DISSERTATION PROPOSAL

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"Cross-Market Impact and Technology Adoption in the Sharing Economy"

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The sharing economy is growing fast, with its global revenue estimated to grow from $14 billion in 2014 to $335 billion by 2025. The growth of the sharing economy has impacted different markets, and its impact is growing larger with technology advancement, which facilitates trade in the sharing economy by improving search, matching, pricing, etc. This dissertation provides insights to these key issues in the sharing economy. The first two chapters examine how the sharing economy affects other traditional industries, in the context of Airbnb and the housing market. In the third chapter, we explore how artificial intelligence technology is leveraged to facilitate transactions in the sharing economy, in the context of Airbnb's Smart Pricing algorithm. These researches are enabled by various quantitative methods, including structural modeling, machine learning, and quasi-experimental methods.

The first chapter examines how Airbnb affects the rental housing market. Airbnb provides landlords with an alternative opportunity to rent to short-term tourists, potentially causing some of the property owners to switch away from long-term rental to local residents and impacting the rental housing supply and affordability. Despite the recent government regulations to address this concern, it remains unclear whether and what type of properties are switching. Combining Airbnb listings data and the American Housing Survey data, we estimate a structural model of property owners' decisions to study the impact of Airbnb on local rental market and its policy implications. The results show that Airbnb mildly cannibalizes the long-term rental supply but creates market expansion effect. The percentage of switchers varies significantly across cities, depending on host and local market characteristics such as demographics, tourism, and mortgage affordability. The impact is largely concentrated on lower priced, affordable units rather than on higher priced, luxurious ones. Counterfactual results suggest that policies such as imposing tax or night limits help reduce the cannibalization of Airbnb on rental housing supply, yet they also reduce the market expansion effect created by Airbnb. We show how the magnitudes of the two forces change with the level of regulations.

The second chapter investigates the impact of Airbnb on the real estate market. On the one hand, Airbnb may drive up demand for homes and raise prices. More people can, and are willing to, afford to buy homes as Airbnb serves as an extra income source and helps hosts pay mortgages, and many investors see Airbnb as a real estate investment. On the other hand, Airbnb may decrease demand and price because of the negative externality issues such as noise, nuisance, and safety. This chapter examines the direction of the Airbnb's impact and explores the underlying mechanism. By leveraging the Airbnb listings data and the zip code level and property level real estate transaction data, we perform aggregate and micro level analyses to study the impact on the real estate transaction volume and price. In the zip code level analysis using difference-in-differences approach, we find that the impact of Airbnb on the transaction volume is different

across different property types, which motivates the property level analysis. In the property level analysis, we construct an Airbnb performance measure for each property using machine learning to assess Airbnb's impact on the housing price. We find that suitability for entire place listings is associated with the increase in the real estate price, while the price-increasing impact from the suitability for private room listings is dominated by the negative externality impact. The size of the impact differs by housing market conditions, such as real estate supply and owner occupancy. Our findings provide policy implications on where and which Airbnb properties should be regulated to alleviate housing affordability problems.

In the third chapter, we aim to provide managerial insights about Airbnb's Smart Pricing algorithm. To help hosts price their properties better, the algorithm provides pricing suggestions, which are automatically set as listing prices if they fall within the price boundaries set by hosts. However, it is puzzling that many hosts do not adopt Smart Pricing, even though it is offered for free and allows hosts to set price boundaries that they are comfortable with. It is also puzzling that nonprofessional hosts are less likely to adopt the algorithm than professional hosts, even though nonprofessional hosts are more likely to benefit from the algorithm. We resolve these puzzles via building a structural model on hosts' adoption behavior, and show that distrust of the algorithm is the reason why most hosts do not adopt the algorithm. Nonprofessional hosts are less likely to trust the algorithm, because they do not vary their prices often, which hinders the training of the algorithm. We simulate policy counterfactuals that help hosts adopt and benefit from the algorithm.