PLAN

Preserve LA Neighborhoods

April 27, 2023

The Honorable Karen Bass
Los Angeles City Mayor

Los Angeles City Council

Dear Mayor Bass and Councilmembers,

Preserve LA Neighborhoods is a coalition of Los Angeles neighborhoods. We represent thousands of households in Los Angeles neighborhoods affected by short-term rentals, and we want you to know that effective enforcement of the current Home Sharing Ordinance (HSO) (LAMC Ordinance No. 185 931) is a very high priority for us as it should be for the City as a whole. We urge you to pay careful attention to enforcement reform and to allocate sufficient funds for such activities in your budget.

The short-term rental oversight and enforcement program is currently underfunded and understaffed and the budget needs to be raised by an order of magnitude. We are asking you to address this shortfall during the current budget process. When the Planning Department, as directed by the City Council, presents their upcoming report on how to improve enforcement, we want you to ensure that the departments have the resources necessary to implement any and all improvements.

We believe that in the current environment, short-term rental enforcement can be self-funding. The ordinance provides for significant fines for non-compliance, and revenue from these fines could be substantial.

A study published in October of 2022 (attached) by the Urban Politics and Governance Research Group, School of Urban Planning at McGill University, found that 45% of short-term rentals in Los Angeles are non-compliant or illegal, many of them concentrated in our neighborhoods. For neighborhoods, they bring crime, quality of life and public safety issues.

In the City, they take valuable housing off the long-term market, and increase rents and home prices significantly. Some of these ghost hotels and other short-term rentals offer rent-stabilized properties, which are prohibited from short-term rent by the HSO but in reality, operate freely. The McGill study also asserts that short-term rentals were removing 7,300 housing units from Los Angeles' long-term rental market prior to the pandemic.

According to the most recent count, there are at least 40,000 unhoused human beings living in our city. Effectively enforcing the short-term rental marketplace is a cost-effective way to add long-term housing to the market. This is a City priority.

Gone are the days when a few mom-and-pop short-term rentals allowed travelers the experience of living like locals. Even calling it "home sharing" paints an inaccurate picture. The vast majority of short-term rental listings are for whole-house or unit rentals, and investors often own multiple short-term rental properties. Short-term rentals are now a huge industry, and their proliferation has become a problem for cities all over the world.

Unregulated commercial interests bypass City oversight and avoid paying taxes. The large-scale conversion of housing units into short-term rentals undermines a neighborhood's social organization and natural ability to counteract and discourage crime and create other public safety impacts.

Enforcing the short-term rental ordinance as written, would free up thousands of needed units of housing. Achieving this will not be possible without commensurate budgetary allocations. We implore you to plan generously for this.

We appreciate your consideration and would very much welcome the opportunity to discuss this issue with you.

Respectfully submitted,

Preserve LA Neighborhoods Steering Committee

Christina Binkley   Ellen Evans
The Oaks Neighborhood Association   Doheny Sunset Plaza Neighborhood Association

Alexa Iles   Barbara Nichols
Hollywood Dell Civic Association   Benedict Canyon Association

On behalf of the following:

Bel Air Association
Bel Air Hills Association
Benedict Canyon Association
Beverly Wilshire Homes Association
Century Glen Neighborhood Association
Doheny Sunset Plaza Neighborhood Association
The Federation of Hillside and Canyon Associations, Inc.
Hollywood Dell Civic Association
Hollywood Heights Association

Hollywoodland Homeowners Association
Laurel Canyon Association
Los Feliz Improvement Association
Miracle Mile Residential Association
Nichols Canyon Neighborhood Association
The Oaks Neighborhood Association
Outpost Neighborhood Association
Park La Brea Residents Association
Sherman Oaks Homeowners Association
South Brentwood Residents Association
Westwood Hills Property Owners Association
Westwood South of Santa Monica Blvd. Homeowner's Association
Westwood Homeowners Association
Whitley Heights Civic Association

cc: Vince Bertoni, Director of Planning
        Lisa Webber, Deputy Director of Project Planning
        Joann Lim, City Planner
        Hydee Feldstein-Soto, City Attorney
        Mashael Majid, Planning and Community Development Director, Council District 4
        Dylan Sittig, Senior Planning Deputy, Council District 5
        Rachel Freeman, Deputy Mayor

Enclosures (3):
        The economic impacts of short-term rentals in Los Angeles, David Wachsmuth
        Airbnb and neighborhood crime: The incursion of tourists or the erosion of local social dynamics? Laiyang Ke, Daniel T. O'Brien, and Babak Heydari
        The economic costs and benefits of Airbnb: No reason for local policymakers to let Airbnb bypass tax or regulatory obligations. Josh Bivens

The economic impacts of short-term rentals in Los Angeles

David Wachsmuth

October 2022

UP GO

A report prepared by researchers
from the Urban Politics and
Governance research group,
School of Urban Planning, McGill University

Executive summary

This reports analyzes the economic benefits and costs of online short-term rental (STR) platforms such as Airbnb to the city of Los Angeles, across four categories: housing impacts, tax impacts, employment impacts, and other impacts. In addition to providing a brief overview of the STR market in Los Angeles, the report evaluates each of these impact categories, then offers recommendations for addressing the disparity between the negative and positive impacts of STRs on Los Angeles.

SHORT-TERM RENTALS IN LOS ANGELES: MARKET OVERVIEW

- There have been an average of **3,300 STR listings active in Los Angeles each day in 2022**. STR hosts earned $254.7 million in the last 12 months.

- STR activity declined steeply during 2020 and 2021 because of the Covid-19 pandemic, not the City's regulatory enforcement. It has since begun to recover.

- **STR activity in Los Angeles is highly concentrated in the Venice, Downtown and Hollywood neighborhoods**, which accounted for a quarter of all listings and listings revenue in 2022.

- **In 2022, 43.1% of active listings in Los Angeles were multilistings**—listings controlled by hosts operating multiple listings —earning 47.8% of total host revenue.

- **Almost half (45.0%) of STR listings in Los Angeles are illegal.** Regulatory compliance appears to be declining.

STR HOUSING IMPACTS

- **Commercial STRs have taken 2,500 homes off the long-term market in Los Angeles**, and this number is rising as the STR market recovers from the pandemic.

- **STRs have raised rents $810 per year for the average renter household in Los Angeles.** Cumulatively, these households have paid $3,440 more on rent since 2015.

- **STRs are responsible for more than 5,000 extra people experiencing homelessness each night in Los Angeles.** It would cost $1.3 billion to build enough supportive housing to accommodate them, and then $163 million each year to operate the housing.

- Hosting STRs enriches a small number of commercial operators instead of helping Los Angeles families pay the mortgage or rent. **Just 10% of hosts earn more than half (53.8%) of all STR host revenue.**

STR TAX IMPACTS

- **The City has lost between $56.8 and $302.2 million in un-assessed HSO fines in the last year.** Because so much STR activity in Los Angeles is illegal, there is a vast amount of potential revenue in fines which the CIty is failing to collect.

- STR hosts may have failed to pay up to $14.2 million in Transient Occupancy Tax last year.

- STR hosts may have failed to pay up to $110.8 million in State and Federal income taxes last year.

STR EMPLOYMENT AND WAGE IMPACTS

- The entry of STR platforms into the City of Los Angeles could be expected to have reduced permanent employment in the hotel sector by more than 400 jobs.

- The entry of STR platforms could similarly have reduced annual wages in the hotel sector by between $400 and $1300 per worker.
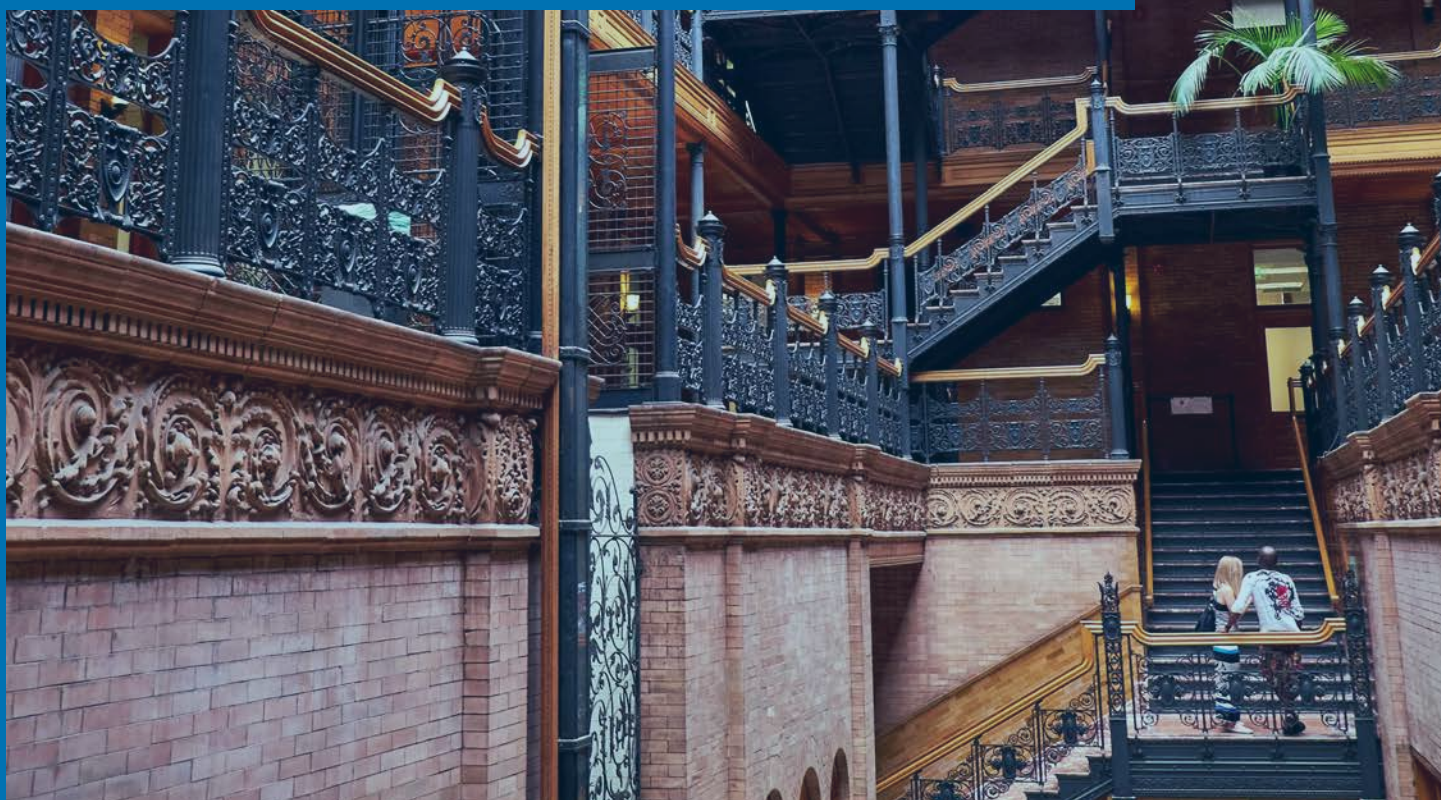
ADDITIONAL STR ECONOMIC IMPACTS

- **From July 2019 through August 2022, the City received 4,370 complaints about STRs.** These were concentrated in Venice, Hollywood, Hollywood Hills and Downtown, and the relative volume of complaints spiked during the pandemic.

REGULATORY RECOMMENDATIONS

- The City should rescind the extended home share permit, close the 31-day minimum stay loophole, and do the work to get remaining STR platforms to enter into a Platform Agreement.
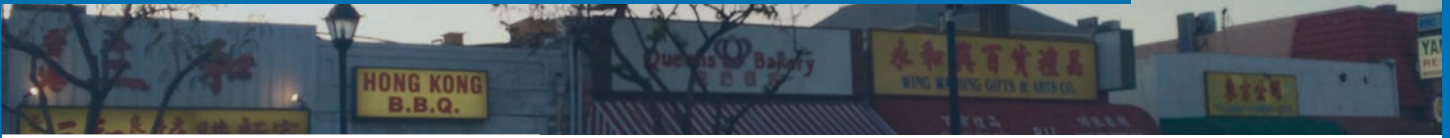
Table of contents

1. Introduction

The City of Los Angeles is one of the most popular destinations for travellers in North America, and in the last decade has witnessed the emergence of a large short-term rental (STR) market. This market has been subject to oversight since November 2019, the City's announced date for the start of STR regulatory enforcement. The City's Home-Sharing Ordinance (HSO) restricts STRs (defined as rentals of fewer than 31 days at a time) to a host's principal residence, forbids rentals of rent-stabilized units, and limits most listings to 120 nights reserved per year.

Municipalities enact regulations such as the HSO because there is now widespread recognition that unregulated STR activity is detrimental to communities. But concerns about the negative (and positive) impacts of STRs on communities are rarely measured precisely.

Bivens (2019), in an overview of the economic effects of STRs, identifies several major potential benefits and costs of STRs. The key potential benefits STRs could bring to local economies are 1) they could allow property owners to earn new types of revenue from their properties; and 2) they could generate additional economic activity through visitors who stay in STRs spending money in other establishments. The key potential costs STRs could bring to local economies are 1) by converting long-term housing to short-term rentals they could make housing less available and less affordable; 2) they could reduce tax revenues; 3) they could impose negative externalities, such as crime and nuisance, on neighbourhoods; and 4) they could generate a negative impact on employment by reducing

overall tourist accommodation jobs or by causing a shift from well-payed (often unionized) hotel jobs to less-well-payed (usually not unionized) intermediary accommodation service jobs.

These benefits and costs group broadly into four categories: housing impacts, tax impacts, employment impacts, and other impacts. After providing a brief overview of the STR market in Los Angeles, this report will evaluate each of these impact categories, then offer a brief set of recommendations for addressing the disparity between the negative and positive impacts of STRs on Los Angeles. The report is a complement to last year's "Short-term rentals in Los Angeles Are the City's regulations working?" (Wachsmuth 2021a), offering a less detailed portrait of STR activity and regulatory action, but a more expansive analysis of the broader socioeconomic impacts of Los Angeles' STR market.

In brief, the report finds that, by any reasonable metric, the negative economic impacts of STRs on Los Angeles outweigh the positive ones. STRs have made long-term housing scarcer and more expensive, have exacerbated homelessness, have generated financial windfalls for a small number of commercial operators but higher costs for most Los Angelenos and for the City of Los Angeles, are responsible for millions of dollars in unpaid taxes and fines, have converted thousands of well-paid and permanent jobs into precarious and temporary ones, and have generated a wide range of neighbourhood nuisances. The report concludes with a set of policy recommendations aimed at better balancing the costs and benefits of STRs in Los Angeles.

2. Short-term rentals in Los Angeles: market overview

There have been 3,300 STR listings active in Los Angeles on average each day in 2022. STR hosts earned $254.7 million last year. STR activity declined steeply during 2020 and 2021 because of the Covid-19 pandemic, not the City's regulatory enforcement, and has since begun to recover. STR activity in Los Angeles is highly concentrated in the Venice, Downtown and Hollywood neighborhoods, which accounted for a quarter of all listings and listings revenue in 2022. In 2022, 43.1% of active listings in Los Angeles were multilistings—listings controlled by hosts operating multiple listings—earning 47.8% of total host revenue. Almost half (45.0%) of STR listings in Los Angeles are illegal. Regulatory compliance appears to be declining.

STR ACTIVITY DECLINED BECAUSE OF THE COVID PANDEMIC, NOT THE CITY'S REGULATIONS

In 2019 there was an average of 11,840 active daily STR listings in Los Angeles operated by an average of 7,420 hosts (Figure 1).[1] These hosts collectively earned $426.3 million in 2019—an average of $36,000 per daily active listing or $57,500 per active host. In the midst of the Covid pandemic, active daily listings decreased to 4,450 in 2020, then to 2,780 in 2021 and 3,300 across

---

[1] Active daily listings are listings which were displayed on Airbnb or Vrbo on a given day, and were either reserved or available for a reservation. They are the most reliable means of determining the overall size of the STR market in a location, particularly with respect to change over time. These and all subsequent calculations are extrapolated from exact daily listing counts for Airbnb and Vrbo, and applied to listings on other platforms for which exact daily counts are not available. Full details are available in the Appendix.

Figure 1. Active daily STR listings in the City of Los Angeles (7-day average)

the first four months of 2022. These 3,300 listings still active on average each day in 2022 were operated by an average of 2,120 hosts, for an average revenue of $27,600 per active listing or $42,900 per active host in the first four months of the year.

Los Angeles STR host revenue in the last 12 months (May 2021 - April 2022) totalled $254.7 million. There was also a daily average of 1,680 listings in 2022 which were visible on STR platforms but were blocked by the host from receiving reservations. When these inactive listings are included, the average listing has earned $18,300 so far this year, and the average host has earned $27,100.

Previous research (Wachsmuth 2021a) examined the decline in STR activity since 2019 and determined that the decline was caused mostly by

the Covid pandemic, as opposed to the City's move to begin to actively enforce the HSO in November 2019. (The latter caused a one-time drop in displayed listings, as Airbnb pre-emptively removed several thousand non-compliant listings, but did not appreciably affect actual STR activity or revenue, since most of the listings removed were partially or entirely defunct.)

As of early 2021, year-over-year revenue growth once again became highly positive, and year-over-year listing growth became positive as well in early 2022 (Figure 2). Both of these indicators signal a rapid recovery underway in Los Angeles' STR market.

Because all Los Angeles STRs are required to be licensed whether or not they are active, Figure 1 shows the total number of listings displayed each day on STR platforms, alongside active daily
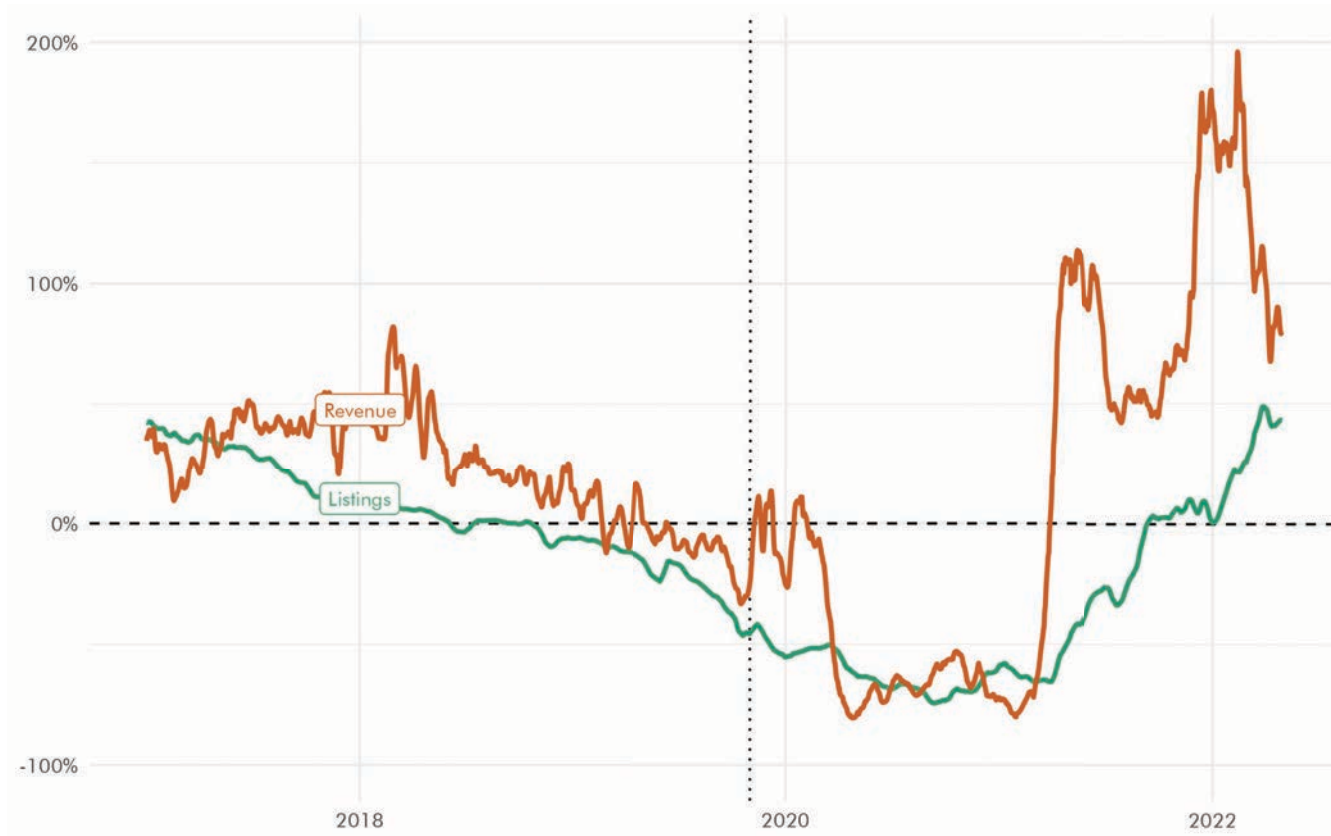
Figure 2. Change in daily active listings and host revenue compared to one year earlier (14-day average)

listings. Short-term rentals (STRs) have minimum reservations of 30 days or fewer, and are subject to the HSO, and long-term rentals (LTRs) have minimum reservations of 31 days or more, and are not subject to the City's rules).

Figure 1 demonstrates a clear shift from "STR" to "LTR" listings on Airbnb and Vrbo. This shift has largely occurred through the imposition of 30-day minimum rental periods on Airbnb for several thousand listings in October 2019 (right before enforcement of the HSO was scheduled to begin) and in August/September 2020 (when the City gained new abilities to report unregistered listings to Airbnb).

However, even though LTR listings now outnumber STR listings in Los Angeles, the latter are still responsible for the vast majority of total platform revenue: $91.1 million in STR revenue versus $30.6

million in LTR revenue in the first four months of 2022. Most LTR listings on Airbnb in fact are former STR listings converted en masse by Airbnb to 30-day minimum stays because they failed to obtain a registration number from the City.

STR activity in Los Angeles is highly concentrated in the Venice, Downtown and Hollywood neighborhoods (Table 1). These three areas accounted for a quarter of all listings and listing revenue in 2022. Venice and Hollywood Hills West have by far the most STR activity when measured in per-capita terms.

In 2022, even in the face of a dramatic decrease in STR listing counts, active STR listings account for 1.5% of all of Venice's housing units, while the equivalent figure for Hollywood Hills West is 2.5% (Figure 3). In 2019, prior to the pandemic, the respective figures were 4.7% and 5.2%.

