

Price-setting Behaviour in the Tourism Sharing Economy:

A Hedonic Price Analysis of Airbnb Listings in the Caribbean

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Overview of the Sharing Economy

Concept of Sharing (1)

- Sharing is a phenomenon as old as time itself
 - it is a means of giving others access to what we have so that they can fill a need
- Historic examples : bartering, trading, swapping
- Contemporary examples: citizens borrowing books from the library
 - firms have been sharing for a long time in areas of computer services, storage capacity, car fleets

Concept of Sharing (2)

- In what is called the sharing economy, individuals participate in sharing activities by renting, lending, trading, bartering, or swapping goods, services, transportation solutions, space, or money (Möhlmann, 2015).
- The sharing economy concept has created markets out of things that were not regarded as monetisable properties before (Geron, 2013).

Defining the “Sharing Economy” (1)

- A form of consumption where people share consumption of goods and services online (Hamari, Mimmi, & Ukkonen, 2016)
- Consumers granting each other temporary access to under-utilized physical assets, possibly for money (Frenken & Schor, 2017)

Defining the “Sharing Economy” (2)

- The term “sharing economy” was added to the Oxford Dictionary in 2015
 - *“An economic system in which assets or services are shared between private individuals, either for free or for a fee, typically by means of the Internet”*
- A set of practices and models that, through technology and community, allows individuals and companies to share access to products, services and experiences (Market Revolution, 2013)

Defining the “Sharing Economy” (3)

- Oh and Moon (2016) identify the following common attributes among prevailing definitions of the sharing economy:
 - social relationship-based open accessibility
 - trust
 - value creation
 - Peer-to-Peer (P2P) transactions

Defining the “Sharing Economy” (4)

Thus the basic concept of the sharing economy is

- to obtain value from untapped potential residing in goods that are not entirely exploited by their owners
- based on P2P sharing of human and physical resources by using Internet platforms as well as information and communications technology applications
- differs from ‘old-fashioned’ sharing because of the integrality of the Internet in the transaction

P2P (1)

- P2P platforms permit owners to offer goods and services for rental while the platform operator manages and maintains the marketplace
 - In these rental markets, the goods and services are “shared” in exchange for payment
- P2P platforms promise to expand access to goods and services, diversify individual consumption, bolster efficiency by increasing asset utilisation, and provide income to owners

P2P (2)

Critique

- The main criticism is that the primary competitive advantage of P2P platforms lies in their ability to avoid costly regulations meant to protect third-parties

Rebuttal

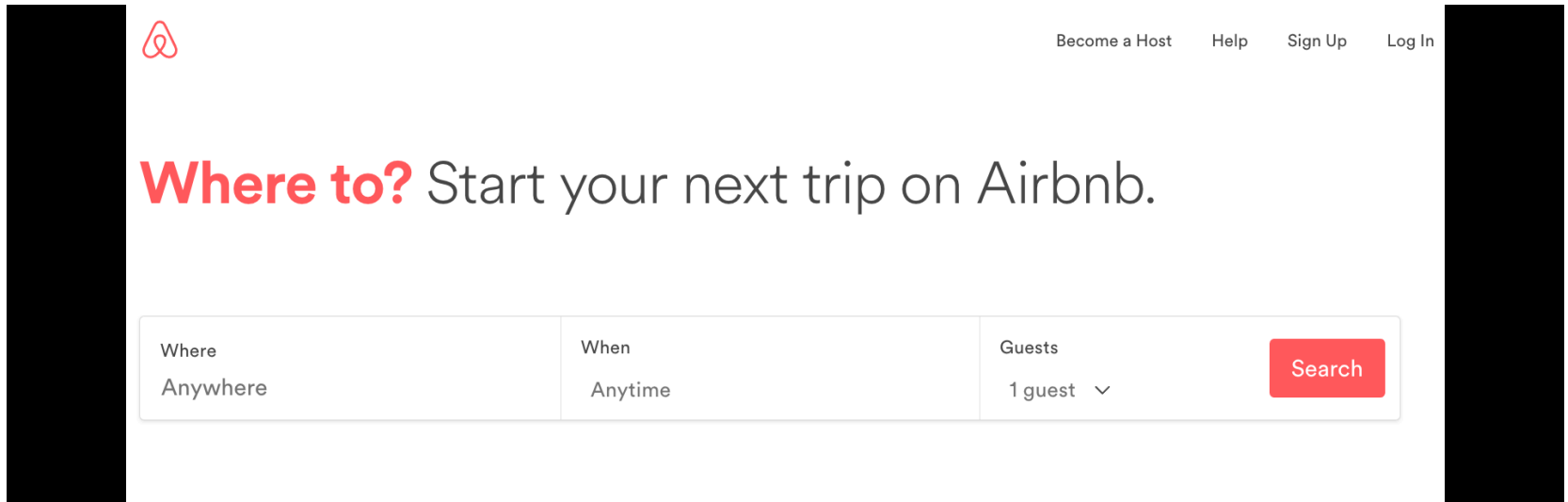
- Consumer welfare is enhanced by offering new innovations, more choice, greater service differentiation, better prices and higher quality services
- Sharing economy removes the need for regulation in several instances, by providing better information and reputation systems, and expanding choices available to consumers

