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Category spanning and competitive dynamics between categories

Evidence from the sharing economy

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Reactions to sharing economy

Argument against:

- It provides unfair competition because of tax evasion and elusion of safety laws.
- Example: Airbnb exacerbates the housing affordability problem because real estate managers move hundreds of properties from the long-rental market to the short-rental market.

Argument in favor :

- It helps lower income people to make some extra money
- Example: Airbnb helps citizens to afford their housing despite de increase in prices

The existence of the two opposing views and whether one or the other will prevail, can be explained by different types of providers' having a different impact on competition in the industry.

	Compliants	Spanners
Theoretical definition	• Active in one category only • Compliant with the claimed category's unique features	• Active in multiple categories • Incumbent in a proximal category within the same industry
Sharing economy context	It makes profits by exploiting existing slack resources	It makes profits by diverting resources from other economic uses
Example from Airbnb	Hosts who short-rent a room in their apartment or the full house when on vacation	Real estate managers that move properties from the long-rental to the short-rental market to make more profits

Review of the Categories literature on spanners

Existing literature

Organization level

- Depreciation of the atypical organizations (spenners) in the market [Negro and Leung, 2013; Zuckerman, 1999]
- Depending on the audience making the judgment, spanners may be appreciated instead of depreciated [Pontikes, 2012]
- Third parties influence audiences evaluations of the category's members [Durand, Rao, and Monin, 2007; Zuckerman, 1999]

Category level

- Spanning brings different interpretations to the emerging industry [Johnson and Hoopes, 2003; Suarez et al., 2015]
- Spanning increases entry and exit rates [Moeen and Agarwal, 2017; Montauti and Wezel, 2016; Pontikes and Barnett, 2015]
- Spanning increases the category's uncertainty [Carnabuci, Operti and Kovács, 2015]

Contribution

Industry level

The presence of spanners (in addition to compliants) brings uncertainty to the category. We look at the effect of category's uncertainty on competition **between** categories

Research question

How does categorical uncertainty affect the competitive dynamics between categories?

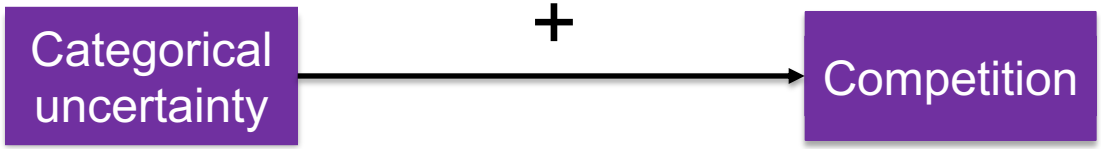
In particular, we look at the distinct effects that two sources of categorical uncertainty have on industry competition by examining:

- *fuzziness* (i.e., the extent to which organizations in a category claim membership to other categories simultaneously)
- *institutional ambiguity* (i.e., the tolerance that third parties have for departures from the categorical prototype).

H1: Categorical uncertainty

Categorical **uncertainty**: *is the uncertainty concerning a category distinctive features, which produces ambiguity about which specific organizational form and capabilities are required in that category*
[Carnabuci, Operti, & Kovács, 2015]

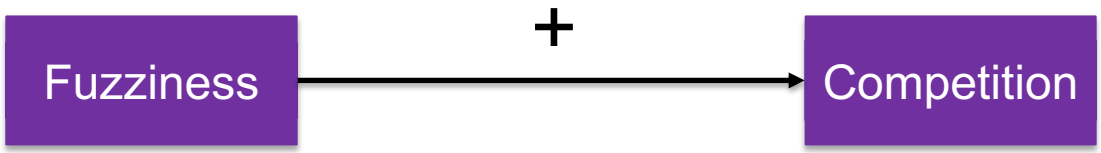
The higher the category's uncertainty:
→ the harder it is to identify the category's unique features
→ **thus**, the higher it will be the product substitution between categories



H2: Fuzziness

Category **fuzziness**: *is the extent to which organizations in a category claim membership to other categories simultaneously*
[Vergne and Wry, 2014]

The higher the category's fuzziness:
→ the higher the overlap between the high uncertainty category and the category where spanners are coming from
→ **thus**, the more the opportunities for product substitution between the two overlapping categories



