Evolution of Loss Reserve Risk

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Abstract

Property and casualty insurers face risks in many key areas, such as operations, natural catastrophes and underwriting. Among the underwriting risks is the potential financial impact of adverse loss reserves development.

While multiple standard actuarial methods exist for evaluating the adequacy of reserves, little information exists on how deficiencies evolve over time. No risk models currently exist to make statements regarding the probability of a level of deficiency over a fixed time horizon. For example, the probability that current reserves will become 20 percent deficient over the next two years is difficult to determine. Current models only make estimates over the "lifetime of liability" or run-off period.

The ability to analyze reserve risk over fixed time horizons is important from several perspectives. First, from a risk management perspective, the time horizon over which a risk will likely emerge is crucial. Understanding the time horizon allows for the creation of appropriate mitigation strategies and an understanding of interrelations with other risks. Second, most other financial risks (e.g., credit and market) are measured over short fixed time horizons. A comparable measure of reserve/underwriting risk is important and required for many emerging capital measuring applications, such as Solvency II.

This paper illustrates a model of loss reserve risk that will incorporate how risk evolves over time at annual time horizons. The paper will illustrate how to build and parameterize the model using multiple years of financial statement data. The model produces results for a sample line of business for time horizons from one to 10 years.