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The Fundamental Theorem of Mutual Insurance

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Abstract

The essence of mutual insurance is the notion that re-distributing risk in a pool of risks is more beneficial than taking the risk alone. Interpreting ‘more beneficial’ as an increase in utility and considering sequences of exchangeable risks, we are able to formalize this notion from the policyholder’s perspective and demonstrate its validity for various alternative preference functionals (e.g., expected utility, Choquet expected utility, and distortion risk measures). To obtain this result, we exploit that for a sequence of exchangeable risks the corresponding sequence of arithmetical averages is a reversed martingale.

We conclude that pooling risks is fundamental for understanding the mechanisms of insurance because it favourably affects the utility of policyholders, and we refer to this phenomenon as the ‘utility-improving effect of risk pooling’. Moreover, we demonstrate that the utility of the policyholder is (strictly) increasing with the size of the risk pool.

JEL classification

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Keywords

Pooling Risks; Exchangeability; Reversed Martingales; Choquet Expected Utility; Distortion Risk Measures

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