Statistics Seminar

Department of Mathematical Sciences

DATE:	Thursday, October 3, 2019
TIME:	1:15pm – 2:15pm
LOCATION:	WH 100E
SPEAKER:	Ruiqi Liu, IUPUI
TITLE:	Deep Instrument Variables Estimator

Abstract

The endogeneity issue is fundamentally important in econometrics and statistics. Many empirical applications may suffer from the omission of explanatory variables, measurement error and simultaneous causality. We propose a two-stage estimator based on deep neural network (Deep Instrument Variables Estimator) to overcome endogeneity in the linear instrument variables model. A critical drawback of existing methods is that when the number of instruments is large, one has to sacrifice the statistical efficiency for avoiding curse of dimensionality, or impose structural assumptions and explicitly rely on the specified structures to obtain an efficient estimator. We impose a latent structural assumption on the reduced form equation, which is more general and includes most of the popular statistical and econometric models. Based on deep neural network, we prove that our estimator can effectively capture the intrinsic structures of the reduced form equation without knowing the prior information of the structures. Moreover, we show that the proposed estimator is root-n consistent and semiparametric efficient. Simulation studies on synthetic data confirm the validity of our theoretical results.