The Effect of Competitor Information on Entrepreneurial Strategy and Productivity: A Field Experiment

This project aims to understand how increased access to competitor information enabled by digitization affects the strategic decisions and productivity of entrepreneurial firms, by running a field experiment across ~4,000 nail salons in four cities (New York, Chicago, San Francisco, and Los Angeles).

Recent years have witnessed a data revolution, with the growth of data from online platforms ranging from Amazon to Yelp to Google (Einav and Levin 2014). While these platforms are not typically designed with improving partner firm performance in mind, they provide valuable sources of real-time data for firms that interact with them. For example, Yelp is intended to help people find local businesses, and Google was founded to match users with content-creating platforms, but both collect millions of data points on customers and competitors that can provide timely information for businesses – even without any further investment in their own technology infrastructure. Yet, while prior literature has explored the relationship between information technology (IT) and firm productivity (Brynjolfsson and Hitt 2000, Bloom et al 2014, Dranove et al 2012), much of this literature has focused on IT investment and underexplored the impact of growing availability of data spurred by digitization.

This data has the potential to help firms improve their strategic decisions. On the one hand, information on competitors may help adjust strategies on pricing or product offerings and allow for more experimentation, which may then lead to higher productivity (Kerr et al 2014). On the other hand, insights from behavioral and organizational studies suggest that individuals may actively avoid new information and organizations are slow to change (Golman and Loewenstein 2015, Schumpeter 1934, Nelson and Winter 1982). Furthermore, young versus old firms may experience differential impacts. While competitor information may help younger firms who face higher uncertainty learn about different practices and their returns -- enabling them to experiment more efficiently (Kerr et al 2014), younger firms may also have less organizational slack to adopt new technologies and adapt compared to incumbents (McElheran 2015, Henderson and Clark 1990). Thus, whether or not increased access to competitor information will lead to any changes in firm decisions is ex ante ambiguous. Yet, there has been little empirical evidence exploring whether and how increased access to information improves the strategic decisions that firms make (Brynjolfsson and McElheran 2015).

To explore, I collaborate with Yelp, an online reviews platform, to run a field experiment across ~4,0000 nail salons in four major US cities. Yelp sends out canvassers to physically visit local businesses to inform them about Yelp and how the business can manage its Yelp listing. Between June and November 2018, I layer a treatment on top of this operation, where businesses randomly assigned to treatment receive an additional personalized report comparing the price of their manicure to those of 9 salons located closest to them. Before and after the interventions, I collect data on the prices of key service offerings across all nail salons in each of these markets (~9,000), and observe whether and how firms that receive information on competitor pricing change their own pricing strategies. Furthermore, I collect data on other aspects of firms' positioning decisions and practices (such as quality, scope, hours, and the number of employees) to observe how competitor information shapes other firm decisions.

Finally, I analyze indicators of firm performance to assess whether this information led to better strategic decisions. I work with the City of San Francisco to obtain tax data on sales for each business, and also analyze proxies of performance collected by Yelp (e.g. number of calls to the business, number of maps and directions views, number of page views).

By exploring the differential impacts of digitalization on entrepreneurial firm strategy and productivity, this project seeks to contribute to the growing literature in IT and digitization that highlights the importance of complementarities between IT and organizational decisions (Brynjolfsson and Hitt 2000). Compared to prior work, this study provides three key advantages to understanding the impact of digitization on firm choices. First, I am able to randomly assign the treatment of competitor information across a large number of firms to tease out the selection versus causal effects of digitization. Second, by exploring firms in an industry with simplified strategy spaces, I have a unique opportunity to empirically identify granular strategic decisions across firms and isolate differential effects by firm attributes. Third, the Yelp setting enables me to examine an increasingly common context where firms obtain data through intermediary platforms, and provide insight on the broader market implications of platform design choices.

More generally, this project contributes to the literature on management practice adoption and how they might relate to persistent performance differences across firms (Bloom et al 2013, Syverson 2011). The primary explanation offered for the variation in practice adoption is that obstacles in information diffusion prevent managers from learning about management practices, and this project seeks to explore in part how increased availability of digital data might help improve firm decisions on organizational practices.

