The Impact of New Short-term Rental Regulations on New York City

David Wachsmuth
Jennifer Combs
Danielle Kerrigan

January 2019

UP GO

Executive Summary

In August 2018 the City of New York introduced new regulations on short-term rentals, requiring STR booking services to share information with the City. The regulations were due to come into effect on February 2, 2019, but have been blocked by a temporary judicial injunction. Because of the resulting uncertainty, there is now a strong public interest in understanding the potential implications of the regulations. Relying on peer-reviewed methodologies, this report analyzes what will happen to Airbnb activity in New York City in the next year under several different regulatory scenarios.

WITHOUT NEW REGULATIONS

If the federal injunction were to remain in place, **New York's STR market would further commercialize** over the next year:

- The number of **housing units which would be taken off the New York long-term housing market** by Airbnb, and thus would become unavailable for New York residents, **would increase by 1,800 to 10,800**.

- **Average daily listings would increase 0.8% to 57,300**, and **68% of listing revenue** ($548 million of $806 million total revenue) would be earned from illegal reservations.

- Airbnb's growth will lead to **$8.6 million in rent increases for New Yorkers looking for apartments** next year (and **$60 million in rent increases over three years**), in addition to the $616 million in previous rent increases identified by NYC Comptroller Stringer (2018).

- **Commercial operators** would operate 18.5% of all entire-home listings (up from 16.7%).

WITH NEW REGULATIONS

If the regulations take effect, they would produce a short-term drop in STR activity in New York (like when San Francisco enacted STR regulation), and give City officials greater ability to enforce STR laws. Under a strong enforcement scenario where the City targets commercial operators and hosts of full-time entire-home listings:

- **Average daily listings decline of 46%:** Average daily listings in New York City would decline from 56,800 to 31,000.

- **8,700 housing units back on the market:** 8,700 housing units which had previously been taken off the market by Airbnb would be returned to the market, reducing rents and increasing vacancy rates.

- **Rental vacancy rate increase next year in top Airbnb neighborhoods:** Many New York neighborhoods currently facing an affordable housing crisis (rental vacancy <5%) would see those vacancy rates significantly increase next

year, and housing become correspondingly easier to find, as listings returned to the market:

- **Williamsburg and Greenpoint:** From 2% to 3.4%, with **720 housing units** returned
- **Chinatown and the Lower East Side:** From 3% to 4.1%, with **730 units** returned
- **Park Slope and Red Hook:** From 1.9% to 2.8%, with **290 units** returned
- **Bedford-Stuyvesant:** From 4.8% to 5.8%, with **400 housing units** returned
- **Chelsea, Clinton and Midtown:** From 6.4% to 8.2%, with **1,160 units** returned

- **$130 million reduction in rent payments over the next three years:** A strong enforcement scenario would lower median new rents citywide, saving New Yorkers looking for new apartments approximately $19 million in rent payments next year, and $130 million over the next three years.

- **Illegal revenue down 69%:** Listing revenue on Airbnb in New York increased 21% to $711 million last year—an increase driven primarily by the further commercialization of the city's STR market—but under a strong enforcement scenario illegal revenue would drop 69% to $170 million.

	Without new regulations	With new regulations
Active daily listings	57,300 (0.8% increase)	31,000 (46% decrease)
Illegal revenue	$548 million (13% increase)	$170 million (69% decrease)
Housing removed from or returned to the market	1,800 units removed	8,700 units returned
Three-year rent increase or decrease	$60 million in additional rent	$130 million in rent saved

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1. The Airbnb market in New York City

56,800 Airbnb listings were active on average each day in New York City last year, a 4.4% increase over the previous year. The revenue they earned increased 21.4% to $711.0 million, driven by the further commercialization of New York's short-term rental market. A majority of active Airbnb listings in New York are entire homes, and 16.7% of entire-home listings active on August 31, 2018 were operated by hosts with multiple such listings—compared to 12.8% a year earlier. We estimate that 45% of listings received at least one illegal reservation last year, and that 68% of total host revenue came from these illegal reservations. 9,000 entire-home listings were rented more than 120 nights last year and thus not available as long-term housing—a 31% increase from the previous year.

In January 2018, our research team released a comprehensive analysis of the Airbnb market in New York City (Wachsmuth et al. 2018). Titled "The High Cost of Short-term Rentals in New York City", the report found a highly unequal distribution of costs and benefits in the STR market. We estimated that a majority of Airbnb revenue was earned by just 10% of hosts, that two thirds of Airbnb revenue was earned by

illegal listings, that between 7,000 and 13,500 units of housing had been removed from the long-term rental market by Airbnb, and that the median new rent in New York had increased by 1.4% over three years—a $380 annual rent increase.

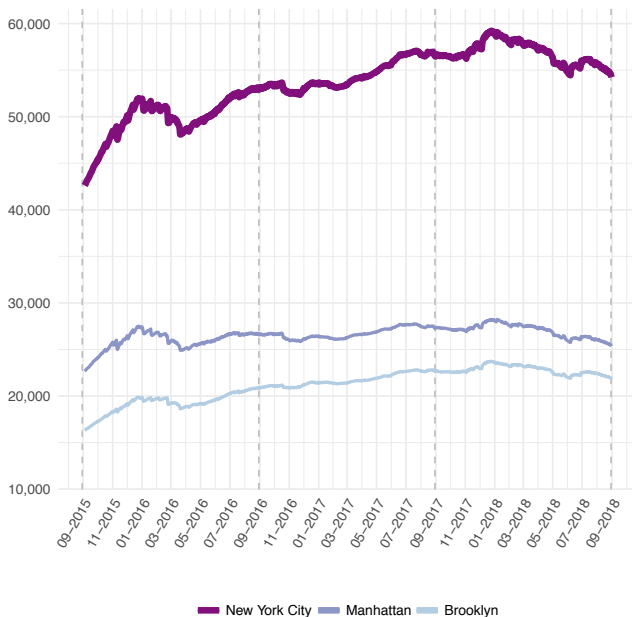A year has passed since the time period we analyzed in that report. Therefore, before

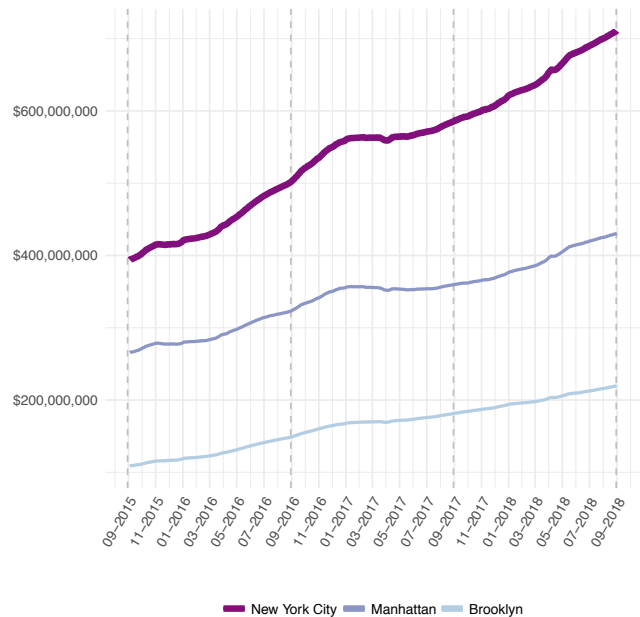*Figure 1. Daily active Airbnb listings in New York City*

Figure 2. Rolling sum of annual Airbnb host revenue

discussing different scenarios for the impact of New York's upcoming STR regulations, we briefly summarize the key facts and trends of the Airbnb market as of August 31, 2018. In what follows we exclude all Airbnb listings which are identified by their hosts as a "hotel", "bed and breakfast" or the like, in order to focus specifically on listings hosted in conventional housing—houses and apartments.

Active listings: Over the year ending August 31, 2018, there were on average 56,800 active Airbnb listings each day in New York City, as measured by properties that were listed on Airbnb.com on a given day, whether or not they were reserved or available for reservations (Figure 1, previous page). This is a 4.4% increase from the previous year, when 54,400 listings were active each day. The number of daily active listings gradually rose through Christmas Day 2017, when it peaked at 59,200. Since then there has been an uneven decline to 54,200 active listings on August 31, 2018. While seasonal fluctuations in the number of listings are common (because casual hosts sometimes list properties only for the winter holidays or for the summer), the recent decline occurred during the summer, when listings would normally be expected to increase, and thus possibly represents a more durable slowdown in the size of the Airbnb market in New York.

Revenue: Even if the number of active listings is only growing slowly in New York, the revenue they earn continues to grow rapidly, reflecting higher average earnings particularly at the top end of the market. For the year ending August 31, 2018, listing revenue was $711 million, a 21.4% increase over the previous year. Revenue continues to be distributed highly unequally among hosts: in the last year, the top 10% of hosts earned 48% of all income, while the bottom 80% of hosts earned only 32%.

Entire-home listings: For two years, New York's Airbnb market experienced a long-term

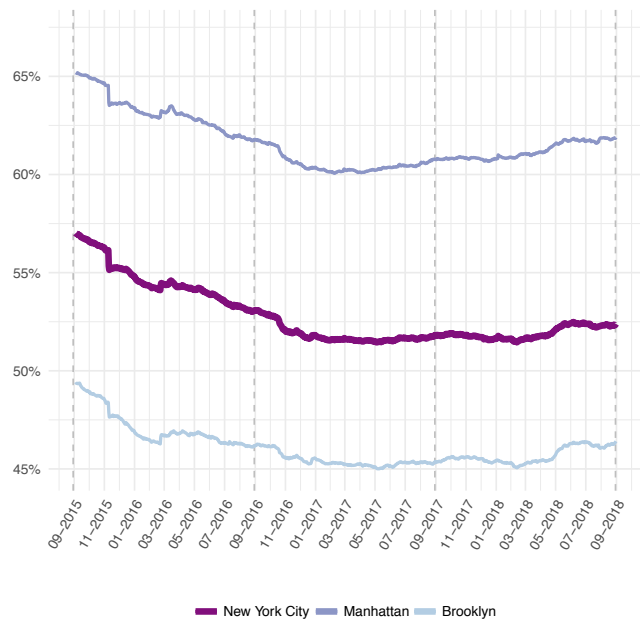*Figure 3. The percentage of active Airbnb listings which are entire homes*

