Score test for unconfoundedness under a logistic treatment assignment model

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Abstract

In the potential outcomes framework for causal inference, the most commonly adopted assumption to identify causal effects is unconfoundedness, namely the potential outcomes are conditionally independent of the treatment assignment given a set of covariates. A natural question is whether this assumption is valid given data. This problem is challenging as only one of the potential outcomes can be observed for each individual. Under a logistic treatment assignment model and parametric regression models on the potential outcomes, we develop a score test for this problem and establish its limiting distribution. A remarkable advantage of our test is that its implementation requires only parameter estimation under the null unconfoundedness assumption and hence bypasses the identification issue. Our numerical results show that the score test has well-controlled type I errors and desirable powers.

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