

A Nonlinear Threshold Model for the Dependence in the Extremes of Stationary Sequences

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Abstract:

One of the main implications of the efficient market hypothesis (EMH) is that expected future returns on financial assets are not predictable. In this paper we argue that financial time series offer more information than that this hypothesis seems to supply. In particular we postulate that runs of very large returns are predictable for small time periods. In order to prove this we propose a TAR(3,1)-GARCH(1,1) model that is able to describe two different types of extreme events: a first type generated by large uncertainty regimes where runs of extremes are not predictable and a second type where extremes come from isolated dread/joy events. This model is new in the literature in nonlinear processes. Its novelty resides in two features of the model that make it different from previous TAR models. The regimes are motivated by the occurrence of extreme values and the threshold variable is defined by the shock affecting the process in the preceding period. In this way this model is able to uncover dependence and clustering of extremes in high as long as in low volatility periods. This model is tested with data from S&P500 financial Index corresponding to two crises that had a substantial impact in financial markets worldwide; the Black Monday of October 1987 and September 11th, 2001. By analyzing the periods around these crises we find evidence of statistical significance of our model and thereby of predictability of extremes for the case of Black Monday. It is striking however our second finding, that the crisis sparked by the events of September 2001 did not produce a sequence of negative returns and hardly an increase in volatility in financial markets.