



THE C. BOYDEN GRAY

Center *for the Study*
of the Administrative State

ANTONIN SCALIA LAW SCHOOL • GEORGE MASON UNIVERSITY

Zoning for Disruption: Local Exposure to Nontraditional Tourist Activity and the Rise of Regulatory Burdens on Digital Platform Short-Term Rentals in Major U.S. Cities

Jordan Carr Peterson

CSAS Working Paper 20-13

Should Internet Platform Companies Be Regulated – And If So, How?

Zoning for Disruption: Local Exposure to Nontraditional Tourist Activity and the Rise of Regulatory Burdens on Digital Platform Short-Term Rentals in Major U.S. Cities

Jordan Carr Peterson
Texas Christian University
Department of Political Science
jordancarrpeterson@gmail.com

Abstract: How have major American cities responded to the rapid growth of digital-platform short term rental (STR) outfits such as Airbnb and Vrbo? And have some cities been more likely to promulgate strict regulatory responses than others? In this article, I present new data on the scope of municipal regulation regarding digital-platform STRs in the principal cities from the fifty most populous metropolitan statistical areas in the United States. I argue that more stringent regulation of digital-platform STRs is most likely given increased ratios of local Airbnb activity per capita. I test these expectations empirically by estimating a set of models in which I find that the most consistent predictor of regulations on digital-platform STRs is a high ratio of local Airbnb activity per capita (relative to the local municipal population).

Many thanks to the C. Boyden Gray Center for the Study of the Administrative State for their support of this research; and to Braedon Sims for his extremely valuable research assistance.

Introduction

Across the United States, municipal governments are grappling with questions regarding how (if at all) to alter their city ordinances based on the economic, social, and political changes stemming from the rise of digital-platform short-term rentals (STRs). Through websites like Airbnb and Vrbo – whose listings are also easily accessible via smartphone apps – finding a nontraditional source of transient accommodation has never been easier for consumers nationwide.¹ The implications of this technological development, unsurprisingly, are manifold and far-ranging, and discussed at some length subsequently in this article. Among the potential benefits are the chance for enterprising travelers to enjoy quality accommodations at lower prices than comparable hotels, as well as the chance to visit and stay in areas of cities and types of units that are geographically far and different in character from hotel rooms in the conventional vacationer’s district; and their hosts – the property owners – are able to derive economic gains from property that they (in theory) are not using, or not using in its entirety, themselves at the time the stay is booked. There are also, however, less appealing qualities associated with mass market entry by STRs for cities and their residents. Most prominently, critics allege that using the municipal housing supply – and in particular components of the local *rental* market – for transient accommodation induces gentrification and distorts prices in the proximate

¹ Indeed, many of these statements are true not just nationwide, but worldwide. Among the cities most dramatically confronted with citizen discontent as a result of Airbnb presence are Paris and Barcelona, where many residents allege the increasing presence of tourists in areas of the cities that were at one point almost exclusively residential has greatly diminished the character of both places (Amiel 2019; Hinsliff 2018).

housing market, of particular concern in regions already struggling with housing affordability, such as many urban areas of California. Likewise, the people who live in desirable urban vacation spots but do not rent out any portion of their dwelling to tourists resent the influx of short-term guests in previously residential areas of town, and contend that the presence of recreational visitors in residential units booked on peer-to-peer platforms like Airbnb and Vrbo seriously detract from the quality of life and character of their district or neighborhood. American cities, then, are confronted with a profoundly difficult choice: namely, how to harness the potential economic benefits associated with expanding the tourism market due to the affordability of digital-platform STR stays compared with hotels while blunting the potentially deleterious effects of allowing for the functional conversion of the rental housing supply into an unregulated component of the hospitality sector and upending a century of land use regulation by allowing mini-hotels to spring up unfettered in residential zones throughout the urban environment.

In this article, I offer one of the first reasonably comprehensive looks at the state of affairs as regards the regulation of digital-platform short-term rentals across major urban centers in the United States. I argue that per capita Airbnb market activity drives regulatory responses to digital platform STRs. I present and analyze components of municipal ordinances related to the regulation of digital-platform STRs in those municipalities designated as principal cities in the fifty most populous metropolitan statistical areas in the United States by the Census Bureau. I seek to answer several questions: (1) How have cities responded to the potential opportunities and challenges

associated with the rise of digital-platform STRs?; and (2) What types of cities have been more (or less) likely to alter their municipal ordinances as a response to activity by digital STR outfits? The answer to the first question involves not just a binary response regarding whether cities have chosen to regulate digital STRs, but also the development of a categorization or typology indicating what types of regulatory responses city governments have chosen. As a partial answer to the second question, I contend that cities with more per capita Airbnb rental activity are more likely to enact more stringent regulations for short-term rentals, and I offer a quantitative analysis examining the association between different municipal characteristics and an increased likelihood of regulating digital STRs. While much of the work presented here remains descriptive and exploratory in nature, I intend this as a first step in a project that will eventually use a mixed-methods approach to identify and analyze the causal mechanisms between a given constellation of municipal political and economic interests and an increased likelihood of changing city codes to incorporate digital-platform STRs into the regulated economy. In this article, I present descriptive statistics on the frequency and distribution of regulatory developments intended as a response to the rise of Airbnb,² and then provide an exploratory quantitative analysis of what urban characteristics are most closely associated with an increased likelihood of regulating digital-platform STRs. I argue and find that per capita digital

² In this article, I generally use “Airbnb” as a metonym for the entire family of digital-platform short term rentals, which includes (but is not limited to) Airbnb, Vrbo (Vacation Rental By Owner), HomeAway, HouseTrip, and FlipKey.

