is the most common form of stress testing that many organizations frequently use. Sensitivity testing is performed by stressing one assumption at a time and measuring the magnitude of that individual assumption or risk. Key uses of sensitivity testing include measuring and monitoring risk exposures, determining and evaluating key assumptions, and better understanding the range of profitability that can be expected for a new product. Unfortunately, the use of sensitivity testing as a product management tool often ends after completing the pricing exercise. Most companies continue to monitor key assumptions using standard experience analysis reports but do not continue to utilize the sensitivity results from pricing.

A standard experience analysis report consists of actual and expected results for key assumptions. This should be improved, given the tools and technology we have available today. Experience analysis reports should go one step further and provide the profitability impact (internal rate of return, profit margin, return on equity, etc.) from the assumptions' deviation from expected. The results from pricing sensitivity testing can be used to produce this "dynamic" product management report, which continues to monitor the profitability of a product. This type of report provides consistency to assumption monitoring, as it links the assumption experience to the profitability impact. Therefore, it is well understood what assumptions are having the largest impact on the profitability of a product.

SCENARIO TESTING

Scenario testing is conducted by stressing multiple assumptions, often historical or hypothetical scenarios about which a story can be told or used to answer a question. A scenario should be well thought out so that all interrelations among risks and assumptions are considered and included in the scenario planning. A key use of scenario testing is that it does the best job of explaining risks to senior management and to stakeholders who may not be experts in the insurance industry (such as board members). Scenarios should tell a story around a particular risk and, most important, help the company develop actions for managing a risk. Key actions that should be developed through scenario testing include implementing preemptive actions and developing contingency and mitigating actions.

The example I like best is how football teams prepare for a game. The most effective teams have a plan for succeeding in a scenario of being down late in a game. This scenario plan is referred to as the "two-minute drill." The best teams not only have preemptive actions in place to keep from getting into this situation, but also have a contingency plan in place to overcome the adverse scenario. Overall, scenario testing is a key tool that all companies should utilize and continue to develop to manage a variety of risks.

REVERSE STRESS TESTING

Reverse stress testing (RST) comes from the opposite end of scenario testing. RST first defines the outcome and then determines the loss it would take to result in that outcome. The outcome is most likely a key trigger level for an organization. Examples of



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outcomes used in RST could be that the company's risk-based capital ratio falls below 200 percent, management suspends shareholder dividends or share repurchases, or the company breaches key metrics identified in the risk appetite statement. RST helps the company understand the losses that can be absorbed without breaching the key triggers important to the company. RST can be a valuable complement to scenario tests, as it can be used as a benchmark to determine the impact of a particular scenario. For example, the financial impact from a data privacy breach scenario or a pandemic scenario can be

assessed against RST to determine if the financial loss from the scenario results in a breach of a key trigger level identified by RST.

Overall, stress testing is an important function of actuaries that should continue to be developed and utilized. Stress testing is a fundamental tool that equips management with the knowledge to make informed decisions. Stress testing lays out the risks and opportunities better than any other tool, and it is the actuary's responsibility to ensure management has this tool in mind when making important business decisions. ■



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