Neighborhood	Active listings (2019)	Active listings (2022)	Active listings as % of dwellings (2019)	Active listings as % of dwellings (2022)	Revenue (last 12 months)
City of Los Angeles	11,840	3,300	0.8%	0.2%	$254.7 million
Venice	1,010	330	4.7%	1.5%	$32.3 million
Hollywood	1,100	190	2.4%	0.4%	$10.1 million
Hollywood Hills West	380	180	5.2%	2.5%	$30.5 million
Hollywood Hills	440	170	3.2%	1.2%	$18.9 million
Downtown	840	160	2.4%	0.5%	$7.3 million
Sherman Oaks	200	90	0.6%	0.3%	$7.8 million
Woodland Hills	190	90	0.8%	0.4%	$6.2 million
Silver Lake	270	90	1.8%	0.6%	$5.4 million
Studio City	210	80	1.0%	0.4%	$6.7 million

Table 1. STR activity by neighborhood in Los Angeles (for neighborhoods with at least 80 active listings)
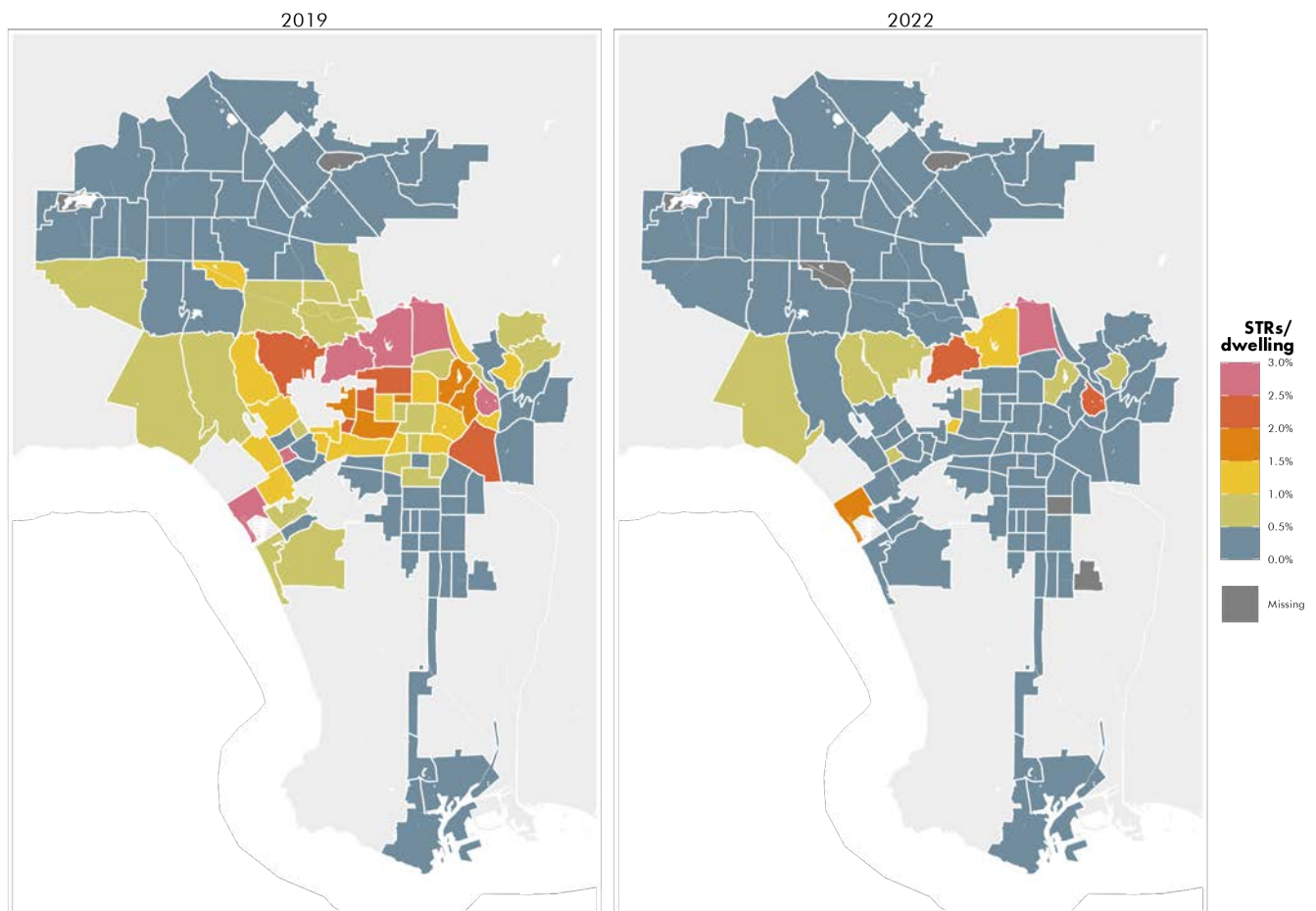

Figure 3. Active STRs as a share of all dwelling units in Los Angeles by neighborhood in 2019 (L) and 2022 (R)

LOS ANGELES' STR MARKET IS DOMINATED BY COMMERCIAL OPERATORS, NOT HOME SHARERS

Many hosts operate multiple STR units, which strongly suggests that they are commercial operators rather than a casual home sharers. We consider entire-homes to be "multilistings" if they are operated by hosts who are simultaneously operating other entire-home listings. We define private-room multilistings as cases where a host has three or more private-room listings operating on the same day.

In 2022, 43.1% of active listings in Los Angeles were multilistings, earning 47.8% of total host revenue. Multilistings had been growing steadily since 2016, both in terms of listings and revenue percentage, until the Covid-19 pandemic, when their proportion dropped significantly (Figure 4). As of the second half of 2021, however, the multilisting share of both listings and revenue has again begun to grow steadily, implying that commercial operators are regaining their control of Los Angeles' STR market.

(These figures should be taken as highly conservative estimates. Many commercial operators will use different STR accounts to manage their listings. Moreover, many STR commercial operators only operate a single listing, but operate it on a full-time basis. A house owner with a secondary suite, or the owner of an investment condo who operates a STR in it, are clearly commercial operators running listings which are not their principal residences, but they would not be counted by this method.)

Figure 4. The percentage of active listings and revenue accounted for by multilistings in Los Angeles (14-day average)
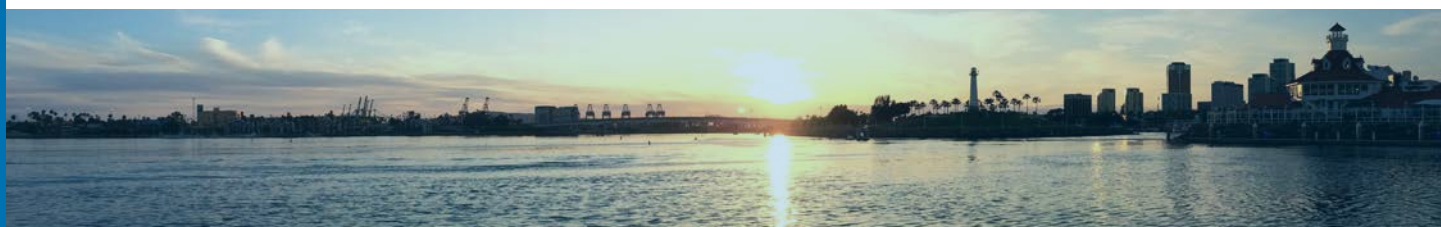
ALMOST HALF OF LOS ANGELES' STR LISTINGS ARE ILLEGAL

In order to be operating legally, an STR listing in Los Angeles must 1) be registered with the City, and 2) must be operated in line with a set of restrictions, notably a principal residence requirement and in most cases an annual limit of 120 nights of reservations. In data shared by the City in September 2022, there were 3,718 properties with valid registrations under the HSO. 2,498 of these properties had standard licenses, while the other 1,220 had extended home sharing licenses. In August 2022, we estimate that there were 4,610 listings displayed on STR platforms in Los Angeles. While precisely determining the legality of every individual STR listing would require extensive inspections and investigation, a close estimate can be obtained by identifying: listings operating with a missing, fake, or invalid HSO permit; listings which are not approved for "extended home sharing" but are in fact rented more than 120 nights per year; listings which are likely to be violating the principle-residence requirement of the HSO because they are multilistings or because they are reserved an extremely high number of nights per year.

We begin by identifying registered listings. A registered listing is not necessarily legal (since it might be operating in a non-compliant fashion despite having a license), but an unregistered one is necessarily illegal. In August 2022, 1.0% of Airbnb STR listings declared an exemption from registration, and we assume that they are operating legally. But 16.0% of listings had no license number whatsoever. Just under half of these listings (46.6% of the total) have displayed locations on Airbnb very near the City border, so it is possible that they are in fact located in neighboring cities and not subject to the City's

regulations. If we assume that this is true in all possible cases, and further optimistically assume that registration rates are as high on non-Airbnb platforms (which generally do not display registration numbers) as on Airbnb, then approximately 394 STR listings operating in Los Angeles (8.6% of the total) do not have a license and do not have a declared exemption to licensing, and therefore are operating illegally.

Of the listings which have a registration number displayed, 26.5% were displaying an expired number or a demonstrably fake number (because it does not appear among the valid permit numbers released by the City). 7.7% were booked for at least 120 nights last year despite not having an extended home sharing permit. A further 11.3% have an extended home sharing permit but were booked for at least 240 nights last year, which makes it highly implausible that they could have served as a host's principal residence. And then 5.4% of listings were entire-home multilistings (i.e. controlled by a host with multiple entire-home listings) which is not permitted by the HSO. In total, therefore, we believe that fully 50.9% of listings with a displayed license number are likely to be operating illegally.

Combining the unlicensed and the licensed-but-illegal listings, we conclude that 2,070 (45.0%) of Los Angeles' 4,610 STR listings are illegal, nearly three years since the City claims to have begun actively enforcing its laws. These results are a substantial deterioration from our previous finding that slightly more than a third of STR listings were illegal in summer 2021, which suggests that STR hosts are increasingly willing to flout the HSO in the face of insufficient regulatory enforcement.

3. STR housing impacts

Commercial STRs have taken 2,500 homes off the long-term market in Los Angeles, and this number is rising as the STR market recovers from the pandemic. STRs have raised rents $810 per year for the average renter household in Los Angeles. Cumulatively, these households have paid $3,440 more on rent since 2015. STRs are responsible for more than 5,000 extra people experiencing homelessness each night in Los Angeles. It would cost $1.3 billion to build enough supportive housing to accommodate them, and then $163 million each year to operate the housing. Hosting STRs enriches a small number of commercial operators instead of helping Los Angeles families pay the mortgage or rent. Just 10% of hosts earn more than half (53.8%) of all STR host revenue.

A large body of research has evaluated the impacts of STRs on local housing markets (e.g. Barron et al. 2020; Garcia-López et al. 2019; Horn and Merante 2017; Li et al. 2022; Wachsmuth and Weisler 2018). The main findings of this research are that STRs make housing both less available and less affordable for local residents. This occurs because dedicated commercial STRs displace either existing or potential long-term residents; each apartment unit or house that is operating as a full-time STR is one fewer housing unit that can be occupied by a long-term resident. The resultant decrease in housing supply makes housing harder to find for residents, and consequently drives up housing prices.

Airbnb itself, along with some academic research, touts the potential positive housing impacts of STRs by suggesting that the income that STR hosts earn can help middle-class families with their own housing affordability problems (Airbnb 2018; Li et al. 2021). In this section we evaluate the possibility of both positive and negative housing-market impacts of STRs in Los Angeles.

COMMERCIAL STRS HAVE TAKEN THOUSANDS OF HOMES OFF THE LONG-TERM MARKET IN LOS ANGELES

One of the major considerations when gauging the impacts of short-term rentals on a city is the extent to which STRs are removing long-term housing from the market. To obtain the exact number of units that have been occupied as STRs, landlords or units would need to be individually surveyed, which is infeasible because STR hosts are mostly anonymous on major STR platforms such as Airbnb and Vrbo. Instead, we use the daily activity of listings, alongside structural characteristics such as listing type and location, to estimate which listings are operating as dedicated STRs and are therefore not available as conventional long-term housing.

Frequently Rented Entire-Home (FREH) listings: The number of frequently-rented units is one way to estimate STR-induced housing loss. If a STR is available for reservations the majority of the year and receives many bookings, it is reasonable to assume that it is not serving as an individual's principal residence at the same time. Along these lines, we define frequently rented entire-home (FREH) listings as entire-home listings which were available on Airbnb or Vrbo the majority of the year (at least 183 nights) and were booked a minimum of 90 nights. We then apply a statistical model (described in the appendix) to the FREH data in order to generate an estimate of FREH activity based on three months of listing activity.

Ghost hostels: In addition to FREH listings, it is possible that entire housing units have been subdivided into multiple private-room listings, each of which appearing to be a spare bedroom or the like, while actually collectively representing an apartment removed from the long-term housing market. We call these clusters of private-room listings "ghost hostels", and detect them by finding clusters of three or more private-room listings operated by a single host, whose reported locations are close enough to each other that they are likely to have originated in the same actual housing unit. (Airbnb and Vrbo obfuscate listing locations by shifting them randomly up to 200 m.)

In September 2019, before the City began to enforce the HSO, there were 5,860 FREH listings in the City of Los Angeles, and 650 more housing units which were operating as ghost hostels. In total, therefore, short-term rentals were removing 6,510 housing units from Los Angeles' long-term market (Figure 5).

Airbnb's removal of several thousand non-compliant listings magnified the usual seasonal decline in STR-induced housing somewhat over the next several months, as did the conversion of a number of STR listings to 30-day minimum stays, but on the eve of the pandemic there were still 4,570 housing units being operated as dedicated short-term rentals. This figure plummeted during the pandemic, and after bottoming out at 1,510 in March 2021, it has begun to increase again. In the last year dedicated STRs increased by nearly two thirds, and as of April 2022 2,500 housing units are being operated as dedicated STRs.

The 2,500 housing units taken off of Los Angeles' housing market by STRs at the moment is only 0.2% of the total amount of housing in the city, but this housing loss has been concentrated in a small part of the city.

Table 2 summarizes STR-induced housing loss by neighborhood, and shows a tale of two cities: in most of Los Angeles, there are relatively few dedicated STRs, while in Venice and the central city they are ubiquitous. In April 2019, 3.7% of all housing units in Venice were operating as dedicated STRs, and that number was still 1.2% in April 2022, despite the pandemic.
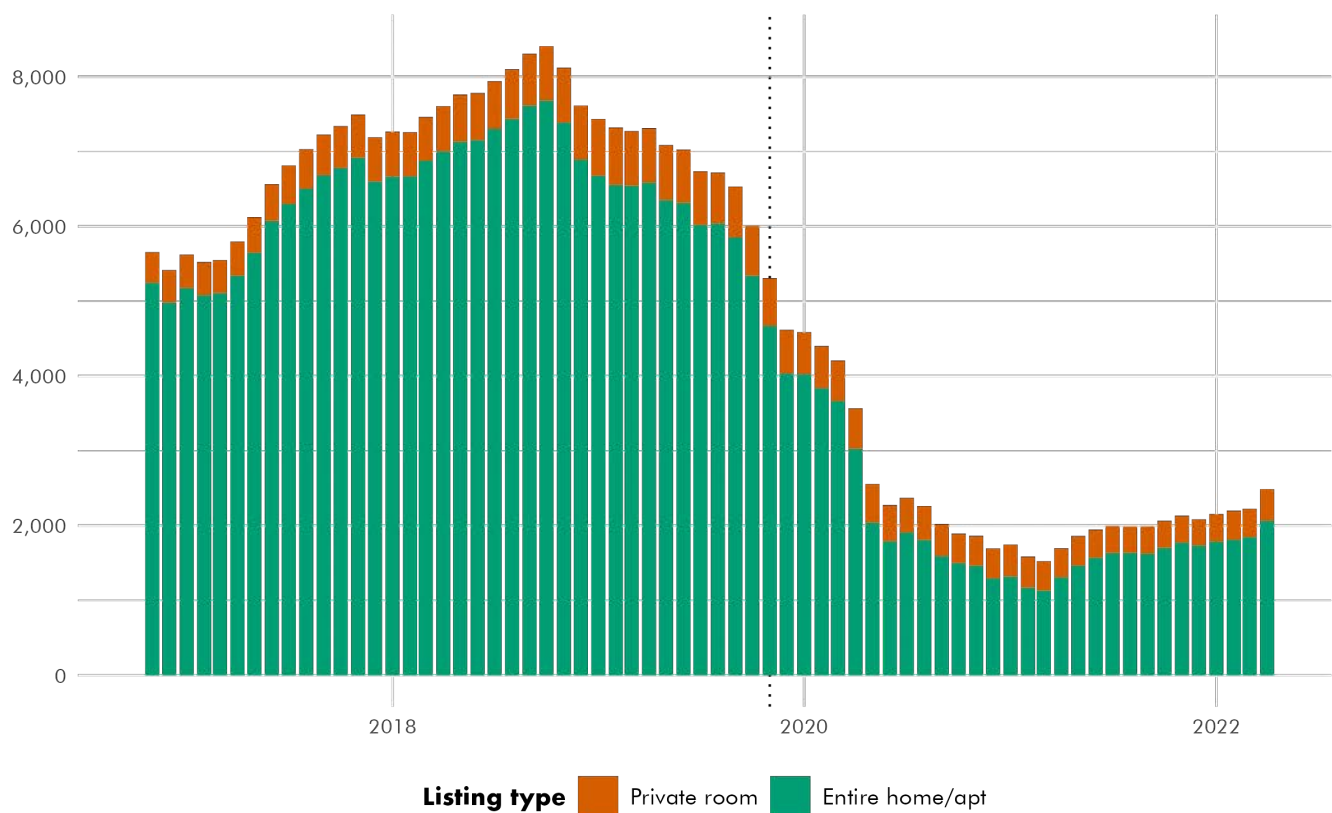
Figure 5. Housing units converted to dedicated STRs in the City of Los Angeles (monthly average)

Neighborhood	Housing loss (April 2019)	Housing loss (April 2022)	% of housing lost (April 2019)	% of housing lost (April 2022)
City of Los Angeles	*7,320*	*2,500*	*0.5%*	*0.2%*
Venice	780	260	3.6%	1.2%
Sherman Oaks	90	150	0.3%	0.4%
Hollywood Hills	300	140	2.2%	1.0%
Hollywood	840	120	1.9%	0.3%
Hollywood Hills West	180	110	2.4%	1.5%
Downtown	590	100	1.6%	0.3%
East Hollywood	180	90	0.7%	0.4%
Silver Lake	210	90	1.4%	0.6%

Table 2. STR-induced housing loss by neighborhood in the City of Los Angeles (for neighborhoods with at least 90 housing units lost)

STRS HAVE RAISED RENTS $810 PER YEAR FOR THE AVERAGE RENTER HOUSEHOLD IN LOS ANGELES

What impact do STRs have on residential rents? STRs could plausibly affect rents in the long-term housing market through two channels. On the one hand, if housing units which otherwise could house residents are converted into tourist accommodations, this will shrink the size of the local rental market, which, in the face of constant demand, will result in higher rents. Second, by offering a new revenue stream to homeowners and potentially some tenants who are willing to become part-time home sharers, STRs can increase the economic value of residential properties. Both phenomena would be expected to increase housing costs and rents, since there is less available housing stock, and since the economic potential of the existing stock is increased.

A recent study evaluated the impact of STR growth on housing prices and rents using an analysis of STR listings across the United States from 2012 to 2016 (Barron et al. 2020). The researchers found that a 1% growth in the number of STR listings predicts a 0.018% increase in monthly rents and 0.026% increase in house prices. While these numbers may seem small, they were multiplied by STR listing growth rates, which had been quite high over the study period. This model was developed to account for a wide range of locations, so we are able to apply the average values of their model to Los Angeles zip codes to obtain a rough estimate of the impact which STR growth has had on residential rents.

Between 2015 and 2022, we estimate that STRs have been responsible for a 2.4% increase in the average monthly rent in the median Los Angeles zip code. Put differently, from 2015 to 2022, the average renter household in the median Los Angeles zip code is now paying an extra $67 each month in rent—$810 per year—because of the impact of STRs on the housing market. Cumulatively, this average renter household has paid $3,440 more on rent since 2015.

For a small number of Los Angelenos, these extra thousands of dollars in housing costs have been more than offset by the windfalls they have earned from operating commercial short-term rentals (which we discuss below). But for the vast majority of Los Angeles households, STRs have made housing harder to find and more expensive to afford, with no compensation of any kind.

STRS ARE RESPONSIBLE FOR MORE THAN 5,000 EXTRA PEOPLE EXPERIENCING HOMELESSNESS EACH NIGHT IN LOS ANGELES. IT WOULD COST $1.3 BILLION TO BUILD ENOUGH SUPPORTIVE HOUSING TO ACCOMMODATE THEM, AND THEN $163 MILLION EACH YEAR TO OPERATE THE HOUSING.

The extra $3,440 that the average Los Angeles renter household has paid on rent since 2015 because of the presence of commercial STRs in the city is by itself a major negative impact on the economic stability and quality of life of Los Angeles families. But for families who were previously living close to the limit of their ability to afford housing, it is possible that the STR-induced increase in housing costs could have forced them onto the streets.

In fact, a variety of studies have demonstrated that increases in the cost of living in a city will also increase homelessness rates (GAO 2020; Glynn et al. 2021). This relationship is a simple consequence of the fact that people who are living

at the margins of homelessness may well be pushed into homelessness if their ability to pay rent does not keep up with the rent they are required to pay. Since STRs have been proven to increase housing costs by facilitating the removal of housing from the long-term market, it follows that the existence of STRs in a city also plays a role in the rate of homelessness experienced by that city.

A model developed by Glynn et al. (2021) specifically predicts that any community where the cost of the median rental apartment is more than 22% of the median income will begin to see homelessness increase, and that when this rent-to-income ratio exceeds 32%, homelessness will explode. This model, when applied to the case of Los Angeles, suggests that a 2% increase in the rent-to-income ratio will translate into 4,230 additional people experiencing homelessness in the city. For reference, there are approximately 50,000 people experiencing homelessness in Los Angeles each night (National Alliance to End Homelessness 2022).

We demonstrated above that STR activity in Los Angeles has caused average rents to increase by 2.4% since 2014. Glynn et al.'s (2021) model thus implies that STR activity is responsible for 5,020 more people experiencing homelessness each night in Los Angeles than would have been the case if there were no STR activity in the city. In the absence of STRs driving up housing costs in Los Angeles, by contrast, homelessness could be close to 10% lower in the city.

While these 5,020 people experiencing homelessness are a human tragedy on their own, there is an additional associated economic cost, since the City of Los Angeles and the State of California both spend large amounts of money each year on homelessness services. The City's 2022 budget included approximately $1 billion in spending on homelessness. Since STR activity is responsible for approximately 10% of the homelessness in Los Angeles, this implies that the City might be paying $100 million more money on homelessness services than it would have had to in the absence of this STR-caused homelessness.

The annual cost of providing supportive housing is approximately $32,500 per bed in the United States (Culhane and An 2021). It would thus cost the City of Los Angeles approximately $163 million each year to operate adequate supportive housing for each person who is homeless because of the presence of commercial STRs in the city. While this cost is already incredibly high—for example, it is equal to approximately two thirds of all the revenue earned by STR hosts in Los Angeles in 2021—it pales in comparison of the cost of actually constructing sufficient units of supportive housing for the Los Angelenos experiencing homelessness because of STR activity in the city. The average cost of building a unit of supportive housing in Los Angeles is $531,000 (Holland 2020). Under the conservative assumption that the 5,020 additional people experiencing homelessness in Los Angeles live in families with an average size of two people, it would thus cost $1.3 billion to construct adequate supportive housing to address the homelessness problems caused by STRs in Los Angeles.

