Dmitry Arkhangelsky

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Research fields

Econometrics, Causal Inference

Doctoral Studies

2013- Stanford GSB, Economic Analysis and Policy program
Expected completion: June 2018
Dissertation: "Essays in Econometrics"

Dissertation committee and references

Guido Imbens (Primary advisor)
Professor of Economics
GSB, Stanford University
imbens@stanford.edu

Lanier Benkard (Co-advisor)
Professor of Economics
GSB, Stanford University
lanierb@stanford.edu

Susan Athey
Professor of Economics
GSB, Stanford University
athey@stanford.edu

Stefan Wager
Assistant Professor of OIT
GSB, Stanford University
swager@stanford.edu

Prior education

2010-2012 MA in Economics (cum laude), New Economic School
2006-2010 BA in Economics (cum laude), Moscow State University

Research

Working papers

Dealing with a Technological Bias: The Difference-in-Difference Approach
(job market paper)

I construct a nonlinear model for causal inference in the empirical settings where researchers observe individual-level data for few large clusters over at least two time periods. It allows for identification (sometimes partial) of the counterfactual distribution, in particular, identifying average treatment effects and quantile treatment effects. The model is flexible enough to handle multiple outcome variables, multidimensional heterogeneity, and multiple clusters. It applies to the settings where the new policy is introduced in some of the clusters, and a researcher additionally has information about the pretreatment periods. I argue that in such environments we need to deal with two

different sources of bias: selection and technological. In my model, I employ standard methods of causal inference to address the selection problem and use pretreatment information to eliminate the technological bias. In case of one-dimensional heterogeneity, identification is achieved under natural monotonicity assumptions. The situation is considerably more complicated in case of multidimensional heterogeneity where I propose three different approaches to identification using results from transportation theory.

The Role of the Propensity Score in Fixed Effect Models (joint with Guido Imbens)

We develop a new estimator for the average treatment effect in the observational studies with unobserved cluster-level heterogeneity. We show that under particular assumptions on the sampling scheme the unobserved confounders can be integrated out conditioning on the empirical distribution of covariates and policy variable within the cluster. To make this result practical we impose a particular exponential family structure that implies that a low-dimensional sufficient statistic can summarize the empirical distribution. Then we use modern causal inference methods to construct a novel doubly robust estimator. The proposed estimator uses the estimated propensity score to adjust the familiar fixed effect estimator.

Work in progress

Combining Experimental Evidence: The Transportation Approach (joint with Stefan Wager)

We construct a flexible framework that allows researchers to combine experimental evidence from different populations to build a counterfactual distribution for a given non-treated population. We show that under certain assumptions the distribution can be identified using a solution of a measure transportation problem. In specific applications our procedure generalizes synthetic control (SC) strategy leading to the same results for the settings where SC strategy can be applied and to partial identification results for the environments where SC strategy fails.

Finite Sample Properties of Two-step Estimators for Structural Econometric Models (joint with Evgeni Drynkin and Lanier Benkard)

We propose a new iterative estimator for dynamic discrete choice games that achieves parametric rate even if the initial first stage estimator is not accurate. The estimator has several appealing properties such as bias reduction, stability, and computational feasibility. Some known results, such as iterative estimators by policy function iterations in the single agent dynamic discrete choice models are special cases of our corrected procedure. We test the performance of our estimator in several examples via simulations.

Conference and seminar presentations

2017 2017 California Econometrics Conference

Teaching

2014-2017

CA for MGTECON 640: Quantitative Methods for Empirical Research, Stanford GSB
2014 Math Camp for incoming PhD Students, Stanford GSB
2011-2013 Teaching Assistant (graduate Micro sequence, IO sequence, Microeconometrics), New Economic School

Work Experience

2015-2017 Research Assistant at Stanford GSB
2015 Summer Intern at Google Inc, USA
2012-2013 Analyst at Yandex (design of experiments), Russia
2011-2013 RA and CA at New Economic School, Russia

Grants, honors & awards

2012 Lombard Odier award for the Best Master Thesis
2012 Students' choice award for teaching excellence

Programming languages

R, Matlab, command-line tools/shell-scripting, LaTeX.

Languages

English: fluent
Russian: native

Last updated: November 10, 2017