Advent of Airbnb

Airbnb (1)

- Founded in 2008 by Brian Chesky and Joe Gebbia
- Airbnb has pioneered the use of the sharing economy business model to connect people who own idle accommodation assets with those who need temporary accommodation via a P2P platform

Airbnb (2)



- The Airbnb website (www.airbnb.com) is straightforward and resembles traditional accommodation booking websites
- To book or rent out a space, one must have an Airbnb profile
- Payments are made through the website and Airbnb earns its revenue by charging guests a 6–12% fee and hosts a 3% fee

Airbnb (3)

- Spaces vary widely, ranging from a living room to an entire island but typically involve a private room or an entire apartment or house
- The 'host' of a space may be living there at the time of the rental, as with a typical bed and breakfast (B&B), or may be absent, possibly away on vacation or even operating the space as a permanent rental

Welcome, Airbnb guest!

Your neighbours are the Trumps.



The New York Times

By ELI ROSENBERG

3 hrs ago

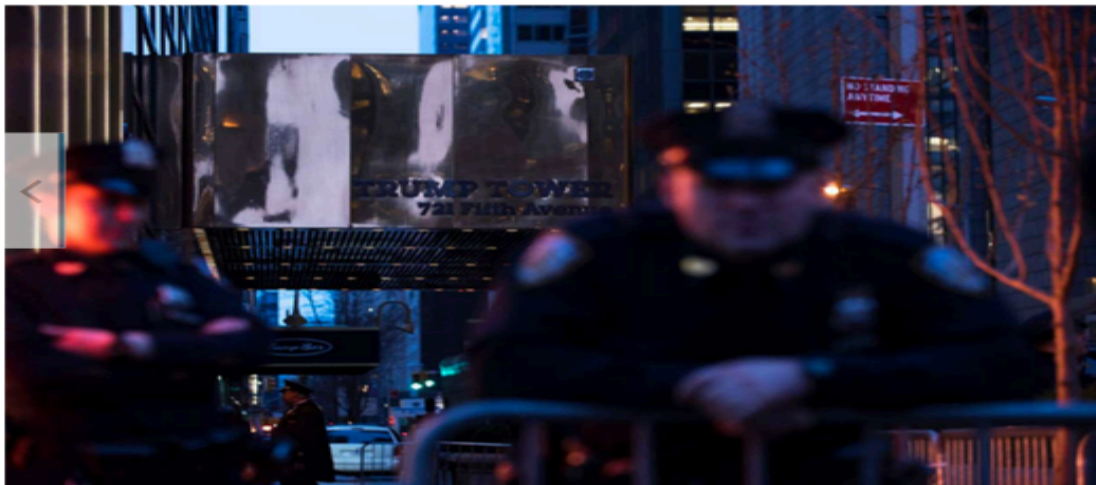
 SHARE

 SHARE

 TWEET

 SHARE

 EMAIL



© Karsten Moran for The New York Times Police officers outside Trump Tower last week. An apartment inside had been listed for rental through Airbnb.

The apartment has spacious windows, a sleek kitchen and expansive views of Manhattan. It boasts a prime location close to Central Park and Rockefeller Center and promises all the excitement of a luxury apartment in Midtown Manhattan.