STR activity increases the likelihood of municipalities regulating digital platform rentals more stringently. These quantitative findings will inform my expectations and approach in future modifications to and extensions of this article that incorporate qualitative case studies of municipal regulation of digital STRs, and explore in greater depth how relevant constituencies – including but not limited to local business interests and political elites – bargain over the optimal level of regulation for Airbnb and its competitors.

Land Use Regulation as an Expression of Public Values

There is no scarcity of undeveloped land in the United States. Data from the United States Department of Agriculture reflect that less than five percent of land in the contiguous United States is devoted to either urban areas or rural transportation zones. That land use is more heavily regulated in cities – arguably, to a fault – becomes less surprising as already-urbanized land is, relatively speaking, scarce. In particular, almost all major American cities have over the prior century enacted zoning ordinances to regulate the development often so granularly as to make determinations regarding the permissibility of different land uses on units smaller than a city block. Zoning ordinances – which stretch almost uniformly now into the many hundreds of pages – cover nearly any imaginable use of urban land, with a number of different (and sometimes competing) goals in mind. As a general matter, zoning statutes subdivide urban (and suburban) land into residential and commercial districts, in order to preserve the relative quietude of home life as kept separate from a more hectic area filled with businesses and the vehicular

or pedestrian traffic associated with their customers, affiliates, and employees. While many new urbanists advocate for integration of residential and commercial uses in mixed-use zones or flexible zoning techniques like overlay zoning (Cannon et al. 2013; Wolf-Powers 2005), compelling evidence suggests that most US municipalities have become less amenable to flexibility and inclusion over time (Talen 2012).

In addition to broad categories of use-oriented zoning requirements that provide for the designation and maintenance of residential and commercial zones, there are a panoply of other conditions governing land use whose precision is surprising to the newcomer. For instance, most cities issue regulations that set forth the minimum lot size within each type of zone (and there is, importantly, heterogeneity within the overarching categories of residential zones, commercial zones, etc.), the height limits for buildings, the maximum number of buildings in a lot, minimum setback requirements (a minimum distance from the street to the front of the building, or from next-door lots to the sides of the building), and minimum on-site parking requirements for commercial zones. Though it falls somewhat outside the scope of this article, a number of fierce, interrelated debates rage among scholars of urban politics, planning, and land use regulation regarding the relationship between zoning statutes, public health, and environmental sustainability (see, e.g., Carter et al. 2003; Maantay 2001; Wilson et al. 2008). Generally speaking, though, a city's approach to regulating land use, and in particular the manner in which it designates categories of purpose for different sectors of urban land – its most valuable resource – is a reflection of public values, and represents among the most prevalent and pervasive

constraints on private property rights in the American legal system. As Fischel (2015) maintains, however, “zoning laws...are not single-valued constraints” (30), and it is critical to bear in mind the cross-pressures to which municipal policy-makers are subjected when evaluating the economic, social, and political consequences of zoning regulations, as well as when searching for their origins in comparative context. Here, my examination of variation in the municipal circumstances most likely to give rise to regulation of digital STRs (regulation primarily but not exclusively found in zoning ordinances) relies heavily on the notion that land use regulations are an expression of (local) public values.

The Nascence and Growth of Digital Platform Short-Term Rentals

In October 2007, Brian Chesky and Joe Gebbia informally founded what would become the digital-platform STR sensation Airbnb when they rented out several air mattresses in their San Francisco apartment for \$80 nightly during an international design conference to cope with their landlord having raised their rent by twenty-five percent (Bramson 2017). A year later, the company was officially founded, and after securing startup capital from venture firm Y Combinator, Airbnb was on the road to worldwide success as the centerpiece in the accommodations sector of the sharing economy. By 2009, Airbnb listed an estimated 2500 rental units nationwide, and its listings began to diversify (Rao 2009). For instance, while some hosts merely provided a sofa or extra bedroom, many began to list entire houses or apartments on the site. Current estimates provided by Airbnb indicate the site makes available seven million unique places to stay in over 100,000 cities in 191

countries and regions. Airbnb has also in the past two years expanded its web platform to include not just transient accommodations (“stays”), but also “experiences,” “adventures,” and “restaurants,” and the firm’s recently estimated internal valuation was about \$38 billion (Schleifer 2019). In short, the firm’s rise has been swift and its economic successes paramount, but this has not come without its fair share of controversy. Along with other short-term rental platforms like Vrbo, Airbnb has come under scrutiny from policy-makers both at the municipal and state levels due primarily to the firm’s having constructively imposed a network of unregulated quasi-hotels on neighborhoods across the world. Among other legal and ethical complications, policy-makers in many different public institutions have begun to try and locate proportionate regulatory responses to the challenges presented by Airbnb’s disruption of the local hospitality industry.

