Pricing multivariate options under stochastic volatility lévy processes

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Abstract

The aim of this article is to study the valuation of multivariate options based on correlated multidimensional time-changed Lévy processes, where two time changes are used to describe diffusion part and jump part stochastic volatilities as well as assets correlation structures. The main contribution of this article is two-folds: First, we build a flexible enough framework to model assets' dependent structure and volatility clustering; second, by employing extended Esscher transform to reduce the problem's dimension, and generalized Fourier transform to simplify the integration involving the terminal payoff, we dramatically reduce the complexities of this problem, and get very accurate solutions in a relatively short computation time.

Keywords: *Multivariate Options, extended Esscher transform, time-changed Lévy process, generalized Fourier transform*

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