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P= Primary Field, S= Secondary Field
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DISSERTATION: “Demand estimation with search and learning”

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Secondary Fields: Econometrics, Organization Economics
TEACHING EXPERIENCE
Industrial Organization I (graduate, MIT course 14.271), Teaching Assistant to Professor Glenn Ellison 2019
Principles of Microeconomics (undergraduate, MIT course 14.01) Head Teaching Assistant to Professor Casey Rothschild 2019
Principles of Microeconomics (undergraduate, MIT course 14.01) Head Teaching Assistant to Professor Jonathan Gruber 2018
Principles of Microeconomics (undergraduate, MIT course 14.01) Head Teaching Assistant to Professor Jeffrey Harris 2018
Intermediate Microeconomic Theory (undergraduate, MIT course 14.04) Teaching Assistant to Professor Juuso Toikka 2017

RELEVANT POSITIONS
Research Assistant to Professor Sara Ellison 2019
Research Assistant to Professor Nikhil Agarwal 2018
Research Assistant to Professor Nancy Rose 2017
Research Assistant to Professor Nikhil Agarwal 2017
Research Assistant to Professor Sara Ellison 2016

FELLOWSHIPS, HONORS, AND AWARDS
D.E. Shaw Exploration Fellowship 2019
Emma Krob Castle Fellowship 2016
Phi Beta Kappa 2015
Burton G. Malkiel *64 Senior Thesis Prize in Finance 2015
Shapiro Prize for Academic Excellence 2013

RESEARCH PAPERS
“Demand estimation with search and learning”
Consumers need to spend resources to discover the characteristics of products they are interested in purchasing. Moreover, consumers often do not know the distribution of these characteristics and they may learn about it as they click on more products. In this paper, I model consumer behavior according to a sequential search model with heterogeneous products. In addition, consumers have Gaussian prior beliefs about the product characteristics that are costly to observe and these beliefs are updated with every product search. I characterize the optimal consumer behavior in this model and construct the likelihood function. I propose a test for learning and I find significant evidence of learning. Using clickstream data on search and purchase behavior of consumers looking to book a hotel in Budapest, I leverage my theoretical model to estimate consumer preferences, a clicking cost distribution and prior beliefs parameters. Under learning, the results suggest consumers have imprecise prior beliefs about the distribution of unobservable hotel characteristics and thus, they book suboptimal hotels. I find average
clicking costs of about $3/click. The results suggest that about 96% of consumers book suboptimal hotels under costly search and learning. If consumers were made aware of the distribution of unobserved hotel characteristics, most of them would book the utility maximizing hotel even though they would still have to pay a clicking cost to discover the realization of some of the hotel characteristics.

“Identification of random utility models in the presence of search”
In this paper, I present a proof of non-parametric identification of the search cost distribution in the context of a random coefficients utility model with sequential search. The model is an extension of the usual random coefficients model with price endogeneity, but I assume that consumers do not know in advance the utility they would get from each product in the choice set. Thus, consumers need to spend resources to discover the value of some product characteristics that are crucial to computing their total utility from purchasing the respective product. I model this as sequential search and I present a proof of non-parametric identification of the search cost distribution when consumer level purchase and search history data is available. I propose an estimation procedure using integral equations and Tikhonov regularization.

“Analyzing the effect of California’s Paid Family Leave program on women’s wages”
In this paper, I use data from the CPS March survey from 1990 to 2014 to analyze the effect of the introduction of the 2004 California Paid Family Leave program on women’s wages. It has been suggested that introducing mandatory paid parental leave will have a negative impact on women’s wages since women are more likely to take advantage of this policy and since this will result in increased costs to employers. I analyze the data using the synthetic control method proposed by Abadie and Gardeazabal (2003). I find no significant short nor long term effects on women’s wages or employment rates following the introduction of this program.
MERT DEMIRER

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DISSERTATION: “Essays on Production Function Estimation”

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Graduated with Distinction

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Secondary Fields: Machine Learning, Networks
TEACHING EXPERIENCE

MIT Sloan School of Management

15.034 Econometrics for Managers: Correlation and Causation in a Big Data World (MBA)
   TA to Joseph Doyle
   2018

15.S14 Transforming Data into Knowledge (Executive MBA)
   TA to Joseph Doyle and Tavneet Suri
   2017

15.034 Metrics for Managers: Big Data and Better Answers (MBA)
   TA to Joseph Doyle and Roberto Rigobon
   2016

MIT Economics

14.20 Industrial Organization & Public Policy (Undergraduate)
   TA to Nancy Rose
   2020

14.382 Econometrics (Graduate)
   TA to Whitney Newey and Florian Gunsilius
   2020

14.273 Advanced Topics in Industrial Organization (Graduate)
   TA to Sara Fisher Ellison and Whitney Newey
   2017

14.15 Networks (Undergraduate)
   TA to Devavrat Shah and Alex Teytelboym
   2017

RELEVANT POSITIONS

Research Assistant to Daron Acemoglu
   2018

Research Assistant to Victor Chernozhukov
   2015-17

Research Assistant to Kamil Yilmaz
   2012-14

INTERNSHIP

Microsoft Research, Cambridge, MA
Supervisors: Vasilis Syrgkanis and Greg Lewis
   2018

FELLOWSHIPS, HONORS, AND AWARDS

George & Obie Schulz Fund Grant
   2018-19

UniCredit & Universities Crivelli Europe Scholarship
   2014-16

Koç University High Merit Scholarship
   2012-14

PROFESSIONAL ACTIVITIES


MIT Summer Research Program Mentor
(with Victor Chernozhukov, Denis Chetverikov, Esther Duflo, Christian Hansen, Whitney Newey and James Robins)  
Most modern supervised statistical/machine learning (ML) methods are explicitly designed to solve prediction problems very well. Achieving this goal does not imply that these methods automatically deliver good estimators of causal parameters. Examples of such parameters include individual regression coefficients, average treatment effects, average lifts, and demand or supply elasticities. In fact, estimates of such causal parameters obtained via naively plugging ML estimators into estimating equations for such parameters can behave very poorly due to the regularization bias. Fortunately, this regularization bias can be removed by solving auxiliary prediction problems via ML tools. Specifically, we can form an orthogonal score for the target low-dimensional parameter by combining auxiliary and main ML predictions. The score is then used to build a de-biased estimator of the target parameter which typically will converge at the fastest possible 1/\sqrt{n} rate and be approximately unbiased and normal, and from which valid confidence intervals for these parameters of interest may be constructed. The resulting method thus could be called a "double ML" method because it relies on estimating primary and auxiliary predictive models. In order to avoid overfitting, our construction also makes use of the K-fold sample splitting, which we call cross-fitting. This allows us to use a very broad set of ML predictive methods in solving the auxiliary and main prediction problems, such as random forest, lasso, ridge, deep neural nets, boosted trees, as well as various hybrids and aggregators of these methods.

(with Victor Chernozhukov, Denis Chetverikov, Esther Duflo, Christian Hansen and Whitney Newey)  

(with Francis X. Diebold, Laura Liu, Kamil Yilmaz)  
We use LASSO methods to shrink, select and estimate the high-dimensional network linking the publicly-traded subset of the world’s top 150 banks, 2003-2014. We characterize static network connectedness using full-sample estimation and dynamic network connectedness using rolling-window estimation. Statically, we find that global bank equity connectedness has a strong geographic component, whereas country sovereign bond connectedness does not. Dynamically, we find that equity connectedness increases during crises, with clear peaks during the Great Financial Crisis and each wave of the subsequent European Debt Crisis, and with movements coming mostly from changes in cross-country as opposed to within-country bank linkages.
RESEARCH PAPERS

“Production Function Estimation with Factor-Augmenting Technology: An Application to Markups” (Job Market Paper)

Traditional production function models rely on factor-neutral technology and functional form assumptions, such as Cobb-Douglas. These assumptions impose strong theoretical restrictions and are often rejected by the data. This paper develops a new method for estimating production functions with factor-augmenting technology and assesses its economic implications. The method does not impose parametric restrictions and generalizes prior approaches that rely on the CES production function. I first extend the canonical Olley-Pakes framework to accommodate factor-augmenting technology. Then, I show how to identify output elasticities based on a novel control variable approach and the optimality of input expenditures. I use this method to estimate output elasticities and markups in manufacturing industries in the US and four developing countries. Neglecting labor-augmenting productivity and imposing parametric restrictions mismeasures output elasticities and heterogeneity in the production function. My estimates suggest that standard models (i) underestimate capital elasticity by up to 70 percent (ii) overestimate labor elasticity by up to 80 percent. These biases propagate into markup estimates inferred from output elasticities: markups are overestimated by 20 percentage points. Finally, heterogeneity in output elasticities also affects estimated trends in markups: my estimates point to a much more muted markup growth (about half) in the US manufacturing sector than recent estimates.

“Drug Rebates and Formulary Design: Evidence from Statins on Medicare Part D” (with Alex Olssen)

The prices charged for patented, branded pharmaceuticals represent a large, and controversial, component of medical spending in the U.S. In contrast to many countries and many other government programs, drug prices in the Medicare Part D program are determined by privately negotiated rebates between insurance plans and drug manufacturers. How big are these rebates? What would happen to formularies, consumer surplus, and firm profits if the government could increase the rebates of a blockbuster Medicare Part D drug? We estimate a simultaneous model of insurance demand and statin demand for the population of statin users in 2010. Our demand estimates allow us to quantify how insurer profits change under different statin formulary structures. We use these profit functions to estimate the rebates for Crestor and Lipitor, two blockbuster drugs of the time; we estimate rebates of 20% for the dominant drug Lipitor, and 50% for the later entrant Crestor. In counterfactuals, we analyze the effect that different government negotiated statin prices would have on welfare. If the government negotiated a 20 percentage point increase in Lipitor rebates, then statin utility would increase by 2.2%. In contrast, a 20 percentage point increase in Crestor rebates would have almost no effect on statin utility.

“Production Function Estimation with Imperfect Proxies”

The ‘proxy variable’ approach is often used to estimate production functions. This approach is not robust to measurement error, and it relies on some strong assumptions, such as strict monotonicity, scalar productivity, and timing. In this paper, I develop partial identification results that are robust to deviations from these assumptions and measurement errors in inputs. In particular, I show that production function parameters are partially identified by an ‘imperfect proxy’
variable via moment inequalities. Using these moment inequalities, I derive bounds on the parameters and propose an estimator. An empirical application is presented to quantify the informativeness of the identified set.

“Partial Identification of Linear Models Using Homophily in Network Data”
Network endogeneity is often recognized as a threat to the identification of models that involve network data, such as empirical models of peer effects. This paper shows how certain features of the network can, in fact, be used as a source of identification. In particular, I study a linear model where network data can be used to control for unobserved heterogeneity and partially identify the parameters. My method does not rely on a parametric model of network formation. Instead, identification is achieved by assuming that the network satisfies latent homophily — the tendency of individuals to be linked with others who are similar to themselves. I first provide two definitions of homophily: weak and strong. Then, based on these definitions, I characterize the identified sets and show that they are bounded under weak conditions. Finally, to illustrate the method in an empirical setting, I estimate the effects of education on risk preferences and peer effects using social network data from 150 Chinese villages.

“Generic Machine Learning Inference on Heterogeneous Treatment Effects in Randomized Experiments”
(with Victor Chernozhukov, Esther Duflo, Iván Fernández-Val)
We propose strategies to estimate and make inferences on key features of heterogeneous effects in randomized experiments. These features include best linear predictors of heterogeneous effects using machine learning proxies, average effects sorted by impact groups, and average characteristics of most- and least-impacted units. The approach is valid in high-dimensional settings, where the effects are proxied by machine learning methods. We post-process these proxies into the estimates of the key features. Our approach is generic; it can be used in conjunction with penalized methods, deep and shallow neural networks, canonical and new random forests, boosted trees, and ensemble methods. It does not rely on strong assumptions. In particular, we do not require conditions for consistency of the machine learning methods. Estimation and inference rely on repeated data splitting to avoid overfitting and achieve validity. For inference, we take medians of p-values and medians of confidence intervals, resulting from many different data splits, and then adjust their nominal level to guarantee uniform validity. This variational inference method is shown to be uniformly valid and quantifies the uncertainty coming from both parameter estimation and data splitting. We illustrate the use of the approach with two randomized experiments in development on the effects of microcredit and nudges to stimulate immunization demand.

“Semi-Parametric Efficient Policy Learning with Continuous Actions”
(with Vasilis Syrgkanis, Greg Lewis, Victor Chernozhukov)
This paper develops a method for policy optimization with continuous treatments in observational data. Our method can be used for problems that require assignments of continuous variables, such as personalized pricing. It extends prior approaches of policy optimization that considered discrete
policies. Our model is semi-parametric, so the value function takes a known parametric form in the treatment, but it is agnostic on how it depends on the observed covariates. We propose a doubly robust policy estimate for this setting and show that policy optimization based on this estimate is robust to estimation errors of the policy function or the regression model. The results also apply if the model does not satisfy our semi-parametric form, but the performance of a policy is measured in terms of the best projection of the true value function to semi-parametric functional space. A simulation study that considers optimal personalized pricing and costly resource allocation shows that our method works well.

“Financial Sector Volatility Connectedness and Equity Returns”
(with Umut Gokcen, Kamil Yilmaz)
This paper analyzes how financial systemic risk affects the cost of equity for firms that are dependent on the financial sector. We first construct a volatility connectedness index by applying the Diebold and Yilmaz (2014) methodology to daily stock prices of the largest 40 U.S. financial institutions. Then we measure the connectedness beta of non-financial firms—sensitivity of their stock returns to the connectedness index. The estimates show that there is a large and statistically significant difference between the returns of non-financial firms with positive and negative connectedness beta. The four-factor alpha of a strategy that goes long in the bottom decile and short in the top decile of stocks sorted on their connectedness betas is roughly 15% per annum. Based on bivariate portfolio tests and Fama-MacBeth return regressions, abnormal returns are robust to market beta, size, book-to-market ratio, momentum, profitability, asset growth, debt, illiquidity, idiosyncratic volatility, and downside beta. We find, however, that these abnormal returns are driven by small firms. These firms tend to be of low credit quality, which explains their dependence on financial institutions.

“RESEARCH IN PROGRESS”
“A Nash-in-Nash Bargaining Model Over Multiple Prices” (with Alex Olssen)
Nash-in-Nash bargaining is commonly used in empirical work to study markets of bilateral oligopoly. However, current approaches restrict negotiation to a single price, which precludes many strategies that upstream firms use, such as retail price maintenance and quantity discounts. This paper extends the Nash-in-Nash bargaining framework to negotiations over retail and wholesale prices. We analyze this model and show how equilibrium and welfare depend on market structure and the degree of substitutability between differentiated products. We also show that downstream prices and demand are sufficient to identify wholesale prices.

