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Evaluating models of autoregressive conditional duration

This paper contains two novelties. First, a unified framework for testing and evaluating the adequacy of an estimated autoregressive conditional duration (ACD) model is presented. Second, two new classes of ACD models, the smooth transition ACD model and the time varying ACD model, are introduced and their properties discussed. A number of new misspecification tests for the ACD class of models are introduced. They are Lagrange multiplier and Lagrange multiplier type tests against general forms of additive and multiplicative misspecification of the conditional mean function. These forms include tests against higher-order models, tests of no remaining ACD in the standardized durations, as well as tests of linearity and parameter constancy. In addition to its generality, the advantage of this testing approach is its ease of application, since all the resulting asymptotic null distributions are standard. The finite sample properties of the tests are investigated by simulation. A general observation is that the tests are well-sized. Versions of the tests robustified against deviations from the exponential error distribution are also given. The smooth transition and time-varying ACD models are introduced, their main properties are examined, and they serve as alternatives in the tests of linearity and parameter constancy. Finally, the tests are applied to ACD models of the IBM stock traded at the New York Stock Exchange.