Equilibrium Premium Strategies for Push-Pull Competition in a Non-Life Insurance Market

Søren Asmussen *[1,2]

[1]Aarhus University, Denmark

Abstract

Two insurance companies I_1, I_2 with reserves $R_1(t), R_2(t)$ compete for customers, such that in a suitable differential game the smaller company I_2 with $R_2(0) < R_1(0)$ aims at minimizing $R_1(t) - R_2(t)$ by using the premium p_2 as control and the larger I_1 at maximizing by using p_1. Deductibles K_1, K_2 may or may not be different, and the claim arrival rate A of a customer varies at random in the portfolio. For the case where $K_1 = K_2$ but also the preference (or market friction) V between companies is random, the optimal simultaneous choice p_1^*, p_2^* of premia is derived and is shown to provide a Nash equilibrium for beta distributed V. If V is insignificant but $K_1 < K_2$ and I_2 is the leader choosing its premium first, a Stackelberg equilibrium is established for gamma distributed A. The analysis is based on the diffusion approximation to a standard Cramér-Lundberg risk process extended to allow investment in a risk-free asset.

Keywords: Deductible; Differential game; Diffusion approximation; Exit problem; Market friction; Nash equilibrium; Saddle point; Stackelberg equilibrium; Stochastic control

References

[1] S. Asmussen, B.J. Christensen & J. Thøgersen (2018), "Equilibrium premium strategies for push-pull competition in a non-life insurance market." *Submitted.*

*E-mail address: asmus@math.au.dk