

Research Statement

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My academic career has been driven by a deep commitment to three core areas: research, teaching, and academic program development. My research agenda centers on development economics, with a particular focus on improving the targeting of social programs, the study of different aspects of conditional cash transfer programs, and the analysis of policy/relevant health interventions. In my teaching career I have developed courses at the graduate and undergraduate level, being the applied microeconometrics courses the ones I have developed more thoroughly. As graduate and undergraduate program director, I have found great fulfillment in supporting students throughout their academic journeys and in leading efforts to keep the curriculum responsive to a rapidly evolving world.

1 Research agenda

1.1 Targeting

Recent papers that I have written advance our understanding of several aspects of targeting strategies in social programs. In particular, two recent papers that I developed give new interesting insights about the use of proxy-means test (PMT) to select recipients. In *Rewriting the Algorithm: School Committees, Misreporting, and Machine Learning in a Social Program Targeting* (joint with Vicente López), I contrast three components of PMT targeting. Targeting in this paper selects high school applicants to a stipend / cash-transfer program. First, I contrast the difference in the profile of recipients selected between a centralized PMT process and a decentralized system involving school-based committees. Second, I use a secondary data source to inspect the risk and impact of information misreporting in the program application process. Third, I employ machine learning strategies to inspect how different is the selection of beneficiaries if the targeting is done based on the program's objective (i.e. reducing dropout) rather than selecting the most vulnerable participants. I came into the project expecting some differences, but finding that between 39% and 49% of recipients would have been different under the above variations surpassed my expectations of the sensitivity of these components.

In *From Means-Tested to Universal Antipoverty Programs: Distributional and School Dropout Consequences* (joint with Roberto González, Santiago Ochoa

and Horacio Reyes), I extend this line of research by comparing a PMT assignment with a long history and proved success (PROGRESA's targeting strategy) to a semi-universal assignment. In this latter assignment, a mix of geographical and administrative (i.e. public schools) standards are employed to filter the schools where the program would be universally implemented. This is the basis of the program *Becas Benito Juarez*, which recently substituted PROGRESA. In this paper we analyze the distributional impact and study the effect on school dropout that results from this different targeting mechanisms.

Harnessing from a rich set of administrative, Census and survey information that we have successfully constructed after several open data requests to the government and the use of reserved survey information at the Mexican Statistics Bureau (INEGI), I am currently collaborating with several graduate students and researchers at ITAM to extend this line of work. We have already constructed data to analyze labor market impacts, household's distribution of expenditures, targeting sensitivity to information misreporting and electoral impacts. All this work will focus on the targeting component, but will also delve on the policy impact of the transition of a program with such an extended history and curriculum as PROGRESA.

An additional extension of this line of work is a joint project that I am currently doing with Kensuke Teshima and Elyana Ramos in which we compare a proxy-means test under two different implementations for the information gathering: a comprehensive data collection in every single household that could be eligible (i.e. a Census-type data collection) to a self-selection strategy in which households have to apply to the program for their possible inclusion.

A different approach to targeting can be found in *The domino effect in centralized school assignment: the case of Mexico* (joint with Adrián Martínez, Jorge Pérez, and Cristián Sánchez). This paper investigates the consequences that result from a shock in a school centralized assignment process. For many years, Mexico City employed a serial dictatorship mechanism to assign seats in public high schools in Mexico City. Each year more than 300,000 students were assigned following this competitive process in which students are rank-ordered in their school assignment with a multidisciplinary test. In the 2017 process, almost 15k applicants had their test incorrectly graded. This had far reaching consequences, since an incorrect score might impact students that were correctly graded because of the competitive nature of the assignment process. We estimate that, even though authorities tried to rectify the grading mistake, the fact that the assignment had already been done caused an incorrect assignment of more than 25% of total applicants. In our paper, we seek to estimate welfare impacts of the shock, educational and labor consequences by matching our data with administrative information.

Finally, a pilot project that I developed (jointly with Maria Elena Ortega) some years ago framed targeting as the efficient and personalized use of school inputs. In this project we seek to develop an algorithm that based on a diagnosis test, would recommend reading resources for children in their early schooling years (first to third grade) based on their abilities and reported interests. This project would contribute to the recent literature that has been developed about

teaching at the right level and personalized education, which in my view is a promising avenue in the wake of AI.

1.2 PROGRESA and social policy

The worldwide renown social program that led the implementation of conditional cash transfer programs has always been of interest to me. My most recent work related to aspects of PROGRESA is *Going Big in Health: Effect of a Large-Scale Preventive Health Policy* (joint with Ricardo Gómez and Adrián Rubí). Motivated by the program's design which requires every household member to regularly attend preventive health visits (at least once per year), we employ administrative information at the clinic level to analyze if visits to the clinic indeed increased for individuals aged below 17 (children receiving the educational benefits of the program) and between 20 and 49 (the household parents). We were particularly interested to analyze if the program provoked any displacement effect of clinic attendance to the elderly caused by increased waiting times (which we document that indeed happened). The paper is centered in understanding what do beneficiaries do during those visits given that they did not attend by their own motivation.

Furthermore, in *Long-Term Effects of PROSPERA on Welfare* (joint with Cristina Barnard and Giacomo de Giorgi), we contribute to the literature by analyzing long-term benefits of the program that are reflected in greater intergenerational mobility, higher likelihood of forming a new and independent household, and better expenditure patterns. This paper employed a 2017 data collection that followed the original panel of PROGRESA's RCT.

