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Education

Ph.D. Social Science (Economics), Caltech, 2024 (expected)

Fields: Empirical Industrial Organization, Econometrics, Applied Microeconomics

Committee: Matthew Shum, Thomas Palfrey, Yi Xin, Gabriel Lopez-Moctezuma

M.S. Social Science, Caltech, 2019.

B.S. Economics and Mathematics, *Valedictorian*, California State Polytechnic University, Pomona, 2018.

Job-Market Paper

“Dynamic Inefficiency in Online Decentralized Advertising Auctions” with Miguel A. Alcobendas (Yahoo)

Abstract: (subject to change) The online advertising market uses decentralized auctions to allocate advertising opportunities. It runs a one-shot first-price auction for every advertising opportunity in real-time as users arrive at websites. The auction is participated by advertising firms, and it typically lasts around a millisecond. Conventional wisdom may suggest the market is efficient because the sheer volume of web traffic creates market thickness and the first-price auction has desirable theoretical properties. Using a novel proprietary dataset and structural model, we indicate and quantify a welfare loss resulting from running standard first-price auctions with forward-looking bidders with dynamic constraints. In this market, bidders are budget constrained and need to allocate their limited budgets to purchase ad opportunities that arrive dynamically. We find that asymmetry in their dynamic incentives creates an allocative distortion in these decentralized auctions as it violates the conditions that guarantee efficiency in the first-price auction. We propose and estimate a dynamic structural model with a finite time horizon in which a budget-constrained bidder faces a sequence of simultaneous auctions. Our estimation results indicate that bidders are indeed forward-looking, and the dead weight loss amounts to 18.6%. Our counterfactual simulation suggests that the welfare loss can be alleviated by running a simple bid preference program providing discounts to bidders with smaller budgets.

Working Papers

1. “The Impact of Privacy Protection Measures on Online Advertising Markets” with Miguel A. Alcobendas (Yahoo), Ke Shi (Caltech), and Matthew Shum (Caltech)
2. “Model-Agnostic Estimation of Non-Expected Utility Models” with Aldo Lucia (Caltech)

Conference Presentations

2023 North American Meeting of the Econometric Society (Los Angeles, presenter)

2022 International Industrial Organization Conference (Boston, presenter and discussant)

Fellowships & Awards

Linde Institute Graduate Research Grant (\$5000 award), “Model-Agnostic Estimation of Non-Expected Utility Models” with Aldo Lucia (Caltech), 2022-2023

Linde Institute Graduate Fellowship, 2020-2021

Linde Institute Graduate Research Grant (\$5000 award), “The Impact of Privacy Protection Measures on Online Advertising Markets”, 2020-2021

Teaching Experience

Caltech

Introduction to Probability and Statistics (Undergraduate): Winter 2021-2022, teaching assistant for Jaksa Cvitanic

Graduate Mentor for Caltech’s Summer Undergraduate Research Fellowship (SURF): Summer, 2021

“Grand TA” for first-year Ph.D. core courses: 2020-2021

Additional Information

Languages: English (fluent), Japanese (fluent)

Programming: Julia, R, Python, Matlab, \LaTeX

Citizenship: US, Japan