Volatility clustering and scaling for financial time series due to attractor bubbling

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Abstract

A microscopic model of financial markets is considered, consisting of many interacting agents (spins) with global coupling and discrete-time thermal bath dynamics, similar to random Ising systems. The interactions between agents change randomly in time. In the thermodynamic limit the obtained time series of price returns show chaotic bursts resulting from the emergence of attractor bubbling or on-off intermittency, resembling the empirical financial time series with volatility clustering. For a proper choice of the model parameters the probability distributions of returns exhibit power-law tails with scaling exponents close to the empirical ones.

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