Do Airbnb properties affect house prices?

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POLICY CONCERN IN RESPONSE TO AIRBNB GROWTH

- 'Prohibited' in Barcelona, Berlin & Santa Monica
- Recent limits in NYC, Airbnb sues
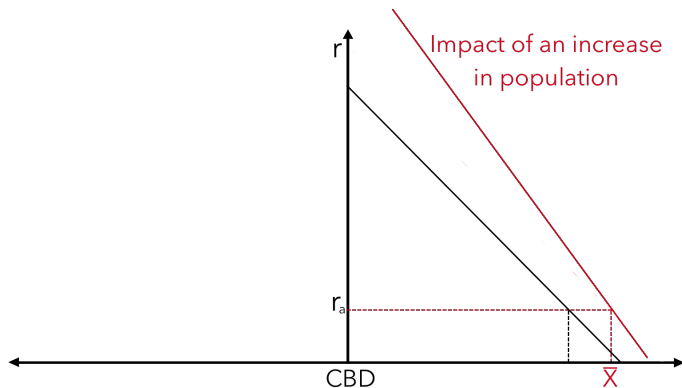- Controversial elsewhere
- Competition with hotels
- Short vs long term?
- Housing prices?
- Gentrification?
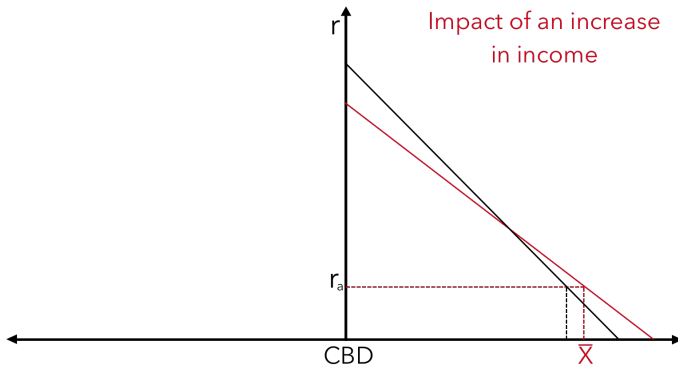
TRANSMISSION MECHANISMS

Airbnb's Impact   **Transmission Mechanism**   **Impact on Property Values**

Airbnb's Impact	Transmission Mechanism	Impact on Property Values
New income/revenue stream is available and incomes rise	More space is demanded: cost of owning/renting a home goes down	
Increase in population demanding space driven by an increase in tourists and residents	Increase in demand for space	Property values rise
Localized economic impact of guests	Local neighborhood quality rises	
Negative externalities of guests (safety, noise, increased demand for publicly provided goods)	Local neighborhood quality falls	Property values fall

ACCOMMODATING MORE POPULATION

Equilibrium utility declines

INCREASING INCOME

Impact of an increase in income

Equilibrium utility increases

DATA SOURCES

| Source	Description & Use
InsideAirbnb	InsideAirbnb (released by Murray Cox) contains information such as pricing, reviews, and location of each listing on Airbnb that was available on the date the Airbnb website was crawled (12 times in 2015-2016).
Department of Finance Annualized Sales Data: January 2003 - August 2015	The Department of Finance releases information on all sales in New York City. The data are available from 2003-2015 and contain information such as sale price, square footage, and sale date.
Department of Finance "Places" or "Areas-of-Interest" Map	The Department of Finance releases information on areas of interest, such as parks, cemeteries, and airports, available in GIS format.
Department of City Planning Pluto^{TM}	The Department of City Planning releases detailed information about each tax lot in New York City (of specific use for this analysis was square footage information).
American Community Survey 2010-2014	The American Community Survey contains information available at the Census Tract level such as education, racial and ethnic demographics, and employment-related measures.
New York Police Department Crime Statistics	The New York Police Department reports annual counts for different crimes (major felonies, non-major felonies, and misdemeanors) by precinct.
Census Geography Maps	In order to merge sales with local Census demographics, Census geographies needed to be identified and spatially joined to the sales dataset.
Metropolitan Transportation Authority Map of Subway Entrances	Information provided by the Metropolitan Transportation Authority was made into a map of subway entrances in New York City.

