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Interplay of Insurance and Financial Risks in a Discrete-time Model with Strong Regular Variation

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Consider an insurance company exposed to a stochastic economic environment, which contains two kinds of risk. The first kind is the insurance risk caused by traditional insurance claims, and the second kind is the financial risk resulting from investments. Its wealth process is described in a discrete-time model in which, during each period, the insurance risk is quantified as a real-valued random variable X equal to the total amount of claims less premiums, and the financial risk as a positive random variable Y equal to the reciprocal of the stochastic return rate. This risk model builds an efficient platform for investigating the interplay of the two risk variables X and Y. Motivated by some applications in risk management, we focus on the tail probability of the aggregate risk amount. Assuming that the maximum of X and Y follows a distribution of strong regular variation, we derive some precise asymptotic formulas in both finite and infinite time horizons, all in the form of linear combinations of the tail probabilities of X and Y . Our treatment is unified in the sense that no dominating relationship between X and Y is required. This talk is based on a recent joint paper with Jinzhu Li at Nankai University.