Mateus Nogueira Meirelles de Souza

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Education

Ph.D., Agricultural and Applied Economics
University of Illinois at Urbana-Champaign, 2020 (expected)
Dissertation Title: Three Essays on Energy Efficiency Economics: market failures, behavioral nudges, and suboptimal investments

B.S., Economics
University of Sao Paulo, Ribeirao Preto, SP, Brazil, 2013

Fields of Concentration

Primary
Environmental Economics
Applied Econometrics

Secondary
Natural Resource Economics
Household Economics

Publications

Souza, M. N. M. (2018) "Why are rented dwellings less energy-efficient? Evidence from a representative sample of the U.S. housing stock." *Energy Policy* 118, pp. 149-159.

Working Papers

Erica Myers and Mateus Souza (2018) "Social Comparison Nudges Without Monetary Incentives: Evidence from Home Energy Reports." *E2e Working Paper* 041. *(revise and resubmit, JEEM)*

Research in Progress

"Predictive Counterfactuals for Event Studies with Staggered Adoption: recovering heterogeneous effects from an energy efficiency program in the US" *(job market paper)*

"Decomposing the Wedge: Mechanisms driving the gap between projected and realized returns from energy efficiency programs." With Peter Christensen, Paul Francisco, and Erica Myers.

"Air pollution and cardiovascular health: evidence from agricultural fires in India." With Hemant K. Pullabhotla.

Teaching Experience

Teaching Assistant for ACE210 (Environmental Economics) at UIUC. Fall 2018, Spring 2019, and Fall 2019. Undergraduate course for students majoring in economics, agricultural economics, urban planning, and others. My primary responsibilities were to lead weekly discussion/problem solving sections, as well as grading assignments and exams.

Professional References

Erica Myers (chair)
Assistant Professor
University of Illinois, ACE
ecmyers@illinois.edu

Peter Christensen
Assistant Professor
University of Illinois, ACE
pchrist@illinois.edu

Don Fullerton
Gutgsell Professor
University of Illinois, Finance
dfullert@illinois.edu

Madhu Khanna
ACES Distinguished Professor
University of Illinois, ACE
khanna1@illinois.edu

Full-Time Pre-Doctoral Employment

Grupo Sao Francisco, Ribeirao Preto, SP, Brazil (2013)

- Grupo Sao Francisco is a Brazilian health insurance company. I was an analyst in their marketing division. My primary responsibilities were to: conduct price, competitor and market analyses; develop client and vendor satisfaction surveys; monitor the brand's health in social networks and online press.

Selected Conference Presentations

"Decomposing the Wedge: Mechanisms driving the gap between projected and realized returns from energy efficiency investments."
- **2019 Camp Resources**, Asheville, NC. (August 2019)
- **2019 Agricultural and Applied Economics Association (AAEA) Annual Meeting**, Atlanta, GA. (July 2019)
- **2019 Association of Environmental and Resource Economists (AERE) Summer Conference**, Incline Village, NV. (May 2019)

"Social Comparison Nudges Without Monetary Incentives: Evidence from Home Energy Reports."
- **2018 Heartland Environmental and Resource Economics Workshop**, Urbana, IL. (September 2018)
- **2018 Agricultural and Applied Economics Association (AAEA) Annual Meeting**, Washington, DC. (August 2018)
- **7th Mannheim Energy Conference**, Mannheim, Germany. (May 2018)

"Why are Rented Dwellings Less Energy-Efficient? Evidence from a representative sample of the U.S. housing stock."
- **5th Economics of Low-Carbon Markets Workshop**, Sao Paulo, Brazil. (December 2017)
- **2017 Association of Environmental and Resource Economists (AERE) Summer Conference**, Pittsburgh, PA. (June 2017)
- **5th International Symposium on Environment and Energy Finance Issues (ISEFI)**, Paris, France. (May 2017)

Awards and Fellowships

CAPES Science Without Borders Fellowship
- University of Illinois at Urbana-Champaign (2014 - 2018)

iSEE Levenick Fellowship
- University of Illinois at Urbana-Champaign (2016)