EXTENDING TIMELINE BASED ON RECENT SNAPSHOT
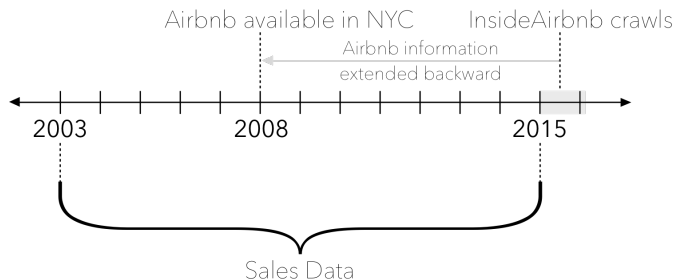
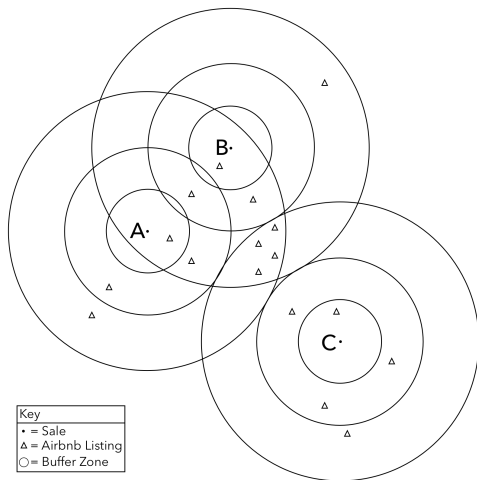# New York Airbnb listings over time
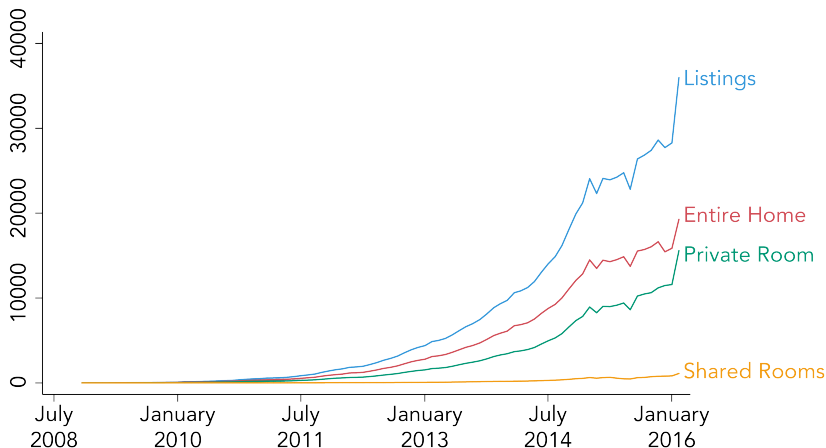
NEW YORK AIRBNB LISTING LOCATIONS
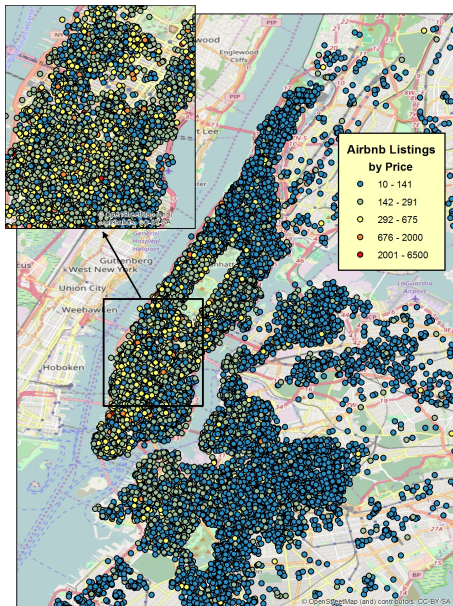
Extensive coverage:

- Manhattan
- Brooklyn
- Queens
  - Astoria
  - Long Island City
  - Jackson Heights

Distance buffers

DESCRIPTIVE STATISTICS

VARIABLES	μ	σ	max
Listing Counts, by Total and Type			
Listings Count (150m)	1.221	5.217	133
Listings Count (300m)	4.644	19.06	439
Listings Count (500m)	11.99	47.75	1,034
Listings Count (1000m)	40.99	157.5	2,899
Listings Count (2000m)	133.4	490.3	6,170
Listing Price			
Avg. Nightly Price (150m)	23.09	65.18	5,000
Avg. Nightly Price (300m)	29.34	69.00	5,000
Sales Unit			
Sale Price	683,922	913,580	10,000,000
Square Footage of Unit	1,183	577.0	18,590