H3: Institutional ambiguity

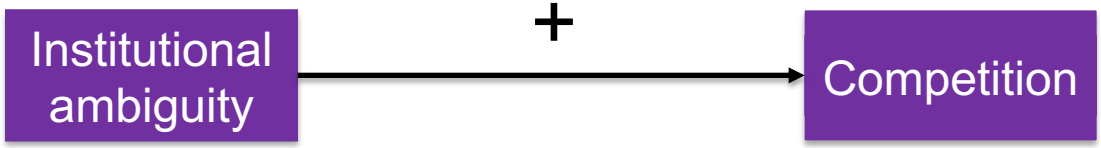
Institutional ambiguity: *is the tolerance that third parties have for doing different things, such as atypicality, due to the lack of agreed upon boundaries*

[Carnabuci et al., 2015; Suarez et al., 2015]

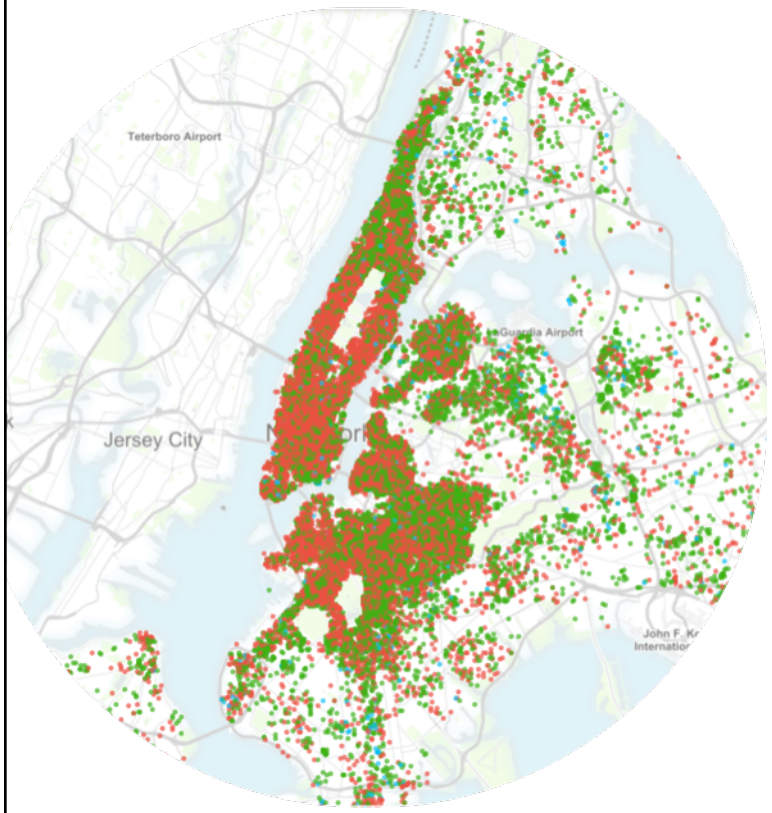
The higher the category's institutional ambiguity:

→ the vaguer the expectations for members in the category, hence the less likely is retaliation against not prototypical actors

→ **thus**, the higher the number of allowed category's interpretations, which reduces the category's distinctiveness and permits product substitution with multiple other categories



Data



7 years: August 2008 - October 2015.

16 cities in U.S.: Asheville, Austin, Boston, Chicago, Denver, Los Angeles, Nashville, New Orleans, New York, Oakland, Portland, San Diego, San Francisco, Santa Cruz, Seattle, Washington.

Daily data from Airbnb: 90,462 hosts managing 120,693 listings.

Monthly data from Zillow Research: sale price in the real estate market at the zip code level.

Variables

Compliants	Spanners
Operationalization: actors managing only 1 listing on the platform.	Operationalization: actors managing an above average number of listings on the platform (i.e. 8 or more listings).

Competition: log of the median price of real estate property on sale at time t_1 (month, zip code)

Categorical ambiguity: compliants' + spanners' listings (month, zip code)

Fuzziness: spanners' listings / compliants' listings (month, zip code)

(Reduction) Institutional ambiguity: law change (dummy) (Austin in 2013, Nashville in 2015)

