



The University of Chicago
Department of Statistics
Master's Seminar

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Wavelet Analysis of Long-Memory Stochastic Volatility Model

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ABSTRACT

In recent years, long-memory processes have developed into an important part of the time series analysis. One characteristic of long-memory processes is featured by slowly decaying autocorrelations, which is more appropriate to reveal the volatility of stock market than short-memory processes. Estimation of long-memory parameter intrigues lots of researchers. Among many methods to estimate long-memory parameter, wavelet analysis has the edge of dealing with time-varying characteristic found in most real-world time series without the stationary assumption. Moreover, wavelet analysis is able to capture the time-varying statistical properties of long-memory process and to identify the scaling behavior found in the statistical properties of the process. Whitcher and Jensen (2000) found an approximate log-linear relationship between the time-varying variance of the wavelet coefficients and the wavelet scale proportional to the local long-memory parameter. They proposed ordinary least squares (OLS) estimation of long-memory parameter using wavelet analysis. This paper applies the method into IBM stock data and compares the accuracy of estimation between two different frequency data sources. Using the method of testing changing points introduced by Wu and Zhao (2007), we test the structural breaks in the estimation results of long-memory parameter.