HOSTING STRS ENRICHES A SMALL NUMBER OF COMMERCIAL OPERATORS INSTEAD OF HELPING LOS ANGELES FAMILIES PAY THE MORTGAGE OR RENT

While the negative economic impacts of STRs on Los Angeles's housing market are distributed widely across the city—ultimately contributing to higher rents paid by every rental household—there is the question of how the positive economic impacts enter the city's housing market. Are STRs a tool to help the middle class with housing affordability problems, or a means for a small number of property owners to get richer at the expense of middle-class housing affordability? The evidence suggests that they are the latter.

The major beneficiary of hosting STRs is a small number of commercial operators, who earn a majority of revenue on STR platforms, instead of

Los Angeles families engaging in home sharing, who are relatively numerous but who earn very little revenue.

A crucial distinction is that between casual STRs ("home-sharing") and dedicated STRs ("commercial operations"). If the STR market in Los Angeles is mostly home sharing listings operated in a host's own home, then it is plausible to conclude that STRs could have significant positive economic impacts by helping these hosts with their own housing expenses. But if the STR market is mostly commercial operations which are not home sharing, then this conclusion does not hold.
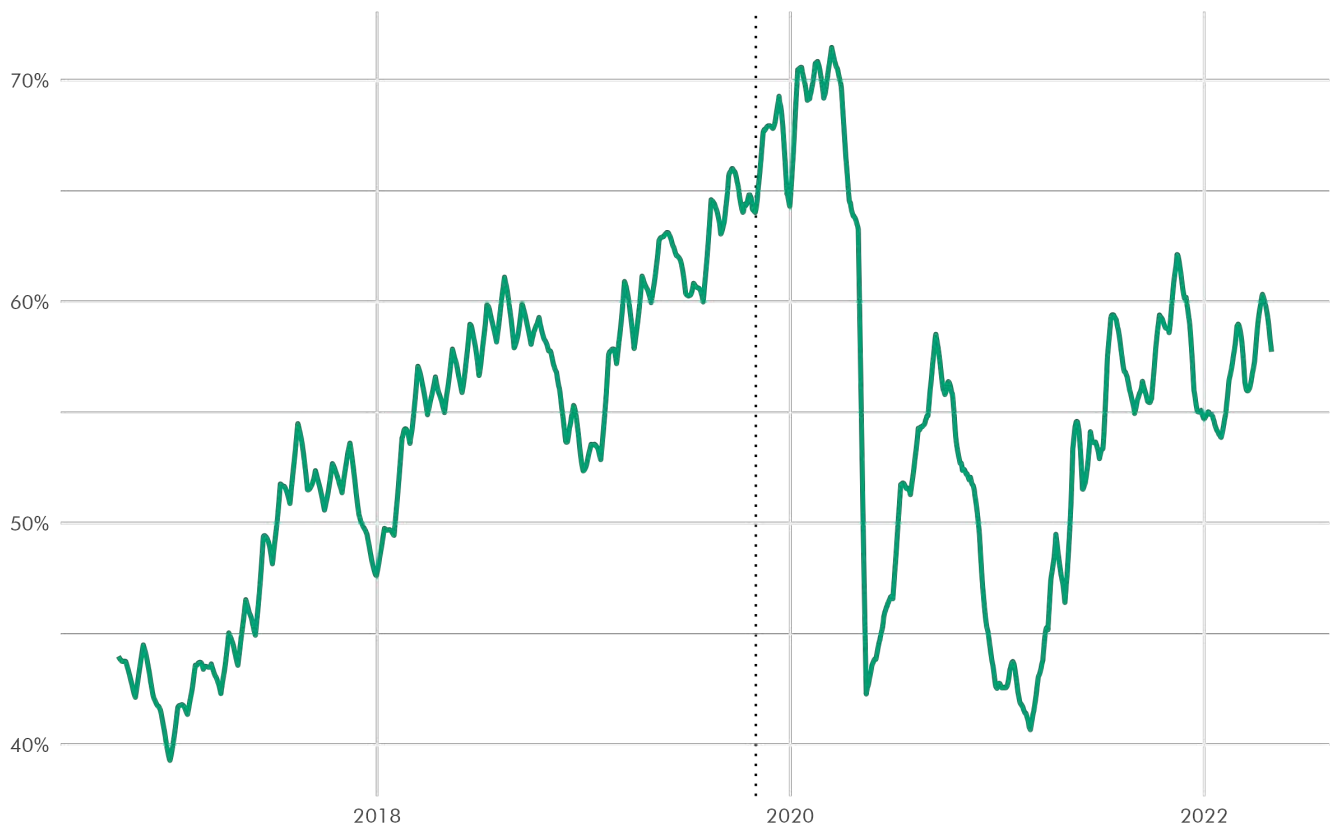

Figure 6. The percentage of active entire-home STR listings contributing to housing loss each day in Los Angeles (14-day average)

Figure 6 shows the percentage of active entire-home listings which have been operated as dedicated STRs since 2017. Prior to the pandemic, home sharing was on its way to vanishing in Los Angeles. In early 2020 more than 70% of entire-home listings were run as commercial operations. The pandemic caused a collapse and several fluctuations in these numbers as listings have exited and re-entered the market, but commercial operations have been recovering fast since the start of 2021. As of April 2022, 60% of entire-home listings were operated as dedicated STRs.

Another way to measure inequality in the STR market is to examine the distribution of revenue among STR hosts. Is revenue widely distributed between many part-time hosts of single listings, or concentrated among a small number of commercial operators who control many full-time

listings? Among all the STR hosts who earned revenue in Los Angeles last year (May 2021 - April 2022), the median revenue was $26,000, while there were 39 hosts or that earned more than $500,000.

Figure 7 shows the percentage of the total $254.7 million in STR revenue in the last year which accrued to each decile of hosts. The most successful 10% of hosts earned more than half (53.8%) of all STR revenue. The revenue concentration is even steeper among the top 10%: the top 5% earned 40.6% of revenue, while the top 1% of hosts earned 20.1% of all revenue.

The evidence thus suggests that the economic benefits of STRs do not primarily flow to casual home sharers, but rather to a small number of large commercial STR operators.
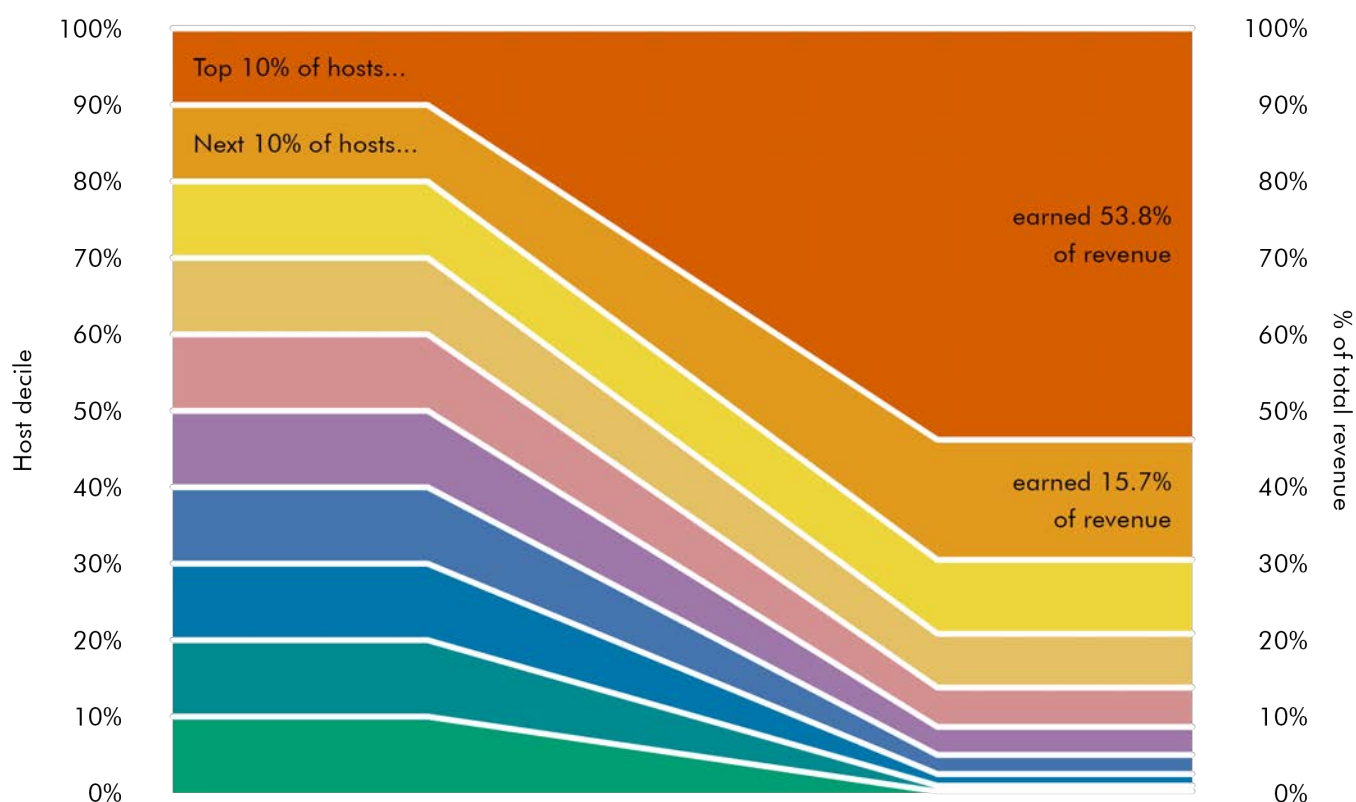

Figure 7. STR host revenue distribution in the City of Los Angeles (May 2021 - April 2022)

4. STR tax impacts

The City has lost between $56.8 and $302.2 million in un-assessed HSO fines in the last year. Because so much STR activity in Los Angeles is illegal, there is a vast amount of potential revenue in fines which the City is failing to collect. STR hosts may have failed to pay up to $14.2 million in Transient Occupancy Tax last year. STR hosts may have failed to pay up to $110.8 million in State and Federal income taxes last year.

THE CITY HAS LOST BETWEEN $56.8 AND $302.2 MILLION IN UN-ASSESSED HSO FINES IN THE LAST YEAR

The HSO mandates a fine of $527.28 (or the nightly rate if that is higher) per day for hosts who advertise an STR which violates HSO regulations, and a fine of $2,109.12 per day for each night a non-extended-home-sharing STR is reserved beyond the 120-day annual limit. Using the previous analysis of illegal STR operations, we can establish plausible estimates of the fines which the City could be levying, and then compare those estimates to the actual fines which have been levied.

From March 2021 to April 2022, there were 1,780 listings advertised which had a missing, fake, invalid or expired permit number, or which are highly unlikely to be a principle residence because they were rented in excess of 240 nights in the year. These listings were advertised for an average of 275 days each, for a total of 477,200 days. At the prescribed fine level of $527.28 per day, this means that the City could have levied a total of $251.6 million in fines last year. If the City only started fining

hosts after an incredibly generous six months of warnings, they would still have been able to levy $106.5 million in fines for improperly advertised listings. If the City only fined hosts a single day a week, the figure would still have been $35.9 million.

The second, larger fine type is for non-extended-home-sharing listings rented for more than 120 nights per year. Our estimate is that 296 listings violated this aspect of the HSO, for an average of 81 additional nights per listing or 24,000 total nights. At the prescribed fine level of $2,109.12 per day, this would be $50.6 million in fines last year. If the City only started fining hosts after they reached 180 days, they would still have been able to levy $20.9 million in fines for hosts violating the 120-day limit on STR reservations.

In total, therefore, the City could have levied between $56.8 and $302.2 million in fines last year, depending on how strictly they enforced the HSO. By

contrast, information from the City suggests that, between November 2021 and August 2022 (slightly less than a year) they only actually levied $36,500 in fines. This is only $18 per host who we believe violated the HSO last year—a trivial amount that is highly unlikely to deter any wrongdoing.

The inescapable conclusion is that lax enforcement of the HSO is costing the City of Los Angeles an enormous amount of money and, at the same time, implicitly offering bad actors free rein to operate illegal commercial STRs with impunity.

STR HOSTS MAY HAVE FAILED TO PAY UP TO $14.2 MILLION IN TRANSIENT OCCUPANCY TAX LAST YEAR

The City of Los Angeles requires all STR bookings to be charged a Transient Occupancy Tax (TOT) of 14% of the listing price, inclusive of cleaning fees. But currently only Airbnb has agreed to collect and remit this tax as part of the booking process. All of the other platforms operating in Los Angeles do not collect the TOT, so it is up to each individual host to collect this tax from each of their guests and then pass it along to the City.

While there are no doubt some hosts who perform these responsibilities diligently, two facts suggest that many or most hosts do not. First, the non-Airbnb STR platforms do not provide any mechanism for hosts to charge the TOT to guests, so hosts will have to undertake a separate, non-platform-mediated transaction with their guests to obtain the TOT. For hosts to collect TOT on

their own is thus likely to be quite cumbersome. Second, the City has no way of reliably tracking the number of reservations and the price per reservation associated with STR bookings. This means that the penalties for hosts who fail to collect and remit TOT are highly likely to be non-existent.
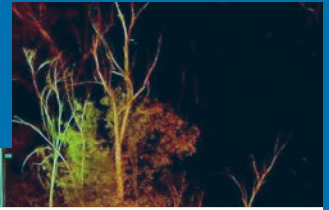
The combination of these facts suggests that only a small fraction of the revenue generated on non-Airbnb STR platforms is properly taxed through the TOT. We estimate that $101.3 million (49.0%) of the total $206.5 million in annual STR host revenue earned in 2021 was earned on non-Airbnb platforms. This revenue should have generated $14.2 million in TOT revenue for the City of Los Angeles, but it is likely that very little of that revenue was ever collected or remitted.

STR HOSTS MAY HAVE FAILED TO PAY UP TO $110.8 MILLION IN STATE AND FEDERAL INCOME TAXES LAST YEAR

A similar tax remittance issue exists for State and Federal income taxes. STR hosts are required to pay income tax on their revenues, but neither Airbnb nor the other online STR platforms remit revenue information to federal or state governments, as would be commonplace with more traditional employer-to-employee relationships.Since there is no oversight of STR earnings from any levels of government, it is likely that many hosts fail to pay the income taxes they are responsible for.

STR hosts earned $206.5 million in Los Angeles in 2021. Under the most conservative possible assumptions (i.e. that this was the only taxable revenue each host earned that year), hosts should pay $28.9 million in California income tax and $81.9 in Federal income tax for the year. This is a combined $110.8 million in tax liability. The true amount owed will certainly be higher, while the true amount paid will certainly be much lower.

The entry of STR platforms into the City of Los Angeles could be expected to have reduced permanent employment in the hotel sector by more than 400 jobs. The entry of STR platforms could similarly have reduced annual wages in the hotel sector by between $400 and $1,300 per worker.

Much of the growth of STRs has come at the expense of hotels. A plausible prospect, therefore, is that one of the economic impacts of STRs on Los Angeles has been a redistribution of economic activity—in terms of jobs and wages—away from the hotel sector and into the STR sector. Since hotel jobs are more likely to be unionized, full-time and well paid than STR jobs (in particular cleaning and key management services), this redistribution could imply a degradation of overall employment conditions in the broader hospitality sector.

A wide variety of studies has found that the presence of STRs negatively affects the economic performance of hotels (Yang et al. 2021; Dogru et al. 2020a). Research into the specific impacts of STRs on hotel employment, however, has been more sparse, and more mixed. Fang et al. (2016) argue that the growth of STRs will replace paid hotel jobs with unpaid STR host labour, and thus will reduce hotel employment. By contrast, Dogru et al. 2020b found that greater presence of STRs predicts greater overall employment in the tourism sector, although this study did not distinguish between high-wage, unionized hotel employment and low-wage, non-unionized STR employment.
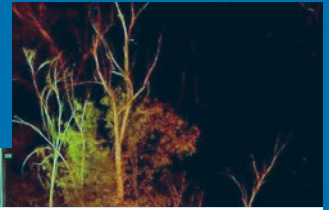
Mhlanga (2020), by contrast, does distinguish between these employment categories, and finds that the entry of Airbnb into a market caused a small statistically significant decline in permanent hotel jobs and a decrease in hotel wages, accompanied by a statistically insignificant increase in temporary employment and self-employment. The study suggests that the decline of permanent employment in the hotel sector could be in the range of 8% of all jobs thanks to the entry of Airbnb. Likewise, Suciu (2016) finds that the daily wages of hotel workers in cities with high presence of STRs are reduced by between 2% and 6%.

STR PLATFORMS MAY HAVE REDUCED PERMANENT EMPLOYMENT IN THE HOTEL SECTOR BY MORE THAN 400 JOBS, AND ANNUAL WAGES IN THE HOTEL SECTOR BY UP TO $1,300 PER WORKER.

While it is not possible to obtain precise employment figures for the hotel industry in the City of Los Angeles, LAEDC (2013) conducted an occupational analysis of Los Angeles County through 2017 which provides plausible estimates. According to this analysis, there were 9,500 cleaning staff and 3,900 hotel desk clerks employed in Los Angeles County, with median earnings of $21,500 and $22,400 respectively. Extrapolating from previous research, the entry of STR platforms into the City of Los Angeles could be expected to have reduced permanent employment in the hotel sector by more than 400 jobs, and annual wages by between $400 and $1,300 per worker in the sector.

5. STR employment and wage impacts

The entry of STR platforms into the City of Los Angeles could be expected to have reduced permanent employment in the hotel sector by more than 400 jobs. The entry of STR platforms could similarly have reduced annual wages in the hotel sector by between $400 and $1,300 per worker.

Much of the growth of STRs has come at the expense of hotels. A plausible prospect, therefore, is that one of the economic impacts of STRs on Los Angeles has been a redistribution of economic activity—in terms of jobs and wages—away from the hotel sector and into the STR sector. Since hotel jobs are more likely to be unionized, full-time and well paid than STR jobs (in particular cleaning and key management services), this redistribution could imply a degradation of overall employment conditions in the broader hospitality sector.

A wide variety of studies has found that the presence of STRs negatively affects the economic performance of hotels (Yang et al. 2021; Dogru et al. 2020a). Research into the specific impacts of STRs on hotel employment, however, has been more sparse, and more mixed. Fang et al. (2016) argue that the growth of STRs will replace paid hotel jobs with unpaid STR host labour, and thus

will reduce hotel employment. By contrast, Dogru et al. 2020b found that greater presence of STRs predicts greater overall employment in the tourism sector, although this study did not distinguish between high-wage, unionized hotel employment and low-wage, non-unionized STR employment.

Mhlanga (2020), by contrast, does distinguish between these employment categories, and finds that the entry of Airbnb into a market caused a small statistically significant decline in permanent hotel jobs and a decrease in hotel wages, accompanied by a statistically insignificant increase in temporary employment and self-employment. The study suggests that the decline of permanent employment in the hotel sector could be in the range of 8% of all jobs thanks to the entry of Airbnb. Likewise, Suciu (2016) finds that the daily wages of hotel workers in cities with high presence of STRs are reduced by between 2% and 6%.

STR PLATFORMS MAY HAVE REDUCED PERMANENT EMPLOYMENT IN THE HOTEL SECTOR BY MORE THAN 400 JOBS, AND ANNUAL WAGES IN THE HOTEL SECTOR BY UP TO $1,300 PER WORKER.

While it is not possible to obtain precise employment figures for the hotel industry in the City of Los Angeles, LAEDC (2013) conducted an occupational analysis of Los Angeles County through 2017 which provides plausible estimates. According to this analysis, there were 9,500 cleaning staff and 3,900 hotel desk clerks employed in Los Angeles County,

with median earnings of $21,500 and $22,400 respectively. Extrapolating from previous research, the entry of STR platforms into the City of Los Angeles could be expected to have reduced permanent employment in the hotel sector by more than 400 jobs, and annual wages by between $400 and $1,300 per worker in the sector.

6. Additional STR economic impacts
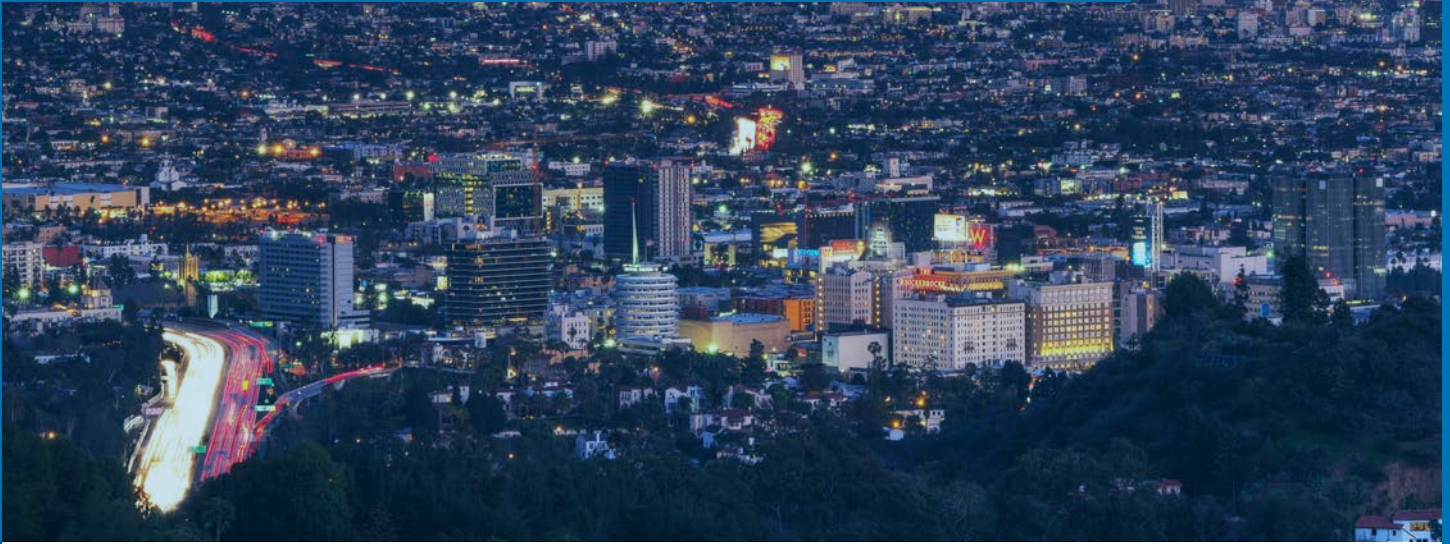
From July 2019 through August 2022, the City received 4,370 complaints about STRs. These were concentrated in Venice, Hollywood, Hollywood Hills and Downtown, and the relative volume of complaints spiked during the pandemic.

