Unified unconditional regression for multivariate quantiles, M-quantiles and expectiles

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Abstract

In this paper, we develop a unified regression approach to model unconditional quantiles, M-quantiles and expectiles of multivariate dependent variables exploiting the multidimensional Huber's function. To assess the impact of changes in the covariates across the entire unconditional distribution of the responses, we extend the work of Firpo et al. (2009) by running a mean regression of the recentered influence function on the explanatory variables. We discuss the estimation procedure and establish the asymptotic properties of the derived estimators. A data-driven procedure is also presented to select the tuning constant of the Huber's function. The validity of the proposed methodology is explored with simulation studies and through an application using the Survey of Household Income and Wealth 2016 conducted by the Bank of Italy.