Percentage of active listings that are entire homes (August 31, 2018)
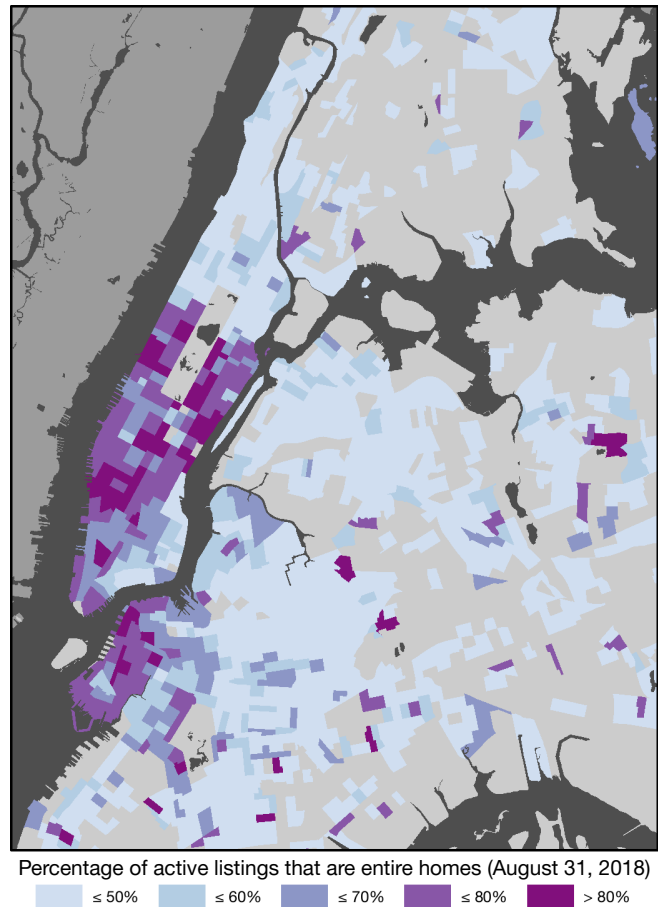≤ 50%   ≤ 60%   ≤ 70%   ≤ 80%   > 80%

Figure 4. The percentage of active Airbnb listings which are entire homes

decline in the percentage of listings which were entire homes. That decline ended in late 2017, after which point the proportion has increased somewhat, reaching 52.4% on August 31, 2018 (Figure 3, previous page). As Figure 4 (previous page) indicates, entire-home listings dominate Midtown and Lower Manhattan and Downtown Brooklyn, while private-room listings tend to be a slight majority in the rest of the city.

Commercial operators: Commercial operators on Airbnb had been in decline for several years, reflecting initially an unreported purge of commercial listings Airbnb undertook before sharing data with policymakers in 2015 (Cox and Slee 2016) and subsequently New York City's stronger enforcement of short-term rental laws. But the last year and a half has seen a steady increase in the proportion of Airbnb hosts who operate two or more entire-home listings ("multilistings"), and thus can unambiguously be categorized as commercial operators (Figure 5). (There will also be many commercial operators who only operate a single listing, but our data does not allow us to identify them; hence our counts of commercial operators are strict and probably substantial underestimates.) As of August 31, 2018, 18.9% of all entire-home Airbnb listings are run by commercial operators, reflecting an increasing professionalization and commercialization of NYC's STR market. Figure 6 demonstrates that these listings are highly concentrated in Midtown Manhattan and North Brooklyn, where they sometimes account for more than 2% of a neighborhood's total housing supply.

Illegal listings: Under current New York State law, short-term rentals are illegal in New York City in any building with three or more units, unless the primary resident is present. Private-room rentals may or may not be legal (depending on whether the host is present or not), but entire-home rentals in such buildings are always illegal if they last

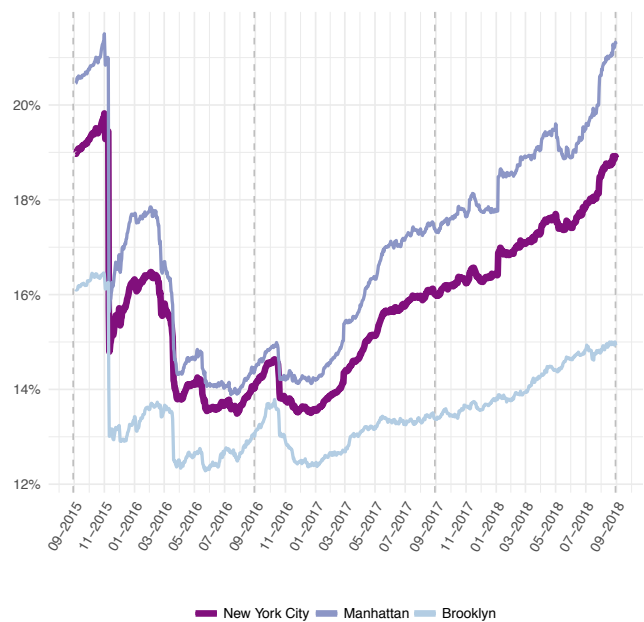*Figure 5. The percentage of active entire-home listings which are multilistings*

Percentage of housing units that are entire-home multilistings
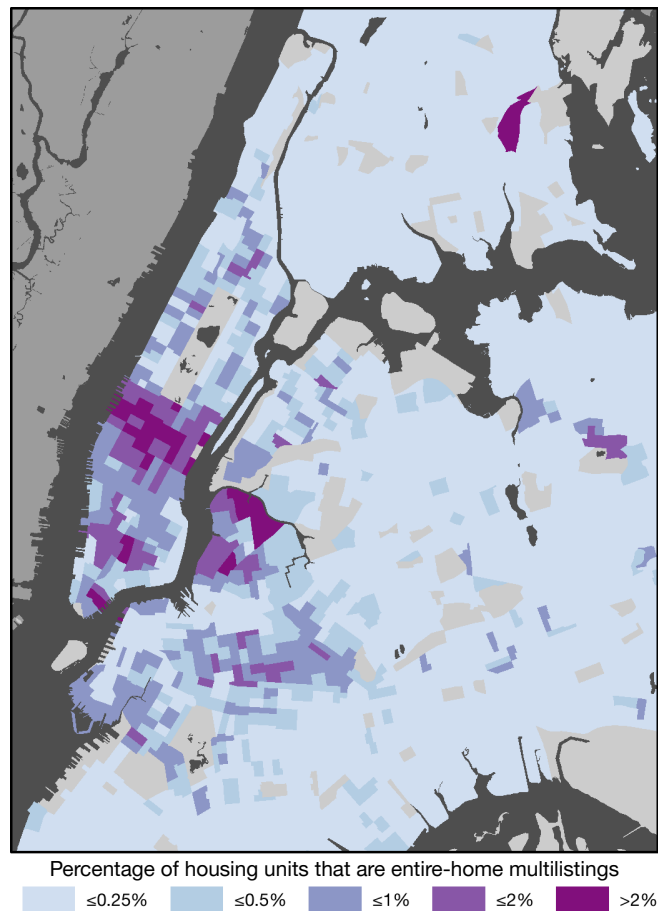≤0.25%   ≤0.5%   ≤1%   ≤2%   >2%

Figure 6. The percentage of total housing units which are active multilistings on Airbnb
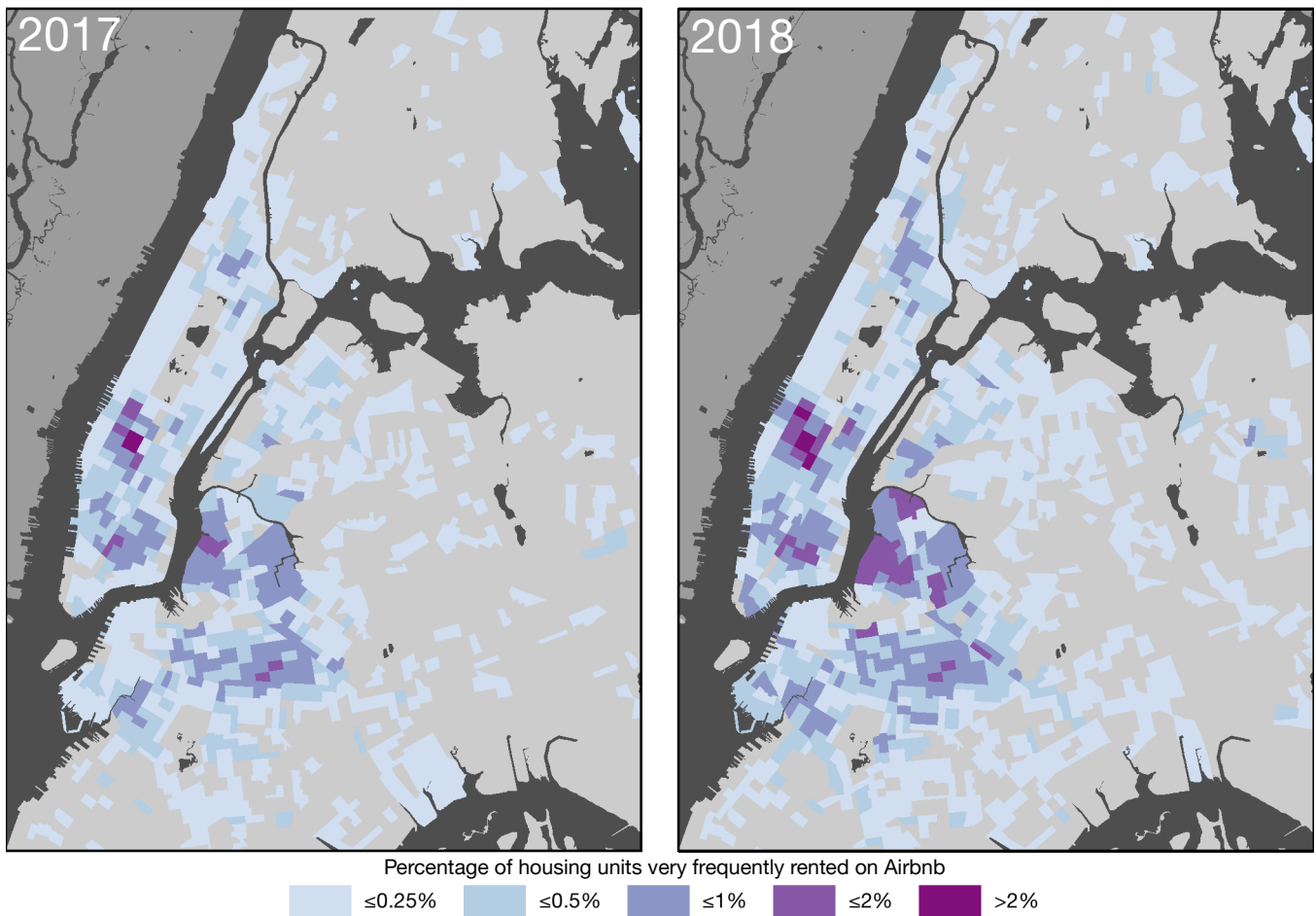
Figure 7. The percentage of total housing units which were very frequently rented entire-home listings on Airbnb last year

fewer than 30 nights. (Municipal regulation in New York City is even more restrictive; all entire-home reservations under 30 nights are illegal, regardless of apartment type.) While it is impossible to know if a given listing violates state law or not without knowing the listing's street address (information which Airbnb does not currently share), we can estimate this using the distribution of housing in the vicinity of a listing. Such an estimate suggests that 44.7% percent of Airbnb listings in New York received at least one reservation last year which was illegal according to state law, and that 68.4% of revenue was earned from such reservations.

