

## Andrey Fradkin

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POSITIONS	Summer 2018 - ongoing: Assistant Professor, Boston University Questrom School of Business Summer 2020 - ongoing: Hariri Institute for Data Science Junior Fellow Fall 2018 - ongoing: Research Affiliate, MIT Initiative on the Digital Economy. Winter 2019 - Winter 2021: Contractor at Pro Unlimited at Facebook. (Research Collaboration) 2015 - 2018: Postdoctoral Associate, MIT Sloan School of Management 2012 - 2016: Part-time Data Scientist, Airbnb Inc. 2014 - 2015: Postdoctoral Fellow, National Bureau of Economic Research	
EDUCATION	Stanford University, Stanford, California Ph.D. in Economics	September, 2008 - June, 2014
	Duke University, Durham, North Carolina B.S. with High Distinction in Economics and Mathematics w/ minor in Political Science	August, 2004 - May, 2008
RESEARCH FIELDS	Industrial Organization, Economics of Digitization, Quantitative Marketing, Labor Economics	
PUBLICATIONS	<b>The Welfare Economics of Default Options in 401(k) Plans</b> (with Douglas Bernheim and Igor Popov) <i>American Economic Review</i> 105.9 (2015): 2798-2837. Default contribution rates for 401(k) pension plans powerfully influence workers' choices. Potential causes include opt-out costs, procrastination, inattention, and psychological anchoring. We examine the welfare implications of defaults under each of these theories. We show how the optimal default, the magnitude of the welfare effects, and the degree of normative ambiguity depend on the behavioral model, the scope of the choice domain deemed welfare-relevant, the use of penalties for passive choice, and other 401(k) plan features. Depending on which theory and welfare perspective one adopts, virtually any default contribution rate may be optimal. Still, our analysis provides reasonably robust justifications for setting the default either at the highest contribution rate matched by the employer or – contrary to common wisdom – at zero. We also identify the types of empirical evidence needed to determine which case is applicable.  <b>The Impact of Unemployment Insurance on Job Search: Evidence from Google Search Data</b> (with Scott R. Baker) <i>The Review of Economics and Statistics</i> (2017) 99 (5): 756 – 768. Job search is a key choice variable in theories of labor markets but is difficult to measure directly. We develop a job search activity index based on Google search data, the Google Job Search Index (GJSI). We validate the GJSI with both survey- and web-based measures of job search. Unlike those measures, the GJSI is high-frequency, geographically precise, and available in real time. We demonstrate the GJSI's utility by using it to study the effects of unemployment insurance (UI) policy changes between 2008 and 2014. We find no evidence of an economically meaningful effect of these changes on aggregate search.  <b>Blame the Parents? How Parental Unemployment Affects Labor Supply and Job Quality for Young Adults</b> (with Frederic Panier and Ilan Tojerow) <i>Journal of Labor Economics</i> , Volume 37, Issue 1, 2019: 35-100. We study the role of shocks to parental income in determining the labor market outcomes of children entering the labor market. We find that a child whose parent loses a job prior to the child's labor	

market entry is, on average, induced to work 9 percent more in the 3 years following labor market entry than a child whose parents lose a job after the child's entry. This effect is concentrated on the extensive margin and decreases in magnitude over time. We find no evidence that these shocks affect the quality of the job that entrants find.

**Reciprocity and Unveiling in Two-sided Reputation Systems: Evidence from an Experiment on Airbnb** (with Elena Grewal and David Holtz)

*Forthcoming at Marketing Science*

Reputation systems are used by nearly every digital marketplace, but designs vary and the effects of these designs are not well understood. We use a large-scale experiment on Airbnb to study the causal effects of one particular design choice—the timing with which feedback by one user about another is revealed on the platform. Feedback was hidden until both parties submitted a review in the treatment group and was revealed immediately after submission in the control group. The treatment stimulated more reviewing in total. This is due to users' curiosity about what their counterparty wrote and/or the desire to have feedback visible to other users. We also show that the treatment reduced retaliation and reciprocation in feedback and led to lower ratings as a result. The effects of the policy on feedback did not translate into reduced adverse selection on the platform.

WORKING PAPERS **The Welfare Effects of Peer Entry in the Accommodations Market: The Case of Airbnb** (with Chiara Farronato)

*Conditionally Accepted at the American Economic Review*

We study the effects of enabling peer supply through Airbnb in the accommodation industry. We present a model of competition between flexible and dedicated sellers—peer hosts and hotels—who provide differentiated products. We estimate this model using data from major US cities and quantify the welfare effects of Airbnb on travelers, hosts, and hotels. The welfare gains are concentrated in locations (New York) and times (New Year's) when hotels are capacity constrained. This occurs because peer hosts are responsive to market conditions, expand supply as hotels fill up, and keep hotel prices down as a result.

