The kth power expectile regression

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Abstract

Check functions of least absolute deviation make sure quantile regression methods are robust, while squared check functions make expectiles more sensitive to the tails of distributions and more effective for the normal case than quantiles. In order to balance robustness and effectiveness, we adopt a loss function, which falls in between the above two loss functions, to introduce a new kind of expectiles and develop an asymptotic least kth power estimation method that we call the kth power expectile regression, k larger than 1 and not larger than 2. The asymptotic properties of the corresponding estimators are provided. Simulation results show that the asymptotic efficiency of the kth power expectile regression is higher than those of the common quantile regression and expectile regression in some data cases. A primary procedure of choosing satisfactory k is presented. We finally apply our method to the real data.

Keywords Asymptotic variance · The kth power expectile · Expectiles · Quantiles

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