Ratemaking of dependent risks[*]

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Abstract

We start by describing how, in some cases, we can use variance related premium principles in ratemaking, when the claim numbers and individual claim amounts are independent. We use quasi-likelihood generalized linear models, under the assumption that the variance function is a power function of the mean of the underlying random variable.

We extend this approach to the cases where the claim numbers are modeled by a bivariate Poisson, by a generalized bivariate negative binomial and by a bivariate Poisson-Laguerre polynomial, which nests the bivariate negative binomial. We apply these models to a portfolio of the Portuguese insurance company Tranquilidade.

Keywords: ratemaking, variance related premium principles, generalized linear models, quasi-likelihood, bivariate Poisson, bivariate negative binomial, generalized bivariate negative binomial, bivariate Poisson-Laguerre polynomial.