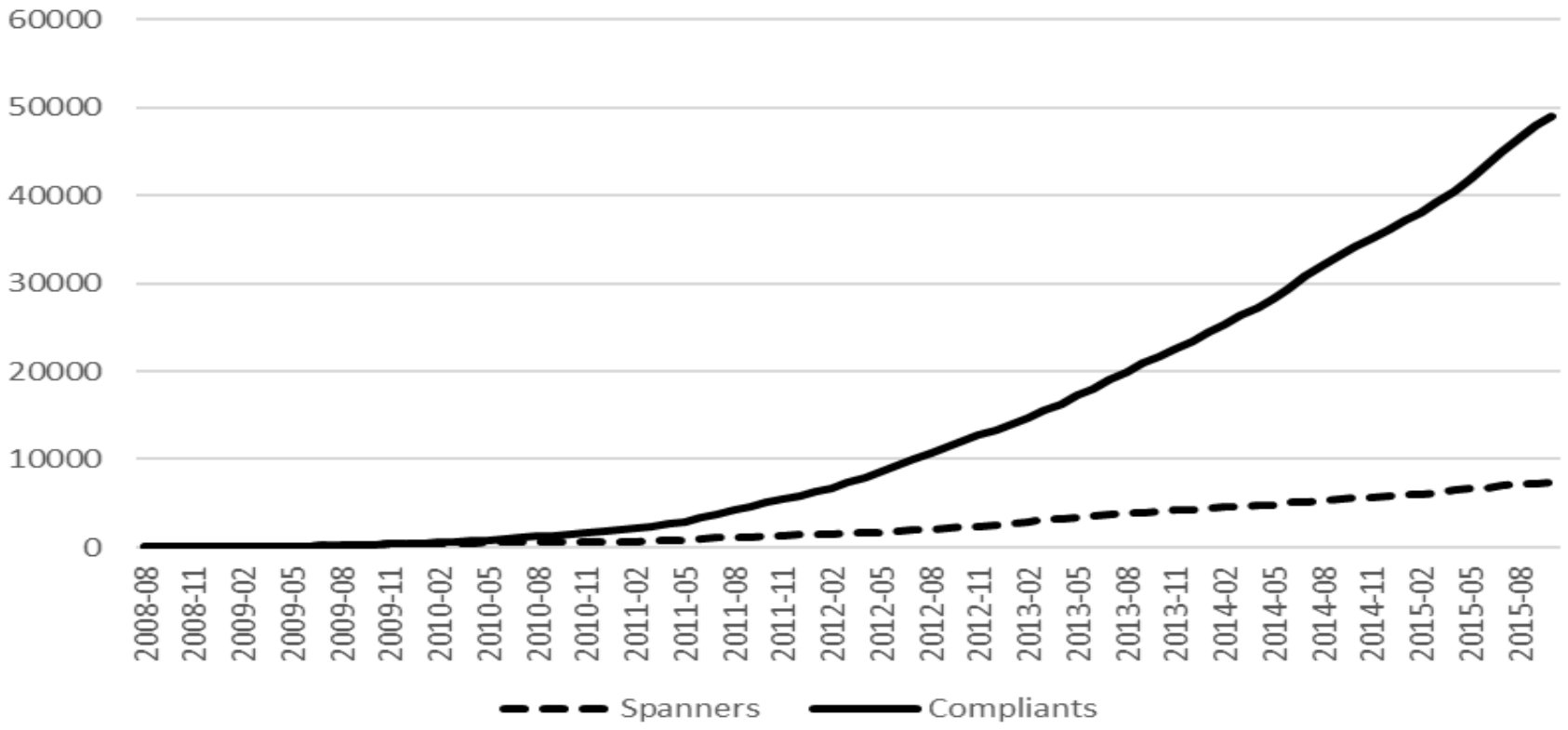
Controls:

Number of compliants (zip code), Population (MSA), Income (MSA), Change in number of houses sold (zip code), Change in number of new building permits (zip code), Time trend, Month fixed effects, Zip codes fixed effects.

