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# Pricing Catastrophe Risk in Life (re)Insurance

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## Abstract

What is the catastrophe risk a life insurance company faces? What is the correct price of a catastrophe cover? During a review of the current standard model, due to Strickler (1960), we found that this model has some serious shortcomings. We therefore present a new model for the pricing of catastrophe excess of loss cover (Cat XL). The new model for annual claim cost  $C$  is based on a compound Poisson process of catastrophe costs. To evaluate the distribution of the cost of each catastrophe we use the Peaks Over Threshold model for the total number of lost lives in each catastrophe and the beta binomial model for the proportion of these corresponding to customers of the insurance company. To be able to estimate the parameters of the model, international and Swedish data were collected and compiled, listing accidents claiming at least twenty and four lives respectively. Fitting the new model to data, we find the fit to be good. Finally we give the price of a Cat XL contract and perform a sensitivity analysis of how some of the parameters affect the expected value and standard deviation of the cost and thus the price.

**KEY WORDS:** Catastrophe excess of loss, life reinsurance, catastrophe risk, catastrophe model, catastrophe data, Cat XL, POT-model, Solvency II, internal models.

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