Obligatorisk stk2510 vår 09

Merk: Dette skal innleveres i en rapportform der tekniske beregninger legges fram til slutt, for eksempel som appendix. Hoveddelen av rapporten skal inneholde hovedkonklusjoner og hovedantakelser i en form mest mulig lesbar for andre. Det kan være flere måter å gå fram på metodisk, og du skal bare velge en som er fornuftig (med kort begrunnelse).

Innlevering: På **papir** *til Erik Bølviken innen 10 mai, 2009.*

Capital requirements and reinsurance

Introduction

A company may cede some of its risk to reinsurers to obtain a suitable spread. Another motive is reduction of the required solvency capital. It is the second aspect that will be analysed here. On average the cedent loses money by reinsuring, but its shareholdes may obtain another advantage: Suppose the value of the company increases. If its original equity capital is kept low, then the gain per share could be higher. For a well-run firm this might for the owners more than compensate for the average loss due to reinsurance.

The problem

We shall analyse a portfolio similar to the Norwegian pool of natural disasters with an annual claim frequency at 1.05 and Pareto distributed claims with shape parameter 1.7 and scale 140 million NOK. These are estimates obtained from hitorical experience. No more that 10 000 million is covered for a single event. The reinsurance is of the bxa type with the upper limit $b = 10000$.

Compute the pure reinsurance premium and the solvency capital at 99% when the lower reinsurance limit is 200, 4000, 6000 and 10000 million NOK. The latter case means that the there is no reinsurance and that the cedent covers all risk himself. Comment on the expense of reinsurance when the reinsurance loading is 50% and also on the amount of capital saved.

Sensitivity

Many of the conditions on which the preceding calculations are based are variable or uncertain. Loadings in the reinsurance market are known to fluctuate greatly and the parameters of the stochastic models are fraught with estimations errors. The latter applies, in particular, to the shape parameter α of the Pareto model. Redo the calculations when you vary α from 1.2 to 10.0 while keeping the mean loss per claim fixed at 200. Also vary the loading from 0% to 100%.