MODELING SEVERITY AND MEASURING TAIL RISK OF NORWEGIAN FIRE CLAIMS

VYTARAS BRAZAUSKAS
University of Wisconsin-Milwaukee, Milwaukee, USA
e-mail: vytaras@uwm.edu

ANDREAS KLEEFELD
Brandenburg University of Technology, Cottbus, Germany
e-mail: kleefeld@tu-cottbus.de

The probabilistic behavior of the claim severity variable plays a fundamental role in calculation of deductibles, layers, loss elimination ratios, effects of inflation, and other quantities arising in insurance. Among several alternatives for modeling severity, the parametric approach continues to maintain the leading position, which is primarily due to its parsimony and flexibility. In this paper, several parametric families are employed to model severity of Norwegian fire claims for the years 1981 through 1992. The probability distributions we consider include: generalized Pareto, lognormal–Pareto (two versions), Weibull–Pareto (two versions), and folded-$t$. Except for the generalized Pareto distribution, the other five models are fairly new proposals that recently appeared in the actuarial literature. We use the maximum likelihood procedure to fit the models, and assess the quality of their fits using basic graphical tools (quantile-quantile plots), two goodness-of-fit statistics (Kolmogorov–Smirnov and Anderson–Darling), and two information criteria (AIC and BIC). In addition, we estimate the tail risk of ‘ground up’ Norwegian fire claims using the value-at-risk and tail-conditional median measures. We monitor the tail risk levels over time, for the period 1981 to 1992, and analyze predictive performances of the six probability models. In particular, we compute the next-year probability for a few upper tail events using the fitted models and compare them with the actual probabilities.

Acknowledgement The first author gratefully acknowledges the support provided by a grant from The Actuarial Foundation.