“Machine Learning Inference on Heterogeneous Effects in Panel Data”
(with Victor Chernozhukov, Esther Duflo, and Iván Fernández-Val)
Panel data are useful to incorporate multidimensional unobserved heterogeneity in economic models. We propose strategies to estimate and make inference on key features of heterogeneous effects in panel data using machine learning methods. The approach is valid in high dimensional settings, where the effects are proxied by fixed effect machine learning methods.
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Sc.B., magna cum laude, Physics (with honors) and Economics

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Secondary Fields: Public Finance, Development Economics
TEACHING EXPERIENCE

Mentor, Undergraduate Research Program, MIT (3 students) 2017-18
Kaufman Teaching Certificate Program, MIT 2016
14.41 Public Finance and Public Policy (Undergraduate) 2015
Teaching Assistant to Professor Jonathan Gruber

RELEVANT POSITIONS

S.V. Ciriacy-Wantrup Postdoctoral Fellow, UC Berkeley 2018-20
Research Assistant to Professors Esther Duflo, Michael Greenstone, and Rohini Pande 2011-12
Research Assistant, Council of Economic Advisers 2010-11

FELLOWSHIPS, HONORS, AND AWARDS

Research Grants:
Weiss Family Program Fund 2019
International Growth Centre 2018
George and Obie Shultz Fund, MIT 2018
Abdul Latif Jameel Water and Food Systems Lab, MIT 2017
International Growth Centre 2017
Abdul Latif Jameel Water and Food Systems Lab, MIT 2016
Weiss Family Program Fund 2015
J-PAL Urban Services Initiative 2014

Fellowships and Awards:
S.V. Ciriacy-Wantrup Postdoctoral Fellowship, UC Berkeley 2018-20
Tata Fellowship, MIT Tata Center for Technology & Design 2013-15
Honorable Mention, NSF Graduate Research Fellowship Program 2013
MIT Energy Fellowship, MIT Energy Initiative 2012-13
Honorable Mention, NSF Graduate Research Fellowship Program 2012
Mildred Widgoff Prize for Excellence in Thesis Preparation, Brown University Department of Physics 2010

PROFESSIONAL ACTIVITIES

Referee Services:

Co-organizer, Reading Group in Water Economics, UC Berkeley 2018-20

Invited Presentations:
Stanford (Environmental and Energy Policy Analysis Center) 2019
Occasional Workshop, UC Santa Barbara 2019
Heartland Environmental and Resource Economics Workshop 2019
Agricultural & Applied Economics Association Annual Meeting 2019
AERE Summer Meeting (Sponsored Session) 2019
Tinbergen Institute (Spatial Economics Seminar) 2019
Public Policy Institute of California 2019
Occasional Workshop, UC Santa Barbara (egg-timer) 2018
UC Berkeley (Environmental & Energy Economics Seminar) 2018
NBER Summer Institute, EEE Workshop (egg-timer) 2018
Interdisciplinary Workshop on Sustainable Development (Columbia) 2018
UC Davis Agricultural & Resource Economics 2018
Environmental Defense Fund 2017

**RESEARCH PAPERS**

**“The Scope for Climate Adaptation: Water Scarcity and Irrigated Agriculture in California” (Job Market Paper)**

How much can societies adapt to climate change? I provide evidence on this question by comparing the short-run and long-run effects of water scarcity in irrigated agriculture. In California, local rainfall matters less than surface water supplies, which are allocated to irrigation districts by historical rules. First, I estimate short-run effects using weather-driven fluctuations in water supplies for the same farm in different years. Then, I estimate long-run effects by comparing across the boundaries between neighboring irrigation districts, where otherwise similar farms have long been exposed to different average water supplies. Using high-resolution satellite data on land use, I find that lower water availability reduces crop area and crop revenue (as predicted by crop choices) in both the short run and the long run. There is some evidence of adaptation: land held fallow in the short run is permanently retired in the long run, while farmers invest in higher-value crops on the remaining cropland. However, predicted crop revenue falls by nearly as much in the long run as in the short run, suggesting that adaptation has mitigated few of the revenue effects of water scarcity. Under current policy, technology, and infrastructure, projected future declines in surface water availability are likely to cause meaningful declines in the land area and total output of agriculture in California.

**“Liquid Constrained in California: Estimating the Potential Gains from Water Markets”**

Water markets may help societies adapt to rising water scarcity and variability, but their setup costs can be substantial and their benefits uncertain. I estimate the gains available from strengthening the wholesale surface water market in California, where conveyance infrastructure is well-developed yet transaction volume remains low. To do so, I develop a new empirical framework to analyze welfare in water markets that uses transactions data. First, I recover marginal valuations of water in the presence of unobserved transaction costs, by using particular price comparisons to find the incidence of both known and unknown cost determinants. Second, I estimate demand using yearly water endowments, which have rich variation driven by weather and amplified by historical rules. Then, I combine this demand model with a hydrological network model to simulate counterfactual outcomes. I find that efficient trading across regions and sectors would achieve benefits of only $86 to $278 million per year, without accounting for any environmental costs. These results suggest that promoting large-scale water markets may not achieve large gains without also reforming the policies and institutions that govern local water allocation.
“The Costs of Industrial Water Pollution to Agriculture in India” (current draft single-authored; revisions in progress with Anshuman Tiwari)

Industrial water pollution is high in many developing countries, but researchers and regulators have paid it less attention than air and domestic water pollution. I estimate the costs of industrial water pollution to agriculture in India, focusing on 63 industrial sites identified by the central government as “severely polluted.” I exploit the spatial discontinuity in pollution concentrations that these sites generate along a river. First, I show that these sites do in fact coincide with a large, discontinuous rise in pollutant concentrations in the nearest river. Then, I estimate that agricultural revenues are nine percent lower in districts immediately downstream of polluting sites, relative to districts immediately upstream of the same site in the same year, although confidence intervals exclude zero only when controlling for baseline characteristics. This effect appears to be driven by reduced yields per cropped land area and not factor reallocation. These results suggest that damages to agriculture could represent a major cost of water pollution and warrant further study.

RESEARCH IN PROGRESS

“Measuring Demand for Groundwater Irrigation: Experimental Evidence from Conservation Payments” (with Ariel Zucker)

We measure the price response of demand for groundwater and electricity in irrigated agriculture in Gujarat, India, where both resources are scarce and largely unregulated. To do so, we install meters and introduce a new program of payments for voluntary conservation through a randomized controlled trial. First, we use the price variation introduced by this program to estimate the price elasticity of groundwater demand, a key parameter required for efficient regulation by any means. Then, we evaluate conservation payments as a policy tool in itself. We measure treatment effects on water and energy consumption, as well as spillovers, mechanisms, and economic impacts. We also assess the program’s cost-effectiveness, testing whether there is opportunity for mutual gain between irrigators and electric utilities. This project will provide the first experimental evidence on groundwater pricing and among the first on conservation payments. Pilot evidence confirms that conservation payments are feasible and suggests large effects on water use. Baseline data collection is complete and the intervention is scheduled to begin in 2020.

PUBLICATIONS IN PHYSICS

“Statistics of DNA capture by a solid-state nanopore” (with Mirna Mihovilovic and Derek Stein), Physical Review Letters, 2013.
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DISSERTATION: “Essays in the Macroeconomics of Labor Markets”

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PRIOR EDUCATION
University of Chicago, Becker-Friedman Institute
Visiting Student

University of Cambridge, Pembroke College
B.A. in Economics, First Class

CITIZENSHIP United Kingdom
GENDER Male

FIELDS Primary Fields: Macroeconomics, Labor Economics
Secondary Field: Finance

TEACHING EXPERIENCE 15.447 Global Capital Markets (MBA/MFin)
Teaching Assistant to Professor Jonathan Parker
14.01 Introduction to Macroeconomics (Undergraduate) 2018
Teaching Assistant to Professor James Poterba

**RELEVANT POSITIONS**
- Research assistant for Professors Daron Acemoglu and David Autor 2018
- Research assistant for Professor Emi Nakamura 2016
- Research assistant for Professor Alp Simsek 2016
- PhD Intern in Macroeconomic Research, Goldman Sachs 2016
- Intern in Global Macroeconomics, Aberdeen Asset Management 2012

**FELLOWSHIPS, HONORS, AND AWARDS**
- Grantee, Washington Center for Equitable Growth 2018
- Participant in ECB Forum on Central Banking 2018
- Summer Research Scholarship, Kennedy Trust 2018
- Stanley & Rhoda Fischer Fellowship, MIT 2016
- Castle-Krob International Fellowship, MIT 2015
- University of Cambridge
  - Gladstone Prize, best undergraduate dissertation 2015
  - Adam Smith Prize, top economics undergraduate performance 2015
  - Adam Smith Prize, best economics undergraduate dissertation 2015
- Summer Undergraduate Research Fellowship, Caltech 2014
- Scholar, Pembroke College 2012-2015

**PROFESSIONAL ACTIVITIES**
**Refereeing:** American Economic Review, Econometrica, Review of Financial Studies

**Presentations:** Society for Advancement of Economic Theory 2015, Society for Economic Dynamics 2016, ECB Forum on Central Banking 2018, NBER Summer Institute (Monetary Economics) 2018

**RESEARCH PAPERS**
**“Downward Rigidity in the Wage for New Hires” (Job Market Paper)**
(with Bledi Taska)

If wages are more rigid downward than upward, then unemployment is particularly volatile during recessions. In benchmark models, the wage for new hires is key. We introduce a dataset that tracks the wage for new hires at the “job level”, across successive vacancies posted by the same job title and establishment. We show that the wage for new hires is more rigid downward than upward, in two steps. First, the nominal wage rarely changes at the job level, across successive vacancies posted by the same job title and establishment. We show that the wage for new hires is more rigid downward than upward, in two steps. First, the nominal wage rarely changes at the job level. When wages do change, they infrequently decrease, suggesting a constraint from beneath. Second, when unemployment rises, wages do not fall for new hires—though wages rise quite strongly as unemployment falls. Prior work studies the average wage for new hires. We show average wages cannot detect downward rigidity, due to changing job composition. Finally, we match
a standard labor search model to our estimates, and uncover “state dependent asymmetry” in unemployment dynamics. After contractions, unemployment responds symmetrically to labor demand shocks; after persistent expansions, unemployment is as much as 40% more sensitive to negative than positive shocks.

“The Falling Labor Share Dampens Unemployment Fluctuations”
The labor share fell in the US and worldwide after the 1980s. This paper argues that the falling labor share dampens unemployment fluctuations. First, I study a class of labor search models with capital. The falling labor share lowers the sensitivity of unemployment to labor demand shocks, regardless of whether rising capital or rising rents govern the labor share. Second, I show empirically that low labor shares dampen employment fluctuations. I exploit labor share variation within industries and between regions, to show that low labor share markets are less sensitive to the aggregate business cycle. The result holds in tradable industries—thereby sweeping away industry product demand—and instrumenting for the labor share with state unionization. Third, I test the secular predictions of the model. The model predicts that the falling labor share increases vacancy posting. I document this pattern at the industry-state level, using proprietary data on the near-universe of online vacancies.

“Systemic Risk Shifting in Financial Networks”
(with Matthew Elliott and Co-Pierre Georg)
Revise and resubmit, Journal of Economic Theory
Banks face different but potentially correlated risks from outside the financial system. Financial connections can help hedge these risks, but also create the means by which shocks can propagate. We examine this tradeoff in the context of a new stylized fact we present: German banks are more likely to have financial connections when they face more similar risks—potentially undermining the hedging role of financial connections and contributing to systemic risk. We find that such patterns are socially suboptimal, but can be explained by risk-shifting. Risk-shifting motivates banks to correlate their failures with their counterparties even though it creates systemic risk.

“AI and Jobs: Evidence from Online Vacancies”
(with Daron Acemoglu, David Autor and Pascual Restrepo)
Artificial intelligence (AI) technologies are developing rapidly, yet there is limited evidence on how AI is affecting hiring in job categories most likely to be either substituted or complemented by AI. We study the impact of AI on US hiring from 2010 onwards, using establishment level data on vacancies with detailed occupation information comprising the near-universe of online vacancies in the US. We classify establishments as “AI exposed” — that is, likely to replace workers with AI — based on their detailed skill mix garnered from their job postings 2010. We offer three sets of findings. First, we document rapid growth in AI related vacancies over 2010-2018 that is not limited to the Information Technology sector and is greater in AI-exposed establishments. Second, AI-exposed establishments reduce vacancy postings in occupations that are “at risk” of AI-replacement and increase vacancy postings
in occupations that are not at risk of AI-replacement. These countervailing
effects are essentially fully offsetting: exposed establishments do not
significantly alter total vacancy postings. Finally, we find suggestive evidence
that AI adoption has non-neutral effects on aggregate vacancy postings at the
local labor market level. When an establishment posts more AI vacancies, other
establishments in the same labor market post fewer overall vacancies. These
“spillovers” are confirmed when we apply a novel identification strategy that
leverages the occupation mix in establishments' non-local headquarters.

RESEARCH IN PROGRESS

The Slope of the Phillips Curve: Evidence from US States”
(with Juan Herreño, Emi Nakamura and Jón Steinsson)

“The Labor Share, Superstar Firms and Business Cycles”
(with Christina Patterson)

“National Chains and National Wage Setting”
(with Christina Patterson)
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**TEACHING EXPERIENCE**

14.73: The Challenges of World Poverty (undergraduate)  
Teaching Assistant to Prof. Esther Duflo and Prof. Frank Schilbach  
2016

14.473: Public Policy in Health Economics (graduate)  
Teaching Assistant to Professor Heidi Williams  
2017

14.03: Microeconomic Theory and Public Policy (undergraduate)  
Teaching Assistant to Professor David Autor  
2018

15.S64: Competitive Strategy Bootcamp (short MBA course)  
Teaching Assistant to Professor Pierre Azoulay  
2018

15.S57: Platform Strategy (short MBA course)  
Teaching Assistant to Professor Pierre Azoulay  
2019

14.33: Research and Communication in Economics (undergraduate)  
Teaching Assistant to Professor Sara Ellison  
2019

14.32: Econometrics (undergraduate)  
Teaching Assistant to Professor Joshua Angrist (scheduled)  
2020

**RELEVANT POSITIONS**

Research Assistant to Professor Joshua Angrist (MIT)  
2016-2018

Research Assistant to Professor Heidi Williams (MIT)  
2014-2015

Research Assistant to Professor Joseph Price (BYU)  
2012-2014

**FELLOWSHIPS, HONORS, AND AWARDS**

National Science Foundation Graduate Research Fellowship  
2014-2019

Wheatley Endowed Leadership Scholarship, BYU  
2013-2015

Phi Beta Kappa, BYU  
2013-2014

**PROFESSIONAL ACTIVITIES**

Referee for *American Economic Review: Insights*

**PUBLICATIONS**

“*Inside Job or Deep Impact? Using Extramural Citations to Assess Economic Scholarship,*” with Joshua Angrist, Pierre Azoulay, Glenn Ellison, and Susan Feng Lu. 2018  
Forthcoming at *Journal of Economic Literature*


**RESEARCH PAPERS**

“*Scooped! Estimating Rewards for Priority in Science*” with Carolyn Stein  
(Job Market Paper)  
Abstract: The scientific community assigns credit or “priority” to individuals who publish an important discovery first. We examine the impact of losing a priority race (colloquially known as getting “scooped”) on subsequent publication and career outcomes. To do so, we take advantage of data from structural biology where the nature of the scientific process together with the Protein Data Bank — a repository of standardized research discoveries — enables us to identify priority races and their outcomes. We find that race winners receive more attention than losers, but that these contests are not winner-take-all. Scooped teams are 2.5 percent less likely to publish, are 18 percent less likely to appear in a top-10 journal, and receive 28 percent fewer
citations. As a share of total citations, we estimate that scooped papers receive a credit share of 42 percent. This is larger than the theoretical benchmark of zero percent suggested by classic models of innovation races. We conduct a survey of structural biologists which suggests that active scientists are more pessimistic about the cost of getting scooped than can be justified by the data. Much of the citation effect can be explained by journal placement, suggesting editors and reviewers are key arbiters of academic priority. Getting scooped has only modest effects on academic careers. Finally, we present a simple model of statistical discrimination in academic attention to explain how the priority reward system reinforces inequality in science, and document empirical evidence consistent with our model. On the whole, these estimates inform both theoretical models of innovation races and suggest opportunities to re-evaluate the policies and institutions that affect credit allocation in science.

“Searching for Superstars: Research Risk and Talent Discovery in Astronomy”

Abstract: What is the role of luck in the careers of scientists? Since the production of science is inherently risky, the allocation of resources, promotions, and publications may be based on noisy signals of ability. Therefore, success might be path dependent, such that lucky breaks early in the career are amplified into future recognition and opportunities. I seek to quantify the short- and long-run effects of exogenous project success and failure in the context of academic astronomy. Using weather conditions during telescope viewing sessions, I test whether project-level shocks have a lasting effect on publication and citation rates. I find that idiosyncratic weather quality increases publication and citation rates for novice astronomers but does not affect the productivity of veteran astronomers. Good weather shocks increase the number of future telescope sessions novices are awarded, suggesting that lucky breaks may improve early-career opportunities. However, these positive effects on productivity are transient, lasting about four years before diminishing. Receiving a good weather shock has no detectable effect on long-run productivity or the probability of staying in academia.

