

# Optimal reinsurance under one insurer and multiple reinsurers

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## Abstract

In this paper, we consider a one-period optimal reinsurance design model with  $n$  reinsurers and an insurer. For very general preferences of the insurer, we obtain that there exists a very intuitive pricing formula for all reinsurers that use a distortion premium principle. The insurer determines its optimal risk that it wants to reinsure via this pricing formula. This risk it wants to reinsure is then shared by the reinsurers via tranching. We provide an example with the insurer's preference is given by an inverse-S shaped distortion risk measure and the reinsurer's premium principle is derived from the Conditional Value-at-Risk.

*Keywords:* optimal reinsurance design, distortion risk measure, distortion premium principle, multiple reinsurers, representative reinsurer, inverse-S shaped distortion.

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