Comparison between Spanners' and Compliants' listings

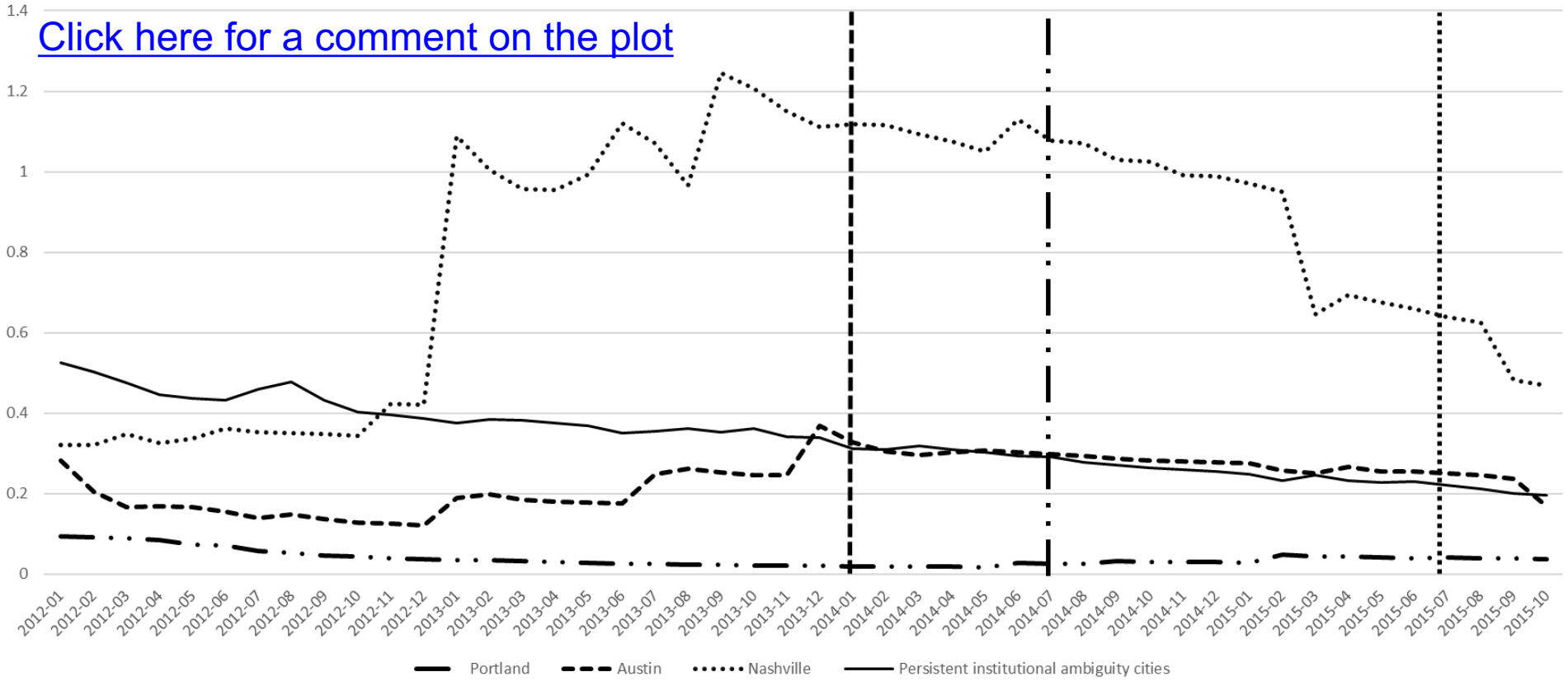
	Spanners (N = 9,847)		Compliants (N = 71,327)	
	Mean	SD	Mean	SD
Number of listings	71.85	145.13	1	0
Score rating	90.55	10.04	94.50	7.42
Price (per listing)	224.51	365.00	175.11	250.74
Proportion of hosts accepting instant booking	0.23	0.42	0.11	0.31
Reviews per month	1.73	1.74	1.59	1.65

Absolute number of listings in Airbnb by provider's type



Change in Fuzziness and Institutional ambiguity across cities

Click here for a comment on the plot



Dependent variable: *Log of price of resources at t_1*				
	Model 1	**Model 2**	**Model 3**	**Model 4**
Time trend	0.000732	0.000733	0.000917	0.000616
	(0)	(0)	(0)	(0)
Log of price of resources (t_0)	0.996	0.996	0.988	0.989
	(0)	(0)	(0)	(0)
No. of compliants			$1.12*10^{-06}$	$1.08*10^{-06}$
			(0.456)	(0.697)
Change in no. of new building permits	$-3.75*10^{-08}$	$-3.66*10^{-08}$	$-6.67*10^{-08}$	$-7.98*10^{-08}$
	(0.439)	(0.450)	(0.165)	(0.763)
Change in no. of houses sold	$1.39*10^{-05}$	$1.41*10^{-05}$	$1.91*10^{-05}$	$2.15*10^{-05}$
	(0.006)	(0.005)	(0)	(0.097)
Population (thousands)	$-1.11*10^{-05}$	$-1.10*10^{-05}$	$-8.23*10^{-06}$	$1.08*10^{-05}$
	(0)	(0)	(0)	(0.612)
Income (thousands)	0.000131	0.000123	0.000182	0.000499
	(0)	(0)	(0)	(0.015)
GDP (thousands)	-0.00989	-0.00993	-0.0123	-0.00782
	(0)	(0)	(0)	(0)
H1 **Categorical uncertainty**		$4.71*10^{-06}$		
		(0)		
H2 **Fuzziness**			0.000137	0.000265
			(0.004)	(0.416)
H3 **Institutional ambiguity**				0.00245
				(0)
Constant	0.146	0.151	0.207	0.108
	(0)	(0)	(0)	(0)
Observations	29,905	29,905	22,318	3,031
R-squared	0.995	0.995	0.996	0.995
Number of zip codes	426	426	410	51
Zip codes fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
Note: p-value in parentheses				

