Long Memory in Finance and Fractional Brownian Motion

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June 9, 2008

Abstract

Empirical studies on trade by trade data in stock markets reveal that there exists a long memory in trade signs. To explain the long memory in trade signs, we present a mathematical model in which trader can divide their orders into two chunks and a probability distribution of the time lag of divided orders is assumed to decay as an inverse power law of time lag with exponent of α. We obtain three types of scaling limit of the signed volume process according to the three cases of the value of α, (i) $\alpha < 1$, (ii) $\alpha = 1$, and (iii) $\alpha > 1$. In the case of (i) we show that fractional Brownian motion is obtained in the scaling limit.

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