Research in Progress

“Competition and Quality in Science” (with Carolyn Stein)

Abstract: We study how competition to publish first and establish priority may impact the quality of scientific research. First, we develop a model where scientists decide how long to work on a given project. Scientists trade off the marginal benefit of higher quality research against the marginal risk of being scooped. More competition encourages scientists to rush and release lower quality work. In particular, our model suggests that the most important (highest potential) projects are executed with the lowest quality. We test our model using project-level data from the Protein Data Bank (PDB), a repository for the structures of large macromolecules. An important feature of the PDB is that it assigns objective measures of project quality. Consistent with our model, we find that projects with the most ex-ante potential are completed with the lowest ex-post quality. We conclude by considering the welfare implications of competition in science when the quality of published findings can vary.
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BSc in Economics 2011

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**TEACHING EXPERIENCE**

- 14.451 Dynamic Optimization Methods (Graduate, MIT)  
  Teaching Assistant to Alp Simsek, Fall  
  2016-19
- 14.54 International Trade (Undergraduate, MIT)  
  Teaching Assistant to Arnaud Costinot, Fall  
  2018-19
- 14.02 Principles of Macroeconomics (Undergraduate, MIT)  
  Teaching Assistant to James Poterba, Spring  
  2018
- 14.581 International Trade (Graduate, MIT)  
  Teaching Assistant to Arnaud Costinot and David Atkin, Fall  
  2016
- Organizational Economics (MBA, Insper)  
  Teaching Assistant to João Manoel Pinho de Mello  
  2014
- Math Camp (Graduate, PUC-Rio)  
  Teaching Assistant to Alex Castro, Summer  
  2014
- Microeconomics II (Graduate, PUC-Rio)  
  Teaching Assistant to Vinicius Carrasco, Fall  
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**RELEVANT POSITIONS**

- IMF Fund Internship Program  
  Research Assistant to Professor Robert M. Townsend  
  2015-17

**FELLOWSHIPS, HONORS, AND AWARDS**

- Macro Financial Modelling Dissertation Fellowship, BFI  
  2018
- Emma Kastle Crob Fellowship, MIT  
  2015-16
- Graduate Fellowship, Department of Economics, MIT  
  2014-15
- FAPERJ Fellowship, MSc in Economics, PUC-Rio  
  2013-14
- CNPq Scholarship, MSc in Economics, PUC-Rio  
  2012-13
- First place in the National Graduate Admission Exam (ANPEC)  
  2012

**CONFERENCES AND SEMINAR PRESENTATIONS**


**RESEARCH PAPERS**

- “Bank Competition, Cost of Credit and Economic Activity: Evidence from Brazil” (Job Market Paper)
  (joint with Bernardus Van Doornik)
  We use heterogeneous exposure to large bank mergers to estimate the effect of bank competition on both financial and real variables in local Brazilian markets. Using detailed administrative data on loans and firms, we employ a difference-in-differences empirical strategy to identify the causal effect of bank competition. Following M&A episodes, spreads increase and there is persistently less lending in exposed markets. We also find that bank competition has real effects: a 1% increase in spreads leads to a 0.2% decline in employment. We develop a tractable model of heterogeneous firms and concentration in the banking sector. In our model, the semi-elasticity of credit to lending rates is a sufficient statistic for the effect of concentration on credit and output. We estimate this elasticity and show that the observed effects in the data and predicted by the model are consistent. Among other counterfactuals, we show that if the Brazilian lending spread were to fall to the world level, output would
increase by approximately 5%.

“Optimal Contracting and Spatial Competition among Financial Service Providers”
(joint with Robert Townsend and Victor Zhorin)

We present a contract-based model of industrial organization for markets characterized by information and other frictions (Moral Hazard, Adverse Selection, Limited Commitment etc.) and different market structures (Monopoly, Oligopoly, Competition), the latter driven by spatial costs, idiosyncratic preferences, and number of financial service providers. Our methods work in a variety of settings and links to recent literature: changes in the number of bank branches in the US or China, experiments varying intermediation in Kenya, and competition of local relationship banks with less-informed national banks. Model simulations show that interpreting reduced form evidence in a setting with interaction of contracting frictions and market structure can be misleading. Therefore, we derive a likelihood estimator for the structural parameters that determine contracting frictions and market structure and apply this to the Townsend Thai data on entrepreneurs and bank locations. Reducing spatial costs by 50% is equivalent to increasing consumption by 4.85%, which we compare to other policies. We also establish methods that do not need to specify both frictions and market structure depending on the counterfactual of interest and available data.

“Lending Rate Caps in Emerging Markets: Good for Growth?”
(joint with Damiano Sandri)

In many emerging markets, governments try to increase credit access and stimulate economic growth by imposing caps on lending rates. We analyze these policies by extending workhorse models with financial frictions to include a banking sector with market power. Caps are beneficial as they reduce credit costs but are also harmful as they crowd out risky borrowers which can access credit only at high interest rates, and thus have an ambiguous effect in current output and capital accumulation. To prevent crowding out of risky borrowers, in some emerging markets banks are permitted to charge uncapped rates on a share of their loans. This allows banks to service risky borrowers but generates capital misallocation since banks provide capped loans to less productive borrowers, while charging higher rates to more productive ones. In a calibrated version of the model, we show that the optimal policy to maximize steady state welfare involves relatively high caps on a large share of bank loans. The optimal policy decreases output today but increases capital accumulation through a lower cost of credit and thus output in the future. The model also reveals that caps may have a perverse effect of reinforcing market power in the banking sector since they may force less profitable banks to exit the market. Thanks to tractable aggregation properties, the framework can be used to analyze a broad set of alternative credit policies.
Despite evidence that lack of competition in the banking sector is detrimental for the economy, there is a limited understanding of the role of the public banks in affecting access to credit and economic activity. In this paper, we use a large-scale change in lending policy from public banks in Brazil to understand their role. Starting in March 2012, the Brazilian government attempted to use state-owned banks to induce competition in the financial sector. Specifically, public banks unexpectedly increased their credit levels by 20% and reduced interest rates by 7 percentage points when compared with private banks. Using detailed administrative data on firms and market level data on lending, we employ a difference-in-differences empirical strategy to identify the causal effect of the changes in lending policy by public banks by comparing banking markets with heterogeneous dependence of public banks. We find a large increase in lending consistent with the objective of the policy, but no effect on employment or wages, which indicates a limited role for public banks in affecting economic activity.
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### Doctoral Studies
Massachusetts Institute of Technology (MIT)  
PhD, Economics, Expected completion June 2020  
Dissertation: “Essays on Electricity and Matching Markets”

### Dissertation Committee and References
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### Prior Education
Bilkent University  
Visiting Student in Economics Department  
2017-2018

Bilkent University  
B.A in Economics, Minor in Mathematics  
Graduated as Salutatorian  
2014

### Citizenship
Turkish

### Gender:
Male

### Fields
Primary Fields: Industrial Organization, Energy and Environmental Economics  
Secondary Fields: Market Design
**TEACHING EXPERIENCE**

- **ECON 204 Microeconomics II**
  (Bilkent University, Undergraduate Level)
  TA to Professor Kevin Hasker 2018

- **ECON 301 Econometrics**
  (Bilkent University, Undergraduate Level)
  TA to Professor Cavit Pakel 2017

- **14.04 Intermediate Microeconomics**
  (MIT, Undergraduate Level)
  TA to Professor Juuso Toikka 2017

- **14.14 Strategy and Information**
  (MIT, Undergraduate Level)
  TA to Professor Mihai Manea 2017

- **ECON 516 Mathematics for Economists II**
  (Bilkent University, Graduate Level)
  TA to Professor Semih Koray 2014

- **ECON 439 Game Theory**
  (Bilkent University, Undergraduate Level)
  TA to Professor Kevin Hasker 2012-2013

- **ECON 442 Application of Graph Theory to Economics**
  (Bilkent University, Undergraduate Level)
  TA to Professor Semih Koray 2012

**RELEVANT POSITIONS**

- Research Assistant to Professor Nikhil Agarwal 2014-2017
- Research Assistant to Bengt Holmström 2016

**FELLOWSHIPS, HONORS, AND AWARDS**

- ExxonMobil-MIT Energy Fellow 2018-2020
- Fulbright Fellowship 2014-2016
- Bilkent University High Merit Scholarship 2009-2014
- Ranked 2nd nationwide in Turkish University Entrance Exam 2009

**PROFESSIONAL ACTIVITIES**

- Referee for *Journal of Economics & Management Strategy*

**PUBLICATIONS**


**RESEARCH PAPERS**

“Economics of Grid-Scale Energy Storage” (Job Market Paper)

The transition to a low carbon electricity system is likely to require grid-scale energy storage to smooth the variability and intermittency of renewable energy. I investigate whether private incentives for operating and investing in grid-scale energy storage are optimal, and the need for policies that complement investments in renewables with encouraging energy storage. In a wholesale electricity market, energy storage systems generate profit by arbitraging inter-temporal electricity price differences. In addition, storage induces non-pecuniary externalities due to production efficiency and carbon emissions. I build a new dynamic equilibrium framework to quantify these effects of grid-scale energy storage and apply it to study the South Australian Electricity Market. This equilibrium framework computes a supply function equilibrium using estimated best responses from conventional sources to observed variation in the residual demand volatility. Accounting for the storage's effect on equilibrium prices is quantitatively important -- previous methods that ignore this channel overestimate the profitability of operating a storage unit. The first set of results shows that although entering the electricity market is not profitable for privately operated storage, such entry would increase consumer surplus, total welfare and reduce emission. A storage operator that minimizes the cost of acquiring electricity could further improve consumer surplus by twice as much. Importantly, a competitive storage market could not achieve this outcome because other power plants distort prices. These results argue for a capacity market to compensate for a private firm for investing in storage. The second set of results shows that at moderate levels of renewable power introducing grid-scale storage to the system reduces renewable generators' revenue by decreasing average prices. For high levels of renewable generation capacity, storage increases the return to renewable production and decreases CO2 emissions by preventing curtailment during low demand periods.

**RESEARCH IN PROGRESS**

“Leveling the Playing Field: Electricity Market Design with Energy Storage” (joint with Jing Li).

Ambitious penetration targets of renewable but intermittent electricity generation sources, such as solar and wind, present challenges to reliability and resilience of power systems. Energy storage can facilitate the integration of these resources. This paper studies how electricity market regulations can be updated to allow for fair and efficient energy storage entry and participation by the full range of energy storage technologies. We specify a model of electricity generation and storage competition in wholesale electricity markets with locational marginal prices (LMPs). In the model, a storage operator maximizes profit (revenue stacking) by participating in energy, ancillary services, and capacity markets. Our model allows for different technologies of energy storage to express their comparative advantage arising from different technical specifications such as fixed costs, operating costs, transmission requirements,
roundtrip efficiency, power and energy capacity. We build on Karaduman (2019) to endogenize the impact of storage participation on prices in wholesale electricity markets. We estimate our model on data from PJM in the United States, where we first infer transmission constraints by combining several data resources on LMPs, location and dispatch of generators. From our estimates and model, we compute optimal locational capacity payments for different storage technologies.

“Are dynamic matching platforms natural monopolies?” (joint with Arda Gitmez).

In this project, we investigate the inclination of dynamic matching platforms to constitute natural monopolies. We present a model of dynamic matching market with multiple platforms, where agents stochastically arrive and leave. Agents’ preferences are two-dimensional, with common preferences over time and heterogeneous tastes over the matching outcome. Each matching platform picks a matching policy, which endogenously generates gains from economies of scale. Agents choose a platform or platforms to participate at a cost. We argue that, given a level of participation cost, a natural monopoly occurs if and only if the preferences over time is salient compared to heterogeneous tastes. Moreover, an equilibrium with multiple platforms is sustained if participation costs are sufficiently high or if the tastes are sufficiently diverse. The results are suggestive of policy-relevant differences between several types of dynamic matching platforms, including dating and ride-sharing platforms.
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PRIOR EDUCATION
California Institute of Technology
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2010-2014

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FIELDS
Primary Fields: Public Economics, Political Economy

Secondary Fields: Law and Economics, Health Economics, Econometrics

TEACHING EXPERIENCE
Applied Econometrics (Grad 14.387), Teaching Assistant, MIT
for Professors Joshua Angrist and Victor Chernozhukov
Spring 2018

Intro to Microeconomics (Undergrad 14.01), Head TA, MIT
for Professor Jon Gruber
Fall 2017

Intro to Microeconomics (Undergrad 14.01), Section Leader, MIT
for Professor Casey Rothschild
2016 & 2019
Intro to Micro (Undergrad Ec10a), Section Leader, Harvard for Professor N. Gregory Mankiw Fall 2016

**RELEVANT POSITIONS**

- Ford Foundation Graduate Dissertation Fellow 2019-2020
- Aging and Health Training Program Participant, NBER 2019-2020
- Research Assistant to Ben Olken, MIT 2015-2016
- Research Assistant to Dustin Tingley, Harvard 2012-2013
- Research Assistant to Jean Ensminger, Caltech 2011

**FELLOWSHIPS, HONORS, AND AWARDS**

**Fellowsips**

- Ford Foundation Dissertation Fellowship 2019-2020
- National Academies of Science, Engineering and Medicine
- NBER Aging and Health Pre-Doctoral Fellowship (Declined) 2019
- Shultz Fund, MIT Economics: Financial Support for New Data 2018, 2019
- Clyo F. Castle Graduate Fellowship, MIT 2015-2016
- Diversity Fellowship, MIT Dean for Graduate Education 2014-2015
- Mellon Mays Undergraduate Fellow, Caltech 2014
- Stamps Leadership Scholarship, Caltech 2010-2014

**Awards**

- Levitan Teaching Award for Best Teaching Assistant 2017
- MIT's School of Humanities, Arts, and Social Sciences
- Harvard University Distinction in Teaching Award 2016
- The Gosnell Prize for Excellence in Political Methodology 2014
- Society for Political Methodology
  - Awarded for Roberts et al, AJPS 2014
- David M. Grether Prize in Social Science, Caltech 2014

**PROFESSIONAL ACTIVITIES**

- Graduate Student Council Rep. to the MIT Committee on Race and Diversity 2015-17 and 2019-20
- Contributing Author, Global Anticorruption Blog (Harvard Law) 2017-2019
- Contributing Writer, JPAL White Paper (Governance Initiative) 2016

**JOB MARKET PAPER**

“Whistleblowers, The False Claims Act, and the Behavior of Health Care Providers” (Job Market Paper)

The False Claims Act compensates whistleblowers who successfully sue healthcare providers for misreporting claims for payment to the Medicare program. This law combines rewards for whistleblowers' private information with a private enforcement mechanism. In this paper, I study the effects of False Claims Act lawsuits, with two aims. First, I measure the deterrence effects of successful whistleblowing lawsuits. Using a synthetic control design for case studies of large settlements, I find that the deterrence effects from $1.9 billion in settlements are more than $18 billion over 5 years. Second, I examine how whistleblowing impacts care decisions by providers. I conduct a case study on a
spinal procedure for osteoporotic patients that was affected by whistleblowing. In this example, whistleblowing redirected care towards those patients expected to benefit from the procedure while also causing a substitution from expensive inpatient treatment to more cost-effective outpatient treatment.

**PUBLICATIONS**


We use Maimonides Rule as an instrument for class size in large Israeli samples from 2002–2011. In contrast with Angrist and Lavy (1999), newer estimates show no evidence of class size effects. The new data also reveal enrollment manipulation near Maimonides cutoffs. A modified rule that uses birthdays to impute enrollment circumvents manipulation while still generating precisely estimated zeros. In both old and new data, Maimonides Rule is unrelated to socioeconomic characteristics conditional on a few controls. Enrollment manipulation therefore appears to be innocuous. We briefly discuss possible explanations for the change in class size effects since the early 1990s.


