William Brasic

Third-Year Doctoral Student in Economics

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Education

The University of Arizona — May 2027
Ph.D., Economics

University of Nevada-Las Vegas — May 2022
M.S., Data Intelligence and Applied Economics

University of Nevada-Las Vegas — August 2020
B.A., Economics (Magna Cum Laude)

Research Interests

Industrial Organization, Antitrust and Competition Policy, Applied Econometrics, Applied Machine Learning

Research

Working Papers

When Asymmetric Pricing Algorithms Collide

Reinforcement Learning, Industrial Organization, Antitrust, Game Theory, C++, MATLAB

- Algorithms are increasingly superseding humans in the pricing of goods and services, enabling firms to adapt to shifting market dynamics with greater precision. Despite the widespread adoption of these algorithms, there remains a scarcity of knowledge regarding their specific configurations and their impact on competition. I assess whether asymmetric reinforcement learning-based pricing algorithms can learn to engage in tacit collusion within a repeated Bertrand-Markov pricing environment. My analysis reveals that diverse algorithms can indeed learn to tacitly collude, consistently setting and sustaining prices above competitive levels. This practice results in enhanced firm profitability, while concurrently diminishing consumer welfare.

Works in Progress

Tacit Algorithmic Collusion when Platforms Use Recommendation Systems

Reinforcement Learning, Industrial Organization, Antitrust, Game Theory, C++, MATLAB

- Algorithmic pricing, powered by AI, raises concerns about fostering supracompetitive outcomes in markets, even without explicit coordination leading to tacit collusion. Simultaneously, platforms increasingly deploy AI-driven recommendation systems (RSs) to decide which products to display to users. This paper models pricing competition through a multinomial logit model with heterogeneous consumer preferences where firms use pricing algorithms on a platform using RSs, both relying on reinforcement learning (RL). The findings reveal that while RL-based pricing algorithms can achieve anti-competitive outcomes, increased consumer heterogeneity and AI-driven RSs on platforms can mitigate collusive tendencies, alleviating concerns of antitrust authorities.

Financial Literacy and Senior-Aged Food Insecurity

with Courtney Coughenour and Ian K. McDonough

Health Economics, Applied Econometrics, R

- Food insecurity remains one of the most significant public health concerns in the United States today with this being particularly true for the senior population. Using original survey data collected in Clark County, NV, we investigate the link between financial literacy and senior food security relying on perceived parental financial confidence as an exclusion restriction. Our results indicate that financial literacy broadly, and financial behaviors specifically, can play a critical role in lessening the propensity for a senior household to be classified as food insecure.

Teaching

Sole Instructor of Record

Introduction to Econometrics: ECON 418-518 (In-person)

Econometrics, Machine Learning, R — Fall 2024

- Solely instructed 20+ students on econometrics and machine learning algorithms
- Taught students how to use the R language for data science, econometrics, and machine learning

Teaching Assistant

ECON 502B: Computational Methods and Dynamic Models in Economics

Dynamic Models, Numerical Computing, Python — Spring 2025

- Held weekly lab sessions to instruct first-year doctoral students on implementing dynamic models using numerical computing in Python
- Held weekly office hours to assist students with course materials

ECON 200: Basic Economic Issues

Microeconomics, Macroeconomics, Python — 2022-2024

- Led a small team of 10+ undergraduate, masters, and Ph.D. students as the head teaching assistant in operating this 500+ student course
- Wrote Python code to automate participation recording and uploading exam scores into the online grade portal

BNAN 276: Statistical Inference

Probability Theory, Statistical Inference, Excel — Summer 2024

- Held weekly office hours to assist students with course materials

Research Assistant

Is Inflation in the U.S. Harder to Predict After COVID-19?

Machine Learning, Applied Econometrics, R — Summer 2024

- Gathered monthly inflation data
- Constructed multiple forecasting models to predict inflation using the R language

Climate Damages

Applied Econometrics, R, STATA — Summer 2024

- Worked with a team of doctoral economics students writing code for a project regarding estimating climate damages
- Translated STATA code into the R language while eliminating potential bottlenecks

Estimating Production Functions using Costs when Output Quantities are Predetermined

Monte Carlo Simulation, Structural Econometrics, R — 2021-2022

- Designed a data generating process and constructed a Monte Carlo simulation in the R language
- The paper that this DGP was created for concerns estimating production functions when output is given exogenously

Conferences, Seminars, and Workshops

NBER Digital Economics and AI Meeting, Invitee — 2025
NBER Digital Economics and AI Tutorial, Invitee — 2025

Skills

Languages: MATLAB, C++, Python, R, Julia, SQL, Java (*in order of usage*)
Tools: Git/GitHub, Docker

Fellowships, Grants, and Scholarships

Steve Manos Prize for Best Second-Year Paper ($2,000.00) | *The University of Arizona* — 2024
Roots for Resilience Data Science Fellowship ($7,000.00) | *The University of Arizona* — 2024
Joseph Smeeding Memorial Scholarship in Economics ($1,540.00) | *The University of Arizona* — 2024
Joseph Smeeding Memorial Scholarship in Economics ($1,490.00) | *The University of Arizona* — 2023
George W. Coleman Scholarship in Economics ($2,000.00) | *The University of Arizona* — 2023
Graduate Access Fellowship ($8,000.00) | *The University of Arizona* — 2022
Lee Business School Graduate College Scholarship ($1,000.00) | *University of Nevada-Las Vegas* — 2021
Graduate Access Grant ($1,000.00) | *University of Nevada-Las Vegas* — 2020

References

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The University of Arizona
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