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Consistent long-memory parameter estimation in a LARCH time series model and its connection to the Hurst parameter of the fractional Brownian motion.

We investigate several possible strategies for consistently estimating the so-called Hurst parameter H responsible for the long-memory property in a special class of nonlinear ARCH-type models popularly known as LARCH, as well as in the continuous-time Gaussian stochastic process named fractional Brownian motion (fBm). Several estimation methods are discussed, including a conditional MLE method and a local Whittle-type estimation procedure. The conditional MLE is proved to be consistent and a Portmanteau-type test for model validation is established. By constructing the LARCH and fBm processes on a common probability space, and showing the convergence of various partial sums of the former to the latter in mean squared, we can propose a specially designed conditional maximum likelihood method for estimating the fBm's Hurst parameter. In keeping with the popular financial interpretation of ARCH-type models, all estimators are based only on observation of the "returns" of the model and not on the "volatilities". (Received August 16, 2007)