Modeling VIX Futures and Pricing VIX Options in the Jump Diffusion Modeling

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April 2014

Abstract

In this thesis, a closed-form solution for the price of options on VIX futures is derived by developing a term-structure model for VIX futures. We analyze the VIX futures by the Merton Jump Diffusion model and allow for stochastic interest rates in the model. The performance of the model is investigated based on the daily VIX futures prices from the Chicago Board Option Exchange (CBOE) data. Also, the model parameters are estimated and option prices are calculated based on the estimated values. The results imply that this model is appropriate for the analysis of VIX futures and is able to capture the empirical features of the VIX futures returns such as positive skewness, excess kurtosis and decreasing volatility for long-term expiration.

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