

Robust Fitting of Claim Severity Distributions and the Method of Trimmed Moments

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Abstract. Many useful quantities in non-life insurance depend on the claim severity distribution, which is usually modeled by assuming a parametric form. Estimating the model parameters is therefore very important in obtaining good estimates of the quantities of interest. The maximum likelihood technique yields efficient estimators with a number of other desirable properties. However, these estimators are generally not robust. Since outliers are common in insurance loss data, it is beneficial to use a method that allows one to achieve a balance between efficiency and robustness. In this paper, we suggest a method we call the method of trimmed moments (MTM). The resulting MTM estimators can achieve various degrees of robustness and allow the actuary to easily see the actions of the estimators on the data. We illustrate these points with detailed analyses of the MTM estimators for location-scale families, as well as for the lognormal, Pareto and other loss distributions. The performance of the estimators is illustrated in a simulation study as well as on a real data set on hurricane damage in the United States.

Keywords: Loss models; Premium calculations; Robust statistics.

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