Robust Standard Errors for Robust Estimators

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Abstract

A regression estimator is said to be robust if it is still reliable in the presence of outliers. On the other hand, its standard error is said to be robust if it is still reliable when the regression errors are autocorrelated and/or heteroskedastic. This paper shows how robust standard errors can be computed for several robust estimators of regression, including MM-estimators. The improvement relative to non-robust standard errors is illustrated by means of large-sample bias calculations, simulations, and a real data example. It turns out that non-robust standard errors of robust estimators may be severely biased. However, if autocorrelation and heteroscedasticity are absent, non-robust standard errors are more efficient than the robust standard errors that we propose. We therefore also present a test of the hypothesis that the robust and non-robust standard errors have the same probability limit.

Keywords: robust regression, robust standard errors, autocorrelation, heteroskedasticity

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