Housing loss: In our previous report we produced a number of different estimates for

the amount of housing converted from long-term use to Airbnb short-term rentals, including "liberal" and "conservative" measures of how often an entire-home listing must be rented and available in a year on Airbnb to resumably assume that it does not have a full-time resident. To facilitate the scenario modeling below, in this report we simply report a single, highly conservative estimate for housing converted from long-term use to short-term rentals: "very frequently rented entire-home listings", or entire-home listings rented at least 120 nights per year on Airbnb. This set of listings (entire-home listings which are rented 120 nights or more of the year) are available on average 280 nights, and are rented on average 214 nights, and are thus highly unlikely to have a long-term

resident. Figure 7 (previous page) shows what percentage of each neighborhood's housing has likely been taken off the market over the last two years by these listings. The figure demonstrates that Lower Manhattan and Northern Brooklyn have lost the largest proportion of their housing supply to Airbnb.

As Figure 8 indicates, even as the growth in the total number of listings has slowed down, a larger and larger number of these listings are rented more than 120 nights, and as of August 31, 2018 there were 9,000 such listings across the city—a stunning 30.6% increase over the previous year, when there were 6,900. This is a worrying trend for New Yorkers, for whom the supply of available housing has correspondingly been reduced.

The areas of the city under the most current pressure for further housing loss to Airbnb are indicated in Figure 9—these are the areas where Airbnb hosts earn the most money compared to the long-term rents landlords charge, and thus the areas where landlords face the strongest economic incentives to convert existing apartments to short-term rentals. In the Lower East Side and the predominantly African American neighborhoods of Harlem and Bedford-Stuyvesant, frequently rented entire-home listings (those rented at least 60 nights a year and available at least 120 nights a year) earn more than double the median long-term rent.

Figure 8. The number of very frequently rented entire-home listings, which have likely been removed from the long-term housing market

Percentage of median rent earned on average by frequently rented entire-home listings

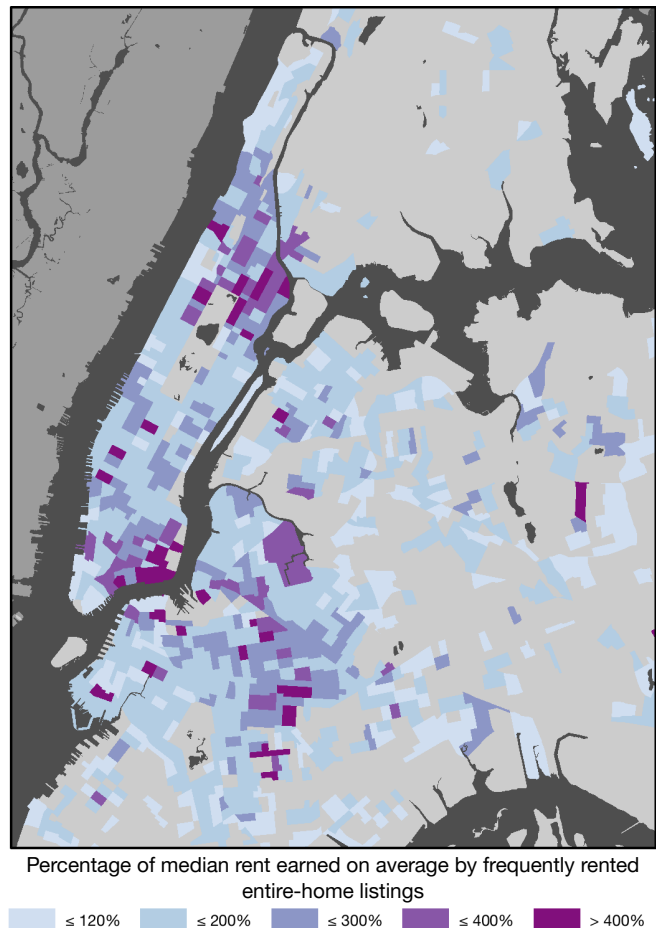≤ 120%   ≤ 200%   ≤ 300%   ≤ 400%   > 400%

Figure 9. Areas where Airbnb operators of frequently rented entire-home listings earn more per unit on average than conventional residential landlords

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2. What impact will new regulations have on New York City's Airbnb market?

If the federal injunction prevents new regulations from coming into effect this year, New York's STR market would further commercialize. Average daily listings would increase 0.8% to 57,300 and illegal revenue would climb 13.3% to $548 million. Commercial operators would remove 1,800 more housing units from the market and drive up median new rents by a further $33 annually. New regulations would produce a short-term drop in STR activity in New York (like when San Francisco enacted STR regulation) and give the city new enforcement capacities. Under a moderate enforcement scenario, daily listings would decline 42% to 33,300, revenue would drop 39.1% to $490.7 million, and 2,700 housing units would be put back on the long-term rental market. Under a strong enforcement scenario, daily listings would decline 46% to 31,000, revenue would drop 58.8% to $331.9 million, and 8,700 housing units would be put back on the market. These gains would increase rental vacancy rates this year in some of the neighborhoods most pressured by gentrification, such as Williamsburg and Greenpoint (from 2.0% to 3.4%), Chinatown and the Lower East Side (from 3.0% to 4.1%), Park Slope and Red Hook (from 1.9% to 2.8%), and Bedford-Stuyvesant (from 4.8% to 5.8%).

In June of 2018 the City of New York introduced an amendment to its administrative code to improve the regulation of STRs. As signed into law in August of 2018, the amendment requires STR booking services to share all STR-related transaction information with the city, including:

- The physical address of the STR
- The full legal name, physical address, phone number and email address of the host
- The name, number and URL of the listing
- Statement as to if the transaction was an entire dwelling unit or part of a unit
- The number of days that the unit was rented
- The total amount of fees received by such booking service, and, if the booking service collects rent on behalf of hosts, the total amount of the rent

If the booking services do not comply, the city will levy fines, the greater of $1,400 or the total fees collected by the booking service for the transactions. The booking service is required to obtain consent from those using its platforms for this information to be shared. The City is responsible for enforcing the law, and will not create a public database of STR hosts. The law was due to come into effect February 2, 2019, although a temporary injunction issued by a federal judge on January 3 has delayed implementation.

Because of the uncertainty around this new regulation, particularly in light of the injunction, there is a strong public interest in understanding the potential implications of the regulation being implemented or not being implemented.

Accordingly, we discuss several different scenarios for New York's STR market over 2019. To do so, we assume that the market continues along a "business as usual" trajectory until February 2019, when the law was due to come into effect, at which point we evaluate three different possibilities. We developed the scenarios by dividing New York City into 55 geographical neighborhoods, and modeling the growth of listings, listing revenue, multilistings, and multilisting revenue among five categories of listing activity (ranging from listings not rented at all to those rented for the majority of the year) for each of these neighborhoods, applying the neighborhood's own previous growth dynamics. Under scenarios where the New York regulations are implemented, we also apply the results of San Francisco's recent STR regulations, again distinguishing between different categories of listing activity to capture the varying impacts of those regulations on different segments of the STR market. The result is 2,200 micro-level models, which we combined to yield the following three scenarios:

Baseline scenario: *The law does not come into effect.* This scenario provides a baseline for comparing the effects of various enforcement options, by indicating how the Airbnb market in New York would be likely to develop if the federal injunction remains in place. Under this scenario we simply extrapolate each of our 2,220 micro-level models forward to August 31, 2019, assuming that existing trends continue uninterrupted into the future.

Moderate enforcement scenario: *The law has the same initial impact as San Francisco's recent regulation, leading to a rapid drop in active listings, and New York City subsequently uses its enhanced enforcement capacity to target commercial operators who control multiple entire-home listings.* As discussed in the methodological appendix, the major immediate effect of San Francisco's STR regulation was to remove a large number of relatively low-performing listings from the market,

as many hosts chose to avoid regulatory scrutiny. We assume the same initial impact of the STR regulations in New York. We furthermore assume that the City would chose to use the information about host activities it will gain under the new regulations to increase the effectiveness of its current enforcement activities, with a particular focus on restricting hosts to a single entire-home listing. In this scenario we assume that 73% of entire-home multilistings are removed from the market, which corresponds to each commercial operator being limited to one such listing.

Strong enforcement scenario: *The same as the moderate enforcement scenario, but with the City additionally cracking down on hosts of very frequently rented entire-home listings.* In this scenario we further assume that entire-home listings with more than 120 nights booked per year are targeted as an additional enforcement priority for the City, since these listings are responsible for a large portion of the housing loss associated with short-term rentals. We assume that 25% of such listings remain unchanged, because they are operating in buildings unregulated by the Multiple Dwelling Law or because they shift their activities to 30-night-or-longer rentals, which are permitted under the Multiple Dwelling Law, that 25% limit their activity to 120 nights booked per year, and that 50% leave the platform altogether.

We have not attempted to model a scenario in which New York City uses the information it receives from STR booking services under the new regulations to strictly enforce the Multiple Dwelling Law, i.e. to completely ban all entire-home rentals of fewer than 30 days in buildings with three or more units. This is because such a decision would lead to the majority of entire-home rentals being suspended, and thus create a major supply shortfall relative to the demand for STRs. This would almost certainly lead to an influx of new entire-home listings in the buildings where such activity is legal under the Multiple Dwelling Law, in lower quantities but at higher prices than

the listings they replaced. While such an outcome is possible, if the City dedicates sufficient resources to enforcement, there are too many unknown parameters to model it. However, it is likely that this outcome would result in a much larger reduction in both the number of listings and their earnings than any of the three scenarios we have modelled.

OVERVIEW OF SCENARIO OUTCOMES

Baseline scenario: Under a scenario where the federal injunction against the new regulations is maintained, and thus the STR market continues growing along its current trajectory, New York's STR market would further commercialize. Average daily listings would only increase 0.8% to 57,300, but revenue would climb 13.3% to $806 million. The number of very frequently rented entire-home listings would increase 19.9% to 10,800, and commercial operations (entire-home multilistings) would rise from 18.9% to 23.9% of total entire-home listings. Airbnb would be responsible for a further increase in the median new rent in the city of $33 annually. Airbnb activity would intensify across existing hotspots as well as expanding further into Brooklyn and Queens.

Moderate enforcement scenario: Under a scenario where the new regulations are implemented as scheduled, the immediate impact is similar to what San Francisco experienced earlier this year with its own regulations, and the City increases enforcement efforts against commercial operators, we expect substantial drops in both overall Airbnb activity and the particularly problematic commercial high-end of the market. Under this scenario, we expect the number of active listings in New York to decrease to an average of 33,300 per day, a 41.8% decline relative to the baseline scenario. (All subsequent comparisons for this and the following scenario are relative to the baseline scenario.) This decline would be driven largely by low-performing listings leaving the platform, as occurred in San Francisco following the city's STR regulations coming online in January 2018.

