Application for NBER Digital Economics and AI Tutorial

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PhD Graduate Study Overview

I am currently a third-year PhD student in Economics at Duke University, having enrolled in Fall 2022.

I have successfully completed PhD core courses in **Microeconomics**, **Macroeconomics**, and **Econometrics** in my first year. I also took a field course in **Econometrics** to enhance my understanding of advanced econometric methods, including Nonparametric and Semiparametric Estimation, Instrumental Variables, and Difference-in-Differences extensions.

My research interests lie in Industrial Organization and Empirical Microeconomics. To explore these interests, I took PhD-level field courses in **Industrial Organization**, focusing on both theoretical and empirical approaches to understanding market structures and the strategic behavior of firms and consumers. Additional coursework in **Health Economics**, **Productivity**, and **Theoretical Industrial Organization** further enhanced my knowledge of IO topics, such as the U.S. healthcare industry, the estimation of production functions, platform markets, and vertical control.

I have also taken other courses in Microeconomics, including **Dynamic Discrete Choice**, **Empirical Market Design**, and **Matching and Sorting**, where I was exposed to topics such as labor markets, education, platforms, school choice, and housing markets.

Research Interests and Projects

My research interests lie primarily in **Industrial Organization** and the **Platform Economics**, with a focus on how technological innovations, such as algorithmic pricing, influence market dynamics and welfare outcomes. I am particularly interested in exploring how firms and platforms adopt algorithmic tools to adjust pricing strategies, and how these innovations impact competition, pricing dynamics, and consumer welfare.

One of my primary research projects examines the introduction of Airbnb's Smart Pricing (SP) algorithm, which was launched in November 2015 to help hosts dynamically adjust listing prices based on regional demand, seasonality, and other factors. The algorithm offers hosts a way to optimize prices automatically, reducing the need for constant manual intervention. This study seeks to address two critical questions: (1) How does Airbnb's algorithmic pricing influence market competition and impact pricing dynamics? (2) What are the welfare implications of algorithmic pricing for hosts, guests, and the platform as a whole?

The research explores both the competitive and welfare dimensions of algorithmic pricing. On the competition side, my project examines whether Airbnb's SP algorithm leads to implicit coordination among hosts, potentially reducing competition and leading to price harmonization across listings. This is particularly important in the context of platform markets, where pricing algorithms can create feedback loops, enabling multiple hosts to adopt similar pricing strategies, possibly without overt collusion. I investigate whether this effect is more pronounced in high-demand periods, where the algorithm may trigger upward price adjustments across similar listings. This raises important concerns about market concentration and price uniformity in digital platforms.

From a welfare perspective, I aim to evaluate how SP impacts various stakeholders, including hosts, guests, and the platform itself. The algorithmic pricing system significantly reduces the cognitive and operational costs for hosts by automating the pricing process, potentially increasing efficiency and improving responsiveness to market fluctuations. However, there are concerns about affordability for guests, especially in peak demand periods, where algorithmic pricing may lead to higher prices. My study investigates the overall impact on market affordability and price dispersion, using a difference-in-differences methodology to compare the effects of SP adoption across different time periods and market segments.

Additionally, my project contributes to the broader literature on platform economics and algorithmic pricing by providing empirical evidence from the sharing economy. Although much of the existing research focuses on traditional retail and housing markets, my work addresses the gap in understanding how algorithmic pricing strategies affect the competitive landscape and welfare outcomes in platform-driven markets like Airbnb. The findings from this study will provide valuable insights for policymakers, platform designers, and regulators concerned with the broader implications of algorithmic pricing in digital markets.

Committee Members

I am currently in the process of forming my dissertation committee. Expected committee members include:

- Prof. Daniel Yi Xu (Chair) daniel.xu@duke.edu
- Prof. Allan Collard-Wexler allan.collard.wexler@duke.edu