White Paper

Planning for NAIC ORSA

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The National Association of Insurance Commissioners (NAIC) launched its Solvency Modernization Initiative (SMI) in June 2008, undertaking a comprehensive self-examination of the U.S. insurance regulatory framework in the context of evolving international solvency standards and regulatory regimes. As the European Union moved toward risk-based solvency regulation with the development of Solvency II, the NAIC looked for opportunities to strengthen its own approach. The Solvency II focus on governance and risk management has been a major structural difference between the evolving European system and the current state of U.S. regulation. In particular, there was nothing in the United States that was comparable to the new Solvency II Own Risk and Solvency Assessment (ORSA) requirement that gives the European regulators the capability to probe and evaluate the strength of an insurer's enterprise risk management (ERM) framework. As one component of SMI, the NAIC has been moving forward with its own ORSA requirement. The ORSA idea is a relatively new one that has not yet been fully tested anywhere, and there will surely be an initially steep learning curve for both insurance companies and regulators.

There is every indication that the NAIC is intent on making it more meaningful than merely an expensive compliance exercise. In 2011, the NAIC actively sought and positively responded to industry feedback on a draft ORSA Guidance Manual. The Guidance Manual that was ultimately published in November 2011 was far less prescriptive than the original exposure draft and demonstrated a greater awareness of the need to ensure protection of proprietary information.

The publication of the Guidance Manual was followed by a feedback pilot project for a small number of insurers to voluntarily submit ORSA summary reports in 2012, providing further opportunity for dialogue between the NAIC and insurers about how best to implement this requirement. In September 2012, the NAIC took the decisive step of adopting the Risk Management and Own Risk and Solvency Assessment Model Act (Model Act), which will now go to the various states to be adopted as legislation. In December 2012, the NAIC published an update of the Guidance Manual to incorporate some of the lessons learned from the feedback pilot project and to make it consistent with the requirement in the Model Act. The NAIC is planning a second-round feedback pilot project for 2013, providing another opportunity for fine-tuning prior to the Model Act's anticipated effective date of January 1, 2015.

Fundamentally, the goal of the new ORSA requirement is to ensure that each insurer has an ERM process in place that is appropriate to its own particular risk profile. More specifically, each insurer faces a threefold requirement:

- To maintain a risk management framework
- To regularly assess the material risks associated with its business plan and the sufficiency of capital available to meet those risks (i.e., conduct an ORSA)
- To file an ORSA summary report with regulators

Recognizing that no two insurers will have the same risk management framework or risk assessment process, the Guidance Manual focuses on the content required in the summary report, leaving the details of the ORSA process itself largely up to company management. This flexibility will be welcome to companies that already have a robust ERM framework that is fully integrated into the management structure. In theory, the only new requirement imposed on such companies is to provide regular summary reports to the regulator that document what is already being done. While there will be an initial cost incurred as these companies come to a complete understanding of what the regulator is looking for in the summary report, the process should be relatively painless after that.

In practice, however, there are few companies so secure in their risk management programs that they welcome more robust regulatory oversight without trepidation. The NAIC clearly recognizes that it is appropriate for small companies with relatively low levels of risk to invest fewer resources in ERM than do larger companies with more risks. Given the dearth of specificity in the Guidance Manual, however, insurers are left wondering precisely what level of sophistication will be required in order to satisfy the regulators.

The requirement to document the insurer's assessment of risk exposures in Section 2 of the ORSA summary report may be particularly worrisome in this regard. The Guidance Manual description of this requirement is full of references to "stressed environments," "simple stress tests or more complex stochastic analyses," "stress tests applicable to [each insurer's] risk profile," "stress factors," and "stressed conditions," but notably avoids providing detailed guidance on how to put these concepts into practice. In fact, there is a broad spectrum of activities that insurers should consider when developing a risk assessment framework.

QUALITATIVE VS. QUANTITATIVE ASSESSMENT

The Guidance Manual allows for the possibility that some risks are not amenable to quantification, and that qualitative approaches may be appropriate for such risks, citing operational and reputational risks as specific examples. It is true that it is no simple task to quantify the probability and severity of loss from such risks, and even insurers with relatively sophisticated ERM frameworks have often resorted to purely qualitative approaches to them. The actuaries and investment professionals employed by the insurance industry have developed sophisticated tools for quantifying balance sheet risks, but insurance companies have not historically devoted significant resources to developing similarly sophisticated quantification methods for operational and strategic risk. Continued reliance on qualitative methods will likely be viewed as low-hanging fruit for insurers looking to minimize the investment of further resources in satisfying the ORSA requirements.

