

On the methods of calculating the Nikkei 225 Model-free Implied Volatility

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Abstract

Although it is widely recognized that volatility changes over time, the commonly used Black-Scholes implied volatility depends on the assumption of constant volatility. Recently, there has been interest in the model-free implied volatility (MFIV) derived by Britten-Jones and Neuberger (2000), because it is not based on any specific option pricing model. In fact, MFIV has been adopted by the Chicago Board of Exchange (CBOE) in constructing the S&P 500 implied volatility index (VIX). However, Jiang and Tian (2007) point that the CBOE procedure may lead to several types of approximation errors, and they propose a simple solution to fix the problems, based on smooth interpolation-extrapolation of the implied volatility function. In this paper, we compute the Nikkei 225 implied volatility by the VIX method and smoothing method, and compare these implied volatilities by the predictive ability of the Nikkei 225 realized volatility. We find that the implied volatility of the smoothing method outperforms that of the VIX method.