**Consumer Protection in an Online World: An Analysis of Occupational Licensing** (with Chiara Farronato, Brad Larsen, and Erik Brynjolfsson)

We study the effects of occupational licensing on consumer choices and market outcomes in a large online platform for home improvement services. Exploiting exogenous variation in the time licenses are displayed on the platform, we find that platform-verified licensing status is unimportant for consumer decisions relative to review ratings and prices. We confirm this result in an independent consumer survey. Licensing restrictions differ widely by state, and persist despite the growing potential of online reputation to reduce information asymmetries. More stringent regulations are associated with less competition, higher prices, and no improvement in consumer satisfaction for transactions on the platform.

**Dog Eat Dog: Balancing Network Effects and Differentiation in a Digital Platform Merger**

(with Chiara Farronato and Jessica Fong)

*Targeted at Management Science*

Mergers among digital platforms are increasingly receiving public and regulatory attention. These mergers may benefit users if network effects from a combined platform are large enough or may hurt users if the two platforms are differentiated and one of the platforms is shut down. We study the net effect of this trade-off in the context of the merger between the two largest platforms for pet-sitting services. We exploit geographic variation in pre-merger market shares and a difference-in-differences approach to causally estimate network effects. We find that users of the acquiring platform benefited from the merger because of network effects. However, users of the acquired platform were more likely to exit the market, for reasons including switching costs, coordination failures, and disintermediation. Network effects and attrition offset each other such that at the market level consumers are, on average, not substantially better off with a single combined platform.

than with two separate and competing platforms. Our results highlight the importance of platform differentiation even when platforms enjoy network effects, which has important implications for antitrust authorities and platform owners.

**The Platform Value of Incentivized First Reviews: Evidence from an Experiment on Airbnb** (with David Holtz) Online reviews are typically written by volunteers and, as a consequence, valuable information about seller quality may be under-provided in digital marketplaces. We study the extent of this under-provision in a large-scale randomized experiment conducted by Airbnb, where the buyers are offered a coupon to review new listings after a transaction. We find that reviews induced by the policy have small average effects on platform outcomes, as measured by seller nights booked, revenues, and proxies for transaction quality. As a result, the return on investment of the policy is negative. We show how the market structure and design of the reputation system can explain this finding.

**Information About Vacancy Competition Redirects Job Search** (with Monica Bhole and John Horton) Job seekers typically do not know the degree of competition they face for a particular vacancy. As a result, they may unwittingly send applications to jobs with a lot of competition and may overlook jobs with little competition. We study how providing information about competition for a vacancy redirects applications. To do so, we conduct three field experiments on a large on-line job platform in which treated job searchers are shown information about the number of prior applicants to a vacancy. This information increases overall applications and redirects applications to jobs with few prior applications. Applications are sent to vacancies that receive fewer cumulative applications but result in similar outcomes to control applications. We use a complementary treatment to show that job seekers also use the age of the vacancy to direct search towards newer jobs with relatively little competition. Our results are consistent with a model in which searchers have imperfect information about competition for a vacancy and redirect their search towards less competitive vacancies when they receive an improved signal.

### **Search, Matching, and the Role of Digital Marketplace Design in Enabling Trade: Evidence from Airbnb**

(This paper is a major revision of the first part of my thesis: “Search Frictions and the Design of Online Marketplaces.”)

Digital peer-to-peer marketplaces have increased trade in underutilized assets. I use the setting of Airbnb to investigate transaction costs in peer-to-peer markets and the role of search engine design in reducing these costs. I show that search is limited, directed, and often results in the rejection of searchers by hosts due to uncertain seller availability. I document the reasons for these rejections and show that rejections cause searchers to leave the market. I then simulate outcomes with alternative consideration sets and find that, without availability tracking by the search engine, the share of rejected contacts would more than double.

### **A Simulation Approach to Designing Digital Matching Platforms**

(This paper is a major revision of the second part of my thesis: “Search Frictions and the Design of Online Marketplaces.”)

