

On efficiency of S&P 500 option market: testing martingale property of forward variances with the spectral density method

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Abstract

This paper examines the efficiency of the S&P 500 option market by testing the martingale properties of the Model-Free Forward Variance (MFFV) time series using the Generalized Spectral Density Test (GSDDT). Based on a sample from January 1, 1996 to May 31, 2010, our tests show robust evidence that the S&P 500 options market is inefficient. Diagnostic tests further indicate that the MFFV is not a Martingale Difference Sequence (MDS) due to the skewness-in-mean effect, and that the skewness-in-mean effect is weakened once we account for the S&P 500 index jump effects, hence we establish a link between jumps and option market inefficiency. Finally, we find that the lagged skewness of the forward variance can help to forecast the forward variance both in-sample and out-of-sample.

Keywords: model-free forward variance, spectral density test, index jump, market efficiency