

R. Ibragimov, Ulrich K. Mueller (Imperial College Business School, Department of Economics, Princeton University). **Correlation and heterogeneity robust inference using conservativeness of test statistics.**

We develop a new general approach to robust inference about scalar parameters of interest when the data is potentially heterogeneous and correlated in a largely unknown way. The approach is based on small sample conservativeness properties of the standard t -statistic and Behrens-Fisher statistic for testing equality of means. These properties show that, for commonly used significance levels, the t - and Behrens-Fisher tests remain conservative for underlying observations that are independent and Gaussian with heterogeneous variances. One might thus conduct robust large sample inference as follows: partition the data into some number of groups, estimate the model for each group, and, conduct standard t - or Behrens-Fisher test with the resulting parameter estimators of interest. This results in valid and in some sense efficient inference when the groups are chosen in a way that ensures the parameter estimators to be asymptotically independent, unbiased and Gaussian of possibly different variances. We provide a number of econometric and statistical applications of the new robust inference approaches, including the analysis of time series, panel, clustered and spatially correlated data, heavy-tailed economic and financial models affected by crises and large fluctuations and robust tests of treatment effects and structural breaks in economics and finance.