

Title: Temporal Aggregation of Nonlinear Volatility Models

Abstract:

Meddahi and Renault (2004) showed that discrete and continuous time volatility models are closed under temporal aggregation when the variance process is the sum of the components of a VAR(1) process of dimension p (SR-SARV(p) model; Andersen, 1994). Therefore, they excluded nonlinear volatility models like the log-normal stochastic volatility model (Taylor, 1986; Hull and White, 1987) and the EGARCH model (Nelson, 1991). We extend the results of Meddahi and Renault (2004) by exhibiting a class of models that is closed under temporal aggregation and contains nonlinear volatility models. To do so, we follow the insights highlighted by Meddahi and Renault (2004) and combine them with the eigenfunction approach of Meddahi (2001). More precisely, we plug any nonlinear volatility model in a larger class of linear volatility models where the variance process is the sum of autoregressive processes. However, the number of autoregressive processes involved in the variance decomposition is infinite, which justifies the SR-SARV(∞) terminology.