There is an opportunity here, however, for insurers interested in truly improving their risk management processes. In this age of extremely rapid innovation, strategic risk could well be the most significant risk facing many insurers, and companies would be well-advised to bring every available tool to bear. Tools have been developed to assist management in turning their qualitative understanding of such risks into quantitative probability distributions. Often the process itself can be its own reward: Forcing managers to think about these risks in new and unfamiliar ways can be an extremely effective tool in helping them find new risk management strategies.

It is interesting to note that the Solvency II ORSA requirement is less flexible than the NAIC in this area. European companies will be required to quantify every risk.

DETERMINISTIC VS. STOCHASTIC

Perhaps the most basic question to be addressed is whether the stress scenarios will be generated deterministically or stochastically. Each approach has strengths and weaknesses.

S&P, in describing its methodology for assessing economic capital models, sums this up well:

> *While we view a stochastic modeling approach as having some advantages over a strictly deterministic approach, we do not believe that a stochastic analysis, in and of itself, necessarily provides a superior framework for analyzing risk and establishing a view of capital. Similarly, merely because a projection has stochastic characteristics, it is not, in our view, "superior" to a deterministic approach. In our opinion, a stochastic projection can provide an unrealistically favorable or unfavorable result depending on, among other things, the number of scenarios generated and the constraints built into the scenario generator. As a result, we score an approach solely dependent on either deterministic or stochastic scenarios as basic, and less favorably than one relying on the combination of the two.*[1]

S&P alludes here to limitations that can exist in the practical implementation of stochastic models, which usually arise from two basic issues.

First, stochastic models may make simplifications to the business logic in order to reduce model run times. These simplifications may be reasonable in depicting non-stress scenarios, but can understate the full potential of stress variables, by ignoring or understating relationships between various risk drivers and disparate segments of the business. This problem can be alleviated through development of an appropriately robust model and through effective use of cause-and-effect business logic to represent potential stress event

[1] Santori, L., Rosen, H.L., Petkov, M., Peacock, J. et al. (January 24, 2011). A New Level of Enterprise Risk Management Analysis: Methodology for Assessing Insurers' Economic Capital Models. RatingDirect on the Global Credit Portal, Standard & Poor's.

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mechanics. Second, stochastic model logic and the numerical parameters must strike a balance between:

- Reasonable and stable behavior in the mean outcome and the body of the distribution, and
- Robustness in the tails of the distributions, meaning that the model should be able to stochastically generate scenarios extreme enough to satisfy stress testing needs.

In practice, the requirement for reasonable and stable behavior usually prevents the stochastic model from generating the most extreme stress scenarios that would fully reflect the many sources of risk that the company faces.

Despite these limitations, a well-designed stochastic model will still generate a rich array of stress scenarios. Current best practice is to minimize the impact of these limitations by deriving parameters from a data set that captures as long a historical time period as is practical and ensuring that the selecting model parameters generate tail outcomes outside the historical record. In the absence of practical limitations on available resources, such a stochastic model should theoretically capture the full risk profile of the company. In the real world, however, there will always be resource limitations that will leave open the possibility that the stochastically generated scenarios underestimate the probability of some extreme stress events. Supplementing the stochastic model with carefully selected deterministic stress tests can therefore often provide valuable additional insight.

TOP-DOWN VS. BOTTOM-UP STOCHASTIC MODELING AND STRESS SCENARIOS

James Lam, in his seminal book on ERM,[2] makes a distinction between *top-down* scenario analysis and *bottom-up* economic capital modeling. As he describes it, scenario analysis "measures the impact that a certain event (or combination of events) will have on the enterprise." Examples would be a repeat of a weather event like Hurricane Sandy or an economic event like the 2008 financial crisis. This single scenario can impact multiple risk categories simultaneously, and has the advantage of capturing the strong correlation between risks in severe tail events.

A favorable attribute of scenario analysis is that the results are an extension of an understandable *real* event. The computed impact is supported by the selected relationships of the stressed risk factors associated with an event that can be described and envisioned. The risk management analyst can readily explain the result of the exercise because the risk event *story* leading to the outcome is built-in.

