Equilibrium Reinsurance and Investment Under the Mean Variance Skewness Criteria

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Abstract

There has been much literature on a mean variance optimizing insurer who selects their optimal reinsurance protection and invests optimally, for example [Li et al., 2017]. In the financial literature, there has been literature on portfolio optimization under the so called mean-variance-skewness model [Mu et al., 2019]. Some papers [Thomas and Aaron, 1987] suggest that the mean variance skewness model is appropriate for insurers, due to skewness inherent in the insurance claims process. There is evidence that insurers are negative skewness averse in determining lines of risk to enter into, causing a demand for reinsurance [Eling, 2012]. In this paper we determine the optimal reinsurance-investment strategy for a mean-variance-skewness insurer. We derive the associated extended Hamilton Jacobi Bellman equation [Bjork et al., 2021] and solve it in closed form. We make comparisons with investment and retention under the classical mean variance model and the exponential utility model in terms of both numerical and theoretical results.

References

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