Total revenue would decrease nearly as much—39.1% to $490.7 million—but in contrast to the decline in listings, the decline in revenue would be driven largely by the City taking enforcement actions against commercial operators, who earn a disproportionate share of platform revenue relative to the number of listings they control. Enforcement action would likewise help drive a 24.8% decrease in very frequently rented entire-homes, from 10,800 to 8,100, which would return 2,700 housing units to the long-term rental market.

Strong enforcement scenario: Under a scenario where, in addition to the assumptions in the moderate enforcement scenario, the City additionally targets enforcement efforts at the hosts who operate full-time or close to full-time entire-home listings, we expect significant additional impacts on the commercial high end of the Airbnb market, and correspondingly significant increases in housing availability and affordability. Under this scenario, we expect daily active listings to decline 45.9% to 31,000, total revenue to decline 58.8% to $331.9 million, and very frequently rented entire-home listings to decline 81.0% to 2,100. The result would be 8,700 housing units returned to the long-term rental market. This would produce a one-time increase in the average New York neighborhood's rental vacancy rate of 10% (and in many neighborhoods the increase would be 25% or higher). It would also lower the median new rent in the city by $74 annually, which would save New York renters looking for a new apartment a collective $19 million next year, and $58 million the year after that.

ACTIVE LISTINGS

While the number of daily active listings in New York has declined over the last several months, the annual average grew compared to the year before, and we expect similarly modest growth in the next year under our baseline scenario, from an annual average of 56,800 last year to 57,300 next year (Figure 10). Under either the moderate or strong enforcement scenarios, by contrast, we expect the number of active listings to drop sharply. The experience of San Francisco after its STR regulations came online in January 2018, which these scenarios are in part modelled upon, suggests that many hosts of low-performing listings will choose to remove their listings rather than subject them to regulatory scrutiny. We thus expect average daily listings to fall to 33,300 or 31,000 under the moderate or strong enforcement scenarios, respectively. The geographic distribution of listings throughout the city under the three scenarios is shown in Figure 11.
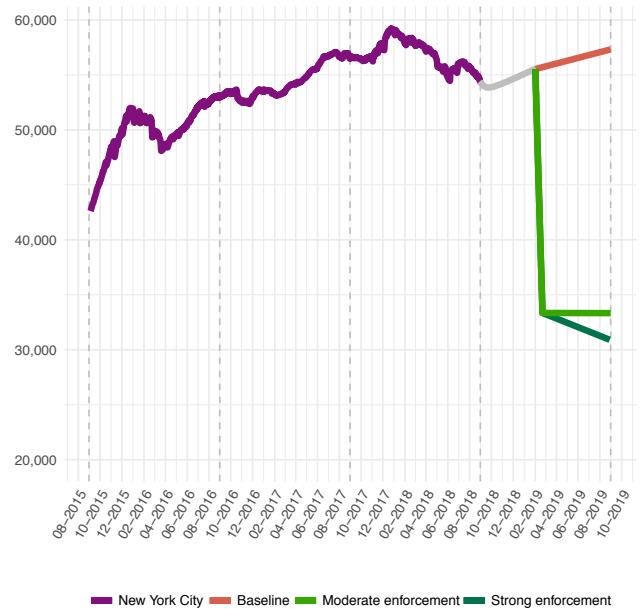
Figure 10. Average daily active Airbnb listings under different regulation scenarios
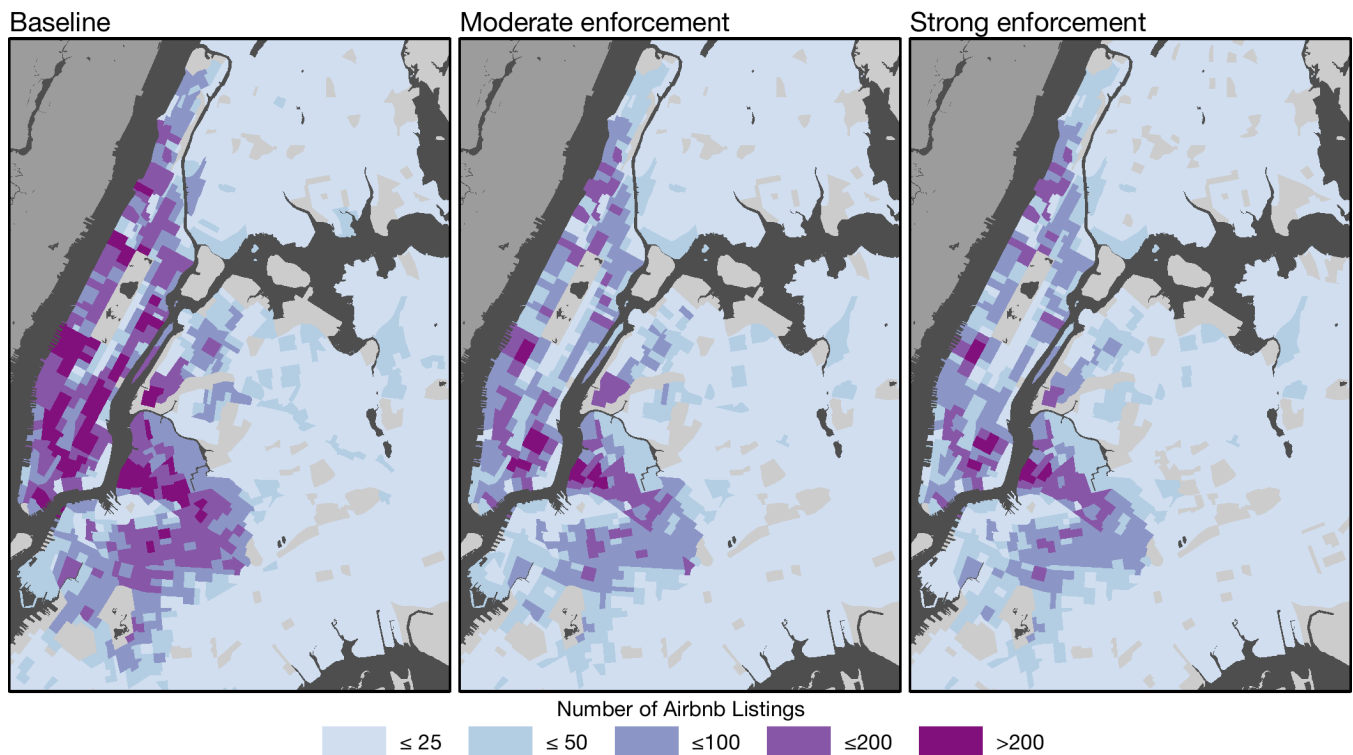
Figure 11. Active Airbnb listings per census tract under different regulation scenarios

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REVENUE

Under our baseline scenario, we expect revenue to grow at a steady pace, increasing by 13.3% to $806 million (Figure 12), of which $548 million would be earned from illegal reservations. Both enforcement scenarios imply sharp drops in revenue, because we assume that the City intensfies enforcement efforts against high-earning commercial operators. Our analysis of San Francisco's regulations suggests that removing a large number of listings does not lead to equivalent numbers of new entrants into the market or to existing hosts dramatically increasing their earnings. Commercial operators in San Francisco saw their revenue increase by 5% in the wake of the new regulations, but overall San Francisco has seen a large, durable decrease in total revenue. We accordingly assume the same will occur in New York, with remaining high-earning hosts earning 5% more, but total revenue declining 39.1% to $490.7 million under the moderate enforcement scenario, and 58.8% to $331.9 million under the strong enforcement scenario (of which $170 million would be earned from illegal reservations).

HOUSING LOST AND HOUSING GAINED

While the overall growth of listings in New York City has slowed down substantially, the number of listings which are rented frequently throughout the year continues to increase, as existing listings shift from part-time use to full-time use. According to our baseline scenario, we project that, in the absence of new regulation, the number of entire-home listings booked at least 120 nights per year will increase 19.9% from 9,000 to 10,800 (Figure 13). Using these very frequently rented entire-home (VFREH) listings as a highly conservative measure of housing converted to dedicated short-term rentals, this implies that 1,800 additional housing units will be lost from New York's long-term rental market to Airbnb next year if the new regulations are not enacted. By contrast, under
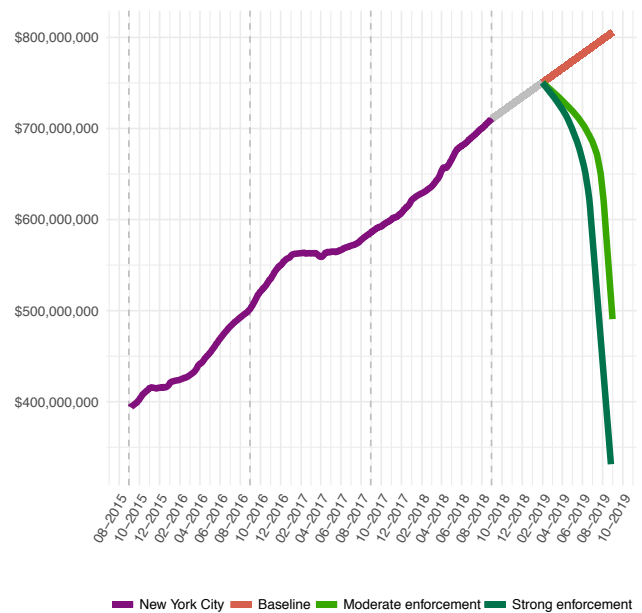

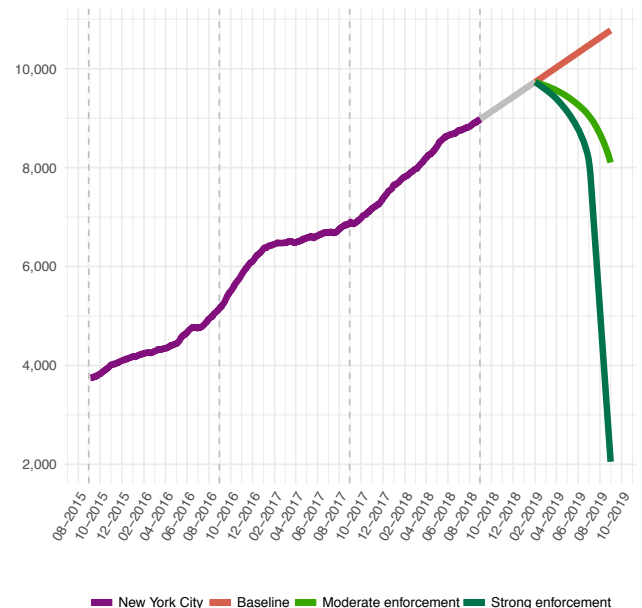*Figure 12. Rolling annual Airbnb host revenue under different regulation scenarios*

