Quantitative Finance > Risk Management

Optimization of dividend and reinsurance strategies under ruin probability constraint

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This paper considers nonlinear regular-singular stochastic optimal control of large insurance company. The company controls the reinsurance rate and dividend payout process to maximize the expected present value of the dividend pay-outs until the time of bankruptcy. However, if the optimal dividend barrier is too low to be acceptable, it will make the company result in bankruptcy soon. Moreover, although risk and return should be highly correlated, over-risking is not a good recipe for high return, the supervisors of the company have to impose their preferred risk level and additional charge on firm seeking services beyond or lower than the preferred risk level. These indeed are nonlinear regular-singular stochastic optimal problems under ruin probability constraints. This paper aims at solving this kind of the optimal problems, that is, deriving the optimal retention ratio,dividend payout level, optimal return function and optimal control strategy of the insurance company. As a by-product, the paper also sets a risk-based capital standard to ensure the capital requirement of can cover the total given risk, and the effect of the risk level on optimal retention ratio, dividend payout level and optimal control strategy are also presented.

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