Robustness tests

1. Identification strategy: checking the existence of the two categories
   - Quantitative analysis of listings' ratings
   - Qualitative analysis of consumers' reviews
2. Addressing concerns of multicollinearity in Fuzziness
   - Introduction of each control one by one in the model.
   - Comparison of the full model with only one of the two highly correlated predictors
   - Theoretical test for multicollinearity
3. Robust to different operationalizations of the main variables
   - Fuzziness [Above average & 1SD above the average number of reviews per month]
   - Institutional ambiguity [R-street data]
   - Competition [Change in price of resources]
4. Portland (OR) special case

Contributions

Spanning affects competition between categories in the same industry [Moeen and Agarwal, 2017; Montauti and Wezel, 2016; Pontikes and Barnett, 2015]

- *Fuzziness* signals spanners' ability to enter and profit in the category]
- *Institutional ambiguity* signals a weak barriers and reduced illegitimacy discount

Categorical uncertainty is endogenously shaped by members' behavior – fuzziness – and in part exogenously created by relevant third parties – institutional ambiguity. [Johnson and Hoopes, 2003; Suarez et al., 2015; Carroll and Swaminathan, 2000]

We provide an example of possible third parties' strategic behavior that can promote as well as hinder the merging of two categories. [Durand, Rao, and Monin, 2007; Kim and Jensen, 2011; Pontikes and Kim, 2017]

The distinction between spanners and compliants can be further extended to investigate the different impact that the two actors have on prices in both the rental and the sale housing market. [Barron et al., 2018; Sheppard and Udell, 2016; Zervas et al., 2013]

Thank you

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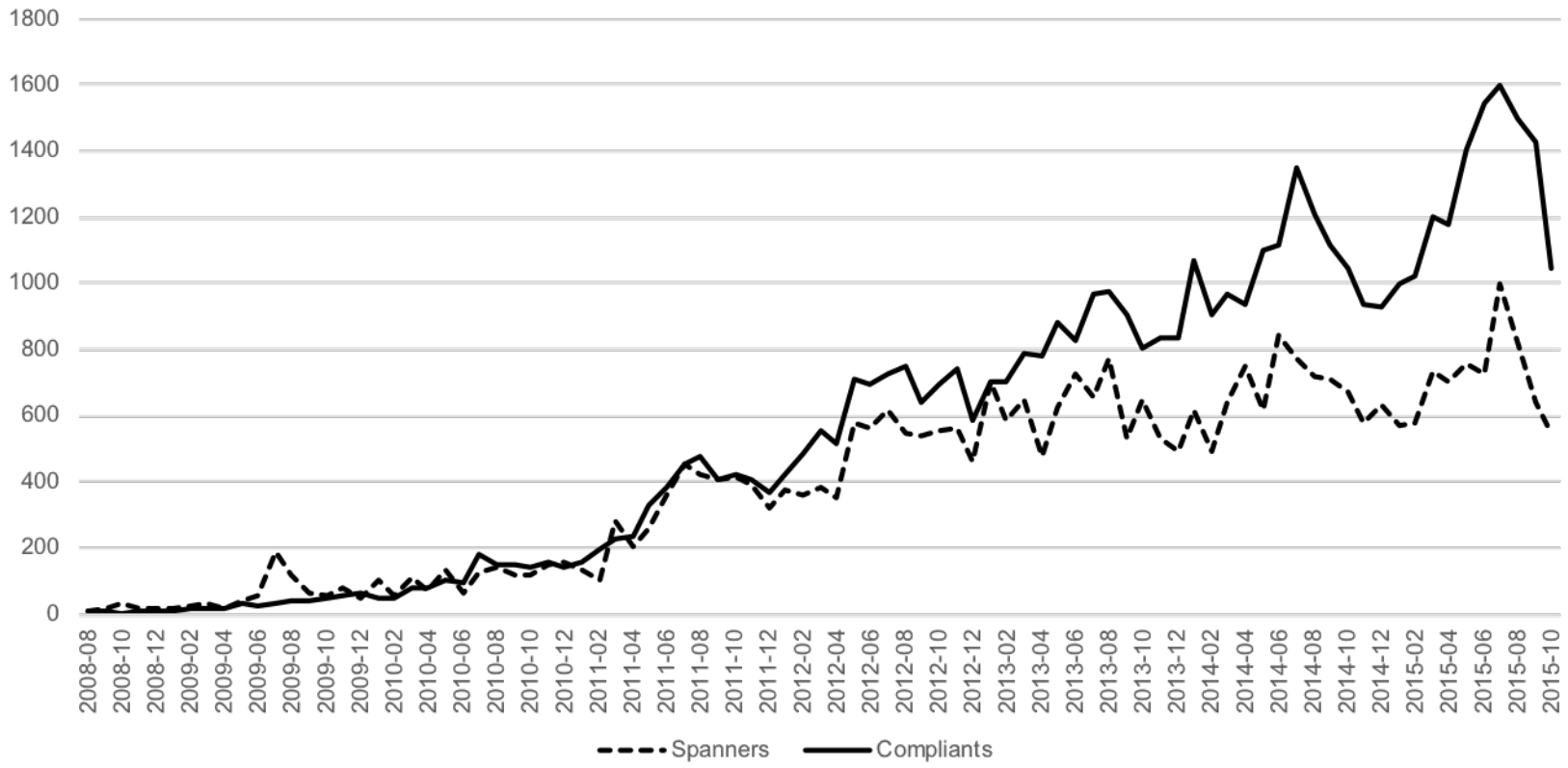
Providers' entry in Airbnb