Legal, Social, and Economic Complications attending the Rise of Digital STRs

The notion of a “sharing economy” did not begin with the digital age. What technological advances have accomplished, however, is a rapid series of efficiency gains in the organization of enterprises that are with some frequency small at the individual level but loom large in the aggregate. Digital-platform short-term rentals dramatically reduce transaction costs in locating non-hotel accommodations, opening up vast swaths of the urban environment to travelers for the first time. These advances notwithstanding, the

balance sheet used to evaluate the impact of digital-platform STRs on economic, social, and political life is a complicated one.

First, all else equal, there are clear affordability benefits for the traveler who is willing to put in the time to browse Airbnb listings (Lieber 2011). Due in part to Airbnb's historical evasion of paying transient occupancy taxes in local jurisdiction – a development that has recently ended nearly everywhere, as detailed subsequently – the cost to stay at luxury or luxury-adjacent Airbnb listings, which might even be a freestanding, two-story single-family home with a manicured lawn in some places, is almost certainly less than any hotel in most cities' upper quartile. It is not, however, merely the economic benefit that Airbnb travelers seek. Rather, many travelers also relish the opportunity to live like locals, eschewing the traditional hospitality environment of hotels and seeking instead to vacation in residential areas that give them a real taste of the city they have chosen to visit (Kaplan and Nadler 2015).

There are also benefits for Airbnb hosts, who derive an additional source of income from renting out extra rooms or homes, though the exact value of this has been the subject of contestation, as well. For example, a journalist who estimated profits for Airbnb hosts in a collection of fifteen US cities³ in 2018 posited that the average annual expected profit

³ The article considered Airbnb listings in Boston, Chicago, Dallas, Houston, Los Angeles, Miami, New York, Oakland, Philadelphia, San Diego, San Francisco, San Jose, Seattle, and Washington, DC. These types of studies have become much more difficult now that Airbnb has redesigned its web platform to prevent web-scrapes of entire municipal jurisdictions, presumably in an attempt to make it more difficult for local regulators to calculate occupancy rates in Airbnb units nationwide as a basis for criticisms of Airbnb for distorting the local affordable housing market.

would be \$20,619 for renting out a full two-bedroom home or apartment, although this figure doubtless varies over time and space, as Kaplan and Nadler (2015) maintain, and there is skepticism regarding the real value of renting out rooms or auxiliary dwellings for middle-class market participants (Gurran and Phibbo 2017). Likewise, the flexibility associated with digital-platform STRs has proved invaluable in locating temporary residences for victims of natural disasters, as Airbnb has provided fee waivers in the wake of hurricanes, floods, and fires (McNamara 2015).

Many criticisms of digital-platform STRs focus on the potential impact of using what would otherwise be rental housing to accommodate tourists. The progressive advocacy group Los Angeles Alliance for a New Economy (LAANE), among Airbnb's most vociferous critics in Southern California, estimates that over a third of the revenue generated by Airbnb in Los Angeles originates in income from units owned by hosts who list two or more entire units on LA Airbnb (Samaan 2015), suggesting that what began as an innovation in the "sharing economy" to help travelers find affordable rooms and property owners supplement their income in a difficult economy by renting out a spare room or a guest house had transformed into a way for property management companies to offer charming transient accommodation with zero of the regulatory overhead with which their competitors were burdened. This corroborates the argument that digital-platform STRs inappropriately merge the residential and recreational economies, comprising two groups of individuals (tenants and tourists) who have vastly different needs, who have traditionally been served by different markets, and whose economic

behavior represents the manifestation of distinct social needs (Lee 2016). In more concrete terms, skeptics fret that digital-platform STRs could skew housing (rental) prices both by reducing rental housing supply, should owners remove entire homes from the residential rental market, by stimulating gentrification, leading to a corresponding increase in rent.

In addition to concerns regarding the affordability of housing, local jurisdictions seeking not just to regulate but to eliminate Airbnb have cited health and safety concerns related to the presence of short-term rentals. For instance, the Office of Special Enforcement in New York City – home to perhaps the most restrictive regulations on digital STRs of any major American city – maintains that “short-term rentals can be dangerous for neighbors, guests, and first responders” as they might “lack proper fire safety systems,...not have enough exists in the event of an emergency...not have adequate security personnel to deal with travelers...[and] often present issues with noise, litter and personal safety, and compromise the comfort of permanent residents” (Office of Special Enforcement). This laundry list of safety concerns indicates deep-seated hostility toward STR infiltration of residential zones of New York, and is among the most prominent examples of regulatory pressure on Airbnb, giving rise to ongoing litigation as well.

Municipal Regulation of Digital Platform STRs in Major American Cities

In order to provide a quantitative assessment of which American cities have elected to enact regulations governing digital-platform short-term rentals, I obtained the zoning ordinance, as well as any other relevant portion of the municipal code, for every principal

city in the fifty most populous metropolitan statistical areas (MSAs) in the United States. An urban area is considered an MSA by the Census Bureau if the area has a population of at least 50,000 in one or more central cities. The largest city in an MSA is a “principal city,” a designation also given to those incorporated places or census-designated places (CDPs) that meet one among a set of additional criteria.⁴ Among the fifty most populous MSAs in the United States, there are 229 principal cities. Ten of these 229 are census-designated places rather than incorporated cities, such as Columbia, Maryland, Metairie, Louisiana, and The Woodlands, Texas. Importantly, census-designated places do not have municipal governments and as such are excluded from the presentation of data here, as CDPs would be unable to issue regulations governing Airbnbs (or anything else).

