New Ways to Estimate Insured Population Mortality

The use of big data and advanced analytics is beginning to transform our industry. Life insurers who effectively use data from both internal and external sources are gaining a competitive advantage. They are developing valuable insights about how their business performs, enabling them to target the right markets, develop better products, price more precisely, select profitable business, and optimize capital.

At SCOR, executing on big data opportunities for innovation and discovery is an important strategic goal. As a leading life reinsurer, we have the largest block of U.S. life reinsurance mortality and lapse experience. To leverage the true value of this data, we are employing analytical tools and modeling approaches that deliver more accurate, credible, and insightful experience research.

Mortality experience studies are a cornerstone of our business. The paper, *Logistic Regression for Insured Mortality Experience Studies*, (presented at the January 2014 Living to 100 Symposium in Orlando, Florida) demonstrates our commitment to finding ways to enhance industry experience studies. In this paper, we introduce a predictive modeling approach based on logistic regression to analyze U.S. insured mortality experience, including at advanced ages where less credible experience data is available.

Logistic Regression: Highlights of the Paper

Logistic regression is a practical alternative to conventional methodologies used in insured experiences studies. A unique and important benefit of a logistic regression model is its flexible model application and straightforward parameter interpretation. It tests the statistical significance of risk drivers in explaining mortality differentiation. It simultaneously analyzes many risk drivers, such as issue age, policy duration, underwriting class, etc., by performing multiple variable analyses. It allows us to make better use of limited amounts of data to derive more credible and normalized mortality differentials. When model-estimated mortality is used as future mortality projection for pricing or underwriting, it becomes a predictive model.

For our study, we developed a logistic regression model with nine of the most frequently used insured mortality drivers: gender, duration, issue age, smoker status, study year, face band, product, issue year and underwriting class. In addition to mortality differentials by these variables, we also constructed industry experience tables with model-estimated mortality.

The benefits of employing logistic regression do not come without challenges. Critical to superior model development is the requirement for copious amounts of data, specialized statistical modeling expertise, and in-depth business knowledge.