Digital Economics and AI Tutorial

Nan Clement

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1 Contact Information

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2 Program

2019 till now (expecting 2024)
PhD Candidate, University of Texas at Dallas
Economic Department

3 field of study

Major Field: Healthcare Digitization
Minor Field: Economics of Privacy

4 Interest in the Economics of Digitization

I am interested in attending this tutorial primarily because I come from a small department where opportunities to engage in discussions on digitization and AI during seminars with colleagues are limited.

Having had the privilege of attending previous tutorials, I eagerly anticipate learning from the presenters and engaging with the exceptional Ph.D. students in attendance. I assume that my fellow attendees from UofT would be there. It would be a great pleasure to see them again. I am hoping that I would be able to form some new collaborations on the topic of AI in healthcare.

I am aware that I will be responsible for covering my travel expenses. Fortunately, I have some resources available from my department and the UT Office of Graduate Education to support my trip.

4.1 Dissertation

Essays on Digital Economics

Project 1: "Dynamics of Shared Security in the Cloud" (Co-author with Daniel G. Arce)

Abstract: Cloud services exist under a shared security environment; both cloud services providers (CSPs) and users contribute to overall security. We investigate the nature of shared security in a dynamic game where users' security contributions and cloud usage figure into their CSP's vulnerability. Furthermore, CSPs' own security contributions take their users into account as well as competition with other CSPs. We characterize the Markov Perfect Equilibrium time path of security in the cloud. In particular, we identify a novel form of time-path strategic complementary between usage and a CSP's Markov state of security. This implies that cloud security is an unusual form of impure public good whereby individual contributions bolstering a CSP's security endow a selective incentive (benefit) on others, rather than providing a selective benefit to the contributor themselves. Consequently, CSP vulnerability increases over time. (Submitted & Under Review)

Project 2: "Economic Motivations of Cyber Attacks in Health Industry: An Empirical Work"

Abstract: In 2022, healthcare data breaches in the US hit more than 40 million victims, violating their privacy rights. Additionally, nearly 600 hospitals spent multi-millions of dollars on ransom, lawsuits, incident response, and recovery. Data breaches can also be life-threatening emergencies for the entire hospital or, even worse, all the hospitals in a health system. In the long term, the breaches increase mortality rates and reduce healthcare quality (Choi, Johnson and Lehmann, 2019). Given these serious consequences, identifying risk factors for data breaches is crucial. I study whether, and how, hospital mergers increase the probability of a data breach. Using proprietary hospital merger records and the archived data breach reporting from the Department of Health and Human Services from 2010 to 2022, I implement a stacked difference-in-differences estimation strategy to show that in the two-year window after hospital consolidation, incidents of data breaches in merger targets, buyers, and sellers more than double as compared to the Pre-treated groups. The effect is robust to changes of the two-year window. The effect is also robust to the change in sample size due to the data availability of the control variables and the change in how standard errors are clustered. The signaling effect that reduces hackers' information asymmetry about the merging hospitals before the operational merger start causes an increase in hacking activities on hospitals, especially in recent years through ransomware attacks. The incompatibility of the two merging information systems causes an increase in hacking as well. Conversely, the complementary effect of organizational capital that improves internal risk control reduces the increase in data breaches. For example, mergers involving publicly traded hospitals can experience a decrease in data breaches during the time window. The truncated regression for the past five years shows that the data breach situation during mergers is getting worse because of soaring cases of hacking ac-

tivities, even though the market's efforts to address misconduct breaches were effective. Healthcare and financial market authorities should prioritize policies that provide cybersecurity incident prevention warnings to merging hospitals, taking into account their market visibility and organizational capital level. Policymakers should focus on information system risk control during mergers to ensure the implementation of robust cybersecurity measures. (Job Market Paper, Work-in-Progress)

4.2 Committee Members

Professor Daniel Arce
Professor Catherine Tucker
Professor Anne Burton
Professor Anton Sobolev

4.3 Conferences and Presentations

April 2022 Economic Brownbag Presentation, School of Economics, Political and Policy Sciences at UT Dallas, Presenter, Richardson, TX

June 2022 The 21^{st} Annual Workshop on the Economics of Information Security (WEIS), Rump Session, Presenter, Tulsa, OK

September 2022 AEA-CSWEP Successfully Navigating Your PhD mentoring workshop for 3rd Year+ Women & Non-Binary PhD Students in Economics Economics-Adjacent Fields, invited mentee, Zoom

October 2022 The 1^{st} University of North Texas Cybersecurity Symposium, speaker, Denton, TX

October 2022 NBER 2022 Fall Economics of Privacy Tutorial, invited attendee, Cambridge, MA

November 2022 AEA-CSWEP Successfully Navigating Your Economics PhD workshop for 3^{rd} and 4^{th} year women and non-binary PhD students in Economics and related fields at SEA 92^nd Annual Meeting, invited mentee, Fort Lauderdale, FL

November 2022 SEA 92^{nd} Annual Meeting, Games and Dynamics Session, Presenter, Fort Lauderdale, FL

March 2023 NBER 2023 Digital Economics Tutorial, invited attendee, San Francisco, CA

March 2023 NBER 2023 Workshop of Digital Economics, invited attendee, San Francisco, CA

March 2023 Marketing Science: Diversity, Equity Inclusion Conference at SMU Cox, attendee, Dallas, TX

March 2023 The 19^{th} Annual Big 12 + MIS Research Symposium, attendee, Dallas, TX

April 2023 The 1^{st} Texas Applied Microeconomics Student Workshop at UT Austin, Speaker, Austin, TX

May 2023 The 2^{nd} Annual Cybersecurity Summer Institute, Georgia Tech's School of Cybersecurity and Privacy and School of Public Policy, invited attendee, Atlanta, GA

June 2023 The 12^{th} American Society of Health Economists (ASHEcon) Annual Conference, Emerging Scholar in Health Care Competition, Presenter, St. Louis, MO

July 2023 The 22^{nd} Workshop on the Economics of Information Security (WEIS), Speaker, Geneva, Switzerland

October 2023 The 2023 Informs Annual Meeting, Community-Committee's Choice Session – "Empirical PSOR 2", Speaker, Pheonix, AZ