Airbnb (4)

- Since inception
 - More than 3,000,000 listings worldwide
 - Serves 65,000+ cities in 191 countries
 - Booked 200,000,000+ guests
- It has attracted USD\$4.4 billion in venture capital since its start, USD\$1 billion in its most recent funding round (Series F), and was valued at USD\$31 billion

Airbnb (5)

- Airbnb is the most prominent company in its particular domain
- Competitors offering identical services: 9flats, Alterkeys, atraveo TUI Group, Benivo (formerly FlatClub), Couchsurfing, Flat4Day, Flipkey, HomeAway, Home Escape, HouseTrip, iStopOver, Kozaza, Localo, Nestpick, Onefinestay, Roomorama, SunnyRentals, TravelRent, Trip.com, Upiq, VRBO, Wimdu, Wyndham Worldwide, and Zukbox

Hedonic Modelling of Airbnb Listings in the Caribbean

Rationale

- As the entire process of searching and booking takes place over the Internet, the characteristics displayed on Airbnb likely serve as the single point of reference for potential guests to assess the quality of a listing
- The listing price is thus likely to depend on the attributes of the accommodation which is offered for rent, feedback received from past customers, and other factors

Price-setting Factors found in Literature

- *Trust*
 - a belief that persons will behave according assurances which they make
- *Reputation*
 - a public perception that conveys the collective evaluation of a group regarding attributes of a person or entity to assurances which they make
- *Host representation*
 - information host uses to present themselves to consumers, including photos
- Host, site and property attributes
- Amenities
- Rental rules
- Online review ratings

Hedonic Model

- Hedonic models are based on the idea that the observed price for a product (or service) is the sum of unobserved prices for its individual attributes or characteristics and to estimate implicit prices for these attributes or characteristics
- The hedonic function $P(\mathbf{z})$ describes how Airbnb accommodation prices change when attributes or characteristics of the accommodation change
 - $P(\cdot)$ is the price per night (week, month, etc.) and \mathbf{z} is a vector of accommodation attributes

Methods (1)

- The hedonic price function:

$$P = P(\mathbf{z}, \varepsilon)$$

where

- P is the observed price of an Airbnb listing
- \mathbf{z} is a vector of characteristics derived from the listing
- ε is an error term with the usual properties

Methods (2)

- Econometric specification:

$$\ln(P_i) = \beta_0 + \sum_{i=1}^j \beta_i X_i + \sum_{i=j+1}^k \beta_i Y_i + \varepsilon_i$$

where:

- X_i is a set of j categorical variables
 - Y_i is a set of $(k-j)$ continuous variables
- } **z**

- The semi-log specification follows the recommendation of Cropper et al. (1988): “On the Choice of Functional Form for Hedonic Price Functions”

Methods (3)

- OLS and quantile regression methods used to estimate the hedonic equation
- OLS regression based on the conditional mean of the dependent variable
- Quantile regression based on the conditional r^{th} quantile of the dependent variable
 - provides a more comprehensive description of the conditional distribution than OLS

Methods (4)

- The coefficients on categorical variables are transformed using the transformation $e^{\beta} - 1$, where β is the coefficient and e is the base of the natural logarithm, to provide a more precise explanation of each coefficient
 - This transformation provides the categorical variable's effect in percentage terms
 - The monetary effect can be obtained by multiplying this transformation by the average level value of the dependent variable

Data

Data (1)

- Analysis based on a dataset of Airbnb listings from 12 Caribbean countries: Antigua & Barbuda, Aruba, the Bahamas, Barbados, Belize, British Virgin Islands (BVI), Grenada, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent & the Grenadines, and Trinidad & Tobago
- Observations were collected using web crawling techniques to collect publicly available information on Airbnb.com
- Only listings with three or more ratings are considered, for which Airbnb provides visible star ratings, to ensure that the price of the accommodation listed reflects the market equilibrium to some extent

Data (2)

Country	Total Listings	Selected Listings	% of Total
Antigua & Barbuda	452	162	35.8
Aruba	744	433	58.2
The Bahamas	873	503	57.6
Barbados	1057	459	43.4
Belize	267	97	36.3
British Virgin Islands	310	79	25.5
Grenada	400	134	33.5
Jamaica	1184	528	44.6
St. Kitts & Nevis	193	55	28.5
St. Lucia	624	272	43.6
St. Vincent & the Grenadines	279	75	26.9
Trinidad and Tobago	642	249	38.8
Total	7025	3046	43.4

Data (3)

