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Education **Harvard University**

Ph.D. Business Economics, 2020 to 2026 (expected)

Massachusetts Institute of Technology (MIT)

S.B. Mathematics with Computer Science, S.B. Economics, 2016 to 2019

Fields Primary: Industrial Organization

Secondary: Innovation, Digital Economics

References Professor Ariel Pakes

Professor Shane Greenstein Harvard University Harvard Business School pakes@fas.harvard.edu greenstein@hbs.edu

Professor Josh Lerner Professor Myrto Kalouptsidi Harvard University Harvard Business School

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Teaching Doctoral Industrial Organization I, Harvard University, teaching fellow for Professors Ariel Pakes,

Myrto Kalouptsidi, & Robin Lee, 2022 to 2024

Mathematics for Computer Science, MIT, teaching assistant for Professors Eric Lehman, Thomas

Leighton, & Albert Meyer, 2018

Employment Meta Platforms Inc., Data Scientist, 2019 to 2020

Acadian Asset Management, Investment Research Intern, 2018

Research Research Assistant, Harvard University, Professor Ariel Pakes, 2021 to 2023

Research Assistant, MIT, Professor Roy Welsch, 2018 to 2020

Research Assistant, Hong Kong University of Science & Technology, Prof. Yangqiu Song, 2017

Job Market Paper "Competition in a networked market: evidence from US broadband"

> The U.S. broadband market remains a facilities-based oligopoly despite significant technological advancements and increasing demand for high-speed internet. This paper examines how local loop unbundling (LLU) policies, which reduce the largest barrier to entry—high infrastructure costs affect market structure, investment incentives, and consumer welfare. I estimate a structural model of household internet demand and incorporate it into a dynamic game of firm entry and investment. Results show that a standard two-period model underestimates firm costs, whereas a richer dynamic framework—accounting for strategic factors such as early-mover advantages and network effects—produces cost estimates consistent with industry benchmarks. To estimate this complex network model, I develop a novel reinforcement learning algorithm. In counterfactual analysis, I use this algorithm to solve for new equilibria under various regulatory regimes to evaluate the impact of entry on competition and welfare and identify the unbundling policy that maximizes consumer welfare while maintaining investment incentives.

Working Papers "The impact of M&As on financial innovation" (with Josh Lerner & Amit Seru)

There has been significant merger and acquisition activity in financial services in recent decades. The vast amount of the literature has focused on the banking industry, with an emphasis on market concentration and the provision of services. The technological factors that motivate such collaborative efforts (versus other methods, such as strategic alliances) as well as the impact of these acquisitions on subsequent innovation have been much more poorly understood. This paper seeks to answer these questions by leveraging a novel panel dataset of firm activity and patent grants as well as a combination of natural language processing (NLP) and machine learning classification tools. We find that M&A activity has a small but significant positive effect on innovation for the merged entity; these results are robust to a number of specifications, including those that control for technological similarities and the endogeneity of acquisition.

"Portfolio construction using robust NLP with noisy social media text" (with Roy Welsch & Frank Xing)

Social media data provides valuable insight into retail investors' market perceptions in close to real-time; however, the signals can be noisy due to misspellings, abbreviations, and other representational differences. Furthermore, NLP models for handling such texts have been shown to suffer from several robustness issues. We present a method for obtaining more robust semantic vector embeddings from social media (Twitter) data by training on a combination of clean and artificially generated noisy texts. We then demonstrate the improved performance of portfolios constructed using these robust estimates in simulation.

Papers in Progress "Data privacy and tecl

"Data privacy and technological innovation in social media"

Social media platforms rely heavily on user data to train algorithms, but face growing regulatory scrutiny over privacy concerns. While firms argue that data-driven algorithms benefit consumers by reducing frictions and surfacing relevant content, the broader welfare implications of restricting data access remain unclear. This paper provides the first empirical analysis of how costlier, more restricted access to user data affects consumer welfare in the long run. I begin by documenting a decline in AI/ML-related innovation among social media firms following the 2016 implementation of the General Data Protection Regulation (GDPR) in the EU. I then estimate a three-sided structural model of platform investment, user engagement (with network effects), and advertiser behavior, using detailed panel data on browsing time and ad auction bids. The model quantifies consumers' trade-offs between convenience/targeting and privacy, and how these preferences shape firm incentives. In counterfactual simulations, I evaluate how a cost shock to data access for a subset of users affects platform investment, user behavior, advertising revenues, and total social surplus in long-run equilibrium.

Conferences Computational and Methodological Statistics Conference, December 2022 and 2023

Academic Service Organizer: Harvard Industrial Organization Graduate Student Workshop, 2023 to present

Languages English (native), Chinese (fluent)