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To whom it may concern,

I am a fourth-year Ph.D. student in the economics department at Northwestern University. My research interests are broadly in industrial organization, with a specific focus in the ways in which emerging technologies affect competition and firm behavior. I am very interested in attending the digital economics and AI tutorial, as I would like for my research to touch on the ways in which emerging technologies have the potential to affect the functioning of markets in unexpected ways. Artificial intelligence is (it is perhaps uncontroversial to say) the most important general-purpose technology developed in recent years, and learning how leading figures in the field have begun to think about it will help me better understand the ways in which it will impact competition moving forward.

I have taken advanced Ph.D. coursework in the fields of industrial organization, information economics and applied microeconomic theory, and econometrics. In general, I've pursued a course of study that gives me the tools to conduct empirical and theoretical research in industrial organization. My committee consists of Robert Porter (co-chair), Vivek Bhattacharya (co-chair), and Gastón Illanes.

I have several ongoing research projects, most of which are relevant to digital economics and emerging technologies more broadly. First, I am working on a project with James Brand, Mert Demirer, and Connor Finucane on firm productivity and learning in cloud computing. We use CPU utilization data from firms across myriad industries and regions and find substantial dispersion in computing productivity, but that this dispersion shrinks over time as there is substantial within-firm productivity growth. These results are useful for thinking about how new technologies affect firm decision making because they reinforce that much of the productivity benefit of

emerging technologies comes not only from adopting the technology itself, but from adapting production processes and human capital to using the technology efficiently.

Second, I am working on a project on pricing algorithms and information design. There has been a fast-growing strand of literature that has documented the potential for pricing algorithms—programs that make recommendations for how firms should set prices—to raise prices above competitive levels. Most of the existing literature emphasizes a dynamic theory of harm: because pricing algorithms can threaten to quickly and sharply cut prices if a competitor does (and because algorithms can learn to do so even when not explicitly instructed to do so), the threat of price wars serves as an effective deterrent to firms lowering their prices. Such mechanisms are feasible when each firm operates their own pricing algorithm even though, in practice, many cases of interest feature one common pricing algorithm marketing to all firms in a market (e.g., RealPage in rental markets). I find a novel channel through which common pricing algorithms can raise prices above competitive levels even when the dynamic incentive is completely shut down: they can serve as *information designers* by pooling certain states of nature to better coordinate firms' actions. In a simple two-by-two model, I show that a common pricing algorithm will raise prices above the competitive level by using its information design power, even when the suggested prices must be consistent with each firm maximizing their own one-period profits.

Finally, I am working on a project about information sharing. This topic has garnered more interest from antitrust authorities in recent years as data collection and sharing platforms have become more ubiquitous—most recently, in 2023, the FTC and DOJ announced that they would take a stricter view on what information firms are allowed and disallowed to share. The existing literature on information exchanges tends to analyze the impact of a particular information exchange on market outcomes such as price levels in a reduced-form way; however, due to difficulties surrounding the analysis of private monitoring games, they tend not to explicitly model the effect that

additional information has on the set of feasible equilibria, meaning that one cannot use this work to simulate and compare different information sharing policy counterfactuals. I develop a framework that one can use to flexibly analyze the effects of different information sharing counterfactuals based on the computational method of Phelan and Skrzypacz (2012) and apply this to the Agri Stats information exchange in the turkey processing industry. This work is still in progress, but my preliminary results suggest that full information sharing is "special" in that introducing even slight uncertainty on competitors' outcomes can cause collusion to break down.

As stated above, I am eager to attend the digital economics and AI workshop. Please let me know if there is any additional information that I can provide. I look forward to hearing back.

Best,

Avner A. Kreps