

Estimating the distortion parameter of the proportional-hazard premium for heavy-tailed losses

Insurance Mathematics and Economics, Volume 49, Issue 3, November 2011, Pages 325–334.

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Abstract

The distortion parameter reflects the amount of loading in insurance premiums. A specific value of a given premium determines a value of the distortion parameter, which depends on the underlying loss distribution. Estimating the parameter, therefore, becomes a statistical inferential problem, which has been initiated by Jones and Zitikis [Jones, B.L., Zitikis, R., 2007. Risk measures, distortion parameters, and their empirical estimation. *Insurance: Mathematics and Economics*, 41, 279–297] in the case of the distortion premium and tackled within the framework of the central limit theorem. Heavy-tailed losses do not fall into this framework as they rely on the extreme-value theory. In this paper, we concentrate on a special but important distortion premium, called the proportional-hazard premium, and propose an estimator for its distortion parameter in the case of heavy-tailed losses. We derive an asymptotic distribution of the estimator, construct a practically implementable confidence interval for the distortion parameter, and illustrate the performance of the interval in a simulation study.

Keywords : Proportional-hazard premium; Proportional-hazard transform; Distortion risk measure; Distortion parameter; Extreme value; Heavy tail; Risk aversion index.

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