Abstract

This bachelor thesis concerns itself with multiple objectives. First, to compare two apparently contradictory frameworks, namely the Log-periodic Power Law model and the Critical Slowing Down, suggested as being able to detect the end of financial bubbles. Second, to enrich current literature dedicated to the Log-periodic Power Law model with a comprehensible description of the non-linear optimization methods in one piece of work. This work, furthermore, aims to compare the performance and the robustness of two versions of this model. Regarding the Critical Slowing down, the correlation across the world market over time prior to a crash is investigated as an addition to two already studied indicators, 1-lag serial correlation and standard deviation of detrended fluctuations. Eventually, both the Log-periodic Power Law models were proved to be able to identify the time of the burst of the financial bubble, while the modified version of the model was found to be more proficient over the initial one in terms of computational efficiency and robustness. In the case of the Critical Slowing Down, obeying autocorrelation of residuals and cross-correlation of intermarket residuals came out to be misleading, and only variance was supported as an appropriate indicator of an imminent tumble, and it was proposed as an aspirant for a potential completion of the Log-periodic Power Law model framework.

Keywords

Financial Markets, Critical Points, Phase Transition, Log-periodic Oscillation, Critical Slowing Down, Non-linear Optimization Methods