Quantitative Finance > Statistical Finance

Large-volatility dynamics in financial markets

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We investigate the large-volatility dynamics in financial markets, based on the minutely and daily data of the Chinese Indices and German DAX. The dynamic relaxation both before and after large volatilities is characterized by a power law, and the exponents $p_\pm$ usually vary with the strength of the large volatilities. The large-volatility dynamics is time-reversal symmetric at the minutely time scale, while asymmetric at the daily time scale. Careful analysis reveals that the time-reversal asymmetry is mainly induced by exogenous events. It is also the exogenous events which drive the financial dynamics to a non-stationary state. In general, the Chinese Indices and German DAX are in different universality classes. An interacting herding model without and with exogenous driving forces could qualitatively describe the large-volatility dynamics.

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