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Stochastic volatility as a simple generator of apparent financial power laws and long memory

B. LeBaron

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Abstract

There has been renewed interest in power laws and various types of self-similarity in many financial time series. Most of these tests are visual in nature, and do not consider a wide range of possible candidate stochastic models capable of generating the observed results in small samples. This paper presents a relatively simple stochastic volatility model, which is able to produce visual power laws and long memory similar to those from actual return series using comparable sample sizes. These are small-sample features for the stochastic volatility model, since asymptotically it possesses none of these properties. The primary mechanism for this result is that volatility is assumed to have a driving process with a half life that is long relative to the tested aggregation ranges. It is argued that this might be a reasonable feature for financial, and other macroeconomic time series.

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