Collection and especially analysis of open-ended survey responses are relatively rare in the discipline and when conducted are almost exclusively done through human coding. We present an alternative, semi-automated approach, the structural topic model (STM) (Roberts, Stewart, and Airoldi 2013; Roberts et al. 2013), that draws on recent developments in machine learning-based analysis of textual data. A crucial contribution of the method is that it incorporates information about the document, such as the author’s gender, political affiliation, and treatment assignment (if an experimental study). This article focuses on how the STM is helpful for survey researchers and experimentalists. The STM makes analyzing open-ended responses easier, more revealing, and capable of being used to estimate treatment effects. We illustrate these innovations with analysis of text from surveys and experiments.


This paper introduces to the learning analytics community the Structural Topic Model, an approach to language processing that can 1) find syntactic patterns with semantic meaning in unstructured text, 2) identify variation in those patterns across covariates, and 3) uncover archetypal texts that exemplify the documents within a topical pattern. We show examples of computationally aided discovery and reading in three MOOC settings: mapping students’ self-reported motivations, identifying themes in discussion forums, and uncovering patterns of feedback in course evaluations.
“Measuring Strategic Data Manipulation: Evidence from a World Bank Project” (with Jean Ensminger)

We develop new statistical tests to uncover strategic data manipulation, and we apply these methods to a World Bank project in Kenya. Data produced by humans follow different patterns than naturally occurring data, which motivates an analysis of digit distributions. These new tests unmask profitable data fabrication and suggest efforts to subvert detection. We find evidence consistent with higher levels of fraud in poorly monitored sectors and in a Kenyan election year when graft also had political value. These methods are validated with results from a forensic audit of the same project, which found extensive levels of suspected fraudulent transactions.

“Federally Mandated Audits and City Finance: A Dynamic Regression Discontinuity Design”

Federal rules mandate that cities undergo an A-133 single audit if they receive more than a threshold amount in federal awards in the course of a fiscal year. For cities with low federal awards, this threshold introduces quasi-random auditing for each fiscal year. I employ a dynamic regression discontinuity (RD) design to examine the effects of these audits on California cities from 2007 to 2015, when the threshold was $500,000. This analysis extends existing dynamic RD frameworks to work with fuzzy regression discontinuities as modeled by instrumental variables. I show evidence that audits create administrative burden, both to undergo the audit process and to comply with audit findings, as measured by number of administrators and by spending on governmental salaries. However, audits do not produce substantive effects on non-salary city financial outcomes, indicating that federal audits may be unnecessarily costly for small city governments.

“State False Claims Acts and Whistleblower Lawsuits”

State level False Claims Act laws allow whistleblowers to sue on behalf of states for money misappropriated from state programs. I study the effect of these laws on whistleblower lawsuit filing and case outcomes. These state laws provide marginal compensation to whistleblowers suing under the federal False Claims Act, particularly for Medicaid-related lawsuits that relate to both state and federal funding. Variation in the timing of state laws motivates a difference-in-difference design. I find that state laws modestly increase the number of healthcare-related whistleblowing lawsuits, with these effects concentrated among states with large Medicaid programs. The increase in case volume does not disproportionately produce dismissed cases, indicating that the marginal cases are not of lower quality and that increased whistleblower compensation may be an effective way of producing additional valuable enforcement.
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RELEVANT POSITIONS
Interim Executive Director
UChicago Energy & Environment Lab
2017-2018

Postdoctoral Scholar
UChicago Energy & Environment Lab. Supervisor: Michael Greenstone
2016-present

PRIOR EDUCATION
Bocconi University, Italy
M.Sc. 110/100 cum laude in Economics and Social Sciences
2010

Bocconi University, Italy
B.A. 110/100 cum laude in Economics and Social Sciences
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CITIZENSHIP
Italian

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LANGUAGES
English (fluent), Italian (native), German (fluent)
FIELDS

Primary Fields: Environmental Economics, Health Economics

Secondary Fields: Labor Economics, Urban Economics

TEACHING EXPERIENCE

Data Analysis for Social Scientists 2016
Research and Communication in Economics: Topics, Methods, and Implementation 2016

FELLOWSHIPS, HONORS, AND AWARDS

BFI Data Acquisition Grant: “Using Satellite Data to Track and Regulate Oil and Gas Methane Emissions in Colorado” with Thomas Covert, Michael Greenstone, Olga Rostapshova 2019


LJAF: “Automated Enforcement of Outdoor Watering Restrictions” with Oliver Browne, Michael Greenstone 2018

HUD: “National Evaluation of the Housing and Neighborhood Impact of the HUD Lead-Based Paint Hazard Control Program” with Steve Billings, Michael Greenstone, Kevin Schnepel 2018


George and Obie Shultz Fund grants 2015
Bonaldo Stringher Fellowship, Bank of Italy 2013
Giovanna Crivelli Fellowship, Unicredit Group 2011
Roberto Franceschi Prize for outstanding research thesis 2010
Merit Award Fellowship, Bocconi University 2008

PROFESSIONAL ACTIVITIES


Talks: TWEEDS, Harvard School of Public Health, Bocconi University, University of Bologna, Marco Fanno Workshop, AERE, ASHEcon, NBER, Indiana University, AFE, Tufts University, RAND 2019

H2D2, ASHEcon, APPAM, Northeastern University, ASSA 2018

Federal Reserve Board of Governors, NBER, Upjohn Institute 2016

EIEF; XVI EU Conference, Fondazione Rodolfo De Benedetti 2013
“Hassles and Environmental Health Screenings: Evidence from Lead Tests in Illinois” (Job Market Paper)

Lead paint, a harmful environmental hazard, can still be found in millions of homes in the United States. Due to high inspection and clean-up costs, prevention programs target intervention to the relatively few homes where small children test positive for lead poisoning. Because children have to visit a doctor to get tested, only households willing to undergo this hassle self-select into screening. Is self-selection an effective targeting mechanism? I study screening take-up by analyzing geocoded 2001-2016 lead screening data on 2 million Illinois children. My empirical strategy exploits variation in travel costs due to healthcare providers' openings and closings. I find that travel costs reduce screening among low- and high-risk households alike, without improving targeting. Consistent with low poisoning rates, high-risk households are only willing to pay $4-29 more than low-risk households for screening. Despite poor targeting, screening incentives may be cost-effective because of the externalities of lead exposure.

“The Price and Allocation Effects of Targeted Mandates: Evidence from Lead Hazards” (R&R Journal of Urban Economics)

Several states require owners to mitigate lead hazards in old houses with children present. I estimate the mandates’ effects on housing markets. My empirical strategy exploits differences by state, year, and housing vintage. The mandates decrease the prices of old houses by 7.1 percent, acting as a large tax on owners. Moreover, families with children become 14.6 percent less likely to live in old houses. Increases in rents for family-friendly houses suggest that the mandates have important distributional consequences. These findings are relevant for evaluating similar mandates such as healthy home standards.

“Enforcement and Deterrence with Certain Detection: An Experiment in Water Conservation Policy” with Oliver Browne, Michael Greenstone, Olga Rostapshova

New technologies are poised to transform regulatory enforcement by automating costly inspections and driving violation detection rates to 100%. We conduct a randomized field experiment to evaluate the adoption of smart meters for enforcing outdoor water-use regulations in a major US city facing water shortage. We randomize 88,905 households into 12 groups varying enforcement methods (automated or visual inspection) and fine levels. Automated enforcement decreases water use by 3% and violations by 17%. However, due to imperfect deterrence, fines increase by 13,800% and customer service calls increase by 545%, leading to backlash that might make maximum enforcement politically untenable.

“Estimating Health Damages from Lead Pipe Disturbances: Evidence from Chicago” with Jennifer Heissel

Water utilities in the United States lose substantial water due to leaks in old water infrastructure. Lead in old service lines that connect homes to water mains may contaminate drinking water. One potential aggravating factor is construction on mains, which shakes the service lines and may remove the protective coating formed by natural sediments. We exploit over 2,500 water main replacements in
Chicago and a unique combination of geocoded data sources to estimate the effects of pipe maintenance on drinking water quality and children’s blood levels. By comparing tests in homes in the same neighborhood but at different distances from replaced mains before and after replacement, we find no evidence that water main replacement affects water quality or children’s lead levels.

The threshold defining elevated blood lead levels (EBLLs) has decreased over time. What are the consequences for optimal lead screening policy? We link birth records from 2.37 Illinois children to 4.19 million lead testing records and data on housing age, industrial emissions, and roads. We use multinomial logistic regression to determine predictors of EBLL at different thresholds, controlling for zip code random effects. While pre-1930 housing is associated with over 2-fold increased risk of EBLL at all thresholds, housing built in 1951-1978 is only associated with increased risk of EBLL at the 5μg/dL threshold. These findings suggest screening guidelines may need updating with the new threshold.

SELECTED RESEARCH IN PROGRESS

“On Peer Effects and Pollution: Does Exposure to Lead Affect Everyone in the Classroom?” with Claudia Persico, Sandra Spirovska
Lead harms children’s cognitive development and behavior. We know substantially less about how one child’s lead exposure might affect that child’s peers in the classroom. We examine this overlooked social cost of lead exposure: the externality of lead exposure on peers’ achievement and behavior in school. We estimate the negative spillovers caused by children with elevated blood lead levels (BLLs) using a novel dataset that links children’s BLLs to education data from public schools in North Carolina. By comparing siblings in the same school but with observably different peer cohorts, we also contribute to the peer effects literature by presenting a novel way of estimating the effects of disruptive and low-achieving peers.

“Using Remote Sensing to Reduce Vehicle Emissions in California” with Fiona Burlig, Michael Greenstone, Olga Rostapshova
Particulate matter (PM) air pollution presents a substantial threat to human health. The transportation sector, particularly the heavy duty trucking industry, is a major contributor to PM. Yet, enforcing vehicle emissions regulations has proven prohibitively costly. We use new remote sensing technology to detect high emitters at greatly reduced cost. We leverage these data in a randomized trial to determine the impact of remote monitoring on regulatory compliance. Partnering with CARB, we randomly assign high-emitting trucks in California to receive letters that (1) inform fleet owners their vehicle is likely in violation of emissions standards, and (2) specify a penalty for failing to comply.
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Massachusetts Institute of Technology (MIT)
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PRIOR EDUCATION
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BS, Mathematics

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Secondary Fields: Finance
14.462 Advanced Macroeconomics II (Graduate) 2018-19
Teaching Assistant to Professor George-Marios Angeletos and Ricardo Caballero (Evaluation: 7.0/7.0, 2018; 6.5/7.0, 2019)

Fellowships, Honors, and Awards

- Alfred P. Sloan Foundation Pre-doctoral Fellowship in Behavioral Macroeconomics, awarded through the NBER 2019
- WFA Cubist Systematic Strategies PhD Candidate Award for Outstanding Research 2017
- Gregory K. Palm Fellow 2016
- George and Obie Shultz Fund 2015-17
- MIT Presidential Fellow 2015
- Phi Beta Kappa 2015

Referee Experiences


Conference Presentations

- 2019: AEA (Atlanta), St. Louis Fed
- 2018: AEA (Philadelphia), D-TEA, Barcelona GSE, SED (Mexico City), NBER Summer Institute, Bank of Canada (discussant)
- 2017: AEA (Chicago), Cowles Foundation (Macroeconomics), SED (Edinburgh), ECB, Banque de France
- 2016: SED (Toulouse), Econometric Society (Philadelphia, Edinburgh)

Publications


How does the economy respond to news about future policies or future fundamentals? Standard practice assumes that agents have common knowledge of such news and face no uncertainty about how others will respond. Relaxing this assumption attenuates the general-equilibrium effects of news and rationalizes a form of myopia at the aggregate level. We establish these insights within a class of games which nests, but is not limited to, the New Keynesian model. Our results help resolve the forward-guidance puzzle, offer a rationale for the front-loading of fiscal stimuli, and illustrate more broadly the fragility of predictions that rest on long series of forward-looking feedback loops.


How do low interest rates affect investor behavior? We demonstrate that individuals “reach for yield,” that is, have a greater appetite for risk-taking when interest rates are low. Using randomized investment experiments holding fixed risk premiums and risks, we show low interest rates lead to significantly
higher allocations to risky assets among diverse populations. The behavior is not easily explained by conventional portfolio choice theory or institutional frictions. We then propose and provide evidence of mechanisms related to investor psychology, including reference dependence and salience. We also present results using observational data on household investment decisions.


This chapter studies how incomplete information helps accommodate frictions in coordination, leading to novel insights on the joint determination of expectations and macroeconomic outcomes. We review and synthesize recent work on global games, beauty contests, and their applications. We elaborate on the distinct effects of strategic uncertainty relative to fundamental uncertainty. We demonstrate the potential fragility of workhorse macroeconomic models to relaxations of common knowledge; the possibility of operationalizing the notions of “coordination failure” and “animal spirits” in a manner that unifies unique- and multiple-equilibrium models; and the ability of incomplete information to offer a parsimonious explanation of important empirical regularities. We provide a general treatment of these ideas, as well as specific applications in the context of business cycles, financial crises, and asset pricing.

**RESEARCH PAPERS**

“Consumption with Imperfect Perception of Wealth” (Job Market Paper)

Consumers have difficulty tracking their total wealth, and keeping wealth at top of their mind when making consumption and saving decisions. In this paper, I show how this imperfect perception of wealth can explain several key deviations of consumption behavior from the permanent income hypothesis, including: excess sensitivity to current income, smaller MPCs out of wealth than out of current income, and excess discounting about future income. My approach provides a behavioral alternative to canonical liquidity-constraint-based theory: it can explain the empirical evidence on high-liquidity consumers' deviations from the permanent income hypothesis. I further provide an interpretation of the model in which the consumer has separate mental accounts for her current income and her wealth. Thus, the consumer exhibits behavior similar to a two-asset model, in a one-asset context without borrowing constraints. The friction can be quantitatively important in explaining MPCs, and has substantive macro implications for monetary and redistributive policy. Methodologically, the paper develops a tractable method for incorporating imperfect perception of the endogenous state into an otherwise standard Markov decision problem.


I develop an approach, which I term narrow thinking, to break the decision maker's ability to perfectly coordinate her multiple decisions. For a narrow
thinker, different decisions are based on different, non-nested, information. The narrow thinker then makes each decision with an imperfect understanding of the others. Formally, it is as if the decision-maker is a collection of multiple selves playing an incomplete-information game. The friction effectively attenuates the degree of interaction across decisions and can translate into either over- or under-reaction depending on the environment. Narrow thinking leads to a violation of the fungibility principle and a smooth model of mental accounting behavior. Narrow thinking also reconciles other seemingly disparate phenomena in a unified framework, such as excess smoothness to taste shocks, the small wage elasticity of daily labor supply, and the label effect. Finally, I study an endogenous narrow thinking problem: the decision maker chooses optimally what information each decision is based upon, subject to a cognitive constraint.

“Anatomy of Corporate Borrowing Constraints” (with Yueran Ma)
Macro-finance analyses commonly link firms’ borrowing constraints to the liquidation value of physical assets. For US non-financial firms, we show that 20% of debt by value is based on such assets (“asset-based lending” in creditor parlance), whereas 80% is based predominantly on cash flows from firms’ operations (“cash flow-based lending”). A standard borrowing constraint restricts total debt as a function of cash flows measured using operating earnings (“earnings-based borrowing constraints”). These features shape firm outcomes on the margin: first, cash flows in the form of operating earnings can directly relax borrowing constraints; second, firms are less vulnerable to collateral damage from asset price declines, and fire sale amplification may be mitigated. Taken together, our findings point to new venues for modeling firms’ borrowing constraints in macro-finance studies.

Why can a negative shock to consumer spending trigger a recession? Our theory centers on an informational or a behavioral friction that plays a dual role. First, it lets the aggregate supply of today’s goods increase with their relative price. Second, it gives rise to a feedback chain between outcomes and beliefs: as output and real returns fall, consumers and firms become pessimistic about the future, which in turn feeds into a further drop in aggregate spending and output, a further drop in confidence, and so on. The first element represents a non-monetary version of Lucas (1972). The second introduces a novel propagation and amplification mechanism, which can be interpreted as a “confidence multiplier.”

