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# Empirical likelihood-based inferences for the Lorenz curve

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**Abstract** In this paper, we discuss empirical likelihood-based inferences for the Lorenz curve. The profile empirical likelihood ratio statistics for the Lorenz ordinate are defined under the simple random sampling and the stratified random sampling designs. It is shown that the limiting distributions of the profile empirical likelihood ratio statistics are scaled Chi-square distributions with one degree of freedom. We also derive the limiting processes of the associated empirical likelihood-based Lorenz processes. Hybrid bootstrap and empirical likelihood intervals for the Lorenz ordinate are proposed based on the newly developed empirical likelihood theory. Extensive simulation studies are conducted to compare the relative performances of various confidence intervals for Lorenz ordinates in terms of coverage probability and average interval length. The finite sample performances of the empirical likelihood-based confidence bands are also illustrated in simulation studies. Finally, a real example is used to illustrate the application of the recommended intervals.

**Keywords** Bootstrap · Confidence interval/band · Empirical likelihood · Income distribution · Lorenz curve