Consumers' category definition: Airbnb vs. Vacation rentals

"The only thing to be aware of is that this is their house, not a vacation rental home. Therefore, there will be clothes in the closet, food in the fridge, etc." (Listing ID 154103 Austin, 23 April 2012)

"I've rented whole house vacation rentals for over 25 years. This was my first airbnb (staying while owners are present) experience" (Listing ID 767107 Austin, 16 July 2014)

"It definitely feels like a rental (and by the looks of things most of the other units are vacation rentals as well), but it suited our need just fine." (Listing ID 1046422 Austin, 5 February 2014)

"This is my second Airbnb stay. My first was more of the "classic" experience, where the host was right there and we had a great time. Jamie is an "Airbnb entrepreneur", and does not live in Austin, so the experience is much more like staying in a (Hidden by Airbnb) vacation rental, with an absentee owner" (Listing ID 383689 Austin, 22 january 2015)

"You can tell that its well kept and only used as a vacation rental-----its not lived in full time." (Listing ID 5145373 Portland, 9 February 2015)

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Providers' reaction to category definition

	Spanners (N = 117)	Change from 2009 to 2015	Compliants (N = 14,707)	Change from 2009 to 2015
Pictures with people	76.1	-14.9	93	-3.7
a) Single person	56.4	-22.5	73.2	-2.3
b) Couple	24.8	-14.6	24.5	0.3
c) Family	9.4	-22.1	6.7	-2.6
Logo	17.1	7.5	0.7	0
House/landscape	18.8	7.5	5.4	-2.3
Other	12	-1.1	7.1	0.4

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Robustness check: Audience's evaluations

	Spanner: 8 listings or more	Number of listings
	Model 1	**Model 2**
Number of listings		-0.002
		(0.006)
Spanner	-0.695	
	(0.000)	
Price	0.001	0.001
	(0.000)	(0.000)
Response time	-0.058	-0.033
	(0.260)	(0.429)
Response rate	0.005	-0.002
	(0.087)	(0.560)
Acceptance rate	0.000	-0.001
	(0.940)	(0.494)
Host is "super host"	0.364	0.366
	(0.000)	(0.000)
Cleaning fee	0.001	0.000
	(0.106)	(0.545)
Number of reviews	-0.001	0.000
	(0.356)	(0.845)
Score accuracy	1.694	1.825
	(0.000)	(0.000)
Score cleanliness	2.243	2.150
	(0.000)	(0.000)
Score check-in	1.306	1.258
	(0.000)	(0.000)
Score communication	1.452	1.667
	(0.000)	(0.000)
Score location	0.953	0.879
	(0.000)	(0.000)
Score value	2.772	2.849
	(0.000)	(0.000)
Instant booking	-0.173	-0.180
	(0.053)	(0.008)
Cancellation policy	0.027	0.071
	(0.531)	(0.033)
Reviews per month	-0.157	-0.178
	(0.000)	(0.000)
Constant	-5.688	-7.215
	(0.000)	(0.000)
R-squared	0.697	0.722
N	16,553	26,710

