

# Optimal price structure of cyber insurance policies with risk mitigation services

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## Abstract

In recent years, as the demand for cyber insurance has increased tremendously, cyber insurance markets around the world have been growing and the range of available cyber policies has been continuously expanding. Many cyber experts agree that pure risk transfer cannot be an optimal cyber risk management solution, and the beneficial potential of including pre-incident and post-incident services into cyber policies is being recognized by insurers and prospective insurance buyers alike (see e.g. [2]).

This talk addresses the question of pricing such services optimally from the insurer's viewpoint, i.e. under which conditions it makes economic sense for a profit-maximizing, risk-averse insurer to share the cost burden of providing such services.

The interaction between buyer and insurer is modelled as a Stackelberg game, where both parties use distortion risk measures with concave distortion functions, yielding a similar problem for the insurance buyer as considered in [1].

After explaining how the notions of pre-incident and post-incident services map to the concepts of self-protection and self-insurance, we detail how in the considered set-up, in the univariate case the insurer will always shift the full cost of self-protection services to the insured. However, this does not generally hold for the pricing of self-insurance services or when taking a multivariate viewpoint, in which case it can be optimal (and even mandatory to find an acceptable contract for both parties) to share the cost of risk reduction service between insurer and policyholder(s).

**Keywords:** Cyber Risk; Cyber Insurance; Prevention; Self-protection; Self-insurance; Coherent risk measures; Stackelberg game.

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## References

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