Optimization of Deductible Levels to Maximize Portfolio Utility in Insurance

Ida Lundmark*

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Abstract

This thesis investigates how an insurance company can determine optimal deductible levels using Borch's theorem to maximize expected utility across a diverse portfolio, given an expected premium. Individual wealth characteristics, a key factor in Borch's framework, are assigned to each policyholder. Assuming a Bernoulli utility function, we compare the impact of Gamma and compound Poisson loss distributions on a representative policyholder, ultimately selecting the compound Poisson for final analysis. Using this framework, optimal deductibles are then numerically calculated for each policyholder and clustered into two- and three-level deductible options. The study also examines how varying wealth levels affect these results and the application of Borch's theorem.

*Postal address: Mathematical Statistics, Stockholm University, SE-106 91, Sweden.
E-mail: idalundmark@live.com. Supervisor: Mathias Millberg Lindholm.