In contrast to the housing, tax and employment domains, there are set of other potential economic impacts of STRs on Los Angeles which are less easily quantifiable. Based on previous research (e.g. Jordan and Moore 2018; Füller and Michel 2014; García-Hernández et al. 2017; Lambea Llop 2017; Freytag and Bauder 2018), the most important category of these impacts is likely to be what economists call "negative externalities" at the neighborhood scale. Negative externalities are harmful byproducts of an activity, the costs of which are not borne by whoever is carrying out the activity. In the case of STRs, the most frequently cited negative externality is neighborhood-level nuisance, usually related to noise, garbage or crime.

The City of Los Angeles maintains a hotline for residents to make complaints related to STR activity in the city, and the volume of complaints received suggests that nuisance issues are indeed significant. From July 2019 through August 2022, 4,370 complaints were received by the City.

Figure 8 shows their distribution by neighborhood (left panel) and their frequency relative to overall STR activity (right panel), and indicates that complaints about STRs were heavily concentrated in Venice, Hollywood, Hollywood Hills and Downtown, and that complaints spiked during the pandemic. Complaints were between 4 and 7 times as common—relative to the size of the STR market—from spring 2020 through summer 2021 as they were in summer 2019.

There are other possible externalities—both positive and negative—which STRs generate at the neighborhood scale which are hard to quantify in Los Angeles due to data limitations. For example, there is the prospect that the presence of STRs drives new tourist spending in neighborhoods which previously had not received significant
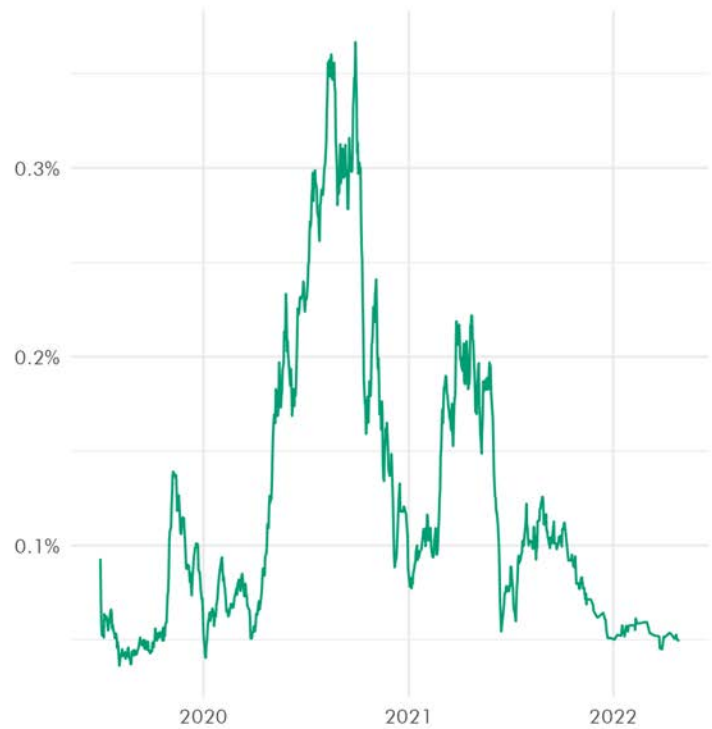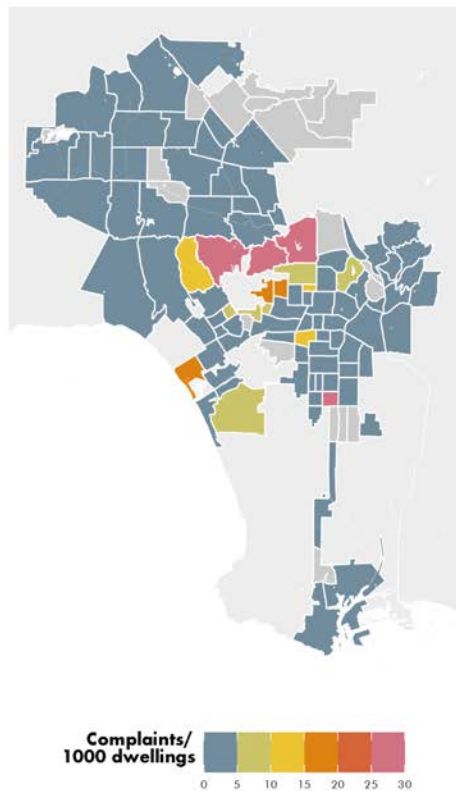
Figure 8. STR complaints received by the City of Los Angeles, per 1000 dwelling units (left) and per active daily STR listing (right) (July 2019 - April 2022)

tourist flows. Existing research implies that these impacts are modest, however; while Basuroy et al. 2022 and Xu and Xu 2021 find that STR growth predicts better restaurant performance in a neighborhood, Alyakoob and Rahman (2022) find that these positive impacts do not occur in Black neighborhoods.

Another important potential neighborhood externality is crime. And indeed Ke et al. (2021) find, in a study of Boston, that more STR listings in a neighborhood predicts subsequent higher crime rates.

While it is not feasible to measure these externalities precisely in Los Angeles, this previous research suggests that the presence of STRs in Los Angeles is responsible both for somewhat better restaurant performance—particularly in white neighborhoods—and somewhat higher levels of crime in the neighborhoods where STRs are most prevalent.

7. Regulatory recommendations

The City should rescind the extended home share permit, close the 31-day minimum stay loophole, and do the work to get remaining STR platforms to enter into a Platform Agreement.

The most important distinction within the STR market for analyzing both the positive and negative economic impacts of STRs is the distinction between commercial STR operators and actual home sharers. The negative economic impacts of STRs—housing loss and homelessness, tax evasion, job loss, and negative neighbourhood externalities—are disproportionately caused by commercial STRs. Meanwhile, the positive economic impacts of STRs—in particular the revenue which hosts can earn—are more meaningful when they are more broadly distributed among a larger number of small-scale STR hosts who are sharing their own homes rather than a smaller number of large-scale commercial STR operations.

THE CITY SHOULD RESCIND THE EXTENDED HOME SHARE PERMIT

While the City of Los Angeles limits most STRs to 120 nights per year in a host's principal residence, it also has an "extended home sharing" option which allows hosts to bypass these limits. There is no public-interest rationale for the existence of the extended home sharing option, which simply redirects STR activity away from the relatively benign home sharing type to the unambiguously harmful commercial type. Accordingly, the City should rescind the extended home sharing option, and strictly limit STRs to 120 nights in a host's principal residence.

THE CITY SHOULD CLOSE THE 31-DAY MINIMUM STAY LOOPHOLE

Second, the City should ensure that hosts (and platforms) are unable to use long minimum-stay requirements on STR platforms as a loophole to avoid the need to register their listings. Because many STR regulations define short-term rentals based on a length of stay, some jurisdictions have had mandatory registration requirements frustrated by Airbnb failing to remove unregistered listings and

instead converting them to 30-day minimum stays. While this change nearly respects the letter of the law,[1] it undermines the key function of a mandatory registration system, which is to comprehensively identify STRs so that rules can be fairly applied to them. The hosts of these newly long-term listings are able to use Airbnb and other STR platforms to advertise their listings while they continue to accept reservations of any length of time offline, and the City will be unable to plausibly monitor this activity if the 31-day-minimum loophole exists.

The consequence is that, if the HSO continues to define STRs with reference to a maximum length of stay, the City will be unable to properly enforce its rules and illegal activity will proliferate on STR platforms.

The simplest way to avoid this loophole is to have the HSO's registration requirement unconnected with any length of stay, and simply to adhere to listings which are advertised on online STR platforms. A small number of legitimate longer-term rentals operating on these platforms will potentially be required to register when they wouldn't otherwise have had to, but this is a small price to pay to ensure that the HSO captures all short-term rental activity in Los Angeles.

This change could be accomplished by re-defining the category of activity being regulated to refer to the means of a property's rental as opposed to

the length of its rental. Registration should be mandatory for all properties which are rented on online platforms such as Airbnb and Vrbo, which not only display listings on behalf of hosts but also perform nearly all the mediation between hosts and guests, including collecting and processing payments, handling disputes, and policing the behaviour of both hosts and guests. Rental agreements on these platforms are rarely if ever formalized through a lease.

By contrast, registration should not be required for properties advertised on other online platforms which simply allow for the advertisement of properties but do not perform any important mediation function between landlords and tenants. Prominent examples of this type of platform are Craigslist and Facebook Marketplace. Prospective tenants use these platforms to identify possible apartments, but all the business of concluding a tenancy arrangement are conducted directly between the parties. These rental agreements are usually formalized through a lease.

Making this distinction the basis of STR regulations will remove the incentives for hosts or platforms to reclassify listings with 31-day minimums to avoid the need to register. By contrast, any distinction based on a maximum length of stay will create precisely this type of incentive, and the City's recent experience has proven that this incentive will be turned into a loophole, and the loophole will be exploited.

THE CITY SHOULD DO THE WORK TO GET REMAINING STR PLATFORMS TO ENTER INTO A PLATFORM AGREEMENT

Finally, the City should exert the necessary pressure on the vast majority of STR platforms which have not entered into an agreement with the City to be accountable for enforcing the HSO on its users. Only Airbnb has entered into such an agreement, and

while it is responsible for the majority of STR activity in Los Angeles, the fact that other STR platforms are allowed to operate with impunity in the face of the law undermines both the effectiveness of the HSO and the principle of fairness.

---

[1] As discussed above, Airbnb shifted non-registered listings to 30-day minimums when in fact listings should have 31-day minimums to be exempt from the HSO.

Appendix. Data and methodology

The analysis in this report is based on a combination of private and public data sources:

- **Listing and activity data about Airbnb and Vrbo short-term rental listings gathered by the consulting firm AirDNA.** This data includes canonical information about every short-term rental listing on the Airbnb and Vrbo (including HomeAway) platforms which was active in the City of Los Angeles between January 1, 2015 and April 30, 2022. The data includes "structural" information such as the listing type, the number of bedrooms, and the approximate location of the listing. AirDNA collects this information through frequent web scrapes of the public Airbnb and Vrbo websites. The data also includes estimates of listing activity (was the listing reserved, available, or blocked, and what was the nightly price?), which AirDNA produces by applying a machine-learning model to the publicly available calendar information of each listing. We use this data for our core analysis of the STR market, including our counts of active listings, our breakdown of different listing types, our estimates of STR-induced housing loss, and our estimates of listings which are commercial operations and which are located in hosts' principal residences.

- **Additional data about Airbnb listings collected by UPGo researchers.** This includes HSO permit numbers which were gathered in August and September 2022.

- **Data from the American Community Survey.** We use this governmental data to analyze population and dwelling counts.

- **Rent data from Zillow.** We use this to measure the impact of STRs on rents in Los Angeles.

Data cleaning: We process the raw STR data we receive from AirDNA through an extensive data cleaning pipeline, the code for which is available at https://github.com/UPGo-McGill/strr (Wachsmuth 2021b).

Listing extrapolation: Our STR calculations are extrapolated from exact daily listing counts for Airbnb and Vrbo, and applied to listings on other platforms for which exact daily counts are not available. Because these other platforms have disproportionately evaded regulatory scrutiny, they have become an increasingly large share of total STR activity in Los Angeles following the implementation of the City's STR regulations. In previous work (Wachsmuth 2021), 90.4% of STR listings present in Los Angeles in the summer of 2021 were listed on Airbnb or Vrbo, and 9.6% of listings were only listed on one of the other platforms. We assume that the non-Airbnb/Vrbo share of listings has grown logarithmically from 1% when HSO enforcement began. We likewise model the share of listing activity for listings cross-listed between Airbnb and another platform by extrapolating from the known relationship between Airbnb and Vrbo within our dataset. We use the formula $y = 0.142 + 0.108x - 0.03x^2$ to model this relationship, where x is a numeric representation of the date and y is the scaling factor.

FREH modelling: We define "frequently rented entire-home listings" as entire-home STR listings which are available for a majority of the year (so 183 days or more in a 365-day period), and which are reserved at least 90 days of that year. This is a consistent and conservative way to estimate listings operated sufficiently often that they are unlikely to be their host's principal residence. But this indicator is slow to adapt to sudden shocks in STR activity, so we developed a linear regression model which predicts FREH status based on three months of listing activity instead of a full year, and which is calibrated both to routine seasonal variation and to a given market's specific dynamics. All of the FREH results reported here are the results of this model rather than the raw FREH calculations themselves.

In order to facilitate public understanding and scrutiny of our work, complete methodological details, along with all the code used to produce this analysis, are freely available under an MIT license on the UPGo GitHub page at https://github.com/UPGo-McGill/la-report-2022.

References

Airbnb (2018). Airbnb and housing in Madrid. https://news.airbnb.com/airbnb-and-housing-in-madrid/

Alyakoob, M., & Rahman, M. S. (2022). Shared prosperity (or lack thereof) in the sharing economy. *Information Systems Research*, 33(2), 638-658.

Barron, K., Kung, E., & Proserpio, D. (2020). The effect of home-sharing on house prices and rents: Evidence from Airbnb. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3006832

Basuroy, S., Kim, Y., & Proserpio, D. (2022) Estimating the impact of Airbnb on the local economy: Evidence from the restaurant industry. http://dx.doi.org/10.2139/ssrn.3516983

Bivens, J. (2019). The economic costs and benefits of Airbnb: No reason for local policymakers to let Airbnb bypass tax or regulatory obligations. Policy report. https://epi.org/157766

Culhane, D. P., & An, S. (2021). Estimated revenue of the nonprofit homeless shelter industry in the United States: Implications for a more comprehensive approach to unmet shelter demand. *Housing Policy Debate*, 32:6, 823-836.

Dogru, T., Mody, M., Line, N., Suess, C., Hanks, L., & Bonn, M. (2020a). Investigating the whole picture: Comparing the effects of Airbnb supply and hotel supply on hotel performance across the United States. *Tourism Management*, 79, 104094.

Dogru, T., Mody, M., Suess, C., McGinley, S., & Line, N. D. (2020b). The Airbnb paradox: Positive employment effects in the hospitality industry. Tourism Management, 77, 104001.

Fang, B., Ye, Q., & Law, R. (2016). Effect of sharing economy on tourism industry employment. *Annals of Tourism Research*, 57, 264-267.

Freytag, T., & Bauder, M. (2018). Bottom-up touristification and urban transformations in Paris. *Tourism Geographies*, 20(3), 443-460.

Füller, H., & Michel, B. (2014). 'Stop Being a Tourist!' New Dynamics of Urban Tourism in Berlin-Kreuzberg. *International Journal of Urban and Regional Research*, 38(4), 1304-1318.

GAO (2020). Better HUD oversight of data collection could improve estimates of homeless population. Report to the Chairwoman, Committee on Financial Services, House of Representatives. https://www.gao.gov/assets/gao-20-433.pdf

García-Hernández, M., De la Calle-Vaquero, M., & Yubero, C. (2017). Cultural heritage and urban tourism: Historic city centres under pressure. Sustainability, 9(8), 1346.

Garcia-López, M.À., Jofre-Monseny, J., Martínez Mazza, R., & Segú, M. (2019). Do short-term rental platforms affect housing markets? Evidence from Airbnb in Barcelona. https://mpra.ub.uni-muenchen.de/96131/1/MPRA_paper_96131.pdf

Glynn, C., Byrne, T. H., & Culhane, D. P. (2021). Inflection points in community-level homeless rates. *The Annals of Applied Statistics*, 15(2), 1037-1053.

Holland, G. (2020). Housing costs for the homeless rose to $531,000 a unit, L.A. controller's report says. *Los Angeles Times*, September 9. https://www.latimes.com/california/story/2020-09-09/high-of-746-000-for-homeless-housing-audit-says-try-rehabbing-motels-instead

Horn, K., & Merante, M. (2017). Is home sharing driving up rents? Evidence from Airbnb in Boston. *Journal of Housing Economics*, 38, 14-24. https://doi.org/10.1016/j.jhe.2017.08.002

Jordan, E. J., & Moore, J. (2018). An in-depth exploration of residents' perceived impacts of transient vacation rentals. *Journal of Travel & Tourism Marketing*, 35(1), 90-101.

Ke, L., T. O'Brien, D., & Heydari, B. (2021). Airbnb and neighborhood crime: The incursion of tourists or the erosion of local social dynamics?. *PLoS one*, 16(7), e0253315.

LAEDC (2013) Industry and labor market intelligence for Los Angeles County. Report commissioned by the Los Angeles County Workforce Investment Board. https://laedc.org/wp-content/uploads/2013/06/Industry-and-Labor-Market-Intelligence_LAC_FINAL.pdf

Lambea Llop, N. (2017). A policy approach to the impact of tourist dwellings in condominiums and neighbourhoods in Barcelona. *Urban Research & Practice*, 10(1), 120-129.

Li, H., Kim, Y., & Srinivasan, K. (2022). Market shifts in the sharing economy: The impact of airbnb on housing rentals. Management Science.

Mhlanga, O. (2020). The innovation-employment nexus: An analysis of the impact of Airbnb on hotel employment. *Journal of Hospitality and Tourism Technology*, 11(3), 407-423.

National Alliance to End Homelessness (2022). State of Homelessness: California. Accessed on August 25, 2022. https://endhomelessness.org/homelessness-in-america/homelessness-statistics/state-of-homelessness-report/california/

Suciu, A.-M. (2016). The impact of Airbnb on local labour markets in the hotel industry in Germany. Available at SSRN: http://dx.doi.org/10.2139/ssrn.2874861

Wachsmuth, D. (2021a). Short-term rentals in Los Angeles: Are the City's regulations working? Report commissioned by Better Neighbors LA.

Wachsmuth, D. (2021b). strr: Tools for analysis of short-term rental data. R package version 0.1. https://github.com/UPGo-McGill/strr

Wachsmuth, D., & Weisler, A. (2018). Airbnb and the rent gap: Gentrification through the Sharing Economy. *Environmental and Planning A: Economy and Space*, 50(6), 1147-1170. https://doi.org/10.1177/0308518X18778038

Xu, M., & Xu, Y. (2021). What happens when Airbnb comes to the neighborhood: The impact of home-sharing on neighborhood investment. *Regional Science and Urban Economics*, 88, 103670.

Yang, Y., Nieto García, M., Viglia, G., & Nicolau, J. L. (2022). Competitors or complements: a meta-analysis of the effect of airbnb on hotel performance. *Journal of Travel Research*, 61(7), 1508-1527.

AUTHORSHIP AND FUNDING

ABOUT UPGO

UPGo, the Urban Politics and Governance research group at McGill University, conducts rigorous, public-interest research into pressing urban governance problems—particularly those that exceed or challenge city boundaries. UPGo has published numerous peer-reviewed journal articles and policy reports on short-term rentals in cities around the world, including "The high cost of short-term rentals in New York City" and "Short-term rentals in Canada: Uneven growth, uneven impacts". UPGo is led by Prof. David Wachsmuth, the Canada Research Chair in Urban Governance at McGill University's School of Urban Planning, and is online at upgo.lab.mcgill.ca.

Short-term rentals and crime: Two potential mechanisms

Most of the discussions about short-term rentals and crime in neighborhoods rest on the logic that tourists might bring such issues, a relationship that has been investigated more generally by researchers in both criminology and tourism. Often, this relationship is framed in terms of routine activities theory [5], in which a crime is understood as requiring three minimal elements: a motivated offender, a suitable target, and the lack of a guardian. There are three hypotheses that arise from this framing. Ryan (1993) makes the case for two of these. One is that tourists make for suitable targets, either because they are known to have money on them or are more vulnerable when navigating an unfamiliar city. Second, he argues that because tourist locations are known to have many suitable targets, they attract more potential offenders, putting both tourists and residents at greater risk [6]. There is more evidence for the first of these two hypotheses, as at least three studies have found that tourists are more likely to be victimized than locals [7–13]. Third, some have noted that tourists might engage in criminal or disruptive behavior themselves. For example, Boivin and Felson (2018) found that urban neighborhoods with more visitors feature elevated rates of crime committed by visitors but no increase in crimes committed by locals [14]. Similarly, arguments against short-term rentals often hinge on the assumption that tourists might bring drunkenness or other unruly behavior with them. Such behaviors are more frequent in downtown areas and business districts with many shops, restaurants, and bars, but would be less familiar in a residential neighborhood that now has many short-term rentals [15].

We also note a second mechanism by which short-term rentals might impact neighborhood crime, one that is less prevalent in public discussions. It draws off of the sociological\criminological concept of social organization–that is, neighborhoods whose residents know and trust each other and share common values are more able to establish and enforce social norms [16]. In turn, they tend to have lower levels of crime [17]. One of the main factors that inhibits a strong social organization is residential instability, because it is hard to develop relationships and establish norms if a sizable proportion of the population is transient [18]. It would stand to reason, then, that if a sufficient number of units throughout a community have been converted to short-term rentals–the most transient form of occupancy possible–it can undermine the social organization and its ability to discourage and prevent crime. A strong social organization is also associated with and able to support various dynamics and processes subsumed under the term 'social capital,' including trust, reciprocity, and social cooperation [19]. Further, researchers focusing more on this latter set of terminologies has repeatedly found that numerous manifestations of social capital are associated with lower incidence of crime [20, 21]. Moreover, previous theoretical work have demonstrated an strong impact of community structure (measured by network modularity) on population level attributes such as cooperation, fairness and stability [22–26].

We then have two potential mechanisms by which short-term rentals can lead to increased crime in a neighborhood–by bringing tourists who then perpetrate crime and disorder, or by creating transience that undermines local social dynamics that might in turn mitigate or prevent crime. It is important to note that these mechanisms are not mutually exclusive and could be operating simultaneously. That said, we note two analytic considerations that might disentangle their presence. The first consideration is temporal. If issues generated by the prevalence of short-term rentals arise from the presence of tourists themselves, we would anticipate increases in Airbnb listings and crime to be nearly if not perfectly concurrent. In contrast, if an abundance of listings is undermining the social organization of the community and its natural ability to prevent and discourage crime, then there would be a more gradual erosion. In this case we would expect to see any effect of Airbnb listings on crime be lagged, increasing over time. The second consideration regards the way we measure the presence of Airbnb in a community. If tourists themselves are perpetrating crime and disorder, the focus should be on the quantity of tourists listings are bringing to the neighborhood, rather than the listings themselves. Alternatively, if the concern is transience, we will want to focus on the quantity of listings. We describe our measurement strategy for each in the next subsection.

Previous evidence and the current study

Whether those staying in Airbnb listings attract or perpetrate crime, or, alternatively, a large number of Airbnb listings undermine the social organization of the community, it has become a common perception that the rise of short-term rentals in a residential neighborhood will be accompanied by a rise in crime. This notion has only been examined by two empirical studies, though neither directly tests this causal claim. One study looking at the association only examined the correlation between crime and Airbnb listings and did not control for other neighborhood characteristics nor the temporal relationship between the arrival of Airbnb listings and shifts in the crime rate [4]. Another paper used policy implementations as a natural experiment, but analyzed only at the citywide scale [27].