Figure 13. The number of very frequently rented entire-home listings under different regulation scenarios

Baseline	Strong enforcement	Units returned to the market

Very frequently rented entire-home listings as percentage of total housing units

≤0.25% ≤0.5% ≤1% ≤2% >2%

Percentage of housing units returned to the market under strong enforcement scenario
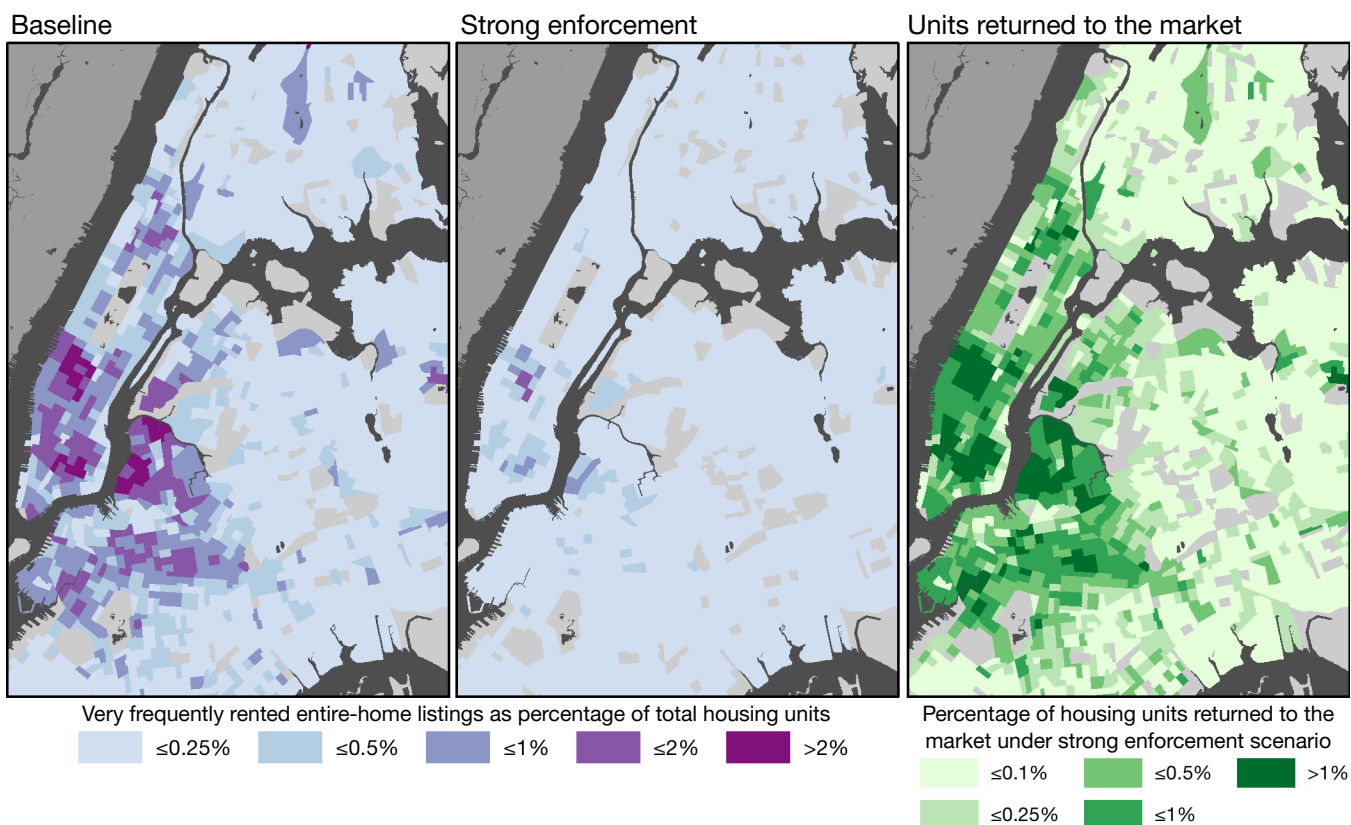
≤0.1% ≤0.5% >1% ≤0.25% ≤1%

Figure 14. The number of very frequently rented entire-home listings under different regulation scenarios

the moderate enforcement scenario, the City targeting commercial operators of multiple entire-home listings will drive a reasonably large decline in VFREH listings, since many of these would be taken down or shifted to occasional use. Under this scenario we expect the number of VFREH listings to decrease 24.8% relative to the baseline, from 10,800 to 8,100, which would return 2,700 housing units to the long-term rental market. Under the strong enforcement scenario, where the City targets VFREH listings for dedicated enforcement, we expect these listings to plummet 81.0% to 2,100. The result would be 8,700 housing units returned to the long-term rental market.

Figure 14 shows the geographical distribution of very frequently rented entire-home listings under the baseline scenario (where they continue to grow rapidly) and the strong enforcement scenario (where they are substantially curtailed), along with the minimum amount of housing

which will be returned to the long-term rental market under the strong enforcement scenario. We expect the impacts of more enforcement on VFREH listings—and hence on housing returned to the market under additional enforcement—to be broadly distributed throughout the city. Only the entertainment district around Times Square would continue to host a significant number of these listings, and large sections of Manhattan and Brooklyn would see an increase of as much as 1% of their total housing stock.

Figures 15 (next page) and 16 (p. 17) provide two ways to contextualize the housing which would be returned to the long-term market by regulating STRs more vigorously. Figure 15 estimates the impact of the strong enforcement scenario on New York's rental vacancy rate. The rental vacancy rate is an important metric of housing availability, and a common rule of thumb is that a 5% vacancy rate is the minimum necessary for
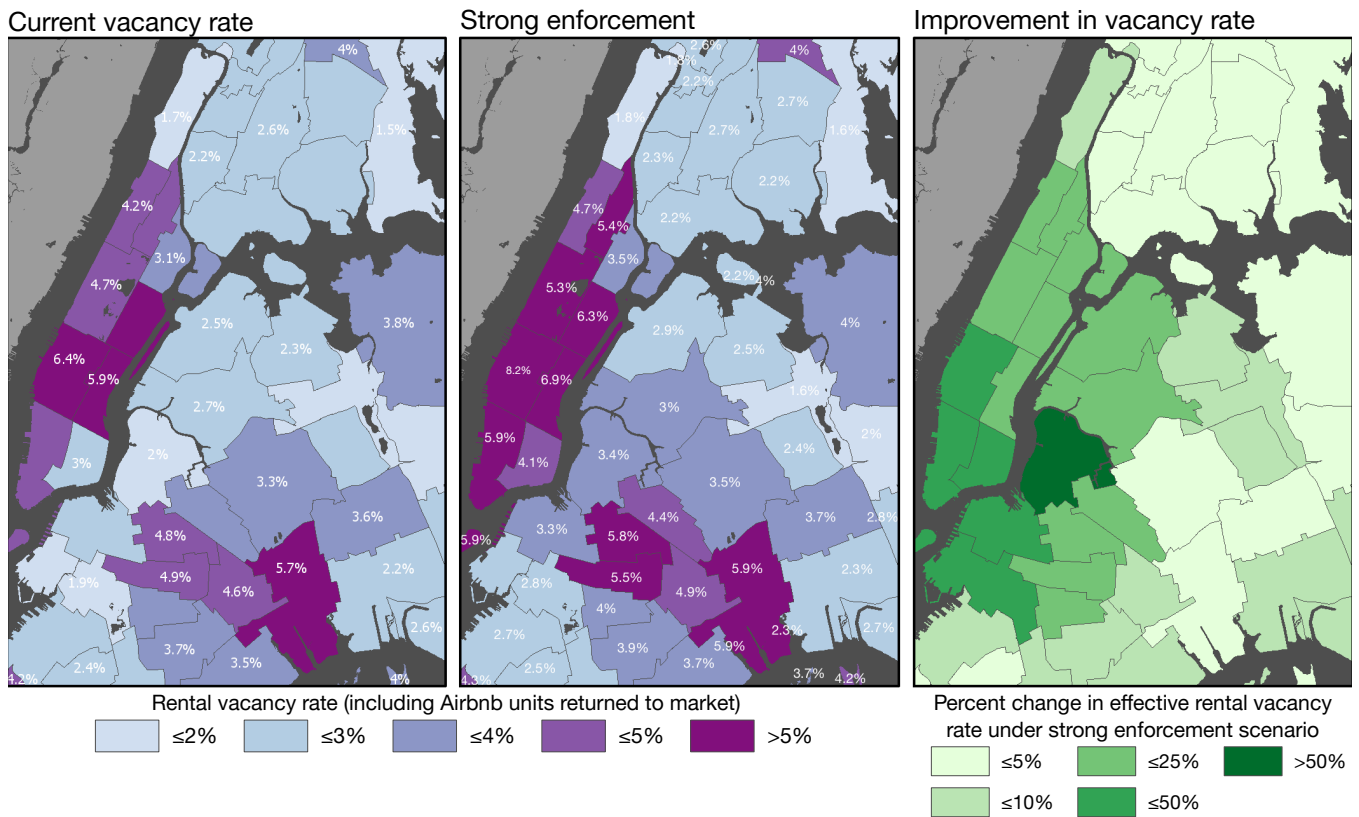
Figure 15. The impact of returning Airbnb units to the market on neighborhood rental vacancy rates

a healthy rental market. The first panel shows the current rental vacancy rates by neighborhood, and indicates that almost every neighborhood in New York has a rate under the 5% rule of thumb. The second panel indicates how those vacancy rates would change in the short term in response to commercial Airbnb operations being returned to the market under the strong enforcement scenario. Neighborhoods across Manhattan, Brooklyn and Queens would all see their vacancy rates climb significantly, reducing pressure on rents and making housing easier to obtain for New York residents. It is important to note that this spike in the vacancy rate would not be expected to last for long, but it would be expected to drive down rents: the market would absorb the new housing and establish a new equilibrium vacancy rate somewhere in between the previous level in panel 1 and the temporarily elevated level in panel 2, and rents would end up correspondingly reduced. Panel 3 identifies the neighborhoods that

would see the proportionately largest increase in their short-term vacancy rates; Williamsburg and Greenpoint in Brooklyn would see particularly large increases in available housing—the rental vacancy rate would temporarily increase from just 2.0% to 3.4%. We expect the city-wide vacancy to temporarily increase from 3.6% to 4.0%

