## Robust Tests Using the Cauchy Distribution

Uwe Hassler Mehdi Hosseinkouchack Goethe-Universität Frankfurt EBS Universität

## Abstract

A testing principle is discussed where the statistic is the ratio of two weighted sums of partial sums. Under weak assumptions, the ratio converges to the standard Cauchy distribution under the null hypothesis. At the same time a potential nuisance scaling parameter cancels from the ratio without having to be estimated, making these Cauchy tests self-normalizing (or scale-invariant).

We consider two time series applications. First, testing for a constant mean. Here, the Cauchy test turns out to be robust with respect to eventual long memory, too. Second, residual-based testing for cointegration. Here, the Cauchy test is superior to the traditional KPSS-type test.

*Keywords* Specification testing, weighted sums of CUSUM, limiting normality, scaleinvariance.