Here we fill this gap in the literature by testing whether the presence of Airbnb leads to increases in crime across the neighborhoods of Boston, MA. As noted above, we use two measurement strategies to study the link between short-term rentals and crime. First, we quantify the influx of Airbnb-related tourists by tabulating reviews for Airbnb listings in the neighborhood. The measure of *usage* is drawn from [29]. Our second strategy focuses on the listings in a neighborhood, for which we employ two such measures. The more common measure in the literature is what we refer to as *density*, which is the number of listings divided by the total number of households. This measure is one step forward to what we expect to impact neighborhood social organization. However, it does not take into account the geographic distribution of these listings. To illustrate, consider two neighborhoods with the same number of households and the same number of Airbnb listings. In one, the listings are distributed throughout the neighborhood, in the other, they are concentrated in two condo buildings that have been effectively converted into unofficial hotels. It would seem likely that the former would have a more pernicious impact on the neighborhood's social networks by undermining relationships more broadly, whereas the impacts of the latter would be more contained at a handful of properties. Thus, we also create measure we refer to as *penetration*, which is defined as the proportion of buildings in the neighborhood with Airbnb listings. This better captures how Airbnb listings are distributed through the community, potentially better capturing how likely they are to impact the social organization. As described above, an association between usage and crime would be evidence that tourists are generating or attracting crime and disorder themselves. Meanwhile, if penetration or density are predictive of crime and disorder and usage is not, there is a stronger case that an abundance of listings in a neighborhood are undermining the social organization.

We examine the relationships between the measures of Airbnb usage, penetration, and density and three types of social disorder and crime: public social disorder (e.g., drunkenness, loitering), private conflict (e.g., landlord-tenant disputes, vandalism), and violence (e.g., fights), all per 1,000 persons in a neighborhood. This allows us to examine in a nuanced way the nature of the impact that short-term rentals might have on neighborhoods. We use fixed effects models to conduct these analyses, comparing

the relationships between these variables from 2011–2017, as Airbnb went from a minor to more major factor in Boston neighborhoods. As noted above, the two mechanisms by which short-term rentals might impact neighborhoods–either the tourists generating or attracting crime themselves, or the prevalence of listings eroding the social organization–would operate on different time scales. If the presence of tourists is responsible for crime, we would anticipate the impacts to occur in the same year as the increase of usage. The erosion of the social organization would take more time to result in elevated crime, lagging increases in listings by one or more years. Thus, we run the difference-in-difference fixed effects models with the Airbnb measures as measured concurrently with the crime outcome measures, with a one-year lag between the Airbnb measures and crime and disorder, and then with a two-year lag. Importantly, this work adds a rigorous empirical perspective to the ongoing debate regarding the negative externalities of short-term rental platforms such as Airbnb.

Data and methods

Measuring Airbnb presence

We use the period between 2011 to 2018 to quantify the presence of Airbnb in Boston. To estimate the presence of Airbnb in a neighborhood, we obtained datasets from InsideAirbnb.com, an independent, non-commercial website that scrapes and publishes longitudinal Airbnb listings' records for cities across the world for the purpose of research. InsideAirbnb.com has published these data annually since 2015, but Airbnb entered Boston in 2009. In order to overcome this limitation, we leveraged the "host since" field, which indicates the date a property became an Airbnb listing, to estimate which Airbnb listings were present in each year 2011–2014. Koster et al. (2018) took a similar approach using the date of a listing's first review, but we found that the "host since" variable more consistently had a value and would be more precise in any case. InsideAirbnb.com also publishes a separate dataset on the reviews received by each listing along with the listings data [28]. The reviews datasets have been used to estimate the amount of tourists brought by Airbnb services [29, 30]. We note that although we consider the start year of our study as 2011, there were still some Airbnb units in Boston as early as 2008 that are not considered in this study. This should not impact the results given the limited nature of this presence; however it might have implications for testing pre-treatment parallel trends in the DID analysis as we will explain in the *Robustness Check* Section.

Following the practice of Horn & Merante (2017), we use census tracts to approximate neighborhoods (avg. population = 4,000; 168 with meaningful population in Boston). We then linked listings to the containing census tract, allowing us to calculate neighborhood-level measures of Airbnb's prevalence. Though listings are not necessarily geographically precise, InsideAirbnb.com indicates that listings are 0–450 feet from the actual address. Meanwhile, census tracts cover .5 mile radius, meaning that most listings should fall in the appropriate census tract.

We use three measures to quantify the level of Airbnb presence in each tract. Specifically, these aim to operationalize the quantity of listings and the quantity of tourists they bring to the neighborhood. For listings, our primary measure *penetration* sought to capture how they were spatially distributed across the neighborhoods. It was calculated as the number of unique addresses with listings divided by the number of parcels (lots that contain one or more units, per the City of Boston's Assessing Department) in the census tract, thereby approximating the number of buildings with at least one Airbnb listing. This might be a more appropriate proxy, for instance, when Airbnb listings are many in a neighborhood but concentrated in one or two condo buildings, thus geographically constraining their overall impact. For robustness, we also measured *density*, or the ratio of Airbnb listings to housing units. This measurement has been widely adopted in previous studies on Airbnb [31, 32]. The quantity of tourists attracted was operationalized as *usage*, calculated as the number of reviews divided by housing units in a census tract as recommended by Schild (2019) [29].

Using 911 call data to measure crime activity

We utilized three variables measuring crime and disorder developed by the Boston Area Research Initiative from 911 dispatches from 2011–2018. These measures were calculated as the rate per 1,000 residents of events falling into a pre-determined set of categories from the dispatches. They include: public social disorder, including intoxicated individuals, lewdness, and drunken disturbances; private conflict includes issues like landlord/tenant trouble, breaking and entering, and vandalism; and violence includes events like armed robberies, assaults, a person with knife, and fights.

Estimation strategies

The key research question we ask in this study is whether the proliferation of Airbnb in a neighborhood lead to higher level of crime events in that neighborhood. The panel dataset we assembled at the census tract-level allows us to employ a generalized multiple time period, multiple group Difference-in-Difference (DID) design, in which Airbnb presence acts as a continuous "treatment", predicting changes in crime in a neighborhood.

The estimated equation is:

$$Y_{i,t} = \alpha + \gamma Airbnb_{i,t-\tau} + \delta X_{i,t} + \eta_i + \beta_t + \varepsilon_{i,t}$$

(1)

where *i* represents the census tract, *t* represents the year, and τ is used to introduce time lag and lead for the treatment variable. $Y_{i,t}$ is the crime level measured by the number of private conflict, social disorder, and violence events per 1,000 people, $X_{i,t}$ is a vector of time-variant neighborhood-level controls, and γ is the estimated causal effect of Airbnb presence. η and β are the neighborhood (tract) and year fixed effects, respectively, capturing both time-invariant characteristics of tracts and spatially-invariant characteristics of years (for example, a city-wide increase in Airbnb prevalence or crime level). We report the results based on using *income* as the main tract-level control variable, although we test a number of other controls for robustness test. $Income_{i,t}$ measures the median household income (drawn from the American Community Survey's five year estimations at the census tract-level, appropriate to the year in question. We estimate Eq (1) using deviation from mean approach, and standard errors are clustered at the tract level.

To further test the direction of causality for the results, we use a lag/lead analysis in the spirit of Granger [33, 34]. This method is used when the sample includes multiple years and uses both lead and lagged versions of the treatment variable (τ can be both positive and negative).

Results

Descriptive analyses

Before testing our main question, it is useful to examine the growth and distribution of Airbnb activities in Boston. As depicted in Fig 1, Airbnb had limited presence in Boston at first, with a negligible number of listings and reviews before 2014. There was rapid growth, however, between 2014 and 2018, over which time the number of listings more than doubled from 2,558 to 6,014. There were also nearly 80,000 total reviews by 2018. That is not to say, however, that this growth was uniform across neighborhoods. Certain census tracts were the first to have a measurable presence of Airbnb and then proceeded to have high levels of Airbnb listings. Fig 2 shows how Airbnb services increased from 2010 to 2018 and across census tracts in Boston. We focus on two main measures to capture Airbnb activities: penetration, or the proportion of buildings with at least one listing; and usage, or the number of reviews per housing unit in the neighborhood. As indicated in Fig 2a, by 2018, the tracts with the highest penetration of Airbnb had listings in as many as 40% of buildings. Likewise, the neighborhoods with the highest level of usage had as many as one review per housing unit. In contrast, in many other tracts the presence of Airbnb was limited or even absent throughout the study period. Meanwhile a handful of tracts started with very low Airbnb presence and then witnessed rapid growth of Airbnb-related activities.
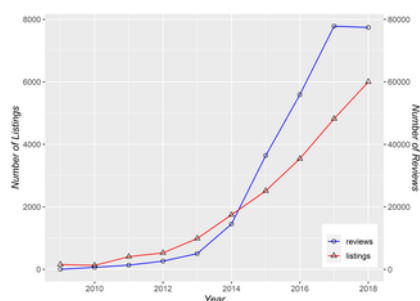

Fig 1. Airbnb's expansion in Boston.
The number of Airbnb listings and reviews in Boston between 2009 and 2018.
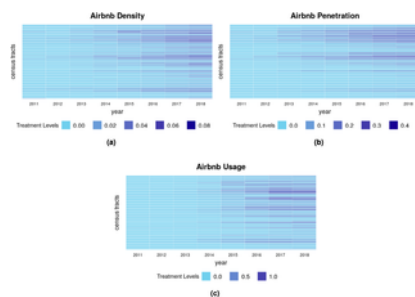https://doi.org/10.1371/journal.pone.0253315.g001

Fig 2. Airbnb's presence in Boston.
(a) Airbnb density, (b) Airbnb penetration, and (c) Airbnb usage. Each row represents a census tract from 2011 to 2018. The darker the color, the higher the Airbnb presence. Tracts are in the same position in each panel, meaning we can compare panels to confirm that most tracts with high level of presence on one measure scored similarly on the other measures.
https://doi.org/10.1371/journal.pone.0253315.g002

Fig 3 maps the spatial distributions of the three measures of Airbnb supply over time. For Airbnb density (Fig 3a), we see that census tracts in the urban center (northeast on the map) show relatively high Airbnb presence from the beginning, but that in recent years the tracts with the highest level of Airbnb penetration emanate further out into surrounding, more residential neighborhoods.
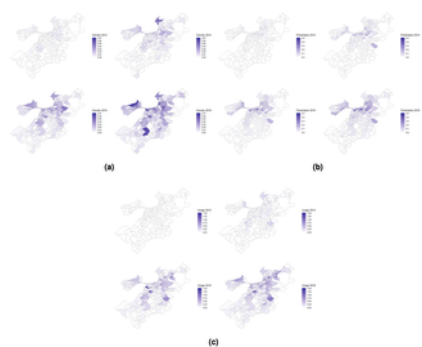
Fig 3. Evolution of spatial distributions of Airbnb in Boston.
(a) Airbnb density, (b) Airbnb penetration, and (c) Airbnb usage in 2012, 2014, 2016, and 2018.
https://doi.org/10.1371/journal.pone.0253315.g003

The concurrent and lagged impacts of Airbnb on crime

We use difference-in-difference models (Eq (1)) to test whether a rise in the prevalence of Airbnb in a census tract in one year predicts increases in crime and disorder in the following year. We focus on two ways in which short-term rentals can impact a neighborhood. The first is through two measures of the quantity of listings in a neighborhood: the penetration of Airbnb, measured as the proportion of buildings with at least one listing; and the density of Airbnb, or the ratio of listings to total households. We believe the latter is the stronger measure for our purposes (see Introduction for more), but include both as a check. The second strategy is to capture the amount of tourists brought in by listings via the measurement of usage, or the ratio of user reviews to households. The model outcomes include three measures of crime and disorder: private conflict between people who live together, like landlord-tenant disputes; public social disorder, like drunkenness and noise complaints; and public violence, including fights (see Methods). The models control for tract-level and year fixed effects. In order to make the parameter estimates that follow more interpretable, we note that the average census tract in the average year experienced 11.32 events of private conflict, 7.68 events of public social disorder, and 28.58 events of public violence per 1,000 residents.

We begin by testing the relationship between Airbnb prevalence and crime in the same year (See Table 1). We see only one significant effect, which is Airbnb penetration predicting higher levels of violent crime ($\beta = 0.328$, $p < 0.05$). Otherwise, density and usage were not associated with any forms of crime, nor were social disorder or private conflict associated with any of the Airbnb measures.

Table 1. Same-year DID regressions on social disorder and crime.
https://doi.org/10.1371/journal.pone.0253315.t001

We then compare these results to models that test the relationship between Airbnb measures from the previous year on crime (i.e., one-year lags). In these models, neighborhoods with a higher level of Airbnb penetration saw rises in violent crime in the following year ($\beta = 0.546$, $p < 0.0001$), and notably to a greater extent than the concurrent measure of penetration. There was still no corresponding effect on public social disorder or private conflict, however. Airbnb density in the previous year was also associated with higher levels of violent crime, albeit at a lower significance, and thus magnitude, relative to penetration (($\beta = 1.407$, $p < 0.05$). Airbnb usage had no effect on any of the three measures in the following year (Table 2).

Table 2. One-year lagged independent variables.
https://doi.org/10.1371/journal.pone.0253315.t002

If the increase in crime rate is driven by changes in social organization, we expect to see the effect to persists and possibly strengthen over a more extended period of time. To further test the validity of this mechanism,we repeated the previous analysis, this time with a two-year lag on independent variables.

Results of the two-year lagged analysis are in general agreement with those with one-year lag in terms of the impact of Airbnb penetration on events of violence. Moreover, Airbnb penetration not only predicted increased violence at this time scale, but also showed a moderate impact on events of private conflict ($\beta = 0.097$, $p < 0.05$), an effect that was not present in the one-year lagged analysis. The effects of Airbnb usage and density also concurred with the one-year lagged analysis (Table 3).

Table 3. Two-year lagged independent variables.
https://doi.org/10.1371/journal.pone.0253315.t003

Robustness checks

The intent here has been to test whether Airbnb activity in a neighborhood impacts crime, but there is an alternative reverse effect interpretation to our results that need to be considered: That crime leads to Airbnb listings, possibly by deterring property owners from renting long-term or living there themselves–could be true. Rejecting the reverse causality in the DID models is often carried out by testing the pre-treatment parallel trends. However, directly applying the standard tests for parallel trends, such as event-study analysis, is not possible here, because on the one hand, the treatment variable (Airbnb Presence) is both continuous and staggered which makes event-study analysis less reliable and difficult to interpret. On the other hand, our data starts from 2011 where Airbnb had already been present in many neighborhoods (See the Section on *Measuring Airbnb Presence*), preventing us from reliably transforming the treatment into a binary variable that could be used in subsequent event-study analysis (similar to [35]). Because of these reasons and to confirm the direction of causality, we took two additional steps. In the first step, we reran our models with the Airbnb measures from one and two years after the year of the crime measures (See the Methods section.). This method follows the logic of Granger Causality and was popularized by [36] in assessing the impact of unjust dismissal doctrine on outsourcing. Moreover, a recent work by Schmidheiny and Siegloch [37] shows that the event-study analysis and a version of the lag/lead model are equivalent for the case of DID with discrete treatments.

Fig 4 shows a graphical representation of the DID regression coefficients and associated error bars for violent crimes for different time lags(-2 years to +2 years) of Airbnb penetration measure(Full results reported in the SI). The coefficient for two years prior to the treatment (the two-year lead) saw no significant effect on crime, suggesting that with sufficient lead time, these results are consistent with an interpretation of Airbnb's presence impacting crime and not the reverse.
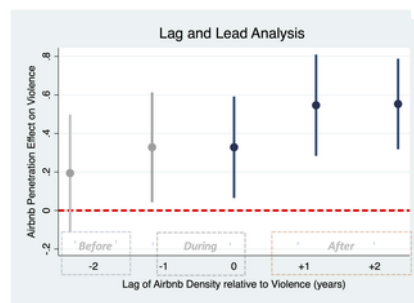
Fig 4. Result of the lag and lead analysis.
The figure shows the DID regression coefficients and the corresponding standard errors for the effect of Airbnb density on violence, before, during, and after the effect. Results confirm the direction of causality from Airbnb penetration on violent crimes and show that Airbnb penetration has a significant positive effect on violence, especially with a time delay, but the opposite is not true, as evident from the non-significant effect of a 2-year lead in Airbnb penetration on criminal activities. Complete results are presented in the SI document.
https://doi.org/10.1371/journal.pone.0253315.g004

The one-year lead model still showed an effect of Airbnb penetration on violence, though attenuated relative. This is not entirely surprising since first of all, the treatment variable is continuous, which—unlike [36]—makes it challenging to clearly separate the treatment year from the immediate prior year (the year with one year lead). Moreover, that crime data are aggregated at a yearly basis and our model cannot differentiate between criminal activities at the beginning and end of the year. These reason suggests that due to the resolution and continuous nature of the data, the one year lead is colinear with the zero lead year and can be interpreted, in part, as a period *during* treatment, as marked in the figure. Thus, we need to consider the coefficient for two years prior to the treatment to be able to reject the possibility of reverse causality.

A second and related concern could be the potential bias due to omitted variables. Though the DID models control for the initial conditions of neighborhoods, they do not necessarily control for trends in these variables that parallel the increases in both Airbnb presence and crime. For example, there is some evidence that gentrifying neighborhoods experience increases in certain types of crime [38], and Airbnb listings have also been associated with gentrification [39]. To address this concern and as the second robustness check steps, we reran the models incorporating shifts in four demographic factors–percentage Black residents, percentage Hispanic residents, median income, and homeownership rate–that are often correlated with crime (and are in our data) or believed to be correlated with short-term rentals (e.g., resident-owners are less likely to put their homes up for short-term rental on a regular basis as they live there). We did this by assigning indicators from American Community Survey's five-year estimates for 2009–2013 to data for 2011–2013, and estimates for 2014–2018 to data for 2014–2017. This is consistent with guidance to not include overlapping estimates in a single analysis [40]. These models did not impact any of the significant effects from the original set of models, indicating our findings were robust to shifts in demographics.

Discussion and conclusion

This study tested the hypothesis that the arrival and growth of Airbnb, or home-sharing platforms in general, may increase crime and disorder in neighborhoods, focusing specifically on private conflict, public social disorder, and violence. We find that the answer is rather nuanced. Airbnb prevalence in a neighborhood appears to be associated with increases in violence, but not with public social disorder or private conflict. Interestingly, the effect on violence was only consistent visible for the measure of Airbnb penetration–or the extent to which buildings in the neighborhood have one or more listings (and for the measure of density, or the listings per household in the two-year lags). It was never present for overall usage, or the estimated quantity of Airbnb guests. Further, the effect of penetration on violence appears to emerge and strengthen over multiple years.

The specific findings suggest that the impacts of short-term rentals on crime are not a consequence of attracting tourists themselves. Instead, the results point to the possibility that the large-scale conversion of housing units into short-term rentals undermines a neighborhood's social organization, and in turn its natural ability of a neighborhood to counteract and discourage crime, specifically violent crime. Further, the lagged effects suggest a long-term erosion of the social organization, which would stand in contrast to the more immediate impacts that the presence of tourists would be expected to have. We of course have not directly tested whether social organization is indeed the intervening variable, but it seems clear that the issue is not the tourists themselves but something about how the extreme transience of a short-term rental unit fails to contribute to critical neighborhood social dynamics. We do note that the effects were exclusively on public violence, apart from penetration predicting higher private conflict in the two-year lag. This observation might be for a few reasons. First, social organization is often argued to be particularly important for managing behaviors in public spaces relative to private ones [18]. In addition, public social disorder as measured here, which includes public drunkenness, panhandling, and loitering, is heavily concentrated in Boston's commercial districts. Thus, such events may be unlikely in residential neighborhoods even with the erosion of social organization. The lack of effects on social disorder, especially drunkenness, might also be taken as additional evidence that tourists staying in short-term rentals are not systematically bringing nuisances to the neighborhood.

The results have important practical implications. To our knowledge, this paper is the first study to robustly test this particular externality of Airbnb at the neighborhood level. Airbnb-related crimes are viewed as a possible consequence of the home-sharing platform because the costs of these incidents are not addressed by the transactions between Airbnb hosts and guests. Instead, these costs are shouldered by increased expenditures for law enforcement and disturbances to neighbors. It is striking to see that the issue is not the visitors themselves but the conversion of units into short-term rentals. In a certain light, this observation is analogous to the effect of Airbnb on housing prices [31, 41–43]. In the one case, Airbnb has removed material capital from the market, raising prices for renters; in the other, Airbnb removes social capital from the neighborhood in the form of stable households, weakening the associated community dynamics.

The apparent unimportance of the tourists themselves might come as something of a surprise given the conceptual and empirical support for the impacts of tourism on crime. It suggests multiple potential explanations. First, although Airbnb has seen notable growth, it might not bring a sufficient quantity of tourists to a neighborhood to have a sustained impact. If there are only a handful of tourists in a neighborhood, the opportunity might not be rich enough to attract predatory crime. Given that we do not expect that other cities have markedly higher Airbnb presence than Boston, we believe this interpretation is extensible to other locales. Second, Airbnb travelers may behave differently in "true" tourist areas than when in the residential neighborhood they are staying in, which in turn could mean that they are less likely to be disorderly or to call attention to themselves as suitable targets.

We note two limitations to our research that call for future studies. First, we have tested this hypothesis in a single city, owing to the availability of both Airbnb listings and 911 dispatches for Boston. Future studies should replicate this analysis in other cities, especially those of different sizes or demographic makeup. Second, we examined a single, hypothesized negative externality of short-term rentals. It does not on its own tell the whole story. Airbnb might have other impacts on neighborhoods–both good and bad. These other relationships require further empirical investigation. Currently, a number of papers have explored how urban planners and policy-makers could respond to potential externalities imposed by Airbnb on urban neighborhoods [44–46], and such efforts will be better informed as we better understand the multifaceted impacts Airbnb can have.

Supporting information

S1 File.
https://doi.org/10.1371/journal.pone.0253315.s001
(PDF)

Acknowledgments

References

1. Shapley L. S. & Shubik M. On the core of an economic system with externalities. *The American Economic Review* 59, 678–684, https://www.jstor.org/stable/1813240 (1969).
   View Article   •   Google Scholar

2. Walker, R. Airbnb pits neighbor against neighbor in tourist-friendly new orleans. *The New York Times* http://nyti.ms/21QHSYv (2016).

3. Brown, K. V. How criminals use uber, tinder and airbnb. *Splinter*. https://splinternews.com/how-criminals-use-uber-tinder-and-airbnb-1793853427 (2015).

