

# Optimal *per claim* reinsurance for dependent risks\*

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**Abstract:** This paper generalizes the results on optimal reinsurance presented in Centeno and Guerra (2008) to the case of an insurer holding a portfolio of  $k$  dependent risks. It is assumed that the number of claims of a risk may depend on the number of claims of the other risks of the portfolio. Our aim is to determine the optimal form of reinsurance for each risk when the cedent seeks to maximize the adjustment coefficient of the retained portfolio - which is equivalent to maximizing the expected utility of wealth, with respect to an exponential utility with a certain coefficient of risk aversion - and restricts the reinsurance strategies to functions of the individual claims.

Assuming that the premium calculation principle is a convex functional we prove existence and uniqueness of solutions and provide a necessary optimality condition. These results are used to find the optimal reinsurance policy for a given risk when the reinsurance loading is either proportional to the expected value or increasing with the variance of the ceded claims. The type of the optimal arrangement for a given risk only depends on the premium of that particular risk.

KEY WORDS: optimal reinsurance, dependent risks, adjustment coefficient, expected utility, exponential utility function, convex premium principles.

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