

## Andrey Fradkin

---

CONTACT INFORMATION	MIT Sloan School of Management Room E62-412, 30 Memorial Drive, Cambridge, MA 02142	<i>Voice:</i> (201) 921-6279 <i>E-mail:</i> afradkin@mit.edu <i>Web:</i> <a href="http://www.andreyfradkin.com">www.andreyfradkin.com</a> <i>Google Scholar:</i> <a href="https://scholar.google.com/citations?user=pTiQBU">goo.gl/pTiQBU</a>
POSITIONS	2015 - ongoing: 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 Committee: Jonathan Levin, Liran Einav, Caroline Hoxby, Luigi Pistaferri	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, 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, September 2015</i> 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>Accepted, The Review of Economics and Statistics</i> 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>Accepted, Journal of Labor Economics</i> 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.

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

We study the entry of Airbnb in the accommodations industry to understand the determinants and effects of peer-to-peer marketplace growth. We first document the heterogeneity of Airbnb's penetration across 50 major US cities (through 2014) and demonstrate that much of this heterogeneity can be explained by proxies for the costs of hotels, the costs of peer hosts, and demand fluctuations. Second, we detect an effect of Airbnb on hotel revenues and find that this effect, mostly due to a reduction in hotel prices rather than occupancy, is greatest in cities with low hotel capacity relative to the size of demand. Third, we estimate a structural model of competition between peers and hotels and use it to study the effects of Airbnb on the distribution of surplus across consumers, peer hosts, and incumbent hotels. We find an average consumer surplus of \$72 per night from Airbnb. This surplus is disproportionately concentrated in locations (New York) and times (New Year's Eve) when hotels have high occupancy. Because Airbnb bookings occur when hotels are sold out, most of these bookings would not have resulted in hotel bookings had Airbnb not been available. In total, hotel revenues fall by 1.1% in the 10 largest US cities on Saturdays in 2014 as a result of peer entry. Lastly, we find that peer producers (hosts) enjoy an average of \$26 in surplus per night booked.

**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.")

*Under Review*

Digital peer-to-peer marketplaces have increased the volume of trade in underutilized assets. I use the setting of Airbnb to investigate transaction costs in these markets and the role of search engine design in reducing these costs. I show that this market is characterized by many options, heterogeneity in preferences, and uncertain availability. Consequently, search is limited, time-consuming, and sometimes results in failed transaction attempts due to rejections of searchers by hosts. I estimate a model of search and matching and use it to show that the search engine plays a critical role in facilitating transactions. Without availability tracking and filtering, searches with accepted inquiries would fall by 68% and rejections would increase by 140%. Lastly, I show how searcher outcomes can be improved from the status quo (as of 2014) by algorithms that redirect searchers towards listings that are more likely to accept those searchers.

**The Determinants of Online Review Informativeness: Evidence from Field Experiments on Airbnb** (with Elena Grewal, David Holtz, and Matthew Pearson)

*Under Review*

An earlier version appeared as an abstract at ACM EC'15

Reputation systems are used by virtually all digital marketplaces but their design varies greatly across websites, even within the same industry. Furthermore, because reviews are a public good, reputation systems are imperfectly informative and this can lead to worse matches and moral hazard in equilibrium. We use the setting of Airbnb to study how design choices affect the ability of ratings and reviews to aggregate information. We first show that online reviews are highly correlated with anonymous and private ratings as well as other signals of transaction quality. We then study two experimental changes to the reputation system of Airbnb. The first change offered guests a \$25 coupon to submit a review. The second change implemented a simultaneous-review system, which eliminated strategic reciprocity from reviews. We show that both experiments made the reputation system more informative and use our findings to quantify the importance of mechanisms that cause information loss in the control group.

**Search Frictions and the Design of Online Marketplaces**

(Superseded by "Search, Matching, and the Role of Digital Marketplace Design in Enabling Trade:

Evidence from Airbnb” and “A Simulation Approach to Modeling the Effects of Market Design in Online Platforms”)

Online marketplaces increasingly act as intermediaries in labor, housing, dating, and other matching markets. These marketplaces collect novel data generated by users’ search and communications activity. I study how this data can be used to inform marketplace design and to diagnose inefficiencies on Airbnb, a prominent online marketplace for short-term housing rentals. I show that potential guests engage in limited search, are frequently rejected by hosts, and match at lower rates as a result. I then estimate a micro-founded model of search and matching and use it to show that if frictions were removed, there would be 102% more matches in the marketplace. I propose and evaluate several search ranking algorithms and show that a personalized algorithm would increase the matching rate by 10% over the status quo. However, due to equilibrium effects, an A/B experiment of the type commonly used by internet companies can overstate the true treatment effect of an algorithm by over 100% in some cases.

NON-PEER  
REVIEWED  
ARTICLES:

### **Digital Marketplaces**

Invited Submission to the New Palgrave Dictionary of Economics

### **Digital Market Design and Inequality**

In preparation for Oxford University Press Volume IV: ”More Equal by Design: Economic Design Responses to Inequality”. Eds. Scott Duke Kominers and Alex Teytelboym.

IN PROGRESS:

**Licenses vs. Reviews: Evidence from an Online Services Marketplace** (with Erik Brynjolfsson, Chiara Farronato, and Brad Larsen)

### **A Simulation Approach to Modeling the Effects of Market Design in Online Platforms**

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

### **Employees as Investors: An Empirical Analysis of the Start-up Job Market**

(with Christian Catalini)

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

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

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  
SERVICE

Econometrica, Quarterly Journal of Economics, Management Science, Journal of Labor Economics, Journal of Public Economics, AEJ-Policy, Journal of Economics and Management Strategy, 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  
**Economic Frontiers Podcast** - 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** - Co-organized conference bringing together academics, technology leaders, and policy makers to discuss how technology is changing matching in the labor market.

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

2015 - 2017: 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.