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Optimal Quota-share Reinsurance Based on the Mutual Benefit of Insurer and Reinsurer

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Abstract

This paper investigates the optimal quota-share reinsurance strategies that can bring mutual benefit to both an insurer and a reinsurer. We consider five different optimality criteria that reflect the interest of both parties. The mutual beneficiary is also reflected in utility improvement constraints, which guarantee that both the insurer and the reinsurer will end up with higher expected utility of wealth with reinsurance agreements. Under each optimality criterion, explicit expressions of optimal quota-share retention and the corresponding objective function are obtained. Results indicate that the reinsurer's safety loading plays a key role in determining the optimal retained proportion. In the numerical example, we demonstrate the expected utility increment after underwriting optimal constrained quota-share reinsurance that minimizes the total VaR/TVaR of the two parties. Comparing with the optimal strategies without utility constraint, the total expected utility will increase significantly after entering into an optimal quota-share reinsurance contact with utility improvement constraints.

JEL classification: G22.

Key Words. Joint survival probability; VaR; TVaR; Quota-share reinsurance; Utility improvement constraints

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