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Digitization Tutorial 2020
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Dear Drs. Goldfarb and Greenstein,

Please consider my application to addend the 2020 tutorial on the Economics of Digitization. I am currently a fourth year Ph.D. student at the Department of Economics at Florida State University. I am keenly interested in attending the tutorial meeting as I feel the topic is closely aligned with my own research agenda. Furthermore, learning from prominent scholars performing frontier research will help me better my own work in the field.

Following the first year of graduate coursework in Economics at Florida State, I enrolled in field courses covering econometrics, labor economics, regional economic development, and economic history. In general, my research interests focus on the topics of skill-biased technological change, intergenerational economic mobility and the role of skill formation, and how digital technologies have altered economic decision making.

Near the completion of my field courses, I became particularly interested in the determinants of economic growth. Specifically, how science, both basic and applied, is created and what factors influence the direction of technological change. Moreover, I am particularly interested in how the adoption of information and communication technologies have influenced the academic process and local economic development. To attempt to answer this question, my dissertation focuses on recent history to study some of the first computer networking technologies.

My first chapter, "Communication Costs in Science: Evidence from the National Science Foundation Network", examines the impact of an early internet technology on academic output. Established in 1985 to connect five NSF-sponsored supercomputers, the National Science Foundation Network (NSFnet) national internet backbone quickly expanded to universities across the United States by linking together existing and newly-formed regional computer networks. In this paper, I estimate the effect of connection to the national NSFnet on average citations per paper by exploiting plausibly exogenous variation in the connection times of the regional NSFnet networks.

I estimate that, following connection to the national NSFnet, average citations per paper increased by over 10 percent relative to the pre-connection mean. Subgroup analyses reveal that the net effect was driven largely by middle- and top-tier institutions. Finally, I show that connection of institution pairs led to a decline in inter-disciplinary citations and an increase in within-field citations. Furthermore, I find no evidence that connection to this early internet

technology significantly changed collaboration patterns.

Taken together, the findings of this paper highlight a fundamental shift in citation patterns that followed the adoption of internet technologies. Consistent with theoretical work by Van Alstyne and Brynjolfsson (1996) and Rosenblat and Mobius (2004), the findings suggest that reductions in communication costs brought forth by the NSFnet fostered greater specialization within scientific disciplines at the cost of inter-disciplinary science.

The second chapter of my dissertation studies the role of the first large-scale computer network, the Department of Defense's ARPANET, in determining technological clusters. This project is in its formative stages. I have only recently returned from The Computer History Museum archive in San Jose. While in the archive, I was able to collect data on the network of ARPANET hosts, including host name, location, and time of connection to the network. I plan to use this information to study how early technological adoption affects the forces of agglomeration.

My research benefits from gracious support by my dissertation committee. The chair of my committee is Dr. Shawn Kantor, L. Charles Hilton Jr. Distinguished Professor of Economic Prosperity and Individual Opportunity at Florida State University and NBER. Along with Dr. Kantor, I have fantastic support from committee members Dr. Carl Kitchens, Associate Professor at Florida State University and NBER, and Dr. Luke Rodgers, Assistant Professor at Florida State University.

In summary, I feel that the opportunity to attend the NBER digitization tutorial will greatly improve my research and expand my interests. Beyond the chance to interact with other qualified and like-minded students, I hope to be better connected with the exciting research within the field of "Digital Economics". This year I was pleased to read the literature survey by Goldfarb and Tucker (2019), which reignited my interest in uncovering the role of new, digital technologies in our rapidly changing lives. Attending the NBER tutorial will afford me the chance to focus my renewed interest into research.

Thank you in advance for your time and consideration.

Sincerely,

Ezra G. Goldstein

*References

Goldfarb, Avi, and Catherine Tucker. 2019. "Digital Economics". *Journal of Economic Literature* 57 (1): 3–43.

Rosenblat, Tanya S., and Markus M. Mobius. 2004. "Getting Closer or Drifting Apart?" *Quarterly Journal of Economics* 119 (3): 971–1009. ISSN: 00335533. doi:10.1162/0033553041502199.

Van Alstyne, Marshall, and Erik Brynjolfsson. 1996. "Could the Internet Balkanize Science ?" *Science* 274 (5292): 1479–1480.