Digital matching marketplaces are characterized by user heterogeneity, limited capacity, and dynamic market clearing. These features create spillovers between users. For example, an Airbnb listing booked by one guest cannot be booked by another guest for the same night. Spillovers limit the applicability of many experimental and observational methods for evaluating the effects of marketplace policies. In this paper, I show how to use marketplace simulations as an input into the design of user acquisition strategies and ranking algorithms. I calibrate a marketplace simulation using data on searches and transactions from Airbnb and use it to address three topics: the returns to scale in matching, the heterogeneity in returns to user acquisition, and the size of bias in experimental designs. I find that returns to scale are initially increasing due to market thickness effects and then decreasing due to availability frictions in search. Furthermore, heterogeneity in the value of listings to the platform is large — the effect of acquiring 25% more listings on bookings varies

between -4.1% and 5.4% depending on the quartile of listing quality. I then measure the extent of bias in experimental treatment effects due to spillovers. The treatment effect of a better ranking algorithm on conversion rates is overstated by 53% when a quarter of users are randomized into treatment.

**The Trade-Off Between Short-Term and Long-Term Network Effects: Evidence from a Digital Platform for Labor** (with Monica Bhole, Chiara Farronato, and Jessica Fong)

NON PEER  
REVIEWED  
ARTICLES:

**Tit for Tat? The Difficulty of Designing Two-Sided Reputation Systems** (with David Holtz)  
NIM Marketing Intelligence Review, 12(2), 34-39.

**Digital Marketplaces**

New Palgrave Dictionary of Economics, July 2017.

**Digital Market Design and Inequality**

Oxford University Press Volume IV: "More Equal by Design: Economic Design Responses to Inequality". Eds. Scott Duke Kominers and Alex Teytelboym. 2018.

COMPUTER AND  
COMPUTATIONAL  
SOCIAL SCIENCE  
CONFERENCE  
PRESENTATIONS:

*Search, Matching, and the Role of Digital Marketplace Design in Enabling Trade*, The Second International Conference on Computational Social Science (IC2S2'16)  
*Search Frictions and the Design of Online Marketplaces*, The Third Conference on Auctions, Market Mechanisms, and Their Applications (AMMA'15)  
*Bias and Reciprocity in Online Reviews: Evidence from Field Experiments on Airbnb*. The Sixteenth ACM Conference on Economics and Computation (EC'15).

PRESENTATIONS /  
CONFERENCES

2021: CU Boulder, NBER IO (co-author), University of Rochester, The Marketplace Innovation Workshop, NBER Digitization, BU Platform Symposium (discussant), Airbnb  
2020: Toulouse Conference on Digital Economics, NBER Winter Labor Studies, NYU Strategy Workshop, NBER Summer Institute Digitization, Advances in Field Experiments Conference, Quantitative Marketing and Economic Conference (co-author), University of Lausanne, Conference on Digital Experimentation, Workshop on Information Systems and Economics (WISE), Marketing Science Conference, Toulouse Platform Economics Seminar, APPAM Conference  
2019: Lehigh University, Brookings Productivity Measurement Conference, Marketing Science Conference, NBER Summer Institute Digitization, Conference on Digital Experimentation  
2018: University of Chicago, BU BDRM Pre-Conference on Digitized Behavior, INFORMS Marketing Science Conference, 16th ZEW Conference on The Economics of Information and Communication Technologies, Platform Research Symposium, FTC Microeconomics Conference, Washington University in St. Louis, INFORMS, Advances in Field Experiments Conference  
2017: University of Toulouse, University of Minnesota, Microsoft Research, Hong Kong University, Third Workshop on Marketplace Innovation, Searle Conference on Internet and Innovation, 15th ZEW Conference on The Economics of Information and Communication Technologies, INFORMS, Clemson University, London Business School, University of Texas (Dallas), University of British Columbia, University of Pennsylvania, Duke University, Boston University  
2016: ASSA 2016, Boston College, Searle Conference on Internet and Innovation, Summer Institute in Competitive Strategy, NBER Summer Institute (Digitization and IO), Travel & Tourism Conference, HCEO Market Design Approaches to Inequality (U. Chicago), Northwestern U., Workshop on Information Systems (WISE), UMass. Amherst (Hotel Admin.), Institute for the Future (IFTF)  
2015: Toulouse Network on Information Technology (Microsoft Research), MIT, Berkeley Crowdfunding Conference, NBER Summer Institute (Digitization, Labor Studies), FTC Sharing Economy Workshop, President's Council of Advisors on Science and Technology - Technology and the Future of Cities, Wharton, U. Chicago Harris School, U. Rochester Business School, Cornell School of Hotel Administration, Sciences Po, UCLA Anderson, Harvard (EconCS), Ebay Data Labs, NBER

Productivity Seminar, Society of Labor Economists Conference (SOLE)  
 2014: Harvard Business School, Columbia Business School, NBER Summer Institute (Digitization), University of Illinois - Urbana Champaign, Microsoft Research, Airbnb Tech Talk, Square Inc., Conference on Digital Experimentation at MIT (CODE), Northeastern University  
 2013: NET Institute Conference, ASSA 2013  
 2011: Google Economics Group