In Table 1, I present summary data regarding the 219 major American cities remaining in the sample after the CDPs are disregarded. I present the mean, minimum, and maximum values for the city population, as well as a series of seven economic indicators: the gross domestic product (GDP), overall private sector GDP, construction sector GDP, real estate sector GDP, private sector goods-producing industries GDP, private sector service-providing industries GDP, and real personal income. The economic indicators are measured in millions of chained 2009 dollars and are presented at the level

⁴ Cities in a core based statistical area (comprising both metropolitan and micropolitan statistical areas) in addition to the most populous incorporated place will be considered additional principal cities if they (a) have at least 250,000 population and more than 100,000 workers; (b) have population between 50,000 and 250,000 and the number of workers working in the place exceeds the number of working residents; or (c) have population between 10,000 and 50,000 where the number of workers working in the place exceeds the number of working residents and are at least one-third the population of the largest principal city.

of the MSA rather than the individual city, as this is what is made available by the Bureau of Economic Affairs. The table reflects that the cities in the sample present a considerable amount of variation in terms of their economic circumstances.

Table 1: Demographic and Economic Characteristics of Major US Cities

	Mean	Minimum	Maximum
<i>Population</i>	311,070	47,749	8,623,000
<i>Gross domestic product (GDP)</i>	\$332,168	\$50,980	\$1,444,484
<i>Private sector GDP</i>	\$301,304	\$43,160	\$1,316,465
<i>Construction sector GDP</i>	\$11,924	\$1607	\$40,613.6
<i>Real estate sector GDP</i>	\$54,517	\$3607	\$248,329
<i>Private sector goods GDP</i>	\$48,301	\$711	\$145,309
<i>Private sector services GDP</i>	\$251,242	\$1769	\$1,209,047
<i>Real personal income</i>	\$269,936	\$54,921	\$1,120,538

In Table 2, I present summary data regarding regulation of digital-platform short-term rentals in the 219 cities studied here. As evidenced by the data, there is considerable disagreement regarding the proper regulatory response to the complications created by the rise of digital-platform STRs. Among the 219 principal cities considered, just over half (110, or 50.2%) have made at least one modification to their code governing the operation of short-term rentals in their city since the rise of Airbnb, whereas half have not. The reasons these cities have chosen not to regulate vary. For instance, municipalities in Arizona and Indiana – eleven of the 219 – are preempted by state legislation in each state from regulating short-term rentals there. A similar proposal is under consideration by the Florida state legislature, but this has not dampened Florida cities’ willingness to regulate

STRs, as eleven of the twenty-three Florida cities among these 219 have enacted at least one regulation governing STR operation in the past decade. Sixteen cities of the 219 have taken a particularly draconian approach to regulating non-hotel transient accommodations: they ban it altogether. These cities are Arcadia, California; Burbank, California; Clearwater, Florida; Coral Gables, Florida; Edina, Minnesota; Fort Worth, Texas; Grapevine, Texas; Irvine, California; Lakewood, Colorado; Miami Beach, Florida; New York City; Oakland, California; Richmond, Virginia; Salt Lake City; San Mateo, California; and Sugar Land, Texas. In practice, of course, even a blanket, formal prohibition such as these does not guarantee enforcement of the proscription. Indeed, a quick search for Fort Worth or Salt Lake City on Airbnb yields a bounty of available rentals, leaving open a number of questions regarding the efficacy and vigor of policy implementation across these prohibiting, “total ban” jurisdictions.

Table 2: The Regulation of Short-Term Rentals in Major US Cities

	Yes	No
<i>City Enacts at least One STR Regulation</i>	110	109
<i>City Bans STRs Altogether</i>	16	203
<i>Single-Stay Cap</i>	17	202
<i>Annual Day Limit</i>	11	208
<i>Density Controls</i>	6	213
<i>Parking Requirements</i>	11	208
<i>Registration Requirements</i>	95	124
<i>Neighbor Notification</i>	5	214
<i>Owner Occupancy</i>	14	205
<i>Occupancy Limits</i>	20	199
<i>Single/Multifamily</i>	10	209
<i>Advertising Bans</i>	2	217

In addition to the sixteen “total ban” cities, ninety-four additional cities have enacted at least one regulation on short-term rentals within city limits. These vary in scope and nature from imposing direct administrative or financial burdens on Airbnb owners, to placing geographic limitations on where digital-platform STR activity is permitted to occur, to limiting the number of STRs that any single owner may operate.