“Dampening General Equilibrium,” (with George-Marios Angeletos)
We formalize the notion that GE adjustment is weak, or that it takes time, by modifying an elementary Walrasian economy in two alternative manners. In one, we maintain rational expectations but remove common knowledge of aggregate shocks and accommodate higher-order uncertainty. In the other, we replace Rational Expectations Equilibrium with solution concepts that mimic
Tâtonnement or Cobweb dynamics, Level-k Thinking, and Cognitive Discounting. We show how these modifications amount to attenuating GE feedbacks and explain why they, contrary to pure noise, can generate either under- or over-reaction in aggregate outcomes.

RESEARCH IN PROGRESS

“A Smooth Taylor Principle” (with George-Marios Angeletos)

“Cash Flow Based Lending and Firm Dynamics” (with Zhen Huo and Yueran Ma)
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DOCTORAL STUDIES
Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected Completion June 2020
DISSERTATION: “Essays on Empowerment and Employment of Women in India”

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Summa Cum Laude

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FIELDS
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Secondary Field: Behavioral Economics
TEACHING EXPERIENCE

MIT 14.13: Behavioral Economics (Undergraduate) 2017
Teaching Assistant for Frank Schilbach

Duke 205: Intermediate Microeconomics II (Undergraduate) 2012 - 2014
Teaching Assistant for Rachel Kranton, Curtis Taylor, and Bahar Leventoglu

RELEVANT POSITIONS

Research Assistant for Esther Duflo and Abhijit Banerjee 2018 - 2019
Research Assistant for Frank Schilbach 2016
Research Assistant for Esther Duflo and Victor Chernozhukov 2015 - 2016
Research Assistant for Esther Duflo 2015

FELLOWSHIPS, HONORS, AND AWARDS

J-PAL Post-Primary Education Initiative Grant (with Namrata Kala) 2019
George and Obie Shultz Fund Grant 2018
Wellspring Philanthropic Fund Grant 2018
J-PAL Project Development Funds Grant 2017
George and Obie Shultz Fund Grant 2017
Weiss Family Fund Grant 2017
J-PAL Fellowship 2016 - 2017
Weiss Family Fund Grant (with Matt Lowe) 2016

PROFESSIONAL ACTIVITIES


Presentations:
Weiss Fund Conference, Harvard University 2019
NEUDC, Northwestern University 2019
NEUDC, Cornell University 2018

RESEARCH PAPERS

India's female labor force participation rate is among the lowest in the world. This paper shows that self-efficacy, a central concept in psychology that refers to beliefs in own ability to attain desired outcomes, can help explain this phenomenon. I outline a model in which women's low self-efficacy constrains their employment and is self-reinforcing, and then test the model using a two-step experiment. In the model, low self-efficacy creates a vicious cycle: it keeps women from trying to work, which keeps them from learning whether they could. Even if they try, low self-efficacy can make women less likely to attribute positive outcomes to their own merit, further constraining self-efficacy. My experiment provides women an intervention in generalized self-efficacy (GSE). I cross-randomize an intervention to reduce family members' opposition to women's employment, a key external constraint to women's work. I then randomize job offers amongst those who sign up for a local job.
There are four main findings. First, I document gains in women's GSE from the GSE intervention. Second, the GSE intervention increases women's employment. Third, reducing external constraints raises employment, but there are no gains from combining the two interventions. Fourth, receiving a job offer raises GSE, but only for those assigned GSE treatment. Taken together, my results suggest that intervening in women's GSE when employment opportunities are available can spark a virtuous cycle.

“Experimental Evidence on the Effects of Women’s Employment.”
A standard prediction of the household literature is that women's employment should increase women's intra-household bargaining power. This paper provides the first experimental tests of this prediction. The experiment is set in an area of rural India where women's employment is low and where women's family members typically decide whether women work. My intervention is a video promoting a women's employment opportunity that was designed to address family members' key objections to women working. I inform both treated and control family members about the opportunity but only show the promotion to treated family members. The promotion led to large increases in women's employment and is unlikely to have affected other family outcomes through channels aside from women's employment; I interpret effects of the promotion on these outcomes as effects of women's employment. I find employment enables women to make more decisions independently and without their husbands' knowledge. However, it does not increase their bargaining power in joint decisions. My results are inconsistent with the standard collective model of the household and more aligned with a model in which spouses do not fully pool their incomes.

We outline a model of household decision-making that has support in recent empirical research and present results from an experiment that tests it. The key feature of the model is that households choose whether or not to bargain. Bargaining is costly, and information about the household's choice set may be asymmetric. In this model, spouses may withhold information to manipulate the choice set and may avoid bargaining to prevent certain outcomes from being realized. We test the model in the context of female labor supply in India. Spousal preferences are misaligned: wives are significantly more supportive of women's employment than their husbands. The model predicts spouses may withhold information or avoid bargaining to manipulate decisions about female labor supply. We experimentally vary enforcement of common knowledge and enforcement of bargaining. We randomize whether husbands or wives are given information about a women's job opportunity and an enrollment ticket. We cross-randomize whether non-targeted spouses are not informed, informed separately, or informed at the same time as their targeted spouses. In the third condition, we explicitly encourage discussion with the view of enforcing bargaining. Surprisingly, we find that husbands do not withhold information and that discussion significantly decreases enrollment. Our results contradict the standard predictions outlined in the model.
“The Economic Consequences of Loneliness amongst the Elderly” (with Esther Duflo, Abhijit Banerjee, Frank Schilbach, Garima Sharma, and Girija Vaidyanathan).

Loneliness has been linked to a number of adverse outcomes such as unhappiness, impaired cognition and health, and even mortality, but has not been studied in the economics literature. Loneliness may be particularly high amongst the elderly given limited mobility and loss of friends and relatives. We study loneliness in a sample of elderly individuals in Tamil Nadu, India who live alone. Recent demographic and economic changes mean that in Tamil Nadu, many more elderly people live alone than was previously believed and do so even when they are supported by their families. Many individuals in this sample report feelings of loneliness and 46% are depressed. We are developing interventions to combat loneliness in this sample that will combine cognitive behavioral therapy with opportunities for individuals to connect. We will study effects of the interventions on cognition, happiness, mobility, health-seeking, and mortality.

“Understanding Low Attendance and Retention of Female Workers in India” (with Namrata Kala).

Female labor force participation (FLFP) is strikingly low in India. We postulate that features of the Indian context constrain job attendance and retention of women. Such barriers could in turn constrain FLFP even when jobs are available and women take them. We partner with a large Indian firm that offers vocational training and employment for women. The firm faces major issues with attendance and retention of women that it would like to address. We have received funding for a pilot project that will explore key barriers to women’s attendance and retention, pilot interventions to address them, and develop systems of digitizing administrative data for analysis. We will investigate barriers that originate in the workplace, including biased management and inflexible hours, as well as factors outside of the workplace that compete for women’s time, such as household chores and demand for agricultural labor. Using results from the pilot, we will design an intervention that we will evaluate with a full-scale experiment in subsequent work.
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DOCTORAL STUDIES
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PhD, Economics, Expected completion June 2020

DISSERTATION: “Monitoring the Vote or Voting to Monitor? Evidence from Two Large Scale Field Experiments in Colombia”

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PRIOR EDUCATION
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GENDER:
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FIELDS
Primary Fields: Development Economics, Political Economy
Secondary Fields: Labor Economics
## Teaching Experience

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<tr>
<th>Course</th>
<th>Instructor(s)</th>
<th>Year(s)</th>
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<tbody>
<tr>
<td>14.770 Introduction to Political Economy (MIT, PhD graduate)</td>
<td>Teaching Assistant to Professors Daron Acemoglu and Ben Olken</td>
<td>2018</td>
</tr>
<tr>
<td>14.661 Labor Economics (MIT, PhD graduate)</td>
<td>Teaching Assistant to Professors Daron Acemoglu and Joshua Angrist</td>
<td>2017</td>
</tr>
<tr>
<td>14.73 The Challenge of World Poverty (MIT, undergraduate)</td>
<td>Teaching Assistant to Professors Esther Duflo, David Atkin and Frank Schilbach</td>
<td>2017-18</td>
</tr>
<tr>
<td>14.31/310 Data Analysis for Social Scientists (MIT, mixed undergraduate and graduate)</td>
<td>Teaching Assistant to Professors Esther Duflo and David Atkin</td>
<td>2017</td>
</tr>
<tr>
<td>14.01 Principles of Microeconomics (MIT, undergraduate)</td>
<td>Teaching Assistant to Professor Casey Rothchild</td>
<td>2016</td>
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## Relevant Positions

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<tr>
<th>Position</th>
<th>Institution</th>
<th>Year(s)</th>
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<tbody>
<tr>
<td>Research Assistant to Daron Acemoglu (MIT)</td>
<td>Cambridge, MA</td>
<td>2015-18</td>
</tr>
<tr>
<td>Research Assistant to Ben Olken (MIT) and Melissa Dell (Harvard University)</td>
<td>Cambridge, MA</td>
<td>2014-15</td>
</tr>
<tr>
<td>Research Assistant to James A. Robinson (Chicago University)</td>
<td>Bogotá, Colombia</td>
<td>2012-14</td>
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## Fellowships, Honors, and Awards

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<th>Award</th>
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<tr>
<td>Jameel Graduate Fellowship</td>
<td>2019</td>
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<td>J-Pal Governance Initiative Grant</td>
<td>2019</td>
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<td>George and Obie Shultz Fund Grant</td>
<td>2018-19</td>
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<tr>
<td>Castle Krob Scholarship for doctoral studies</td>
<td>2014-16</td>
</tr>
<tr>
<td>Ramón de Zubiría Scholarship for undergraduate studies</td>
<td>2010-13</td>
</tr>
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## Professional Activities

Referee for the *American Economic Review*. 
“Monitoring the Vote or Voting to Monitor? Evidence from Two Large Scale Field Experiments in Colombia” (Job Market Paper)

Can crowdsourcing technologies aimed at augmenting civil engagement in electoral monitoring increase electoral integrity? We report the results of two large-scale field experiments in the context of Colombian municipal elections, designed to assess the effectiveness of online and crowdsourcing technologies in increasing the engagement of civil society in electoral monitoring. We leveraged Facebook advertisements to encourage citizen reporting of electoral irregularities through official websites, and also varied whether candidates were informed about the campaign in a subset of municipalities. In addition to the expected informational effects, the results highlight powerful salience effects. In particular, the advertisements generated a large shift in votes for non-traditional, anti-corruption candidates and away from more traditional ones. Citizens in municipalities exposed to the campaign were also more likely to protest against the traditional-party incumbent president in the months following the elections. We argue that these salience effects are driven by a shift in voter preferences towards candidates they perceived as ‘cleaner’. We formally test this hypothesis in a follow-up (ongoing) experiment in which we directly manipulate the salience of electoral irregularities around the 2019 mayoral elections.

“How Close Is Too Close When It Comes to Public Auditing? Evidence from Colombian Municipalities”

Are more decentralized public auditing institutions better at increasing government accountability and reducing corruption than centralized ones? I exploit the exogenous variation in the level of decentralization of local auditing institutions created by Colombian law to implement a regression discontinuity design and study the empirical effects of decentralizing public auditing. Using data from public contracts, sanctions by third party auditors and proxies for government performance I show that more centralized auditors do a worse job at curbing corruption and increasing the accountability of local governments than decentralized ones.

“Does Corruption Pave the Way to Authoritarianism? Evidence from Brazil”

Can the recent rise in authoritarianism in developing countries be explained by recent corruption scandals? I study this question in the context of Brazil’s 2018 Presidential elections. Using the random audits performed by the Controladoria-Geral da União in the period 2003-2016 as an instrument for mayoral convictions, I show that municipalities that have had mayors convicted for corruption had a higher vote share for Jair Bolsonaro in both the first and the
second round of elections. I then study whether this increased support for Bolsanaro is accompanied by a shift in people’s preferences for authoritarianism, as expressed in public opinion surveys. I show that this is not the case, suggesting that support for Bolsanaro might be explained by an “experimentation” motive instead of a shift in preferences for democratic institutions.

“The Costs of Representation: Effects of Local Council Size on Public Good Provision in Mexico”

What is the optimal number of representatives in democracies? In this project, I shed some light on this question by exploiting a series of population-based rules that determine the size of local councils in Mexican states in order to causally estimate the effect of an increased body of representatives on public good provision. Regression discontinuity estimates show that, on average, there are small negative effects of increasing the number of representatives on the provision of public goods. However, I show that these results conceal a substantial heterogeneity: while municipalities that initially have a lower initial representation show strong negative effects of increasing representation, municipalities with higher initial representation are slightly positively affected by increasing their representation. This suggests an inverted “U” relationship between the number of council members and the provision of public goods.
MIT Economics

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Massachusetts Institute of Technology (MIT)
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DISSERTATION: “Geometric Methods in Econometrics and Statistics”

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PRIOR EDUCATION
Columbia University, New York, NY
G1 of Economics PhD program
2011-2012

University of Nevada, Las Vegas, NV
BA in Mathematics, BA in Economics, MS in Statistics
2007-2011

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USA, Russia

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LANGUAGES
English (fluent), Russian (native), German (beginner)

FIELDS
Econometrics, Statistics
TEACHING EXPERIENCE

14.382 Econometrics
Teaching Assistant to Professor Victor Chernozhukov

14.386 Topics in Econometrics
Teaching Assistant to Professors Whitney Newey
Teaching Assistant to Professors Alberto Abadie

14.381 Statistical Methods in Economics
Teaching Assistant to Professor Michal Kolesár
Teaching Assistant to Professor Isaiah Andrews

14.385 Nonlinear Economic Analysis
Teaching Assistant to Professor Isaiah Andrews
Teaching Assistant to Professors Alberto Abadie

14.381 Statistical Methods in Economics
Teaching Assistant to Professor Anna Mikusheva

14.384 Time Series Analysis
Teaching Assistant to Professor Anna Mikusheva

RELEVANT POSITIONS

Visiting Lecturer at Department of Economics of Dartmouth College

Postdoctoral Research Associate at MIT Institute for Data, Systems, and Society

Consultant at NBER, Cambridge, MA
References: Prof. Simon Jäger and Prof. Benjamin Schoefer

Research Assistant to Professor Matthew Gentzkow and Professor Jesse Shapiro

Research Assistant to Professor Victor Chernozhukov
Research Assistant to Professor Whitney Newey

FELLOWSHIPS, HONORS, AND AWARDS

Tinbergen Workshop "Machine Learning for Economics and Econometrics" Travel Grant

Castle Krob International Fellowship

Erdős Number 3

Charles & Selma Knauss Scholarship

Marie Barbara Woodrich Scholarship

Mary Dougherty Honors Scholarship

PROFESSIONAL ACTIVITIES

Invited Academic Presentations:
“On Counterfactual Analysis of Differentiable Functionals”
International Econometrics PhD Conference at the Econometric Institute, Erasmus University Rotterdam
Young Economists Symposium, Columbia University in New York City
Econometric Society - North American Winter Meetings in San Diego (scheduled)

Refereeing: Econometric Theory
**Publications**

“Cordial Sets of Hypercubes” (with Ebrahim Salehi and Suhadi Wido Saputro), *Bulletin of the ICA*, 2015

“Product Cordial Sets of Long Grids” (with Ebrahim Salehi), *Ars Combinatoria*, 2012

**Research Papers**

“On Counterfactual Analysis of Differentiable Functionals” (Job Market Paper)

Counterfactual probability distributions are important elements of policy analysis, Oaxaca-Blinder style decomposition analysis, robustness and sensitivity analysis in empirical economics. In this paper we solve two complementary problems of statistical counterfactual analysis: (i) Given a counterfactual change in a scalar functional of a probability distribution, we describe the counterfactual distributions that have such an effect on the functional and deviate minimally from the status quo distribution in a continuous fashion. (ii) Given a counterfactual distribution, we compute the change in a statistical functional relative to the status quo distribution by integrating its local changes along a path from the status quo to the counterfactual distribution. In combination, these two exercises provide a general framework for measuring the local and global relationship between (structural) estimators of parameters or counterfactuals and descriptive statistics or specific features of the data. To solve these problems, we use von Mises calculus (i.e. influence functions), information geometry, optimal transport, and introduce gradient score flows. We define a unique path of counterfactual distributions with a combination of a statistical functional and a metric of distance or cost on the nonparametric manifold of probability distributions via the gradient flow of the functional. We describe the gradient flow paths obtained with the Fisher-Rao information metric, 2-Wasserstein optimal transport metric, and their weighted variants.