Figure 16 provides a similar analysis, but with respect to current rates of new housing construction. Panel 1 shows the average annual rate of new housing construction by neighborhood, expressed as a percentage of total housing stock. The rate of construction is an important indicator of the health of a high-demand housing market such as New York, since ongoing new supply is necessary to accommodate housing demand and keep housing costs affordable. Panel 2 shows how the strong enforcement scenario would temporarily increase the effective construction rate next year
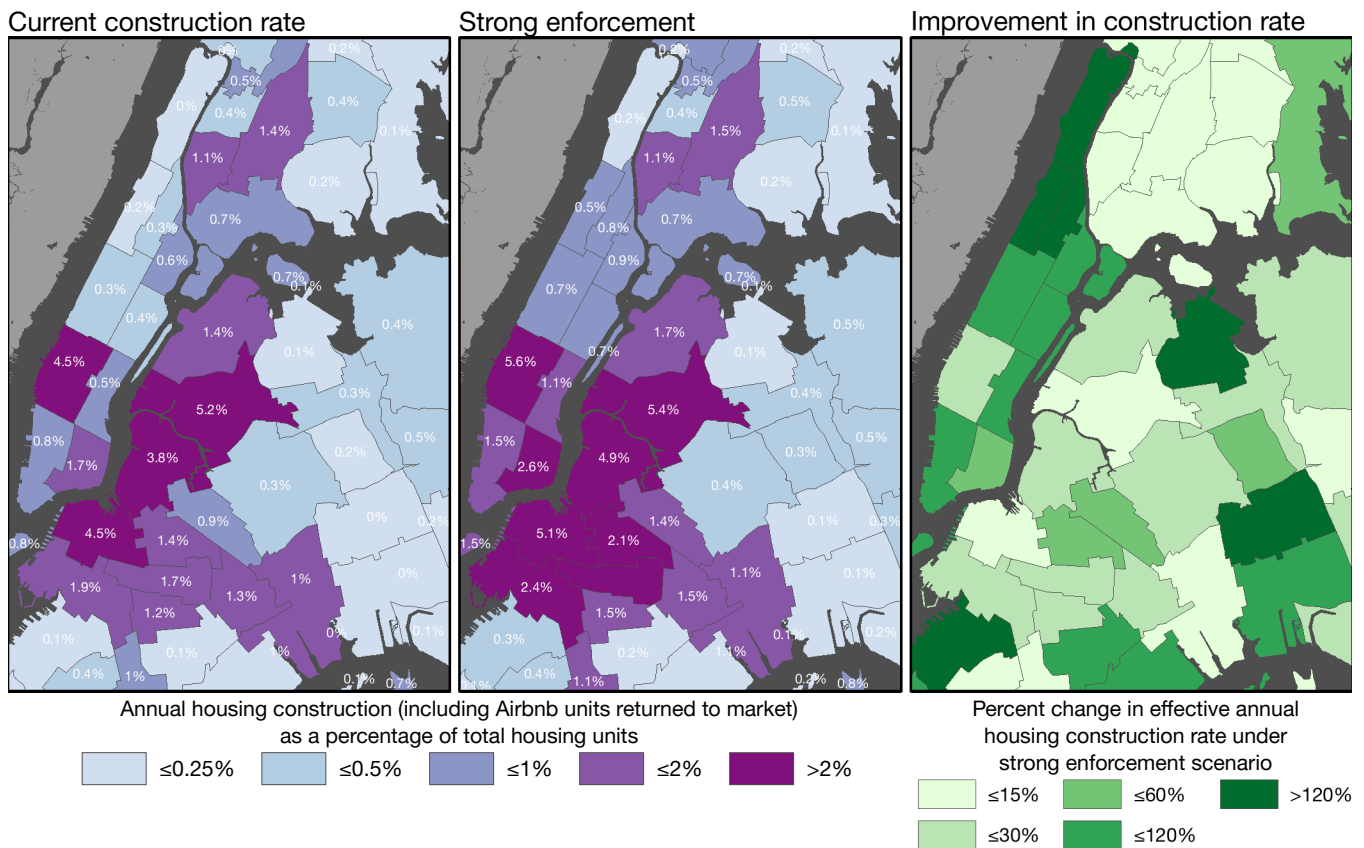
| Current construction rate | Strong enforcement | Improvement in construction rate |

Annual housing construction (including Airbnb units returned to market) as a percentage of total housing units

| ≤0.25% | ≤0.5% | ≤1% | ≤2% | >2% |

Percent change in effective annual housing construction rate under strong enforcement scenario

| ≤15% | ≤60% | >120% |
| ≤30% | ≤120% | |

Figure 16. The impact of returning Airbnb units to the market on effective neighborhood construction rates

by introducing thousands of houses back to the market in a manner functionally equivalent to new construction. Panel 3 identifies the neighborhoods where this new housing supply would be

proportionately largest, and demonstrates that Northern Manhattan would see a particularly large relative influx of new housing supply under the strong enforcement scenario.

CHANGES IN MEDIAN NEW RENT

In our previous report (Wachsmuth et al. 2018) we estimated that Airbnb's growth between September 2014 and August 2017 was responsible for a $384 annual increase in the median new rent in New York City, relying on a statistical model developed by Barron et al. (2018) from data across the United States, which finds that a 1% increase in Airbnb listings leads to a 0.018% increase in rents. Growth in the total number of listings in New York in the last year would suggest that that number has increased an additional 0.15%, or $40 annually.

We now proceed to apply this model to our scenarios to estimate further impacts of Airbnb growth or shrinkage on rents in New York City. There are two serious methodological caveats to applying this model to estimate rent decreases, however. First, Barron et al.'s dataset does not include any instances of sharp drops in the number of listings such as what San Francisco experienced in early 2018 and what we are projecting under the moderate and strong enforcement scenarios for New York City, and therefore their model does not incorporate the results of such occurrences.

Second, their model relies on the overall number of Airbnb listings present in an area, and does not distinguish between entire homes and private rooms, and between casual and full-time listings. This is a perfectly defensible decision for their model, given that the proportion of listings which are full-time or entire homes are reasonably consistent between locations and across time, but our scenarios imply significant shifts in these proportions, and thus may strain the validity of their model. As a result of these considerations, we present two approximate rent change calculations: one for the baseline scenario, where listing growth continues and the calculation is straightforward, and one for the strong enforcement scenario, where the decrease in total listings is most closely matched to the change in the composition of listings. Even so, these estimates should be treated as rough approximations.

Under the baseline scenario, where the federal injunction remains in place and Airbnb continues to grow according to existing trends, we expect median new rents to increase by approximately 0.12%, or $33 annually by August 2019. Approximately 261,000 households move into

a new apartment each year in New York, so this implies that these households will have to pay an additional $8.6 million in rent this year if Airbnb were to continue to grow unregulated, and $60 million over three years as the number of households affected by the rent increases grows.

Under the strong enforcement scenario, by contrast, where the Airbnb market is reduced significantly, we expect median new rents to decrease by 0.27% relative to the baseline scenario (0.15% relative to August 2018), which would be a $74 annual decline in new rents by August 2019. This decline would reflect a significant drop in both the number of listings and the number of frequently rented entire-home listings taking long-term housing off the market. The implication is that the upcoming STR regulations, paired with increased enforcement activities from the City, would save the 261,000 households moving into a new apartment next year $19 million that year, and $58 million the year after that as the number of households affected by the rent declines grows. Over three years we would expect New York households to pay a total of approximately $130 million less in rent under our strong enforcement scenario.
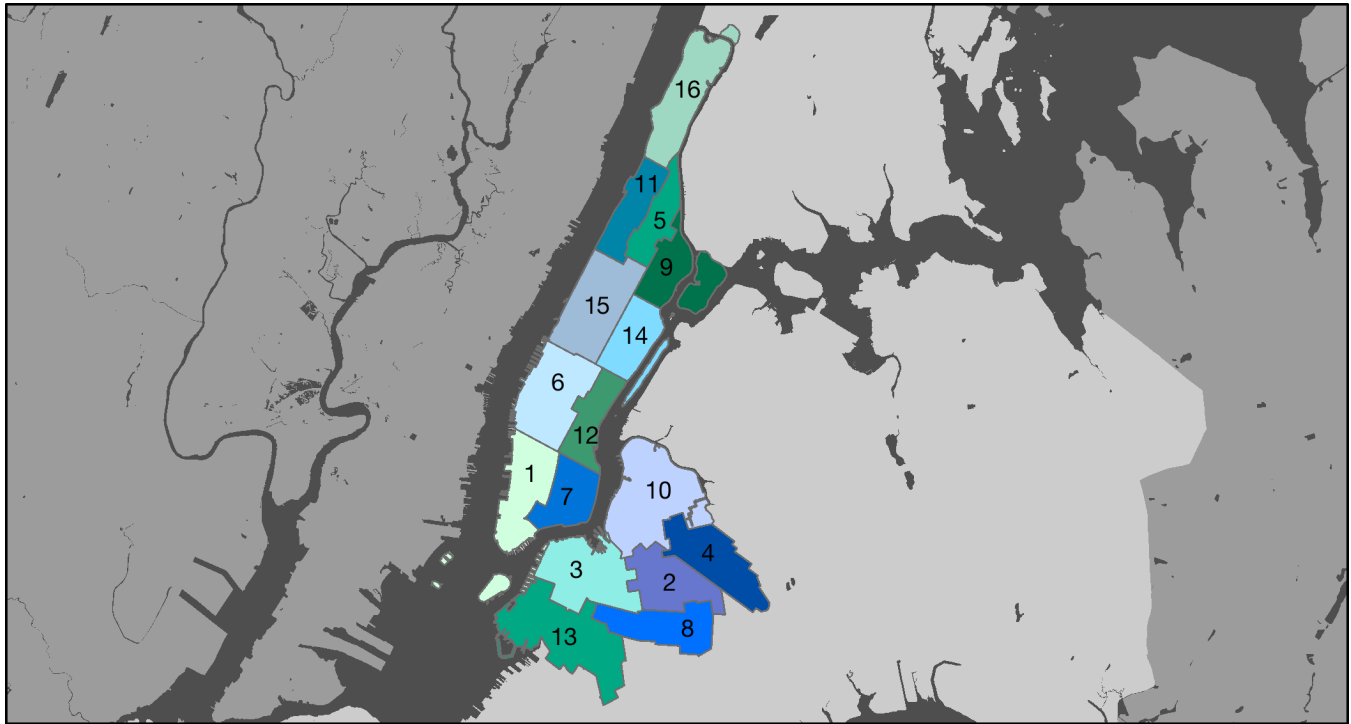
SUMMARY OF IMPACTS FOR SELECTED NEIGHBORHOODS

