Quantile regression coefficients modelling

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Abstract

In standard quantile regression (QR), quantiles are estimated one at the time. An alternative approach, which is referred to as quantile regression coefficients modeling (QRCM), is to describe the functional form of the regression coefficients parametrically. This approach facilitates estimation and inference, simplifies the interpretation of the results, and generates more efficient estimators. Moreover, thanks to the imposed parametric structure, it makes it easier to estimate quantiles in situations involving latent variables, missing or partially observed data, and other complications arising in survival analysis and longitudinal data analysis, where applying standard QR proves difficult and computationally inefficient. Finally, the same family of estimators can be used to implement a general robust method, that can be applied to fit parametric models, such as the normal homoskedastic model or the proportional hazards model, that have little in common with quantile-based approaches. We discuss methodological and theoretical aspects, and illustrate the R packages "qrcm" and "Qest".