- Attributes are examined under the following categories: (1) Site (2) Reputation (3) Convenience (4) Personal, (5) Amenities, and (6) Country

Data (4): Site Attributes

- Site is concerned with physical aspects immediately associated with the Airbnb site
 - Number of bathrooms
 - Number of bedrooms
 - Number of beds
 - Property type (apartment, vacation home, house, B&B, villa)
 - Rental space (entire space or shared)

Data (5): Reputation Attributes

- Reputation is comprised of several variables:
 - Length of Airbnb membership
 - Number of listing photos
 - Number of ratings
 - Overall rating
 - ‘Superhost’ badge (a distinction given to hosts by Airbnb for meeting particular benchmarks which they set, such as high response rate, consistent 5-star evaluations, experience and commitment)
 - Wish list (number of times listing has been saved by Airbnb customers)

Data (6): Convenience Attributes

- Convenience is comprised of options Airbnb hosts may offer for guests' convenience, which depending on the option could prove inconvenient to guests:
 - Check-in window
 - Checkout time
 - Cleaning fee
 - Extra charge
 - Minimum stay
 - Response rate
 - Response time
 - Security deposit
 - Self check-in

Data (7): Personal Attributes

- The only personal attribute considered was whether hosts offered multiple listings on the Airbnb platform

Data (8): Amenities Attributes

- Amenities include:
 - AC
 - Breakfast
 - Cable TV
 - Doorman
 - Elevator
 - Gym
 - Pool
 - Wheelchair access
 - WIFI

Data (9): Country Attributes

- Country attributes can have effects on pricing behaviour:
 - Infrastructural development: *broadband subscriptions per 100 persons*
 - Purchasing power: *exchange rate*
 - Biodiversity: *land area*
 - Competition: *population*
 - Economic strength: *real GDP per capita*

Summary Statistics of Continuous Variables

	Mean	Std. Dev.
List Price (\$USD)	147.40	150.10
Number of Bedrooms	2.1	1.3
Number of Bathrooms	1.8	1.2
Number of Beds	2.9	2.0
Check-in Window (hours, 1-24)	11.0	9.5
Checkout Time	2:00 pm	5.5 hours
Overall Rating (max 5 stars)	4.8	0.3
Number of Ratings	18.4	19.7
Response Rate (%)	95.3	16.5
Membership (months)	32.3	18.0
Wish List	289.5	379.7
Minimum Stay (nights)	5.9	17.4
Number of Photos	22.4	15.7
Maximum Extra Charge (\$USD)	33.48	89.41
Cleaning Fee (\$USD)	34.94	48.44
Security Deposit (\$USD)	128.02	215.96

Summary Statistics of Categorical Variables

	Percent (%)
Entire Rental Space (= 1)	85.6
Property Type	
• Apartment (= 1)	44.2
• Vacation Home (= 2)	5.8
• House (= 3)	32.1
• Bed & Breakfast (= 4)	4.1
• Villa (= 5)	13.8
Superhost (= 1)	25.0
Self-Check-in (= 1)	12.5
Elevator (= 1)	4.0
Doorman (= 1)	3.5
Breakfast (= 1)	10.5
Wifi (= 1)	96.9
Gym (= 1)	8.6
Wheelchair (= 1)	13.6
Pool (= 1)	41.2
AC (= 1)	78.0
Cable TV (= 1)	62.5
Response Time	
• Within an hour (= 5)	59.2
• Within a few hours (= 4)	25.6
• Within a day (= 3)	12.6
• Within a few days (= 2)	0.4
• Other (= 1)	2.1
Hosts with Multiple Listings (= 1)	69.8

Results: Price Setting Behaviour

Results (1): Site

	OLS		25Q		50Q		75Q	
	%	\$USD	%	\$USD	%	\$USD	%	\$USD
Bathrooms	15.6	24.89	14.4	7.98	18.6	17.05	22.1	33.88
Bedrooms	3.1	4.64	4.4	2.32	6.8	5.87	7.9	22.36
Beds	1.5	2.23	2.8	1.46	2.3	1.94	--	--
Property Type	7.8	11.48	6.4	3.29	6.4	5.33	6.4	8.76
Rental Space	50.8	74.94	46.8	24.11	40.6	33.89	34.7	47.56