By far, as indicated in Table 2, the most common regulation enacted among these 219 cities is a *registration (or permitting) requirement*, demanding that individuals operating STRs register with the municipal government. While in terms of possessory control this may seem comparatively less intrusive than more direct interventions in private owners’ land use rights, registration requirements may nevertheless pose a substantial burden on Airbnb owners. In addition to the possibility (which seems, at least anecdotally, to vary across cities based on their relative hostility to digital STRs) that permits may not be granted, or may be regularly granted in some geographic regions of a city but not others, the registration process allows local governments the opportunity to track the geographic extent of STRs in their jurisdiction, as well as the all-important capacity to collect transient occupancy taxes from Airbnb, which now includes local occupancy taxes in the overall cost of renting the unit when consumers “check out” on the website or iPhone app. In many cities, the registration process itself also costs a nominal (and uniform) fee, although Los Angeles’s recently revised regulations scale the amount of the registration fee based on the level of Airbnb activity at the STR unit. Likewise, some jurisdictions require digital STRs in single family residential zones to obtain a more

general conditional use permit for operating a business in a residential zone whose cost can register in the thousands of dollars each year.

A number of cities impose one (or both) of two durational or temporal limitations on short-term rental operators within their borders. Seventeen cities, including Portland, Providence, and Raleigh, impose *single-stay caps*, which place durational limits in days on the amount of time a given occupant can consecutively rent an STR unit. Likewise, eleven cities, such as Pasadena and Washington, D.C., have included an *annual day limit* on what proportion of the year an STR unit can be rented out in their municipal code. Seven cities – Detroit, Philadelphia, Redwood City, California, San Francisco, San Jose, South San Francisco, and St. Petersburg, Florida – limit both the duration of an occupant’s stay as well as the number of days a property may be rented annually.

Many of the other regulatory approaches to digital-platform STRs are geared toward preserving the residential character of neighborhoods not typically associated with commercial activity or transient accommodations. Six cities have enacted *density controls*, which establish minimum distance requirements between short-term rental properties in their jurisdiction, such as the regulation in Las Vegas that STRs be at least 660 feet from one another. These zoning provisions severely constrict the (formal) geographic expanse into which non-hotel STRs might extend, and since all six cities with density controls couple that regulation with the requirement that STR operators obtain permits, precisely monitoring the penetration of transient lodging into residential zones is a manageable municipal task. Likewise, eleven cities, primarily in areas with less thorough public

transportation networks such as Arlington, Texas, and Newport Beach, California, impose *parking requirements* on STR properties, requiring operators to provide a minimum number of parking spots per unit. Five cities require that STR operators *notify their neighbors* of the rental property's status. In what could amount to a serious restriction if consistently enforced, fourteen cities only allow STRs to operate in residential zones if the *owner occupies the property* – i.e., generally, owner-operators are permitted to rent out rooms in their primary residence, or in auxiliary units to the primary home such as guest houses or mother-in-law suites, while twenty cities limit the number of guests who can stay at a given STR property each night. Ten cities distinguish between *single- and multi-family residential zones* in their municipalities, allowing STR activity in the latter but not the former.

Last, and somewhat provocatively, two cities in my sample have enacted bans on *advertising* STRs, seen as a means of circumventing the difficulty many local jurisdictions have encountered in enforcing STR regulations, violations of which are typically only detectable by inquisitive neighbors. The municipal code of Santa Monica, California, for instance, includes a provision designated Ordinance 2535 that holds short-term rental platforms (“hosting platform operators”) themselves civilly liable if short-term rentals which violate local public policy are listed on their websites or apps. After incurring over \$40,000 in fines for advertising illegal listings in 2015, Airbnb and HomeAway partnered to unsuccessfully challenge the Santa Monica Ordinance 2535 as a violation of the

Communications Decency Act in federal court (*HomeAway Inc. v. City of Santa Monica*, No. 18-55367, 9th Cir. 2019).

As these original data regarding regulatory activity toward digital-platform short term rentals suggest, municipal responses to the disruption of Airbnb and other digital STRs have varied somewhat wildly across major U.S. cities. I argue that regulatory stringency to digital platform STRs – whether taking the form of a total ban on STRs in residential zones or a network of interlaced regulatory requirements governing land use for STRs in areas of noncommercial or non-mixed use – is primarily a function of comparative exposure to short-term rental activity in the relevant (local) jurisdiction. In other words, municipal regulatory responses to Airbnb and Vrbo are more likely given the degree to which a locality has witnessed transient accommodation creeping into geographies traditionally considered residential in nature.

The promulgation of local regulatory responses to digital platform STRs might occur via one or more of several different mechanisms or channels. First, city officials may issue new regulations on digital STRs as a response to citizen demands. Given greater market activity by Airbnb operators in a municipality, there is an increased likelihood that anti-development or “NIMBY” (not in my back yard) residents in noncommercial zones – who generally oppose not only commercial development in their neighborhoods but also upzoning and higher-density development, as well – would take note of changing lifestyle characteristics near their homes and pressure municipal officials to enact regulatory constraints on digital rental platforms. So-called NIMBY constituents

demonstrate a notoriously high level of political motivation in their opposition to proximate development activity (Matthews et al. 2014). Second, representatives of business interests in the local community – particularly those from the tourism and recreation sector of the economy traditionally responsible for transient accommodations such as hotels and motels – may exert pressure on local policy-makers to enact regulations that curb the growth of digital platform STRs who they see as their competition. Existing research suggests opposition to Airbnb and Vrbo among representatives of incumbent firms in the tourism sector is rational as digital STR market entry negatively impacts local hotel revenue, in particular when Airbnb stays function as a substitute for certain hotel stays, although these effects are conditional on geographic and economic factors such as region, hotel market segment, and season (Zervas et al. 2017).

