

Comparison study of global and local approaches describing critical phenomena on the developing and developed financial markets.

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Abstract

We confront global and local methods in analysis of crash like events on the biggest emerging financial market in Europe – the Polish market. An analysis is made from the critical phenomena point of view and its conclusions are compared with the outcomes of most developed US market. We use methods based on log-periodicity and on the fractal properties of discussed financial time series. The whole history (1991-2008) of Warsaw Stock Exchange Index (WIG) is analyzed in a daily time horizon. We find that crash-like events on the Polish financial market are described better by the log-divergent price model decorated with log-periodic behavior than by the power law –divergent price model. Predictions coming from log-periodicity scenario are verified for all main crashes that took place in WIG history. It is argued that crash predictions within log-periodicity model depend strongly on the amount of data taken to make a fit. Therefore, this method is likely to contain huge inaccuracies. Turning to local fractal description we calculate the so-called time dependent Hurst exponent H_{loc} for WIG time series and for DJIA index. An interesting dependence between local fractal properties of financial time series and the crash or rupture point appearance is noted and described in some details. The latter method seems to work better than the global approach – both for developing as well as for developed financial markets. The current situation on the market, particularly related to the FED intervention and the situation immediately after this intervention, will also be analyzed. It will be shown that the fractional Brownian motion with different long-range dependence properties can be found in evolution of financial market before, immediately after, and long time ago after the external influence.

Keywords

Econophysics, complex systems, time series analysis, Hurst exponent

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