Tests for Stochastic Ordering under Biased Sampling

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Abstract

In two-sample comparison problems it is often of interest to examine whether one distribution function majorizes the other, i.e. for the presence of stochastic ordering. This talk introduces a nonparametric test for stochastic ordering based on size-biased data, allowing the pattern of size bias to differ between the two samples. The test is formulated in terms of a maximally-selected local empirical likelihood statistic. A Gaussian multiplier bootstrap is devised to calibrate the test. A simulation study indicates that the proposed test outperforms an analogous Wald-type test, and that it provides substantially greater power than what is available when ignoring the sampling bias. The approach is illustrated using data on blood alcohol concentration and age of drivers involved in car accidents, in which size bias is present because the drunker drivers are more likely to be sampled. Further, younger drivers tend to be more affected by alcohol, so when comparing with older drivers, the analysis is adjusted for differences in the patterns of size bias.

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