Optimal Investment Policies and Optimal Reinsurance for an Insurer

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Abstract

In the paper, an insurance company is assumed to use reinsurance retentions to reduce its risk while investing its reserve into a financial market, which consists of a risk asset and a risk-free asset, to add its wealth. The objective of the insurance company is to find the optimal dynamic reinsurance retention, together with the optimal dynamic investment strategy, to maximize the expected exponential utility at a fixed terminal time or to minimize the ruin probability. Using diffusion approximation, this optimal control problem is solved and the explicit and closed-form solutions for the optimal dynamic reinsurance retention and the optimal dynamic investment strategy are obtained. Additionally, the impact of the dependence between the finance risk and insurance risk on the optimal reinsurance retention and the optimal investment strategy is also illustrated numerically.