# Prevention efforts, insurance demand and price incentives under coherent risk measures

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## Abstract

This paper studies an equilibrium model between an insurance buyer and an insurance seller, where both parties' risk preferences are given by convex risk measures. The interaction is modeled through a Stackelberg type game, where the insurance seller plays first by offering prices, in the form of safety loadings. Then the insurance buyer chooses his optimal proportional insurance share and his optimal prevention effort in order to minimize his risk measure. The loss distribution is given by a family of stochastically ordered probability measures, indexed by the prevention effort. We give special attention to the problems of self-insurance and self-protection, and show that if the buyer's risk measure decreases faster in effort than his expected loss, optimal effort is non-decreasing in the safety loading with a potential discontinuity when optimal coverage switches from full to zero. On the contrary, if the decrease of the buyer's risk measure is slower than the expected loss, optimal effort may or may not be non-decreasing in the safety loading. In case of Pareto distributed losses, the seller sets the highest possible price under which the buyer still prefers full insurance over no insurance. We also analyze the case of discrete distributions: on the one hand, for self-protection, under the assumption that the marginal impact of the effort is higher on small losses than it is on catastrophic losses, the optimal effort is non-decreasing in the safety loading. On the other hand, in the case of self-protection, more conditions are needed, in particular, we obtain sufficient conditions for the optimal effort to be non-decreasing or non-monotone in the safety loading. 

## Palabras clave

**Palabras clave de autor:**Prevention; Self-insurance; Self-protection; Coherent risk measures; Stackelberg game
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