“Sensitivity of Regular Estimators” (arXiv:1805.08883)

This paper studies local asymptotic relationship between two scalar estimates. We define the sensitivity of a target estimate to a control estimate to be the directional derivative of the target functional with respect to the gradient direction of the control functional. The gradient direction depends on the metric of distance between probability distributions. Sensitivity of the information metric on the model manifold is the asymptotic covariance of regular efficient estimators. Sensitivity of a general policy metric on the model manifold can be obtained from the influence functions of regular efficient estimators. Policy sensitivity has a local counterfactual interpretation, where the ceteris paribus change to a counterfactual distribution is specified by the combination of a control functional and a Riemannian metric on the model manifold. The functional has the economic interpretation of policymaker’s preferences, and the metric has the economic interpretation of the cost of counterfactual distributions.

**Research in Progress**

“General Heterogeneity Welfare Bounds” (joint work with Max Cytrynbaum)

This paper develops nonparametric bounds on the average surplus measures of consumer welfare. We do not restrict unobserved individual heterogeneity or the number of goods. Bounds are based on cross-section data on the marginal
distributions of the population demand system, the Axioms of Revealed Preferences and shape restrictions assumptions of monotonicity and convexity about individual preferences. Consumer surplus depends on varying price and income for an individual, and its expectation is not identified from the marginal distributions of demand. We obtain bounds on the average welfare effects of price changes by bounding the individual surplus based on finitely many choices, and coupling the marginal distributions of demand into a random utility model.

“On Semiparametric Bound of Asymptotic Variance for Conditional Moment Restrictions” (joint work with Whitney Newey)
There is given a vector of moment functions that depend on the data and a parameter. The restrictions on the distribution of the data are that the conditional expectation of this function has a unique zero for some value of the parameter. The statistical functional of the distribution is defined to be this value of the parameter. In this note we characterize the tangent space of the semiparametric model described by conditional moment restrictions. We derive the efficient influence function by solving the Riesz representation equation for the pathwise derivative of the functional and projecting it onto the tangent space of the model. The semiparametric efficiency bound for the functional is the smallest asymptotic variance of any regular estimator sequence of this parameter, that is any estimator whose asymptotic distributions are sufficiently uniform in the distribution of the data. This bound is the variance of the efficient influence function.

“Inference for Functionals of Continuous Exponential Tilting”
Continuous exponential tilting (CET) is a path of counterfactual distributions, obtained by solving a score flow differential equation with a status quo distribution as the initial position. We characterize the influence function for the counterfactual change in a functional along the CET path. The variance of the influence function is the semiparametric efficiency bound of the asymptotic variance of any regular estimator of this counterfactual based on data generated by the status quo distribution. We construct uniform confidence bands for the counterfactual change along the CET path and provide conditions for the validity of bootstrap.

“Inference for Nonsmooth Nonlinear Models with Measurement Error”
We propose an estimator for nonlinear and nonsmooth moment restriction models with measurement errors in the covariate, when repeated observations are available for each mismeasured variable. The independent repeated observations are used to cancel out the measurement error, using analytic properties of the Fourier transform, and identify the moments of the model with respect to the distribution of the unobserved true covariates. We establish asymptotic normality and derive the rates of convergence of the proposed estimator as a function of the smoothness of the moment conditions and densities of the true variables and measurement errors.

“Bernstein-von Mises Theorem for High-Dimensional Quasi-Bayesian Estimation” (joint work with Victor Chernozhukov)
We develop Bayesian procedures for estimation, computation and inference for a low-dimensional (target) parameter of interest in the presence of a high-dimensional nuisance parameter that is estimated using modern nonregular high-dimensional methods. We construct a marginal Quasi-posterior distribution over the target parameter space that can be approximated (in total variation norm) by the Gaussian distributions centered at the orthogonalized influence function of the target parameter and a covariance that is the inverse of the efficient information matrix. Bayes estimators based on such a posterior distribution are regular and efficient, and can be computed with modern Monte Carlo Markov Chain tools.
ALEXANDER OLSSEN

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**DOCTORAL STUDIES**  
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DISSERTATION: “Drug Rebates and Competition in Medicare Part D”

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2010

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**FIELDS**
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**TEACHING EXPERIENCE**

- 14.273 Adv Topics in Industrial Organization (MIT, Graduate) 2018
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- 14.41 Public Finance & Public Policy (MIT, Undergraduate) 2018
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  - Teaching Assistant to Professors Nikhil Agarwal and Tobias Salz
- 14.01 Principles of Microeconomics (MIT, Undergraduate) 2019
  - Teaching Assistant to Professor Sara Ellison

**RELEVANT POSITIONS**

- Research Assistant to Professor Amy Finkelstein 2015-2018
- Research Assistant to Professor Parag Pathak 2014-2015
- Harvard LEAP Pre-Doctoral Fellow for Professor Raj Chetty 2013-2014
- Research Assistant to Professor John Stachurski (ANU) 2012-2013

**FELLOWSHIPS, HONORS, AND AWARDS**

- George P. and Obie B. Shultz Grant 2019
- Jan Whitwell Prize, New Zealand Association of Economists 2011
- DEEWR Labour Economics Honours Scholarship, ANU 2010

**PROFESSIONAL ACTIVITIES**

- Referee: *American Economic Review: Insights*

**RESEARCH PAPERS**

- **“Drug Rebates and Formulary Design: Evidence from Statins in Medicare Part D” (Job Market Paper)**
  
  Drug manufacturers offer Medicare Part D insurers rebates in order to affect insurance plan formulary design. How big are these rebates? What would happen to formularies, consumer surplus, and firm profits if the government could increase the rebates of a blockbuster Medicare Part D drug? We estimate a simultaneous model of insurance demand and statin demand for the population of statin users in 2010. Our demand estimates allow us to quantify how insurer profits change under different statin formulary structures. We use these profit functions to estimate the rebates for Crestor and Lipitor, two blockbuster drugs of the time. In counterfactuals, we analyze the effect that different government negotiated statin prices would have on welfare. If the government negotiated a 20 percentage point increase in Lipitor rebates, then statin utility would increase by 2.2%. In contrast, a 20 percentage point increase in Crestor rebates would have almost no effect on statin utility.

**RESEARCH IN PROGRESS**

- **“The Effect of Loyalty Discounts on Endogenous Product Design: Evidence from Medicare Part D”**

  How do loyalty discounts affect downstream competition and consumer surplus? On the one hand, loyalty discounts could reduce the range of products downstream firms offer. On the other hand, cost savings could be passed on to consumers. I study the effect of loyalty discounts in Medicare Part D, a setting
where competing drug manufacturers offer insurers loyalty discounts to increase market share through preferential formulary treatment. In equilibrium, loyalty discounts increase the share of insurers that offer asymmetric coverage. I develop a framework for estimating loyalty discounts in Medicare Part D using moment inequalities. In counterfactual analyses, I simulate the consequences of prohibiting loyalty discounts.

“A Nash-in-Nash Bargaining Model Over Multiple Prices”
(with Mert Demirer)
Nash-in-Nash bargaining is commonly used in empirical work to study markets of bilateral oligopoly. However current approaches restrict negotiation to a single price, which precludes many strategies that upstream firms use, such as retail price maintenance and quantity discounts. This paper extends the Nash-in-Nash bargaining framework to negotiations over retail and wholesale prices. We analyze this model and show how equilibrium and welfare depend on market structure and the degree of substitutability between differentiated products. We also show that downstream prices and demand are sufficient to identify wholesale prices.
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Doctoral Studies
Massachusetts Institute of Technology (MIT)
PhD, Economics, 2015 - Expected completion June 2020
Dissertation: “Essays on Innovation in Health Care Markets”

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Primary Fields: Health Economics, Public Finance
Secondary Fields: Economics of Innovation, Industrial Organization
Teaching Experience

14.46 Innovation Policy and the Economy 2018
Teaching Assistant to Professor Heidi Williams

Relevant Positions

Research Assistant to Professor Glenn Ellison, MIT 2016
Research Assistant to Professor Amy Finkelstein, NBER and MIT 2013-2015

Fellowships, Honors, and Awards

NBER Pre-Doctoral Fellowship in Aging and Health 2017-2019
National Science Foundation Graduate Research Fellowship 2015-2020
MIT Graduate Fellowship 2015-2017
Washington and Lee University
Phi Beta Kappa Society (elected Junior Year) 2012
Lee Scholar (full-ride merit scholarship) 2009-2013

Professional Activities

Co-President, MIT Graduate Economics Association 2016-2017

Publications

“Outpatient Wait Times and Quality of Care for Medicaid Patients” (first author with Amy Finkelstein and Liran Einav), Health Affairs, 36(5), May 2017: 826-832.

Research Papers

“Funding of Clinical Trials and Reported Drug Efficacy” (Job Market Paper)
Clinical trials are a key determinant of drug approvals and also influence subsequent prescription decisions. In recent years, an increasing share of clinical trials have been funded by pharmaceutical firms, as opposed to by the public sector. This paper estimates the effect of financial sponsorship on reported drug efficacy, leveraging the insight that the exact same sets of drugs are often compared in different randomized control trials conducted by parties with different financial interests. In principle, randomized control trials comparing the same drugs should yield consistent estimates, regardless of the interests of the trial's funders. Using newly assembled data on hundreds of psychiatric clinical trials, I estimate that, in practice, a drug appears 0.15 standard deviations (36%) more effective when the trial is sponsored by that drug's manufacturer, compared with the same drug in the same trial without the drug manufacturer's involvement. Sponsored papers with non-positive results are more likely to remain unpublished. Back-of-the-envelope calculations suggest this publication mechanism can account for just under half of the sponsorship effect. In contrast, I find little evidence that observable characteristics of trial design and patient enrollment explain this effect.

Debates over whether and when to recommend screening for a potential disease focus on the causal impact of screening for a typical individual covered by the recommendation, who may differ from the typical individual who responds to the recommendation. We explore this distinction in the context of recommendations that breast cancer screening start at age 40. The raw data suggest that responders
to the age 40 recommendation have less cancer than do women who self-select into screening at earlier ages. Combining these patterns with a clinical oncology model allows us to infer that responders to the age 40 recommendation also have less cancer than women who never screen, suggesting that the benefits of recommending early screening are smaller than if responders were representative of covered individuals. For example, we estimate that shifting the recommendation from age 40 to age 45 results in over three times as many deaths if responders were randomly drawn from the population than under the estimated patterns of selection. These results highlight the importance of considering the characteristics of responders when making and designing recommendations.

**RESEARCH IN PROGRESS**

“Opium for the Masses: The Effect of Declining Religiosity on Drug Poisonings, Suicides, and Alcohol Abuse”

Drug poisonings, opioid overdoses, suicides, and alcoholic liver disease mortality have all increased dramatically in the past two decades. A potential factor in this crisis of ‘deaths of despair’ is declining community ties and social cohesion. To test this hypothesis, I assess the causal impact of declining religiosity on opioid deaths, instrumenting for religiosity with the Catholic sex-abuse scandal. First, I document that opioid deaths and religiosity are strongly negatively correlated across counties. Then, I find that an 8% decrease in religious employment - equivalent to the decrease observed since the height of the Catholic sex abuse scandal - would increase opioid deaths by 4.8 per 100,000, approximately a third of the current opioid epidemic. The effects of religiosity are concentrated in areas with higher Catholic rates before the scandal. In contrast, I find no evidence that religiosity affects other drug deaths, suicides, or mortality due to alcoholic liver disease.

“Site Selection and Heterogeneous Effects in Clinical Trials”

New drug treatments are required to show efficacy in clinical trials, but efficacy rates in the general population are generally believed to be much lower than trial estimates suggest. One potential explanation is that clinical trials may enroll patients – e.g. younger, healthier patients – who are more likely to benefit from the treatment than the average treatment recipient in the population. I test for this idea by leveraging the fact that in many cases the same drug is tested in different trials and at different site locations within a trial, leading to a distribution of treatment effect estimates across heterogeneous populations. Using individual-level data, I estimate the magnitude of site and participant selection bias in clinical trials – namely, whether the probability that patients of a particular demographic are enrolled in a clinical trial is correlated with their potential treatment effect. I also estimate to what extent this selection bias affects out-of-sample inference of clinical trial results to the general population.
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Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected completion June 2020
DISSERTATION: “Channels of Communication in Organizations”

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PRIOR EDUCATION
University of California, San Diego
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2012

CITIZENSHIP
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GENDER:
Male

FIELDS
Primary Fields: Organizational Economics, Microeconomic Theory
Secondary Fields: Industrial Organization
**TEACHING EXPERIENCE**

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Institution</th>
<th>Instructor(s)</th>
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<td>14.26</td>
<td>Economics of Incentives (MIT, Undergraduate Course)</td>
<td>MIT</td>
<td>Guest Lecturer for Professor Robert Gibbons</td>
<td>2019</td>
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<td>Applied Econ. for Managers (MIT Sloan, EMBA Course)</td>
<td>MIT Sloan</td>
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<td>2018-19</td>
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<td>14.122</td>
<td>Micro. Theory II (Game Theory) (MIT, PhD Course)</td>
<td>MIT</td>
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<td>2018</td>
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<td>14.04</td>
<td>Int. Micro. Theory (MIT, Undergraduate Course)</td>
<td>MIT</td>
<td>TA for Professor Robert Townsend</td>
<td>2018</td>
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<td>14.21</td>
<td>Health Economics (MIT, Undergrad Course)</td>
<td>MIT</td>
<td>TA for Professor Jeffrey Harris</td>
<td>2017</td>
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<tr>
<td>14.282</td>
<td>Intro. to Organizational Econ (MIT, PhD Course)</td>
<td>MIT</td>
<td>TA for Prof(s) Robert Gibbons, John Van Reenen, and Michael Whinston</td>
<td>2016-17</td>
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<tr>
<td>14.271</td>
<td>Industrial Organization I (MIT, PhD Course)</td>
<td>MIT</td>
<td>TA for Professor Glenn Ellison</td>
<td>2016</td>
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**RELEVANT POSITIONS**

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<tr>
<td>RA</td>
<td>MIT Sloan</td>
<td>2016-18</td>
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<td>RA</td>
<td>Nikhil Agarwal, MIT and NBER</td>
<td>2016</td>
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<tr>
<td>RA</td>
<td>Robert Townsend, MIT and NBER</td>
<td>2014-16</td>
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<td>Senior Research Analyst</td>
<td>Federal Reserve Bank of New York</td>
<td>2013-14</td>
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<tr>
<td>Research Analyst</td>
<td>Federal Reserve Bank of New York</td>
<td>2012-13</td>
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**FELLOWSHIPS, HONORS, AND AWARDS**

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<td>MIT Fellowship</td>
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<td>University of California, San Diego</td>
<td>2012</td>
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<td>Muir Scholar Award</td>
<td>2012</td>
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<tr>
<td>Award for Excellence in Joint Economics and Mathematics</td>
<td>2012</td>
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**PUBLICATIONS**

“Federal Reserve Tools for Managing Rates and Reserves” (joint with Antoine Martin, Jaime MCArendrews, and David Skeie), *Federal Reserve Bank of New York Staff Reports*, April 2019. [https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr642.pdf](https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr642.pdf)
“Channels of Communication: Organizational Design in the Presence of Signaling and Influence” (Job Market Paper)

Decision makers are often accessible via a variety of communication channels, e.g. face-to-face meetings, E-mails, internal message boards, and more. Given that channel choice can be an observable signal, a natural question is what kind of information should be sent through which channel? This paper studies a privately informed agent who may wish to influence the decision making of a principal. The key innovation of the model is that the agent can observably choose a communication channel which determines the cost of his communicative effort, the latter of which is only observed with noise. Under a single-crossing condition, two forms of equilibrium pooling can occur. In one form, partisan pooling, agent types pool on a common channel if their preferred state-contingent decisions are similar. The noisy-signaling nature of communication, however, also admits the possibility of advocates pooling. In this second form of pooling, agent types pool based on the intensity of their desires for particular decisions, and different members of the advocates group will have comparably intense desires for opposing decisions. Optimal equilibria may have one or both forms of pooling, and shutting down a channel can improve welfare if parties are unable to coordinate on a Pareto optimal equilibrium. Finally, I reinterpret the model as one in which the agent can supplement noisy signaling with cheap talk. I argue that optimal organizational design may in fact discourage cheap talk, even in cases where it would be beneficial to both parties, ex post.