Figure 17. Selected neighborhoods

	Baseline scenario		Strong enforcement scenario		
	Active daily listings	**Housing lost**	**Active daily listings**	**Housing returned to the market**	**Rental vacancy rate change**
New York City	**57,300**	**10,800**	**31,000**	**8,700**	**3.6% → 4.0%**
1. Battery Park City, Greenwich Village & Soho	1,800	260	1,070	210	4.7% → 5.9%
2. Bedford-Stuyvesant	3,190	480	1,911	400	4.8% → 5.8%
3. Brooklyn Heights & Fort Greene	2,090	410	1,140	330	2.5% → 3.3%
4. Bushwick	3,260	260	2,000	220	3.8% → 4.4%
5. Central Harlem	1,850	390	1,100	320	4.7% → 5.4%
6. Chelsea, Clinton & Midtown Business District	5,230	1,440	2,200	1,160	6.4% → 8.2%
7. Chinatown & Lower East Side	3,600	940	2,010	730	3.0% → 4.1%
8. Crown Heights North & Prospect Heights	2,010	320	1,160	270	4.9% → 5.5%
9. East Harlem	1,250	240	780	190	3.1% → 3.5%
10. Greenpoint & Williamsburg	4,900	870	2,760	720	2.0% → 3.4%
11. Hamilton Heights, Manhattanville & West Harlem	2,070	230	1,200	180	4.2% → 4.7%
12. Murray Hill, Gramercy & Stuyvesant Town	2,940	670	890	540	5.9% → 6.9%
13. Park Slope, Carroll Gardens & Red Hook	1,450	350	780	290	1.9% → 2.8%
14. Upper East Side	2,330	590	1020	480	5.7% → 6.3%
15. Upper West Side & West Side	2,090	500	910	400	4.7% → 5.3%
16. Washington Heights, Inwood & Marble Hill	1,310	120	800	100	1.7% → 1.8%

Methodological appendix

DATA SOURCES

The analysis in this report is based on a comprehensive analysis of four years (01 September 2014 to 31 August 2018) of Airbnb activity in New York City. For each day in this period, we analyze the activity of every Airbnb active in the city, a total of 66 million datapoints across 190,211 listings. In addition, in order to develop the regulation scenarios, we also analysed San Francisco's Airbnb market, examining 12 million data points across the 35,450 listings active during the same four years.

The report relies on five data sources. The first is a proprietary dataset of Airbnb activity obtained from the consulting firm Airdna, which has performed daily "web scrapes" of Airbnb's public website since mid-2014 to record information about each listing. The information scraped contains static information about the property (e.g. the listing title, the listing type, the number of bedrooms, and the cancellation policy) as well as unique Property IDs and Host IDs. Each property is scraped daily, and the property's nightly price and status (available, reserved, or blocked) is aggregated into a 'transaction' file. For 2014 and 2015, this transaction data was taken directly from Airbnb and is thus completely accurate. In late 2015 Airbnb stopped disclosing when a non-available property was reserved or was simply blocked from new reservations, which made it impossible to exactly measure occupancy and revenue earned. To overcome this limitation, Airdna developed a machine-learning model to estimate this information based on its historical dataset of activity and other publicly available performance factors, including reviews and ratings. While the activity dataset from late 2015 onwards thus relies on estimated data, it is nevertheless the most accurate third-party estimate of Airbnb activity available.

The second data source is the American Community Survey (ACS), an annual survey performed by the US Census Bureau to complement the decennial census. The ACS is the most reliable, up-to-date data source on the demographic and socioeconomic features of US cities. We used 2016 ACS five-year estimates to measure housing and demographic characteristics of New York City at the scales of census tracts and Public Use Microdata Areas (PUMAs). Both of these scales are defined by the Census Bureau; the former is a small, stable geographic area of approximately 1,200-8,000 people, while the latter is an aggregate of census tracts to a minimum population of 100,000. (New York City has 55 PUMAs.)

The third data source is Certificate of Occupancy data from New York City's Department of Buildings. This data measures the number of new housing units completed per census tract. For the most recent available full year of data (2017), we aggregated Certificate of Occupancy data to the PUMA level to measure neighborhood-wide impacts of housing construction and loss.

The fourth data source is the New York City Housing and Vacancy Survey, conducted every three years by the US Census Bureau. We used the most recent survey (2017) to identify the number of new renter households in New York City each year.

The final data source is the Zillow Rent Index (ZRI), compiled by the online real estate database company Zillow. The ZRI is widely understood to offer the best estimate of the new market rents which a prospective tenant is likely to encounter if searching for an apartment. We used the New York City median-new-rent figure for August 2018.

SAN FRANCISCO REGULATORY ANALYSIS

In order to carry out the scenario modelling of New York City's Airbnb market, we rely in part on the experience of San Francisco in the wake of its new STR regulations, since San Francisco and New York have similar housing and STR market dynamics, San Francisco's regulations are broadly similar to New York's, and San Francisco's regulations were implemented quite recently.

In San Francisco, prior to 2015, STRs in multi-unit buildings were illegal, as they continue to be in New York City. In early February 2015, San Francisco introduced new regulations, limiting entire-home STRs to 90 nights per year and requiring listings to be registered and pay taxes on each booking. Challenges with enforcing these rules led San Francisco to update their regulations in June of 2016, requiring booking platforms to prohibit unregistered apartments from being advertised on their sites or face heavy fines. Under San Francisco's new regulations, hosts were required to provide quarterly reports to the city and booking services were required to verify such reports at the city's request. The law came into force in January 2018 and was portrayed by the media as a success, due to the fact that thousands of Airbnb listings (nearly 50%) were reported to have been removed (Kerr 2018; CBS Local 2018), in addition to approximately 50% of Homeaway listings (Reader 2018), and nearly 90% of FlipKey listings (Said 2018). The widely reported success of San Francisco's regulations has led other jurisdictions to model their own newly proposed regulations after San Francisco's (Zamost and Brennan 2018).

Drawing in part on new research we have conducted comparing STR regulations in a number of US cities (Rathwell et al. 2018), here we present an analysis of the impact of San Francisco's STR regulation, based on two factors: the listings which were removed from Airbnb as the new law came into effect in January 2018, and the performance
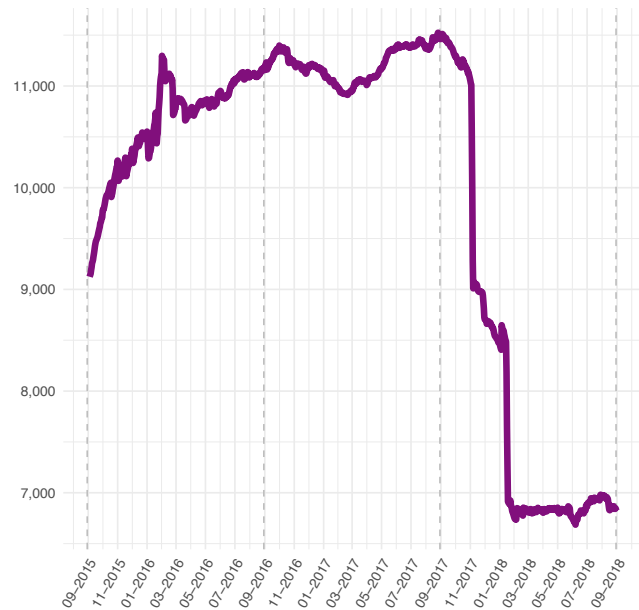

Figure 18. Daily active Airbnb listings in San Francisco

of the remaining listings in the months following the law's implementation (February-August 2018). We find a large and durable decrease in the number of active listings in San Francisco, alongside a smaller decrease in revenue, but relatively little impact on commercial operators or frequently rented entire-home listings. Our conclusion is that San Francisco's experience demonstrates the likely impact of passive regulation—where hosts are subject to additional regulatory scrutiny and many choose to exit the platform—but does not offer much in the way of guidance about active enforcement, since the City has not used the new capacity for enforcement actions it received from the regulations to aggressively pursue such actions. We now summarize the main findings of our analysis.

1. The size of the Airbnb market was durably reduced, both in terms of number of listings and total host revenue. Over the months leading up to the implementation of the new law, San Francisco's active daily Airbnb listings dropped 42.0%, from 11,500 to 6,700 (Figure 18). Most of the decline occurred during two four-day periods (in

November 2017 and January 2018) when Airbnb removed several thousand listings which did not conform to the new law. One possible outcome of a large one-time removal of listings such as the one experienced by San Francisco would be a short-term decline in market activity but a medium-term rebound, as new listings replaced those which were removed. This is not what happened, however. As Figure 18 shows, the drop in active Airbnb listings has been durable, with the number of daily active listings hovering consistently between 6,000 and 7,000 in the seven months since the regulations came online. Revenue also declined during this time period, albeit not as sharply, and has likewise shown little evidence of recovering. Figure 19 shows San Francisco's revenue trajectory and contrasts it to New York, which had a similar trajectory prior to the San Francisco regulations. The dotted line is the path revenue in San Francisco would have followed if it had continued on the same trend as New York. The evidence suggests that San Francisco's regulations produced a permanent downward shock to the Airbnb market in the city.

2. Removed listings were largely defunct or rarely rented. In the run-up to the implementation of San Francisco's new regulations, we identified 3,860 listings which were removed from Airbnb in two periods (early November 2017 and mid-January 2018), which represent approximately 40% of all the listings active at the time. This is an extremely large drop, but our analysis finds that most of these listings were barely active at the time of their removal. In fact, 73% had no revenue at all in the previous three months, while the other 27% had earned on average $940 in those three months, compared to $1980 for the listings that were not removed. Moreover, the listings of commercial operators were largely left alone—such listings comprised only 5% of the removed listings, but 25% of the listings which were not removed.

3. Commercial operators have been mostly unaffected by the regulations. Although San Francisco's new regulations cap entire-home STRs
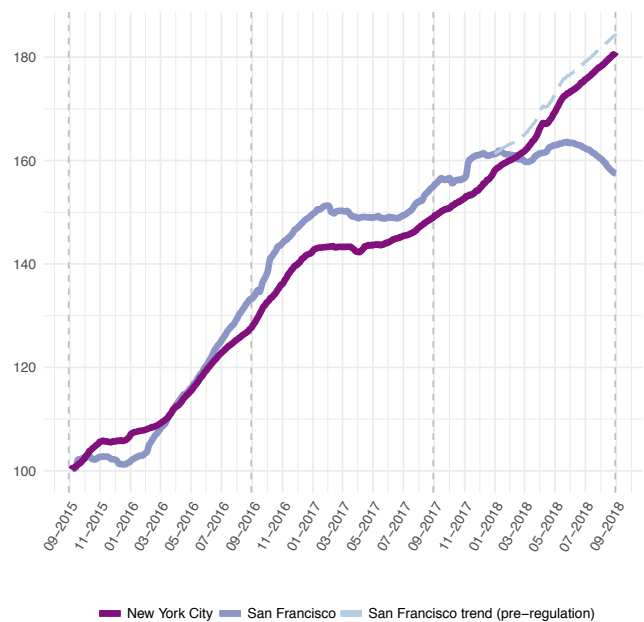

Figure 19. Rolling sum of annual host revenue in San Francisco and New York (Sep 2014 – Aug 2015 = 100)

at 90 nights per year, this aspect of the regulations appears to have had no impact on the market. Comparing the period since the regulations took effect (February-August 2018) with the same period the previous year, there are almost exactly the same number of listings which were booked 90 nights during the seven-month period (2,430, compared with 2,500 last year), which represent a dramatically higher proportion of all listings (27.0%, compared with 17.2% last year), given the number of defunct or low-performing listings which were removed. These listings exceeded the total annual limit on nights booked in just seven months, and many more were on track to exceed the 90-night threshold before the end of the year. Additionally, listings with 90 or more nights reserved now earn on average slightly more per night (an increase of approximately 5% over the previous seven-month period), which suggests that commercial operators have taken advantage of the reduced supply of STRs to raise prices. Figure 20 (next page) shows the distribution of listings by number of nights booked, before and after the regulations took effect. (Listings with zero nights booked are not shown.) It demonstrates that the reduction in listings was almost entirely carried out

through a decrease in infrequently-rented listings. At the very high end (listings rented 180 nights or more during the seven-month period from February to August), the number of listings has actually increased. This suggests that few if any Airbnb listings in San Francisco have been returned to the long-term rental market. Figure 21, meanwhile, demonstrates that commercial operators with multiple listings have actually skyrocketed as a share of all active daily listings in the period since the regulations came online—from under 20% prior to the regulations to 35% on August 31, 2018—both as a consequence of the initial removal of low-performance listings and more organically since the regulations took effect.