Note: P-values in parentheses

Robustness check: Different coding of Fuzziness

Variables	Spanner: above average frequency of reviews per month		Spanner: one s.d. above the average frequency of reviews per month	
	Model 1	**Model 2**	**Model 3**	**Model 4**
Time trend	0.00046	0.00050	0.00046	-0.00019
	(0.000)	(0.000)	(0.000)	(0.140)
Nr. of compliants		$1.6*10^{-6}$		-0.00002
		(0.601)		(0.164)
Log of price of resources t_0	0.99	0.99	0.99	0.99
	(0.000)	(0.000)	(0.000)	(0.000)
Change in number of houses sold	0.00001	0.00002	0.00001	0.00004
	(0.147)	(0.261)	(0.147)	(0.017)
Population	$-1.4*10^{-8}$	$7.8*10^{-10}$	$-1.4*10^{-8}$	$3.4*10^{-7}$
	(0.000)	(0.970)	(0.000)	(0.000)
Income	$1.9*10^{-7}$	$7.3*10^{-7}$	$1.9*10^{-7}$	$-2.8*10^{-6}$
	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.00001	-0.00001	-0.00001	-0.000001
	(0.000)	(0.000)	(0.000)	(0.000)
Categorical uncertainty	$4.4*10^{-6}$		$4.4*10^{-6}$	
	(0.000)		(0.000)	
Fuzziness		0.00037		0.00044
		(0.285)		(0.344)
Institutional ambiguity (reduction)		-0.0015		-0.00027
		(0.022)		(0.743)
Constant	0.15	0.14	51818.0	-0.12
	(0.000)	(0.001)	(0.000)	(0.110)
N	33550	2812	33550	1405
R-squared (within)	0.995	0.995	0.995	0.998
Zip code fixed effects	YES	YES	YES	YES
Month fixed effects	YES	YES	YES	YES

Note: P-values in parentheses

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Robustness check: Different coding of variables

	Model 1: Categorical uncertainty (proportion)	Model 2: Rstreet data	Model 3: Portland	Model 4: Change in price of resources
Time trend	0.00087		-0.000110	118.9
	(0.000)		(0.442)	(0.003)
No. of compliants			$-9.22*10^{-07}$	2.322
			(0.881)	(0.037)
Log of price of resources (t0)	0.9893	1.001	0.979	
	(0.000)	(0)	(0)	
Change in no. of new building permits	$-6.49*10^{-08}$	$-1.07*10^{-07}$	$1.36*10^{-06}$	-0.0313
	(0.178)	(0.049)	(0.023)	(0.776)
Change in no. of houses sold	0.00002	$5.04*10^{-06}$	$3.17*10^{-05}$	9.410
	(0.000)	-0.684	(0.076)	(0.079)
Population (thousands)	$-7.84*10^{-06}$	$-1.42*10^{-06}$	0.000240	6.336
	(0.000)	(0)	(0.020)	(0.471)
Income (thousands)	0.0002	$8.35*10^{-05}$	-0.00247	78.88
	(0.000)	(0)	(0)	(0.337)
GDP (thousands)	-0.0118	0.000225	0.0108	-1,709
	(0.000)	(0.805)	(0)	(0.009)
Categorical uncertainty (proportion)	0.0045			
	(0.000)			
Institutional ambiguity (Rstreet score)		$-7.08*10^{-05}$		
		(0)		
Fuzziness			0.00501	121.7
			(0.022)	(0.367)
Institutional ambiguity			0.000550	-563.0
			(0.523)	(0.033)
Constant	0.1941	-0.00385	-0.0743	10,915
	(0.000)	(0.816)	(0.239)	(0.294)
Observations	22,790	3,817	1,364	3,036
R-squared	0.996	1.000	0.997	0.073
Number of zip codes	411		22	51
Zip codes fixed effects	YES	No	Yes	Yes
Month fixed effects	YES	No	Yes	Yes

Note: p-value in parentheses

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Addressing multicollinearity concerns:
Introduction of each control one by one in the model