Funding from NBER would enable me to collect outcomes across my full sample at the midline and endline points of my experiment. Collecting pricing data at multiple points after the baseline would enable me to identify more granular processes of change in firm decisions over time. Furthermore, collecting a full midline and endline on firms' decisions and practices outside of pricing would allow me to characterize the positioning decisions of each firm across these markets and how they change as some are exposed to information on competitor strategies. These additional data collection efforts would enrich possible insights that I can draw from my field experiment.

Bibliography

Bloom, N., B. Eifert, A. Mahajan, D. McKenzie, & J. Roberts. 2013. "Does management matter? Evidence from India." Quarterly Journal of Economics 128(1):1-51.

Bloom, N., L. Garicano, R. Sadun, and J. Van Reenen. 2014. "The distinct effects of effects of communication technology and information technology on firm organization." Management Science 60(12), 2859-2885.

Brynjolfsson, E. & L. Hitt. 2000 "Beyond Computation: IT, Organizational Transformation and Business Performance." Journal of Economic Perspectives 14(4), 23-48.

Brynjolfsson, E., and K. McElheran. 2015. "Data in Action: Data-Driven Decision-Making in U.S. Manufacturing." Working Paper.

Dranove, D., C. Forman, A. Goldfarb, and S. Greenstein. 2012. "The Trillion Dollar Conundrum: Complementarities and Health Information Technology." Working paper.

Einav, L., and J. Levin. 2014. "The Data Revolution and Economic Analysis." Innovation Policy and the Economy 14.

Golman, R. and G. Loewenstein. 2015. "The Demand for, and Avoidance of, Information." Working Paper.

Henderson, R. and K. B. Clark. 1990. "Architectural Innovation: The Reconfiguring of Existing Product Technologies and the Failure of Established Firms." Administrative Science Quarterly 35(1): 9-30.

Kerr, W.R., Nanda, R. and Rhodes-Kropf, M., (2014). "Entrepreneurship as experimentation." The Journal of Economic Perspectives, 28(3), pp.25-48.

McElheran, K. 2015. "Do Market Leaders Lead in Business Process Innovation? The Case(s) of E-Business Adoption." Management Science 61(6): 1197-1216

Nelson, R. and S. Winter. 1982. An Evolutionary Theory of Economic Change. Cambridge, Massachusetts: Harvard University Press.

Schumpeter, J.A., 1934. The theory of economic development. Cambridge. MA: Harvard University Press.

Syverson, Chad. 2011. "What Determines Productivity?" Journal of Economic Literature, 49(2): 326-65.

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Doctoral Studies

Harvard Business School

Doctor of Business Administration, Strategy (Expected May 2020)

Prior Education

Harvard University
A.B., Social Studies, High Honors (May 2010)

University of Oxford
M.Sc., Environmental Change and Management (September 2011)

London School of Economics
M.Sc., Economics and Management (June 2014)

Personal Information

Citizenship: U.S.A.

Languages: English (primary), Korean (fluent), French (proficient), Spanish (basic)

Research Experience

Yelp, Inc (Jul 2016 – Present)
Economics Researcher

Stanford University (SIEPR) (Jul – Dec 2016)
Visiting Student Researcher

Massachusetts Institute of Technology (2013)
Research Assistant for Prof. Daron Acemoglu

Harvard Business School (2010; 2013)
Research Associate for Prof. Ramon Casadesus-Masanell and Prof. Forest Reinhardt

London School of Economics (2011 – 2012)
Research Assistant for Prof. Cameron Hepburn

Professional Experience

Emerge Venture Lab (2010 – 2015)
Co-founder, Director, and Advisor

Knewton (2011 – 2013)
Product Manager

McKinsey & Company (2009)
Business Analyst (summer)

