

Effects of Neighborhood Characteristics in the Sharing Economy: the Case of San Francisco

Yanjie Luo

Graduate School of Economics, Keio University

Email: <luoyanjie1992@keio.jp> Web: <https://sites.google.com/view/luoyanjie/>

(1) Motivation: In recent years, as a prominent example of the sharing economy, Airbnb brings a succession of significant impacts and alternations in the world. In this study, we emphasize the question of whether there is evidence that the neighborhood characteristics of the Airbnb accommodations affect the listing price of rooms in the rental accommodation market of San Francisco.

(2) Data and methods: We tested the hedonic price model using a dataset of 6,624 Airbnb listings in 579 neighborhoods of San Francisco in the U.S. as of August 2018 (Figure 1). The Airbnb listing price data derived from the Inside Airbnb website (<http://insideairbnb.com/>), crime data from DataSF, classified transportation data from SFMTA, and restaurant datasets extracted from Yelp.com. This study also assembled data from the Top 30 most popular attractions from Trip Advisor and batched these locations into geographic coordinates by Google Maps API and Python 3.7.0. We calculated the walking distance from each Airbnb accommodation to the nearest transit stop/ attraction by find nearest analysis, supported by ArcGIS Online.

(3) Results and Discussion: In Table 1, we present the estimation results of the following five models:

$$\text{Model 1: } \log(\text{Price}_i) = \alpha + \beta P_i + \varepsilon_i$$

$$\text{Model 2: } \log(\text{Price}_i) = \alpha + \beta P_i + \gamma H_i + \varepsilon_i$$

$$\text{Model 3: } \log(\text{Price}_i) = \alpha + \beta P_i + \gamma H_i + \delta R_i + \varepsilon_i$$

$$\text{Model 4: } \log(\text{Price}_i) = \alpha + \beta P_i + \gamma H_i + \delta R_i + \tau N_i + \varepsilon_i$$

$$\text{Model 5: } \log(\text{Price}_i) = \alpha + \beta P_i + \gamma H_i + \delta R_i + \tau N_i + \varepsilon_i$$

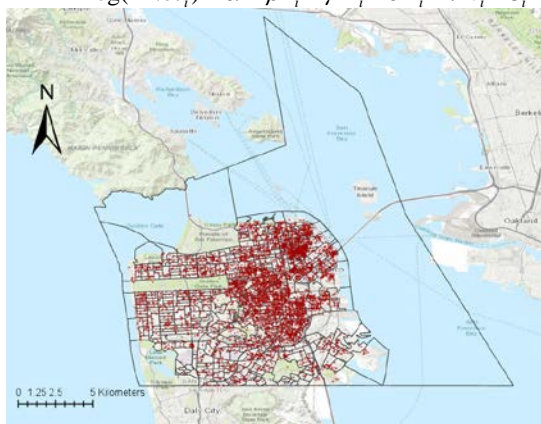


Figure 1: The spatial distribution of Airbnb listing accommodations in San Francisco

Table 1 shows that adding neighborhood characteristics into analysis model is helpful to enhance the reliability of models while different categories of transportation, population and housing characteristics have different significance and effects in specific analysis models.

(4) Conclusion: This article analyzes the relationships between Airbnb pricing and neighborhood characteristics in San Francisco which are examined with the hedonic pricing models at the block group levels. By providing such comprehensive observation at factors that influence prices of Airbnb listings, this research rendered hosts with insights as to potential market competition strategies and public authorities with the proficiency of the cooperative relationship across various regional industries and identified rental accommodation supervision strategies.

Table 1: Estimated results model

Variables	Model1	Model2	Model3	Model4	Model5
~Physical characteristics~					
PropertyType1	0.189***	0.193***	0.168***	0.024*	0.024*
PropertyType2	0.124***	0.173***	0.188***	-0.007	-0.009
Accommodations	0.141***	0.139***	0.139***	0.135***	0.135***
Bathrooms	-0.049***	-0.038***	-0.036***	-0.057***	-0.056***
Bedrooms	0.219***	0.215***	0.211***	0.214***	0.214***
Wireless Internet	0.048	-0.051***	-0.049	-0.042	-0.041
Breakfast	-0.004	-0.001	-0.005	-0.014	-0.014
Free parking	0.010	-0.010	-0.001	0.071***	0.071***
~Host characteristics~					
Superhost		0.111	0.105***	0.100***	0.100***
Identity verified		0.035***	0.032**	0.029**	0.028**
Cancellation		-0.144**	-0.157***	-0.159***	-0.159***
Host Verifications		0.000**	-0.015***	-0.016***	-0.016***
Host long		-0.015***	0.000**	0.000	0.000
~Reputation characteristics~					
Review Overall Rating			0.003**	0.003*	0.003*
Review Scores Accuracy			0.000	0.008	0.008
Review Scores Cleanliness			0.120***	0.119***	0.119***
Review Scores Checkin			-0.113***	-0.075***	-0.075***
Review Scores Communication			-0.059***	-0.043***	-0.043***
Review Scores Location			0.075***	-0.008	-0.008
Review Scores Value			-0.06***	-0.032***	-0.032***
~Neighborhood characteristics~					
Transit1: Bus				0.375***	0.369***
Transit2: Cable Car				-0.095***	-0.093***
Transit3: Metro				0.027	0.029
Transit4: Street Car				0.023*	0.023*
5minsrest				0.000	
10minsrest					0.000
Attractions				-0.024**	-0.023*
Population Density				0.000***	0.000***
Crime Density				0.000	0.000
Young Proportion				0.139*	0.143*
Income				0.000	0.000
Employed Proportion				0.221	0.226
High Education Proportion				0.238***	0.238***
Tenure Proportion				0.065*	0.064*
Invalue				0.000	0.000
Vacancy Proportion				0.275**	0.270**
Single Proportion				-0.008	-0.012
White Proportion				0.171*	0.176*
Black Proportion				0.073	0.075
Asian Proportion				-0.083	-0.085
Hispanic Proportion				0.109	0.107
Observations	6624	6624	6624	6624	6624
Adjusted R2	0.402	0.417	0.441	0.498	0.498

(Note: ***p < 0.01, ** p < 0.05 and * p < 0.1)