A progression of the backtrack optimization technique for forecasting potential financial crisis periods

Eleni G. Lisgara, Georgios I. Karolidis and George S. Androulakis

Department of Business Administration, University of Patras,

Rio, GR-265.04, Greece

`lisgara|karolidis|gandroul@upatras.gr`

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Financial crisis is a curse that follows any economic and financial system regardless its profitability and the level it functions. The appearance of crises across financial markets, especially during the 1990s that the internationalized markets adopted a rather approachable character, imposed severe costs in financial and social systems. Such situation enhance major withdrawn of funds from economies and finally affect the society itself. The recent global financial abnormal situation has motivated further interest empowered from the socio-economical consequences its results would enclose, which certify the importance of an immediate response to a crisis first symptoms towards minimizing its impact. Plethora of research and methodologies have developed towards resolving the issue of predicting a potential period of crisis. Their common characteristic is that most of them focus on the existence of indicator/s able to allocate the threshold rendering a crisis burst.

Recently we proposed an algorithm which, although it extracts indicator-based alerts, differentiates from the signal approaches on the indicator's nature. Moreover, the observation that a time series behavies similarly to a trace of a function with m variables, expanded the implementation of function properties on time series. Based on such observations, on this algorithm was exploited the Lipschitz constant as an indicator of a time series' acceleration to drastic changes. Its usage provided efficient evidence regarding its accuracy to an ex-ante chronical allocation of a future abnormal financial situation.

This idea is combined with that of using two different optimization methods, with different convergence characteristics, in order to envelop the future optima in a time range. Different convergence characteristics of the methods result to the interval that is eligible to envelop the local optima, plus on this study the local optima to foresee regards changes of the crisis indicator used; that is deductions of the Lipschitz constant.

This paper imposes the generation of a forward chronical interval that is vulnerable for a crisis to burst. *Some* approximations of the Lipschitz constant as a crisis indicator consist the time series in question. Further the application of two different optimization techniques over the Lipschitz-made time series results to a future period of time that is a chronical interval vulnerable for a crisis to burst. The preliminary obtained results provide strong evidence that the method may be used as an Early Warning System (EWS) in financial crisis.