Explaining Variation in Regulatory Stringency toward STRs across Major U.S. Cities

In order to test my expectations regarding the association between local digital STR market activity and the likelihood of stringent municipal STR regulation, I employ a quantitative analysis in which I estimate two statistical models with heteroskedasticity robust standard errors. In each of these two models, whose results are presented in Table 3, the unit of analysis is the city. In Model 1, I estimate an ordered probit regression in which the dependent variable is an ordinal index of *Regulatory Stringency*. This dependent variable was calculated by first creating a series of ten binary variables for each of the ten possible regulations of short-term rentals discussed previously and respectively presented in Table

2 (*Single-Stay Caps, Annual Day Limits, Density Controls, Parking Requirements, Registration Requirements, Neighbor Notification, Owner Occupancy, Occupancy Limits, Single vs. Multifamily Distinctions, and Advertising Bans*), each coded 1 if a city has enacted a given regulation, and 0 otherwise. I then took the sum of these ten indicator variables to create an additive regulatory stringency index. Thus, the minimum value of *Regulatory Stringency* is 0, for those cities with no regulations of STRs in their municipal code, and the maximum value of this measure for those cities that have not banned transient accommodation in residential zones altogether is 10. Those municipalities that *have* enacted total bans for short-term rentals in residential zones are coded as an 11 to indicate the highest possible value of *Regulatory Stringency*. The maximum value among those jurisdictions that regulate but do not ban digital STRs in residential zones is 7 (Detroit), and the mean value of *Regulatory Stringency* is 1.67. In Model 2, by contrast and as a slight simplification, the dependent variable is a binary measure of whether the city has enacted *Any STR Regulation*, coded 1 if a municipality has enacted either a total ban or any combination of the ten regulatory mechanisms toward short-term rentals composing the regulatory stringency index, and 0 otherwise.

The independent variable of interest is *Airbnb Activity Per Capita*, measured as the ratio of *Airbnb Reviews* to *City Population*, and intended to measure the proportionate influence of Airbnb in a given municipal market.⁵ If my expectations articulated earlier

⁵ The number of Airbnb Reviews in a city is a proxy measure for digital-platform STR activity in each municipality. Ideally, I would use the number of available digital-platform STR units in each city, but –

are correct – namely, that the relative market activity of short-term rental platforms in a given municipality increases the likelihood that the city’s officials will take regulatory steps in response to the disruption – greater values of *Airbnb Activity Per Capita* will result in greater values of the *Regulatory Stringency* index and increases in the likelihood of *Any STR Regulation* having been enacted.

I include a series of other independent variables to control for variation in regulatory activity based on political and economic qualities of a given municipality. In general, these additional covariates account for the possibility that regulatory responses to digital STRs vary as a function of either preferences in local government or among the electorate, or structural characteristics of the local economy. The other independent variables are as follows: the natural logarithm of the *City Population*, to account for whether more populous cities differ in their regulatory responses to Airbnb; *Council-Manager*, a binary variable coded 1 if the city government is a council-manager government, and 0 otherwise; the two-party *Presidential Vote Share* earned by the Democratic candidate in the 2016 election for each city’s containing county;⁶ a variable indicating whether a city is in a state which has enacted *Preemption* legislation preventing

as discussed previously – Airbnb has made their website prohibitively difficult for conventionally available web scraping software to recover data from, so I have used the number of reviews in each city as a proxy – since, as an impressionistic matter, the number of reviews varies more or less proportionately with the amount of Airbnb activity in each place.

⁶ Ideally, I would include a measure of the 2016 Democratic presidential vote share in each city rather than each city’s containing county, but these data were not readily available at the time the article was composed. I rely, then, on the assumption that most principal cities in the fifty most populous MSAs do not appreciably differ in their presidential or partisan politics from their containing counties, although a more refined municipality-specific measure would be optimal.

municipalities from regulating STRs; *Airbnb Reviews*, the approximate number of reviews left on the Airbnb system for STR units in each city; and the *Private Sector Goods-Producing Industries GDP*, *Private Sector Service-Providing Industries GDP*, and *Real Personal Income* for each city’s encompassing MSA, measured in hundreds of thousands of dollars, obtained from the Bureau of Economic Affairs.

