On a continuous time stock price model with regime switching, delay and threshold

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Abstract

Motivated by the need to describe bear-bull market regime switching in stock prices, we introduce and study a stochastic process in continuous time with two regimes, threshold and delay, given by a stochastic differential equation. When the difference between the regimes is simply given by different set of real valued parameters for the drift and diffusion coefficients, changes between regimes depending only on these parameters, we show that if the delay is known there are consistent estimators for the threshold as long we know how to classify a given observation of the process as belonging to one of the two regimes. When the drift and diffusion coefficients are of geometric Brownian motion type we obtain a model with parameters that can be estimated in a satisfactory way, a model that allows to differentiate regimes in some of the NYSE 21 stocks analyzed and also, that gives very satisfactory results when compared to the usual Black-Scholes model for pricing call options.

Keywords

Ergodic diffusions, Transition and invariant densities, Maximum likelihood estimators.

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