On August 9, 2011, SCOR SE, a global reinsurer with offices in more than 31 countries, acquired substantially all of the life reinsurance business, operations and staff of Transamerica Reinsurance, the life reinsurance division of the AEGON companies. The business of Transamerica Reinsurance will now be conducted through the SCOR Global Life companies, and Transamerica Reinsurance is no longer affiliated with the AEGON companies.

While articles, treaties and some historic materials may continue to bear the name Transamerica, AEGON is no longer producing new reinsurance business.

Archive Materials

Predictive Modeling in Life Insurance
Reprinted from the December 2010 Messenger newsletter

By Zhiwei Zhu, Vice President, Risk Modeling & Analytics
Predictive modeling has been gaining attention in the life insurance industry for its potential to enable life insurers to use consumer data to augment APS and blood testing in assessing mortality risk. However, it’s less recognized that predictive modeling has many other application potentials that can deliver immediate benefits to life insurers.

To better explain these potentials, it’s necessary to distinguish predictive modeling from predictive models. Which of the following is a predictive model?
1. A 2001 VBT tables
2. An underwriting risk classification manual
3. A fortune cookie that contains imaginative lottery numbers
4. All of the above
5. None of the above

A predictive model is an estimated non-deterministic (or random) relationship between some interested outcomes such as mortality and observable predictors such as applicants’ age, sex, etc. By this definition, the correct answer to the above question is 5.

Predictive models may appear as math functions, spreadsheet tables or other forms. Once a predictive model is created, many can acquire the same model and use it to serve the purpose that it is designed for. The mortality risk scoring algorithms promoted by some consulting or lab companies are good examples of predictive models.

Predictive modeling, on the other hand, refers to statistical methodology or processes for harnessing the non-random correlations between interested outcomes and possible predictors. Special statistical training is necessary to perform predictive modeling well. Experienced modelers can take advantages of embedded statistical and optimization procedures to create ‘optimal’ predictive models or to customize them for a variety of analytical tasks.
**A New Paradigm**

Under a traditional mortality study approach, actuaries strive to identify risk drivers through slicing and dicing data with pivot tables and to normalize multiple-variable impacts by calculating A/Es on a selected mortality table basis. As data is being sliced thinner, smaller sample sizes result in lower credibility. As more variables than those a mortality table covers need to be normalized for, normalization becomes much less systematic.

If designed properly, predictive modeling can overcome these shortfalls and deliver more credible and insightful analysis of the same data. In other words, in addition to pivot tables, predictive modeling may be used to estimate risk faster and/or better.

As a reinsurer, Transamerica Reinsurance has contact with multiple underwriting operations and expects that these operations contribute to the mortality experiences of the underwritten products. Using predictive modeling, we have systematically analyzed underwriting characteristics (e.g., preferred criteria, underwriting manual, distribution channel) and weighted their values in correlation with future outcomes. The level of learning credibility and learned insights is not easy to achieve by conventional experience studies alone.

Of the 40+ underwriting operation variables prepared for analysis, a handful were confirmed as having statistically significant correlations with mortality experience. After normalizing for all study variables and limiting quantification only to a group of 14 underwriting variables, we derived “relative predictive values” of these variables (Figure 1).

![Figure 1: The Predictive Power of Select Underwriting Variables in Explaining Mortality Experience](image)

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Based on the findings, managers and actuaries could confidently narrow their additional exploration to a few operational characteristics for potential intervention. They may also determine more precise adjustment factors if two or more underwriting characteristics were selected for adjustment.
Future Best Estimates and Tail Risks

As new regulatory requirements (e.g., Solvency II and PBA) develop, an era is beginning when companies are given the choices of marking their assumed business risks as scripted by regulators or to the market. For companies to gain competitive advantage, it is no longer sufficient to simply assume best estimates of risks from the mean and variance of a pre-assumed distribution such as a normal distribution. More precise best estimates of risk drivers, risk distributions, tail risks, and impact correlation between drivers will need to be identified and quantified with better empirical data and more scientifically sound methodology.

To reach the objectives of Solvency II and PBA, the industry will gradually move away from just replacing one regulated risk control script with another and will evolve toward risk assessment activities that involve more advanced analytical methodology and significantly more data collection and management. New regulatory developments must support and speed up this evolution.

Predictive modeling has been used successfully in medical research, credit risk management, P&C claim prediction, consumer marketing, etc., as an advanced risk assessment tool. As a data-driven and statistical-analysis-based methodology, it has the potential not only to deliver scoring algorithms for mortality risk profiling but also to be tailored to reveal insights for a broad range of risk management practices including experience studies and portfolio valuations.

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