Abstract

Score-driven time series models (DCS/GAS) have developed rapidly over the last ten years and continue to be a fruitful area for research; see the papers listed on the website http://www.gasmodel.com/gaspapers.htm. They offer a unified and comprehensive theory for a class of nonlinear time series models in which the dynamics of a changing parameter, such as location or scale, are driven by the score of the conditional distribution. When combined with basic ideas of maximum likelihood estimation, the approach leads to observation-driven models which, in contrast to many in the literature, are relatively simple in their form, yield analytic expressions for their principal features and are open to the development of an asymptotic distributional theory for the estimated parameters. The models have been particularly successful at capturing the movements in the volatility and correlation (association) of financial time series; see the recent book in http://www.econ.cam.ac.uk/DCS. However, they have been extended into other areas, including those dealing with environmental data such as wind direction.

Score-driven time series models have their origins in observed component and state space models. This class of models has been shown to provide a flexible and effective approach when linearity and normality are reasonable assumptions. Many simple methods, such as exponential smoothing are special cases. The extension to handling
nonlinearity follows naturally and yields an integrated approach to
time series modeling and prediction. From the practitioners point
of view, the models have the attraction of ease of computation and
interpretation as well as excellent forecasting performance.