FAPESP Undergraduate Research Fellowship
- University of Sao Paulo (2012 - 2013)

Other Professional Activities

Big Data in Environmental Economics and Policy (BDEEP) Research Group, University of Illinois at Urbana-Champaign (2017 - present)

President of the Graduate Students' Organization of the Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign (May 2017 - April 2018)

Additional Information

Software proficiency:	Stata, R, Python, LaTeX, Microsoft Office
Languages:	English (fluent), Portuguese (native), French (intermediate)

Abstracts for Research in Progress

"Predictive Counterfactuals for Event Studies with Staggered Adoption: recovering heterogeneous effects from an energy efficiency program in the US." *(job market paper)*

Abstract: This paper contributes to a growing literature in machine learning applications to recover causal effects. The focus is on event studies with staggered adoption: for which treatment dates are known and vary across units. First, I build on the potential outcomes framework to clearly define parameters of interest in such settings, as well as identifying assumptions. Then I introduce a two-step method for causal inference in such settings. The first step of the method involves using machine learning to flexibly predict a distribution of counterfactual (potential) outcomes of treated units. A distribution of treatment effects can then be obtained by taking the difference between potential and realized outcomes. Finally, effects can be aggregated for different portions of the sample, thus allowing for identification of heterogeneity. I propose cross-validated (out-of-sample) errors as a measure of reliability of the predictive step. Simulations demonstrate that, contrary to standard difference-in-difference estimators, the proposed two-step method is robust to dynamic (time-varying) treatment effects, and imbalances across treated and control groups. The approach is also more efficient than traditional impact evaluation estimators. I conclude with an application to recover treatment effect heterogeneity (in reduced energy consumption) for homes served by the Weatherization Assistance Program in Illinois. I find that furnace replacements are associated with significantly higher savings compared to furnace repairs. Home insulation measures are also among the strongest contributors to energy savings. It was also possible to identify which types of homes (in terms of housing structure and demographics) benefitted the most from the program.

"Decomposing the Wedge: Mechanisms driving the gap between projected and realized returns from energy efficiency programs." With Peter Christensen, Paul Francisco, and Erica Myers.

Abstract: Our paper examines the gap between projected and realized energy savings from a subset of homes in the Weatherization Assistance Program (WAP). Consistent with previous literature, our results from standard econometric estimators suggest that WAP realized savings, on average, fall short of ex ante projections. Building on literature for heterogenous treatment effect estimation, we further decompose this gap using a rich set of utility, energy audit, and administrative data. With tree-based machine learning models, combined with a difference-in-differences framework, we predict counterfactual outcomes that allow us to obtain estimates of energy savings and of the gap for each home. We find that, while wall insulation may be a strong contributor to energy savings, ex ante projections are biased upward for spending on that measure. Conversely, ex ante projections appear to underestimate the benefits of furnace replacements. Our ML approach also allows us to perform cost-benefit analyses for each home in our sample. We identify significant heterogeneity in cost-effectiveness, such that there are homes with a performance gap close to zero. Our findings suggest that residential retrofit programs could be more cost-effective by targeting highly responsive homes. Further, such programs can likely benefit from ex post measured savings to improve predictive models of upgrade or home-specific savings.

"Air pollution and cardiovascular health: evidence from agricultural fires in India." With Hemant K. Pullabhotla.

Abstract: This paper uses high-resolution satellite data on agricultural fires to generate plausibly exogenous variation in exposure to air pollution across all of India. We then asses the impact of pollution exposure on hypertension and cardiovascular stress, as measured by blood pressure levels. Results suggest that individuals exposed to 10 upwind fires within 75km of their residences have a 0.24% increased probability of experiencing moderately high to severely elevated blood pressure. That effect is stronger (0.32%) for rural households. Downwind firs are shown not to be associated with those effects. Further, we find no evidence of short-term impacts of pollution exposure on incidence of anemia or elevated blood glucose. Our results contribute to a growing literature on quantifying air pollution damages to health, which in turn can lead to decreased labor productivity.