

UNIVERSITY OF PENNSYLVANIA

Undergraduate Studies:

B.A., Business Administration, Universidad de los Andes (Colombia), cum laude, 2013

Masters Level Work:

M.A., Economics, Universidad de los Andes (Colombia), 2015

Graduate Studies:

University of Pennsylvania, 2015 to present

Thesis Title: “Essays on Peer Effects and Network Econometrics”

Expected Completion Date: May 2020

Thesis Committee and References:

Professor Xu Cheng (Primary Advisor)
University of Pennsylvania
133 South 36th St., PCPSE 620
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Professor Francis J DiTraglia
University of Oxford
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Professor Petra Todd
University of Pennsylvania
133 South 36th St., PCPSE 606
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Teaching and Research Fields:

Primary fields: Econometrics, Development Economics, Applied Microeconomics

Secondary fields: Causal Inference, Networks, Big Data and Machine Learning

Teaching Experience:

As primary instructor:

2017, 2018, 2019 Summer Math Camp for incoming Economics Ph.D. Students, UPenn

Fall 2015 Stata Workshop, UniAndes

Spring 2014 Stata Workshop, UniAndes

Teaching Assistant (TA) at University of Pennsylvania:

Spring 2020 Polit. Econ. of Early British America, TA for Jesus Fernandez-Villaverde

Fall 2019 Foundations of Market Economies, TA for Jesus Fernandez-Villaverde

Spring 2019 Topics in Development, TA for Jesus Fernandez-Villaverde

Fall 2018 Statist. Learning and Causal Inference in Econ., TA for Francis J. DiTraglia

Spring 2018 Econometric Theory II (Ph.D. course), TA for Frank Diebold

Fall 2017 Econometric Theory I (Ph.D. course), TA for Xu Cheng and Frank Schorfheide

Spring 2017 Intermediate Macroeconomics, TA for Alessandro Dovis

Fall 2016 Econometric Theory I (Ph.D. course), TA for Xu Cheng and Frank Schorfheide

Teaching Assistant (TA) at Universidad de los Andes:

Summer 2015 Impact Evaluation for Policy Makers, TA for Raquel Bernal

Spring 2015 Advanced Econometrics (Masters), TA for Raquel Bernal

Fall 2014 Advanced Econometrics (Masters), TA for Raquel Bernal

Spring 2012 Colombia and its Institutions (Undergraduate), TA for Nathalia Franco
2011, 2012, 2013 Finance 3: Strategy (Undergraduate), TA for Samuel Malone

Research Experience and Other Employment:

2019 UPenn, Research Assistant for Jere Behrman and Irma Elo
2018 UPenn, Research Assistant for David Abrams
2017 UPenn, Research Assistant for Hans-Peter Kohler
2016-2017 UPenn, Research Assistant for Francis J. DiTraglia and Camilo García-Jimeno
2013-2015 UniAndes, Research Assistant for Raquel Bernal, Samuel Malone and Luz M. Ferro

Professional Activities:

Presentations Young Economists Symposium 2020
Econometric Society World Congress 2020
Warwick Ph.D. Conference 2019
Referee *Journal of Econometrics*

Honors, Scholarships, and Fellowships:

2020 School of Arts and Sciences Dissertation Completion Fellowship, UPenn
2018 Joel Popkins Award for best teaching by an economics graduate student, UPenn
2016 Award for best preliminary examination in Econometrics, UPenn
2015 University Fellowship for five years of Ph.D. studies, UPenn

Research Papers:

(1) Spillovers, Homophily and Selection into Treatment: The Network Propensity Score

(Job Market Paper)

Propensity score matching is often used to estimate treatment effects when there is selection on observables; however, it fails to identify causal effects when one person's treatment affects another's outcome. This phenomenon is known as spillovers. I propose a novel network propensity score matching approach that identifies both the average treatment effects and the average spillover effects between individuals. My approach is grounded on an endogenous model of network formation with spillovers on the outcome. This methodology can be used to identify causal effects for individuals with similar observables, analogous to the propensity score. I then propose estimators that are consistent and asymptotically normal for settings with multiple networks. I apply my methodology to two empirical examples. First, I study the effects of an intervention on political participation in Uganda where I find evidence of spillovers on non-participants. Second, I evaluate a microfinance adoption intervention in India, and find large treatment effects but limited spillovers effects. In some extensions of the method, I show how to conduct robustness checks and how to interpret the network propensity score in stratified multi-stage experiments.