**REFEERING AND EXTERNAL SERVICE** Econometrica, Quarterly Journal of Economics, American Economic Review, AER: Insights, Review of Economic Studies, Management Science, AEJ-Applied, Journal of Labor Economics, Journal of Public Economics, AEJ-Policy, PNAS, Journal of Economics and Management Strategy, Journal of Human Resources, Journal of Industrial Economics, Journal of Applied Econometrics, Program Committee of the 25th World Wide Web Conference (WWW'16), Manufacturing and Service Operations Management, ICIS, Marketing Science, AAAI/ACM conference on Artificial Intelligence, Ethics, and Society (2019), Program Committee of ACM Conference on Economics and Computation 2019 (EC'19, EC'20), Journal of Marketing, Nature - Human Behavior, Review of Economics of the Household

**The Virtual Quantitative Marketing Seminar (2020 - 2021)** - Founded and co-organized a regular virtual seminar with 100+ person attendance on topics in quantitative marketing.

<https://sites.google.com/view/vquantmarketing/>

**Economics of Platforms Seminar (2020 - 2021)** - Scientific committee.

<https://www.tse-fr.eu/online-seminar-economics-platforms>

**ProjectN95 (2020)** - Advised ProjectN95 on designing a marketplace for masks and other personal protective equipment.

**Economic Frontiers Podcast (2016 - 2017)** - Economic Frontiers is a podcast about the frontier of economics research regarding technology, innovation, and digitization. Each episode brings in a leading researcher or research team for a discussion of their work and its broader implications.

**MIT On-Demand Economy Workshop and Conference (2016)** - Co-organized conference bringing together academics, technology leaders, and policy makers to discuss how technology is changing matching in the labor market.

**BOSTON UNIVERSITY SERVICE**

**Marketing Seminar Organizer** - Co-organized the research seminar for the marketing department.

**MSBA PDC** - Provided input into the development of the MSBA program.

**Thesis Committee Member** - Ian Meeker (Boston University Department of Economics)

**Co-organizer of series "Machine Learning for Model-Rich Problems" at the Hariri Institute.**

**SCHOLARSHIPS, HONORS AND AWARDS**

Scholarships: NET Institute Fellowship, Shultz Fellowship Award, George P. Shultz Scholar, Haley-Shaw Fellowship Scholar

Awards: Allen Starling Johnson, Jr. Best Undergraduate Thesis in Economics Prize

**TEACHING EXPERIENCE**

2018 - 2021: Measuring Impact with Causal Methods, Business Experimentation and Causal Methods (MBA, Masters in Business Analytics, Undergraduate)

2018: Mathematical Modeling and Marketing (Ph.D.) (joint with Professors Johnson, Srinivasan, and Sun.)

2015 - 2018: Guest lectures: Ph.D. Market Design (Harvard), MBA Marketing Analytics (MIT Sloan, Boston U. Questrom School of Business), MBA Information Economics (MIT Sloan)

2011 - 2012: TA: Advanced Topics in Econometrics (Prof. DeGiorgi), Introduction to Econometrics (Prof. Harding and Prof. Mahajan), Market Design (Prof. Levin).

2007 - 2008: TA: Intermediate Microeconomics (Prof. Yildirim and Prof. Taylor), Financial Markets and Investment (Prof. Eraker), Junior Honors Thesis Seminar (Prof. Tauchen and Prof. Bollerslev).

DATA SCIENCE /  
OTHER

**A National Survey of the Peer-to-Peer Economy** (with Chiara Farronato and Rover.com)

Designed a quarterly national survey to measure the current and expected size of the peer-to-peer economy. The survey also quantifies the importance of barriers to the consumption of peer-to-peer services in the labor, hospitality, transportation, and pets markets.

**Ranking Algorithm Design:**

Co-designed a proprietary algorithm that uses discrete choice models to rank the listings displayed to Airbnb searchers.

**Search Experimentation Framework:**

Co-designed a system that tracks the actions of searchers and evaluates search experiments.

**Operations Experiments:**

Designed experiments to evaluate the effectiveness of customer support and platform pricing.

**Consulting:**

Advised on the design of Airbnb's reputation system, pricing recommendations, marketing strategy, and academic collaboration policy.

**Media:**

Co-created the Airbnb Hospitality Index and the Airbnb Global Citizenship Index. This work was covered in Le Monde, El Pais, the Telegraph, and other media outlets.