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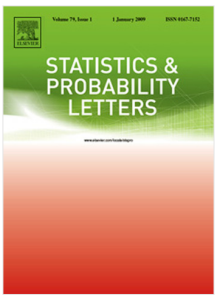

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Dividend Barrier Strategy: Proceed with Caution

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Abstract

We consider a Lévy risk process and a Sparre-Andersen risk process with Parisian ruin in the presence of a constant dividend barrier. We demonstrate that with few exceptions, ruin occurs with probability one. Subsequently, generalizations to certain dependent risk processes are discussed. Despite the mathematical nature of this paper, its goal is to convey some simple conclusions to the actuarial community. The reader may focus solely on the introduction and conclusion sections (Sections 1 and 5, respectively) as well as the numerical illustrations.

Keywords: Lévy risk process, Parisian ruin, Probability of ruin, Sparre-Andersen risk process, Time of ruin

1. Introduction

The idea of Parisian barrier options is proposed by Chesney et al. (1997). This type of options allows the owner to keep the option even when the price of the underlying asset is in the *knock-out region* (or *red zone*), unless the price stays in that region long enough. Likewise, the concept of *Parisian ruin* introduced to ruin theory by Dassios and Wu (2008) allows the surplus process to stay below zero within a pre-fixed period of time. Under this framework, Dassios and Wu (2008) obtain the Parisian ruin probability under a Cramér–Lundberg model with exponential claims. More recently, Loeffen et al. (2013) derive an elegant expression for the Parisian ruin probability for a class of Lévy risk models, and Czarna and Palmowski (2013) demonstrate the optimality of a constant barrier dividend strategy.

In this paper, we show that an absorbing barrier leads to Parisian ruin *almost surely* for a large class of risk models — including the general Lévy risk models and most of the Sparre-Andersen risk models. Moreover, we propose a condition (Theorem 2, Case 3) under which the Parisian ruin probability may be reduced to zero.

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