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 whether and how artificial intelligence technology leveraged to facilitate transactions benefits players 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 the impact of Airbnb on the local rental housing market. Airbnb provides landlords an alternative opportunity to rent to short-term tourists, potentially causing some property owners to switch away from long-term rental, thereby affecting rental housing supply and affordability. Despite recent government regulations to address this concern, it remains unclear whether and what type of properties are switching. Combining Airbnb and American Housing Survey data, we estimate a structural model of property owners’ decisions and conduct counterfactual analyses to evaluate various regulations. We find that Airbnb mildly cannibalizes long-term rental supply. Cannibalization is concentrated among lower priced and affordable units. Cities where Airbnb is more popular experience a larger reduction in rental supply, but they do not necessarily have a larger percentage of switchers. The counterfactual results suggest that limiting the number of days a property can be listed is a more desirable policy than imposing a linear tax. We propose a new concave tax and show that it outperforms existing policies in terms of reducing cannibalization, maintaining market expansion, limiting affordable units from switching, and allowing economically disadvantaged hosts to benefit from Airbnb. Finally, Airbnb and rent control can exacerbate the negative impacts of each other.

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 examine the societal impact of machine learning deployment in the context of Airbnb's Smart Pricing algorithm. With advancements in technology, many firms are implementing or expanding their use of artificial intelligence and machine learning in marketing. To help hosts price their properties better, Airbnb launched Smart Pricing algorithm, which uses machine learning to deliver recommended prices tailored to each individual property. 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. To investigate the reason for the low adoption rate, we estimate a structural model of hosts' pricing and algorithm adoption using the Airbnb listings data. The results show that the algorithm potentially benefits hosts and Airbnb if the right hosts use the algorithm at the right time. However, hosts' adoption behavior, especially the tendency not to turn the algorithm on or off and the beliefs about the algorithmic bias, often leads to hosts adopting the algorithm when they are worse off with the adoption. The results suggest the need for a “smarter” algorithm that not only performs well but also considers hosts' adoption behavior so that hosts benefit from the algorithm.