Modelling time-varying volatility interactions with an application to volatility contagion

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Abstract:
In this paper, we propose an additive time-varying (or partially time-varying) structure where a time-dependent component is added to the extended vector GARCH process for modelling the dynamics of volatility interactions. In this setting, codependence in volatility is allowed to change smoothly between two extreme states and financial contagion is identified from these crisis-contingent structural changes. The estimation of the new time-varying vector GARCH process is simplified using an equation by equation estimator for the volatility equations in the first step, and estimating the correlation matrix in the second step. A Lagrange multiplier test of volatility contagion is also presented for testing the null hypothesis of constancy codependence against a smoothly time-varying interdependence. The proposed statistical test allows us to investigate volatility contagion by testing a significant increase in cross-market volatility transmissions. Finite sample properties of the proposed test statistic are investigated by Monte Carlo experiments. An empirical application of the modelling and testing procedure to sovereign bond yields is also provided.