4. Xu Y.-H., Pennington-Gray L. & Kim J. The sharing economy: a geographically weighted regression approach to examine crime and the shared lodging sector. *Journal of travel research* 58, 1193–1208, (2019).
   View Article   •   Google Scholar

5. Cohen L. E. & Felson M. Social change and crime rate trends: A routine activity approach. *American sociological review* 588–608, (1979).
   View Article   •   Google Scholar

6. Ryan C. Crime, violence, terrorism and tourism: an accidental or intrinsic relationship? *Tourism Management* 14, 173–183, (1993).
   View Article   •   Google Scholar

7. Brunt P., Mawby R. & Hambly Z. Tourist victimisation and the fear of crime on holiday. *Tourism Management* 21, 417–424, (2000).
   View Article   •   Google Scholar

8. Biagi B. & Detotto C. Crime as tourism externality. *Regional Studies* 48, 693–709, (2014).
   View Article   •   Google Scholar

9. De Albuquerque K. & McElroy J. Tourism and crime in the caribbean. Annals of tourism research 26, 968–984, (1999).
   View Article   •   Google Scholar

10. Stults B. J. & Hasbrouck M. The effect of commuting on city-level crime rates. *Journal of Quantitative Criminology* 31, 331–350, (2015).
    View Article   •   Google Scholar

11. Farley J. E. Suburbanization and central-city crime rates: New evidence and a reinterpretation. *American journal of sociology* 93, 688–700, (1987).
    View Article   •   Google Scholar

12. Schiebler S. A., Crotts J. C., Hollinger R. C. et al. Florida tourists' vulnerability to crime. *Tourism, crime and international security issues* 37–50, https://popcenter.asu.edu/sites/default/files/problems/crimes_against_tourists/PDFs/Schiebler_Crotts_&Hollinger_1996.pdf (1996).

13. Harper D. W Jr. et al. Comparing tourists crime victimization. *Annals of Tourism Research* 28, 1053–1056, (2001).
    View Article   •   Google Scholar

14. Boivin R. & Felson M. Crimes by visitors versus crimes by residents: The influence of visitor inflows. *Journal of Quantitative Criminology* 34, 465–480, (2018).
    View Article   •   Google Scholar

15. Caplan J. M. & Kennedy L. W. *Risk terrain modeling compendium* (Rutgers Center on Public Security, 2011).

16. Sampson R. J. & Groves W. B. Community structure and crime: Testing social-disorganization theory. *American journal of sociology* 94, 774–802 (1989).
    View Article   •   Google Scholar

17. Kawachi I., Kennedy B. P. & Wilkinson R. G. Crime: social disorganization and relative deprivation. *Social science & medicine* 48, 719–731 (1999).
    View Article   •   Google Scholar

18. Sampson R. J. *Great American city: Chicago and the enduring neighborhood effect* (University of Chicago Press, 2012).

19. Coleman J. S. Social capital in the creation of human capital. *American journal of sociology* 94, S95–S120 (1988).
    View Article   •   Google Scholar

20. Kennedy B. P., Kawachi I., Prothrow-Stith D., Lochner K. & Gupta V. Social capital, income inequality, and firearm violent crime. *Social science & medicine* 47, 7–17 (1998). pmid:9683374
    View Article • PubMed/NCBI • Google Scholar

21. Hirschfield A. & Bowers K. J. The effect of social cohesion on levels of recorded crime in disadvantaged areas. *Urban Studies* 34, 1275–1295 (1997).
    View Article • Google Scholar

22. Gianetto D. A. & Heydari B. Network modularity is essential for evolution of cooperation under uncertainty. *Scientific reports* 5, 9340 (2015). pmid:25849737
    View Article • PubMed/NCBI • Google Scholar

23. Mosleh M. & Heydari B. Fair topologies: Community structures and network hubs drive emergence of fairness norms. *Scientific reports* 7, 1–9 (2017). pmid:28578403
    View Article • PubMed/NCBI • Google Scholar

24. Heydari B., Heydari P. & Mosleh M. Not all bridges connect: integration in multi-community networks. *The Journal of Mathematical Sociology* 1–22 (2019).
    View Article • Google Scholar

25. Gianetto D. A. & Heydari B. Sparse cliques trump scale-free networks in coordination and competition. *Scientific reports* 6, 21870 (2016). pmid:26899456
    View Article • PubMed/NCBI • Google Scholar

26. Heydari B., Mosleh M. & Dalili K. Efficient network structures with separable heterogeneous connection costs. *Economics Letters* 134, 82–85 (2015).
    View Article • Google Scholar

27. Han, W. & Wang, X. Does home sharing impact crime rate? a tale of two cities. https://aisel.aisnet.org/icis2019/sustainable_is/sustainable_is/6/ (2019).

28. Koster H., van Ommeren J. & Volkhausen N. Short-term rentals and the housing market: Quasi-experimental evidence from airbnb in los angeles. (2018).
    View Article • Google Scholar

29. Schild, J. *Unintended Consequences of the Sharing Economy: Airbnb's Role in Tourism Gentrification*. Ph.D. thesis, Indiana University (2019).

30. Alyakoob, M. & Rahman, M. S. Shared prosperity (or lack thereof) in the sharing economy. *Available at SSRN 3180278* https://dx.doi.org/10.2139/ssrn.3180278 (2019).

31. Horn K. & Merante M. Is home sharing driving up rents? evidence from airbnb in boston. *Journal of Housing Economics* 38, 14–24, (2017).
    View Article • Google Scholar

32. Wegmann J. & Jiao J. Taming airbnb: Toward guiding principles for local regulation of urban vacation rentals based on empirical results from five us cities. *Land Use Policy* 69, 494–501, (2017).
    View Article • Google Scholar

33. Angrist J. D. & Pischke J.-S. *Mostly harmless econometrics: An empiricist's companion* (Princeton university press, 2008).

34. Granger C. W. Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: journal of the Econometric Society* 424–438 (1969).
    View Article • Google Scholar

35. Abouk R. & Heydari B. The immediate effect of covid-19 policies on social-distancing behavior in the united states. *Public Health Reports* 136, 245–252 (2021). pmid:33400622
    View Article • PubMed/NCBI • Google Scholar

36. Autor D. H. Outsourcing at will: The contribution of unjust dismissal doctrine to the growth of employment outsourcing. *Journal of labor economics* 21, 1–42 (2003).
    View Article • Google Scholar

37. Schmidheiny, K. & Siegloch, S. On event study designs and distributed-lag models: Equivalence, generalization and practical implications. (2019).

38. Papachristos Andrew V. S C. M. S. M. L., & Fugiero M. A. More coffee, less crime? the relationship between gentrification and neighborhood crime rates in chicago, 1991 to 2005. *City Community* 10, 215–240 (2011).
    View Article • Google Scholar

39. Wachsmuth D. & Weisler A. Airbnb and the rent gap: gentrification through the sharing economy. *Environment and Planning A: Economy and Space* 50, 1147–1170 (2018).
    View Article • Google Scholar

40. on the Functionality, P., Usability of Data from the American Community Survey, Citro C. F. & Kalton G. *Using the American Community Survey: benefits and challenges* (National Research Council, 2007).

41. Sheppard, S., Udell, A. et al. Do airbnb properties affect house prices. *Williams College Department of Economics Working Papers* 3 (2016).

42. Segú, M. et al. Do short-term rent platforms affect rents? evidence from airbnb in barcelona. Tech. Rep., University Library of Munich, Germany (2018).

43. Barron K., Kung E. & Proserpio D. The sharing economy and housing affordability: Evidence from Airbnb. *SSRN Electronic Journal* (2018).
    View Article   •   Google Scholar

44. Gurran N. & Phibbs P. When tourists move in: how should urban planners respond to airbnb? *Journal of the American planning association* 83, 80–92, (2017).
    View Article   •   Google Scholar

45. Espinosa T. P. The cost of sharing and the common law: How to address the negative externalities of home-sharing. *Chap. L. Rev.* 19, 597, https://heinonline.org/HOL/LandingPage?handle=hein.journals/chlr19&div=30&id=&page= (2016).
    View Article   •   Google Scholar

46. Nieuwland S. & van Melik R. Regulating airbnb: how cities deal with perceived negative externalities of short-term rentals. *Current Issues in Tourism* 1–15, https://doi.org/10.1080/13683500.2018.1504899 (2018).
    View Article   •   Google Scholar

The economic costs and benefits of Airbnb

No reason for local policymakers to let Airbnb bypass tax or regulatory obligations

Report • By Josh Bivens • January 30, 2019

Summary

"The sharing economy" refers to a constellation of (mostly) Silicon Valley–based companies that use the internet as their primary interface with consumers as they sell or rent services. Because this term is "vague and may be a marketing strategy" (AP 2019), we refer to these firms less poetically but more precisely as "internet-based service firms" (IBSFs).

Economic policy discussions about IBSFs have become quite heated and are too often engaged at high levels of abstraction. To their proponents, IBSFs are using technological advances to bring needed innovation to stagnant sectors of the economy, increasing the quality of goods and services, and providing typical American families with more options for earning income; these features are often cited as reasons why IBSFs should be excused from the rules and regulations applying to their more traditional competitors. To skeptics, IBSFs mostly represent attempts by rich capital owners and venture capitalists to profit by flouting regulations and disguising their actions as innovation.

The debates about whether and how to regulate IBSFs often involve theories about their economic costs and benefits. This report aims to inform the debate by testing those theories. Specifically, it assesses the potential economic costs and benefits of the expansion of one of the most well-known of the IBSFs: the rental business Airbnb.

Airbnb, founded in 2008, makes money by charging guests and hosts for short-term rental stays in private homes or apartments booked through the Airbnb website. It started in prototype in San Francisco and expanded rapidly, and is now operating in hundreds of cities around the world. Airbnb is frequently depicted as a boon for travelers looking for lower-cost or nontraditional accommodations, and for homeowners looking to expand their income stream. But in many local markets, the arrival and expansion of Airbnb is raising questions about its potential negative impacts on local housing costs, quality of life in residential neighborhoods, employment quality in the hospitality industry, and local governments' ability to

enforce municipal codes and collect appropriate taxes.

In our cost-benefit analysis, we find:

- **The economic costs Airbnb imposes likely outweigh the benefits.** While the introduction and expansion of Airbnb into U.S. cities and cities around the world carries large potential economic benefits and costs, the costs to renters and local jurisdictions likely exceed the benefits to travelers and property owners.

- **Airbnb might, as claimed, suppress the growth of travel accommodation costs, but these costs are not a first-order problem for American families.** The largest and best-documented potential benefit of Airbnb expansion is the increased supply of travel accommodations, which could benefit travelers by making travel more affordable. There is evidence that Airbnb increases the supply of short-term travel accommodations and slightly lowers prices. But there is little evidence that the high price of travel accommodations is a pressing economic problem in the United States: The price of travel accommodations in the U.S. has not risen particularly fast in recent years, nor are travel costs a significant share of American family budgets.

- **Rising housing costs are a key problem for American families, and evidence suggests that the presence of Airbnb raises local housing costs.** The largest and best-documented potential cost of Airbnb expansion is the reduced supply of housing as properties shift from serving local residents to serving Airbnb travelers, which hurts local residents by raising housing costs. There is evidence this cost is real:

  - Because housing demand is relatively inelastic (people's demand for somewhere to live doesn't decline when prices increase), even small changes in housing supply (like those caused by converting long-term rental properties to Airbnb units) can cause significant price increases. High-quality studies indicate that Airbnb introduction and expansion in New York City, for example, may have raised average rents by nearly $400 annually for city residents.

  - The rising cost of housing is a key problem for American families. Housing costs have risen significantly faster than overall prices (and the price of short-term travel accommodations) since 2000, and housing accounts for a significant share (more than 15 percent) of overall household consumption expenditures.

- **The potential benefit of increased tourism supporting city economies is much smaller than commonly advertised.** There is little evidence that cities with an increasing supply of short-term Airbnb rental accommodations are seeing a large increase in travelers. Instead, accommodations supplied via Airbnb seem to be a nearly pure substitution for other forms of accommodation. Two surveys indicate that only 2 to 4 percent of those using Airbnb say that they would not have taken the trip were Airbnb rentals unavailable.

  - Studies claiming that Airbnb is supporting a lot of economic activity often vastly overstate the effect because they fail to account for the fact that much of this spending would have been done anyway by travelers staying in hotels or other alternative accommodations absent the Airbnb option.

- **Property owners do benefit from Airbnb's capacity to lower the transaction costs of**

operating short-term rentals, but the beneficiaries are disproportionately white and high-wealth households. Wealth from property ownership is skewed, with higher-wealth and white households holding a disproportionate share of housing wealth overall—and an even more disproportionate share of housing wealth from nonprimary residences because they are much more likely to own nonprimary residential property (such as multi-unit Airbnb rentals).

- **The shift from traditional hotels to Airbnb lodging leads to less-reliable tax payments to cities.** Several large American cities with a large Airbnb presence rely heavily on lodging taxes. Airbnb has largely blocked the ability of these cities to transparently collect lodging taxes on Airbnb rentals that are equivalent to lodging taxes on hotel rooms. One study found that the voluntary agreements Airbnb has struck with state and local governments "[undermine] tax fairness, transparency, and the rule of law."

- **City residents likely suffer when Airbnb circumvents zoning laws that ban lodging businesses from residential neighborhoods.** The status quo of zoning regulations in cities reflects a broad presumption that short-term travelers likely impose greater externalities on long-term residents than do other long-term residents. Externalities are economic costs that are borne by people not directly engaged in a transaction. In the case of neighbors on a street with short-term renters, externalities include noise and stress on neighborhood infrastructure like trash pickup. These externalities are why hotels are clustered away from residential areas. Many Airbnb rental units are in violation of local zoning regulations, and there is the strong possibility that these units are indeed imposing large costs on neighbors.

- **Because Airbnb is clearly a business competing with hotel lodging, it should be subject to the same taxation regime as hotels.** In regard to zoning regulations, there is no empirical evidence that the net benefits of Airbnb introduction and expansion are so large that policymakers should reverse long-standing regulatory decisions simply to accommodate the rise of a single company.

Overview of the economics of Airbnb

Airbnb runs an online marketplace for short-term lodging rentals. It largely does not own dwellings or real estate of its own; instead, it collects fees by acting as a broker between those with dwellings to rent and those looking to book lodging.

The perception that Airbnb tries to foster is that its "hosts" are relatively typical households looking to earn supplementary income by renting out rooms in their homes or by renting out their entire residence when they're away. Critics argue that Airbnb bookings have become increasingly concentrated among a relatively small number of "hosts" that are essentially miniature hotel companies.[1]

Potential economic benefits

At a broad level, the potential economic benefits and costs of Airbnb are relatively straightforward.[2]

The key potential benefit is that property owners can **diversify the potential streams of revenue** they generate from owning homes. Say, for example, that before Airbnb arrived in a city, property owners setting up residential rental properties faced transaction costs so high that it only made economic sense to secure relatively long-term leases. These transaction costs incurred by property owners could include advertising for and screening of tenants and finding alternative accommodations for themselves if they were renting their own dwellings. But if the rise of internet-based service firms reduced these transaction costs and made short-term rentals logistically feasible and affordable for the first time, it could allow these property owners to diversify into short-term rentals as well as long-term rentals.

Another potential benefit is the **increased supply (and variety) of short-term rentals** available to travelers. This increased supply can restrain price growth for short-term rentals and make traveling more affordable.

Finally, one well-advertised potential benefit of Airbnb is the **extra economic activity that might result** if the rise of Airbnb spurs an increase in visitors to a city or town. Besides the income generated by Airbnb property owners, income might be generated by these visitors as they spend money at restaurants or in grocery stores or on other activities.

Potential costs

The single biggest potential cost imposed by Airbnb comes in the form of **higher housing costs for city residents** if enough properties are converted from long-term housing to short-term accommodations. If property owners take dwellings that *were* available for long-term leases and convert them to short-term Airbnb listings, this increases the supply of short-term rentals (hence driving down their price) but decreases the supply of long-term housing, increasing housing costs for city residents. (We refer to all long-term costs of shelter as "housing," including rentals and owners' equivalent rental costs.)

Another large potential city-specific cost of Airbnb expansion is the **loss of tax revenue**. Many cities impose relatively steep taxes on short-term lodging, hoping to obtain revenue from out-of-town travelers to spend on local residents. The most common and straightforward of these revenue raisers is a tax on traditional hotel rooms. If Airbnb expansion comes at the expense of traditional hotels, and if the apparatus for collecting taxes from Airbnb or its hosts is less well-developed than the apparatus for collecting taxes from traditional hotels, this could harm city revenues.

A further potential cost is the **externalities that property rentals (of all kinds) impose** on neighbors, for example, noise and/or use of building facilities. Since hosts are often not on-site with their renters, they do not bear the costs of these externalities and hence may not factor them into rental decisions. Of course, one could argue that such externalities

are also incurred with long-term rentals not arranged through Airbnb. But if the expansion of Airbnb increases total short- and long-term rental activity, or if short-term rentals impose larger externalities than long-term rentals, then Airbnb expansion can increases these externalities.

Finally, if Airbnb expansion comes at the expense of traditional hotels, it could have a **negative impact on employment**. First, since some of the labor of maintaining Airbnb lodgings is performed by the property owners themselves, the shift to Airbnb from traditional hotels would actually reduce employment overall. Second, since the task of cleaning and maintaining rooms and even greeting Airbnb renters is often done by third-party management firms, the shift from the traditional hotel sector to Airbnb rentals could degrade job quality.

The rest of this report evaluates the potential scope of each of these benefits and costs, and ends with an overall assessment of the effect of Airbnb expansion.

Potential benefits of Airbnb introduction and expansion in U.S. cities

This section elaborates on the potential benefits identified in the previous section. For each benefit, it assesses how likely the benefit is to emerge, provides empirical estimates of the magnitude of the benefit, and discusses the likely distribution of the benefit.

Potential benefit one: Property owners can diversify into short-term rentals

The most obvious benefit stemming from the creation and expansion of Airbnb accrues to property owners who have units to rent. Owners of residential property have essentially three options for earning a return on the property: They can live in the residence and hence not have to pay rent elsewhere, they can rent it out to long-term residents, or they can rent it out to short-term visitors.

If the only barrier to renting out residential property to short-term visitors were the associated transaction costs, then in theory the creation and expansion of Airbnb could be reducing these transaction costs and making short-term rental options more viable. It does seem intuitive that transaction costs of screening and booking short-term renters would be higher over the course of a year than such costs for renting to long-term residents (or the costs of maintaining owner-occupied property). However, the potential benefits are only the *difference* between what the property owner earned before the introduction of Airbnb and what the property owners earned from short-term rentals booked through the Airbnb platform.

These potential benefits are likely quite skewed to those with more wealth. While housing is more widely held than most other assets, the total value of housing wealth is (like all wealth) quite concentrated among white and high-income households. Further, because of the myriad benefits of owning one's own residence, it is likely that much of the benefit of Airbnb's introduction and expansion accrues to those with more than one property (one for occupying and one or more for renting).[3] The distribution of property wealth generated by nonprimary residential real estate is even more concentrated than housing wealth overall. **Figure A** shows, by wealth class, the distribution of housing wealth overall and of housing wealth excluding owner-occupied housing.

This figure shows that the potential benefits of Airbnb introduction and expansion to property owners are highly concentrated. To put it simply, any economic occurrence that provides benefits proportional to owning property is one that will grant these benefits disproportionately to the wealthy. In 2016, for example, 60.0 percent of primary housing wealth (housing wealth in households' primary residences) was held by the top 20 percent

Housing wealth—particularly wealth from owning a nonprimary residence—is skewed

Share of total primary and nonprimary household housing wealth in the U.S. economy held by each wealth class, 2016
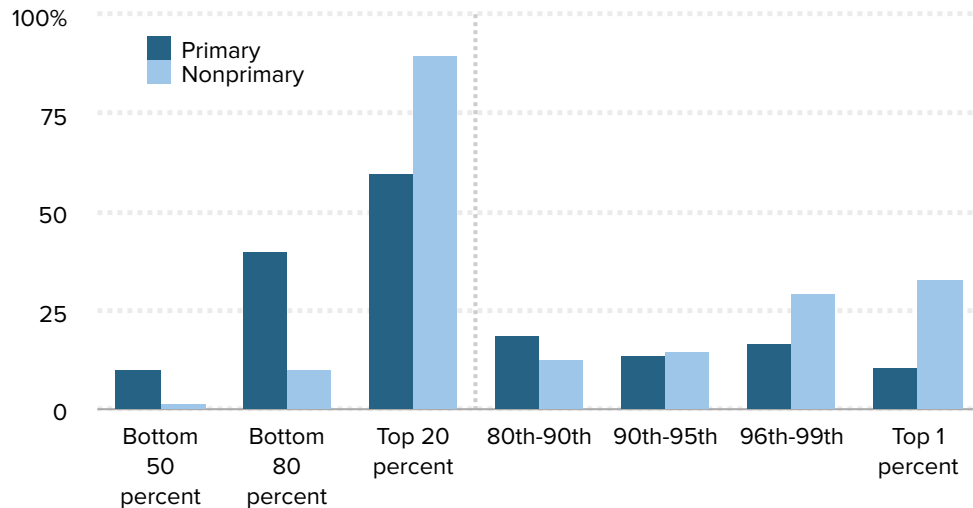
Note: Primary housing wealth is wealth from owner-occupied housing. Nonprimary housing wealth is wealth from nonowner-occupied housing. The wealth classes depicted overlap, with the top 20 percent broken down into households falling within the 80th to 90th, 90th to 95th, and 96th to 99th percentiles.

Source: Author's analysis of microdata from the Federal Reserve Board Survey of Consumer Finances (2016)

Economic Policy Institute

of households. (Not shown in the figure is that this share has increased by 5.4 percentage points since 1989.) As we noted earlier, however, many Airbnb listings are actually owned by households with multiple units to rent. Given this, Figure A also shows the share of housing wealth from nonprimary residences held by various groups. This "nonprimary housing wealth" is far more skewed. For example, the top 20 percent hold 90.1 percent of this type of wealth.

Figure B shows the distribution of housing wealth by race and ethnicity. Across racial groups, more than 80 percent of wealth in one's primary residence was held by white households. African American households held just 6.5 percent of wealth in primary residences, Hispanic households held 6.0 percent of this type of wealth, while households of other races and ethnicities held 6.9 percent. Not shown is the change in the share of wealth in primary residences held by racial and ethnic groups: Primary housing wealth held by nonwhite households has risen a bit (by roughly 6 percentage points) since 1989. As with the distribution by wealth class, the holdings of nonprimary housing wealth by race and ethnicity are again even more skewed, with white households holding more than 86 percent of this type of wealth. African American households hold just 5.0 percent of nonprimary housing wealth, Hispanic households hold 3.6 percent, and households of other races and ethnicities hold 5.2 percent.

White households disproportionately benefit from housing wealth

Share of total primary and nonprimary household housing wealth held, by race and ethnicity

Note: Primary housing wealth is wealth from owner-occupied housing. Nonprimary housing wealth is wealth from nonowner-occupied housing. Hispanic means "Hispanic any race" and the race/ethnicity categories are mutually exclusive.

