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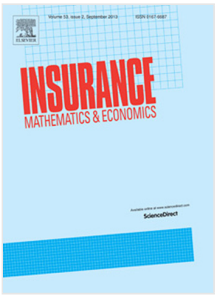

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A Self-Exciting Threshold Jump-Diffusion Model for Option Valuation

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Abstract

A self-exciting threshold jump-diffusion model for option valuation is studied. This model can incorporate regime switches without introducing an exogenous stochastic factor process. A generalized version of the Esscher transform is used to select a pricing kernel. The valuation of both the European and American contingent claims is considered. A piecewise linear partial differential-integral equation governing a price of a standard European contingent claim is derived. For an American contingent claim, a formula decomposing a price of the American claim into the sum of its European counterpart and the early exercise premium is provided. An approximate solution to the early exercise premium based on the quadratic approximation technique is derived for a particular case where the jump component is absent. Numerical results for both European and American options are presented for the case without jumps.

JEL Classification Codes: G13

Keywords: Option valuation; Self-exciting threshold model; Generalized Esscher transform; Piecewise linear partial differential equation; Quadratic approximation.

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