# Application: NBER Digital Economics and AI Tutorial

**Contact Information**

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**Graduate Study**

I enrolled in the Economics Ph.D. program in Fall 2020 and pursued empirical industrial organization and experimental economics. My graduate coursework emphasized applied microeconomics, structural IO, and experimental and behavioral economics, where I focused on digital markets, platforms, and technology industries.

During my Ph.D. studies, I developed a research agenda centered on digital economics and competition policy, particularly the role of technology ecosystems, cross-market complementarities arising from mergers, and the welfare consequences of market power. My dissertation, titled "Essays in Industrial Organization and Experimental Economics," examines how compatibility across ostensibly independent markets—smartphones and laptops—shapes consumer demand and firm market power. Using an incentivized experiment, I show that compatibility with a consumer's existing laptop has a causal effect on willingness to pay for smartphones. I then estimate a structural smartphone demand model that incorporates compatibility characteristics and use it to evaluate counterfactual policies. I find that forcing cross-brand compatibility (an "open ecosystem") produces different competitive outcomes across periods: in 2018–2019, closed ecosystems benefit Samsung by locking non-Apple laptop owners into lower-quality Samsung smartphones, while open ecosystems increase Apple's dominance; in 2020–2023, closed ecosystems benefit Apple, as Samsung's superior smartphones induce Apple laptop owners to switch to Samsung under open ecosystems. Across both periods, open ecosystems increase consumer surplus. In a counterfactual cross-market merger between Samsung and HP, smartphone market concentration decreases but Samsung raises prices, disadvantaging consumers who value compatibility less.

In my Postdoctoral Fellowship at the Rotman School of Management at the University of Toronto, I have continued to build this agenda on digital markets and expanded it to the economics of AI. Together with Avi Goldfarb, I study the forces and bottlenecks shaping market power in AI markets. In another paper, we analyze AI as a general-purpose technology whose enabling hardware—the graphics processing unit (GPU)—evolved through a feedback loop: demand from gaming and high-resolution graphics accelerated GPU innovation; those GPU advances enabled breakthroughs in AI models; and the resulting AI progress further raised demand for GPU performance, driving additional improvements in graphics and display technology. We further examine how horizontal and vertical relationships among AI developers, hardware producers, and downstream markets influence the trajectory of AI as a GPT and the future structure of digital markets.

**Research Interests in Digital Economics and AI**

My research lies at the intersection of industrial organization and antitrust, with a particular focus on technology ecosystems, digital goods, and AI. Substantively, I study how compatibility, data, and compute technology shape market power and consumer welfare in digital environments. Methodologically, I combine structural IO models with experimental designs.

My primary interests include:

- Digital product ecosystems (e.g., smartphones and laptops) and their role in locking consumers into platforms;
- AI as a general-purpose technology, focusing on how access to compute and specialized hardware (e.g., GPUs for training and inference) shapes innovation incentives and market structure through a feedback loop across markets;
- The interaction between AI-driven prediction technologies, which allow more accurate prediction of damages, and existing market frictions, particularly in regulated sectors such as insurance.

**Current Research and Projects**

*1. Papers Derived from the Job Market Paper.*

"Closed Ecosystems and Firms' Investments." Regulations mandating open ecosystems reduce differentiation. Firms may respond by increasing hardware investment while reducing compatibility to limit competitor use. This paper examines how ecosystems shape firms' investment decisions in the smartphone market. I find that open ecosystem regulation leads firms to adopt uniform compatibility without altering hardware investment.

"The Effect of Closed Ecosystems on Consumers' Consideration Sets," with Lucas Coffman. Traditional discrete choice models identify product variety and advertising as the main drivers of consumers' consideration sets; this paper introduces a new determinant—compatibility between standalone products. Using a novel experiment, we study how laptop–smartphone compatibility shapes which smartphones consumers are willing to consider, comparing incentivized elicitation of consideration sets with naive self-reports to evaluate whether non-incentivized statements accurately capture search behavior. We then incorporate the consideration margin into a smartphone demand model to quantify how cross-product compatibility influences market power and consumer welfare, enabling counterfactual analysis of policies mandating open ecosystems.

*2. "GPU Diffusion, Market Power, and the AI Trajectory as a General-Purpose Technology."* Jointly with Avi Goldfarb, we study how advances in GPUs and compute capacity shape AI progress and market structure. We model the GPU–AI feedback loop as a GPT dynamic: advances in gaming and screen resolution spurred GPU development, enabling AI progress that fueled further improvement in graphics and display technology. We identify forces and bottlenecks shaping AI market power and build a structural framework to analyze spillovers across markets, concentration's effect on innovation, scope in chip design, and how vertical and horizontal relationships influence AI's GPT trajectory.

*3. "The Welfare Impact of AI-Driven Flood Damage Prediction," with Charlie Murry.* We study the welfare implications of using AI-based flood-damage prediction tools in the design and pricing of flood insurance. Using detailed insurance and property data, we examine how an AI-based risk model alters the mapping from underlying risk to premiums and claims and how this change interacts with frictions such as adverse selection and moral hazard. This project connects to digital economics and AI by studying how prediction technologies reshape information flows in risk markets.

**Dissertation Title, Description, and Committee**

*Dissertation Title: "Essays in Industrial Organization and Experimental Economics"*

*Dissertation Description:* My dissertation examines how cross-product compatibility across ostensibly independent technology markets (e.g., smartphones and laptops) generates platform lock-in and shapes market power. Using an incentivized experiment and a structural smartphone demand model incorporating compatibility characteristics, I evaluate counterfactual policies such as open-ecosystem regulation and cross-market mergers to quantify their effects on market concentration, consumer welfare, and firms' incentives to invest in hardware and compatibility.

*Dissertation Committee:*

- Charles Murry (Co-chair), University of Michigan
- Lucas Coffman (Co-chair), Boston College
- Michael D. Grubb, Boston College

**Motivation for Attending the Tutorial**

The Digital Economics and AI Tutorial aligns closely with my current and planned research. The tutorial would provide an opportunity to deepen my understanding of cutting-edge approaches to digital markets and AI, to receive feedback on ongoing projects that link digital ecosystems and compute markets, and to connect with researchers working on related questions in industrial organization, platform economics, and AI policy.

Attending both the tutorial and the associated NBER Digital Economics and AI meetings would help refine my research agenda at the interface of empirical IO and AI, and would strengthen the bridge between my dissertation work on compatibility and my ongoing projects on GPU and AI markets.

*Thank you for considering my application.*
Yuval Lidany