William Brasic

Third-Year Doctoral Student in Economics

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THE UNIVERSITY OF ARIZONA

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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 — *GPA: 4.0/4.0*

University of Nevada-Las Vegas — August 2020
B.A., Economics (Magna Cum Laude) — *GPA: 3.87/4.0*

Research Interests

Industrial Organization, Machine Learning, Applied Econometrics

Research

Working Papers and Works in Progress

Tacit Algorithmic Collusion when Platforms Use Recommendation Systems

Reinforcement Learning, Industrial Organization, Antitrust, Game Theory, C++, MATLAB — 2024-Present

- Algorithmic pricing has drawn significant attention from economists, legal scholars, and antitrust officials due to its growing use across various industries and evidence of their ability to tacitly collude. Additionally, platforms that connect producers with consumers are increasingly utilizing AI-based recommendation systems (RSs) to determine which products to display to which users. In this paper, we explore the potential for collusion between algorithms engaged in pricing competition on platforms, where both the pricing and recommendation systems rely on reinforcement learning (RL). This study demonstrates that firms employing algorithmic pricing can obtain anti-competitive outcomes even when acting on a platform using an AI-based RSs, although the collusive capacity is inhibited.

When Asymmetric Pricing Algorithms Collide

Reinforcement Learning, Industrial Organization, Antitrust, Game Theory, C++, MATLAB — 2023-Present

- 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.

Sole Instructor of Record

The University of Arizona

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

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

Exogenous Productivity Data Generating Process
Monte Carlo Simulation, Applied 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

Teaching Assistant

ECON 502B: Computational Methods and Dynamic Models in Economics
Dynamic Models, Numerical Computing, Julia, Python Spring 2025

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

BNAN 276: Statistical Inference
Probability Theory, Statistical Inference, Excel Summer 2024

- 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

Skills

Languages: Python, R, MATLAB, C/C++, Julia, SQL, Java
Tools: Git/GitHub, Docker

Scholarships, Fellowships, and Grants

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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