1.3 Health and Early Child Development

My PhD job market paper, *El Niño and children: Medium-term effects of early-life weather shocks on cognitive and health outcomes* (joint with Marta Vicarelli) analyzed the developmental and anthropometric impacts of a climatic shock suffered early in life. Given the long-term documented impacts on education related to the *fetal origins hypothesis*, this paper contributes to our understanding of the developmental mechanisms driving those effects. We find that children affected in-utero and up to 2 years of age have worse language, long-term memory and visual-spatial thinking development by six years of age. The literature suggests that these skills prove to be critical for later educational outcomes.

This work motivated a follow-up project named *Supporting healthier pregnancies and early child development one text at a time*. The project created a two-way SMS information system that delivered information timed with the delivery date. The information included: checkup reminders, prompts to plan for birth, information on potential concerns, preventive health care advice and emergency actions. The project was designed as a large-scale RCT with a control group and three treatment arms: (1) only SMS system, (2) SMS system plus community involvement, (3) SMS system plus incentives to health care providers

based on user evaluations. In addition, the SMS content had two variations (randomized as well): (1) messages with motivational and socio-emotional content, and (2) regular messages removing any emotional or motivational expression. Both sets of messages include the same health information and functionality previously described. The project was implemented in 655 clinics along five states in Mexico and had the participation of several institutions, including: the Mexican Ministry of Health, the Mexican Institute for Social Security (IMSS), UNICEF, Babycenter, and UK’s Behavioral Insights Team. After the government transition, this project did not receive further support to evaluate the final result. Still, jointly with Cesar Landín and Manett Vargas, we have managed to use aggregate information at the municipal level and to imperfectly match information from birth records. We expect to estimate an ITT with the data, but this is still work in progress.

Finally, I have analyzed different policies with interesting features. In *Benefits and Unintended Consequences of Gender Segregation in Public Transportation: Evidence from Mexico City’s Subway System* (joint with Emilio Gutierrez and Paula Soto), we analyze the impacts of gender segregation in the Mexican subway system to estimate reductions in sexual violence, but increases in verbal insults and physical aggression. Furthermore, in *he Effectiveness of Sin Food Taxes: Evidence from Mexico* (joint with Emilio Gutierrez and Enrique Seira), we estimate that the Mexican tax on soda and junk food does not display the intended impacts in improving diets due to substitution. Even though soda consumption was reduced (as argued in other papers), calories and sugar consumption were not significantly affected.

2 Teaching and student advising

Teaching is one of the most fulfilling aspects of my career. I design each course to be research-informed, data-driven, and responsive to new developments. In my *Applied Microeconometrics*, *Applied Econometrics* and *Causal Inference* courses, for example, I integrate the newest advances in causal inference—including staggered DiD designs—into the curriculum. Each semester I create new problem sets where students must use real data to solve policy-relevant problems. Some projects require them to design surveys, gather data, and analyze it themselves, building a wide set of applied research skills. As a result of the material I have developed for students, I have organized my notes in a book-style format (see [here](#)).

I also encourage students to adopt AI tools: they may use copilots to support their programming, reflecting my philosophy that AI should complement and extend analytical skills. My courses combine theory with practice, ensuring students leave not only with econometric knowledge but also with strong problem-solving, data collection, and programming abilities. The evaluations I have received from students awarded me a *Teaching Distinction* for being one of the top five evaluated teachers during one semester.

Beyond the classroom, I have advised over 40 theses, served on more than

100 committees, and written more than 50 graduate school recommendations. Many of my former students are now thriving in graduate programs, academic careers, government and industry.

3 Directive duties

At ITAM I have been given two directive roles that have proven to be quite inspiring.

Director of Masters in Economics Theory. In 2021 I was invited to be Co-Director of the master program in ITAM that prepares students for PhD applications. During my time as director, I had 41 students being part of the program. My responsibilities mainly involved following the students coursework progress, overseeing PhD applications and attract new talent. Since our cohorts are relatively small, my main approach was to be close to the students. I personally spoke to each student at least once per semester. In addition, I developed three projects: (i) a brown bag lunch in which students present their research at several stages of development and begin to foster skills to present their work, (ii) a GRE competition to promote that students begin to prepare the test early and collaborate with their peers, and (iii) a 30-minute tea with our weekly seminar visitor to provide our students exposure to researchers visiting from other universities. The first two projects are still implemented nowadays.

Director of the Economics Undergraduate program. Last year, I had the privilege to be invited to direct the Economics Bachelor program. Historically, this is ITAM's most renowned program. Also, I was fortunate to be involved in the last phase of its curriculum renewal. My passion and commitment to education and the current context in which AI will play a key role is a very exciting time to be involved in the program development and to be in close contact with students. In the short time I have been involved I have developed some initiatives for students. Mainly, the EcoWeek, which is a yearly event that mixes formal talks and conferences geared towards students in all levels, interactive economic-themed activities (e.g. a simulator of the stock exchange operations), visits to economically relevant places (e.g. the bill factory), and fun informal activities to socialize. Also, to support students in a difficult academic situations I have promoted special labs that teach to the level and follow up regularly with students in face-to-face meetings.