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Uncovering Nonlinear Structure In Real-Time Stock-Market Indexes: The S&P 500, the DAX, the Nikkei 225, and the FTSE-100

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Abstract

This article tests for nonlinear dependence and chaos in real-time returns on the world's four most important stock-market indexes. Both the Brock–Dechert–Scheinkman and the Lee, White, and Granger neural-network-based tests indicate persistent nonlinear structure in the series. Estimates of the Lyapunov exponents using the Nychka, Ellner, Gallant, and McCaffrey neural-net method and the Zeng, Pielke, and Eyckholt nearest-neighbor algorithm confirm the presence of nonlinear dependence in the returns on all indexes but provide no evidence of low-dimensional chaotic processes. Given the sensitivity of the results to the estimation parameters, we conclude that the data are dominated by a stochastic component.

KEY WORDS:

Brock–Dechert–Scheinkman test | Chaos | GARCH models | Lyapunov exponent | Nearest-neighbor method | Neural net | Nonparametric | Stock index futures | Stock returns

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