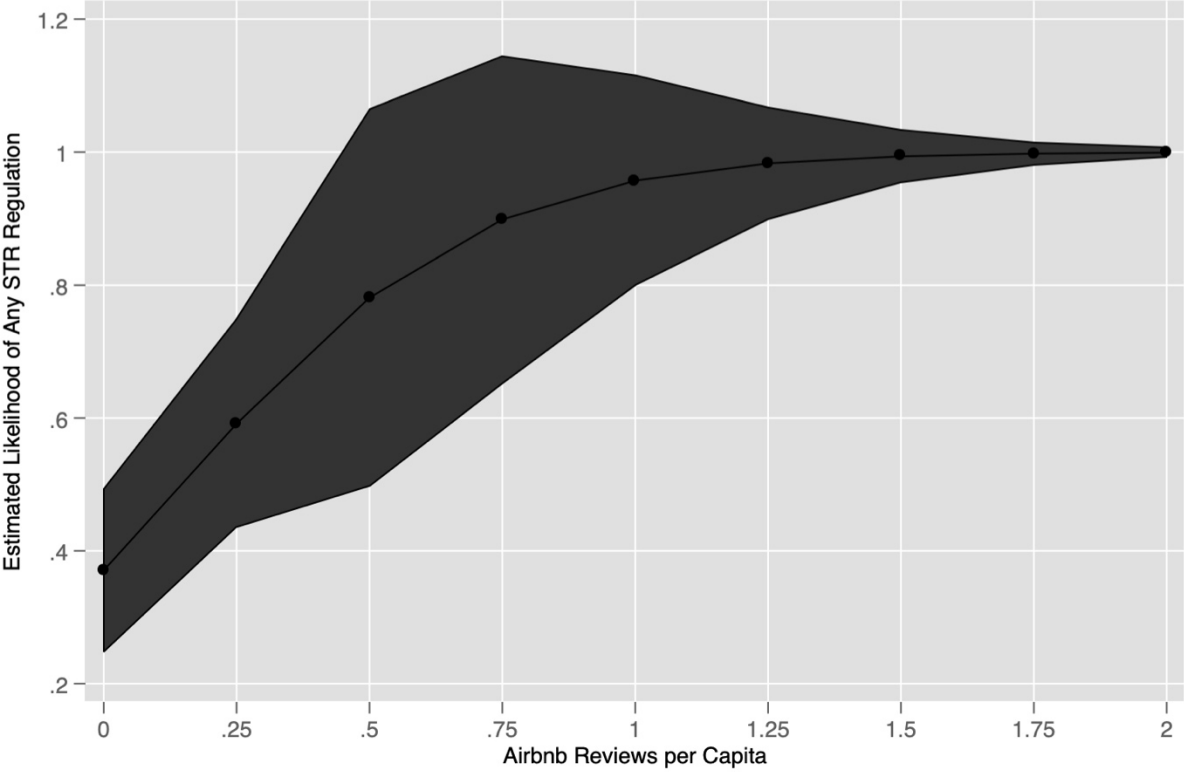
Table 3: Estimating the Likelihood of Regulating Digital STRs in Major U.S. Cities

	Model 1 DV: <i>Regulatory Stringency</i>	Model 2 DV: <i>Any STR Regulation</i>
<i>Airbnb activity per capita</i>	0.619** (0.276)	4.205** (2.390)
<i>City population</i>	0.331*** (0.111)	0.838*** (0.254)
<i>Council-Manager</i>	0.191 (0.169)	0.179 (0.363)
<i>Dem. presidential vote share</i>	1.727*** (0.678)	3.146** (1.458)
<i>State preemption</i>	-1.151** (0.636)	-2.453** (1.404)
<i>Airbnb reviews</i>	0.000 (0.000)	-0.002 (0.002)
<i>GDP private goods</i>	0.260 (0.378)	0.053 (0.747)
<i>GDP private services</i>	0.070 (0.246)	-0.374 (0.515)
<i>Real pers. income</i>	-0.146 (0.263)	0.336 (0.575)
N	219	219

*** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.10$. One-tailed tests for Airbnb reviews per capita, Dem. presidential vote share, Airbnb reviews, real personal income, and state preemption; two-tailed tests otherwise.

The findings presented in Table 3 suggest that the proportionate degree of digital-platform STR activity is strongly associated with more stringent regulation of Airbnb and its competitors. The findings from Model 2 are graphically presented in Figure 1 below.

Figure 1: Airbnb Market Activity and the Likelihood of Digital STR Regulation



These results are consistent whether regulatory activity is conceived of as an ordinal or a binary measure. In other words, increases in per capita digital STR activity are associated both with the existence of *any* regulation for digital STRs, as well as more burdensome regulations as measured by my index of regulatory stringency. This suggests that it may be oversaturation of STRs in certain municipal environments that make more hostile regulatory action toward the platform more likely, whether due to pressure from

NIMBY groups, progressive housing policy pressure groups, or local tourism and recreational interests. In particular, if there are indeed negative effects on either affordable housing or community character and cohesion stemming from the rapid and unplanned integration of residential and recreational economies in certain cities, it follows that public demand for increased regulation of STRs in residential districts is more likely.

