Title: Optimal Reinsurance with Regulatory Initial Capital and Default Risk

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Abstract: In a reinsurance contract, a reinsurer promises to pay the part of the loss faced by an insurer in exchange for receiving a reinsurance premium from the insurer. However, the reinsurer may fail to pay the promised amount when the promised amount exceeds the reinsurer's solvency. As a seller of a reinsurance contract, the initial capital or reserve of a reinsurer should meet some regulatory requirements. We assume that the initial capital or reserve of a reinsurer is regulated by the value-at-risk (VaR) of its promised indemnity. When the promised indemnity exceeds the total of the reinsurer's initial capital and the reinsurance premium, the reinsurer may fail to pay the promised amount or default may occur. Mathematically, the proposed model can be reduced to existing reinsurance risk models that do not consider the possible default by a reinsurer. Practically, the proposed model allows more realistic settings. In the presence of the regulatory initial capital and the counterparty default risk, we investigate optimal reinsurance designs from an insurer's point of view and derive optimal reinsurance strategies that maximize the expected utility of an insurer's terminal wealth or minimize the VaR of an insurer's total retained risk. It turns out that optimal reinsurance strategies in the presence of the regulatory initial capital and the counterparty default risk are different both from optimal reinsurance strategies in the absence of the counterparty default risk and from optimal reinsurance strategies in the presence of the counterparty default risk but without the regulatory initial capital. The results show that the regulatory initial reserve and the default risk have a significant impact on the optimal reinsurance strategies. The optimal reinsurance strategies under the proposed model are more complicated than those in the existing default risk-free reinsurance risk models. This talk is based joint works with Christiane Lemieux and Fangda Liu.