“A General Framework for Studying Communication Channel Design”

This paper studies a potentially informed agent who can influence the distribution of a principal's signal, at a personal cost. The key innovation of the model is that, prior to the interaction, the two parties can efficiently bargain over a communication channel, which is characterized by: 1) the cost the agent must pay in order to influence the principal's signal; and 2) the distributional effect the agent's influence activities have on the principal's signal. The model admits a unique equilibrium for any implemented communication channel. Using this result, I show that if the agent is informed with probability greater than a threshold value, it is optimal for the parties to agree upon the channel that maximizes influence activities in equilibrium. Alternatively, when this threshold is not met, a variety of organizational structures arise in optimality, including adoption of intermediate channels that neither maximize nor eliminate influence.
“The Role of Property Rights in a Repeated Interaction with Private Information”

This paper studies vertical structure in a repeated relationship between an upstream input supplier and a downstream input user, when the downstream firm privately realizes liquidity shocks. Optimal relational contracts will typically make use surplus destroying punishments on the equilibrium path. This occurs either through reduced product specialization or higher selling prices following report of a shock from the downstream firm. However, I find that the allocation of property rights, in this case selling rights for the input, can play a novel role in mitigating welfare losses from surplus destruction that inevitably occurs. In particular, the model highlights the role of endogenous spin-offs, whereby optimal relational contracts start with employment of the upstream firm, who is then outsourced upon report of a liquidity shock. Thus, this governance structure change does not occur as an efficient response to persistent exogenous changes in parameter values, but rather as an equilibrium response to transient shocks that have already ceased to be payoff relevant.

“Relational Referral Networks”

This paper studies a market in which service providers receive customers via referrals from other service providers, and agreements to refer customers in a particular way must be self-enforcing. I derive necessary and sufficient conditions for a customer allocation rule to be sustainable for a particular subgroup of providers, referred to as a provider referral network (PRN). When transfers are used, a PRN can expand the set of sustainable allocation rules by allowing members who predominantly receive referrals to make monetary payments to referring providers. These payments are made self-enforcing by allowing net payers a larger share of the relational surplus. When transfers are not used, reciprocity in referrals is required. If a PRN member ever makes a referral that is not consistent with her dominant strategy, there must be another member who will also be asked to make a weakly dominated referral at a later time with positive probability. Using these necessary and sufficient conditions I find that inequality in market power between members of a PRN can very quickly render the arrangement unsustainable when transfers are not used. When transfers are used, inequalities in market power that tighten self-enforcement incentive constraints also serve to increase the total PRN surplus. Thus, sustainability of an arrangement is far less sensitive to changes in market power across providers when transfers are used. I propose an application of the model for structurally identifying illicit kickbacks for patient referrals in the US medical industry.
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PhD, Economics, Expected completion June 2020
Dissertation: “Essays in Environmental Regulation”

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B.A. in Social Studies, summa cum laude 2013

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FIELDS
Primary Fields: Industrial Organization, Environmental Economics
TEACHING EXPERIENCE

Instructor, MIT Economics, Math Camp (for incoming economics PhD students) Summers 2016-18

TA, MIT 14.282, Industrial Organization II (second-year PhD course taught by Nancy Rose) expected 2020

TA, MIT 14.475, Environmental Economics (second-year PhD course taught by Clare Balboni) expected 2020

TA, Harvard Mathematics Department, Linear Algebra and Real Analysis I and II (Math 23a,b) 2012-13

RELEVANT POSITIONS

Research Assistant for Daron Acemoglu (MIT) Summer 2015
Research Assistant for Mihai Manea (MIT) Fall 2014
Research Assistant for Dave Donaldson (MIT) Summer 2013
Research Assistant for Carolyn Kousky and Molly Macauley (Resources for the Future) Summer 2012

FELLOWSHIPS, HONORS, GRANTS

National Science Foundation Graduate Research Fellowship 2014-19
George and Obie Schultz Fund Grant 2016-18
MIT International Science and Technology Initiatives (MISTI) Research Travel Grant 2016
Price Theory Scholarship, Becker Friedman Institute at the University of Chicago 2016
MIT Priscilla King Gray Public Service Center IAP Fellowship 2015
MIT Environmental Solutions Initiative (ESI) Seed Grant (PI.s: Parag Pathak and Dennis McLaughlin) 2015-17
Harvard-Cambridge Fellowship (Lt. Charles H. Fiske III Scholarship at Trinity College) 2013-14
Hoopes and Alexis de Tocqueville Prizes for undergraduate senior thesis 2013
Phi Beta Kappa 2012

PROFESSIONAL ACTIVITIES


Referee: AEJ: Applied
“Droughts, deluges, and (river) diversions: Valuing market-based water reallocation” (Job Market Paper)
This paper studies a water market used by irrigated farms inhabiting a connected river network in Australia’s southern Murray-Darling Basin during a period of substantial environmental change (2007–2015). It uses new panel data to estimate shadow values of water for each farm from production functions identified with regulatory variation in river diversion caps. The estimates imply that observed water trades increased irrigated agricultural output by approximately 4–6%. Equivalently, producer surplus without the water market is the same as under an 8–11% uniform reduction in surface water resources or approximately the median decline predicted for this region from 1°C of global warming. The value of the water market is increasing and highly convex in water scarcity, with realized gains an order of magnitude greater during the drought, concentrated in farms and regions facing local water scarcity. This suggests that retrospective analyses of extant water markets can understate the future value of trade in a changing climate and that a water market is an important institutional adaptation to climate change.

“Mirage on the horizon: Geoengineering and carbon taxation without commitment” (with Daron Acemoglu). NBER Working Paper No. 24411, March 2018
We show that, in a model without commitment to future policies, geoengineering breakthroughs can have adverse environmental and welfare effects because they change the (equilibrium) carbon taxes. In our model, energy producers emit carbon, which creates a negative environmental externality, and may decide to switch to cleaner technology. A benevolent social planner sets carbon taxes without commitment. Higher future carbon taxes both reduce emissions given technology and encourage energy producers to switch to cleaner technology. Geoengineering advances, which reduce the negative environmental effects of the existing stock of carbon, decrease future carbon taxes and thus discourage private investments in conventional clean technology. We characterize the conditions under which these advances diminish—rather than improve—environmental quality and welfare, and show that given current estimates of costs and environmental damages, these conditions are likely to be satisfied.


“Conservation law and decentralized offsets markets: The case of Florida wetlands” (with Dan Aronoff)
Environmental law bans property development on federally protected wetlands in the United States. In places where wetlands are abundant, such as Florida (29% of all land), decentralized offsets markets have emerged to give private
landowners and government infrastructure developers greater flexibility. Each landowner can consume, conserve, or produce the public good, and the market clears to keep the aggregate level of the public good unchanged in the long run. We study the efficiency of this offset scheme for a regulator who values both the extent and configuration of conservation across space. Using new permit transaction data collected from a private broker, FOIA requests, and government registries, we recover demand and supply for wetlands offsets and estimate the entry and pricing game of incumbent offsets producers. The model predicts equilibrium land use and wetland configurations under alternative market designs. With a new calibrated flood risk model used by a water management district covering one-fifth of Florida, we then calculate the effect of market-driven wetlands reallocation on flood risk, which we value using FEMA flood damage maps. We then assess the long-run equilibrium outcomes of alternative wetlands offset schemes designed to address these unintended consequences.
Cory Smith

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PhD, Economics, Expected completion June 2020
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Secondary Field: Economic History
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Econometrics (Undergrad 14.32)  Spring 2019
Teaching Assistant, MIT for Professor Brigham Frandsen
Intro to Microeconomics (MBA 15.024)  Summer 2017
Teaching Assistant, MIT for Professor Tavneet Suri
Intro to Microeconomics (Undergrad 14.01)  Spring 2017
Section Leader, MIT for Professor Jeffrey Harris
Political Economy (Undergrad 14.75)  Fall 2016
Teaching Assistant, MIT for Professor Benjamin Olken

Relevant Positions

Research Assistant, Brookings Institution  2012-2013
Research Assistant, Professor Dave Donaldson  2011-2012

Fellowships, Honors, and Awards

Fellowships
National Science Foundation, Graduate Research Fellow  2014-2019
MIT Presidential Fellow  2014-2019

Awards
MIT Undergraduate Economic Association Best Teaching Assistant  2019
Putnam Mathematics Competition, Honorable Mention  2009

Professional Activities

Referee, American Economic Review

Publications

“Evolving Comparative Advantage and the Impact of Climate Change in Agricultural Markets: Evidence from 1.7 Million Fields around the World”  
(With Arnaud Costinot and Dave Donaldson)

A large agronomic literature models the implications of climate change for a variety of crops and locations around the world. The goal of the present paper is to quantify the macro-level consequences of these micro-level shocks. Using an extremely rich micro-level data set that contains information about the productivity—both before and after climate change—of each of 10 crops for each of 1.7 million fields covering the surface of the earth, we find that the impact of climate change on these agricultural markets would amount to a 0.26 percent reduction in global GDP when trade and production patterns are allowed to adjust. Since the value of output in our 10 crops is equal to 1.8 percent of world GDP, this corresponds to about one-sixth of total crop value.
RESEARCH PAPERS

“Land Concentration and Long-Run Development:
Evidence from the Frontier United States” (Job Market Paper)

Worldwide, land ownership is concentrated in the hands of relatively few people. This paper studies the impacts of land concentration on the long-run development of communities founded in the frontier United States by using the “checkerboard” pattern of railroad land grants as a natural experiment that encouraged land accumulation. I collect a large database of modern property tax valuations and show that land concentration had persistent effects over a span of 150 years, lowering investment by 23%, overall property value by 4.4%, and population by 8%. I argue that landlords’ use of sharecropping agreements raised the costs of investment, a static inefficiency that persisted due to transaction costs in land markets. I find little evidence for other explanations, including elite capture of political systems. I use my empirical estimates to evaluate counterfactual policies, applying recent advances in combinatorial optimization to show that an optimal property rights allocation would have increased my sample’s agricultural land values by $28 billion (4.8%) in 2017.

“When Coercive Economies Fail:
The Political Economy of the US South After the Boll Weevil”
(with James Feigenbaum and Soumyajit Mazmuder)

How do coercive societies respond to negative economic shocks? We explore this question in the early 20th century United States South. Since before the nation’s founding, cotton cultivation formed the politics and institutions in the South, including the development of slavery, the lack of democratic institutions, and intergroup relations between whites and blacks. We leverage the natural experiment generated by the boll weevil infestation from 1892-1922, which disrupted cotton production in the region. Panel difference-in-differences results provide evidence that Southern society became less violent and repressive in response to this shock with fewer lynchings and less Confederate monument construction. Cross-sectional results exploiting spatial variation in the infestation and historical cotton specialization show that affected counties had less KKK activity, higher non-white voter registration, and were less likely to experience contentious politics in the form of protests during the 1960s. To assess mechanisms, we show that the reductions in coercion were responses to African American out-migration. Even in a context of coercive and antidemocratic institutions, ordinary people can retain political power through the ability to “vote with their feet.”

RESEARCH IN PROGRESS

“Tiebout and the Long-run Effects of Local State Capacity”

At least since Tiebout (1956), economists have been interested in how public goods shape people’s location decisions and vice versa. A number of empirical studies have provided evidence that people move in response to public goods, but we know less about how such dynamics shape development in the long run. This paper studies the impact of historical public goods on migration and development on the American frontier. I develop an estimation technique which leverages (a) the formula-based
reservation of lands for funding local government (b) the randomness of land quality within very small geographic areas. Areas whose reserved lands happen to be of higher quality than their immediate neighbors receive more public goods in historical times. Surprisingly, higher levels of these public goods lead to lower population today with a standard deviation increase in reserve land quality lowering it by about 28%. I show that most of this decrease is linked to lower levels of town formation and argue that increased levels of rural schools lowered settlers' desire to move to cities.

“Group Size and Governmental Performance”

Whether and how a polity’s size affects its functioning is a central question in political economy. I propose to study this question in the context of Pakistan’s 1959 Basic Democracies Order. The order established local governments in the form of village councils and a system specifying which villages could be combined into a single polity. In particular, councils were formed by combining pre-specified groups of villages whose total population needed to fall between a certain minimum and maximum. I aim to use a regression discontinuity (RD) design based on these thresholds to find quasi-random variation in whether villages are grouped together into larger, potentially more diverse polities. I will then consider the impacts of increased polity size on electoral, governmental, and developmental outcomes such as elections, revenue collection, public goods provision, and education.
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DOCTORAL STUDIES
Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected completion June 2020
DISSERTATION: “Essays on Redistributive Fiscal Policies and Macroeconomics”

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PRIOR EDUCATION
Universidad Torcuato di Tella (UTDT)
M.A. in Economics 2013
B.A. in Economics 2011

CITIZENSHIP: Argentina

GENDER: Male

LANGUAGES: Spanish (native), English (bilingual), French (basic)

FIELDS
Primary Fields: Macroeconomics
Secondary Fields: Econometrics
**TEACHING EXPERIENCE**

- Principles of Microeconomics (undergraduate, MIT)  
  Teaching Assistant to Professor Jonathan Gruber  
  2017-2019
- Econometric Data Science (undergraduate, MIT)  
  Teaching Assistant to Professor Anna Mikusheva  
  2017
- Principles of Microeconomics (undergraduate, MIT)  
  Teaching Assistant to Professor Jeffrey Harris  
  2017
- Principles of Macroeconomics (undergraduate, MIT)  
  Teaching Assistant to Professor Ricardo Caballero  
  2016
- Microeconomics Introductory Course (masters, UTDT)  
  Lecturer  
  2013
- International Monetary Economics (undergraduate, UTDT)  
  Teaching Assistant to Professor P. Andres Neumeyer  
  2012
- Microeconomics II (masters, UTDT)  
  Teaching Assistant to Professor Leandro Arozamena  
  2012
- Public Economics (undergraduate, UTDT)  
  Teaching Assistant to Professor Martin Besfamille  
  2012
- Industrial Organization (undergraduate, UTDT)  
  Teaching Assistant to Professor Leandro Arozamena  
  2011
- Topics in Microeconomic Theory (undergraduate, UTDT)  
  Teaching Assistant to Professor Marzia Raybaudi  
  2011
- Mathematics Introductory Course (undergraduate, UTDT)  
  Teaching Assistant to Leandro Vendramin  
  2009-2010

**RELEVANT POSITIONS**

- Research Assistant to Professor Robert Townsend (MIT)  
  2017
- Research Assistant to Professor P. Andres Neumeyer (UTDT)  
  2011-2012
- Investment Analyst at Kaszek Ventures  
  (Based in Buenos Aires, Kaszek Ventures is one of the largest venture capital funds in Latin America)  
  2013-2014

**FELLOWSHIPS, HONORS, AND AWARDS**

- Robert M. Solow Fellowship, Dept. of Economics, MIT  
  2015-2016
- Charles M. Vest Presidential Fellowship, MIT  
  2014-2015
- Distinction for highest GPA of 2013 graduating class (graduate, UTDT)  
  2013
- Scholarship for M.A. in Economics, Dept. of Economics, UTDT  
  2011-2012
- Distinction for highest GPA of 2011 graduating class (undergraduate, UTDT)  
  2011
- Distinction for best undergraduate economics thesis, UTDT  
  2011
- Best Undergraduates in Economics Award, National Academy of Economic Sciences (Argentina)  
  2011

**PROFESSIONAL ACTIVITIES**

- Princeton Initiative: Macro, Money and Finance  
  2016
Fiscal stimulus during the Great Recession consisted mainly of transfers, rather than government purchases. This paper analyzes the role of marginal propensities to consume (MPCs) in shaping the effect of such policies. I build a tractable continuous-time New Keynesian model with heterogeneous overlapping generations (OLG) which allows for arbitrary MPC heterogeneity. I provide a complete analytical characterization of output multipliers for arbitrary policy paths of fiscal transfers. When consumers with a low MPC receive a transfer, they save most of it, which allows them to consume more in future periods. As a result, I show that the role of MPCs is mainly to determine the timing of the fiscal stimulus: high MPCs front-load the stimulus, low MPCs back-load it. The relation between the timing of the stimulus and the cumulative effect on output (measured by the present value) is ambiguous; indeed, I show that transfers to low MPC consumers may generate a higher cumulative effect on output. From a normative perspective, however, there is no ambiguity: a planner that optimally chooses the timing of transfers always benefits from larger differences in MPCs because macro stabilization can be obtained with less cross-sectional consumption dispersion. Finally, I undertake quantitative exercises with a standard incomplete markets model. The numerical results are consistent with my analytical OLG model.