Fellowships, Grants, and Awards	Kauffman Dissertation Fellowship (Ewing Marion Kauffman Foundation, 2018)
	Foundations of Human Behavior (Harvard University, 2017)
	Behavioral Insights Group Research Grant (Harvard University, 2017)
	Distinction in Teaching Award (Harvard University, 2017)
	Magdalen College Research Grant (University of Oxford, Magdalen College, 2011)
	Environmental Change Institute Grant (University of Oxford, 2011)
	Phi Beta Kappa (Harvard University, 2009)
	Williams/Lodge Government & Public Affairs Research Fellowship (Harvard University, 2009)
	University Committee on Human Rights Summer Scholarship (Harvard University, 2009)
	John Harvard Scholarship for academic distinction (Harvard University, 2007-2009)
	Harvard College Scholarship for academic distinction (Harvard University, 2007)
	Detur Prize for academic excellence (Harvard University, 2007)
Technical Skills	Programs: Python, SQL, STATA, R, Matlab, LaTex
	Statistical Skills: applied microeconometrics on causal inference, including regression analysis (linear, nonlinear, logistic, panel), instrumental variables, differences-in-differences, regression discontinuity designs, experiments and quasi-experiments, and matching; classification and tree-based machine learning methods
Published Papers	Glaeser, Edward L., Hyunjin Kim, and Michael Luca. "Nowcasting Gentrification: Using Yelp Data to Quantify Neighborhood Change." *American Economic Association Papers and Proceedings* 108 (May 2018): 77–82.
Working Papers	Glaeser, Edward L., Hyunjin Kim, and Michael Luca. "Nowcasting the Local Economy: Using Yelp Data to Measure Economic Activity." Harvard Business School Working Paper, No. 18-022, September 2017. (Revised October 2017.)
	Kim, Hyunjin, and Michael Luca. "The Costs of Entering through Tying: Experimental Evidence." May 2018.
	Kim, Hyunjin, and Michael I. Norton. "Which Gifts for Which Employees? The Effectiveness of Gift Exchange in the Workplace." July 2017.
Case Studies	Advertising Experiments at Restaurant Grades, Harvard Business School Exercise and Teaching Note 916-039, March 2016 (with Michael Luca and Weijia Dai)
	Coursera, Harvard Business School Case 714-412, August 2013 (with Ramon Casadesus-Masanell)
	Patagonia, Harvard Business School Case 711-020, August 2010 (with Ramon Casadesus-Masanell and Forest L. Reinhardt)
Other Activities	Organizer, HBS Digital Workshop (Jan 2018 – Present)
	Organizer, HBS Strategy Workshop (August 2015 – Jan 2018)

Research Chair, Behavioral Insights Student Group (August 2017 – May 2018)

NBER Economics of Digitization PhD Workshop (March 2017, 2018)

Strategy Research Initiative (SRI) PhD Workshop (Summer 2016)

Teaching

Teaching Assistant, Field Experiments (Harvard Business School PhD Course, Spring 2018)

Teaching Assistant, Immersive Field Course United Kingdom: Behavioral Insights (Harvard Business School MBA Course, Fall 2017)

Instructor, Economics 970: Purpose and Strategy in the Online Economy (Harvard Economics Department, Spring 2017)

Teaching Assistant, The Online Economy: Experimental and Regression Analysis Methods (Additional session for Harvard Business School MBA Course, Spring 2016)

Facilitator, Leading Change and Organizational Renewal (Harvard Business School Executive Education, Spring 2016)

Presentations

Nowcasting the Local Economy: Using Yelp Data to Measure Economic Activity at Scale
2018 Society of Labor Economists Annual Meeting. Toronto, CA.
2018 Organization Science Winter Conference (Poster). Park City, UT.
2018 ASSA/AEA Annual Meeting. Philadelphia, PA (coauthor presented).
2017 Conference on Digital Experimentation (CODE@MIT, Poster). Boston, MA.
2017 Stanford Institute for Economic Policy Research Economics Experiments in the Tech Industry (Poster). Palo Alto, CA.

The Costs of Entering through Tying: Experimental Evidence
2018 EC '18 ACM Conference on Economics and Computation. Ithaca, NY (anticipated).
2018 International Industrial Organization Conference. Indianapolis, IL.

Which Gifts for Which Employees? The Effectiveness of Gift Exchange in the Workplace
2017 Trans-Atlantic Doctoral Conference. London, United Kingdom.
2016 Harvard Business School Strategy Workshop. Boston, MA.
2016 Behavioral Insights Student Group, Harvard University. Boston, MA.

Budget Estimate

Item	Calculation	Subtotal
Midline data collection	(4000 businesses / 4 businesses per hour) * $15 per hour wage and transportation stipend	$15,000.00
Endline data collection	(4000 businesses / 4 businesses per hour) * $15 per hour wage and transportation stipend	$15,000.00
Software for mapping and data collection	$180 per research assistant * 30 research assistants	$5,400.00
	TOTAL	**$35,400.00**