Source: Author's analysis of microdata from the Federal Reserve Board Survey of Consumer Finances (2016)
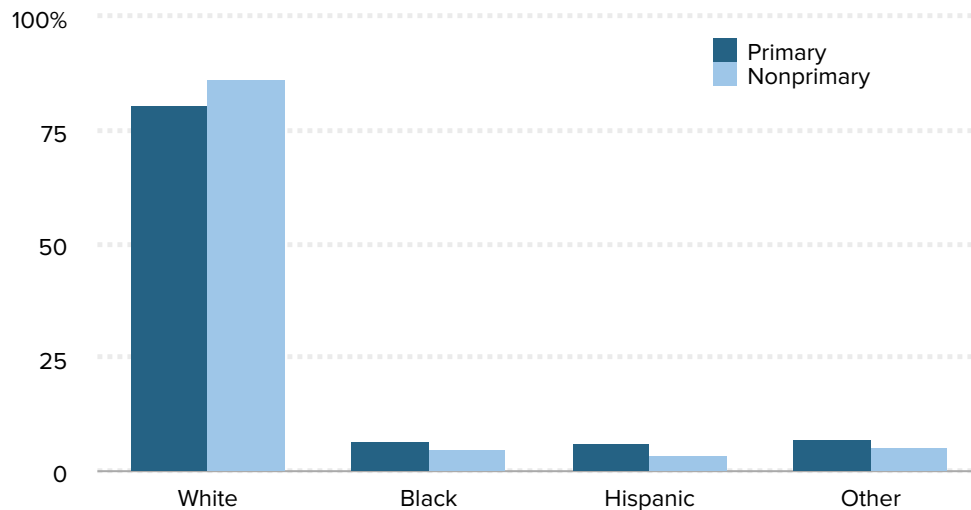
Economic Policy Institute

In short, what Figures A and B show is that because wealth from residential properties that can produce rental income is concentrated among the wealthy and white households, giving property owners the unfettered option to choose Airbnb over long-term rental uses of their property means conferring an enhanced option to predominantly wealthy and white owners of housing wealth. (**Appendix Table 1** provides the same analyses shown in Figures A and B for the years 1989, 1998, and 2007, and for the most recent data year, 2016, as well as the change from 1989 to 2016.)

Finally, while Airbnb might make short-term rentals feasible for property owners by reducing transaction costs through the technological efficiencies provided by Airbnb's internet-based platform, the company might also just make short-term rentals feasible by creating a norm of ignoring regulations that bar short-term rentals. Short-term rentals are effectively banned in many residential neighborhoods in the cities where Airbnb operates, yet they have proliferated after the introduction of Airbnb.[4] The regulations barring or limiting short-term rentals were established to reduce the externalities associated with commercial operations of certain kinds—including hotel operations—in residential neighborhoods. Airbnb's business model appears to depend significantly on skirting these regulations and dodging competition from traditional hotel owners who are prohibited from operating in these same neighborhoods. If the regulations banning short-term rentals are baseless and serve no useful purpose, then subverting them could be seen as a

benefit of Airbnb. But allowing large corporations such as Airbnb to simply ignore regulations—rather than trying to change them through democratic processes—is hardly the basis of sound public policy.

Potential benefit two: Increased options and price competition for travelers' accommodations

Airbnb is essentially a positive supply shock to short-term accommodations. Like all positive supply shocks, it should be expected to lower prices. There is some accumulating evidence that Airbnb does exactly this. Zervas, Proserpio, and Byers (2017) examine the effect of Airbnb expansion across cities in Texas. They find that each 10 percent increase in the size of the Airbnb market results in a 0.4 percent decrease in hotel room revenue. They find that most of this revenue decline is driven by price declines. Evidence of the positive supply shock is particularly evident in the 10 American cities where Airbnb's presence is largest. Dogru, Mody, and Suess (2019) find a negative correlation between Airbnb expansion and hotels' average daily rates in the 10 U.S. cities with the largest Airbnb presence.

Besides cost, the introduction and expansion of Airbnb could improve the perceived quality of accommodations available. There is some limited evidence that this is the case: a survey by doctoral candidate Daniel Adams Guttentag (2016) finds that "convenient location" is one of the top reasons given by Airbnb guests when asked why they chose the service. But the Guttentag 2016 survey also identifies "low cost" as the *single most-identified* reason people give when asked why they chose Airbnb.

However, it should be stressed that this potential benefit of Airbnb introduction and expansion is overwhelmingly a *redistribution* of welfare, not an *increase* in economywide welfare. Very few people have claimed that Airbnb's spread within a given city has led developers to build *more accommodations* in the city overall. Instead, owners or third parties have often turned long-term rental units into short-term lodging via Airbnb.

The question then becomes, "Has this redistribution of potential accommodations from the long-term to the short-term market increased economic welfare overall?" One way that Airbnb could be increasing economic welfare overall is if it were helping travelers deal with rising travel accommodation costs.

By looking at trends in prices and spending in the short-term lodging sector, we can get a commonsense check on whether high prices for short-term travel accommodations are a pressing economic problem for ordinary American households. If the price of short-term travel accommodations were rising rapidly, then presumably an increase in supply that restrained price increases would be valuable (or at least more valuable than if these prices were not showing any particularly trend). The two lines in **Figure C** show changes in the consumer price index for travel accommodations compared with changes in the overall price index for personal consumption expenditures (PCE). According to Figure C, in the 2010s, the price of short-term travel accommodations has grown faster than prices overall only since 2014—this is the same year that ushered in the large-scale expansion of Airbnb.

Figure C

The price of short-term travel accommodations has increased slightly faster than prices overall, but only in recent years

Price indices for short-term travel accommodations and overall personal consumption expenditures (PCE), 2000–2016
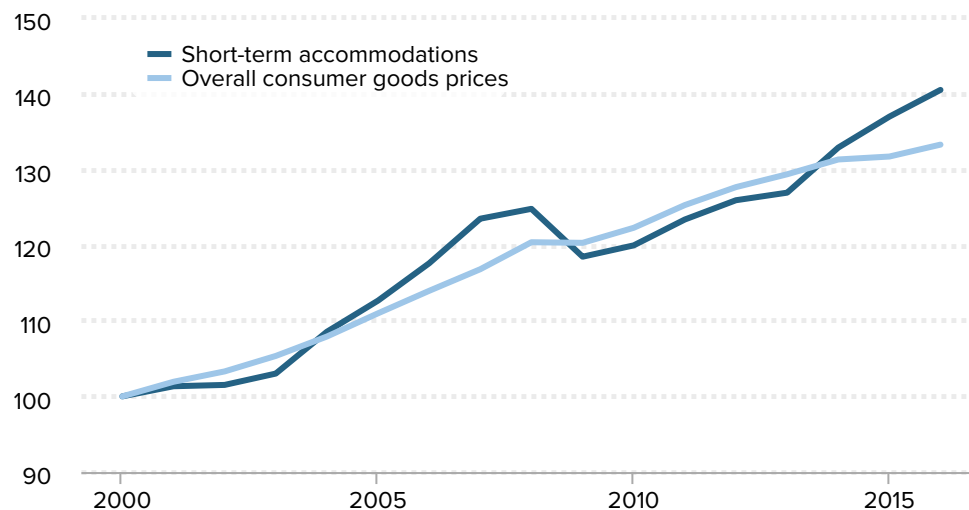
Source: Author's analysis of Bureau of Economic Analysis National Income and Product Accounts (NIPA) Table 2.4.4.

Economic Policy Institute

So it certainly seems that the launch and growth of Airbnb was not solving any preexisting price pressure—because it was operating and expanding well before recent years' price growth. (Further, it is possible that by substituting more strongly for a less-expensive slice of the traditional hotel market—leisure travel as opposed to business travel, for example—that Airbnb introduction might actually be associated with raising measured short-term travel accommodation prices, through a composition effect.)

Potential benefit three: Travelers' spending boosts the economic prospects of cities

The lower prices and greater range of options made available by the introduction and expansion of Airbnb could, in theory, induce a large increase in travel and spark economic growth in destination cities. This is precisely the claim made in a report by NERA Economic Consulting (NERA 2017), which says that Airbnb "supported" 730,000 jobs and $61 billion in output globally, with roughly a quarter of this economic gain occurring in the United States.

To be blunt about these claims, they are flatly implausible. They rest on the assumption that all money spent by those renting Airbnb units is money that would not have been spent in some alternative accommodations had Airbnb not existed.

Say, for example, that guests at Airbnb properties spent $10 million in New York City in 2016, including the money spent at restaurants and theaters and other attractions while visiting the city. The rental payment these guests make is included in the NERA numbers, but is expressed as extra income for Airbnb hosts. NERA then takes this entire $10 million in spending (both nonaccommodation spending by visitors and the extra income going to Airbnb hosts) and runs it through input–output models to generate multiplier effects that yield their final numbers for output and employment supported in each city.

There are a number of problems with the NERA study. First, it is surprisingly opaque. It does not provide overall global and U.S. spending numbers or break these numbers into their components: nonaccommodation spending by Airbnb guests and income generated for Airbnb hosts. It also does not report the assumed size of the multiplier. Rather, it provides final numbers for global and U.S. output and employment that are functions of primary spending flows multiplied by the effects of their input–output model. The study states that it uses the well-known IMPLAN model, but IMPLAN can generate multipliers of varying size: It would be valuable to know just how large NERA is assuming the multiplier effects of this Airbnb-related spending is, just as a plausibility check.

Second, the study seems clearly written to maximize the perceived support Airbnb might provide local economies—both now and into the future. For example, toward the end of the report NERA provides several tables showing projected support for output and employment for years after the study (from 2017 to 2025). These projected *future* contributions to output and employment dwarf the contribution that is apparent in the actual data analyzed by NERA. But these projections rely on overoptimistic assumptions about Airbnb's future growth. For example, NERA forecasts growth of 75 percent for Airbnb arrivals in 2017,[5] but another study (Molla 2017) suggests that these arrivals in fact grew by closer to 25–50 percent, with growth rates particularly slowing in the U.S. and the European Union.[6]

What is by far the most important weakness of the NERA analysis is its reliance on the assumption that *all* spending done by travelers staying at Airbnb properties is spending that would not have been done had Airbnb not existed. The possibility that Airbnb visitors would still have visited a city even if Airbnb units were unavailable—by securing alternative accommodations—is completely ruled out by the NERA analysis. This is obviously an incorrect assumption. For example, it assumes that Airbnb and traditional hotels are not seen as potential substitutes for each other in the minds of travelers. But research has shown that they *are* quite close substitutes. Zervas, Proserpio, and Byers (2017) empirically assess the effect of Airbnb's expansion on the hotel industry in the state of Texas. In their introduction, they write, "Our hypothesis is that some stays with Airbnb serve as a substitute for certain hotel stays, thereby impacting hotel revenue...." In their discussions and conclusions section, they summarize what their empirical investigation has found: "Focusing on the case of Airbnb, a pioneer in shared accommodations, we estimate that its entry into the Texas market has had a quantifiable negative impact on local hotel room revenue." Put simply, this result is completely inconsistent with the assumption that Airbnb has no potential substitutes for those using its services. This in turn means that at least some of the economic activity "supported" in local economies by spending done by Airbnb guests is activity that would have been supported absent Airbnb, likely by these

same guests staying in traditional hotels or other accommodations.

As discussed in a previous section, Guttentag (2016) reports the findings of a survey of Airbnb users. Among other questions, the survey explicitly asks how substitutable travelers find Airbnb lodgings. The precise question is, "Thinking about your most recent Airbnb stay—If Airbnb and other similar person-to-person paid accommodations services (e.g., VRBO) did not exist, what type of accommodation would you have most likely used?" Only 2 percent of Airbnb users responded to this question with the assertion that they would not have taken the trip. The remaining 98 percent identified other lodging possibilities that they would have used. In a similar survey that included some business travelers, Morgan Stanley Research 2017 reports near-identical findings, with between 2 and 4 percent of respondents saying that they would not have undertaken a trip but for the presence of Airbnb.[7] In both the Morgan Stanley Research survey and the Guttentag survey, roughly three-fourths of the respondents indicated that Airbnb was substituting for a traditional hotel.

If the Guttentag 2016 and Morgan Stanley Research 2017 findings are correct, this implies that NERA overstates the support Airbnb provides to local economies by somewhere between 96 and 98 percent. It is possible that some flows of spending might support more local spending when associated with Airbnb instead of traditional hotels—for example, one could argue that income accruing to Airbnb hosts is more likely to be spent locally than money paid to large hotel chains. However, the reverse is also true—for example, Airbnb rentals are far more likely to come equipped with a kitchen, and so Airbnb lodgers might be more likely to eat in rather than patronize restaurants.

Additionally, the local spillover spending associated with Airbnb expansion might not be uniform across neighborhoods. Alyakoob and Rahman (2018) document a modest increase in local restaurant spending associated with expanding Airbnb presence. Essentially, restaurants located away from central hotel cores in cities are unlikely to attract many out-of-town tourists. But if Airbnb penetration in outlying neighborhoods increases, restaurants there might now be able to tap some of this tourist market. Alyakoob and Rahman find that every 2 percent rise in Airbnb activity in a given neighborhood increases restaurant employment in that neighborhood by 3 percent. Crucially, Alyakoob and Rahman make no such calculation for potential employment-depressing effects of restaurants closer to traditional hotels. Further, they find that the boost to restaurant employment given by greater Airbnb activity does not occur in areas with a relatively high share of African American residents.

Finally, given that the overwhelming share of jobs "supported" by Airbnb are jobs that would have been supported by guests in some alternative accommodation, it seems likely that even if there is a slight increase in *spending* associated with a slight (about 2 percent) increase in visitors to a city due to Airbnb, there may well be a decline in *jobs*. We have noted previously that it is quite possible that traditional hotels are a more labor-intensive source of accommodation than are Airbnb listings. If, for example, Airbnb operators employ fewer people to provide cleaning and concierge and security services, then each dollar spent on Airbnb accommodations is likely to support less employment than each dollar spent on traditional hotel accommodations.

We can gauge the employment effect with a hypothetical scenario that assumes that the Guttentag 2016 and Morgan Stanley Research 2017 analyses are correct and that only 2 to 4 percent of the spending supported by Airbnb represents net new spending to a locality. In this case, if even half of the overall spending "supported" by Airbnb is a pure expenditure shift away from traditional hotels, and if traditional hotels are even 5 to 10 percent more labor-intensive than Airbnb units, then introducing Airbnb would actually have a *negative* effect on employment.[8]

Even if one grants that 2 to 4 percent of the output supported by Airbnb in host cities is net new spending, this spending is just a redistribution away from other, presumably less-Airbnb-intensive, localities. Given that Airbnb has tended to grow in already rich and desirable cities, it is unclear why inducing the transfer of even more economic activity away from other cities toward thriving cities would ever be viewed as a positive policy outcome.

In short, the results of the NERA study should be ignored by policymakers seeking an accurate sense of the scale of Airbnb expansion costs and benefits.[9]

Potential costs of Airbnb introduction and expansion

This section elaborates on the potential costs highlighted in the overview section. It assesses the likely outcome of these costs, estimates their empirical heft, and assesses the likely distribution of these costs.

Potential cost one: Long-term renters face rising housing costs

The mirror image of Airbnb's positive supply shock to short-term travel accommodations is its negative supply shock to long-term housing options. Again, none of the literature reviewed in this paper suggests that the introduction and expansion of Airbnb has spurred more residential construction overall, so as more units become available to Airbnb customers, this means that fewer potential housing units are available to long-term renters or owner-occupiers in a city.

Earlier, we saw that price increases in short-term travel accommodations have been in line with overall consumer price increases in recent years, suggesting that there is no obvious shortage in short-term accommodations. (It is important to note that the tracking of short-term travel accommodation prices and overall prices was tight well before Airbnb was exerting any serious effect one way or the other on prices.) However, national prices of long-term housing are rising faster than overall prices, suggesting a shortage of long-term housing. Because of this above-inflation growth in long-term housing costs, any trend that exacerbates this increase is more damaging than if these prices had been relatively flat in recent years. **Figure D** shows inflation in the price indices for housing (long-term rentals as

Housing costs are rising faster than costs of short-term accommodations or overall consumer goods

Price indices for housing, short-term travel accommodations, and overall personal consumption expenditures (PCE), 2000–2016
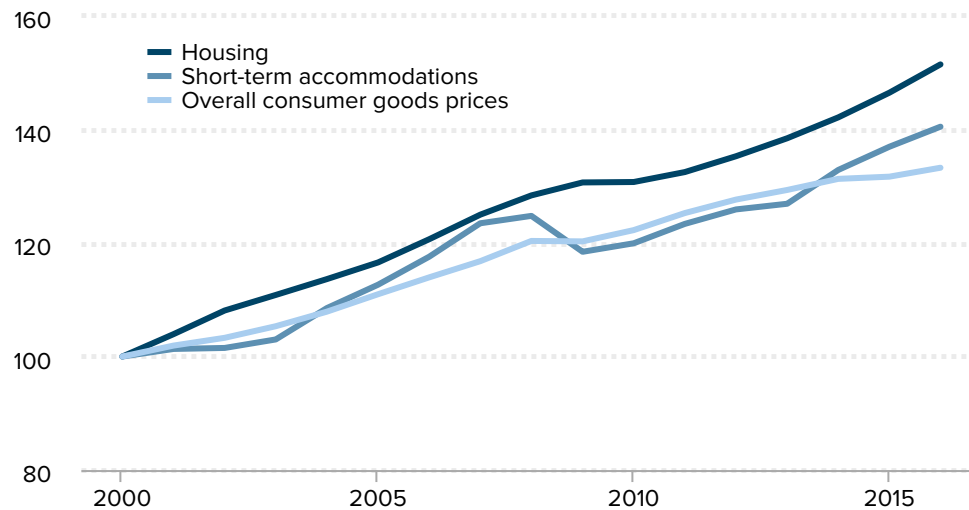
Note: The housing price index includes both long-term rentals as well as imputed rents for owner-occupied housing.

Source: Author's analysis of Bureau of Economic Analysis National Income and Product Accounts (NIPA) Table 2.4.4

Economic Policy Institute

well as imputed rents for owner-occupied housing) and for short-term travel accommodations, and in the overall personal consumption expenditures index. In recent years, long-term housing price growth has clearly outpaced both overall price growth and increases in the price of short-term travel accommodations. This recent rise in the inflation rate of long-term housing, in fact, has become a much-discussed policy challenge that has spurred much commentary and analysis over the past decade.

The fact that the cost of long-term housing has become a prime source of economic stress for typical Americans should be considered when weighing the costs and benefits of Airbnb's introduction and expansion. Crucially, demand for housing is quite inelastic, meaning that households have little ability to forgo housing when it becomes more expensive. When demand is inelastic, even relatively small changes in housing supply can cause significant changes in the cost of housing.[10] This intuition is clearly validated in a number of careful empirical studies looking precisely at the effect of Airbnb introduction and expansion on housing costs.

According to these studies, Airbnb—though relatively new—is already having a measurable effect on long-term housing supply and prices in some of the major cities where it operates. For example, Merante and Horn (2016) examine the impact of Airbnb on rental prices in Boston. The authors construct a rich data set by combining data on weekly

rental listings from online sources and data from Airbnb listings scraped from web pages. They find that each 12 Airbnb listings per census tract leads to an increase in asking rents of 0.4 percent. It is important to note that this is a finding of causation, not just correlation. They put this finding in perspective as follows:

> If Airbnb's growth rate in 2015, 24%, continues for the next three years, assuming constant mean rents and total number of housing units, Boston's mean asking rents in January 2019 would be as much as $178 per month higher than in the absence of Airbnb activity. We further find evidence that Airbnb is increasing asking rents through its suppression of the supply of rental units offered for rent. Specifically, a one standard deviation increase in Airbnb listings [an average of 12 units per census tract] relative to total housing units is correlated with a 5.9% decrease in the number of rental units offered for rent. (Merante and Horn 2016)

Barron, Kung, and Proserpio (2018) undertake a similar exercise with different data. They create a data set that combines Airbnb listings, home prices and rents from the online real estate firm Zillow, and time-varying ZIP code characteristics (like median household income and population) from the American Community Survey (ACS). To account for the fact that rents and Airbnb listings might move together even if there is no causal relationship (for example, if both are driven by the rising popularity of a given city), they construct an instrumental variable to identify the causal effect of rising Airbnb listings on rents. Using this instrument, they find that a 10 percent increase in Airbnb listings in a ZIP code leads to a 0.42 percent increase in ZIP code rental prices and a 0.76 percent increase in house prices. They also find that the increase in rents is larger in ZIP codes with a larger share of nonowner-occupied housing. Finally, like Merante and Horn, they find evidence that Airbnb listings are correlated with a rise in landlords shifting away from long-term and toward short-term rental operations.

Sheppard and Udell (2018) also undertake a similar exercise, looking within neighborhoods of New York City. Their key finding is that a doubling of Airbnb activity within a tight geographic zone surrounding a home sale is associated with a 6 to 11 percent increase in sales prices. Their coefficient values are quite close to those from Barron, Kung, and Proserpio (2018).[11]

Wachsmuth et al. (2018) apply the regression results identified by Barron, Kung, and Proserpio (2018) to the large increase in Airbnb rentals in New York City. They find a 1.4 percent increase in NYC rents from 2015 to 2017 due to Airbnb's expansion in that city. For the median NYC renter, this implies a $384 annual increase in rent from 2015 to 2017 due to Airbnb's expansion over that time.

Potential cost two: Local government tax collections fall

For the localities making policy decisions regarding the expansion of Airbnb, perhaps the single biggest consideration is fiscal. Across the United States, total lodging taxes are significant: For the 150 largest cities, the all-in lodging tax rate (including state, county, and

city taxes) averaged more than 13 percent (Hazinski, Davis, and Kremer 2018). The temptation for any given locality to set relatively high lodging tax rates (particularly when compared with overall sales tax rates) seems clear—city residents pay little of the lodging tax but still enjoy the benefits funded by the tax. For a number of cities, the total revenue collected is substantial. In 2016, for example, New York City and Las Vegas each collected well over $500 million in lodging taxes, and San Francisco collected just under $400 million.

It seems odd to exclude Airbnb stays from the lodging tax, yet the tax treatment of Airbnb rentals is inconsistent and incomplete. The company has entered into a number of tax agreements with state and local governments and is clearly trying to build the impression that it wants to help these governments collect taxes. Yet a number of tax experts argue that Airbnb's efforts to collect and remit lodging taxes (as well as other taxes) have been wholly insufficient.

A description in Schiller and Davis 2017 of the state of Airbnb's tax agreements as of early 2017 highlights the patchy, voluntary nature of the tax regime that Airbnb faces:

> Airbnb, whose operations in some instances may violate traditional local zoning and rental ordinances, has sought to legitimize its business by negotiating agreements with cities under which it will collect local sales and lodging taxes. "Working together, platforms like Airbnb can help governments collect millions of dollars in hotel and tourist tax revenue at little cost to them," the company stated in a "policy tool chest" it offered in late 2016.

> Overall, by Airbnb's count, the company is collecting sales, hotel, or other taxes in 26 states and the District of Columbia (DC) as of March 1, 2017. State-level taxes are collected in 18 of those states. Among this group, some or all local-level taxes are also being collected in every state except Connecticut, which lacks local lodging taxes. In the remaining eight states, Airbnb collects a patchwork of local taxes but no state taxes. In three states—Alaska, Maryland, and New Jersey—Airbnb's tax collection is limited to a single locality (Anchorage, Montgomery County, and Jersey City, respectively). The company has dramatically expanded its tax collection practices in recent years and appears poised to continue its expansion in the months and years ahead. Airbnb recently announced that it will soon begin collecting state lodging taxes in Maine, for instance.