Economic capital modeling, on the other hand, is often implemented with a focus on quantifying individual risks separately and then aggregating them. Stochastic modeling approaches, in general, often take this bottom-up approach. The bottom-up stochastic modeling risk assessment process enables the derivation of risk metrics from the aggregate simulated distribution. The expectation is that a stochastic process leads to statistical output without a scenario analysis level of explanation underlying individual simulations. The adverse *tail* simulations define the Value at Risk or similar metric results from which a company can determine whether risk tolerances are adhered to.

For communication and understanding of the stress environment, these stress simulations (individual trials) should be deconstructed into event-driven cause-and-effect relationships. Model validation would engage company operational executives, C-suite management, and board members in "can this happen to us" discussions rather than encouraging a narrow statistical back-testing exercise. If the simulated scenario is deemed plausible, then natural follow-on discussions would investigate to what degree the company can accept the adverse outcome or reassess its controls, limits, and risk profile. Undoubtedly, such an examination of severe adverse outcomes is the intention of ORSA.

RISK CORRELATIONS AND DIVERSIFICATION MODELING

With the financial crisis of 2008, many financial institutions learned that interdependence among risks is simultaneously a crucial component of effective risk management and something that is extremely difficult to measure.

In assessing diversification modeling for insurers, S&P generally scores the approach[3] as follows:

- Basic: When an insurer considers interdependence partially or generically through a high-level correlation matrix, with little or no empirical justification.
- Good: When an insurer applies empirically derived dependency assumptions to determine interdependence among major risk drivers, for example by using Gaussian copulas or a correlation matrix. These are calibrated to tail correlations using stress scenarios, with such scenarios capturing all the most significant dependencies between the insurer's relevant business or investment entities.
- Superior: When an insurer estimates economic capital using a set of fully integrated stochastic models with joint distributions to integrate exposures or a copula approach that adequately captures tail dependencies.

[2] Lam, J. (2003). Enterprise Risk Management. John Wiley & Sons, Inc.

[3] S&P, ibid.

Deconstruction of any stressed *tail* simulations into the driving factors (e.g., very high casualty loss ratios, large natural catastrophe, sharp decline in the asset portfolio) will likely reveal that most of these adverse paths encompass multiple tail risk events emerging relatively contemporaneously, reflecting the risk correlation features of the model. Risk correlation is typically seen as the application of statistical methods for risk aggregation. This involves using correlation matrices, multivariate distributions for a body of risks, and sometimes copula structures that statistically reflect correlations that change throughout a distribution of outcomes. These aggregation methods are necessary if an insurer seeks a *good* to *superior* diversification assessment from S&P.

Revisiting the definition of correlation, Lam summarizes the concept with the question, "How are the risks of the business related to each other?"[4] The aforementioned statistical methods are a path to quantification but can limit model structure and greatly inhibit the interpretation of model output. Stochastic model structures do not need to have risk quantification and aggregation as discrete steps. A much more explainable and understandable way to address the relationship of risks to each other is in recognizing the common forces that drive risk factors to stressed levels, thus integrating risk quantification and aggregation. Examples include:

- Macro-economic and financial scenarios applied simultaneously to asset evaluation, liability evaluation, business volume, and profitability
- Common management of business segments and similar competitive forces across lines of business
- Overall portfolio or individual business line management decisions reacting to prior period results captured both for the whole company and business segment levels

By way of example, while economic scenario generators (ESGs) are commonly used in stochastic analyses to simulate a distribution of returns on assets and the value of the asset portfolio, these same economic assumptions are affecting the liability side of the balance sheet. Inflation forecasts are tied to the trend rates on claim costs; unemployment forecasts impact claim frequency and premium growth for lines of business such as workers' compensation and mortgage insurance; stock market returns impact claim frequency and severity assumptions for the liability of public company directors and officers.

[4] Lam, ibid.

CONCLUSION

In late February the NAIC invited insurers to participate in the 2013 ORSA pilot project, voluntarily submitting a confidential ORSA report in September. For insurers with robust ERM frameworks in place, the 2013 pilot project is a valuable opportunity to get feedback from the regulators on their ORSA reports prior to the implementation of the model law. For insurers with relatively unsophisticated risk management programs, on the other hand, development of an effective ERM framework will be a major undertaking involving all levels of company management. Those who commit the resources and time to develop their ORSA, however, will reap significant benefits beyond satisfying a new regulatory requirement. Sophisticated risk analytics will provide a new window on aspects of company operations and associated risks that may not have been properly identified, evaluated, or managed.

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