

Dear Selection Committee of the Winter Meeting of the NBER Economics of Digitization Group,

I am writing to apply to participate in the in the Economics of Digitization tutorial for economics graduate students. My name is Daniel Rock, and I am a fourth year Ph.D. Candidate at the MIT Sloan School of Management (my advisor is Professor Erik Brynjolfsson). My research focuses on two main areas. I am interested in researching the relationship between information technology capital and firm financial performance and capital structure. I am also working on investigating the effect of algorithmic decision making on the integrity and performance of markets. The winter tutorial for economics graduate students seems like a perfect opportunity to meet and learn from some of the best researchers in the field and I would love a chance to participate.

My coursework so far has largely centered on economics and econometrics. As a student in the Information Technologies group at Sloan, my major area for my General Examinations was the Economics of Information with a minor in Statistical Learning and Econometrics. Most of my coursework has been in the Economics department at MIT. I have completed the graduate sequence in microeconomic theory (including topics in general equilibrium, game theory, decision theory, and contract theory), the graduate econometrics sequence, and courses in industrial organization. In other departments, I have completed courses in nonlinear optimization, applied network analysis and econometrics, machine learning, and the economics of digitization.

At the moment I am working on four different projects at different stages. The first, with Erik Brynjolfsson and Sonny Tambe, is using LinkedIn data to estimate the market value of and returns to human capital investment. As firm competition to produce physical goods has intensified globally, it is possible that the scarce resources driving the success (or failure) of companies are related to information and knowhow. We are in the process of partnering with LinkedIn to see which types of workers, practices, and skills generate market value. The second project presents a model characterizing why digital technology risk exposure is a compensated factor in asset returns, which will then be described empirically using a company-level panel of installed technologies. The third project is a continuation of work with Sinan Aral on identifying peer effects in product engagement for digital products with social network features. Certain features of observable social networks can help us as researchers to figure out precisely “how social” a given digital product might be. The challenges of identification in networked data carry over to the final project, which is in very early stages. We are partnering with Nasdaq to launch new financial data products experimentally across equity markets. Our hope is that the experimental variation in market participant information sets will help us identify which types of digital tools can help improve the functionality and integrity of market performance over time (e.g. liquidity provision, price discovery, participant aggregation, and settlement). As each asset market is correlated with the others, we are working as well to develop econometric techniques to better handle network interference in experiments. That project is joint work with Neil Thompson, Andrew Lo, and Guillaume Saint-Jacques. I expect that the 3 projects related to digital capital will form the bulk of my dissertation and I hope to graduate in the spring of 2018.

I have only recently begun my career as a researcher and I am grateful for the opportunity to apply to this program. It would be a great privilege to hear what my peers and leading researchers in the digitization field are working on, and I would love a chance to learn how I might improve my own work from them. Thank you for your consideration.

Sincerely,

Daniel Rock

[drock@mit.edu](mailto:drock@mit.edu) | (847) 370-3178  
4<sup>th</sup> Year Ph.D. Candidate – MIT Sloan  
Office 365  
100 Main St  
Cambridge, MA 02142