Pricing Commodity Options with Mean-Reverting Processes and Stochastic Volatility

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Abstract

Commodity derivatives market has been one of most fast-growing markets in these years. This paper presents a new and tractable model for the valuation of commodity derivatives in a discrete-time framework, which incorporates two most important features of commodity markets: mean-reverting process of spot prices and stochastic volatility. Based on Heston and Nandi (2000), our model has closed-form solutions and allows for easy valuation of derivatives. The model is evaluated by fitting an extensive panel data of crude oil futures, and by valuing a large sample of options on futures contracts traded on New York Exchange Mercantile (NYMEX) from 1990 to 2006 spanning 4244 business days. We compare our model performance with the well-established benchmark model by Schwartz and Smith (2000).

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