A new approach to risk

The role of capital management and enterprise risk management in the insurance industry. by Chris Suchar and Dilip Krishna

Insurance is a business of risks, and the proper management of an insurance company’s capital is critical to its long-term survival and profitability. Insurance companies earn their capital through premiums collected on policies sold to customers, and in funds earned by investing their profits.

Unlike other industries, insurers regularly sell products where the maximum possible loss is multiples of their financial resources—they literally bet the company on claims that could exceed the premiums collected. When insurance products are sold to customers, the collected premiums are held for the duration of the policy so that money is available to pay claims on those policies, perhaps because of an automobile accident or the death of the policyholder. Usually, the premiums collected exceed the amount required to pay claims, and the excess becomes profit to the insurer.

However, there is the potential for claims to exceed premiums, especially when multiple events go against the insurer simultaneously—for example, a hurricane or a disease epidemic. Insurers need to maintain excess funds on their balance sheets as a cushion against the risk of adverse outcomes. These funds are typically raised from investors through equity capital or from policyholders in the case of a mutually owned company.

Insurance companies also take financial chances in their investment portfolio. An increasing trend in the industry is to make more aggressive investments to yield a higher return, which typically correlate directly to higher risk. Insurers rely on a variety of approaches to mitigate these exposures, but the risk remains substantial.

The players

An insurance company’s various stakeholders have different interests in its capital. Investment performance is usually measured in terms of return on equity (ROE) capital: the greater the ROE achieved using the same equity, the better the return. Investors want as attractive a return as possible from their investment and are, therefore, interested in running as lean as possible in terms of capital. In contrast, regulators are interested in ensuring the strength and solvency of insurance companies, which implies increased capital.

Credit rating agencies such as Standard & Poor’s are interested not only in the amount of capital held by companies (indicating their ability to weather a storm) but also in their ongoing profitability.

Finally, insurance company CEOs, while not directly affected by capital, are answerable to investors and regulators. They are also keenly interested in keeping the rating agencies satisfied, since their ability to grow the business depends on the agencies’ evaluation of their ongoing profitability. With the numerous stakeholders vying for...
Investors, regulators and rating agencies are putting additional emphasis on accurately measuring risks and managing capital more intelligently.

their own interests in an insurance company’s capital, accurately defining risk is increasingly important.

Risk complexity
Insurance risks have become larger and more complex in recent years with increases in terrorism, extraordinary natural catastrophes and predictions of flu pandemics. Complex interactions can occur among varying product lines—risks that might be acceptable in isolation become dangerous when combined with others. For example, an insurance company with customers along a coastline may focus on auto and home coverage. While each product may appear relatively safe when regarded separately, a hurricane that destroys cars and homes could be devastating to a company with these combined risks.

More complex insurance products have also been developed. Variable annuities, for instance, can create exotic financial risks on par with those of Wall Street derivatives markets. In addition, insurance companies have increasingly been doing business on a global scale, leading to a larger portfolio with greater diversity of risk factors.

While insurance companies have become exposed to newer and more complex risks, they also have available advanced risk management tools and the opportunity to diversify into different markets and businesses that can reduce the effects of these risks.

Capital is the currency insurance companies use to ensure they are adequately protected against the manifold risks to which they are exposed. As a precious resource, capital needs to be carefully measured and managed to offer adequate, but not excessive, protection. All insurance companies are required by regulation to, at the minimum, use basic metrics of capital; but the complex risks faced by large insurance companies render simpler approaches to capital management as unacceptable.

Capital management
The goal of capital management is to balance the competing interests of investors versus regulators and rating agencies. To determine the amount of cushion to hold, a careful quantification of the potential downside risks to the insurance operation is required.

Until recently, capital requirements were based on relatively simple approaches that tended toward over-estimation to compensate for their inaccuracy. This has led to higher than necessary capital levels for the risks addressed, depressing ROE. At the same time, these simpler methods have tended to miss other forms of risk entirely; consequently, these insurers became unknowingly exposed to ruin due to subtle “bet the business” risk accumulations. It’s easy to see how the current capital management approaches leave all stakeholders—investors, regulators and rating agencies—dissatisfied and wanting more refined strategies.

Subsequently, insurance companies have become increasingly interested in enterprise risk management (ERM) and a more extensive approach to capital management. As opposed to traditional risk management practices, ERM focuses on the inter-relationships of risks across the enterprise. Capital management measures and manages risks that span the enterprise.

This move from traditional risk management to ERM and capital management has been induced by the regulators and rating agencies that monitor capital levels in the insurance industry. European regulators have mandated more sophisticated risk controls by the Financial Services Authority (FSA) in the United Kingdom and in the European Union with the development of Solvency II.

