Solving Calibrated Estimation Equations for Approximately Median-Unbiased Estimators

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The median-unbiased estimator has, or potentially has, its importance in many econometric applications. Apart from the least absolute deviation approach, however, there is a lack of systematic methods to construct median-unbiased estimators. Andrews (1993) adopted an inverse median function approach to find exactly the median unbiased estimator in the AR(1) model. His method is a special case of a general approach to correcting the median-bias by bootstrap, as disclosed in MacKinnon and Smith (1998). In this paper, a new approach is proposed to construct median-unbiased estimators in different models. Instead of correcting the bias afterwards, we attempt to calibrate the score function (or estimation equation, when maximum likelihood is not used) beforehand by using parametric bootstrap and then to solve the adjusted estimation equation for the (approximately) median-unbiased estimator. Therefore it is bias preventing rather than bias correcting. The proposed method is closely linked to the score-adjusting techniques used by McCullagh and Tibshirani (1990) for the adjusted profile likelihood and Firth (1993) for mean-bias correction. It is shown that several well-known median-unbiased estimators in the literature can all be constructed by using the proposed method. Finally the approach is applied to the dynamic linear regression model with AR(1) disturbances. The median-unbiased estimators of the autoregression coefficient and the regression parameters are compared with their more popular alternatives and some simulation results are reported**.**

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