

On estimation of loss distributions and risk measures

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Estimation of certain loss distribution and analyzing its properties is a key issue in several finance-mathematical and actuarial applications. A special interest usually lies on the tail of the loss distribution, which allows us to answer important questions related to solvency of the insurer. It is common to apply the tools of extreme value theory and generalized Pareto distribution in problems related to heavy-tailed data (see, e.g., Coles, 2001, McNeil et al., 2005), this also provides conservative estimates for certain risk measures such as value at risk and expected shortfall.

Our main goal is to study third party liability claims data obtained from Estonian Traffic Insurance Fund (ETIF) where the observation period is one year (from mid 2006 to mid 2007). The data is quite typical for insurance claims containing very many observations and being heavy-tailed. In our approach the fitting consists of two parts: for main part of the distribution we use log-normal fit (which was the most suitable based on our previous studies) and generalized Pareto distribution is used for the tail. Main emphasis of the fitting techniques is on the proper threshold selection. We examine a wide range of thresholds and seek for stability of parameter estimates, compare the mean residual life plots and study the behaviour of risk measures at fixed thresholds. Additionally we compare our model with composite lognormal-Pareto model in respect of risk measures proposed by Cooray and Ananda (2005).

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