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: Three Essays on Energy Efficiency Economics: Market Failures, Behavioral Nudges, and Suboptimal Investments

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

Fields of Concentration

Primary	Secondary
Environmental Economics	Natural Resource Economics
Applied Econometrics	Household Economics

Publications

Mateus Souza (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, Journal of Environmental Economics and Management)*

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, Fall 2019. Undergraduate course for students majoring in economics, agricultural economics, natural resources, urban planning, and others. My primary responsibilities were to lead weekly discussion/problem solving sections, as well as grading assignments and exams.

Selected Conference Presentations

"Decomposing the Wedge: Mechanisms Driving the Gap Between Projected and Realized Returns from Energy Efficiency Programs."
- Heartland Environmental and Resource Economics **(HERE)** Workshop, Urbana, IL. (Sep. 2019)
- **Camp Resources**, Asheville, NC. (Aug. 2019)
- Agricultural and Applied Economics Association **(AAEA)** Annual Meeting, Atlanta, GA. (Jul. 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."
- Heartland Environmental and Resource Economics **(HERE)** Workshop, Urbana, IL. (Sep. 2018)
- Agricultural and Applied Economics Association **(AAEA)** Annual Meeting, Washington, DC. (Aug. 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 **(LCM)** Workshop, Sao Paulo, Brazil. (Dec. 2017)
- 2017 Association of Environmental and Resource Economists **(AERE)** Summer Conference, Pittsburgh, PA. (Jun. 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, SQL, Microsoft Office
Languages:	English (fluent), Portuguese (native), French (intermediate)

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
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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 on machine learning applications for causal inference. I propose a novel method that uses counterfactual predictions to recover heterogeneous treatment effects in event studies where subjects have different treatment/exposure dates (i.e. staggered adoption). Recent econometric literature shows that traditional regression specifications can be near-term biased in such settings. I introduce an approach that does not suffer from that bias and that can recover heterogeneous effects accurately and efficiently. The method can be summarized as follows: first, use machine learning to flexibly predict a distribution of counterfactual outcomes for treated units; second, obtain treatment effects by subtracting predicted counterfactuals from true post-treatment outcomes; third, summarize or aggregate the effects for different portions of the sample, thus identifying heterogeneity. Simulations demonstrate that the method is robust to dynamic (time-varying) treatment effects and imbalances across treated and control groups, which are often threats to traditional impact evaluation estimators. The approach is also more efficient than standard difference-in-differences. I conclude with a real-data application to recover treatment heterogeneity for homes served by the Weatherization Assistance Program. While previous literature focuses on Program average effects, I am able to identify specific measures/upgrades that are associated with higher energy savings.

"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 fires 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.