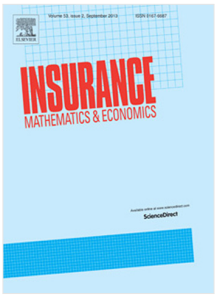

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A time of ruin constrained optimal dividend problem for spectrally one-sided Lévy processes

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Abstract

We introduce a longevity feature to the classical optimal dividend problem by adding a constraint on the time of ruin of the firm. We consider de Finetti's problem for one-sided Lévy risk models in both scenarios with and without fix transaction costs. To characterize the solution to the aforementioned models we introduce the dual problem and show that the complementary slackness conditions are satisfied and therefore there is no duality gap. As a consequence the optimal value function can be obtained as the pointwise infimum of auxiliary value functions. Finally, we illustrate our findings with a series of numerical examples.

Keywords: Dividend payment, Optimal control, Ruin time constraint, Spectrally one-sided Lévy processes

1. Introduction

Proposed in 1957 by Bruno de Finetti [1], the problem of finding the dividend payout strategy that maximizes the discounted expected payout throughout the life of an insurance company has been at the core of actuarial science and risk theory. An important element of this problem is how one chooses to model the process describing the reserves of the firm, X. The solution to de Finetti's problem has been given for the case X is assumed to be a compound Poisson process with negative jumps and positive drift, commonly referred as the *Cramér-Lundberg* model, where X is a Brownian motion, and the sum of the previous two, [2, 3, 4]. Nowadays, the case in which X is assumed to be a spectrally negative Lévy process is the most general

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