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Fuzziness	-0.0100***	0.00123***	0.000117***	0.000116***	0.000164***	0.000163***	0.000134***	0.000110**
Time trend		0.00521***	0.000284***	0.000281***	0.000295***	0.000292***	0.000266***	0.000753***
Log of price of resources (t_0)			0.984***	0.984***	0.984***	0.984***	0.984***	0.990***
Nr. of compliants' listings				1.92e-06*	3.33e-06**	2.84e-06*	1.11e-06	1.02e-07
Change in number of houses sold					2.30e-05***	2.27e-05***	2.09e-05***	1.80e-05***
Population						3.47e-09*	-3.48e-09*	-6.26e-09***
Income							1.76e-07***	2.19e-07***
GDP								-9.67e-06***
Constant	12.90***	12.44***	0.181***	0.184***	0.184***	0.180***	0.185***	0.236***
Observations	29,904	29,904	29,873	29,873	22,690	22,690	22,690	22,690
R-squared	0.010	0.642	0.995	0.995	0.995	0.995	0.995	0.996
Time fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Zip code fixed effects	YES	YES	YES	YES	YES	YES	YES	YES

Note: *** p<0.01, ** p<0.05, * p<0.1

[Mata and Alves, 2018]

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Addressing multicollinearity concerns:
Comparison of the full model with only one of the two highly correlated predictors

	Model 1	Model 2	Model 3	Model 4
Time trend	0.000526***	0.000469***	0.000529***	0.000467***
Log of price of resources (t_0)	1.002***	0.994***	1.001***	0.994***
Change in nr. of houses sold	7.30e-06	6.94e-06	7.35e-06	7.07e-06
Population	-6.89e-10***	-1.39e-08***	-6.73e-10***	-1.38e-08***
Income	2.35e-08***	1.93e-07***	2.18e-08***	1.86e-07***
GDP	-6.23e-06***	-4.96e-06***	-6.38e-06***	-4.92e-06***
Nr. of spanners' listings	-1.24e-06	-2.35e-06		
Nr. of compliants' listings			5.69e-06***	3.64e-06**
Constant	0.0424***	0.141***	0.0464***	0.147***
Observations	33,550	33,550	33,550	33,550
R-squared	1.000	0.995	1.000	0.995
Time fixed effects	NO	YES	NO	YES
Zip code fixed effects	NO	YES	NO	YES

Note: *** p<0.01, ** p<0.05, * p<0.1

[Wang, 2018, 2019]

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Addressing multicollinearity concerns:
Theoretical test for multicollinearity

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Time trend	-0.000809***	-0.000810***	-0.000997***	-0.000994***	-0.000908***	-0.000928***
Nr. of compliants	5.59e-05***	-6.13e-06	-6.95e-05*	9.80e-05***		3.54e-05***
Log of price of resouces (t_0)	1.002***	1.002***	0.963***	0.963***	0.970***	0.968***
Change in nr. of houses sold	7.10e-06	7.15e-06	9.89e-06	9.95e-06	1.61e-05	1.68e-05
Population	-4.41e-10***	-4.39e-10***	4.41e-09*	4.44e-09*	3.32e-09	3.25e-09
Income	1.13e-08***	1.29e-08***	1.22e-07**	1.05e-07**	2.79e-07***	2.31e-07***
GDP	1.76e-05***	1.76e-05***	1.84e-05***	1.85e-05***	1.97e-05***	1.97e-05***
Categorical uncertanty		5.39e-05***	0.000148***			
Fuzziness					0.000190**	0.000191**
Constant	-0.242***	-0.241***	0.227***	0.231***	0.119***	0.147***
Observations	12,881	12,881	12,881	12,881	7,283	7,283
R-squared	1.000	1.000	0.962	0.962	0.947	0.947
Time fixed effects	NO	NO	YES	YES	YES	YES
Zip code fixed effects	NO	NO	YES	YES	YES	YES

Note: *** p<0.01, ** p<0.05, * p<0.1

Test of the two first hypotheses for the period in which multicollinearity is theorized to be at its lowest (August 2009 - May 2012).

Change in Fuzziness and Institutional ambiguity across cities

Comment:

Change in fuzziness (no. spanners / no. compliants) for the two cities experiencing a reduction in institutional ambiguity (Austin and Nashville) and for the only city experiencing an increase in institutional ambiguity (Portland), versus the 13 cities which did not experience a change in institutional ambiguity between 2012 and 2015.

The three dashed vertical lines represent the moments of the institutional ambiguity reduction –for both Austin (left dashed line, 2014/01) and Nashville (right dashed line, 07/2015), or increase, for Portland (middle dashed line, 08/2014).

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