CHICAGO BOOTH

The University of Chicago Booth School of Business

Econometrics and Statistics Workshop Meeting Schedule

Thursday, November 11, 2016

Beth Ann Griffin, RAND

"Propensity Score Estimation with Generalized Boosted Regression: Recommendations and Lessons Learned"

Abstract: The theory of propensity score analysis (PSA) is elegant. Provided strong ignorability holds, the single propensity score is all that is required to control for pretreatment differences between two treatment groups or a treatment and a control group. In practice, use of propensity scores is more complicated because the propensity score function and its functional form are unknown and must be estimated from the data. Logistic regression has been the standard approach to estimating propensity scores. I will demonstrate the use of the generalized boosting model (GBM) as an alternative to logistic regression for estimating propensity scores and share findings from two key studies involving the performance of GBM for estimating propensity score weights. GBM is a machine learning approach used primarily for predicting outcomes. It combines many simple regression trees to provide a smooth and flexible propensity score model. In this talk, we will carefully examine two important implementation issues when estimating propensity scores using GBM. First, we examine which of the following goals lead to better inferences for GBM: pursuing covariate balance between the treatment groups or tuning the propensity score model on the basis of a model fit criterion. Second, we will examine how well GBM can handle irrelevant covariates that are thrown into the estimation model. Finally, I will also summarize recent comparisons of GBM to alternative methods for propensity score estimation. Using a simulation study patterned after studies by Lee and colleagues (2010, 2011), I will compare GBM to the covariate balance propensity scores (CBPS) estimation methods of Imai and Ratkovic (2014). We contrast the methods in terms of covariate balance, and the bias and mean squared error of the treatment effects estimated by propensity score weighting.