

Bonus-Malus in collective insurance risk models

**Corina D. Constantinescu,
Institute for Financial and Actuarial Mathematics,
Department of Mathematical Sciences, University of Liverpool**

Abstract

The classical collective insurance risk model considers a compound Poisson process for the outgoing claims and a fixed constant rate for the incoming premiums. In order to adapt the model to a Bonus-Malus system, namely premium rates dependent on the history of the claims, a mixed Poisson process is proposed. Based on the Poisson parameter of the mixed process, we distinguish two scenarios: when the probability of having no claim is zero versus non-zero probability of having no claims. We refer to the claims in the second scenario as latent claims. Dubey (1977) showed that in the first case the ruin probability will be the same as in the classical model, as long as the premiums are dynamically adjusted according to the Bayes' rule. We show that in the second case the ruin probability is a logarithmic function of the classical one. Furthermore, we introduce a model which combines latent and historical claims and derive the conditions under which such a relationship can be constructed.

Speaker Profile:

<http://www.liv.ac.uk/mathematical-sciences/staff/dana-constantinescu/>