(2) Identifying Causal Effects in Experiments with Social Interactions and Non-compliance

(with Frank DiTraglia, Camilo Garcia and Rossa O'Keefe-O'Donovan)

This paper shows how to use a randomized saturation experimental design to identify and estimate causal effects in the presence of social interactions—one person's treatment may affect another's outcome—and one-sided non-compliance—subjects can only be offered treatment, not compelled to take it up. Two distinct causal effects are of interest in this setting: direct effects quantify how a person's own treatment changes her outcome, while indirect effects quantify how her peers' treatments change her outcome. We consider the case in which social interactions occur only within known groups, and take-up decisions do not depend on peers' offers. In this setting we point identify local average treatment effects, both direct and indirect, in a flexible random coefficients model that allows for both heterogeneous treatment effects and endogenous selection into treatment. We go on to propose a feasible estimator that is consistent and asymptotically normal as the number and size of groups increases.

(3) High-Dimensional Minimum Distance Estimation with Graphical Lasso Weighting

(with Xu Cheng and Andrew Shephard)

Following the seminal paper by Altonji and Segal (1996), many researchers who estimate structural models through moment matching apply a diagonal weighting matrix. The diagonal structure plays a crucial role in reducing the estimation bias caused by the correlation between the weighting matrix and the moment conditions. We argue that the diagonal design is a simple yet extreme way to impose sparsity, i.e., many zeros on the weighting matrix. This paper proposes to replace it with a new weighting matrix based on the graphical lasso estimator, a machine learning method for estimating high-dimensional covariance matrix and its inverse. This alternative weighting matrix uses data to determine the position of a small number of non-zero off-diagonal elements and provides more effective bias and variance trade-off in practice. Furthermore, we show that the ideal and infeasible weighting matrix exhibits a sparse pattern in many economic settings, including the models for earnings dynamics that we study in detail. In this case, this graphical-lasso-based weighting matrix provides the same level of efficiency as the ideal and infeasible weighting matrix in a many-moments asymptotic setting. Finally, we illustrate the improved finite-sample performance in a simulation study from the earnings dynamics literature.

(4) Politico-financial crises: New Evidence (with Samuel W. Malone)

Using a wide sample of countries during the period 1974-2004, we instrument leader exits and financial crises to assess the causal effect each has on the other. We find that leader exits due to scheduled elections and term limits raise the probability of a banking crisis in the same year by 9% and that of a twin crisis by 7.6%. These effects are highly significant statistically, robust, and confined primarily to presidential regimes. In contrast, for financial crises instrumented with determinants from early warning models, only sovereign defaults appear to induce the exit of national leaders.

Research in Progress:

(5) Enrollment, Math Performance and Wages: A Coordination Model in Mexican Middle Schools (with Gabrielle Vasey and Petra Todd)

We estimate a structural model of students' enrollment decisions, and the joint effort decisions of students and teachers for those that do enroll in school. Class composition and effort choices are determined endogenously via a strategic game, which takes into consideration peer effects within the classroom. We combine administrative data on test performance with surveys for teachers, students and parents. We incorporate spatial data on child wages to evaluate the outside option from dropping out of school. Our model allows for heterogeneous endowments and teacher ability. With this model, we can evaluate the impact of a conditional cash transfer on not only beneficiary enrollment choices and achievement, but also on their classmates.

(6) Own and Parents' Schooling as Predictors of Cognitive and Physical Health at Older Ages: Findings from the Longitudinal Chilean Social Protection Survey

(with Irma Elo, Jere Behrman, David Bravo and Sneha Mani)