Conclusion

There remains much work to be done in determining the political opportunity structure that gives rise to regulating Airbnb and its ilk. Here, I have examined zoning ordinances and other relevant components of the municipal codes in the 219 principal cities among the fifty most populous metropolitan statistical areas in the United States, and presented both descriptive statistics and exploratory quantitative findings that suggest proportionate activity by digital-platform short-term rentals makes municipal regulatory responses to Airbnb more likely. In future work, I intend to consider how civic partnerships between advocacy organizations and business interests may amplify the likelihood of more stringent regulation on digital-platform STR activity, as well. Likewise, it may be there are more theoretically appropriate ways to weight the different components of the regulatory stringency index I have created. In other words, it may not be suitable to consider the economic or social burden engendered by each of the ten regulatory categories found in relevant city ordinances as equal to one another, and to create an additive index based on this assumption of equal stringency across categories. Certain categories of

regulation – such as registration requirements, which are invariably accompanied by the mandate that Airbnb operators supply local governments with transient occupancy tax revenues that could reach thousands of dollars in the aggregate annually for rental units in high-activity areas – may represent a much more serious imposition on local property owners than a requirement that they tell their neighbors (whose opposition presumably carries neither economic costs nor political consequences) they are operating a digital STR down the street. Another fruitful avenue forward is to compare municipal regulatory responses to Airbnb with how cities – whether in concert with or despite the protests of local taxi unions – wrested rideshare programs like Uber and Lyft out of the shadow economy. In any regard, this research represents a first step toward more thoroughly and comprehensively analyzing municipal responses to the regulatory challenge presented by digital-platform short term rentals in the United States.

Bibliography

- Amiel, Geraldine. 2019. "In the City of Love, Mass Tourism Troubles Parisian Hearts," *Bloomberg*. July 18th, 2019.
- Bramson, Kate. 2017. "Airbnb's launch holds lesson for RISD grads, co-founder says." *Providence Journal*. June 3rd, 2017.
- Cannon, Carol L., Sue Thomas, Ryan D. Treffers, Mallie J. Paschall, Lauren Heumann, Gregory W. Mann, Dashiell O. Dunkell, and Saskia Nauenberg. 2013. "Testing the Results of Municipal Mixed-Use Zoning Ordinances." *Journal of Health Politics, Policy and Law* 38(4): 815-839.
- Carter, Sherry Plaster, Stanley L. Carter, and Andrew L. Dannenberg. 2003. "Zoning Out Crime and Improving Community Health in Sarasota, Florida: 'Crime Prevention Through Environmental Design.'" *American Journal of Public Health* 93(9): 1442-1445.
- Fischel, William A. 2015. *Zoning Rules! The Economics of Land Use Regulation*. Cambridge, MA: Lincoln Institute of Land Policy.
- Gurran, Nicole and Peter Phibbs. 2017. "When Tourists Move In: How Should Urban Planners Respond to Airbnb?" *Journal of the American Planning Association* 83(1): 80-92.
- Hinsliff, Gaby. 2018. "Airbnb and the so-called sharing economy is hollowing out our cities," *The Guardian*. August 31st, 2018.
- Kaplan, Roberta A. and Michael L. Nadler. 2015. "Airbnb: A Case Study in Occupancy Regulation and Taxation." *University of Chicago Law Review Online* 82(1): 103-115.
- Lee, Dayne. 2016. "How Airbnb Short-Term Rentals Exacerbate Los Angeles's Affordable Housing Crisis: Analysis and Policy Recommendations." *Harvard Journal of Law and Public Policy* 10: 229-253.
- Lieber, Ron. 2011. "Airbnb's Lodging Gets Tested, Yielding a Mixed Bag." *The New York Times*. Nov. 11th, 2011.
- Maantay, Juliana. 2001. "Zoning, equity, and public health." *American Journal of Public Health* 91(7): 1033-1041.
- Matthews, Peter, Glen Bramley, and Annette Hastings. 2014. "*Homo Economicus* in a Big Society: Understanding Middle-Class Activism and NIMBYism towards New Housing Developments." *Housing, Theory and Society* 32(1): 54-72.
- McNamara, Brittany. 2015. "Airbnb: A Not-So-Safe Resting Place." *Colorado Technology Law Journal* 13: 149-170.
- New York City Office of Special Enforcement. 2019. "About Illegal Short-Term Rentals." Accessible at <https://www1.nyc.gov/site/speciaenforcement/stay-in-the-know/about-illegal-short-term-rentals.page>.
- Rao, Leena. 2009. "Y Combinator's Airbed and Breakfast Casts a Wider Net for Housing Rentals as AirBnB." *TechCrunch*. March 4th, 2009.

- Samaan, Roy. 2015. "Airbnb, Rising Rent, and the Housing Crisis in Los Angeles." *Los Angeles Alliance for a New Economy*.
- Schleifer, Theodore. 2019. "Airbnb sold some common stock at a \$35 billion valuation, but what is the company really worth?" *Vox Recode*. March 19th, 2019.
- Talen, Emily. 2012. *City Rules: How Regulations Affect Urban Form*. Washington, DC: Island Press.
- Wilson, Sacoby, Malo Hutson, and Mahasin Mujahid. 2008. "How Planning and Zoning Contribute to Inequitable Development, Neighborhood Health, and Environmental Injustice." *Environmental Justice* 1(4): 211-216.
- Wolf-Powers, Laura. 2005. "Up-Zoning New York City's Mixed-Use Neighborhoods: Property-Led Economic Development and the Anatomy of a Planning Dilemma." *Journal of Planning Education and Research* 24(4): 379-393.
- Zervas, Georgios, Davide Proserpio, and John W. Byers. 2017. "The Rise of the Sharing Economy: Estimating the Impact of Airbnb on the Hotel Industry." *Journal of Marketing Research* 54(5): 687-705.