HOW MUCH IMPACT SHOULD WE EXPECT?

$$P = \frac{R(v, x)}{u}$$

$$u = r_{\mathsf{rf}} + \omega - \tau \cdot (r_{\mathsf{m}} + \omega) + \delta - g + \gamma - (1 - \tau) \cdot \alpha$$

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Assume the expected capital gain equals the owner risk premium $\Rightarrow g = \gamma = 0$ and that:

Variable	Value	Interpretation
r_{rf}	0.02	Risk free annual interest rate
ω	0.025	Property tax rate as a percent of market price
τ	0.29	Effective tax rate on personal income
r_{m}	0.04	Annual mortgage interest rate
δ	0.025	Maintenance costs as a percent of market price
α	0.01373	Airbnb rental as a percent of market price

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$\Rightarrow$ 17.7% **increase** in the price of housing

HEDONIC ESTIMATES: IMPACT ON $ln(\text{SALE PRICE})$

Variable	(1)	(2)	(3)
Total Accommodations	0.0646***		
Total Rooms		0.0814***	
Total Rents			0.0323***

HEDONIC ESTIMATES: IMPACT ON ln(SALE PRICE)

Variable	(1)	(2)	(3)
Total Accommodations	0.0646***		
Total Rooms		0.0814***	
Total Rents			0.0323***
Square Feet	0.402***	0.402***	0.402***
Felonies	-0.0458***	-0.0455***	-0.0517***
Pre-war	0.0843***	0.0842***	0.0847***
Distance to AOI	-0.103	-0.103	-0.102
Distance to subway	-0.00875	-0.00897	-0.00897
Elevator	0.0858***	0.0863***	0.0847***

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Elevator	0.0858***	0.0863***	0.0847***
R-squared	0.524	0.524	0.524
Sale-Year FE	YES	YES	YES
Local Nbd FE	Block-Group	Block-Group	Block-Group
Clustered Standard Errors	Tract	Tract	Tract

Estimated HPI and Case-Shiller

Hedonic Estimates
Home Price Index

S&P/Case-Shiller
NY, NY Home Price Index
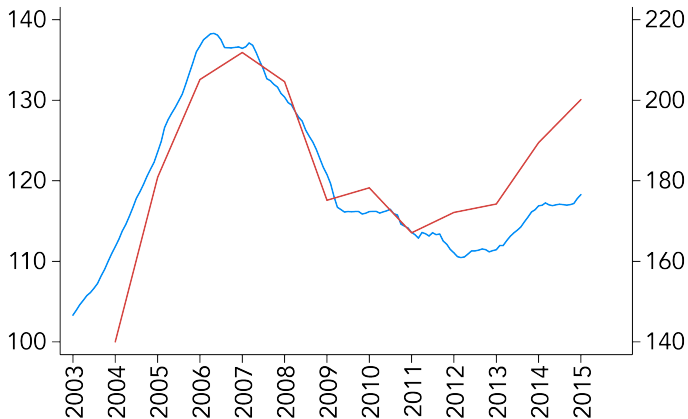
HEDONIC ESTIMATES WITH INCREASING BUFFERS

Variable	(1)	(2)	(3)
Airbnb_{500}	0.0773***		
Airbnb_{1000}		0.0670***	
Airbnb_{2000}			0.0601***

HEDONIC ESTIMATES WITH INCREASING BUFFERS

Variable	(1)	(2)	(3)
$Airbnb_{500}$	0.0773***		
$Airbnb_{1000}$		0.0670***	
$Airbnb_{2000}$			0.0601***
Sauare Feet	0.403***	0.402***	0.402***
Felonies	-0.0268*	-0.0243	-0.0307*
Pre-war	0.0839***	0.0842***	0.0840***
Distance to AOI	-0.100	-0.0997	-0.0991
Distance to subway	-0.00984	-0.0111	-0.0113
Elevator	0.0907***	0.0903***	0.0902***
R^2	0.525	0.525	0.525
Local Nbd FE	Block Broup	Block Broup	Block Broup
Clustered σ	Tract	Tract	Tract

