MIT Economics

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DOCTORAL STUDIES

Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected completion June 2022
DISSERTATION: "Essays on Healthcare Delivery Innovations"

DISSERTATION COMMITTEE AND REFERENCES

Professor Jonathan Gruber
MIT Department of Economics
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Professor Joseph Doyle
MIT Sloan School of Management
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Professor John Van Reenen
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Professor Abhijit Banerjee
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PRIOR EDUCATION

Instituto Tecnológico Autónomo de México (ITAM), Mexico — 2017
M.A in Economic Theory, top 1%

Instituto Tecnológico Autónomo de México (ITAM), Mexico — 2017
B.A in Applied Mathematics, top 1%

Instituto Tecnológico Autónomo de México (ITAM), Mexico — 2015
B.A in Economics, top 1%

CITIZENSHIP Mexico **GENDER** Male

LANGUAGES English (fluent), Spanish (native)

FIELDS Primary Fields: Health Economics, Development Economics

Secondary Fields: Public Economics, Organizational Economics

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TEACHING EXPERIENCE

Data Analysis for social Scientists (EdX online) — 2020
Teaching Assistant to Profs. Esther Duflo and Sarah Ellison

Political Economy and Economic Development (undergraduate and DEDP master students) — 2020
Teaching Assistant to Profs. Abhijit Banerjee and Ben Olken

Strategy and Organization (MBA) — 2019
Teaching Assistant to Prof. Robert Gibbons

Organizational Economics (graduate) — 2019
Teaching Assistant to Prof. Robert Gibbons

Foundations of Development Policy (EdX online) — 2019
Teaching Assistant to Profs. Abhijit Banerjee, Esther Duflo, Ben Olken

Intermediate macroeconomics (ECO-V. ITAM) — 2015
Teaching Assistant to Prof. Alejandro Hernandez

Intro to microeconomics (4x) (ECO-1. ITAM) — 2013-15
Teaching Assistant to Prof. Magdalena Barba

Minor Faculty at ITAM- tutoring students — 2012-14

RELEVANT POSITIONS (ACADEMIA)

Research Assistant to Profs. Joseph Doyle and John Van Reenen — 2019-2022
Research Assistant to Prof. Kensuke Teshima — 2016-2017
Research Assistant to Prof. Enrique Seira — 2016-2017
Research Assistant to Prof. Nicolas Melissas — 2015-2017

RELEVANT POSITIONS

Health Economist at Petroleos Mexicanos (PEMEX) — 2016-2017

- Served as Liaison between CEO and Medical Director.
- Designed and implemented healthy habits behavioral nudges for 120,000 workers. Program rewarded workers for healthier behaviors so that the burden of diabetes would be reduced.
- Modeled disability and retirement costs to restructure retirement plan. Model was used as the base for designing changes.
- Improved efficiency of medical supply allocation by shifting resource allocation across hospitals.

Project Coordinador at Instituto Mexicano del Seguro Social (IMSS) — 2014-2016

- Created novel datasets by combining different administrative sources. Data contains employment history for 30 million people and health records for 130 million.
- Incorporated machine learning algorithms into diabetes testing decisions. Led to 90% increase in diagnosis.
- Designed pay for performance scheme for private diabetes care supplier. Aim was to improve care without added costs.

AWARDS AND HONORS

Ex-ITAM Best Thesis Award — 2017
FUNSALUD 30th Anniversary Best Public Health Research — 2015

GRANTS AND FELLOWSHIPS

George and Obie Shutlz Fund — 2019

Eli Lilly Global Health Initiative: $1.5 million USD — 2018
Mexico Fund Fellowship — 2017, 18, 20

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PROFESSIONAL ACTIVITIES	Referee for Journal of Public Economics Organizer of AILatin American Summit Policy Advising for the Government of Yucatán Consulting for Social Impact Incentives Gaceta de Economia editorial board
INVITED PRESENTATIONS	Interamerican Development Bank (2021), Policy Seminar at Tecnológico de Monterrey (2020), MIT Better World campaign (2020), Evaluation Week in Mexico (2020), Lilly Global Health (2019)
OTHER ACTIVITIES	Graduate Economic Association Social Chair Graduate Housing Committee at MIT Site 4 Graduate Dorm. Advisory board Eastgate Graduate Dorm. Events Coordinator

RESEARCH PAPERS

"Texting to Save Lives: Evidence from a Reform in Cardiovascular Treatment" (Job Market Paper)

Can widely available technologies be leveraged to reduce healthcare fragmentation in a cost-effective way? I evaluate a program implemented by the largest public healthcare provider in Mexico (IMSS) to reduce heart attack mortality by minimizing the time to treatment for patients. The program improves within-hospital capabilities and increases across-hospital transfer coordination through a group chat. I first document a large effect among hospitals that have a higher survival gap relative to the specialized centers they send patients to: survival rates increase by 29% (11 percentage points) and transfers by 85% (5 percentage points). I then present a model that disentangles the capabilities and communication channels and allows me to link the reduced-form results to structural parameters. A counterfactual policy analysis shows that the chat groups are responsible for 67% of the survival effect and that, without the improvements in capabilities, transfers would have been substantially higher. Additional exercises highlight a degree of substitution between both components.