Leading rating agencies such as Standard & Poor’s, Fitch Ratings and A.M. Best have also elevated the importance of risk and capital management in their rating evaluations: Companies with excellent capabilities can attain higher ratings, while those with poor capabilities are at greater risk of downgrade.

A better approach
Advances in risk measurement methodology have enabled insurance companies to quantify risks more accurately and completely. This assuredness helps dramatically improve their financial performance on several levels:

- Obtain higher ratings from rating agencies by demonstrating stronger ERM capabilities. Insurance companies with higher ratings are viewed favorably by bond investors who are, in turn, willing to lend to them at lower rates.
- Return capital to equity investors by reducing the amount of funding required to run the business. This can be done by measuring more precisely the risks that create the need for capital, and then hedging or eliminating them.
- Optimize the use of reinsurance. Insurance companies can reduce the cost of reinsurance by more easily identifying areas that are over-utilized, or they can redeploy the reinsurance to areas that are inadequately covered.
- Better align management incentives with the needs of investors, regulators and rating agencies. When incorporating riskiness directly into their performance metrics, companies can identify segments that, while appearing profit-
able, contribute excessively to company risk. Once pinpointed, these segments can be scaled back or restructured. Likewise, growth opportunities that seem risky on a stand-alone basis can actually diversify well with the rest of the company’s business.

The Monte Carlo simulation method
Insurance liabilities and assets are complex and exposed to risks that depend on a number of economic variables in highly non-linear ways. The best way to calculate such complex risks is via a mathematical technique called Monte Carlo simulation. This technique finds the values of the assets and liabilities in a large number of random scenarios. The risk of the insurance company, and the capital required to mitigate it, can be calculated from the distribution of the resultant values from this calculation.

The computational infrastructure needed to support these analytics is considerable, as there can easily be billions of individual floating point calculations in a single model run. Monte Carlo simulations typically use millions of variables, many of which are randomly drawn from probability distributions.

These models must be parameterized using statistical analysis of detailed historical data at the segment, customer or transaction level. All of this data must be available for interactive analysis and rapidly updated so the models can keep current with the emerging results of the business. The model elements will also be subject to audit and control requirements similar to other forms of financial reporting.

Multiple applications
In much the same way that a proper data warehouse is characterized by the “store once, use often” paradigm, a robust risk and capital management platform can support many areas of financial operations, such as:

- Strategic planning and forecasting
- Reinsurance purchasing
- Asset/liability management (ALM)
- Performance management
- Product pricing
- Hedging of complex insurance and annuity products

Risk is an integral component of decision making in each of these areas, and better tools for quantifying risk will add value in each one. Furthermore, the risks to an insurance company are intertwined in that they all rely on a common base of capital and often have correlations or explicit linkages. Thus, a model of total-company risk is required in each previously mentioned area. Fortunately, the same risk platform (if it is robust and properly implemented) can be applied in all of these areas mentioned above.

Most insurers opt for a phased implementation where one application is completed and tangible results are achieved in a relatively short time. Once established in one area, the platform can be readily leveraged into other areas for a fraction of the cost of building another risk system from scratch.

The insurance industry faces increasingly difficult risks in all areas of its business. Concurrently, investors, regulators and rating agencies are putting additional emphasis on accurately measuring risks and managing capital more intelligently.

These challenges demand vigorous risk analytics linked tightly with enterprise data for speed, accuracy, transparency and control. With advances in risk management methodologies, combined with vast improvements in computational power, insurance companies now have new methods to calculate their enterprise risks in a robust and comprehensive fashion.

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DFA and Teradata offer insurers new solutions

North American and European insurance and reinsurance providers in the property, casualty, life and annuity sectors can now take advantage of a new, innovative enterprise risk management (ERM) and capital management solution from DFA Capital Management Inc. and Teradata. The integration of DFA’s analytic software tools, ADVISE (Advanced Decision and Value Simulation Engine) and GEMS (General Economic and Market Simulator), with Teradata’s industry-leading data warehouse technology and data management consulting creates a powerful enterprise executive decision-making solution for measuring and managing risk and capital.

The DFA/Teradata solution enables companies to realize real competitive advantage through greater accuracy in strategic decision making, regulatory (e.g., Solvency II) and rating agency compliance, and in the allocation of capital and resources. Additionally, companies can realize measurable uplifts in the return on capital (ROC), develop focused strategies for funding the balance sheet and optimize the use of reinsurance. Other benefits include:

- More accurate risk projections due to full leveraging of company-wide data
- Robust back-testing (a key ERM requirement of rating agencies)
- Superior validation and reconciliation
- Precise measurement of risk at the customer relationship level
- Better audit trail, transparency and consistency

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—C.S.