Impact of increasing buffer size
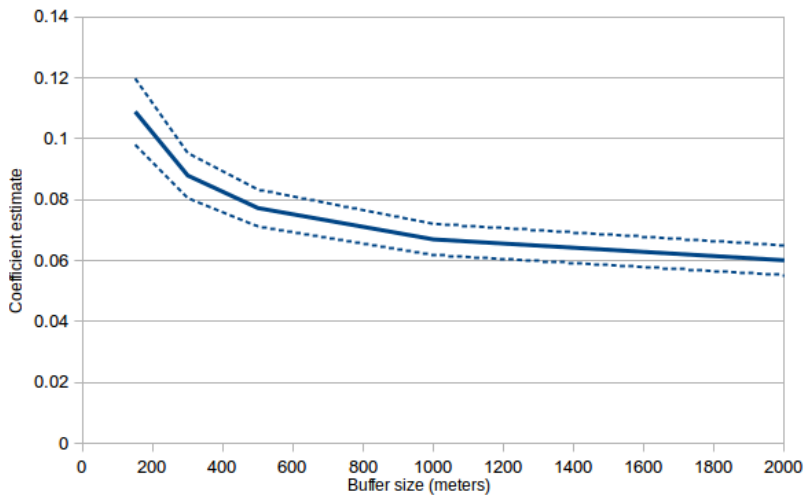
EFFECT OF AIRBNB TREATMENT ON $\ln$ PRICE

|	Nearest Neighbor	Propensity Score	Regression Adjustment
All distances	0.2094***	0.3171***	0.3493***
Less than 7 km	0.3252***	0.5142***	0.5490***
7 km to 11.5 km	0.2405***	0.3113***	0.2854***
11.5 km to 17 km	0.1734***	0.2774***	0.1678***
More than 17 km	0.1051***	0.0490***	0.0428***

*** - significant at 1 percent

INCREASING INTENSITY OF AIRBNB TREATMENT

# Airbnb	All Distances	Less than 7km	7km to 11.5km	11.5km to 17km
1 to 5	0.1596***	0.1413***	0.1653***	0.0855***
6 to 10	0.4553***	0.5838***	0.3371***	0.2202***
11 to 15	0.5399***	0.6486***	0.4228***	-0.1171
16 to 20	0.6636***	0.6712***	0.4999***	0.4179*
21 to 25	0.6403***	0.6699***	0.5361***	-0.0761
26 to 30	0.6436***	0.6499***	0.5379***	-0.3063
31 or more	0.7748***	0.7934***	0.5903***	-0.0325

*** - significant at 1 percent, * - significant at 10 percent

INCREASING INTENSITY OF AIRBNB TREATMENT
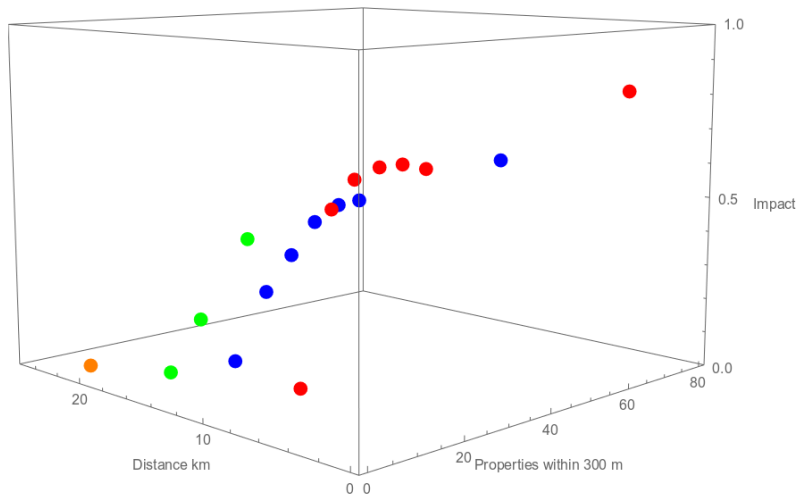
CONCLUDING REMARKS

- Airbnb listings do affect local house prices
- Greater in more central locations, less at periphery
- Analogous to increase in population
- Local impact between 5% and 30%
- Similar to expected from simple capitalization
- Similar to that found in Barron, Kung and Proserpio [2017]

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- Welfare impacts are less clear
- Presumably positive for Airbnb hosts and guests
- Potential reduced utility for original residents
- Political economy of policy responses