

On the Efficiency of Logistic Regression Estimators in Estimating The Causal Effect

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Abstract: This talk is about the Logistic Regression Estimators of the Average Treatment Effect (ATE) in randomized experiments, when the potential outcomes are binary variables. Based on some regularity conditions, exact expressions of asymptotic variances of the estimators are provided which is considered to be an important criterion for evaluating asymptotic efficiency. Also, we'll compare efficiency of different estimators of ATE (including the regression adjustment estimator) and prove some important results. We find that introducing interaction terms between the assignment variable and the covariate sometimes helps improve asymptotic efficiency. Numerical simulations are carried out to verify the theoretical results and a counterexample is given to show that sometimes introducing interaction terms in Logistic Regression might make the estimator of ATE less efficient.