

Numerical Comparison of Different Option Pricing Models with Real Data

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ABSTRACT

When trying to model asset returns or option prices, a well-known problem with the traditional Black-Scholes approach is that empirical properties of asset returns for the first case and observed skews/smiles for the second cannot be replicated. A common approach to face this problem is the introduction of stochastic volatility and/or jumps in the underlying process. This project studies the stochastic volatility jump diffusion model with log uniform jump amplitudes with and without shot noise and compare other stochastic volatility jump diffusion models. Further, it is reviewing their theoretical properties, and focusing on their ability to model asset returns by analyzing their statistical properties. The models are calibrated using U.S. OIL FUND (ETF) (NYSE Arca: USO) option prices. Finally, numerical illustration of SVJD models with and without shot noise are consistent with the real data in compare to Heston model.

Key Words : Black-Scholes, stochastic volatility jump diffusion, statistical properties.