Bruno Furtado

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Education

2017 - May 2023 (expected)	PhD in Economics **Columbia University GSAS**, New York, USA *Committee*: Navin Kartik (chair), Mark Dean, Jose Luis Montiel Olea
2013 - 2015	MSc in Economics **University of Brasília**, Brasília, Brazil
2006 - 2011	Bachelor of Economics **University of Brasília**, Brasília, Brazil

Fields

Primary: Microeconomic Theory

Secondary: Econometrics

Research Interests: Decision Theory, Information Economics, Mechanism Design, Econometrics

Research

Working Papers

1. **Job market paper:** *"The Behavioral Implications of Statistical Decision Theory"*

   Abstract: Statistical decision theory (SDT), which models the information acquisition and decision under uncertainty problems as strategic games against Nature, is the preferred framework used to study information economics. Surprisingly, axiomatic representations of statistical decision theoretic models have hitherto been absent from the literature, leaving the exact behavioral implications of such models unclear. This paper provides axioms on preferences over the objects of choice of SDT – decision rules and experiments – that characterize a very general statistical decision theoretic model. Using the representation of this base model and a result that connects SDT to the Anscombe-Aumann framework, I then develop a methodology to import existing representation results from classic decision theory into SDT. I illustrate the power of this technique by providing representations of SDT versions of some widely used decision theoretic models. While I initially axiomatize preferences over decision rule-experiment pairs, many applications are concerned only with choices between decision rules for a given experiment, or with choices between experiments paired with a specific decision rule. To bridge the gap between the main representation results and these applications, I also characterize when such choices are derived from a single preference over pairs of decision rules and experiments.

2. *"Statistical Mechanism Design: Robust Pricing and Reliable Projections"*
   with Duarte Gonçalves

   Abstract: This paper studies the robustness of pricing strategies when a firm is uncertain about the distribution of consumers' willingness-to-pay. When the firm has access to data to estimate this distribution, a simple strategy is to implement the mechanism that is optimal for the estimated distribution. We find that such empirically optimal mechanism boasts

strong profit and regret guarantees. Moreover, we provide a toolkit to evaluate the robustness properties of different mechanisms, showing how to consistently estimate and conduct valid inference on the profit generated by any one mechanism, which enables one to evaluate and compare their probabilistic revenue guarantees.

3. *"Rational Choice with Full-Comparability Domains"*
with Leandro Nascimento and Gil Riella

Abstract: We propose a new model of choice in the presence of incomplete preferences. Instead of simply choosing an element which is maximal according to her preferences, the decision maker divides the space of alternatives into subdomains inside which her preferences are complete. She then acts fully rationally and maximizes her preferences inside these domains of full comparability. Representation theorems are given in which the decision maker always satisfies a weaker form of the Weak Axiom of Revealed Preference and different postulates are imposed on a general notion of revealed preference. They identify a class of choice functions that is nested between choice functions represented by multiple rationales and the standard model of rational choice.

Work in Progress

4. *"Identifiability of Finite Mixture Models via Non-negative Matrix Factorization"*

Abstract: High-dimensional latent parameter models, such as finite mixtures and topic models, are notoriously only set identifiable, in general. By establishing directly verifiable conditions under which a matrix has a unique exact non-negative factorization (up to permutations), I provide sufficient conditions for point identifiability of mixture models. Since these conditions are imposed on the data matrix before factorization, they can be checked prior to estimation. I also show that, when the model is identifiable, approximate non-negative matrix factorization provides a consistent, likelihood-free estimator of mixture weights. Applications include identifiability and point estimation of topic models.

Conference Presentations

2022	26^{th} Spring Meeting of Young Economists, Orléans, France Title: *"Behavior under Uncertainty in Statistical Decision Problems"*
2019	41^{st} Meeting of the Brazilian Econometric Society, São Paulo, Brazil *Economic Theory Prize Session* Title: *"Rational Choice with Full-Comparability Domains"*
2015	37^{th} Meeting of the Brazilian Econometric Society, Florianópolis, Brazil Title: *"Rational Choice with Categories"*
2014	International Workshop of the Game Theory Society, São Paulo, Brazil Title: *"Auction Design and Collusion in Public Procurements"*

Distinctions and Awards

2019/2020	Dhrymes Econometrics Award of the Columbia University Economics Department
2019	Brazilian Econometric Society best paper award in Economic Theory for *"Rational Choice with Full-Comparability Domains"*

Grants

2017 - 2023	Columbia GSAS Dean's Fellowship
2017 - 2022	Wueller Fellowship
2022	Columbia University GSAS Dissertation Fellowship
2022	Columbia University Department of Economics Teaching Fellowship
2020	MTI Summer Reseach Grant
2019	PER Summer Research Fellowship
2020	Sander's Fellowship for Promising Students in the Department of Economics
2013 - 2015	CNPq Fellowship for MSc. Program in Economics

Teaching Experience

TA Appointments at Columbia GSAS

2021	• PhD Mathematical Methods for Economists, Prof. Elliot Lipnowski • PhD Introduction to Econometrics II, Profs. Jushan Bai and Simon Lee
2020	• PhD Introduction to Econometrics I, Prof. Jose Luis Montiel Olea • Behavioral Economics, Prof. Mark Dean
2019	• Cognitive Mechanisms and Economic Decisions, Prof. Michael Woodford • Principles of Economics, Profs. Sunil Gulati and Wouter Vergote
2018	• Principles of Economics, Prof. Anna Musatti

Work and Research Experience

2019 - 2020	Research Assistant at the Columbia University Department of Economics *Supervisor:* Navin Kartik
2014 - 2017	Finance and Control Auditor at Brazil's Treasury Department, Brasilia, Brazil *Economic Affairs Advisory/Cabinet of the Minister of Finance*
2009 - 2010	Research Assistant at Sustainable Development Centre (CDS) - UnB, Brasília, Brazil *LUPIS Project Scholar*
2008 - 2009	Intern at Integration Ministry, Brasília, Brazil *Budget and Finance Coordination*

Languages

Portuguese (Native), English (Fluent), Spanish (Intermediate), Japanese (Intermediate)

Computer Skills

Wolfram Mathematica, R, C, Matlab, LaTeX, Office.

References

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