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High School
Inglewood High School, Inglewood CA, class of 2001

Undergraduate Studies:
I.G.E.T.C. Santa Monica College, 2004
B.A., Applied Mathematics, Economics, University of California-Berkeley, Highest Honors, 2006

Graduate Studies:
Harvard University, 2007 to present
Ph.D. Candidate in Economics
Thesis Title: "*Essays in Applied Econometrics and Education*"
Expected Completion Date: June 2014

References:

Professor Gary Chamberlain
Littauer Center 123
617-495-1869, gary_chamberlain@harvard.edu

Professor Edward Glaeser
Littauer Center 315A
617-494-2150, eglaeser@harvard.edu

Professor Guido Imbens
655 Knight Way, Stanford, CA
650-723-4315, imbens@stanford.edu

Professor Lawrence Katz
Littauer Center 224
617-495-5148, lkatz@harvard.edu

Teaching and Research Fields:
Primary fields: Labor Economics, Econometrics

Secondary fields: Behavioral Economics, Public Finance

Teaching Experience:

Fall, 2009	Graduate Probability and Statistics, Harvard, teaching fellow for Professor Rustam Ibraginov
Spring, 2010 and 2011	Graduate Introduction to Econometrics, Harvard, teaching fellow for Professor Gary Chamberlain
Fall, 2010	Undergraduate Introduction to Applied Econometrics, Harvard, head teaching fellow for Professor James Stock

Research Experience and Other Employment:

2013-ongoing	Harvard, Affiliate at the Center for Education Policy Research (CEPR)
2008-2009	Harvard, Research Assistant for Guido Imbens
2008-2009	Harvard, Research Fellow, EdLabs, PI Roland Fryer

Professional Activities:
Referee: Quarterly Journal of Economics, Journal of the European Economics Association, Journal of Urban Economics

Grants:

2012	Ideas42 Research Grant $7,000
2011	Warburg Fund Research Grant $3,000
2011	NSF Doctoral Dissertation Improvement Grant $5,500
2010	Lab for Economic Applications and Policy (LEAP) Research Grant $3,600

Research

Published Paper:
Barrios, Thomas, Rebecca Diamond, Guido W. Imbens, and Michal Kolesar, (2012) ``Clustering, Spatial Correlation and Randomization Inference'' *The Journal of the American Statistical Association* 107:498, 578-591
It is a standard practice in regression analyses to allow for clustering in the error covariance matrix if the explanatory variable of interest varies at a more aggregate level (e.g., the state level) than the units of observation (e.g., individuals). Often, however, the structure of the error covariance matrix is more complex, with correlations not vanishing for units in different clusters. Here, we explore the implications of such correlations for the actual and estimated precision of least squares estimators. Our main theoretical result is that with equal-sized clusters, if the covariate of interest is randomly assigned at the cluster level, only accounting for nonzero covariances at the cluster level, and ignoring correlations between clusters as well as differences in within-cluster correlations, leads to valid confidence intervals. However, in the absence of random assignment of the covariates, ignoring general correlation structures may lead to biases in standard errors. We illustrate our findings using the 5% public-use census data. Based on these results, we recommend that researchers, as a matter of routine, explore the extent of spatial correlations in explanatory variables beyond state-level clustering.

Job Market Paper:
"Optimal Stratification in Randomized Experiments"
I show that stratifying on the conditional expectation of the outcome given baseline variables is optimal in matched-pair randomized experiments. The assignment is done to minimize the variance of the post-treatment difference in mean outcomes between treatment and controls. Optimal pairing depends only on predicted values of outcomes for experimental units, where the predicted values are the conditional expectations. After randomization frequentist inference and randomization inference depend only on the actual strata chosen and not on estimated predicted values. This gives a way to use big data (possibly more covariates than the number of experimental units) ex-ante while maintaining simple post-experiment inference techniques. Optimizing the randomization with respect to one outcome allows researchers to credibly signal the outcome of interest prior to the experiment. Inference can be

conducted in the standard way by regressing the outcome on treatment and strata indicators. To illustrate the application of the methodology, I revisit a classic field experiment.

Research Paper(s) in Progress

"Peer Effects in Prison" with Ryan Sakoda
How do peer interactions in prison affect crime and work outcomes after inmates are released? We use Kansas Department of Corrections administrative data to determine whether the criminal records of an inmate's prison peers (whether they are in the same cell, cell block, or facility) are related to that inmate's propensity to recidivate with a particular type of crime-- the type of crime of which his peers tended to be convicted.

"Course Availability, Delays, Degrees, and Grades" with Robert Fairley and Silvia Robles
Community colleges serve close to half of the undergraduate students in the United States and tuition at two-year public/non-profit colleges is mostly a public expenditure. We measure the effect of decreased course availability on grades, degree attainment, and transfer to four-year colleges using a regression discontinuity from course enrollment queues due to oversubscribed courses. Using a panel from a large California community college and the National Student Clearinghouse we find that in the short run students substitute unavailable courses with others. We find no significant effects on later outcomes, given the precision of our tests, however we cannot rule out economically significant effects.

"Using Geography as Instruments" with Edward Glaeser, Guido Imbens, and Michal Kolesar
We examine identification with many invalid instruments (Kolesar et al., 2011) in situations encountered when using geography variables for identification. The spatial distribution of resources, for example coal mines, rivers or archaic travel routes, are often used to identify important economic parameters. We provide data dependent methods for constructing instruments from geographic variables and relate the methods to the many invalid instruments model.