Results (2): Reputation

	OLS		25Q		50Q		75Q	
	%	\$USD	%	\$USD	%	\$USD	%	\$USD
Membership	0.3	0.44	0.2	0.10	0.3	0.25	0.3	0.41
No. of Photos	0.1	0.15	--	--	--	--	0.2	0.27
No. of Ratings (NOR)	-0.7	-1.03	-0.7	-0.36	-0.6	-0.50	-0.7	-0.96
Overall Rating (OR)	18.3	29.61	20.5	11.72	16.6	15.06	14.6	21.54
NOR x OR	0.5	0.74	0.5	0.26	0.4	0.33	0.5	0.69
Superhost	9.3	14.37	9.1	4.91	7.7	6.68	8.0	11.41
Wish List	0.02	0.03	0.02	0.01	0.02	0.02	0.02	0.03

Results (3): Convenience

	OLS		25Q		50Q		75Q	
	%	\$USD	%	\$USD	%	\$USD	%	\$USD
Check-in Window	-0.003	-0.44	--	--	--	--	-0.003	-0.41
Checkout Time	0.7	1.04	0.9	0.47	--	--	--	--
Cleaning Fee	0.1	0.15	0.1	0.05	--	--	--	--
Extra Charge	--	--	-0.1	-0.05	--	--	0.10	0.14
Minimum Stay	--	--	--	--	--	--	--	--
Response Rate	--	--	--	--	--	--	--	--
Response Time	11.1	17.31	7.7	4.12	9.1	7.95	11.7	17.00
Security Deposit	0.04	0.06	0.04	0.02	0.04	0.03	0.03	0.04
Self-Check-in	-8.5	-12.55	-7.8	-4.01	--	--	--	--

Results (4): Personal

	OLS		25Q		50Q		75Q	
	%	\$USD	%	\$USD	%	\$USD	%	\$USD
Multiple Listings	4.5	6.63	6.5	3.35	8.7	7.22	3.1	4.31

Results (5): Amenities

	OLS		25Q		50Q		75Q	
	%	\$USD	%	\$USD	%	\$USD	%	\$USD
AC	15.5	22.84	21.9	11.28	14.0	11.67	10.4	14.26
Breakfast	9.1	13.40	9.6	4.96	6.8	5.69	7.5	10.23
Cable TV	--	--	--	--	--	--	--	--
Doorman	15.5	22.84	18.5	9.54	--	--	--	--
Elevator	24.4	35.91	32.6	16.78	33.5	27.95	21.8	29.83
Gym	12.0	17.64	--	--	6.7	5.60	14.0	19.18
Pool	21.8	32.10	25.2	12.99	22.5	18.77	15.6	21.38
Wheelchair	4.4	6.48	--	--	6.6	5.51	--	--
Wifi	-15.5	-22.80	-16.0	-8.22	-20.5	-17.07	-12.7	-17.42

Results (6): Country

	OLS		25Q		50Q		75Q	
	%	\$USD	%	\$USD	%	\$USD	%	\$USD
Broadband	0.8	1.18	1.1	0.57	0.6	0.50	--	--
Exchange Rate	0.2	0.30	0.2	0.10	0.2	0.17	--	--
Land Area	0.003	0.46	0.003	0.14	0.003	0.24	0.004	0.48
Population	-0.00002	-0.003	-0.00002	-0.001	-0.00002	-0.002	-0.00002	-0.002
Real GDP	0.0007	0.10	--	--	0.0007	0.05	0.001	0.13

Conclusions (1)

- OLS results indicate that 32 of the 36 variables are significant determinants of price-setting behaviour
- Results from quantile regressions also indicate that these variables do explain price-setting, but these effects vary over the spectrum of prices under study
- This is evidence of the complexities in the pricing of accommodation in the tourism sharing economy

Conclusions (2)

- Accommodations with greater capacity charge higher prices.
- Hosts with superior reputations charge higher prices
- Provision of convenience options have an overall positive effect on prices, although there is evidence that some options can result in lower prices for tourists.
- Personal attribute is associated with higher price-setting behaviour.
- Virtually all amenities examined result in greater prices being charged for the site.
- Geography has significant, even if not large, effects on price-setting behaviour. Listings in countries with greater economic and infrastructural development, greater biodiversity, but weaker exchange rates have higher prices. On the other hand, prices are lower in countries where there is more competition for customers.



Thank You