"Can Privatized Health Care Add Value? The Mexico Diabetes Experiment"
(With Jonathan Gruber and Enrique Seira)

We implement a novel deniers randomization evaluation of a private supplement to the free public health system for one of the world's deadliest health problems, diabetes. We estimate enormous impacts of the private supplement, increasing the share of those treated who are under control by 69%. This effect arises through both improved treatment compliance and health behaviors. Diabetes complications fall in the short run. The net costs of this intervention are at most one-third of the gross costs, and the returns to private care do not appear to reflect more productive delivery but rather more attachment to medical care.

"The impact of Healthcare IT on Clinical Quality, Productivity and Workers"
(With Joseph Doyle and John Van Reenen)

Adoption of health information and communication technologies ("HICT") has surged over the past two decades. We survey the medical and economic literature on HICT adoption and its impact on clinical outcomes, productivity, and labor. We find that HICT improves clinical outcomes and lowers healthcare costs, but (i) the effects are modest so far, (ii) it takes time for these effects to materialize, and (iii) there is much variation in the impact. More evidence on the causal effects of HICT on productivity is needed to guide further adoption. There is little econometric work directly investigating the impact of HICT on labor, but what there is

suggests no substantial negative effects on employment and earnings. Overall, while healthcare is "exceptional" in many ways, we are struck by the similarities to the wider findings on ICT and productivity stressing the importance of complementary factors (e.g. management and skills) in determining HICT impacts.

Risk-Profiling of Potential Diabetics at IMSS: A Logistic Regression Approach
(With Christian Norton, Oscar Sanchez, Kevin Schmidt, Carlos Tendilla)

Modern public medicine is increasingly relying on preventive rather than corrective action. Preventive care is proving cost-effective and desirable, as it can reduce length of convalescence and treatment expenditures while allowing for better living conditions for patients and improving longevity. We are able to estimate the risk of being diagnosed with Type 2 Diabetes Mellitus on individuals that attended a medical clinic from Mexico's Institute for Social Security (IMSS) between 2012 and 2014. The results show that by applying our risk-profiling criteria for confirmatory laboratory test referral and without performing any additional medical tests, fifty- thousand additional diabetes cases would have been detected, which means a 90% increase in diagnosis. Highlighting the public-policy relevance of these conclusions, and leveraging the structure of IMSS databases, we introduce a simple questionnaire that would allow risk-profiling to be applied to the population at large.

RESEARCH IN PROGRESS

"Why Patients Abandon Treatment?"
(With Jonathan Gruber and Enrique Seira)

A large share of patients with chronic diseases abandon treatment. Although there is a strong presumption that this hurts their health, causal evidence is lacking. We are conducting an RCT with 3,000 diabetic patients enrolled to a private one-stop shop clinic for diabetes to understand treatment attrition and its consequences. In particular, we first offer incentives to continue enrollment in order to estimate the causal effect of staying in treatment, knowledge of diabetes, expectations of treatment effectiveness, and estimated cost of complying with treatment. Second, we randomize the incentives to see whether it is more cost effective to incentivize clients to stay ex-ante, or to bring the abandoners back through a subsidy. The latter may be better targeted, but the former may encourage patients from the beginning to continue their treatment, therefore improving outcomes and retention. Third, we cross-randomize with a personalized information intervention to investigate whether it increases their knowledge and causes them to stay longer in treatment.

"Effect of Information Technology on the Healthcare Workforce"
(With Joseph Doyle and John Van Reenen)

The literature on health information technology adoption highlights overall positive but small effects on productivity, with vast heterogeneity in effects. However, very little is known about the effect of healthcare IT on the workforce empirically. Understanding the effects of health-IT on the health workforce is paramount as the U.S has dramatically increased its health-IT adoption rates over the past decade from under 20% in 2007 to 90% by 2015). In this project, we explore the relationship between health IT adoption and the healthcare workforce causally by exploiting a novel law adoption dataset that captures 19 legal dimensions related to health IT at the state level, yearly, from 2000 to 2020. We analyze the effects of adoption at the local labor market level, which enables us to track substitution patterns and overall effects at the industry level.

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Cost-Effectively Increasing Healthcare Access for Seniors
(With Jonathan Gruber and Eduardo Rivera)

Centralized public healthcare systems often fail to provide an accessible solution for seniors who cannot commute to a faraway clinic on their own, leading to under-provision of care and a significant toll on family members who must take them. Through a randomized controlled trial with 8,000 seniors, this project analyzes the tradeoffs between offering at-home visits or a mobile medical unit near the patient's home on certain days. Both services include the ability to schedule appointments through a call center. The former is more convenient but expensive and the returns on such an effort are not known. The latter is an innovative solution that may prove efficient and feasible. On top of that, we will cross-randomize whether assigning a case monitor to each patient is more effective than simply offering increased access and waiting for seniors to ask for service. We will also get information from close family members to measure the spillover effects of increased senior access to health on productivity, income, and mental state.

MEDIA COVERAGE

Spectrum, El Norte, Conexion, MIT news, The Visible Hand, VOXDev and LSE Business Review