

PUBLISHED ARTICLES



Projections and Stress Testing: Key Tools for Analysts and Examiners

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Financial projections and stress testing are key tools for regulators to measure the impact of adverse events and possible future scenarios. While stress and scenario testing are not new to regulators and risk management professionals, the use of projections and stress scenarios continues to accelerate under Own Risk Solvency Risk (ORSA) requirements, International Association of Insurance Supervisors (IAIS) principles, and Enterprise Risk Management (ERM) in general.

As analysts and examiners, we must review and understand projections and stress testing submitted by the companies we regulate so that we can challenge critical assumptions where necessary and maximize the regulatory value of these important tools.

Goals and Use of Stress Testing

Projections and stress testing are simply models of the firm's future results under various scenarios or assumptions to better understand possible outcomes. Often, these models are considered to be economic capital models because they measure, "the amount of capital an organization requires to survive or to meet a business objective for a specified period of time and risk metric, given its risk profile".¹

In other words, the goal of the model under adverse scenarios is to determine how much extra capital the firm should have today to weather adverse events that could occur in the future. Because adverse events are often related, the model should also account for the interrelationship of these events.

A key goal of risk focused examinations is to identify prospective risks, and the appropriate use of stress testing can help regulators evaluate or quantify some of these prospective risks.²

Typical approaches used to quantify these risks include:

Stress Tests - Stress tests show the potential financial impact to the company if an adverse event occurs. This can include scenario tests which tend to be portfolio/event driven or sensitivity tests which focus on key assumptions. Often the stress testing includes a combination of scenario testing and sensitivity testing with Monte Carlo simulation and historical replays.

Reverse Stress Tests - Reverse stress tests identify scenarios that could cause an insolvency and then work backward to understand the likelihood that the scenario could occur and how the scenario could be prevented.

¹ ASOP No. 46 Risk Evaluation in Enterprise Risk Management

² Effective Stress Testing in Enterprise Risk Management, Lijia Guo, Ph.D., ASA, MAAA, Society of Actuaries, 2008.



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Stochastic Models - Stochastic models use random variables and statistical techniques to estimate the probability distribution of potential outcomes. Often this includes the use of an economic scenario generator to simulate potential results of financial markets and economies.

Reference to Standard Measures - Regulator and rating agency capital models often have standard measures of risk. Examples include the NAIC Risk Based Capital (RBC) formula which is factor based and assigns a risk load to reported amounts of financial exposure by category.³

Review of Models – So, how realistic are the results?

Any projection is only as good as the quality of the model and the reasonableness of the assumptions. There is no easy, bright line test to confirm the accuracy and completeness of the model used in stress testing, but there are a number of factors to consider. As you will see, the steps to review the completeness and accuracy are very similar to the steps used to confirm other financial statement items.

Corporate Governance – Models and stress tests should be a fundamental element of the insurer’s overall risk management framework and not just a regulatory burden. It should provide the board, as well as the regulator, with a clear understanding of the risks facing the company. The regulator should receive the results of the most material stress test and a clear understanding of the underlying assumptions. While it may be difficult in smaller organizations, those involved in designing the stress tests should have a level of independence from those making related business decisions or benefiting from outcomes.⁴

Independent Validation – Considerable professional judgement is involved with any model, therefore independent validation is a key step in the risk evaluation process. Back testing and stress testing are commonly used to understand the strengths and limitations of models. Other factors to consider if the model is appropriate for its intended use include:

- The tradeoff between precision and simplicity
- Appropriate consideration of correlated risks
- The need to be reproducible

³ Insurance Enterprise Risk Management Practice Note, March 2013, American Academy of Actuaries.

⁴ International Association of Insurance Supervisors, Guidance Paper No. 8, Stress Testing by Insurers Guidance Paper, 2003.



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- Practical considerations including ease of use, transparency, reliability, timeliness and cost effectiveness
 - Cash flow and discounting methods used.
- Appropriate Controls** – Regular assessment of the accuracy and completeness of data input into the model, software controls around the model, and resulting model outputs. Example of model risk controls include:
- Data reconciliation
 - Peer reviews
 - Reasonability checks
- Affirmation by key staff
 - Supporting documentation
 - Independent validation
 - Controls over software, servers and the proprietary modeling
- Reasonableness of Assumptions** – Assessing the reasonableness of assumptions is not easy, but the following items can help when assessing critical assumptions.
- Historical data and results
 - Fit of assumed distributions to available data in terms of expected value, variance, and extreme value
 - Comparison to market data or peers
 - Opinion of independent experts
 - Sensitivity of results to changes from baseline assumptions
 - Internal consistency of assumptions
 - Consistency in assumptions over time⁵

Conclusion

Financial projections and stress testing of insurers provide valuable regulatory information, but the real value of this information is highly dependent upon the quality of the model and the reasonableness of assumptions.

To take full advantage of this valuable tool, examiners and analysts must be prepared to test the model and challenge the assumptions before accepting the outcomes shown in the projection.

⁵ Insurance Enterprise Risk Management Practice Note, March 2013, American Academy of Actuaries.



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