Dan Bucks, a former director of the Montana Department of Revenue and former executive director of the Multistate Tax Commission, wrote a report assessing the tax agreements that Airbnb has struck with state and local governments in different parts of the country. His central finding is that these agreements "[undermine] tax fairness, transparency, and the rule of law" (Bucks 2017).

Bucks examines 12 of the Airbnb tax agreements from across the country that had been made public by mid-2017. He describes them as follows:

> Airbnb devises and presents to tax agencies what are typically ten to twelve-page documents covering back-tax forgiveness, prospective payments, information

access and multiple other terms that produce, as this report documents, serious negative consequences for society. Airbnb labels these documents as "voluntary collection agreements," which they most assuredly are not. These Airbnb-drafted documents do not guarantee the proper collection of taxes due. They block tax agencies from verifying the accuracy of Airbnb payments. Airbnb may be seeking to superficially to liken these documents to the high quality "voluntary disclosure agreements" that states use to bring non-compliant taxpayers into full conformity with the law. However, these documents profoundly undermine sound tax administration and the rule of law. For these and other reasons detailed below, we will not use Airbnb's misleading label for these documents but will refer to them objectively as "Airbnb agreements." (Bucks 2017)

The most specific criticism Bucks makes is that these agreements have largely been kept secret from the public, in clear contrast to other "voluntary disclosure agreements." This secrecy, combined with agreements to "cede substantial control of the payment and audit processes to Airbnb," make it impossible for tax authorities to ensure proper payment of lodging taxes. Bucks also argues that these agreements between Airbnb and state and local governments provide large benefits to third parties (Airbnb hosts) who are not signatories and are not obligated to provide anything in exchange for these benefits.

In 2016, an analysis from AlltheRooms.com forecast that Airbnb's failure to ensure the full payment of lodging taxes was on track to cost subnational governments a combined $440 million in revenue unless policymakers moved to guarantee proper payment. Of the total, $110 million in lost revenue was for New York City alone. In October 2016, shortly after the AlltheRooms.com analysis was released, New York City passed restrictions on Airbnb advertisements for rentals of less than 30 days when an owner is not present. While these restrictions may have stemmed the loss of revenue relative to the AlltheRooms.com projection, the analysis that predated the restrictions highlight how the unregulated expansion of Airbnb, and its cannibalization of traditional hotel business market share, could still have large fiscal implications for New York and other cities.

Finally, even if Airbnb were to fully comply with the local jurisdiction's tax system on lodgings and pay the same tax rate per dollar earned as traditional hotels, there likely would still be some small fiscal losses stemming from Airbnb's expansion. The primary appeal of Airbnb to most travelers is lower-price accommodations, so even if the same tax rate were paid on Airbnb rentals as is paid on hotel rooms, the lower Airbnb prices would lead to less tax revenue accruing to local governments.

Potential cost three: Externalities inflicted on neighbors

When owners do not reside in their residential property, this can lead to externalities imposed on the property's neighbors. If absentee owners, for example, do not face the cost of noise or stress on the neighborhood's infrastructure (capacity for garbage pickup, for example), then they will have less incentive to make sure that their renters are respectful of neighbors or to prevent an excessive number of people from occupying their

property.

These externalities could be worse when the renters in question are short term. Long-term renters really do have some incentive to care about the neighborhood's long-run comity and infrastructure, whereas short-term renters may have little to no such incentive. Further, some Airbnb hosts are renters themselves who are subletting a long-term rental property to short-term travelers, which may further shield the ultimate property owners from bearing the costs faced by immediate neighbors. In cities where the spread of Airbnb has become a political issue, hundreds (if not thousands) of complaints have been made in this regard.[12]

The potential for such externalities has been broadly recognized for a long time and was a consideration leading to the prevalence of zoning laws that ban short-term travel accommodations in residential neighborhoods. There is a reason, for example, why Times Square in New York City is a cluster of hotels while the Upper East Side is largely a less noisy cluster of residential dwellings. There is of course no reason why such past zoning decisions need to be completely sacrosanct and never changed, but these decisions were made for a reason, and changes to them should be subject to democratic debate.

While researchers have often noted the possibility that Airbnb may impose externalities on the communities surrounding Airbnb units, we know of no empirical estimates of these externalities. If these externalities were powerful enough in degrading the desirability of neighborhoods, they could in theory lead to reduced rents and home prices. From the evidence of the previous section, we know that Airbnb adoption in neighborhoods has actually boosted rental and home prices. But this price boost doesn't mean these externalities don't exist—it simply means that price-depressing externalities are offset by the supply effect of moving properties out of the long-term rental market.

Miller (2016) makes an interesting (if likely too abstract) policy proposal for dealing with the externalities associated with home rental via Airbnb. He proposes creating a market in "transferable sharing rights," in which, for example, each resident of a neighborhood would be given the right to rent out one housing unit for one night. Most residents in a neighborhood won't want to rent out their home. But those who do want to rent out units using Airbnb would want far more than the right to rent out these properties for just one night. To obtain the right to rent out their properties for more nights, they would need to purchase permits from their neighbors. The price it takes to obtain these permits would provide a good indicator of the true costs of the externalities imposed by Airbnb. A city that experimented with these tradeable sharing rights could provide very useful information.

Potential cost four: Job quantity and quality could suffer

We have noted already that when Airbnb enters and expands in a city, it shifts traveler business from hotels to Airbnb, leading to downward price pressure for hotels. This shift from traditional hotels to Airbnb properties also implies either a shift in jobs or a reduction

in jobs. As an example, take hotel cleaning workers. As more visitors to a city pick Airbnb units over traditional hotel accommodations, the need for cleaning doesn't go away. Instead, it is either foisted on Airbnb proprietors, done by third-party cleaning services, or left unmet and thus implicitly imposing costs on both travelers and the surrounding neighborhood (think of improperly disposed-of trash).

Given that much of the growth of Airbnb in recent years has been driven by hosts with multiple properties (which, when in a single location, are in effect mini hotels), it is not surprising to see an emergence of cleaning services specifically serving Airbnb hosts.[13] These new cleaning services may be less likely to offer decent wages relative to traditional travel lodging; it may also be more difficult for workers to unionize in this context. For example, in the 10 U.S. cities with a particularly large Airbnb presence (including New York City, Los Angeles, and Chicago), combined unionization rates for maids and cleaners in the hotel industry are nearly double the unionization rates of maids and cleaners in other industries in the economy.[14]

In some sense, the shift in cleaning jobs from traditional hotels to cleaning services for Airbnb hosts is likely analogous in its economic effects to what happens when traditional hotels outsource their own cleaning staffs. Dube and Kaplan (2010) demonstrate large negative wage effects stemming from this type of domestic outsourcing for janitors and security guards. Their findings are reinforced by recent analysis of the German labor market by Goldschmidt and Schmieder (2017), who find similar large negative effects of domestic outsourcing on a range of occupations, including cleaners. While these studies do not directly examine the effect of substituting in-house hotel cleaning jobs for Airbnb cleaning jobs, they both track the effect of "fissuring" between the entity that uses and pays for the service and the entity that manages the service providers. This fissuring has been a key and troubling feature of the American labor market in recent decades, and it is hard to see how the substitution of Airbnb for traditional hotels does not potentially constitute another layer of this fissuring.[15]

This potential for Airbnb to degrade the quality of cleaning jobs is recognized even by the company itself: Airbnb offers hosts the opportunity to advertise that they have taken the "living wage pledge" by committing to pay a living wage to the cleaners and servicers of their properties. It is not clear how commitment to this pledge is (or can be) enforced, however.

# Conclusion: Airbnb should have to play by the same rules as other lodging providers

The current policy debates sparked by the rise of Airbnb have largely concerned tax collections and the emergence of "mini hotels" in residential neighborhoods. At its inception, Airbnb advertised itself as a way for homeowners (or long-term renters) to rent out a room in their primary residence, or as a way for people to rent out their dwellings for

Housing costs matter much more to household budgets than short-term lodging costs

Shares of average household personal consumption expenditures devoted to housing vs. short-term travel accommodations, 1979, 2000, and 2016
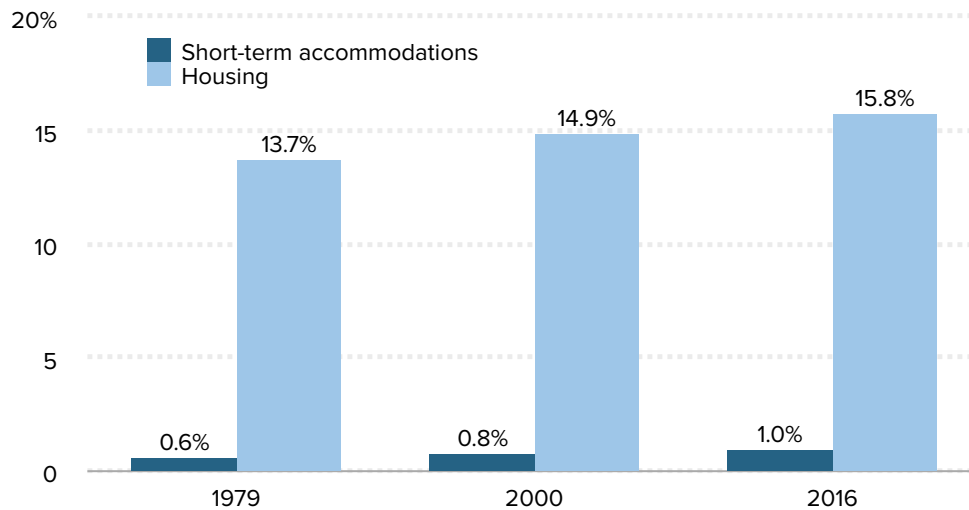
Note: The housing price index includes both long-term rentals as well as imputed rents for owner-occupied housing.

Source: Author's analysis of Bureau of Economic Analysis National Income and Product Accounts (NIPA) Table 2.5.5

Economic Policy Institute

short periods while they themselves are traveling. However, in recent years Airbnb listings and revenues have become dominated by "multi-unit" renters—absentee property owners with multiple dwellings who are essentially running small-scale lodging companies on an ongoing basis.

This evolution of Airbnb into a parallel hotel industry raises questions about the preferential treatment afforded to this rental company. These questions include, "Why isn't Airbnb required to ensure that lodging taxes are collected, as traditional hotels are?" And, "Why is Airbnb allowed to offer short-term rentals in residential neighborhoods that are not zoned for these uses, while traditional hotels are not allowed in these same neighborhoods?"

While there are plenty of other considerations, the spread of Airbnb seems at its core to be a shift of potential housing supply from the long-term residential housing market to the market for short-term accommodations. This shift of supply can lower prices for travelers but raise housing prices for long-term residents. This seems like a bad trade-off, simply based on the share of long-term housing expenses versus short-term travel expenses in average family budgets. **Figure E** presents the share of total personal consumption expenditures accounted for by housing and by short-term travel accommodations. As the figure shows, housing costs eat up far more of the average household's budget, and rising housing prices mean that long-term housing has grown more as a share of family budgets

than short-term travel accommodations.

This rising cost of housing has become a major economic stress for many American households. Anything that threatens to exacerbate this stress should face close scrutiny. A reasonable reading of the available evidence suggests that the costs imposed on renters' budgets by Airbnb expansion substantially exceed the benefits to travelers. It is far from clear that any other benefits stemming from the expansion of Airbnb could swamp the costs it imposes on renters' budgets.

There may be plenty wrong with the status quo in cities' zoning decisions. But the proper way to improve local zoning laws is not to simply let well-funded corporations ignore the status quo and do what they want. As this report shows, there is little evidence that the net benefit of accelerated Airbnb expansion is large enough to justify overturning previous considerations that led to the regulatory status quo—in fact, the costs of further Airbnb expansion seem likely to be at least as large, if not larger, than the benefits.

About the author

Josh Bivens joined the Economic Policy Institute in 2002 and is currently EPI's director of research. His primary areas of research include macroeconomics, social insurance, and globalization. He has authored or co-authored three books (including *The State of Working America, 12th Edition*) while working at EPI, has edited another, and has written numerous research papers, including for academic journals. He appears often in media outlets to offer economic commentary and has testified several times before the U.S. Congress. He earned his Ph.D. from The New School for Social Research.

Distribution of housing wealth (primary and nonprimary), by household characteristics

	1989	1998	2007	2016	1989–2016 change
Primary residence					
Bottom 50 percent	90.2%	85.7%	87.3%	89.6%	-0.7%
Bottom 80 percent	45.4%	47.5%	44.0%	40.0%	-5.4%
Top 20 percent	54.6%	52.5%	56.0%	60.0%	5.4%
80th–90th percentile	19.9%	17.9%	17.5%	18.6%	-1.3%
90th–95th percentile	12.6%	11.6%	11.0%	13.9%	1.3%
96th–99th percentile	15.6%	15.0%	18.2%	16.8%	1.2%
Top 1 percent	6.5%	8.0%	9.3%	10.7%	4.3%
Nonprimary residential property					
Bottom 50 percent	97.4%	95.7%	97.8%	98.4%	1.0%
Bottom 80 percent	16.8%	18.1%	13.9%	9.9%	-6.9%
Top 20 percent	83.2%	81.9%	86.1%	90.1%	6.9%
80th–90th percentile	15.2%	16.8%	10.7%	12.6%	-2.7%
90th–95th percentile	20.6%	15.5%	13.9%	14.9%	-5.7%
96th–99th percentile	28.7%	28.7%	34.0%	29.6%	0.9%
Top 1 percent	18.6%	21.0%	27.5%	32.9%	14.3%
Primary residence					
White, non-Hispanic	86.4%	87.5%	82.6%	80.6%	-5.9%
Black, non-Hispanic	4.9%	5.0%	6.2%	6.5%	1.6%
Hispanic, any race	4.1%	3.7%	6.1%	6.0%	2.0%
Other	4.6%	3.7%	5.1%	6.9%	2.3%
Nonprimary residential property					
White, non-Hispanic	87.3%	89.5%	84.2%	86.2%	-1.1%
Black, non-Hispanic	4.3%	4.1%	4.1%	5.0%	0.7%
Hispanic, any race	3.1%	3.4%	6.7%	3.6%	0.5%
Other	5.3%	3.0%	5.0%	5.2%	-0.1%

Note: Per the Survey of Consumer Finances definitions, primary housing wealth is the total value of the primary residence of a household. Nonprimary housing wealth includes the value of all of other residential real estate owned by the household, including one-to-four family structures, timeshares, and vacation homes.

Source: Author's analysis of microdata from the Federal Reserve Board Survey of Consumer Finances (2016)

Economic Policy Institute

Endnotes

1. According to a recent report, "a significant—and rapidly growing—portion of Airbnb's revenue in major U.S. cities is driven by commercial operators who rent out more than one residential property to short-term visitors" (CBRE 2017).

2. Horton and Zeckhauser (2016) provide a deep dive into the economics of internet-based service firms. Slee (2017) provides an excellent popularization of some of the economic issues surrounding IBSFs from a deeply critical perspective.

3. The most obvious benefit to living in housing that one owns is the tax treatment of mortgage interest payments on owner-occupied property, which can be deducted from federal taxes. Another benefit is that the implicit rental income earned by owner-occupiers is not taxed (the money that owner-occupiers are saving by not having to pay rent elsewhere could be viewed as implicit rental income).

4. Wachsmuth et al. (2018), for example, find that just under half of Airbnb listings in New York City had likely taken illegal reservations.

5. "Arrivals" is a term referring to each stay in a unit, regardless of length of stay.

6. For example, Molla (2017) highlights more recent forecasts for 2017 indicating a large slowdown in U.S. Airbnb expansion.

7. The range of 2 to 4 percent represents the range of findings across 2015, 2016, and 2017. The value was 4 percent in 2015, 2 percent in 2016, and 3 percent in 2017.

8. The arithmetic on this is relatively straightforward. The NERA 2017 study asserts that Airbnb supports $14 billion in spending and 130,000 jobs in the United States. This implies each $107,690 supports a job. Say that half of this spending is the direct cost of accommodations and that it represents a pure expenditure shift away from traditional hotels. Assume further that traditional hotels are 5 percent more labor-intensive—so each traditional hotel job is supported by $102,300 in spending (5 percent less than the ratio identified by Airbnb). This shift from traditional hotels to Airbnb hence reduces employment by 3,400 jobs for each $7 billion in spending. Even if overall spending were to rise by 2 percent due to Airbnb's expansion, this would increase employment by only roughly 2,600 jobs. The key insight here is that once one allows Airbnb to substitute for other forms of accommodation, the link between output and employment might change significantly.

9. Airbnb itself has commissioned and reported on a number of studies claiming that the share of guests who would not have taken the trip absent Airbnb is as high as 30 percent. Even this number is far larger than the independent assessments of Guttentag (2016) and Morgan Stanley Research (2017), but it does highlight just how outlandish the NERA assumption on this is.

10. In a review of housing markets, Albouy, Ehrlich, and Liu (2016) note that "Housing demand is income and price inelastic."

11. The geographic unit implicitly being examined by Sheppard and Udell (2018) is not intuitive. Their observation is an individual home sale. They then track Airbnb listings within five different radii of the sale: 150, 300, 500, 1,000, and 2,000 meters. They interact the number of Airbnb listings with categorical variables for each of the five "buffer zones" defined by the radii and use this as an explanatory variable predicting sales prices.

12. See Office of New York State Attorney General 2014.

13. Lawler (2014) notes that Airbnb was testing out dedicated cleaning services for its hosts as early as 2014.

14. Unionization rates derive from the author's analysis of data pooled from 2008–2017 from the Outgoing Rotation Groups (ORG) of the Current Population Survey (CPS). Code and results are available upon request. The 10 cities are Boston, Chicago, Los Angeles, Las Vegas, Miami, New York City, San Diego, San Francisco, Seattle, and Washington, D.C. In these 10 cities, the unionization rate for maids and cleaners was 23.2 percent in the traveler accommodation industry, but 12.1 percent in all other industries.

15. See Weil 2017 for an overview of labor market fissuring.

References

Albouy, David, Gabriel Ehrlich, and Yingyi Liu. 2016. "Housing Demand, Cost-of-Living Inequality, and the Affordability Crisis." National Bureau of Economic Research (NBER) Working Paper no. 22816, November 2016.

AllTheRooms.com. 2016. *Vacation Rental Market Analysis: 440 Million Reasons to Tax Airbnb Vacation Rentals*, October 2016.

Alyakoob, Mohammed, and Mohammed Saifur Rahman. 2018. "Shared Prosperity (or Lack Thereof) in the Sharing Economy." Purdue University working paper, May 2018. http://dx.doi.org/10.2139/ssrn.3180278.

Associated Press (AP). 2019. "Question from Washington on Oct. 11, 2016" (search result for "sharing economy"). *AP Stylebook* subscription-based website, accessed January 4, 2019.

Barron, Kyle, Edward Kung, and Davide Proserpio. 2018. "The Sharing Economy and Housing Affordability: Evidence from Airbnb." Working paper, March 2018.

Bucks, Dan R. 2017. *Airbnb Agreements with State and Local Tax Agencies: A Formula for Undermining Tax Fairness, Transparency and the Rule of Law*. March 2017.

Bureau of Economic Analysis. Various years. National Income and Product Accounts (NIPA), Tables 2.4.4 and 2.5.5. Accessed September 2018.

CBRE Hotels' Americas Research (CBRE). 2017. *Hosts with Multiple Units—A Key Driver of Airbnb Growth: A Comprehensive National Review Including a Spotlight on 13 U.S. Markets*. March 2017.

Dogru, Tarik, Mararand Mody, and Courtney Suess. 2019. "Adding Evidence to the Debate: Quantifying Airbnb's Disruptive Impact on Ten Key Hotel Markets." *Tourism Management*, forthcoming June 2019.

Dube, Arindrajit, and Ethan Kaplan. 2010. "Does Outsourcing Reduce Wages in Low-Wage Service Occupations? Evidence from Janitors and Guards." *Industrial and Labor Relations Review* 63, no. 2: 287–306.

Federal Reserve Board. 2016. Survey of Consumer Finances microdata. Accessed August 2018.

Goldschmidt, Deborah, and Johannes Schmieder. 2017. "The Rise of Domestic Outsourcing and the

Evolution of the German Wage Structure." *Quarterly Journal of Economics* 132, no. 3: 1165–1217. http://doi.org/10.1093/qje/qjx008.

Guttentag, Daniel Adams. 2016. "Why Tourists Choose Airbnb: A Motivation-Based Segmentation Study Underpinned by Innovation Concepts." PhD diss., University of Waterloo.

Hazinski, Thomas, Anthony Davis, and Daniel Kremer. 2018. *2018 HVS Lodging Tax Report – USA*. HVS Convention, Sports, and Entertainment Consulting, September 2018.

Horton, John, and Richard Zeckhauser. 2016. "Owning, Using and Renting: Some Simple Economics of the 'Sharing Economy.'" National Bureau of Economic Research Working Paper no. 22029, February 2016.

Lawler, Ryan. 2014. "Airbnb Is Testing Out an Affordable Cleaning Service for Hosts in San Francisco." Techcrunch.com.

Merante, Mark, and Keren Mertens Horn. 2016. "Is Home Sharing Driving Up Rents? Evidence from Airbnb in Boston." University of Massachusetts Boston Department of Economics Working Paper no. 2016-03.

Miller, Stephen. 2016. "First Principles for Regulating the Sharing Economy." *Harvard Journal on Legislation* 53: 149–202.

Molla, Rani. 2017. "Airbnb Is On Track to Rack Up More Than 100 Million Stays This Year—and That's Only the Beginning of Its Threat to the Hotel Industry: As Long as Regulation Doesn't Stop It, That Is." *Recode*, July 19, 2017.

Morgan Stanley Research. 2017. *Surprising Airbnb Adoption Slowdown in US/EU, and What It Means for Hotels and OTAs*. Report on Global Insight AlphaWise survey, November 2017.

NERA Economic Consulting (NERA). 2017. *Airbnb's Global Support to Local Economies: Output and Employment*. Prepared for Airbnb, March 2017.

Office of New York State Attorney General. 2014. *Airbnb in the City*. Prepared by the Office of the Attorney General of the State of New York's Research Department and Internet Bureau, October 2014.

Schiller, Zach, and Carl Davis. 2017. *Taxes and the On-Demand Economy*. Institute on Taxation and Economic Policy, March 2017.

Sheppard, Stephen, and Andrew Udell. 2018. "Do Airbnb Properties Affect House Prices?" Williams University working paper, January 2018.

Slee, Tom. 2017. *What's Yours Is Mine: Against the Sharing Economy*. New York: OR Books.

Wachsmuth, David, David Chaney, Danielle Kerrigan, Andrea Shillolo, and Robin Basalaev-Binder. 2018. *The High Cost of Short-Term Rentals in New York City*. Urban Politics and Governance research group, School of Urban Planning, McGill University, January 2018.

Weil, David. 2017. *The Fissured Workplace: Why Work Became So Bad for So Many and What Can Be Done to Improve It*. Cambridge, Mass.: Harvard Univ. Press.

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, no. 5: 687–705.