TIME TO RUIN, INSOLVENCY PENALTIES AND DIVIDENDS IN A MARKOV-MODULATED MULTIRISK MODEL WITH COMMON SHOCKS.

STÉPHANE LOISEL,∗Université Lyon 1

Abstract

We consider a main insurance company with $K$ subcompanies. The joint evolution of the surpluses of these lines of business is modelled by a Markov-modulated multivariate compound Poisson model with common Poisson shocks, modified by interactions between the lines of business and payment of dividends. We assume that the financial situation of the subcompanies has an impact on the other companies, for example because they have part of their surplus invested in each other. In this paper, we focus on a particular line of business, and provide an approximation for expected time to ruin, and the expected amounts of dividends paid to the shareholders, and used to pay penalty due to insolvency of some subcompany. The method is to discretize claim amounts and to approximate the multidimensional surplus process of the subcompanies with a continuous time Markov process with finite state space. A technique of Frostig (2004) and Asmussen and Kella (1992) enables us to get approximates, which are shown to converge at a certain asymptotical rate to the desired values. It is possible to compare the behavior of the main company with and without the other subcompanies, which could provide a tool to help making consortium building decision.

Keywords: Ruin theory; Sample path properties; Optimal reserve allocation; Multidimensional risk process; Risk measures
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∗Postal address: Ecole ISFA
50 avenue Tony Garnier - 69366 LYON CEDEX 07 - FRANCE
stephane.loisel@univ-lyon1.fr
Tel +33 4 37 28 74 38. Fax +33 4 37 28 76 32