

ABSTRACT

After the stock market crash of October 19, 1987, interest in nonlinear dynamics, especially deterministic chaotic dynamics, has increased in the field of financial analysis. The extent that the daily return data from the Shanghai Stock Exchange Index and the Shenzhen Stock Exchange Index exhibit nonlinearity and chaotic characteristics are investigated by employing various tests from chaos theory. The visual and topological inspection techniques reveal that the underlying structures in the returns data are different from those in the random data and the periodic series. Two supporting measures Recurrence Quantitative Analysis (RQA) and Spatial-Temporal Entropy (STE) indicate there may be evidence of chaotic structure. The BDS test and Rescaled Range (R/S) analysis provide evidence for nonlinearity and long-term memory respectively. The estimated correlation dimensions provide evidence for deterministic chaotic behaviors, consistent with the results of RQA and STE. A Generalized Autoregressive Conditional Heteroscedasticity (GARCH(1,1)) process does not appear to capture the nonlinear behavior of the stock series. Finally, the nearest neighbor forecasting approach has been employed to illustrate whether such methodology is applicable to forecast the time series of Chinese stock returns.