In conclusion, while San Francisco's regulations were designed to "protect affordable housing" and "protect housing supply" (Nieuwland & Van Melik 2018: 7), the impact has been more complicated than that. We found that the regulations have indeed durably reduced the size of the Airbnb market in San Francisco, but they have done so mainly by removing casual and infrequently rented listings. Frequently rented and commercial listings, by contrast, have not been curtailed, and in fact have expanded over the last year.

SCENARIO MODELLING

In order to estiamte the potential impacts of New York's new STR regulations, which are due to take effect on February 1, 2019, we have modelled three scenarios for New York's Airbnb market. The first is a **baseline scenario**, which assumes that the law does not come into force, and therefore serves as a "control" to properly measure the impacts of the regulation against the counterfactual where no regulation exists. The second is a **moderate enforcement scenario**, which assumes that the law comes into force and has a passive impact comparable to San Francisco's STR regulations, and furthermore that New York City uses its enhanced enforcement capacity under the
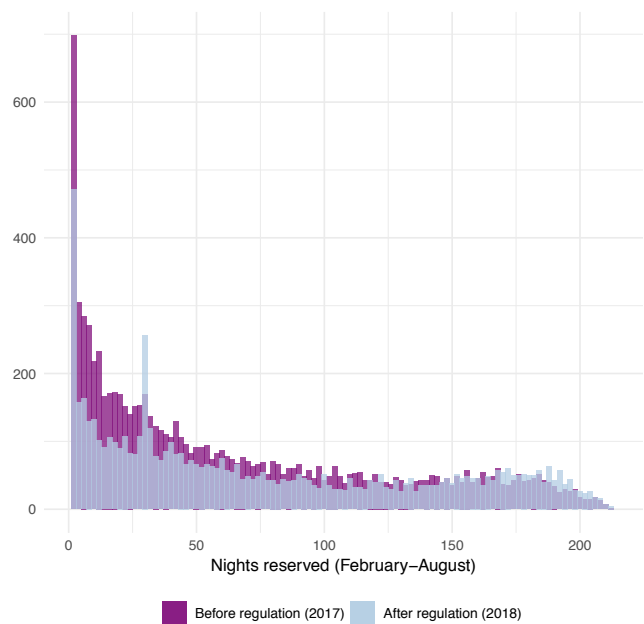

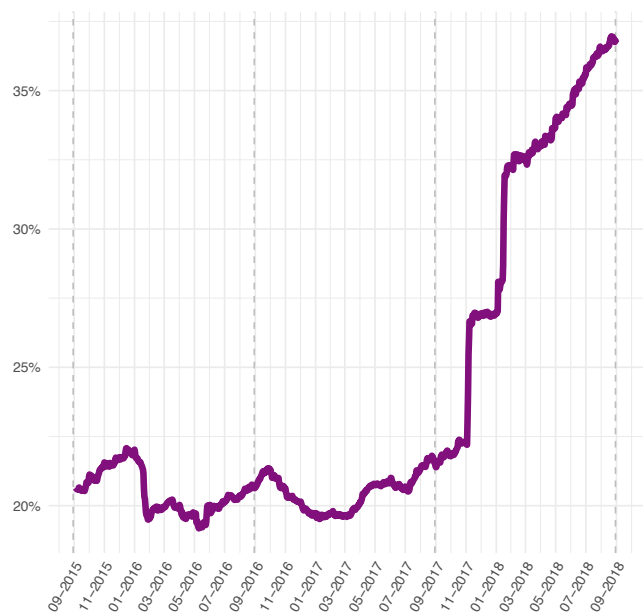*Figure 20. Histogram of nights reserved per Airbnb listing in San Francisco*

Figure 21. The percentage of active entire-home listings which are multilistings

law to target commercial operators who control multiple entire-home listings. The third is a **strong enforcement scenario**, which is identical to the previous scenario except that it assumes that the City targets additional enforcement actions against hosts who operate entire-home listings very frequently throughout the year.

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Our existing historical data for Airbnb activity in New York City extends to August 31, 2018. Each of our three scenarios projects out one year, to August 31, 2019. Because the law takes effect February 1, 2019, activity between September 1, 2018 and January 31, 2019 is assumed to be identical under all scenarios, and the actual modelling is for the seven-month period February-August 2019. Because San Francisco's STR regulations were implemented in January 2018, the February-August study period further facilitates a clear comparison between New York and San Francisco, since February-August 2018 is precisely the time period for which we have post-regulation activity data in San Francisco.

The scenario modelling for New York's Airbnb market during the February-August 2019 time period was performed using three main inputs:

1. Historical data on New York's Airbnb market during previous February-August time periods, which allows us to calculate endogenous growth trends and apply them to the future.
2. Historical data on San Francisco's Airbnb market, which allows us to predict the "passive" impact of New York's regulations, i.e. the impact without additional enforcement activities.
3. Assumptions about plausible enforcement activities to be undertaken by New York City following the new law taking effect.

All three scenarios begin with the first input: using historical growth trends in New York to establish baseline expectations about Airbnb activity over the next twelve months in the absence of any exogenous shocks (i.e. the new regulations). We measure existing growth trends and apply them to the scenarios as follows. First, city-wide growth expectations are established for active listings, total host revenue, active multilistings, and multilisting host revenue. Since all of these time series demonstrate strongly linear trends over the last several years, these linear trends are simply extrapolated one year into the future. These city-wide

trends are then decomposed by geography and by listing activity. We aggregate Airbnb listings at the PUMA scale, and then divide these aggregations into five groupings of listing activity based on the number of nights the listings was reserved over the February-August 2018 time period: 0 nights, 1-45 nights, 46-90 nights, 91-135 nights, and more than 135 nights. Between the 55 PUMAs and five listing categories, we thus developed 275 listing groupings for each of the four categories of active listings, total host revenue, active multilistings and multilisting host revenue. For each of these groupings we calculated the growth rate from 2017 and 2018, and used these growth rates to allocate the projected city-wide growth between groupings. (As an example, a PUMA with exceptionally high growth among very frequently reserved listings would be expected to receive a proportionately higher share of total growth of such listings than a PUMA with low growth in that listing category.) In the few cases where a 2017-2018 growth rate could not be calculated (because the grouping had no listings in 2017) a growth rate of 1 was assumed. The grouping-specific multipliers are then applied to every individual census tract within a PUMA, to create precise neighborhood-level projections for the entire city. The results of this procedure are the baseline scenario, which assumes that current growth trends continue uninterrupted.

The moderate and strong regulation scenarios use the results of the baseline scenario, but further assume that New York experiences similar dynamics to San Francisco after the latter city's regulations came into effect in January 2018, and that New York City undertakes additional enforcement activities. We calculate the impact of regulations on San Francisco's Airbnb market similarly to how we calculate New York's current growth trends—by comparing activity in February-August 2018 (the period immediately following the regulations taking force) with February-August 2017. However, while we aggregate listings by number of nights booked we do not aggregate them by geography,

since the purpose of the exercise is not to characterize San Francisco's spatial market evolution but rather to generate broad parameters which can be applied to New York City. For each activity category (active listings, total host revenue, active multilistings and multilisting host revenue) and each activity grouping (0 nights reserved, 1-45 nights, 46-90 nights, 91-135 nights, and more than 135 nights) we generate an estimate of the impact of regulations. In each case we compare the actual change in activity from 2017 to 2018 with the estimated counterfactual case where the regulations do not occur. We do this either by extrapolating from 2016 and 2017 activity in San Francisco and from 2018 activity in New York (which did not receive a regulatory shock in 2018 and where growth in all four activity categories had previously been highly correlated with growth in San Francisco).

For both the moderate and strong enforcement scenarios, we apply the regulatory impact modifiers to each activity grouping in the baseline scenario, to generate census-tract level estimates of the likely impact of San-Francisco-style "passive" regulation.

For the moderate enforcement scenario, we further assume that the City undertakes a targeted enforcement effort against commercial operators with multiple entire-home listings—effectively enforcing a 'one host, one home' rule for entire-home listings. (Airbnb currently claims to have and enforce such a rule in New York City, but our evidence is that their efforts have not put an appreciable dent in this segment of the market.) We assume that all hosts of multiple entire-home listings are limited to a single such listing, and thus that listings in excess of one per house are removed from the platform. Since commercial operators control on average 3.27 entire-home listings each, this corresponds to removing 69.4% of these multilistings. Of course, even with strict enforcement of multilisting hosts, some will be able to continue to manage multiple entire-home listings—either because their listings are among the small percentage which are legal according to the Multiple Dwelling Law, or because they convert their listings into multiple private-room listings. However we expect this proportion will be balanced by commercial operators who, upon being unable to operate two thirds or more of their listings, will leave the platform altogether.

Finally, for the strong enforcement scenario, in addition to all the steps discussed above, we also model the City targeting very frequently rented entire-home listings for additional enforcement actions. Specifically, we model a scenario where, in response to stronger enforcement, 50% of the entire-home listings with more than 120 nights reserved a year are removed from the platform, 25% reduce their activity to 120 nights, and 25% sustain existing levels of activity (because they are already legal under the Multiple Dwelling Law or because they begin renting for 30 or more nights in a stretch, which would also render them legal).

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AUTHORSHIP AND FUNDING

ACKNOWLEDGMENTS

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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 New York and other cities worldwide, including "The High Cost of Short-term Rentals in New York City". UPGo is led by Prof. David Wachsmuth, the Canada Research Chair in Urban Governance at McGill University's School of Urban Planning.