Differences in marginal propensities to consume (MPCs) across households are a key determinant of the output effect of redistributive fiscal policies. However, when households also differ in the risk composition of their portfolios, then this second dimension of heterogeneity is also relevant to determine the size of transfer multipliers. I provide an analytical characterization of transfer multipliers in a continuous time New Keynesian model in which capital is subject to idiosyncratic risk and agents are heterogeneous in these two dimensions. If households with higher MPCs are also more risk averse, then the stimulus obtained from redistributing from low to high MPC agents will be dampened. There are two mechanisms that drive this result: the price of risky assets falls when the average risk aversion in the economy increases, which tends to depress consumption through a negative wealth effect; and risk averse agents become relatively poorer over time because they get a lower-than-average return on their savings, which tends to "dilute" the effect of the initial transfer.

An essential role of labor markets is the allocation of talent. However, this function can be impaired by asymmetric information, since firms have only partial knowledge about workers' skills until they go through the interview process. I study a model of a frictional labor market in which workers are horizontally differentiated and firms have incomplete information about the skills of workers who apply to their posted vacancies. Workers self-insure against unemployment risk by applying to jobs for
which their skills are not well suited. This decreases firms' incentives to create vacancies because they expect the average quality of the pool of applicants to be low. That is, low quality matches crowd-out higher quality matches. This negative externality that workers impose on each other makes the competitive equilibrium inefficient (even when the Hosios condition is satisfied). Although in the competitive equilibrium workers apply to too many jobs, I show that unemployment can be too low or too high: in partial equilibrium applying to more jobs always increases the job finding probability, but in general equilibrium the crowding out effect can drive enough firms out of the market so that unemployment increases. I consider various government policies that can mitigate this inefficiency by providing incentives for workers to wait for higher quality matches.
Michael Stepner

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Prior Education
McGill University BA in Economics, First Class Honors

Citizenship
Canadian

Languages
English, French

Fields
Primary Field: Public Finance
Secondary Fields: Health, Labor
### Relevant Positions

<table>
<thead>
<tr>
<th>Position</th>
<th>Year</th>
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<tbody>
<tr>
<td>Post-Doctoral Fellow, Retirement and Disability Policy Research</td>
<td>2019-20</td>
</tr>
<tr>
<td>National Bureau of Economic Research, Cambridge MA</td>
<td></td>
</tr>
<tr>
<td>Harvard University, Cambridge MA</td>
<td></td>
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<tr>
<td>Research Assistant to Professor Amy Finkelstein</td>
<td>2016</td>
</tr>
<tr>
<td>Massachusetts Institute of Technology, Cambridge MA</td>
<td></td>
</tr>
<tr>
<td>Research Assistant to Professors Raj Chetty, John Friedman and Nathan Hendren</td>
<td>2012-13</td>
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<tr>
<td>Harvard University, Cambridge MA</td>
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### Fellowships, Honors, and Awards

<table>
<thead>
<tr>
<th>Title</th>
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<tr>
<td>Network Leader: Health Trends and Inequalities</td>
<td>2019</td>
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<tr>
<td>NBER Center for Aging and Health Research</td>
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<tr>
<td>NIA P30 Grant</td>
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<tr>
<td>National Tax Association Dissertation Award, Honorable Mention</td>
<td>2019</td>
</tr>
<tr>
<td>NBER Economics of an Aging Workforce Pre-Doctoral Fellowship</td>
<td>2017-19</td>
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<tr>
<td>NBER Retirement Research Center Fellowship</td>
<td>2016-17</td>
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<td>SSHRC Doctoral Fellowship</td>
<td>2013-17</td>
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<tr>
<td>MIT Fellowship</td>
<td>2013-15</td>
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<tr>
<td>McGill University</td>
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<tr>
<td>Governor General’s Academic Medal</td>
<td>2012</td>
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<tr>
<td>C.W. Snyder, C. Peters and J.W. McConnell Scholarships</td>
<td>2009-12</td>
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### Professional Activities

<table>
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<th>Year</th>
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<tbody>
<tr>
<td><em>American Economic Review: Insights</em></td>
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<tr>
<td><em>Quarterly Journal of Economics</em></td>
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<tr>
<td><em>European Journal of Health Economics</em></td>
<td></td>
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<td><em>PLOS Medicine</em></td>
<td></td>
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<tr>
<td>Conference Organizer</td>
<td>2019</td>
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<tr>
<td>NBER Workshop on Income and Life Expectancy (co-organizer)</td>
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<tr>
<td>Invited Presentations</td>
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<tr>
<td>Harvard Economics, Opportunity Insights</td>
<td>2019</td>
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<tr>
<td>Retirement and Disability Research Center Annual Meeting (poster)</td>
<td>2019</td>
</tr>
<tr>
<td>UQAM Human Capital Research Group</td>
<td>2019</td>
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<tr>
<td>The Dartmouth Institute</td>
<td>2018</td>
</tr>
<tr>
<td>NBER Aging Spring Meeting (discussant)</td>
<td>2018</td>
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</table>
PROFESSIONAL ACTIVITIES (CONTINUED)

Invited Presentations (continued)
- Statistics Canada 2018
- Employment and Social Development Canada (ESDC) 2017
- CIFAR Social Interactions, Identity and Well-Being Group 2016
- Stata Conference Boston 2014

Selected Software Publications
- **binscatter**: Stata module to produce binned scatterplots
- **maptile**: Stata module to produce chloropleth maps
- **vam**: Stata module to compute drift-adjusted teacher value-added

Public Service
- **The Immigrant Doctors Project** 2017
  - [https://immigrantdoctors.org](https://immigrantdoctors.org)
- **Effective Technical Collaboration: A Coding Style Guide** 2017
  - [https://michaelstepner.com/style-guide/](https://michaelstepner.com/style-guide/)
- **Git vs. Dropbox from a Researcher’s Perspective** 2016
  - [https://michaelstepner.com/blog/git-vs-dropbox](https://michaelstepner.com/blog/git-vs-dropbox)

RESEARCH PAPERS

“The Insurance Value of Redistributive Taxes and Transfers” (Job Market Paper)

Progressive tax and transfer schedules serve a redistributive role by transferring from high-income to low-income individuals, but they also serve an insurance role by transferring from the high-income years to the low-income years within each person's lifespan. This paper examines how the design of the tax and transfer system provides insurance against income risks by studying the two largest economic shocks faced by working-age households: layoffs and illness. Using 1.6 million layoffs and 1.2 million hospital stays linked to Canadian tax records, I first show that both events cause persistent declines in earnings lasting more than six years. The full tax and transfer system provides substantial insurance against these risks, shrinking the percentage of income lost post-layoff by 40% and post-hospitalization by 60%, which I estimate to be worth 7-10% of total post-event consumption. But less than half of this social insurance comes from the unemployment and disability insurance programs that formally insure these risks. The progressive shape of taxes and transfers provides the majority of social insurance, and is especially important for reducing the risk of catastrophic income losses and mitigating inequality in the income risks of layoffs and hospitalizations. Using a dynamic model, I find that the insurance value of redistributive taxes and transfers is considerable across the entire income distribution, and is more than twice as large at the bottom of the income distribution than at the top.
“The Long-Term Externalities of Short-Term Disability Insurance”

This paper shows that employer-provided short-term disability insurance (STDI) increases long-term disability insurance (LTDI) take-up and imposes a negative fiscal externality on the government budget. Expanding private STDI has been touted as a way to lower public LTDI costs by giving employers a financial incentive to provide workplace accommodations. But private STDI can also raise public LTDI costs, since STDI generates moral hazard by providing benefits during the waiting period for LTDI. Using variation in private STDI coverage caused by Canadian firms ending their plans, I find that the moral hazard effect dominates and private STDI raises two-year flows onto LTDI by 0.07 percentage points (33%). Extrapolating to Canada's entire population, private STDI generated 18,300 LTDI recipients and CA$230 million dollars (5%) of public LTDI spending in 2015. The efficient Pigouvian tax on Canadian private STDI that internalizes this externality is approximately CA$35 per insured worker.

“Health Inequality Around the World: Comparing the Relationship Between Income and Life Expectancy in Ten High-Income Countries”

Lead author with Lorena Di Bono, Yiqun Chen, Raj Chetty, Luke Chu, David Cutler, Andreas Haller, Katja Hofmann, Jonas Minet Kinge, Claus Thustrup Kreiner, Hsien-Ming Lien, Kevin Milligan, Benjamin Milner, Thomas Minten, Torben Heien Nielsen, Petra Persson, Maria Polyakova, Tammy Schirle, Benjamin Ly Serena, Johannes Spinnewijn, Stefan Staubli, Tzu-Ting Yang, Yuting Zhang and Josef Zweimüller.

This paper studies the sources of cross-national differences in life expectancy using linked income tax and mortality data from Australia, Austria, Canada, Denmark, the Netherlands, New Zealand, Norway, Sweden, Taiwan and the United States. Building on the methods of Chetty et al (2016), we measure inequality in life expectancy by income percentile at age 40 within each country. We show that the gradient between income and life expectancy is significantly steeper in the United States than any of the nine peer countries studied. Men and women with below-median household income live more than two years longer in the nine other countries than in the United States. But life expectancies are similar in all countries for individuals with above-median income. In ongoing work, we examine how well the cross-national variation in the relationship between life expectancy and income is explained by differences in income inequality, progressive taxes and transfers, disease burdens, health behaviors, and health care systems.
**RESEARCH IN PROGRESS (CONTINUED)**

“The Value and Efficiency of Wage Insurance: New Evidence from an Old RCT” (with Ben Sprung-Keyser)

Wage insurance provides benefits to laid-off workers who find work at lower wages than their prior job, and has been touted as a way to help workers adjust to growing automation and offshoring. Yet there is little evidence about the efficiency costs or consumption smoothing benefits of wage insurance programs, in contrast to the extensive literature on optimal unemployment insurance. This paper uses newly linked data and modern welfare analysis to re-examine the Earnings Supplement Project, a large-scale RCT evaluation of wage insurance funded by the Canadian government in the mid-1990s.

**PUBLICATIONS IN MEDICINE**


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DOCTORAL STUDIES
Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected completion June 2020
DISSERTATION: “Lumpy Investment and Aggregate Demand”

DISSERTATION COMMITTEE AND REFERENCES
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Professor Ricardo Caballero
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PRIOR EDUCATION
University of Lausanne
MSc in Economics 2012-2014
BSc in Economics 2009-2012

CITIZENSHIP
Switzerland

GENDER: Male

LANGUAGES
French (native), English

FIELDS
Primary Fields: Macroeconomics
Secondary Fields: International Economics
TEACHING EXPERIENCE

14.454 Economic Crises (graduate)  
   TA to Professor Ricardo Caballero  
   Spring 2019

14.453 Economic Fluctuations (graduate)  
   TA to Professor George-Marios Angeletos  
   Spring 2018, 2019

14.73 The Challenge of World Poverty (undergraduate)  
   TA to Professor Nathan Lane and Frank Schilbach  
   Fall 2018

14.462 Advanced Macroeconomics II (graduate)  
   TA to Professors Jonathan Parker and Robert Townsend  
   Spring 2017

14.461 Advanced Macroeconomics I (graduate)  
   TA to Professors Daron Acemoglu and Iván Werning  
   Fall 2016

14.121 Microeconomic Theory I (graduate)  
   TA to Professor Alexander Wolitzky  
   Fall 2016

RELEVANT POSITIONS

Research Assistant to Professor Ricardo Caballero  
   2017

Research Assistant to Professor Iván Werning  
   2015-2016

Research Assistant to Professor Mathias Thoenig  
   2011-2014

FELLOWSHIPS, HONORS, AND AWARDS

Graduate Student Fellowship, MIT  
   2017

Award for Highest GPA, MScE, University of Lausanne  
   2014

Award for Highest GPA, BScE, University of Lausanne  

PROFESSIONAL ACTIVITIES

Rapporteur for NBER Macroeconomics Annual (2018-2019) to Professors Martin Eichenbaum, Erik Hurst and Jonathan Parker

RESEARCH PAPERS

“Investment Dynamics and Cyclical Redistribution” (Job Market Paper)

Demand for durable goods and residential investment is strongly pro-cyclical. Workers employed in the corresponding industries are imperfectly insured against these fluctuations, leading to distributional consequences during booms and busts. This paper studies the interaction between the cyclicality of durable demand and redistribution of labor income. I explore this feedback loop within a heterogeneous-agent New Keynesian (HANK) model with multiple sectors and lumpy durable adjustment. Income redistribution emerges endogenously when labor mobility between sectors is limited. Crucially, lumpy adjustment at the micro level generates non-linearities at the macro level. Redistribution of labor incomes is non-neutral and modulates the propagation of aggregate shocks. I find that the interaction between cyclical investment and redistribution dampens the aggregate response of durable investment during a typical recession. The lumpy nature of durable adjustment accounts for virtually the entire effect.
“Liquidity and Insurance in a Multi-Sector Economy”

I study the design of optimal unemployment insurance (UI) in a multi-sector economy with aggregate shocks. Sectoral labor mobility is costly, and borrowing is limited. I focus on the optimal timing of UI benefits and its interaction with liquidity frictions. I first explore the trade-offs in a partial equilibrium, heterogeneous agent model with two sectors. Wages are rigid, households face idiosyncratic employment risk, and search is directed across sectors. The degree of front-loading of UI benefits depends on two key sets of parameters: the cross-sectoral distribution of liquid asset holdings; and the (auto-)correlation of shocks across time and sectors. Taking stock, I extend this analysis using a general equilibrium, calibrated model. The economy consists of six sectors producing differentiated goods. Sectoral fluctuations are endogenous and result from a mix of monetary, fiscal and productivity innovations. I solve numerically for the optimal UI schedule and investigate its sensitivity to the persistence of (pecuniary) mobility costs and foregone earnings.

“Durable Pricing and Real Rigidities”

The relative price of (new) durable goods is acyclical in the data, which contributes to the strong volatility of investment. This price rigidity cannot be accounted for by differences in nominal rigidity or labor share between durable and non-durable sectors. This paper explores the role of state-contingent changes in the price elasticity of durable demand as a source of real rigidity. I proceed in three steps. First, I quantify the degree of (pro-)cyclicality of this price elasticity in a realistic model of durable demand with lumpy adjustment and incomplete markets. Then, I investigate its partial equilibrium implications for optimal, dynamic durable pricing with oligopolistic competition. Finally, I embed this mechanism into a heterogeneous agent, flexible-price model to quantify the role of this real rigidity for the non-neutrality of monetary shocks. As an extension, I introduce a secondary market with search-and-frictions.