

with an n^{-1} term instead of an $n^{-1/2}$ term. As a result, the bootstrap approximation of the distribution of such a modified pivot is automatically third-order correct.

We believe that this extensive theoretical study will prove to be very helpful to the users of the bootstrap technique in making a “right choice” of a bootstrap confidence interval.

REFERENCES

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As a bootstrap practitioner and applied econometrician/statistician, my comments will focus on the implications this fine paper in bootstrap theory has for applied research. From my perspective, it seems that two branches of research into bootstrap confidence intervals have developed. What I shall call the “asymptotic” approach follows the initial motivation of Efron and emphasizes finding confidence interval estimates where no feasible analytic alternatives exist. Much of Peter Hall’s paper is instead in the “finite sample” branch in that, as he notes, it largely assumes that there are suitable analytic standard error estimates and hence analytic confidence intervals are available; the bootstrap is used to improve on the large sample approximations required for most confidence interval construction. Hall’s research therefore provides a simulation alternative to analytic Edgeworth expansion and inversion. I find the asymptotic and finite sample approaches complementary and, interestingly, that they each correspond to growing needs in applied econometric research.

Applied econometricians, like other kinds of statistical practitioners, often diverge sharply from standard statistics textbook approaches. One such divergence has been the estimation of very complex models in which the formulae for standard errors are too complicated to calculate analytically. For these situations the bootstrap was an important innovation and found rapid acceptance among econometricians, many of whom were already using some kind of simulation/resample technique to aid inference in this context.

To take an example along this line from my own work, I used the bootstrap to estimate confidence intervals in a complicated forecasting problem involving future electricity demand [Veall (1987a)]. As have most econometricians, I used the percentile method. Hall’s “looking-up-the-tables-backwards” argument has